FEHILY TIMONEY

DESIGNING AND DELIVERING A SUSTAINABLE FUTURE

Appendix 4

Description of the Development

Appendix 4-1- IPC Licence P0499-01
Appendix 4-2 - Rehab Plans
Appendix 4-3 - AERs
Appendix 4-4 - Aerial Photos
Appendix 4-5 - IPC Licence Environmental Code of Practice for Peat Energy Works
Appendix 4-6 - IPC Licence Compliance Training Programme
Appendix - 4-7 Silt Committee Interim Report 1976
Appendix - 4-8 Silt Committee, Excavator records 1984
Appendix 4-9 - Internal Bord na Móna Harkins Report 1991
Appendix 4-10 - BnM Peat Development in Ireland 1954
Appendix 4-11 - Environmental & Operational Control Procedures for the Protection of Surface Water
Appendix 4-12 - BnM Biodiversity Action Plan 2016-2021
Appendix 4-13 - BnM Silt Control Study No. 1, 1983 BnM Silt Comittee Report, 1984
Appendix 4-14 - Drainage Study with Particular Reference to Pumping, 1983
Appendix 4-15 - Peco Harvester Tests, 1986
Appendix 4-16 - Distribution and Nature of Ash Material in a Milled Peat Stockpile, 1982
Appendix 4-17 - Regional Administration in Relation to Milled Peat Operation 1988
Appendix 4-18 - Industrial Cutaway Bog Land-Use Studies (Clonsast), 1978

Appendix 4-1

IPC Licence P0499-01

This licence was amended on 25 September 2012, 22 August 2019 and 17 September 2021 under Section 96(1) of the Environmental Protection Agency Act 1992, as amended. The details of Amendment A, Amendment B and Amendment C must be read in conjunction with this licence. The amendment documents are entitled "Technical Amendment A", "Technical Amendment B" and "Technical Amendment C".

Headquarters,
Johnstown Castle Estate,
County Wexford, Ireland

INTEGRATED POLLUTION CONTROL LICENCE

Licence Register Number:	499
Licensee:	Bord na Móna Fuels Limited
Location of Activity:	Littleton Group c/o Littleton Briquette Factory Thurles County Tipperary

Table of Contents

Page No.

Glossary 1
Reasons for the Decision 3
Activities Licensed 3
Condition 1 Scope 4
Condition 2 Management of the Activity 4
Condition 3 Interpretation 6
Condition 4 Notification 8
Condition 5 Emissions to Atmosphere 9
Condition 6 Emissions to Water 11
Condition 7 Waste Management 13
Condition 8 Noise 14
Condition 9 Water Protection 14
Condition 10 Cutaway Bog Rehabilitation 14
Condition 11 Energy Use 15
Condition 12 Monitoring 16
Condition 13 Recording and Reporting to Agency 17
Condition 14 Accidents and Emergency Response 17
Condition 15 Financial Provisions 18

Schedule 1(i) Emissions to Atmosphere 19
Schedule 1(ii) Monitoring of Emissions to Atmosphere 22
Schedule 2(i) Emissions to Water 22
Schedule 2(ii) Monitoring of Emissions to Water 23
Schedule 3(i) Hazardous Wastes for Disposal/Recovery 24
Schedule 3(ii) Other Wastes for Disposal/Recovery 24
Schedule 4 Monitoring of Workshop/Depot Surface Water Run-off 25
Schedule 5 Recording and Reporting to the Agency 25

Glossary of Terms

The Agency	Environmental Protection Agency.
The Licensee	Bord na Móna Fuels Limited, Main Street, Newbridge, County Kildare.
Location of Activity	Littleton Group, c/o Littleton Briquette Factory, Thurles, County Tipperary.
AER	Annual Environmental Report.
Annually	All or part of a period of twelve consecutive months.
BATNEEC	Best Available Technology Not Entailing Excessive Cost.
Bi-annually	All or part of a period of six consecutive months.
COD	Chemical Oxygen Demand.
Daily	During all days of plant operation, and in the case of emissions, when emissions are taking place; with no more than 1 measurement on any one day.
Day	Any 24 hr. period.
Daytime	0800 hrs to 2200 hrs.
dB(A)	Decibels (A weighted).
Dust Sensitive location	Any dwelling house, hotel or hostel, health building, educational establishment, place of worship or entertainment, or any other facility or area of high amenity which for its proper enjoyment requires the absence of dust at nuisance levels.
EMP	Environmental Management Programme.
EWC	European Waste Catalogue (94/3/EEC, see also Agency Guidance Note on the EWC).
Flood Period	Any period in which the daily rainfall exceeds 50mm.
Fortnightly	At least 20 measurements in a calendar year with no more than one measurement in any one week.
IPC	Integrated Pollution Control.
Leq	Equivalent continuous sound level.
Lighting-up time	30 minutes after sun set.

Local Authorities	Tipperary SR County Council, Tipperary NR County Council, Kilkenny County Council and Laois County Council.
Monthly	At least 12 times per year at approximately monthly intervals.
NHA	National Heritage Area.
Night-time	2200 hrs to 0800 hrs.
Noise sensitive location	Any dwelling house, hotel or hostel, health building, educational establishment, place of worship or entertainment, or any other facility or area of high amenity which for its proper enjoyment requires the absence of noise at nuisance levels.
Quarterly	All or part of a period of three consecutive months beginning on the first day of January, April, July or October.
Screenings	Wood, stone and other debris removed from milled peat (by screening) prior to introduction to processing.
SAC	Special Area of Conservation.
Standard Methods	As detailed in "Standard Methods for the Examination of Water and Wastewater", (prepared and published jointly by A.P.H.A., A.W.W.A & W.E.F) 19th Ed. 1995, American Public Health Association, 1015 Fifteenth Street, N.W., Washington DC 20005, USA.
TA Luft	Technical Instructions on Air Quality Control - TA Luft in accordance with art. 48 of the Federal Immission Control Law (BImSchG) dated 15 March 1974 (BGBl. I p.721). Federal Ministry for Environment, Bonn 1986 and amendments.
Waste disposal operation	Means any of the operations included in the Third Schedule to the Waste Management Act 1996.
Waste recovery operation	Means any of the operations included in the Fourth Schedule to the Waste Management Act 1996.
Weekly	During all weeks of plant operation, and in the case of emissions, when emissions are taking place; with no more than one measurement in any one week.

Reasons for the Decision

The Agency is satisfied, on the basis of the information available that, subject to compliance with the conditions of this licence, any emissions from the activity will comply with and not contravene any of the requirements of Section 83(3) of the Environmental Protection Agency Act, 1992.

In reaching this decision the Agency has considered the application and supporting documentation received from the applicant, all objections received and the report of its inspectors.

Activities Licensed

In pursuance of the powers conferred on it by the Environmental Protection Agency Act, 1992, the Agency hereby grants a licence to:

Bord na Móna Fuels Limited, Main Street, Newbridge, County Kildare,

under Section 83(1) of the said Act to carry on the following activity,

-: the extraction of peat in the course of business which involves an area exceeding 50 hectares

at Littleton Group, c/o Littleton Briquette Factory, Thurles, County Tipperary (lands labelled as Littleton Group on Location Map Drawing 2.2 (Attachment 2) of the IPC Application), subject to the following fifteen Conditions, with the reasons therefor and associated schedules attached thereto.

Conditions

Condition 1 Scope

1.1 The activity shall be controlled, operated, and maintained and emissions shall take place as set out in this Integrated Pollution Control licence. All programmes required to be carried out under the terms of this licence, become part of this licence.

1.2 No alteration to, or reconstruction in respect of, the activity or any part thereof which would, or is likely to, result in a material change or increase in:

1.2.1 The nature or quantity of any emission,

1.2.2 The abatement/treatment or recovery systems,

1.2.3 The range of processes to be carried out,

1.2.4 The fuels, raw materials, intermediates, products or wastes generated,

or any changes in:

1.2.5 The site management and control with adverse environmental significance

shall be carried out or commenced without prior notice to, and without the prior written agreement of, the Agency.

1.3 This licence is for the purposes of IPC licensing under the EPA Act, 1992 only and nothing in this licence shall be construed as negating the licensee's statutory obligations or requirements under any other enactments or regulations.

1.4 Any reference in this licence to 'site' shall mean the areas outlined in red on Drawing 2.2 of Attachment 2 in the IPC licence application.

Reason: To clarify the scope of this licence.

Condition 2 Management of the Activity

2.1 The licensee shall establish and maintain an Environmental Management System (EMS) which shall fulfil the requirements of this licence. The EMS shall assess all operations and review all practicable options for the use of cleaner technology, cleaner production and the reduction and minimisation of waste, and shall include as a minimum those elements specified in the Conditions 2.2 to 2.7 below:

2.2 Environmental Management Programme (EMP)

2.2.1 The licensee shall, not later than six months from the date of grant of this licence, establish, maintain and submit to the Agency for agreement an EMP, including a time schedule, for achieving objectives and targets. The EMP shall thereafter, form part of the AER and shall be agreed with the Agency prior to implementation. It shall include:

(i) designation of responsibility for targets;

(ii) the means by which they may be achieved;

(iii) the time within which they may be achieved.

2.2.2 The EMP shall as a minimum include the following objectives:

(i) Minimisation of suspended solids movement to surface water systems via peatland surface water drainage channels during development and operation of boglands.

(ii) Rationalisation of surface water discharge points.

(iii) Investigation of reed-bed systems for final polish of silt pond discharges.

(iv) Reduction of fugitive dust emissions during loading and transfer operation on the bog and during unloading operations at the tippler and works yard areas.

(v) Provision of measures to protect dust sensitive areas.

(vi) Reuse of silt pond waste.

(vii) Collection, storage and reuse of polythene covering.

(viii) Use of reusable material for stockpile protection.

(ix) Use of wind power technology for pumped drainage.

(x) Separation of storm water runoff from process and non process areas.

(xi) Effective spill/leak management of mobile fuelling units.

(xii) Replacement (and remediation where necessary) of all underground fuel tanks.

(xiii) Reduction of particulate emissions to air from briquette factory stacks.

2.2.3 A report on the programme, including the success in meeting agreed targets, shall be prepared and submitted to the Agency as part of the AER. Such reports shall be retained on-site for a period of not less than seven years and shall be available for inspection by authorised persons of the Agency.

2.3 Documentation

2.3.1 The licensee shall establish and maintain an environmental management documentation system which shall be to the satisfaction of the Agency.

2.3.2 The licensee shall issue a copy of this licence to all relevant personnel whose duties relate to any condition of this licence.

2.4 Corrective Action

2.4.1 The licensee shall establish procedures to ensure that corrective action is taken should the specified requirements of this licence not be fulfilled.

The responsibility and authority for initiating further investigation and corrective action in the event of a reported non-conformity with this licence shall be defined.

2.5 Awareness and Training

2.5.1 The licensee shall establish and maintain procedures for identifying training needs, and for providing appropriate training, for all personnel whose work can have a significant effect upon the environment. Appropriate records of training shall be maintained.

2.5.2 Personnel performing specifically assigned tasks shall be qualified on the basis of appropriate education, training and/or experience, as required.

2.6 Responsibilities

2.6.1 The licensee shall ensure that a person in charge, as defined under the terms of the Environmental Protection Agency Act, 1992 shall be available on-site at all times when the activity is in operation. The person in charge shall also be available to meet with authorised persons of the Agency at all reasonable times.

2.7 Communications

2.7.1 The licensee shall, within six months of date of grant of this licence, put in place a programme to ensure that members of the public can obtain information concerning the environmental performance of the licensee at all reasonable times.

2.7.2 The licensee shall submit to the Agency, by 1 March each year, an AER which shall be to the satisfaction of the Agency. This report shall include as a minimum the information specified in *Schedule 5 Recording and Reporting to the Agency* and shall be prepared in accordance with any relevant guidelines issued by the Agency.

Reason: To make provision for management of the activity on a planned basis having regard to the desirability of ongoing assessment, recording and reporting of matters affecting the environment.

Condition 3 Interpretation

3.1 Emission limit values for emissions to atmosphere in this licence shall be interpreted in the following way:-

3.1.1 For Non-Continuous Monitoring:

(i) For any parameter where, due to sampling/analytical limitations, a 30 minute sample is inappropriate, a suitable sampling period should be employed and the value obtained therein shall not exceed the emission limit value.

(ii) For flow, no hourly or daily mean value, calculated on the basis of appropriate spot readings, shall exceed the relevant limit value.

(iii) Mass flow thresholds refer to a rate of discharge expressed in units of kg/h, above which the concentration emission limit value applies. Mass flow threshold rates shall be determined on the basis of a single 30 minute measurement (i.e. the concentration determined as a 30 minute average shall be multiplied by an appropriate measurement of flow and the result shall be expressed in units of kg/h).

(iv) Mass flow limits shall be calculated on the basis of the concentration, determined as an average over the specified period, multiplied by an appropriate measurement of flow. No value, so determined, shall exceed the mass flow limit value.

(v) For all other parameters, no 30 minute mean value shall exceed the emission limit value.

3.1.2 Dust deposition at Dust Sensitive Locations

(i) No value shall exceed the emission limit value.

3.2 The concentration limits for emissions to atmosphere specified in this licence shall be achieved without the introduction of dilution air and shall be based on gas volumes under standard conditions of :-

3.2.1 In the case of non-combustion gases:

Temperature 273K, Pressure 101.3 kPa (no correction for oxygen or water content).

3.2.2 In the case of combustion gases:

Temperature 273K, Pressure 101.3 kPa, dry gas; 3% oxygen for liquid and gas fuels; 6% oxygen for solid fuels.

3.3 Emission limit values for emissions to water in this licence shall be interpreted in the following way:-

3.3.1 Non-Continuous Monitoring:

(i) eight out of ten consecutive results, on the basis of 24hr flow proportionate composite sampling, shall not exceed the emission limit value. No individual daily result shall exceed 1.5 times the emission limit value.

(ii) 75% of grab samples for each monitored discharge shall not exceed the emission limit value; and no individual grab sample value shall exceed 3 times the emission limit value.

3.4 Noise

3.4.1 Noise from the activity shall not give rise to sound pressure levels ($Leq_{,30\ min.}$) measured at noise sensitive locations which exceed the limit value(s) by more than 2 dB(A).

Reason: To clarify the interpretation of emission limit values fixed under the licence.

Condition 4 Notification

4.1 The licensee shall notify the Agency by both telephone and facsimile, if available, to the Agency's Headquarters in Wexford, or to such other Agency office as may be specified by the Agency, as soon as practicable after the occurrence of any of the following:

4.1.1 Any release to atmosphere resulting in significant impairment of, or significant interference with amenities or the environment.

4.1.2 Any emission which does not comply with the requirements of this licence.

4.1.3 Any malfunction or breakdown of abatement equipment as set out in Attachment 8 of the IPC licence application which is likely to lead to loss of control of the abatement system.

4.1.4 Any incident with the potential for environmental contamination of surface water or groundwater, or posing an environmental threat to air or land, or requiring an emergency response by a Local Authority.

The licensee shall include as part of the notification, date and time of the incident, details of the occurrence, and the steps taken to minimise the emissions and avoid recurrence.

4.2 The licensee shall make a record of any incident as set out in Condition 4.1 above. The notification given to the Agency shall include details of the circumstances giving rise to the incident and all actions taken to minimise the effect on the environment and minimise wastes generated.

4.3 A summary report of reported incidents shall be submitted to the Agency as part of the AER. The information contained in this report shall be prepared in accordance with any relevant guidelines issued by the Agency.

4.4 In the case of any incident as set out in Condition 4.1.2 above which relates to discharges to water, the licensee shall notify the Southern Regional Fisheries Board as soon as practicable after such an incident.

4.5 In the event of any incident, as set out in Condition 4.1.4 having taken place, the licensee shall notify the appropriate Local Authority as soon as practicable, after such an incident

4.6 In the case of any incident, as set out in Condition 4.1.4, which has the potential to impact the conservation objectives of any NHA or SAC site having taken place, the licensee shall notify Dúchas of the Department of Arts, Heritage, Gaeltacht and the Islands as soon as practicable after such an incident.

4.7 The licensee shall as part of their AER, or more frequently as may be necessary, notify the Agency of boglands, and discharges from same, intended to be included in the subsequent years development and operational programmes.

Reason: To provide for the notification of incidents and update information on the activity.

Condition 5 Emissions to Atmosphere

5.1 No specified emission to the atmosphere shall exceed the emission limit value set out in *Schedule 1(i) Emissions to Atmosphere*, subject to Condition 3 of this licence. There shall be no other emission to the atmosphere of environmental significance.

5.2 The licensee shall within eighteen months of the date of grant of licence, conduct a feasibility study to investigate the reduction of particulate emissions from stacks A103, A104 and B101. This study shall include an environmental cost-benefit analysis, which shall quantify the optimum reduction for each stack, and propose a timeframe for implementation of the required measures.

5.3 Combustion Efficiency of boiler AB1 (Templetuohy works) shall be tested annually and results reported on annually as part of the AER.

5.4 The licensee shall ensure that all operations on-site shall be carried out in a manner such that air emissions and/or dust do not result in significant impairment of, or significant interference with amenities or the environment beyond the site boundary.

5.5 Within six months of the date of grant of the licence, the licensee shall submit to the Agency for agreement, a proposal for:

- The identification and monitoring of Dust Sensitive Locations (DSL's) on and off site for dust deposition. A report on this monitoring shall be submitted annually as part of the AER.
- Maintenance of the cyclones and grit arrestors.

5.6 Activities on-site shall not give rise to dust levels off site at any Dust Sensitive Location which exceed 350 mg/m^{2}/day. [The sampling method to be in

accordance with German TA Luft Emission Standards for Particle Deposition (IW1)].

5.7 In relation to Dust Control the licensee shall, within twelve months of the date of grant of this licence, develop, for implementation, procedures to ensure that:

- shelter belts are planted in sensitive areas,
- harvesting in sensitive areas is avoided during windy weather,
- where possible machinery use grassed pathways,
- stockpiles are sheeted where possible,
- moving machinery maintains slow speeds when travelling along dusty headlands,
- when harvesting, the jib is maintained low to the stockpile,
- shelter belts are planted around outloading facilities,
- road transported peat is adequately covered (sheeted or similar),
- wind breaks are planted wherever appropriate.

5.8 Monitoring and analyses of each emission shall be carried out as specified in *Schedule 1(ii) Monitoring of Emissions to Atmosphere* of this licence. A report on the results of this monitoring shall be submitted to the Agency on a quarterly basis.

5.9 The licensee shall not operate the briquette manufacturing plant during the last two weeks of May, and the months of June, July, and August, unless it can demonstrate by appropriate use of air dispersion modelling, or the fitting of abatement, that operation of the plant during these times will not result in any breach of Air Quality Standards.

Reason: To provide for the protection of the environment by way of control, limitation, treatment and monitoring of emissions.

Condition 6 Emissions to Water

6.1 No specified emission to water shall exceed the emission limit values set out in *Schedule 2(i) Emissions to Water* subject to Condition 3 of this licence. There shall be no other emissions to water of environmental significance.

6.2 The licensee shall within three months of the date of grant of this licence submit to the Agency for approval, a proposal for a surface water discharge monitoring location programme. This programme shall, *inter alia*, have regard to the current status of each bogland (virgin, under development, operational or worked out), sensitivity of the receiving water, status of silt pond upgrade programme. This programme shall be reviewed and revised as necessary each year as part of the AER.

6.3 The licensee shall, within six months of the date of grant of licence, present a proposal for the installation (on a long term basis) of a composite sampler to one representative discharge point within the licensed area. The proposal shall set out the rationale for selection of the nominated discharge point as well as the sampling programme. The results of this monitoring are to be reported each year as part of the AER. Any proposal to relocate the composite sampler is to be dealt with under Condition 6.2.

6.4 Monitoring and analyses of each agreed emission monitoring location shall be carried out as specified in *Schedule 2(ii) Monitoring of Emissions to Water* of this licence. A report on the results of this monitoring shall be submitted to the Agency quarterly.

6.5 A summary report of emissions to water shall be submitted to the Agency as part of the AER. The information contained in this report shall be prepared in accordance with any relevant guidelines issued by the Agency.

6.6 The licensee shall, within six months of the date of grant of licence submit to the Agency for agreement, a programme to ensure that all drainage water from all boglands in the licensed area is discharged via an appropriately designed silt pond treatment arrangement. The programme, to be implemented within a period to be agreed with the Agency, shall ensure that all discharges associated with operational boglands are prioritised. The programme shall also include measures to minimise the discharge from the briquette plant to the river Ballybeg, and include proposals to monitor both the discharge and it's impact on receiving waters.

6.7 Within three months of the date of grant of licence, the licensee shall prepare an operational procedure for de-silting of the silt ponds. The procedure shall as a minimum provide for visual inspection of all ponds on a fortnightly basis. The de-silting roster shall be based on recommendations of such visual inspection. A log of visual inspection and de-silting shall be maintained and a summary report on the de-silting programme shall be included in the AER. The licensee shall within twelve months of the date of grant of the licence demonstrate to the satisfaction of the Agency that the programme of inspection is adequate.

6.8 Silt ponds serving operational bogs shall be cleaned as a minimum twice a year, once before ditching and once before harvesting, and more frequently as inspections may dictate (refer Condition 6.7).

6.9 Within six months of the date of grant of licence, the licensee shall submit a programme, for agreement with the Agency, to upgrade the sedimentation pond treatment system. The programme shall, *inter alia*, address provision of additional ponds, weir or pipe installation (inlet and outlet), pond configuration, use of baffles, performance efficiency and frequency of de-silting. The upgrade programme, to be implemented within a period to be agreed with the Agency, shall have regard to the minimum silt pond specifications detailed in Condition 6.10.

6.10 Within three years of date of grant of this licence all existing silt ponds serving operational bogs shall achieve the following minimum performance criteria (flood periods excepted):

- Maximum flow < 10 cms^{-1},
- Silt design capacity of lagoons, minimum 50m^3 per net ha of bog serviced.

All new ponds installed shall be designed to achieve these stated minimum design criteria.

6.11 All silt ponds prone to flooding shall be de-silted by 1st November of each year. Excavated sludge shall be removed for disposal to a location outside the flood plain to be agreed with Agency.

6.12 In respect of silt control the licensee shall, within six months of the date of grant of this licence, prepare and implement procedures to ensure that:

- drainage manholes are protected and maintained free of peat,
- harrows, millers, ridgers do not drag loose peat onto manholes or into drains,
- headlands are kept clean and free of loose peat,
- drivers of bog plant do not turn short (over drains) at headlands,
- outside harrow spoons are directed away from drains,
- silt run-off while piping is prevented,
- outfalls are cleaned from the upstream direction with downstream end dammed,
- drains are ditched in dry weather,
- while ditching, outfalls are blocked and ditch towards outfall,
- outlets from field drains are blocked during stockpile loading,
- field drains adjacent to stockpiles are cleaned immediately after stockpile loading,
- adequate room is allowed for rail bed beside Peco stockpiles,
- all fields that have been milled are ridged at the end of the production season,
- all fields liable to winter flooding have been cleared of milled peat at the end of the production season,

- all new manholes and outfalls are set well back from turning grounds,
- pond outlets are sealed off during cleaning.

6.13 The licensee shall maintain a rain gauge on site and record rainfall level daily.

Reason: To provide for the protection of the environment by way of control, limitation, treatment and monitoring of emissions.

Condition 7 Waste Management

7.1 Disposal or recovery of waste shall take place only as specified in *Schedule 3(i) Hazardous Wastes for Disposal/Recovery* and *Schedule 3(ii) Other Wastes for Disposal/Recovery* of this licence and in accordance with the appropriate National and European legislation and protocols. No other waste shall be disposed of/recovered either on-site or off-site without prior notice to, and prior written agreement of, the Agency.

7.2 Waste sent off-site for recovery or disposal shall only be conveyed to a waste contractor, as agreed by the Agency, and only transported from the site of the activity to the site of recovery/disposal in a manner which will not adversely affect the environment.

7.3 A full record, which shall be open to inspection by authorised persons of the Agency at all times, shall be kept by the licensee on matters relating to the waste management operations and practices at this site. This record shall as a minimum contain details of the following:

7.3.1. The names of the agent and transporter of the waste.

7.3.2. The name of the persons responsible for the ultimate disposal/recovery of the waste.

7.3.3. The ultimate destination of the waste.

7.3.4. Written confirmation of the acceptance and disposal/recovery of any hazardous waste consignments sent off-site.

7.3.5. The tonnages and EWC Code for the waste materials listed in *Schedule 3(i) Hazardous Wastes for Disposal/Recovery* and *Schedule 3(ii) Other Wastes for Disposal/Recovery* sent off-site for disposal/recovery.

7.3.6. Details of any rejected consignments.

A copy of this Waste Management record shall be submitted to the Agency as part of the AER for the site.

7.4 Within six months of the date of grant of licence, the licensee shall submit to the Agency for agreement, a proposal for identification and management of all ash and screening disposal areas. Once agreed, the proposal shall be implemented within a time-scale stipulated by the Agency.

Reason: To provide for the disposal of waste and the protection of the environment.

Condition 8 Noise

8.1 Activities on-site shall not give rise to noise levels off site at any noise sensitive location which exceed the following sound pressure limits ($Leq,_{30min}$) subject to Condition 3:

8.1.1 Daytime: 55 dB(A),

8.1.2 Night-time: 45 dB(A).

8.2 There shall be no clearly audible tonal component or impulsive component in the noise emission from the activity at any noise sensitive location.

8.3 The licensee shall carry out a noise survey of the site operations as may be required by the Agency. The licensee shall consult with the Agency on the timing, nature and extent of the survey and shall develop a survey programme to the satisfaction of the Agency. The survey programme shall be submitted to the Agency in writing at least one month before the survey is to be carried out. A record of the survey results shall be available for inspection by any authorised persons of the Agency, at all reasonable times and a summary report of this record shall be included as part of the AER when relevant.

Reason: To provide for the protection of the environment by control of noise.

Condition 9 Water Protection

9.1 Surface & Groundwater Protection

9.1.1 No potentially polluting substance or matter shall be permitted to discharge to off-site surface waters, off site storm drains or groundwaters.

9.1.2 Monitoring and analyses of each surface water discharge shall be carried out as specified in *Schedule 4 Monitoring of Workshop/Depot Surface Water Run-off* of this licence. A report on the results of this monitoring shall be submitted to the Agency quarterly.

9.1.3 In the event that any analyses or observations made on the quality or appearance of surface water runoff should indicate that contamination has taken place, the licensee shall

(i) carry out an immediate investigation to identify and isolate the source of the contamination,

(ii) put in place measures to prevent further contamination and to minimise the effects of any contamination on the environment,

(iii) and notify the Agency as soon as is practicable.

9.1.4 Within twelve months of the date of grant of licence, all tank and drum storage areas shall be rendered impervious to the materials stored therein. In addition, tank and drum storage areas shall, as a minimum

be bunded, either locally or remotely, to a volume not less than the greater of the following;

(i) 110% of the capacity of the largest tank or drum within the bunded area,

(ii) 25% of the total volume of substance which could be stored within the bunded area.

9.1.5 Drainage from bunded areas shall be diverted for collection and safe disposal.

9.1.6 The integrity and water tightness of all the bunding structures and their resistance to penetration by water or other materials stored therein shall be tested and demonstrated by the licensee to the satisfaction of the Agency and shall be reported to the Agency within eighteen months from the date of grant of this licence and every two years thereafter. A report on such tests shall be included in the AER.

9.1.7 Within twelve months of the date of grant of licence, the loading and unloading of fuel oils shall be carried out in designated areas protected against spillage and leachate run-off. While awaiting disposal, all materials shall be collected and stored in designated areas protected against spillage and leachate run-off.

9.1.8 With the exception of roof water, all surface water discharges from workshop areas shall, within twenty-four months of date of grant of this licence, be fitted with oil interceptors.

9.1.9 A maintenance/cleaning log for all oil interceptors and septic tanks shall be maintained. This log shall also record the observations made during weekly inspections of all oil interceptors and bi-annual inspections of septic tanks.

9.1.10 An inspection for leaks on all flanges and valves on over-ground pipes used to transport materials other than water shall be carried out weekly. A log of such inspection shall be maintained.

9.1.11 The licensee shall have in storage an adequate supply of containment booms and/or suitable absorbent material to contain and absorb any spillage.

9.1.12 The licensee shall maintain a log of bi-annual inspections of all rail and tractor transported fuelling units. These inspections as a minimum should record any damage or leaks or flaws in rolling stock that could result in accidental spillage.

9.2 Groundwater

9.2.1 The licensee shall within twelve months from the date of grant of this licence present a report to the Agency outlining the nature and extent of any historical waste disposal on site. This report should detail the likely effects, if any, on environmental media, and include a suitable proposal for monitoring of these effects and/or remediation of the site.

Reason: To provide for the protection of surface waters and groundwater.

Condition 10 Cutaway Bog Rehabilitation

10.1 Following termination of use or involvement of all or part of the site in the licensed activity, the licensee shall:

10.1.1 Decommission, render safe or remove for disposal/recovery, any soil, subsoils, buildings, plant or equipment, or any waste, materials or substances or other matter contained therein or thereon, that may result in environmental pollution.

10.1.2 Implement the agreed cutaway bog rehabilitation plan (refer Condition 10.2).

10.2 Cutaway Bog Rehabilitation Plan:

10.2.1 The licensee shall prepare, to the satisfaction of the Agency, a fully detailed and costed plan for permanent rehabilitation of the cutaway boglands within the licensed area. This plan shall be submitted to the Agency for agreement within eighteen months of the date of grant of this licence.

10.2.2 The plan shall be reviewed every two years and proposed amendments thereto notified to the Agency for agreement as part of the AER. No amendments may be implemented without the written agreement of the Agency.

10.3 The Rehabilitation Plan shall include as a minimum, the following:

10.3.1 A scope statement for the plan; to include outcome of consultations with relevant Agencies, Authorities and affected parties (to be identified by the licensee).

10.3.2 The criteria which define the successful rehabilitation of the activity or part thereof, which ensures minimum impact to the environment.

10.3.3 A programme to achieve the stated criteria.

10.3.4 Where relevant, a test programme to demonstrate the successful implementation of the rehabilitation plan.

10.3.5 A programme for aftercare and maintenance.

10.4 A final validation report to include a certificate of completion for the Rehabilitation Plan, for all or part of the site as necessary, shall be submitted to the Agency within six months of execution of the plan. The licensee shall carry out such tests, investigations or submit certification, as requested by the Agency, to confirm that there is no continuing risk to the environment.

Reason: To make provision for the proper closure of the activity ensuring protection of the environment.

Condition 11 Energy Use

11.1 The licensee shall carry out an audit of the energy efficiency of the site within one year of the date of grant of this licence. The licensee shall consult with the Agency on the nature and extent of the audit and shall develop an audit programme to the satisfaction of the Agency. The audit programme shall be submitted to the Agency in writing at least one month before the audit is to be carried out. A copy of the audit report shall be available on-site for inspection by authorised persons of the Agency and a summary of the audit findings shall be submitted as part of the Annual Environmental Report. The energy efficiency audit shall be repeated at intervals as required by the Agency.

11.2 The audit shall identify all opportunities for energy use reduction and efficiency and the recommendations of the audit will be incorporated into the Schedule of Environmental Objectives and Targets under Condition 2.2 above.

Reason: To provide for the efficient use of energy in all site operations.

Condition 12 Monitoring

12.1 The licensee shall carry out such sampling, analyses, measurements, examinations, maintenance and calibrations as set out in Schedules:-

Schedule 1(ii) Monitoring of Emissions to Atmosphere,

Schedule 2(ii) Monitoring of Emissions to Water,

Schedule 4 Monitoring of Workshop/Depot Surface Water Run-off,

of this licence.

12.2 Where the ability to measure a parameter is affected by mixing before emission, then, with prior written agreement from the Agency, the parameter may be assessed before mixing takes place.

12.3 All automatic monitors and samplers shall be functioning at all times (except during maintenance and calibration) when the activity is being carried on unless alternative sampling or monitoring has been agreed in writing by the Agency for a limited period. Prior written agreement for the use of alternative equipment, other than in emergency situations, shall be obtained from the Agency.

12.4 Monitoring and analysis equipment shall be operated and maintained as necessary so that monitoring accurately reflects the emission or discharge.

12.5 The frequency, methods and scope of monitoring, sampling and analyses, as set out in this licence, may be amended with the written agreement of the Agency following evaluation of test results.

12.6 The licensee shall provide signage to clearly identify and label all emission points.

12.7 The licensee shall install on all emission points such sampling equipment, including any data-logging or other electronic communication equipment, as may be required by the Agency. All such equipment shall be consistent with the safe operation of all sampling and monitoring systems.

12.8 The licensee shall provide safe and permanent access to the following sampling and monitoring points:

(i) Waste storage areas on-site,

(ii) Surface and process water discharges,

(iii) Dust sampling locations,

(iv) Emission to atmosphere sampling points

and safe access to any other sampling and monitoring points required by the Agency.

Reason: To ensure compliance with the requirements of other conditions of this licence by provision of a satisfactory system of measurement and monitoring of emissions.

Condition 13 Recording and Reporting to Agency

13.1 The licensee shall record all sampling, analyses, measurements, examinations, calibrations and maintenance carried out in accordance with the requirements of this licence.

13.2 The licensee shall record all incidents which affect the normal operation of the activity and which may create an environmental risk.

13.3 The licensee shall record all complaints of an environmental nature related to the operation of the activity. Each such record shall give details of the date and time of the complaint, the name of the complainant and give details of the nature of the complaint. A record shall also be kept of the response made in the case of each complaint. The licensee shall submit a report to the Agency, during the month following such complaints, giving details of any complaints which arise. A summary of the number and nature of complaints received shall be included in the AER.

13.4 The format of all records required by this licence shall be to the satisfaction of the Agency. Records shall be retained on-site for a period of not less than seven years and shall be available for inspection by the Agency at all reasonable times.

13.5 Reports of all recording, sampling, analyses, measurements, examinations, calibrations and maintenance as set out in *Schedule 5 Recording and*

Reporting to the Agency of this licence, shall be submitted to the Agency Headquarters as specified in this licence. The format of these reports shall be to the satisfaction of the Agency. One original and three copies shall be submitted as and when specified.

13.6 Provision shall also be made for the transfer of environmental information, in relation to this licence, to the Agency's computer system, as may be requested by the Agency.

13.7 All reports shall be certified accurate and representative by the licensee's Plant Manager or other senior officer designated by the Plant Manager.

13.8 All written procedures controlling operations affecting this licence shall be available on-site for inspection by the Agency at all reasonable times.

13.9 The frequency and scope of reporting, as set out in this licence, may be amended with the written agreement of the Agency following evaluation of test results.

Reason: To provide for the collection and reporting of adequate information on the activity.

Condition 14. Accidents and Emergency Response

14.1 The licensee shall, within six months of the date of grant of this licence, ensure that a documented Accident Prevention Policy is in place which will address the hazards on-site, particularly in relation to the prevention of accidents with a possible impact on the environment.

14.2 The licensee shall, within six months of the date of grant of this licence, ensure that a documented Emergency Response Procedure is in place, which shall address any emergency situation which may originate on-site. This Procedure shall include provision for minimising the effects of any emergency on the environment.

14.3 Both policies shall be reviewed annually and up-dated as necessary. These policies shall be made available on-site for inspection by the Agency at all reasonable times.

Reason: To provide for the protection of the environment.

Condition 15 Financial Provisions

15.1 Agency Charges

15.1.1 The licensee shall pay to the Agency an annual contribution of £8,503 (Euro – 10,796.58) or such sum as the Agency from time to time determines, towards the cost of monitoring the activity as the Agency considers necessary for the performance of its functions under the

Environmental Protection Agency Act, 1992. The licensee shall in 2002 and subsequent years, not later than January 31 of each year, pay to the Agency this amount updated in accordance with changes in the Public Sector Average Earnings Indices from the date of the licence to the renewal date. The updated amount shall be notified to the licensee by the Agency. For 2001, the licensee shall pay a pro rata amount from the date of this licence to December 31 2001. This amount shall be paid to the Agency within one month of the date of grant of this licence.

Reason:	*To provide for adequate financing for monitoring and financial provisions for measures to protect the environment.*

Schedule 1(i) Emissions to Atmosphere

Emission Point Reference No.: B101

Location: Boiler House – Littleton Briquette Factory

Volume to be emitted: Maximum in any one day: 864,000 m^3

Maximum rate per hour: 36,000 m^3

Minimum discharge height: 30 m above ground

Parameter	Emission Limit Value [Note 1]
Oxides of sulphur	1000 mg/m^3
Nitrogen oxides as (NO_2)	100 mg/m^3
Particulate	400 mg/m^3

Note 1: The emission limit values do not apply during sootblowing. Sootblowing shall not occur more than twice daily, and each sootblowing period shall not last more than 30 minutes.

Emission Point Reference No.: A101 – Drier 2B stack

Location: Drying Plant

Volume to be emitted: Maximum in any one day: 836525 m^3

Maximum rate per hour: 34852 m^3

Minimum discharge height: 30 m above ground

Parameter	Emission Limit Value
Particulate	50 mg/m^3 (at mass flows>0.5kg/h)
	150 mg/m^3 (at mass flows<0.5kg/h)

Emission Point Reference No.: A102 – Drier 2A stack

Location: Drying Plant

Volume to be emitted: Maximum in any one day: 1017792 m^3

Maximum rate per hour: 42400 m^3

Minimum discharge height: 30 m above ground

Parameter	Emission Limit Value
Particulate	50 mg/m^3 (at mass flows>0.5kg/h) 150 mg/m^3 (at mass flows<0.5kg/h)

Emission Point Reference No.: A103 – Conveyor exhaust stack

Location: Drying Plant

Volume to be emitted: Maximum in any one day: 140,000 m^3

Maximum rate per hour: 5800 m^3

Minimum discharge height: 30 m above ground

Parameter	Emission Limit Value
Particulate	7 kg/hr

Emission Point Reference No.: A104 – Stemple suction stack

Location: Process House

Volume to be emitted: Maximum in any one day: 280800 m^3

Maximum rate per hour: 11700 m^3

Minimum discharge height: 10.5 m above ground

Parameter	Emission Limit Value
Particulate	6 kg/hr

Emission Point Reference No.: A105 – Press vapour suction stack

Location: Press House

Volume to be emitted: Maximum in any one day: 163123 m^3

Maximum rate per hour: 6797 m^3

Minimum discharge height: 10.5 m above ground

Parameter	Emission Limit Value
Particulate	50 mg/m^3 (at mass flows>0.5kg/h) 150 mg/m^3 (at mass flows<0.5kg/h)

Emission Point Reference No.: A106 – Vacuum exhaust stack

Location: Screens House

Volume to be emitted: Maximum in any one day: 15933 m^3

Maximum rate per hour: 660 m^3

Minimum discharge height: 10 m above ground

Parameter	Emission Limit Value
Particulate	50 mg/m^3 (at mass flows>0.5kg/h) 150 mg/m^3 (at mass flows<0.5kg/h)

Emission Point Reference No.: A108 – Drier/Cutter stack

Location: Firelighter production plant

Volume to be emitted: Maximum in any one day: 160128m^3

Maximum rate per hour: 6700 m^3

Minimum discharge height: 6 m above ground

Parameter	Emission Limit Value
Total Organic Carbon (as C)	170 mg/m^3

Schedule 1(ii) Monitoring of Emissions to Atmosphere

Emission Point Reference No.: B101

Parameter	Monitoring Frequency	Analysis Method/Technique
SOx	Annually	Flue gas analyser
NOx	Annually	Flue gas analyser
CO	Annually	Flue gas analyser
Particulates	Quarterly	Isokinetic/Gravimetric

Emission Point Reference No's.: A101, A102, A103, A104, A105, A106

Parameter	Monitoring Frequency	Analysis Method/Technique
Particulate	Quarterly	Isokinetic/Gravimetric

Emission Point Reference No.: A108

Parameter	Monitoring Frequency	Analysis Method/Technique
Total Organic Carbon (as C)	Quarterly	Flame ionisation detection

Schedule 2(i) Emissions to Water

Emission Point Reference No's.: All surface water outfalls from boglands within the site.

Location: As detailed in Section 11 and Attachment 11 of the IPC licence application form, and any additional locations as may be agreed under Condition 4.7

Parameter	Emission Limit Value
Suspended Solids	35 mg/l

Emission Point Reference No.: PW-102

Location: Discharge point to Ballybeg river

Parameter	Emission Limit Value
Suspended Solids	35 mg/l

Schedule 2(ii) Monitoring of Emissions to Water

Emission Point Reference No's.: As agreed under Condition 6.2

Parameter	Monitoring Frequency	Analysis Method/Technique
pH	Quarterly	Standard Methods
Flow	Quarterly	Agreed Method
Suspended Solids	Quarterly	Standard Methods
Total Phosphorus (as P)	Quarterly	Standard Methods
Ammonia (as N)	Quarterly	Standard Methods
Colour	Quarterly	Standard Methods
COD	Quarterly	Standard Methods

Emission Point Reference No: PW-102

Parameter	Monitoring Frequency	Analysis Method/Technique
pH	Weekly	Standard Methods
Flow	Weekly	Agreed Method
Suspended Solids	Weekly	Standard Methods
Total Phosphorus (as P)	Quarterly	Standard Methods
Ammonia (as N)	Quarterly	Standard Methods
Colour	Quarterly	Standard Methods
Oils, Fats, & Grease	Quarterly	Standard Methods
COD	Weekly	Standard Methods

Schedule 3(i) Hazardous Wastes for Disposal/Recovery

Waste Materials	Method of disposal/recovery [Notes 1, 2, 3]
Engine, gear & lube oil	Agreed hazardous waste recycling contractor.
Hydraulic Oils	Agreed hazardous waste recycling contractor.
Oil Filters	Agreed hazardous waste recycling/disposal contractor.
Used Batteries	Agreed hazardous waste recycling/disposal contractor.
Fluorescent lights	Agreed hazardous waste disposal contractor.
Empty paint cans	Agreed hazardous waste disposal contractor.
Anti- freeze liquid	Agreed hazardous waste disposal contractor.
Other [Note 3]	

Note 1: The licensee may treat, reuse, recycle or recover waste subject to the prior written agreement of the Agency.

Note 2: Any variation from those contractors named in the IPC Licence application, or subsequent agreements, must have the prior written agreement of the Agency. In cases where a previously agreed waste contractor is considered by the Agency not to exercise due care in respect of the transport and disposal of the licensee's waste, the Agency may at any time instruct the licensee to stop using this contractor.

Note 3: No other waste shall be disposed of/recovered on or off-site without prior notice to, and prior written agreement of the Agency.

Schedule 3(ii) Other Wastes for Disposal/Recovery

Waste Materials	Method of disposal/recovery [Notes 1, 2, 3]
Scrap Metal	Agreed waste recovery contractor.
Ash/Cinders	Agreed waste disposal contractor.
Settlement pond silt	Returned to bog.
Polythene covering	Agreed recycling disposal contractor.
Workshop & General domestic waste	Agreed waste disposal contractor.
Empty silicone sealant tubes	Agreed waste disposal contractor.
Empty Drums	On and off site reuse.
Used tyres	Agreed waste disposal contractor.
Septic tank sludge	Landspreading contractor to be agreed.
Lagoon sediments	Used for on site landscaping.
Drains pond sediments	Used for on site landscaping.
Peat screenings	On site disposal.
Timber/Pallets	Agreed waste disposal contractor.
Other [Note 4]	

Note 1: The licensee may treat, reuse, recycle or recover waste subject to the prior written agreement of the Agency.

Note 2: Any variation from those contractors named in the IPC Licence application, or subsequent agreements, must have the prior written agreement of the Agency. In cases where a previously agreed waste contractor is considered by the Agency not to exercise due care in respect of the transport and disposal of the licensees waste, the Agency may at any time instruct a licensee to stop using this contractor.

Note 3: Other method to be agreed with the Agency.

Note 4: No other waste shall be disposed of/recovered on or off-site without prior notice to, and prior written agreement of the Agency.

Schedule 4 Monitoring of Workshop/Depot Surface Water Run-off

Emission Point Reference No's.: All surface water discharges from workshops and depots associated with the licensed activity

Parameter	Monitoring Frequency	Analysis Method/Technique
Visual	Weekly	-
COD	Monthly	Standard Methods

Schedule 5 Recording and Reporting to the Agency

Completed reports shall be submitted to: The Environmental Protection Agency

Headquarters
Johnstown Castle Estate
Co Wexford
Ireland

or Any other address as may be specified by the Agency

Reports are required to be forwarded as set out below:

Recurring Reports:

Report	Reporting Frequency	Report Submission Date
Air emissions monitoring	Quarterly	Ten days after end of the quarter being reported on.
Surface Water (*Schedule 2(ii) and Schedule 4*)	Quarterly	Ten days after end of the quarter being reported on.
Complaints (where these arise)	Monthly	Ten days after end of the month being reported on.
Noise monitoring programme	----------	As may be required by the Agency.
Proposal for an energy efficient audit	----------	Within eleven months from the date of grant of licence and thereafter as may be required by the Agency.
Annual Environment Report(AER)	Annually	1 March of each year.

Annual Environmental Report Content	
• Emissions to air summary	• Environmental management programme - proposal
• Boiler AB1 combustion efficiency	• Environmental management programme - report
• Emissions to water summary	• Reported incidents summary
• Waste management report	• Bog development and operational programme
• Resource consumption summary	• Bog rehabilitation progress report
• Complaints summary	• Energy efficiency audit report summary
• Report on de-silting programme	• Dust deposition monitoring report
• Noise monitoring report (where required)	• Particulate emissions minimisation report
• Surface water discharge monitoring location programme	

Once-off Reports:

Report	Report Submission Date
Environmental management programme proposal	Within six months of the date of grant of licence.
Particulate abatement feasibility study (Condition 5.2)	Within eighteen months of the date of grant of licence.
Proposal for dust monitoring locations (Condition 5.5)	Within six months of the date of grant of licence.
Proposal to maintain particulate abatement equipment (Condition 5.5)	Within six months of the date of grant of licence.
Proposal for surface water monitoring locations (Condition 6.2)	Within three months of the date of grant of licence.
Proposal for composite sampling of surface water (Condition 6.3)	Within six months of the date of grant of licence.
Programme for fitting of silt ponds to all bog discharges (Condition 6.6)	Within six months of the date of grant of licence.
Upgrade of sedimentation pond treatment system (Condition 6.9)	Within six months of the date of grant of licence.
Proposal for screenings disposal (Condition 7.4)	Within six months of the date of grant of licence.
Bund integrity assessment (Condition 9.1.6)	Within eighteen months of the date of grant of licence.
Hydrogeological report (Condition 9.2.1)	Within twelve months of the date of grant of licence.
Bog rehabilitation programme (Condition 10.2)	Within eighteen months of the date of grant of licence.

Signed on behalf of the Agency

Padraic Larkin

_____

Director/Authorised Person

Dated this 17th day of August, 2001

Appendix 4-2

Rehab Plans

Longford Pass Bog

Cutaway Bog Decommissioning and Rehabilitation Plan

2026

This document seeks to address the requirements of Condition 10.2 of IPC Licence Ref. P0499-01:

> "*The licensee shall prepare, to the satisfaction of the Agency, a fully detailed and costed plan for permanent rehabilitation of the cutaway boglands within the licensed area.*"

This licence condition requires BnM agree with the EPA the measures that will provide for rehabilitation, i.e., stabilisation of Longford Pass Bog upon cessation of peat production and compliments the licence requirement to decommission the site.

***Rehabilitation** generally comprises site stabilisation with natural colonisation with or without targeted management.*

Industrial peat production has now fully ceased at Longford Pass Bog. A rehabilitation programme was carried out at Longford Pass Bog in 2018-2021.

BnM have defined the key rehabilitation outcome at Longford Pass Bog as environmental stabilisation, re-wetting and setting the bog on a trajectory towards development of naturally functioning peatland and wetland habitats.

Any consideration of any other future after-uses for Longford Pass Bog will be conducted in adherence to the relevant planning guidelines and consultation with relevant authorities and will be considered within the framework of this rehabilitation plan.

Document Control Sheet	
Document Name:	Longford Pass Bog Cutaway Bog Decommissioning and Rehabilitation Plan 2026
Document File Path:	Q:\Ecology Team\EPA draft rehab plans 2017 word docs\Longford Pass ref.499 (Littleton)\Longford Pass
Document Status:	Final

This document comprises:	DCS	TOC	Text (Body)	References	Maps	No. of Appendices
	1	2	34	4	0	12

Rev. 0.1	Author(s):	Checked By:	Approved By:
Name(s):	CS	MMC	MMC
Date:	14/04/2026	17/04/2026	17/04/2026

Rev. 1	Author(s):	Checked By:	Approved By:
Name(s):		MG	MMC
Date:		05/05/2026	05/05/2026
Rev. 1.1	**Author(s):**	**Checked By:**	**Approved By:**
Name(s):		CS	CS
Date:		12/05/2026	12/05/2026

Table of Contents

Non-technical summary 1
1. Introduction 3
1.1 Constraints and Limitations 3
2. Methodology 4
2.1 Desk Study 4
2.2 Consultation 6
2.3 Field Surveys 6
3. Site Description 7
3.1 Status and Situation 8
3.1.1 Site history 8
3.1.2 Current land-use 8
3.1.3. Socio-Economic conditions 9
3.2 Geology and Peat Depths 9
3.3 Key Biodiversity Features of Interest 10
3.3.1 Current habitats 10
3.3.2 Species of conservation interest 13
3.3.3 Invasive species 13
3.4 Statutory Nature Conservation Designations 13
3.4.1 Other Nature Conservation Designations 14
3.5 Hydrology and Hydrogeology 14
3.6 Emissions to surface-water and watercourses 15
3.7 Fugitive Emissions to air 16
3.8 Carbon emissions 17
3.9 Current ecological rating 17
4. Consultation 18
4.1 Consultation with interested parties 18
4.2 Issues raised by Consultees 19
4.3 BnM response to issues raised during consultation and rehabilitation 2018-2021 20
5. Rehabilitation Goals and Outcomes 23
6. Scope of Rehabilitation 25
6.1 Key constraints 25
6.2 Key Assumptions 26
6.3 Key Exclusions 26

7. Criteria for successful rehabilitation 27
7.1 Criteria for successful rehabilitation to meet EPA IPC licence conditions: 27
7.2. Critical success factors needed to achieve successful rehabilitation as outlined in the plan 29
8. Rehabilitation Actions and Time Frame 30
8.1 Completed 31
8.2 Short-term planning actions (0-1 years) 31
8.3 Short-term practical actions (0-2 years) 31
8.4 Long-term (>5 years) 31
8.5 Timeframe 32
8.6 Budget and costing 32
9. Aftercare and Maintenance 33
9.1 Programme for monitoring, aftercare and maintenance 33
9.2 Rehabilitation plan validation and licence surrender – report as required under condition 10.4 33
10. References 35
APPENDIX I: Bog Group Context 39
APPENDIX II: Ecological Survey Report 44
APPENDIX III: Environmental Control Measures to be applied to bog rehabilitation 47
APPENDIX IV: Biosecurity 48
Appendix V: Policy and Regulatory Framework 49
APPENDIX VI: Decommissioning 56
APPENDIX VII: Glossary 59
APPENDIX VIII: Extractive Waste Management Plan 61
APPENDIX IX: Mitigation Measures for the Application of Fertiliser 67
APPENDIX X: Consultation Summaries 68
APPENDIX XI: Archaeology 76
APPENDIX XII: Water Quality Monitoring Results for Longford Pass Bog 80

NON-TECHNICAL SUMMARY

- BnM (formerly known as Bord na Móna) is updating the rehabilitation plan prepared in 2018 for Longford Pass Bog, located in Co. Tipperary.
- BnM Industrial peat harvesting ceased at Longford Pass Bog in 2017.
- Longford Pass Bog was in industrial peat production since 1940 and had a pump-based drainage regime. Longford Pass Bog initially was developed as a sod turf production site. It then supplied peat to the Littleton Briquette Factory.
- In 2017, BnM announced the closure of the Littleton Briquette factory and the cessation of industrial peat production in a number of cutaway bogs within the Littleton Bog Group.
- A rehabilitation programme was carried out by BnM between 2018-2021 (Phase 1) with targeted drain-blocking through the site.
- Large bare peat areas were re-wetted with intensive drain-blocking.
- Longford Pass Bog had a partially pumped drainage regime until the pump was permanently depowered in 2022 so pumping across the site has now ceased. This has contributed to the development of large wetlands.
- Some areas were constrained from rehabilitation and re-wetting including boundary drains and some areas adjacent to the new motorway.
- The site is now developing a mosaic of pioneer cutaway habitats and there are large areas of open shallow water. Bare peat cover is shrinking as pioneer vegetation cover establishes. Other sections that ceased peat extraction at an earlier stage have more developed vegetation and pioneer habitats.
- This rehabilitation plan has been prepared by BnM as part of obligations to carry out peatland rehabilitation via an IPC licence issued by the Environmental Protection Agency.
- The key objective of peatland rehabilitation is environmental stabilisation. This means developing habitats and vegetation back onto the bare peat (putting a “skin” back onto the peat), and minimising effects to downstream waterbodies.
- In general, soggy ground conditions are preferred. This means the remaining peat is wet and that plants that prefer wetter conditions, like Bog Cotton will thrive.
- Some sections with deeper residual peat have the capacity to regrow *Sphagnum* moss again, where there are suitable hydrological conditions. *Sphagnum* is a key species for restoring naturally functioning raised bog conditions.
- A project called the BnM/Coillte Midlands Native Woodland Project has been proposed for Longford Pass Bog. The main objective of this proposed project is to develop and enhance native woodland in areas of cutaway that would remain naturally dry, developing woodland habitat that would naturally complement wetland and peatland habitats already developing across the bog. This proposed project has not been approved by the Forest Service yet. The area proposed as part of the native woodland project will be constrained from additional rehabilitation.
- Rehab measures included drain-blocking and other measures to raise water levels to the surface of the bog, thus encouraging the development of naturally functioning cutaway peatland habitats.
- These rehabilitation measures were planned by a team consisting of expert ecologists and engineers. It is a guiding principle of BnM rehabilitation planning that no actions or activities will be undertaken that would negatively impact on adjacent land. No boundary drains will be blocked. Water will still leave the bog via the existing outlets.

- Peatland rehabilitation of this bog will bring a range of benefits to the local community via improvements to the local landscape and is also important for supporting national policies and strategies in relation to reduction of carbon emissions from these peatlands, supporting biodiversity and improvements to water quality.
- Rehabilitation at Littleton Bog will result in improved water quality, climate benefits with the reduction of carbon emissions and enhanced biodiversity when the residual peat is re-wetted.
- Many BnM bogs cannot be restored back to raised bog, as the majority of peat has been removed and the environmental conditions have been modified. However other natural habitats will develop, like poor fen and regenerating wet deep peat vegetation communities (on deeper peat); and wetlands with Reedbeds and Birch woodland on shallower peat. In time a naturalised peatland can be developed.
- It will take some time for vegetation and habitats to fully develop at Longford Pass Bog, and a peatland ecosystem to be restored. However, it is expected that any bare peat will be developing pioneer habitats after 5-10 years.
- The development of a range of habitats at Longford Pass Bog will support biodiversity including plants, insects, birds and mammals. This includes some species that are rare and protected in the wider landscape.
- This peatland rehabilitation plan does not consider future after-use or development. BnM continually reviews its land-bank to consider future commercial or industrial developments. Any other proposed development will be planned in adherence to relevant planning guidelines and will consider the rehabilitation and the condition of the bog.

1. INTRODUCTION

BnM (formerly known as Bord na Móna) operates under IPC Licence issued and administered by the EPA to extract peat within the Littleton Bog Group (Ref. P0499-01) (see Appendix I for details of the bog areas within this Group). As part of Condition 10.2 of this licence, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area. Longford Pass Bog is located in Co. Tipperary.

This document seeks to address the requirements of Condition 10.2 of IPC Licence Ref. P0499-01:

> "*The licensee shall prepare, to the satisfaction of the Agency, a fully detailed and costed plan for permanent rehabilitation of the cutaway boglands within the licensed area.*"

It also seeks to outline measures to optimise climate action and other ecosystem services benefits, mainly through hydrological management.

This plan is a specific rehabilitation plan for the bog and outlines:

- Description of site management and status.
- Main issues and approaches to rehabilitation.
- Consultation to date with interested parties.
- Interaction with other policy and legislative frameworks (Appendix V).
- The planned rehabilitation goals and outcomes.
- The scope of the rehabilitation plan.
- Criteria which define the successful rehabilitation and key targets to validate rehabilitation.
- Proposed rehabilitation actions.
- Proposed timeframe to implement these measures.
- Budget and Costings.
- Associated aftercare, maintenance, and monitoring.

Note: This plan should be read in conjunction with the accompanying Map book.

Longford Pass Bog is part of the Littleton Bog Group. BnM made the decision to close this brickette factory in 2017 and to rehabilitate the Littleton Bog group. Longford Pass Bog was rehabilitated by BnM during 2018-2021.

This updated rehabilitation plan supersedes the previous rehabilitation plan prepared and submitted to the EPA in 2018.

1.1 Constraints and Limitations

This document covers the area of **Longford Pass Bog** shown in drawing number *BNM- ECO-26-11-01: Site Location Map*.

Some margins of Longford Pass Bog were developed as private mature conifer forestry. This is mapped as a constraint.

There are no known rights of way around the margins of Longford Pass Bog. None of the rehabilitation proposed as part of this plan will affect these rights of way. Part of the site has been leased to Thurles Gun Club and this area has been mapped as a constraint on the rehabilitation plan.

Rehabilitation in other areas of the bog may also be constrained due to other property issues or archaeological features. There is known archaeology at Longford Pass Bog.

2. METHODOLOGY

This rehabilitation plan was developed with a combination of desktop and field surveys, consultations with internal and external stakeholders. The development of this rehabilitation plan considered recently published guidance issued by the EPA, '*Guidance on the Process of Preparing and Implementing a Bog Rehabilitation Plan' (EPA, 2020)*.

The ecological information and site information collected during the BnM ecological baseline survey, additional confirmatory site visits (covering the period 2010 to 2025 inclusive) and monitoring and desktop analysis forms the basis for the development of the rehabilitation plan for the bog, along with:

- Experience of 40 years of research on the after-use development and rehabilitation of the Bord na Móna cutaway bogs (Clarke, 2010; Bord na Móna, 2016)
- Significant international engagement during this period with other counties in relation to best practice regarding peatland rehabilitation and after-use through the International Peat Society and the Society for Ecological Restoration (Joosten & Clarke, 2002; Clarke & Rieley, 2010; Gann *et al*., 2019)
- Consultation and engagement with internal and external stakeholders
- GIS Mapping
- BnM drainage surveys
- Bog topography and LIDAR data
- Previous research studies on site
- Hydrological modelling

2.1 Desk Study

The desk study involved collecting all relevant environmental and ecological data for the study area. The development of the rehabilitation plan also takes account of research, experience and engagement with other peatland restoration and rehabilitation projects and peatland research including Irish, UK, European and International best practice guidance (full citations are in the References Section):

- Anderson *et al*. (2017). An overview of the progress and challenges of peatland restoration in Western Europe.
- Barry, T.A. *et al*. (1973). A survey of cutover peats and underlying mineral soils. Soil Survey Bulletin No. 30. Dublin, Bord na Móna and An Foras Taluntais.
- Bonn *et al*. (2017). Peatland restoration and ecosystem services- science, policy and practice.
- Carroll *et al*. (2009). *Sphagnum* in the Peak District. Current Status and Potential for Restoration. Moors for the Future Report No 16.
- Clark & Rieley (2010). Strategy for responsible peatland management.
- Eades *et al*. (2003). The Wetland Restoration Manual.
- Farrell & Doyle (2003). Rehabilitation of Industrial Cutaway Atlantic Blanket Bog, NW Mayo, Ireland.
- Gann *et al*. (2019). International Principles and Standards for the practice of Ecological Restoration.
- Hinde *et al*. (2010). *Sphagnum* re-introduction project: A report on research into the re-introduction of *Sphagnum* mosses to degraded moorland. Moors for the Future Research Report 18.
- Joosten & Clarke (2002). Wise Use of mires and peatlands – Background and Principles including a framework for Decision-making.

- Lindsay (2010). Peatbogs and Carbon: a Critical Synthesis to Inform Policy Development in Oceanic Peat Bog Conservation and Restoration in the Context of Climate Change.
- Mackin *et al*. (2017). Best practice in raised bog restoration in Ireland. Irish Wildlife Manuals, No. 99. National Parks and Wildlife Service,
- McBride *et al*. (2011). The Fen Management Handbook (2011), Scottish Natural Heritage.
- McDonagh (1996). Drain blocking by machines on Raised Bogs. Unpublished report for National Parks and Wildlife Service.
- NPWS (2017a). National Raised Bog Special Areas of Conservation management plan. Department of Arts, Heritage and the Gaeltacht.
- Pschenyckyj et al., (2021). Optimising Water Quality Returns from Peatland Management while Delivering Co-Benefits for Climate and Biodiversity. An Fóram Uisce.
- Quinty & Rochefort (2003). Peatland Restoration Guide, second edition. Canadian *Sphagnum* Peat Moss Association and New Brunswick Department of Natural Resources and Energy.
- Regan*, et. al.* (2020). Ecohydrology, Greenhouse Gas Dynamics and Restoration Guidelines for Degraded Raised Bogs. EPA Research Report. Prepared for the Environmental Protection Agency by Trinity College Dublin.
- Renou-Wilson *et al*. (2011). BOGLAND - Sustainable Management of Peatlands in Ireland. STRIVE Report No 75 prepared for the Environmental Protection Agency.
- Schouten (2002). Conservation and Restoration of Raised Bogs: Geological, Hydrological and Ecological Studies. Dúchas - The Heritage Service of the Department of the Environment and Local Government, Ireland.
- Thom, *et al*. (2019). Conserving Bogs – The Management Handbook, second edition.
- Wheeler & Shaw (1995). Restoration of Damaged Peatlands – with Particular Reference to Lowland Raised Bogs Affected by Peat Extraction.
- Wittram *et al*. (2015). A Practitioners Guide to Sphagnum Reintroduction. Moors for the Future Partnership.

Additional on-line resources were also incorporated into the desk study, including:

- Littleton Integrated Pollution Control Licence
- Littleton Annual Environmental Reports
- Review of the National Biodiversity Data Centre (NBDC) webmapper
- Inland Fisheries Ireland (IFI) Reports
- Environmental Protection Agency database (www.epa.ie)
- EPA Guidance on Requests for Alterations to a Licensed Industrial or Waste Activity
- Birdwatch Ireland online data (including I-WeBS and CBS datasets; www.birdwatchireland.ie)
- Geological Survey of Ireland - National Draft Bedrock Aquifer map
- Geological Survey of Ireland - Groundwater Database (www.gsi.ie)
- Historic Environment Viewer at https://webgis.archaeology.ie/historicenvironment/
- National Parks & Wildlife Services Public Map Viewer (www.npws.ie)
- Water Framework Directive catchments.ie/maps/ Map Viewer (www.catchments.ie)
- OPW Indicative Flood Maps (www.floodmaps.ie)
- CFRAM Preliminary Flood Risk Assessment (PFRA) maps (www.cfram.ie)
- River Basin Management Plan for Ireland 2022-2027

- BnM Annual Report 2025
- Spatial data in respect of Article 17 reporting, available online at https://www.npws.ie/maps-and-data/habitat-and-species-data/article-17

2.2 Consultation

A number of stakeholders have been identified during the course of BnM's rehabilitation and Biodiversity Action Plan activities and are contacted during the rehabilitation planning process for their views. See Section 4.

2.3 Field Surveys

BnM carried out a baseline ecological survey of all of its properties in 2009-2012 and developed habitat maps. As part of this exercise, Longford Pass Bog was surveyed in 2010, with additional surveys in 2012 and 2017. Habitat maps were updated in 2018. Habitat maps have been updated, where required. This rehabilitation plan is informed by the original baseline survey as well as subsequent confirmatory site walk-over surveys and visits, and updates to baseline data.

Habitat mapping followed best practice guidance from Smith *et al.* (2011). Map outputs including all habitat maps and target notes were produced using GIS software application packages (ArcGIS). General marginal habitats and other habitats that had not been modified significantly by industrial peat extraction were classified using Fossitt *et al*. (2000). Plant nomenclature for vascular plants follows Stace (2019), while moss and liverwort nomenclature follow identification keys published by the British Bryological Society (2010).

A detailed ecological survey report for Longford Pass Bog is contained in Appendix II.

3. SITE DESCRIPTION

Longford Pass (Pope's Bog) is located in Co. Tipperary, 5km south-west of Urlingford. The overall area of the bog is 278 hectares.

The bog is situated adjacent to the old N8 Cork-Dublin road and the newer M8 motorway bisects the southern part of the site. It is bordered to the south by a minor road (that separates Longford Pass from the adjacent Littleton BnM property).

Industrial peat extraction ceased at Longford Pass Bog in 2017. Rehabilitation took place at Longford Pass Bog between 2018-2021. Bare peat areas were targeted with intensive drain-blocking. Some outfalls were adjusted with hydrological management to raise water-levels across the site.

More intensive rehabilitation was carried out across the bare peat areas. Field drains were regularly blocked. Pumping ceased in the northern section of the site after 2022. This has contributed the development of large wetlands to the east of the site. The pump at Longford Pass Bog is now permanently depowered and scheduled for removal.

There has been a relatively long period of industrial peat extraction at Longford Pass Bog. Up until 2017, the majority of the site was managed for industrial milled peat production. This bog had a partially pumped drainage regime. The bog became cutaway on a phased basis and there were older cutaway sections that were already vegetating and developing cutaway habitats. A BnM industrial railway passes through Longford Pass Bog along the eastern margin and connected this former industrial peat production bog and bogs to the north to the wider Littleton network, where milled peat was formerly transferred to Lanespark Briquette factory.

Several small areas have underlying glacial sub-soil where the bog was completely cutaway. Large wetlands were developing across some of the older cutaway where drainage was breaking down naturally.

An area of cutaway bog to the south of the railway has been developing prior to 1995 and split into two sections by the construction of the new M8 motorway between 2006-2010. The northern side of the motorway is re-colonising naturally with a mosaic of habitats including Birch scrub, Heather and poor fen. Part of the site south of the motorway was reclaimed as farmland by a local farmer under licence from BnM.

There are also two separate sections of bog at the southern end of the site that lie south of the old N8 Dublin-Cork road and adjacent to Littleton bog to the south. These sections were never developed for milled peat production. The former BnM industrial railway passes along the eastern side of the western section. These areas were used for private sod peat production in the past. The eastern section is also used by Littleton Shooting Club.

There are no EPA mapped watercourses flowing through the bog. The Drish_050 River (EPA Name: TEMP_16V04 EPA code: 16V04) is located along of the southern boundary of the western section of Longford Pass Bog.

See Drawing number *BNM-ECO-26-11-01: Site Location Map*, included in the accompanying Mapbook[1] , which illustrates the location of Longford Pass Bog in context to the surrounding area.

[1] Cutaway Bog Decommissioning and Rehabilitation Plan – Killeen Bog Map Book

3.1 Status and Situation

3.1.1 Site history

Industrial peat production commenced in Longford Pass Bog in the 1940's and continued until 2017. Longford Pass Bog initially was developed as a sod turf production site. Longford Pass Bog then formerly supplied peat to the Littleton Briquette Factory. In 2017, BnM announced the closure of the Littleton Briquette factory and the cessation of industrial peat production in the majority of cutaway bogs within the Littleton Bog Group.

The site was bisected by the construction of the N8 Motorway in 2000s. A small area between the new motorway and R639 (old main road) was leased and developed for farmland in 2018.

Part of the site north of the M8 re-vegetated, with pioneer vegetation maturing and developing a mosaic of typical cutaway habitats with Birch woodland predominating. Parts of the site (younger cutaway) naturally colonising for > 10 years and developed a mosaic of cutaway habitats. Some areas of shallow peat cutaway on site are developing pioneer cutaway vegetation communities with deep peat areas slower to colonise. Natural re-colonisation of the cutaway was effective.

Rehabilitation commenced at Longford Pass Bog in 2018, with a program of drain blocking. A large part of the site has been re-wetted.

Pumping continued at the site until 2022, when the pumping ceased operation.

3.1.2 Current land-use

Industrial peat extraction has now completely ceased. Pumping at the bog continued until 2022. Pumps have been permanently depowered and are scheduled for removal. Some remedial drainage was carried out to manage water-levels via gravity flow.

The former BnM industrial railway is still present on site with the exception of the western portion of it. The remaining former railway is expected to be decommissioned shortly.

Part of the site north of the M8 is developing into a woodland. Older cutaway areas have continued to develop and mature, and are also responding to the re-wetting around the site. Areas that were bare peat in 2018 are colonising with pioneer vegetation however some areas of bare peat still remain.

Longford Pass is proposed to be included in the Coillte/BnM Midlands Native Woodland Project (Midlands Native Woodland - Coillte). The main objective of this proposed project is to develop and enhance native woodland in areas of cutaway that would remain naturally dry, developing woodland habitat that would naturally complement wetland and peatland habitats already developing across these sites. This proposed project is currently being considered for consent by the Forest Service. Areas proposed to be included in Native Woodland Project have also been mapped as constrained land in the rehabilitation plan.

The Littleton Labyrinth is a proposed amenity project that was also developed during this period, in partnership with Tipperary County Council. Initially a feasibility study was carried out that looked at developing greenway amenity, and associated facilities across the Littleton Bogs, and potential links to existing infrastructure and local villages/towns. The first phase of this project was developed by Tipperary County Council in 2023/24, and a greenway was constructed on former BnM industrial railway though Killeen and Lanespark Bog to link with Loch Doire Bhile amenity, north of Lanespark. There potential to extend the greenway development through Longford Pass Bog.

A small section of broadleaf forestry borders the western section of bog. The eastern section of the southern parcel of the site has been leased to Thurles Gun Club.

Tipperary County Council has currently included the area of Longford Pass Bog within the Mid-Tipperary Decarbonising Zone in the Tipperary Climate Action Plan.

3.1.3. Socio-Economic conditions

BnM has historically been a vital employer for the rural communities in the Irish midlands. BnM compiled a report on the role of peat extraction in the midlands historically in which they report that in 1986, by the end of BnM's Third Development Programme, a total of twenty-three work locations had been established around the country. The company had an average employment of approximately 4,688 in the mid 1980's, with a peak employment of 6,100 during the production season, which placed it among the country's largest commercial employers. The importance of such levels of employment were largely due to its regional concentration in the Midlands and the lack of alternative employment opportunities in these areas at the time.

According to the Energy Crop Socio-Economic Study undertaken by Fitzpatrick Associates in 2011, there were an estimated 1,443 jobs supported by the peat-to-power industry in Ireland at the time, some 81% of which were located in the catchment areas of the three peat-fired generating stations (Lough Ree, West Offaly, and Edenderry Power Stations). These constituted jobs in the plants and in peat extraction, jobs indirectly supported in upstream supply industries and jobs induced through the trickle-down effects of the wages and salaries of those supported directly or indirectly. These job numbers have now declined with the cessation of peat extraction.

In respect of Longford Pass Bog, jobs included in the above study would have included those to facilitate extraction of peat at this bog and associated processing and transfer to Littleton Briquette Factory.

As the primary employer in many Midland counties, BnM played a central role in building communities through several initiatives, including development and construction of local housing complexes, education bursaries, support of local sporting clubs, the provision of community gain funds, charity programmes and the provision and building of amenity areas.

Employment numbers have now significantly declined following the cessation of industrial peat extraction at this bog.

3.2 Geology and Peat Depths

3.2.1 Sub-soil geology

The underlying geology[2] at Longford Pass Bog comprises four different bedrock units; Waulsortian Limestones (Dolomitised massive fine-grained limestone), Crosspatrick Formation (Pale-grey cherty crinoidal limestone), Waulsortian Limestones (Massive unbedded lime-mudstone) and Ballysteen Formation (Dark muddy limestone, shale).

The underlying geology of Longford Pass is predominantly Dolomitised massive fine-grained limestone (Waulsortian Limestones). The northwestern section is made up of Pale-grey cherty crinoidal limestone (Crosspatrick Formation (CDCROS)). The southern section is made up of a small section of Massive unbedded

[2] https://www.gsi.ie/en-ie/data-and-maps/Pages/Bedrock.aspx

lime-mudstone (Waulsortian Limestones (Code: CDWAUL)) and the furthest south section of the site which borders Littleton bog is made up of Dark muddy limestone, shale (Ballysteen Formation (Code: CDBALL)).

The Dolomitised Waulsortian formation is classified as a regionally important aquifer (Rkd) because of its diffuse karstification, while the unbedded lime-mudstone Waulsortian formation is classified as a regionally important (Rk) as it is subject to karstification.

The Crosspatrick Formation is considered a Locally Important Aquifer - Bedrock which is Generally Moderately Productive (Lm). The Ballysteen Formation is also considered a Locally Important Aquifer Bedrock but is Moderately Productive only in Local Zones (LI).

Quaternary subsoil mapping maps most of the Longford Pass area as cut peat, surrounded by a mix of Deep poorly drained mineral - Derived from mainly calcareous parent materials as well as Deep well drained mineral - Deep well drained mineral.

3.2.2 *Peat type and depths*

The majority of Longford Pass Bog has very shallow peat remaining (0-1m) particularly within the western and southern section of the former production area. A significant portion of Longford Pass is considered to have relatively deep residual peat, and the eastern section of the bog is estimated to have between 2m - 5m of peat remaining.

3.3 Key Biodiversity Features of Interest

3.3.1 Current habitats

The most common vegetation communities/habitats[3] present at Longford Pass Bog include:

- Poor fen vegetation (pJeff/pEang) (in mosaic) (Codes refer BnM classification of pioneer habitats of production bog. See Appendix II).
- Dry heath (dHeath) (in mosaic)
- Open Birch scrub (oBir) (in mosaic)
- Dry/wet grassland (gMol)
- Temporary open water (TOW) (wet sections)
- Bare peat
- Riparian zones (old silt ponds and culverted streams/drains along motorway embankment)
- Small wetland pools with open water and poor fen vegetation (pRos)
- Access routes (Acc) (railways, travel paths and gravel paths with associated scrub/dry heath verges)

Cutaway habitats are continuing to develop across Longford Pass Bog. Birch scrub and woodland has significantly expanded across the site on some of the drier, more elevated ground on the western side. The eastern and northern sections all have natural basins that are developing as wetlands. Pumping at this site ceased in 2022 and this has supported the expansion of wetlands. Pioneer vegetation is continuing to develop across the site and the bare peat cover is rapidly shrinking.

[3] Codes refer BnM classification of pioneer habitats of production bog

In general, cutaway habitats are developing according to the underlying environmental conditions and reflect the varying topography, hydrology and peat depths. Drain-blocking and other rehabilitation measures have had a significant positive impact across the site in re-wetting residual peat and enhancing the development of wetland habitats. Ceasing pumping has also had a significant impact and has supported extensive wetland development across the site.

	More established vegetation in older cutaway to the west of the site. Typical Bog Cotton-dominated poor fen reflecting shallow cutaway peat
	Pioneer vegetation developing on bare peat in 2018. Pioneer vegetation quickly establishing across bare peat areas after the peat extraction activity ceasing. Re-wetting not implemented in this area at the time.
	Typical Birch scrub and Rush-dominated pioneer vegetation developing in the central part of the site.

	2019. Northern part of the site. Site now re-wetted. Pumping reduced.

See Drawing number *BNM-ECO-26-11-17: Habitat Map (2018)*, included in the accompanying Mapbook, which illustrates the habitats at Longford Pass Bog. See also Table 3.1 for photographic plates of habitats (taken in 2018 and 2019).

3.3.2 Species of conservation interest

Biodiversity is continually adapted to the changing conditions across the site. A number of species of conservation interest utilize the habitats available at Longford Pass Bog. The following is a summary of the records of these species available within both BnM and NBDC records.

- Multiple mammal species have been recorded as part of BnM surveys on or in close proximity to the bog including Mountain hare (*Lepus timidus*) (AR1719 code: 1334), Badger (*Meles meles*), Rabbit (*Oryctolagus cuniculus*) and Red Fox (*Vulpes vulpes*).
- Bird species of conservation interest recorded from the bog include the BOCCI[4] red listed species Snipe (*Gallinago gallinago*) and Meadow Pipit (*Anthus pratensis*). The BOCCI amber listed species Willow Warbler (*Phylloscopus trochilus*), Mallard (*Anas platyrhynchos*) and Swallow (*Hirundo rustica*) have also been recorded at Longford Pass Bog.

Peatland rehabilitation can result in increases on the relative abundance or proportion of species of conservation interest utilising bogs post rehabilitation. This can include red or amber listed species of breeding waders along with wintering species including Swans and other wildfowl. Re-wetting has created new habitat for species such as Black-Headed Gull. Wetland birds (Mallard, Teal and small flocks of Whooper Swan) continue to use the more established wetlands on the western side of the site.

3.3.3 Invasive species

The NBDC holds records for the high impact invasive species Japanese Knotweed (*Fallopia japonica*), which has been recorded between the southern boundary of Longford Pass and the northern boundary of Littleton bog. NBDC also holds records for the invasive mammal species Fallow deer (*Dama dama*) within Longford Pass bog.

A broad range of common garden escapes are occasionally present around the margins of BnM bogs, and although spatial overlap with the rehabilitation areas is expected to be limited, these will be treated in line with best practice during all activities.

3.4 Statutory Nature Conservation Designations

There are no European Designated Sites i.e. Special Areas of Conservation (SAC) or Special Protection Areas (SPA) in close proximity (i.e. within a 5km radius at minimum) to Longford Pass Bog.

The nearest European Designate Sites to Longford Pass bog are as follows:

- The Loughans SAC (000407)- 7.4km east
- Spahill and Clomantagh Hill SAC (000849)- 9.4km northeast
- River Barrow and River Nore SAC (002162) (002162)-11.4km southeast
- Galmoy Fen SAC (001858)- 11.8km northeast
- Lower River Suir SAC (002137) - 12.1km southwest
- Cullahill Mountain SAC (000831)- 13.8km northeast

There are also no NHA's (Natural Heritage Areas) or pNHA's (proposed Natural Heritage Areas) within a 5km radius of Longford Pass Bog. A number of non-statutory designated sites which overlap with European designated

[4] https://birdwatchireland.ie/app/uploads/2021/04/BOCCI4-leaflet-2-1.pdf

sites occur in the wider area. There are also a number of pNHA's that occur within 10km of Longford Pass bog including:

- Kilcooly Abbey Lake (000958) – 5.9km southeast,
- The Loughans pNHA (000407) - 7.4km east,
- Spahill and Clomantagh Hill pNHA (000849) - 9.4km northeast and
- Cabragh Wetlands pNHA (001934) – 9.6km west.

See drawing *BNM-ECO-26-11-23: Proximity to Designated Sites* in the accompanying map book.

3.4.1 Other Nature Conservation Designations

The Ramsar Convention entered into force in Ireland on 15th March 1985. Ireland currently has 45 sites/wetlands designated as Wetlands of International Importance (Ramsar Sites). These cover a surface area of 66,994ha.

There are no Ramsar sites in close proximity to Longford Pass Bog with the closest located in excess of 35km.

3.5 Hydrology and Hydrogeology

Longford Pass Bog forms part of the Suir Catchment (Catchment ID: 16) as defined by the EPA under the Water Framework Directive (WFD). The bog lies within the Suir_SC_040 sub catchment. Longford Pass had a partially pumped system, but the pump has been permanently depowered since 2022 and is scheduled for removal. Longford Pass now has a gravity-based drainage system. Some remedial drainage was carried out to manage water-levels via gravity flow to the north under the road.

The bog contains two drainage pathways and discharge locations, discharging to streams (via silt ponds), which eventually flow into the River Suir.

The Dolomitised Waulsortian formation is classified as a regionally important aquifer (Rkd) because of its diffuse karstification, while the unbedded lime-mudstone Waulsortian formation is classified as a regionally important (Rk) as it is subject to karstification.

The Crosspatrick Formation is considered a Locally Important Aquifer - Bedrock which is Generally Moderately Productive (Lm). The Ballysteen Formation is also considered a Locally Important Aquifer Bedrock but is Moderately Productive only in Local Zones (LI).

An aquifer is an underground body of water-bearing rock or unconsolidated materials (gravel or sand) from which groundwater can be extracted in useful amounts. GSIs Aquifer classes are divided into three main groups based on their resource potential, and further subdivided based on the type of openings through which groundwater flows. There are nine aquifer categories in total. Locally important aquifers are capable of supplying locally important abstractions (e.g. smaller public water supplies, group schemes), or good yields (100-400 m^3/d). This data gives an indication of sub-surface deposits (bedrock and unconsolidated materials) in terms of their groundwater resource potential and dominant groundwater flow type.

Regionally important aquifers are those in which the network of fractures, fissures and joints, through which groundwater flows, is well connected and widely dispersed, resulting in a relatively even distribution of highly permeable zones. There is good aquifer storage and groundwater flow paths can be up to several kilometres in

length. There is likely to be substantial groundwater discharge to surface waters ('baseflow') and large (>2,000 m^3/d), dependable springs may be associated with these aquifers.

The majority of the cutover bog is located in an area mapped by GSI as of low groundwater vulnerability with some peripheral sections having moderate groundwater vulnerability (GSI Mapviewer). Groundwater vulnerability for the area surrounding Longford Pass Bog ranges from predominantly high to extreme vulnerability. Groundwater Vulnerability is a term used to represent the intrinsic geological and hydrogeological characteristics that determine the ease with which groundwater may be contaminated by human activities. Groundwater vulnerability maps are based on the type and thicknesses of subsoils (sands, gravels, glacial tills (or boulder clays), peat, lake and alluvial silts and clays), and the presence of karst features. Groundwater is most at risk where the subsoils are absent or thin and, in areas of karstic limestone, where surface streams sink underground at swallow holes. These data indicate there is generally low risk of any groundwater contamination occurring at this site. Groundwater Vulnerability is typically used to indicate the susceptibility to groundwater pollution.

3.6 Emissions to surface-water and watercourses

Longford Pass Bog has 2 treated surface water outlets (SW17 and SW18) from previously active peat extraction catchment, which discharge to the Drish 20 river (EPA Code: IE_SE_16D020068) to the north east of the site and to the TEMP_16V04 stream, a tributary of the Drish 16 river (IE_SE_16D020200) from the west of the site. The Drish 16 river is classed as Poor water quality status and the TEMP_16V04 stream is classed as Good water quality status (River Waterbody WFD Status 2019-2024).

The locations of silt ponds, associated surface water emission points and those being monitored and sampled as part of the IPC licence are detailed on the *BNM-ECO-26-11-02 Longford pass: Structures and Sampling*, along with the water quality map (*BNM-ECO-26-11-WQ01: Water Quality Map*) in the associated map book.

Peat extraction is identified as a pressure in the third cycle of the River Basin Management Plan (Water Action Plan for Ireland) all be it not a significant pressure. The main emission limit value (ELV) associated with these bogs is 35mg/l suspended solids, with trigger levels for ammonia of 3.6 mg/l and COD 100mg/l.

An analysis of the results over a number of years of the IPC licence environmental monitoring of some of the discharges from these bogs (appendix XII), indicates that results were under the Emission Limit Value for Suspended Solids 100% of this period, with a similar level of compliance for COD and under the trigger level for Ammonia, all trending in the right direction.

Ammonia averaged 0.5mg/l and ranged from 0.015 to 2.9 mg/l with Suspended Solids ranging from 2 to 39 mg/l and averaging 7.52mg/l.

Rehabilitation of cutaway peatland is closely linked with control of emissions. One of the criteria for successful rehabilitation is stabilisation through re-vegetation, which will stabilise all substrates and in turn remove the need for further silt control measures. This site is already vegetated in some areas. Re-wetted peat also aids the primary objective of stabilizing peat, as when peat is re-wetted it is not vulnerable to wind erosion. Re-wetted peat and the development of wet peatland habitats can also act as sinks for silt and mobile peat, and increases additional retention time for solids, and the peatland vegetation can quickly stabilise this material within blocked drains on site (by acting like constructed wetlands).

Water quality of water discharges from restored peatlands normally improves as a result of bog restoration measures and the restoration of natural peatland processes (Bonn *et al*., 2017). Bog restoration is also expected to improve water attenuation of the site as the drains are blocked, slowing water movement and water release from the site. Restored peatlands help slow the release of water and aid the natural regulation of floods downstream (Minayeva *et al*., 2017). The draft National River Basin Management Plan (NRBMP) 2022-2027 (DHPCLG, 2022) is the key national plan for Ireland to achieve the objectives of the Water Framework Directive (WFD). The NRBMP outlines how key actions such as the BnM peatland rehabilitation is expected to have a positive impact on water quality and help the NRBMP deliver its objectives in relation to the WFD.

Water will still discharge from designated emission points when rehabilitation at Longford Pass has been completed. This discharge will have improving water quality and there will be increased wetland attenuation, meaning slower release of water. This is expected to have a positive impact on status of downstream water bodies. While water quality improvements assist in meeting water frameworks directive ambitions and targets, they can also improve drinking water sources in applicable catchments with drained peatlands and the potential for associated reduction in treatment requirements at drinking water treatment facilities.

Decommissioning and Rehabilitation Programme Water Quality Monitoring.

Initial quarterly results are included in Appendix XII, for Longford Pass.

BnM have been providing the Local Authority Water Programme (LAWPRO) with details of the surface water emissions points associated with this bog.

This is necessary to ensure that there is alignment with the WFD monitoring programme and that where possible, the monitoring programme will enable any improvements in water quality or establishing trends to be quantified against any available WFD monitoring data. It will also enable the periodic sharing of data which will inform the monitoring reports, success criteria and enable LAWPRO under the Water Framework Directive to track any changes in pressures and be aware of changes in water chemistry.

Monitoring results will be maintained, trended every six months and reported on each year and as required, as part of the requirement to report on Condition 10.1 of the IPC Licence on Bog Rehabilitation in the Annual Environmental Report, and will be provided to LAWPRO and the EPA as required to inform progress and national monitoring requirements under the WFD.

These results will also be available in May each year as a requirement of the Annual Environmental Report at www.epa.ie.

The parameters to include as per condition 6.2 of the IPC Licence include monthly monitoring for pH, Flow, Suspended Solids, Total Solids, Total Phosphorus, Total Ammonia, Colour & COD.

3.7 Fugitive Emissions to air

None.

The bog is no longer in industrial peat production. Rehabilitation of the cutaway peatland will seek to re-wet the dry peat where possible and re-vegetate all areas (whether wet or dry). Collectively, ceasing industrial peat production, re-wetting and re-vegetating will minimise any risk of emission to air from dust.

3.8 Carbon emissions

Irish peatlands are a huge carbon store, containing more than 75% of the national soil organic carbon (Renou-Wilson *et al.* 2012). Peatland drainage and extraction transforms a natural peatland which acts as a modest carbon sink (taking in 0.1 to 1.1 t of carbon as CO_2-C /ha/yr) into a cutaway ecosystem which is a large source of carbon dioxide (releasing 1.3 to 2.2 t of carbon as CO_2-C /ha/yr) based on Tier 1 Emission factors (Evans *et al*. 2017). Renou-Wilson *et al.* (2018) reported losses of between 0.81 – 1.51 CO_2-C /ha/yr from drained peatlands located in Ireland.

Re-wetting of dry peatlands will increase methane emissions (Gunther *et al*. 2020) as a consequence of the anoxic conditions within the peat body that provide a suitable environment for the microbial breakdown of plant litter and root exudates. Tanneberger *et al.* (2021) describes how peatland management has to choose between CO_2 emissions from drained peatlands or increased methane (CH_4) emissions from rewetted industrial peatlands. However, when radiative effects and atmospheric lifetimes of both GHG gases are considered and modelled, postponing rewetting increases the long-term warming effect of continued CO_2 emissions (Gunther *et al*. 2020). This means the increase in methane due to rewetting of dry peatlands is still negated by the CO_2 emissions reductions. Further, Wilson *et al.* (2022) confirmed the benefit of rapid rewetting to achieve strong carbon reductions and potentially altering the warming dynamics from warming to cooling depending upon the climate scenario.

It is expected that Longford Pass Bog will become a reduced carbon source following rehabilitation. The potential of any cutaway site to develop as a carbon sink in the longer-term depends on the success of the rehabilitation measures, the extent of development of *Sphagnum*-rich or other peat-forming habitats, the balance of carbon fluxes from different cutaway habitats and future climatic conditions. Much of this bog is expected to develop wetland habitats on shallow peat with open water, reed swamp and fen habitats with alkaline emission factors and a smaller proportion will develop as regenerating wet deep peat vegetation on deep peat areas. Birch woodland is expected to develop on the drier mounds and along peripheral headlands.

3.9 Current ecological rating

(Following NRA (2009) Evaluation Criteria)

The majority of this site is deemed to be of low ecological value due to the dominance of bare peat or open water on bare peat as a result of industrial peat production. Areas still dominated by bare peat are rated as having a low-moderate local ecological value in general. These bare peat and associated pioneer habitats are currently deemed to be of **local importance, lower value.**

A proportion of the site has higher biodiversity value in a local context and is rated as **Local Importance (higher value)** as the site supports developing semi-natural habitats and pioneer cutaway habitats such as the wetland area, Birch woodland and some of the marginal remnant habitats are also included in this higher ecological rating.

4. CONSULTATION

4.1 Consultation with interested parties

There has been ongoing consultation about rehabilitation, biodiversity and other general issues over the years about Littleton bog group, including Longford Pass Bog, with various stakeholders in relation to:

- General consultation with range of stakeholders at annual Bord na Móna Biodiversity Action Plan review days 2010-2018.
- Open consultation with range of stakeholders at annual BAP review days 2010-2018.
- Consultation with the North Tipperary Heritage Forum during the period 2010-2015.
- General consultation at a local community event in Littleton in Dec 2016.
- General consultation with Tipperary County Council and other stakeholders in relation to the Littleton Labyrinth Project Feasibility Study.
- Ongoing engagement with Lisheen Mine.
- Archaeological Liaison Committee (National Museum of Ireland & Dept of Culture Heritage and the Gaeltacht).
- Midlands & East Regional WFD Operational Committee (River Basin Management Plans).
- Ongoing consultation with Coillte – proposed Coillte/BnM Midlands Native Woodland Project.
- Ongoing consultation with Slieve Ardagh Rural Development Group.
- General consultation with Tipperary County Council and other stakeholders in relation to the Midlands Network Trail.
- Specific Consultation with Tipperary Climate Action Officer and Biodiversity Officer relating to the Tipperary Climate Action Plan and the Mid-Tipperary Decarbonising Zone.

There was specific consultation and engagement about rehabilitation of the Littleton Bog group, including Longford Pass, with various stakeholders during the period 2018-2021:

- Lisheen Mine.
- Irish Peatland Conservation Council.
- NPWS (site visits).
- Tipperary County Council (2018).
- Tipperary Heritage Forum.
- Kilkenny County Council.
- Consultation with members of the local community.
- Consultation with local community groups.
- Slieve Ardagh Rural Development.
- National University of Galway.
- Limerick Institute of Technology.
- Irish Wildlife Trust.
- Environmental Protection Agency.
- Birdwatch Ireland.
- Birdwatch Ireland Tipperary Branch.
- Forest Service.
- Coillte.

To inform the original Plan (Phase 1 Rehabilitation), both national and local stakeholders, and local representatives of national bodies (such as Regional National Parks and Wildlife Service staff) and relevant offices in County Councils (such as the Heritage or Environmental Offices) were contacted. Any identified local interest groups were informed of the opportunity to engage with this rehabilitation plan and were invited to submit their comments or observations in relation to the proposed rehabilitation (Phase 1) at Longford Pass Bog or the programme in general

4.2 Issues raised by Consultees

Some issues were raised by consultees during the consultation process for the rehabilitation plan for Longford Pass Bog and for response to consultation for rehabilitation across the Littleton Bog Group between 2018-2025, and these are summarised below.

NPWS welcomed the restoration and rehabilitation measures proposed for the Littleton Bog Group in 2018, particularly where it could result in the development of Annex I active raised bog or would significantly aid Ireland in meeting its commitments under the EU Habitats Directive.

NPWS (2018) suggested that BnM consider more fully the potential for forward-planning during production phases of its operation so that the topography of the commercial fields could be engineered so as to best facilitate rewetting of the sites. Consideration should be given to reprofiling works within the Littleton Bog Group.

NPWS (2018) highlighted the potential for more intensive rehabilitation during initial consultation and the potential for larger project opportunities focusing on GHG emission reduction creation of peat-forming habitats, biodiversity enhancement, other ecosystem services enhancement/restoration. The use of bunding at several sites was discussed.

Birdwatch Ireland (2018) welcomed the proposed restoration/rehabilitation of the Littleton Bog Group and highlighted need to take consideration of bird nesting season when carrying out works, particularly for Lapwing and Curlew.

IPCC (2018) requested clarity around the scope of sites included in the Littleton Rehabilitation Programme and recommended that priority be given to raised bog restoration, where possible. IPCC were concerned about the fact that milled peat extraction was projected to continue at Killeen Bog (in 2018, subsequently ceased in 2021). The IPCC were also unclear about the aims and objectives for sites with biodiversity interest. The IPCC recommended the use of contouring as a methodology to improve re-wetting outcomes.

The IPCC (2018) highlighted that monitoring of changes to water-levels as a result of rehabilitation could be improved using piezometers and queried the frequency of ecotope mapping. NPWS (2018) recommended that ongoing research into the interaction between rehabilitation measures and carbon emissions is prioritized so as to better inform future rehabilitation plans.

The Irish Farmers Association (IFA), The Department of Agriculture Food and the Marine, individual local residents and ICMSA queried likely impacts relating to the finalisation of several bog rehabilitation plans in 2021 and 2022. They raised concerns based on the proposed re-wetting in relation to flooding on adjoining lands and, specifically, with regards to the maintenance of drains. In previous submissions, the IFA also raised the issue of Health and Safety in relation to raising water levels as well as possible impacts on land and property prices.

Several individuals who owed adjacent land to bogs within the Littleton Bog Group expressed concerns about the potential impacts of re-wetting to their land (2018).

Several individuals and organisations expressed interest in the development of amenity and greenways through the Littleton Bog Group (2018). IPCC highlighted a bog area at the north of Littleton Bog that had been used for educational purposes in the past.

Tipperary County Council (2018) highlighted the need to avoid any unnecessary deterioration in the quality and quantity of ground and surface waters. Tipperary County Council (2018) also suggested that peatland water levels and flow regimes should be restored to as close to the natural reference conditions as possible.

Queries about future nature conservation designations were also submitted by IPCC, discussed with IWT and with Birdwatch Ireland Tipperary Branch. Birdwatch Ireland, Tipperary Branch (2018) suggested further management of sites for to improve habitat for breeding wetland birds.

The Irish Farmers Association (IFA) (2021-2022) expressed concerns regarding the future ownership of the BnM bogs subject to rehabilitation, in submissions made on earlier rehabilitation plans. They expressed a desire for contingency planning for potential future ownership of designated bogs so as to ensure no negative impacts arise on adjacent properties from any new ownership.

University of Galway (2017) were interested in developing an INTEREG Project on peatland sites and were discussing the inclusion of several BnM sites in this proposed project. (This subsequently became the CarePeat INTEREG Project and Cavemount Bog Co. Offaly was included in the project, which is now completed).

Limerick Institute of Technology (LIT) were interested in developing a project on peatlands and paludiculture and were discussing the potential availability of land within the Littleton Bog Group. This proposal ultimately did not develop into a project on BnM lands.

An individual highlighted the presence of several rare Bee Orchid varieties along the BnM railway at Longford Pass.

Tipperary County Council developed a Climate Action Plan in 2024 and have developed an area called the Mid Tipperary Decarbonizing Zone. This Decarbonising Zone within the local authority area is to act as a test bed for a range of climate mitigation, adaptation and biodiversity measures in a specifically defined area through the identification of projects and outcomes that will assist in the delivery of the National Climate Objective (Tipperary County Council 2024).

4.3 BnM response to issues raised during consultation and rehabilitation 2018-2021

BnM carried out extensive consultation and engagement with all interested parties during 2018-2021.

Consultees during the Phase 1 rehabilitation (2018-2021), including NPWS and the IPCC, suggested the use of more intensive rehabilitation measures such as contouring and bunding. These ultimately were beyond the scope of the rehabilitation budget allocated to these sites by BnM at the time (2018-2021). PCAS is now an opportunity to carry out some of these suggested measures (e.g. bunding, recontouring) through the Littleton Bog Group as part of Phase 2 rehabilitation and various additional phase 2 rehab has been proposed for Templetouhy, Carrickhill, Derryville, Baunmore, Inch, Ballybeg, Derryvilla and Killeens. This additional Phase 2 rehab is dealt with by the 2025 update to the Ballybeg-Lanespark-Derryvilla Rehabilitation Plan 2025.

Sphagnum inoculation is one measure that was initially suggested by IPCC (in 2018) for use at Ballysorrell to support raised bog restoration. This measure was ruled out initially by BnM in 2018 due to its relatively high cost, lack of resources and other logistical issues such as lack of suitable local *Sphagnum* donor sites. Since then, BnM has developed the Peatlands and People LIFE Project (Home | Ireland's Climate Action Catalyst | Peatlands &

People) and one of the main objectives of this project on BnM land is to inoculate approx. 800 ha of suitable residual deep peat with *Sphagnum* plugs to speed up the trajectory of development of *Sphagnum*-rich embryonic bog vegetation. So far, 350 ha has been inoculated across midlands bogs. The future selection of sites within the Littleton Bog Group for *Sphagnum* inoculation will be dependent on availability of resources for planting. Site visits to Lanespark and Littleton (2025) has also shown that *Sphagnum* is present on site and is recolonising and spreading in certain areas quickly in response to the re-wetting in 2018-2021.

Rehabilitation measures should positively impact the water quality in receiving water bodies through enhancing the water attenuation across rehabilitated sites. The robust water monitoring programme implemented will be used to assess water quality leaving rehabilitated sites at designated points. BnM also advised that decommissioning of silt ponds will only be carried out when the EPA are satisfied that adequate stabilisation of the bog has been achieved and silt ponds are no longer required. This decommissioning will be determined by water quality results and EPA approval.

During Phase 1 of the rehabilitation across Littleton Bogs, individual landowners who expressed concerns were met on site. No boundary drains were blocked and, in several instances, (Ballybeg) some internal drainage was modified to allow water draining from external lands to flow through these sites unhindered. It is the intention of BnM that the re-wetting of the bogs will be carried out in such a manner that does not impact on third party lands. Where it is deemed that blocking of a shared drain would cause any adjoining lands to be adversely affected, this will be avoided, and alterations made to the rehabilitation plan. In general, drains around the margins of the bog will not be blocked. It is intended that rehabilitation measures will not significantly alter the existing topographical catchments and that the spine of the drainage networks, those which the upstream catchments drain through, will be retained by BnM. If issues arise with boundary drainage in the future, then these will be dealt with by BnM.

BnM and Tipperary County Council carried out a feasibility study of the potential for amenity development across the Littleton Bog Group called Littleton Labyrinth in 2018-2020. The first phase of this amenity has been completed, and a greenway has been constructed at Killeen Bog to Loch Doire Bhile. A further extension (Phase 2) is proposed at Ballybeg and Derryvella Bog. There is potential for future extensions to this greenway network in the future. These greenways can be integrated into the rehabilitated landscape with no significant impact to the previous re-wetting.

Rehabilitation plans are not intended to plan out future management of these sites. Known or planned after-use (way-leave, Littleton Labyrinth greenway feasibility) has been incorporated, where possible, in the rehabilitation plan. Peatland rehabilitation is not intended to constrain future land-uses, where they are compatible with this environment.

BnM will continue to manage their land bank into the future. As industrial peat production has now ceased on BnM lands and rehabilitation measures carried out, a regular drainage maintenance programme will not be required or carried out as would have been the case in the past. However, if issues arise with the BnM internal drainage system that affects upstream or downstream landowners, then these issues will be addressed by BnM.

BnM considers issues regarding estate security, fire risk, invasive species and water pollution of utmost importance. BnM intends to maintain security and manage fire risk over the entirety of the estate. In this regard, rehabilitation should have no detrimental impact on these issues. Regarding water pollution, BnM is regulated by the EPA and as such adheres to the strict water pollution measures laid out by the same. BnM will consider future opportunities for biodiversity enhancement, subject to availability of resources and funding, where possible. BnM intends to maintain a “No Shooting” policy on Longford Pass Bog.

It is the intention of BnM to keep secure the estate and ensure that any anti-social behaviour that occurs within the estate is reported and dealt with by the appropriate authorities.

5. REHABILITATION GOALS AND OUTCOMES

The rehabilitation goals and outcomes outline what BnM want to achieve by implementing the rehabilitation. These include:

- Meeting conditions of IPC Licence.
- Stabilisation or reduction in water quality parameters of water discharging from the site (e.g. suspended solids).
- Reducing pressure on receiving waterbodies that have been classified as *At Risk* from peatlands and from peat extraction, via stabilization or improving water-quality from this bog, and therefore, reducing pressures.
- Optimising hydrological conditions for **climate action benefits.**
- Optimising hydrological conditions for the development of reed swamp and fen on shallow more alkaline peat and other subsoils, or *Sphagnum*-rich regenerating wet deep peat vegetation communities on deep residual peat, where present.
- Optimising hydrological conditions for the protection of exposed archaeological structures, their retention in situ and preservation into the future.
- Integrating rehabilitation measures with existing land-use (e.g. conifer forestry). Supporting other potential future land-uses. Integrating rehabilitation measures with future potential land-uses on site. It is not proposed to carry out any rehabilitation actions to change or negatively affect any infrastructure.
- The main goal and outcome of this plan is the successful rehabilitation (environmental stabilisation) of peatlands used for industrial peat production at the bog in a manner that is acceptable to both external stakeholders and to BnM and which optimise climate action and other ecosystem service benefits.

The rehabilitation goals and outcomes take account of the following issues.

- BnM have carried out rehabilitation at Longford Pass Bog in 2018-2021 (Phase 1 rehabilitation). Significant drain-blocking and re-wetting was carried out during this phase.
- It will take some time for stable naturally functioning habitats to fully develop at Longford Pass Bog. This will happen over a longer timeframe than the implementation of this rehabilitation plan.
- Re-wetting residual peat will initially maintain and enhance the carbon storage capacity of the bog. There is scientific consensus that restoration of hydrology in damaged bog can improve carbon storage, water storage and attenuation and help support biodiversity both on the site and in the catchment (See Section 3.8). This will reduce carbon emissions from the site from a larger carbon source to a smaller carbon source. In time, the site has the capacity to develop in part as a carbon sink.
- It is not expected that the cutover bog in the former production area has the potential to develop active raised bog (ARB) analogous to the priority EU Habitats Directive Annex I habitat within the foreseeable future (c.50 years). Longford Pass Bog has some sections with relatively deep residual peat across the site, with sections of the bog containing shallow residual peat and proportions of the bog cutaway with exposed gravel ridges. Therefore, there are areas that have potential to develop *Sphagnum*-rich habitats in this timeframe. Nevertheless, re-wetting across the entire bog, will improve habitat conditions of the whole bog. Other peatland habitats such as wetland or scrub/woodland will develop in a wider mosaic that reflects underlying conditions.

- Rehabilitating former industrial peat production bog will also in the longer-term support other ecosystem services such as such the development of new habitat to support biodiversity and local attenuation of water flows from the bog.
- WFD status in receiving water bodies can be affected by peatlands and peat extraction but is also affected by other sources such as agriculture. In addition, receiving water bodies that are assessed as At Risk from peatlands and from peat extraction are likely to have several contributary sources of impacts (private peat extraction and BnM). Reducing pressures due to former peat extraction activities at Longford Pass Bog will contribute to stabilising or improving water quality status of receiving water bodies in general. Ultimately, improving the WFD status of the receiving water body will depend on reducing pressure from a range of different sources, including peatlands in general (private and BnM).
- Re-wetting in general will benefit the future preservation of most known and unknown archaeological features.

6. SCOPE OF REHABILITATION

The principal scope of this enhanced rehabilitation plan is to rehabilitate the bog. This is defined by:

- The area of Longford Pass Bog within the rehabilitation footprint.
- EPA IPC Licence - Ref. P0499-01. As part of Condition 10.2 of this licence, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area.
- The eastern portion of the site has rewetted bare deep residual peat. Much of the remainder of the site already has establishing pioneer cutaway habitats with some areas having well-developed habitats. Targeted drain-blocking, wetland outfall management and deep peat measures are the most suitable rehabilitation approach for the site.
- BnM have defined the key goal and outcome of rehabilitation at Longford Pass Bog as **environmental stabilisation** and **optimising residual peat re-wetting,** to enhance the development of compatible habitats.
- Rehabilitation of Longford Pass Bog will support multiple national strategies of climate action, biodiversity action and other key environmental strategies such was the Water Framework Directive.
- Rehabilitation of Longford Passs Bog also supports and aligns with the goals and objectives of the Tipperary Decarbonizing Zone.

6.1 Key constraints

- **Bog conditions.** Rehabilitation outcomes are constrained by the environmental characteristics of the particular bog. For example, there is potential for raised bog restoration at some sites where there has not been significant industrial peat extraction, and the peat body is largely intact (deep peat sites that are drained). At other sites, most of the peat mass has been removed, the environmental characteristics of these areas have therefore changed radically (peat depths, hydrology, water chemistry, substrate type, nutrient status, etc.) and there will therefore be different habitat outcomes (wetlands, fen, heathland, grassland and Birch woodland).
- The majority of Longford Pass has shallow residual peat with a significant areas of deep residual peat. One pump is still present on site but remains non-functional. The bog now has a gravity-based drainage regime. Areas of residual deeper peat are likely to develop *Sphagnum* rich deep peat vegetation in time. Wetland habitats (fen, wetland, reedswamp) and dry cutaway habitats (birch woodland, scrub and heath) are the most likely habitats to develop in areas with shallower peat. These habitats are already developing in places.
- **Surrounding landscape and neighbours.** Another key constraint is the interaction between the BnM bogs and the surrounding landscape. Care has to be taken that no active rehabilitation management is carried out that could negatively and knowingly impact on surrounding land. This includes any hydrological management on neighbouring farmland. It is anticipated that the work proposed here (blocking drains and re-wetting cutaway peatlands) will not have any flooding impacts on adjacent land.
- **Archaeology**. The discovery of monuments or archaeological objects during peatland rehabilitation may potentially constrain the rehabilitation measures proposed for a particular area. The rehabilitation will optimise hydrological conditions for the protection of exposed archaeological structures, their retention in situ and preservation into the future. Any newly discovered archaeology may require rehabilitation measures to be reviewed and adapted. An Archaeological Impact Assessment (Appendix XII) will be carried out to mitigate against any impact on archaeology that may be found at the bog. Should any

previously unknown archaeological material be uncovered during the rehabilitation works, it will be avoided and reported to the BnM Archaeological Liaison Officer and the National Museum of Ireland.

- **Conifer plantation Forestry and agricultural grassland**. Conifer plantation forestry and parcels of agricultural grassland border the bog. These areas have been identified as constrained land where they overlap the rehabilitation footprint.
- **Leases**: Part of the site has been leased to Thurles Gun Club and this area has been mapped as a constraint on the rehabilitation plan.
- **Coillte/BnM Midlands Native Woodland Project.** Longford Pass is proposed to be included in the Coillte/BnM Midlands Native Woodland Project (Midlands Native Woodland - Coillte). The main objective of this proposed project is to develop and enhance native woodland in areas of cutaway that would remain naturally dry, developing woodland habitat that would naturally complement wetland and peatland habitats already developing across these sites. This proposed project is currently being considered for consent by the Forest Service. Areas proposed to be included in Native Woodland Project have also been mapped as constrained land in the rehabilitation plan.
- **Amenity development**. Tipperary County Council and BnM carried out a feasibility study of the potential for amenity development across the Littleton Bog Group called Littleton Labyrinth. There is potential for future extensions to this greenway network through Longford Pass Bog. The proposed rehabilitation measures will not impact on the delivery of any future amenity as a route is still available across the bog, and there is no constraint to rehabilitation.

6.2 Key Assumptions

- It is assumed that BnM will have all resources required to deliver this project.
- It is expected that weather conditions will be within normal limits over the rehabilitation plan timeframe. Long periods of wet weather have the capacity to significantly affect ground conditions and constrain drain blocking and other ground activities.

6.3 Key Exclusions

The scope of this rehabilitation plan does not cover:

- Areas subject to turf cutting are excluded should any still exist.
- The longer-term development of stable naturally functioning habitats at Longford Pass Bog. The plan covers the short-term rehabilitation **actions** and **an additional monitoring and after-care programme** to monitor the rehabilitation and to respond to any needs.
- This plan is not intended to be an after-use or future land-use plan for Longford Pass Bog.
- The longer-term management of this site, potentially as a nature conservation site, or for amenity, or for other uses in the future.

7. CRITERIA FOR SUCCESSFUL REHABILITATION

This section outlines what criteria will be used to indicate successful rehabilitation and what critical success factors are needed to achieve successful rehabilitation. All criteria used will be measured to validate the achievement of the rehabilitation goals and outcomes and validate the completion of the rehabilitation.

The key objective of this enhanced rehabilitation plan is **environmental stabilisation** and the stabilisation of any emissions from the site that related to the former industrial peat extraction activities.

Rehabilitation is generally defined by BnM as:

- stabilisation of bare peat areas via targeted active management (e.g. drain-blocking/re-wetting) slowing movement of water across the site and encouraging natural colonisation; and
- mitigation of key emissions (e.g. potential run-off of suspended solids).

In addition, BnM wish to optimise climate action and other ecosystem service benefits via enhanced rehabilitation measures.

7.1 Criteria for successful rehabilitation to meet EPA IPC licence conditions:

- Rewetting of residual peat in the former area of industrial peat production to offset potential silt run off and to encourage and accelerate development of vegetation cover via natural colonisation and reducing the area of bare exposed peat. See Table 7.1 for a summary of the criteria for successful rehabilitation and associated monitoring. The target will be the delivery of measures and this will be measured by an aerial survey after rehabilitation is completed.
- That there is a stabilizing/improving concentration of suspended solids and ammonia in discharges from BnM sites, associated with the measures undertaken to stabilize the peat surface by the blocking of the internal drainage system and the maximized rewetting of the peat surface. This will be demonstrated by developing a stable or downward trajectory of water quality indicators (suspended solids and ammonia) towards what would be typical of a re-wetted cutaway bog. This will be measured via water quality monitoring (suspended solids and ammonia) for at least 2 years after the rehabilitation has been completed.
- Receiving water bodies have been classified under the River Basin Management Plan and this classification includes waters that are *At Risk* from peatlands and peat extraction. The success criteria will be that the *At Risk* classification will see improvements in the associated pressures from this peatland or if remaining *At Risk*, that there is an improving trajectory in the pressure from this peatland.

Table 7-1 Summary of Success criteria, targets, how various success criteria will be measured and expected timeframes.

Criteria type	Criteria	Target	Measured by	Expected Timeframe
IPC validation	Rewetting in the former area of industrial peat production	Delivery of rehabilitation measures Reduction in bare peat.	Aerial photography after rehabilitation has been completed – to demonstrate measures (drain-blocking) Establishment of a baseline for future monitoring of bare peat, vegetation establishment and habitat condition.	2025-2027
IPC validation	Key water quality parameters Ammonia, Phosphorous, Suspended solids, pH and conductivity	Reduction or stabilisation of key water quality parameters associated with this bog	Water quality monitoring for a period after rehabilitation has been completed	2025-2027
IPC validation	Reducing pressure from peat production on the local water body catchment (WFD)	Where this section of the water body, that this bog drains to, has not been identified as under pressure from peat extraction, that the intervening EPA monitoring programme associated with its Programme of Measures for this water body, confirms that its classification remains at not being at risk from peat extraction associated with activities at this bog.	EPA WFD monitoring programme	WFD schedule

Meeting climate action verification criteria and monitoring of these criteria after the scheme has been completed is dependent on support from the Climate Action Fund or other sources of funding. Note that monitoring and verification of the overall scheme will be stratified – not all these criteria will be measured at each individual site. Baseline monitoring to be carried out during the scheme when rehabilitation is complete. Sites can be re-monitored in the future and compared against this baseline.

7.2. Critical success factors needed to achieve successful rehabilitation as outlined in the plan

The achievement of successful rehabilitation as outlined in the plan requires:

- **Funding to pay for resources required to deliver the planned rehabilitation (BnM and external).** BnM maintains a provision on its balance sheet to pay for these future costs. BnM is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence. It is expected that additional costs of enhanced rehabilitation will be supported by Government through the Climate Action Fund and Ireland's National Recovery and Resilience Plan.
- **BnM to have sufficient resources (staff and training) to deliver the planned rehabilitation with required associated skills and competencies.**
- **BnM to have sufficient resources (suitable machinery) and staff to maintain this machinery.**
- **Weather conditions to be within normal limits over the rehabilitation plan timeframe.** Long periods of wet weather have the capacity to significantly affect ground conditions and constrain the delivery of rehabilitation. The potential impact of wet weather on ground conditions can be reduced by appropriate planning and management. BnM have significant experience of managing these issues through 70 years of working in these peatland environments.
- **Rehabilitation measures to be effective.** The rehabilitation measures proposed in this plan are based on 40 years of BnM experience of peatland management and best practice applied internationally in peatland management. Measures proposed in this plan have already been shown to be affective at other sites. BnM will apply a flexible and adaptable approach to the more innovative rehabilitation measures proposed in this plan**.** If measures are not initially effective, BnM will review any requirement for additional practical rehabilitation.
- **Natural colonisation of vegetation to develop semi-natural habitats at a rate within the normal limits.** The development of naturally functioning semi-natural habitats on degraded bog takes time. It may take 30-50 years for active raised bog vegetation to re-develop on suitable cutaway that was previously bare peat. However, BnM experience has demonstrated the effectiveness of these type of measures for re-wetting bog and creating carbon sinks (Renou-Wilson *et al*. 2018).
- Rehabilitation measures have been designed to accelerate and work with natural colonisation and other natural processes. BnM experience of rehabilitation has shown that re-wetting improves conditions for natural colonisation and that natural colonisation is accelerated where the environmental conditions are most suitable. Rehabilitation measures have been designed to modify the conditions of areas within sites where conditions are less suitable for natural colonisation (modifying hydrology, topography, nutrient status or availability of potential seed sources).
- **Monitoring to be robust and effective.** Rehabilitation Monitoring will be established to validate the success of rehabilitation as required by Condition 10 of the IPC Licence and to verify the benefits of the proposed enhanced measures to optimise climate action. This will focus on a collecting a range of scientific data that can then quickly be adapted and into metrics that can be used to measure changes in various ecosystem services.

8. Rehabilitation Actions and Time Frame

Peatland rehabilitation requires detailed planning and the use of data from desktop surveys and field surveys. This data in association with topographical and hydrological modelling will be important in planning the future peatland landscapes and planning the use of the most appropriate rehabilitation methodologies to maximise climate action benefits. Hydrological modelling indicates those areas that are likely to re-wet when drains are blocked, based on the current topography, and areas where water levels may have to be modified, where needed. Enhanced rehabilitation measures will look to optimise hydrological conditions for re-wetting peat in other areas. This planning is also essential for matching the most sustainable rehabilitation methodology to the most suitable cutaway environment to maximise the benefits of the resource outlay (maximising cost/benefit).

A number of illustrative figures have been produced to inform Rehab Planning and Design, including Aerial Photography, Peat Depths, LiDAR Surface Maps, and Depression Analysis modelling; these are included in the accompanying Mapbook as the drawings referenced below:

BNM-ECO-26-11-21 Longford Pass Bog: Aerial Imagery 2000

BNM-ECO-26-11-22 Longford Pass Bog: Aerial Imagery 2020

BNM-ECO-26-11-04 Longford Pass Bog: Peat Depths

BNM-ECO-26-11-03 Longford Pass Bog: LiDAR Map

BNM-ECO-26-11-09 Longford Pass Bog: Depression Analysis

The rehabilitation actions themselves will be a combination of measures to re-wet peat. The distribution of these measures is provisionally outlined in drawing titled *BNM-ECO-26-11-20 Longford Pass Bog: Standard Rehab Measures* in the accompanying Mapbook (note that the actual distribution of these measures may be subject to change in response to stakeholder consultation and refinement of the enhanced rehabilitation measures.)

Extensive drain-blocking was already carried out as part of the rehabilitation programme between 2018-2021.

Rehabilitation measures for Longford Pass included below.

Re-assessment of the pumping regime

- Initial hydrological modelling indicated that a part of the site would develop a mosaic of wetland habitats with some permanent deeper water if the pump was decommissioned. Hydrological management looked to optimise summer water levels to maximise the development of wetland vegetation (by looking to set water depths at < 0.5 m, where possible. It is inevitable that some sections will naturally have deeper water due to the topography at this site and restrictions on lowering the level by gravity due the level of the outfall pipe under the road. Water-levels were adjusted at outfalls and by adjusting piped drainage, where possible. More sustainable permanent gravity drainage solutions were examined. It is expected that a natural seasonal regime of water fluctuation will develop, with water-levels fluctuating in association with levels of surrounding rivers.
- A targeted drain-blocking programme was implemented across the cutaway, where possible. In general, field drains were blocked where possible to re-wet cutaway and re-wet to the optimum water-level. More intensive measures were targeted towards the bare peat.
- Less intensive measures (targeted drain-blocking) were used in areas where habitats have already established.
- Hydrological measures included modifying outfalls and managing water levels with overflow pipes.

The existing silt ponds were retained and maintained during the rehabilitation phase. During the monitoring and verification phase the silt pond wase continually inspected and maintained, where appropriate. When it is deemed that the silt pond is not required, as the bog has been successfully stabilised and there is no silt run-off, the condition of the silt pond will be reviewed. The silt pond will either be de-watered (water levels lowered to a level where the silt pond will naturally develop as a small wetland feature), left in situ, or infilled (where discharges do not require silt control).

8.1 Completed

- A rehabilitation programme was carried out in Longford Pass between 2018-2021. This comprised of a range of measures outlined in *BNM-ECO-26-11-20 Longford Pass Bog: Standard Rehab Measures*. These measures varied in intensity, were targeted in places and reflected the existing environmental conditions.
- Some areas of bare peat had regular drain-blocking (Drain-blocking).
- Some areas were subject to reducing or ceasing pumping (Hydrological management).
- Some areas had minimal intervention as there were already re-vegetated and developing a mosaic of wetland, woodland and peatland habitats (Minimal intervention).
- Some areas were allowed to continue to develop as wetland due to the natural breakdown of drainage and ceasing drain maintenance (Wetland).
- Cutaway habitats are continuing to develop across Longford Pass Bog. Birch scrub and woodland has significantly expanded across the site on some of the drier, more elevated ground on the western side. The eastern and northern sections all have natural basins that are developing as wetlands. Pumping at this site ceased in 2022 and this has supported the expansion of wetlands. Pioneer vegetation is continuing to develop across the site and the bare peat cover is rapidly shrinking.
- In general, cutaway habitats are developing according to the underlying environmental conditions and reflect the varying topography, hydrology and peat depths. Drain-blocking and other rehabilitation measures have had a significant positive impact across the site in re-wetting residual peat and enhancing the development of wetland habitats. Ceasing pumping has also had a significant impact and has supported extensive wetland development across the site.

8.2 Short-term planning actions (0-1 years)

- Seek formal approval of this plan.
- Ensure all activities comply with the environmental protection requirements of the IPC Licence.

8.3 Short-term practical actions (0-2 years)

- Silt ponds will be monitored during this period and there will be continued maintenance and cleaning to prevent potential run-off of suspended solids from the site during the rehabilitation phase.

8.4 Long-term (>5 years)

- Evaluate success of short-term rehabilitation measures outlined above and remediate where necessary.
- Delivery of a monitoring, aftercare and maintenance programme (See section 9 below).

- Decommissioning of silt-ponds will be assessed and carried out, where required.
- Reporting to the EPA will continue until the IPC Licence is surrendered.

8.5 Timeframe

- **2026**: Short-term planning actions.
- **2025-2026**: Short-term delivery actions.
- **2026**: Long term delivery actions. Evaluate success of short-term rehabilitation measures outlined above and remediate where necessary.
- **2028**: Decommission silt-ponds, if necessary.

8.6 Budget and costing

BnM maintains a provision on its balance sheet to pay for the future costs of standard rehabilitation and decommissioning. This is updated every year - for more information see the BnM Annual Report (BnM, 2025). BnM is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence.

At this time, a 'standard' rehabilitation provision (sufficient to discharge the requirement of Condition 10 in the licence) has been allocated to the site based on the area of different cutaway types across the site

9. AFTERCARE AND MAINTENANCE

9.1 Programme for monitoring, aftercare and maintenance

This programme for monitoring, aftercare and maintenance has been designed to meet the Conditions of the IPC Licence. This is defined as:

- There will be **initial quarterly monitoring assessments** of the site to determine the general status of the site, the condition of the silt ponds, assess the condition of the rehabilitation work, monitoring of any potential impacts on neighbouring land, general land security, boundary management, dumping and littering.
- **Water quality monitoring** at the bog will be maintained. The main objective of this water quality monitoring will be to establish a baseline and then monitor the impact of peatland rehabilitation on water quality from the bog.
- Monitoring results will be maintained, trended and reported on each year as part of the requirement to report on Condition 10.1 of the IPC Licence on Bog Rehabilitation in the Annual Environmental Report, which will be available in April each year at www.epa.ie.
- The parameters to be included (as per condition 6.2 of the IPC Licence) include monthly monitoring for pH, Suspended Solids, Total Solids, Total Phosphorus, Total Ammonia, Colour, and COD and DOC.
- If, after two years, key criteria for successful rehabilitation are being achieved and key targets are being met, then the water quality monitoring will be reviewed, with consideration of potential ongoing research on site. The water quality data, the aerial surveys and the habitat mapping will be collated and will be submitted to the EPA as part of the final validation report.
- If, after two years, key criteria for successful rehabilitation have **not** been achieved and key targets have **not** been met, then the rehabilitation measures and status of the site will be evaluated and enhanced, where required. This evaluation may indicate no requirement for additional enhancement of rehabilitation measures but may demonstrate that more time is required before key criteria for rehabilitation has been achieved. Monitoring of water quality will then also continue for another period to be defined.
- Where other uses are proposed for the site that are compatible the provision of biodiversity and ecosystem services, these will be assessed by BnM in consultation with interested parties. Other after-uses can be proposed for licensed areas and must go through the required assessment process and planning procedures.

9.2 Rehabilitation plan validation and licence surrender – report as required under condition 10.4

IPC Licence Condition 10.4. *A final validation report to include a certificate of completion for the Rehabilitation Plan, for all or part of the site as necessary, shall be submitted to the Agency within six months of execution of the plan. The licensee shall carry out such tests, investigations or submit certification, as requested by the Agency, to confirm that there is no continuing risk to the environment.*

Reporting to the EPA will continue until the IPC Licence is surrendered. The bog will be included in the full licence surrender process as per the Guidance to Licensees on Surrender, Cessation and Closure of Licensed Sites EPA, 2012, when:

- The planned rehabilitation has been completed.

- The key criteria for successful rehabilitation have been achieved and key targets have been met;
- Water quality monitoring demonstrates that water quality of discharge is stabilising or improving; and
- The site has been environmentally stabilised.

10. REFERENCES

Atherton, I, Bosanquet, SDS & Lawley, M (2010). Mosses and liverworts of Britain and Ireland - a field guide. British Bryological Society.

Anderson, R., Farrell, C., Graf, M., Muller, F., Calvar, E., Frankard, P., Caporn, S., Anderson, P. (2017). An overview of the progress and challenges of peatland restoration in Western Europe. Restoration Ecology, Issue 2 Pages 271-282.

Barry, T.A. *et al.* (1973). A survey of cutover peats and underlying mineral soils. Soil Survey Bulletin No. 30. Dublin, Bord na Móna and An Foras Taluntais.

BnM (2025). BnM Annual Report 2025. BnM_Annual-Report-2025_English.pdf

Bord na Móna 2014. Blocking Drains in Irish raised bogs. The Bord na Móna Raised Bog Restoration Project. Cris, R. Buckmaster, S. Bain, C. Reed, M. (Eds) (2014) Global Peatland Restoration demonstrating SUCCESS. IUCN UK National Committee Peatland Programme, Edinburgh. http://www.iucn-uk-peatlandprogramme.org/sites/www.iucn-uk-peatlandprogramme.org/files/IUCNGlobalSuccessApril2014.pdf

Bord na Móna. 2016. Bord na Móna Biodiversity Action Plan 2016-2021. Brosna Press, Ferbane. http://www.bordnamona.ie/wp-content/uploads/2016/04/Biodiversity-Action-Plan-2016-2021.pdf.

Bord na Móna (2022). *Methodology Paper for the Enhanced Decommissioning, Rehabilitation and Restoration on Bord na Móna Peatlands – Preliminary Study Nov 2022 Version 19.* Bord na Móna. Available online at : https://www.bnmPCAS.ie/supporting-material/

Bonn, A., Allott, T., Evans, M., Joosten, H. & Stoneman, R. (2017) Peatland restoration and ecosystem Services-science, policy and practice. Cambridge University Press.

Carroll, J., Anderson, P., Caporn, S., Eades, P., O'Reilly C. & Bonn, A. 2009. Sphagnum in the Peak District. Current Status and Potential for Restoration. Moors for the Future Report No 16. Moors for the Future Partnership.

Clark, D. and Rieley, J. 2010. Strategy for responsible peatland management. International Peat Society, Finland.

Clark, D. (2010). Brown Gold. A history of BnM and the Irish peat industry. Gill Books.

Cross, J.R. (2006). The Potential Natural Vegetation of Ireland. Biology and Environment: Proceeding of the Royal Irish Academy, Vol. 106B, No. 2, 65-116 (2006).

Department of Communications, Climate Action and Environment 2019. National Climate Action Plan 2019. https://www.dccae.gov.ie/en-ie/climate-action/publications/Pages/Climate-Action-Plan.aspx

Department of Arts, Heritage and the Gaeltacht 2015. National Peatland Strategy. Department of Arts, Heritage and the Gaeltacht. http://www.npws.ie/sites/default/files/general/Final%20National%20Peatlands%20Strategy.pdf

Department of Housing Local Government and Heritage (2024). Ireland's 4th National Biodiversity Plan 2023-2030. Actions for Nature. 4th-national-biodiversity-action-plan.pdf.

Department of Housing, Local Government and Heritage (2024). Water Action Plan2024. A River basin Management Plan for Ireland 2022 – 2027.

www.gov.ie/pdf/?file=https://assets.gov.ie/303156/b0c6512b-2579-4296-9abe-ffdb1ddd6157.pdf#page=null

Eades, P., Bardsley, L., Giles, N. & Crofts, A. (2003). The Wetland Restoration Manual. The Wildlife Trusts, Newark.

Environment Agency (2013). The Knotweed code of practice. Managing Japanese Knotweed on development sites. Environment Agency, Bristol, UK. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/536762/LIT_2695.pdf

European Commission (2013). Interpretation manual of European Union Habitats. European Commission DG Environment Nature ENV B.3.

EPA (2012). Guidance to Licensees on Surrender, Cessation and Closure of Licensed Sites. https://www.epa.ie/publications/licensing--permitting/industrial/ied/Guidance-on-Cessation_.pdf

EPA (2020). Guidance on the process of preparing and implementing a bog rehabilitation plan. http://www.epa.ie/pubs/reports/enforcement/guidanceontheprocessofpreparingandimplementingabogrehabilitationplan.html.

EPA (2026). http://gis.epa.ie/Envision. EPA Envision Map Viewer. (Last Viewed: 14/04/2026)

Farrell, C. A. and Doyle, G. J. 2003. Rehabilitation of Industrial Cutaway Atlantic Blanket Bog, NW Mayo, Ireland. Wetlands Ecology and Management, 11, 21-35.

Fernandez, F., Connolly K., Crowley W., Denyer J., Duff K. & Smith G. (2014) Raised Bog Monitoring and Assessment Survey (2013). Irish Wildlife Manuals, No. 81. National Parks and Wildlife Service, Department of Arts, Heritage and Gaeltacht, Dublin, Ireland.

Fossitt, J. (2000). A guide to habitats in Ireland. Kilkenny. The Heritage Council.

Gann, G.D., McDonald, T., Walder, B., Aronson, J., Nelson, C.R., Jonson, J., Hallett, ,J.G., Eisenberg, C., Guariguata, M.R., Liu, J., Hua,F., Echeverría, C., Gonzales, E., Shaw, N., Decleer, K. & Dixon, K.W. (2019). International Principles and Standards for the practice of Ecological Restoration. Restoration Ecology 27(S1): S1–S46.

Grand-Clement, E., Anderson, K., Smith D., Angus, M., Luscombe D.J., Gatis, N., Bray L.S., Brazier R.E. (2015). New approaches to the restoration of shallow marginal peatlands Journal of Environmental Management 161.

Hinde, S., Rosenburgh, A., Wright, N., Buckler, M. and Caporn, S. 2010. *Sphagnum* re-introduction project: A report on research into the re-introduction of Sphagnum mosses to degraded moorland. Moors for the Future Research Report 18. Moors For the Future Partnership.

Holden, J., Walker, J., Evans, M.G., Worrall, F., Bonn, A., 2008. In: DEFRA (Ed.), A Compendium of Peat Restoration and Management Projects.

Joosten, H. and Clarke, D. 2002. Wise Use of mires and peatlands – Background and Principles including a framework for Decision-making. I.M.C.G. – I.P.S., Jyväskylä, Finland.

Lindsay, R., 2010. Peatbogs and Carbon: a Critical Synthesis to Inform Policy Development in Oceanic Peat Bog Conservation and Restoration in the Context of Climate Change (Report to RSPB Scotland, Edinburgh).

Mackin, F., Barr, A., Rath, P., Eakin, M., Ryan, J., Jeffrey, R. & Fernandez Valverde, F. (2017) Best practice in raised bog restoration in Ireland. Irish Wildlife Manuals, No. 99. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Ireland.

McBride, A., Diack, I., Droy, N., Hamill, B., Jones, P., Schutten, J., Skinner, A. and Street, M. 2011. The Fen Management Handbook, (2011), Scottish Natural Heritage, Perth.

Minayeva, T. *et al.* (2017). Towards ecosystem-based restoration of peatland biodiversity. Mires and Peat, Volume 19 (2017), Article 01, 1–36, http://www.mires-and-peat.net

McDonagh, E. (1996). Drain blocking by machines on Raised Bogs. Unpublished report for National Parks and Wildlife Service. https://www.npws.ie/sites/default/files/publications/pdf/McDonagh_1996_Drain_Blocking_Raised_Bogs.pdf.

NPWS. (2014). Review of the raised bog Natural Heritage Area network. Department of Arts, Heritage and the Gaeltacht.

NPWS. (2017a). National Raised bog Special Areas of Conservation management plan. Department of Arts, Heritage and the Gaeltacht. https://www.npws.ie/sites/default/files/files/FOR%20UPLOAD%20Plan(WEB_English)_05_02_18%20(1).pdf

NPWS (2025). The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitat Assessments. Unpublished NPWS report. Edited by: Domhnall Finch, Aoife Delany, Fionnuala O'Neill and Deirdre Lynn. npws.ie/sites/default/files/publications/pdf/article-17-report-2025-volume-2.pdf

NRA (2009). Guidelines for Assessment of Ecological Impacts of National Road Schemes (Revision 2). National Roads Authority.

NRA (2010). Guidelines on The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads. National Roads Authority. https://www.tii.ie/technical-services/environment/construction/Management-of-Noxious-Weeds-and-Non-Native-Invasive-Plant-Species-on-National-Road-Schemes.pdf

Pschenyckyj, C., Riondata, E., Wilson, D., Flood, K., O'Driscoll, C., Renou-Wilson, F. (2021). Optimising Water Quality Returns from Peatland Management while Delivering Co-Benefits for Climate and Biodiversity, Report produced for An Fóram Uisce, Online, Available at: https://thewaterforum.ie/app/uploads/2021/04/Peatlands_Full_Report_Final_March2021b.pdf, Accessed 14/04/2026

Quinty, F. and L. Rochefort, 2003. Peatland Restoration Guide, second edition. Canadian Sphagnum Peat Moss Association and New Brunswick Department of Natural Resources and Energy. Québec, Québec.

Regan, S., Swenson, M., O'Connor, M. & Gill, L. (2020). Ecohydrology, Greenhouse Gas Dynamics and Restoration Guidelines for Degraded Raised Bogs. EPA RESEARCH PROGRAMME 2014–2020. Report No.342. (2014-NC-MS-2). EPA Research Report. Prepared for the Environmental Protection Agency by Trinity College Dublin. www.epa.ie.

Renou-Wilson F., Bolger T., Bullock C., Convery F., Curry J. P., Ward S., Wilson D. & Müller C. (2011). BOGLAND - Sustainable Management of Peatlands in Ireland. STRIVE Report No 75 prepared for the Environmental Protection Agency. Johnstown Castle, Co. Wexford.

Renou-Wilson, F., Wilson, D., Rigney, D., Byrne, K., Farrell, C. and Müller C. (2018). Network Monitoring Rewetted and Restored Peatlands/Organic Soils for Climate and Biodiversity Benefits (NEROS). Report No. 238. Report prepared for the Environmental Protection Agency. Johnstown Castle, Co. Wexford.

Schouten, M.G.C. 2002. Conservation and Restoration of Raised Bogs: Geological, Hydrological and Ecological Studies. Dúchas - The Heritage Service of the Department of the Environment and Local Government, Ireland; Staatsbosbeheer, the Netherlands; Geological Survey of Ireland; Dublin.

Smith, G., O'Donoghue, P., O'Hora, K. & Delaney, E. (2011). Best Practice Guidance for Habitat Survey and Mapping. The Heritage Council.

Stace, C. A. (1997). New Flora of the British Isles. Cambridge: Cambridge University Press.

Thom, T., Hanlon, A., Lindsay, R., Richards, J., Stoneman R. & Brooks, S. (2019). Conserving Bogs – Management Handbook. https://www.iucn-uk-peatlandprogramme.org/sites/default/files/header-images/Conserving%20Bogs%20the%20management%20handbook.pdf.

Wilson, D., Renou-Wilson, F., Farrell, C., Bullock, C. and Muller, C. (2012). Carbon Restore – the potential of restored Irish peatlands for carbon uptake and storage; CCRP Report. EPA Wexford.

Wilson, D., Dixon, S.D., Artz, R.R., Smith, T.E.L., Evans, C.D., Owen, H.J.F., Archer, E., & Renou-Wilson, F. (2015). Derivation of greenhouse gas emission factors for peatlands managed for extraction in the Republic of Ireland and the UK. Biogeosciences Discuss., 12, 7491–7535.

Wheeler, B. D., & Shaw, S. C. (1995). Restoration of Damaged Peatlands – with Particular Reference to Lowland Raised Bogs Affected by Peat Extraction. London: HMSO.

Wittram, B. W., Roberts, G., Buckler, M., King, L., & Walker, J. S. (2015). A Practitioners Guide to Sphagnum Reintroduction. Edale: Moors for the Future Partnership.

APPENDIX I: BOG GROUP CONTEXT

The Littleton Bog Group IPC Licenced area was in industrial peat production for several decades until 2017. There are 11 defined bog units covering a total area of 4,421 ha. Each bog area further comprises a range of habitats from bare milled peat former production areas to re-colonising cutaway to workshops areas and transport infrastructure. Industrial peat extraction from these sites mainly supplied briquettes (Littleton Brickette Factory), horticulture and commercial turf for domestic use.

Industrial peat extraction across the majority of the Littleton Bog Group ceased in 2017. (Killeen extended to 2021). Littleton Brickette Factory finally ceased production in 2021. All licences for sod turf production also ceased during this period.

The Littleton Rehabilitation Programme started in 2018. Rehabilitation was planned and implemented across all of the Littleton Bogs. A range of different strategies was implemented across different sites, which reflect variable underlying environmental conditions and land-uses and potential future land-uses at the time.

Drain-blocking was carried out at Ballysorrell Bog and Knockahaw Bogs with the objective of raised bog restoration. These bogs had not had significant peat extraction and retained raised bog restoration potential. Rehabilitation measures at Templetouhy took account of the Bruckana Windfarm, which was is operational since 2015. Bawnmore, Littleton, and Derryville were developing cutaway habitats already as scrub and wetland, and targeted measures were carried out through these sites to enhance these developing habitats. More intensive drain-blocking was carried out across Carrickhill, Inch, Ballybeg, Derryvilla, Longford Pass and Killeen Bogs, particularly where there was recent industrial peat extraction and there were functional drains and bare peat dominated. Pumping ceased at Carrickhill, Inch and Baunmore. Some pumping continued for various periods at Derryville, Longford Pass and Littleton, due to operational issues. Some fertiliser treatments were carried out at Carrickhill and Derryvilla in 2020 as a pilot rehabilitation project.

Rehabilitation measures so far has been very effective. The majority of the targeted areas have been re-wetted. Ballysorrell and Knockahaw Bogs are responding quite quickly to the new conditions with the development of Sphagnum and improvement in bog conditions. Areas at Templetuohy, Bawnmore, Littleton and Derryvilla are changing quickly with the development of existing habitats and new pioneer vegetation where there was bare peat. Habitats at Killeen and Lanespark are developing and integrating with the new greenway amenity. Areas in Carrickhill, Inch and Killens that where large areas of bare peat in 2018 have been slower to recolonise due to underlying environmental factors (deeper residual peat).

A project called the BnM/Coillte Midlands Native Woodland Project was developed over the same period (Midlands Native Woodland - Coillte). It was proposed to be funded and administered by the Forest Service. The main objective of this proposed project is to develop and enhance native woodland in areas of cutaway that would remain naturally dry, developing woodland habitat that would naturally complement wetland and peatland habitats already developing across these sites. An initial feasibility study was carried out in 2018 and a project was developed across the Littleton bogs, which finally identified 120 ha of cutaway to be developed as woodland. This project has piloted alternative methods to establish native woodland, including seeding, and these trials were carried out at Bawnmore. This proposed project has not been approved by the Forest Service yet. Areas of cutaway at Carrickhill, Bawnmore, Inch, Ballybeg and Killeen have been proposed as part of this project.

The Littleton Labyrinth is a proposed amenity project that was also developed during this period, in partnership with Tipperary County Council. Initially a feasibility study was carried out that looked at developing greenway

amenity, and associated facilities across the Littleton Bogs, and potential links to existing infrastructure and local villages/towns. The first phase of this project was developed by Tipperary County Council in 2023/24, and a greenway was constructed on former BnM industrial railway though Killeen and Lanespark Bog to link with Loch Doire Bhile amenity, north of Lanespark. There are proposals to develop a Phase 2 shortly, with additional links being planned in Ballybeg and Derryvilla Bogs. This project is in pre-planning and is funded via Failte Ireland.

BnM rehabilitated several bogs in the Littleton Bog Group via Peatland Climate Action Scheme in 2025. The main objective of this proposed Phase 2 rehabilitation is to look at enhancing re-wetting and development of pioneer vegetation to support climate action, where possible. Measures are likely to include targeted drain-blocking, use of fertiliser to encourage pioneer vegetation growth, water-level management (adjustment of outfalls and use of over-flows). Bogs included Templetouhy, Derryville, Carrickhill, Baunmore, Inch, Ballybeg, Inch and Killeens.

A breakdown of the component bog areas for the Littleton Bog Group IPC Licence Ref. P0499-01 is outlined in Table Ap-1. Industrial peat production history varies across the Littleton bog group, so there is a wide range of peat depths at present.

Table Ap-1: Littleton Bog Group names, area and indicative status

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
Carrickhill	170 ha	Cutover Bog Industrial peat production started in the 1970's and ceased in 2017. There is residual deep peat across much of this site. Carrickhill had a partially pumped drainage system.	Carrickhill Bog formerly supplied peat to the Littleton briquette factory. Some areas of shallow peat cutaway on site are developing pioneer cutaway vegetation communities. The pump was decommissioned in 2018. Drain blocking was carried out in 2018. A fertiliser treatment on part of the headland was carried out in 2021. The majority of the site is still mostly bare peat. Carrickhill is proposed for the Coillte/BnM Midlands Native Woodland Project. 28 ha is proposed for planting at this site. This proposed project is currently being considered for consent by the Forest Service.	2017	Draft 2018 Phase 1 Rehab measures implemented 2018-2021. Updated 2025. Phase 2 PCAS measures ongoing 2026
Templetuohy	737 ha	Cutover Bog Industrial peat production commenced at Templetuohy Bog in 1940's. Areas began to develop as cutaway during the 1980s as peat extraction ceased on a phased basis. Industrial peat extraction finally ceased in 2017. This bog has a partially pumped drainage system. Part of the site has developed pioneer cutaway habitats. Areas re-developed for peat extraction in 2015-17 are now revegetating quickly. Areas that were used for peat extraction upto 2017 are a	Templetuohy Bog formerly was developed to supply fuel sod peat and also supplied peat to the Littleton briquette factory. BnM have constructed a 40MW Wind Farm with 14 turbines and road network on cutaway at Templetuohy bog called Bruckana Wind Farm. This windfarm is operational. Pumping is still operational across this site to support the windfarm infrastructure.	2017	Draft 2018 Phase 1 Rehab measures implemented 2018-2021 Updated 2025. Phase 2 PCAS measures ongoing 2026

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
		mosaic of re-wetted bare peat and pioneer communities.			
Derryville	250 ha	Cutover Bog Industrial peat production commenced at Derryville Bog in 1970's. Areas began to develop as cutaway during the 2000s as peat extraction ceased on a phased basis. Peat extraction finally ceased in 2017. This bog has a partially pumped drainage system.	Derryville Bog formerly supplied peat to the Littleton briquette factory. Part of the site has been developed for conifer forestry and is leased to Coillte. Part of the site was sold to Lisheen Mine and removed from the IPC Licence in the 2000s. Much of the former production area on site is developing pioneer cutaway vegetation communities, the remainder of the site is bare peat and developing wetland. Pumping continued at Derryville until 2022. Pumping has now ceased, and measures have been implemented in 2024 to manage water levels across the site and to decommission the pump.	2017	Finalised 2018 Phase 1 Rehab measures implemented 2018-2021 Updated 2025 Phase 2 PCAS measures ongoing 2026
Bawnmore	531 ha	Revegetating cutover bog. Industrial peat production commenced at Baunmore Bog in 1970's. Areas began to develop as cutaway during the 2000s as peat extraction ceased on a phased basis. Peat extraction finally ceased in 2017. Much of the site is now developing a mosaic of woodland, peatland and wetland habitats. Baunmore had a partially pumped drainage regime.	Bawnmore Bog formerly supplied peat to the Littleton briquette factory. Much of the site is developing pioneer cutaway habitats and the site has significant biodiversity value. Pumping ceased in 2018. Part of the access is used for log biomass storage (for Edenderry Power). Bawnmore is proposed for the Coillte/BnM Midlands Native Woodland Project. 39 ha is proposed for planting at this site. This proposed project is currently being considered for consent by the Forest Service.	2017	Finalised 2018 Phase 1 Rehab measures implemented 2018-2021 Updated 2025 Phase 2 PCAS measures ongoing 2026
Ballysorrel	196 ha	Drained raised bog – This site was initially drained for peat extraction. It was developed for peat production in the 1970s, but milled peat harvesting only occurred over a short 2 year timeframe. The site was then left as a peat reserve to be re-developed in the future. Restoration/drain blocking carried out in in 2018.	Much of the site was bare peat in the early 2000s. The site has since re-vegetated naturally (in a drier situation) since then and is now responding quickly to the recent re-wetting. Much of the high bog has re-colonised with Heather-dominated vegetation. Small hummocks of *Sphagnum* capillifolium and S. subnitens are present. *Sphagnum* spp. are also present in some low-lying areas that are permanently waterlogged and are spreading.	2017	Finalised 2018 Phase 1 Rehab measures implemented 2018-2021 Updated 2025 Phase 2 PCAS measures ongoing 2026
Inch	120 ha	Cutover Bog Industrial peat production since 1970s. Finally ceased in 2017. Inch had a partially pumped drainage regime.	Inch Bog formerly supplied peat to the Littleton briquette factory. Some areas of shallow peat cutaway on site are developing pioneer cutaway vegetation communities with deep peat areas slow to colonise and remaining mostly bare peat. Pumping ceased in 2018.	2017	Finalised 2018 Phase 1 Rehab measures implemented 2018-2021

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
			Inch is proposed for the Coillte/BnM Midlands Native Woodland Project. 19 ha is proposed for planting at this site. This proposed project is currently being considered for consent by the Forest Service.		Updated 2025 Phase 2 PCAS measures ongoing 2026
Longford Pass (Popes Bog)	214 ha	Cutaway Bog Peat production at Longford Pass bog commenced in the 1940's and finally ceased in 2017. Peat extraction ceased and cutaway habitats began to develop on a phased basis. Longford Pass has a partially pumped drainage system.	Longford Pass Bog initially was developed as a sod turf production site. It then formerly supplied peat to the Littleton briquette factory. The site was bisected by the construction of the N8 Motorway in 2000s. A small area between the new motorway and R639 (old main road) was leased and developed for farmland in 2018. Longford Pass is part of the proposed Littleton Windfarm Project. This project is currently in pre-planning. Some areas of shallow peat cutaway on site are developing pioneer cutaway vegetation communities with deep peat areas slower to colonise. Pumping continued at the site until 2022, when the pumping failed. Since then, measures have been carried out to manage water-levels.	2017	Finalised 2018 Rehab measures implemented 2018-2021 Updated 2026
Ballybeg, Lanespark and Derryvilla	474 ha	Cutaway Bog Industrial peat production since 1970s and finally ceased in 2017. Peat extraction ceased and cutaway habitats developed on a phased basis during this period. .	Ballybeg, Lanespark and Derryvilla initially were developed for sod turf production, and then formerly supplied peat to the Littleton briquette factory. Part of the site has been developed for conifer forestry and is leased to Coillte. Part of Lanespark/Derryvilla (Loch Doire Bhile) was developed as fishing lake and an amenity site in 1999-2002. This site is leased to Slieve Ardagh Rural Development. A greenway was constructed across the site as part of the Littleton Labyrinth Project in 2024, connecting the historical site of Derrynaflan to Loch Doire Bhile amenity, via Lanespark. Additional greenway is proposed to extend amenity through Derryvilla and Ballybeg as part of Failte Ireland. Midlands Trail project. This is currently in pre-planning. Ballybeg and Lanespark are proposed for the Coillte/BnM Midlands Native Woodland Project. 21 ha is proposed for planting at this site. This proposed project is currently being considered for consent by the Forest Service .	2017	Finalised 2018 Phase 1 Rehab measures implemented 2018-2021 Updated 2025 Phase 2 PCAS measures ongoing 2026
Killeen	632 ha	Industrial peat production commenced at Killeen Bog in 1980s. Industrial peat extraction finally ceased in 2021.	Killeen bog formerly supplied peat to the Littleton briquette factory and the horticultural market. Re-wetting was carried out across the site in 2021. Some areas of shallow peat cutaway on site are developing pioneer cutaway vegetation	2017	Finalised 2018 Phase 1 Rehab measures implemented 2018-2021

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
			communities with deep peat areas slower to colonise since the site was re-wetted. A greenway was constructed across the site as part of the Littleton Labyrinth Project in 2024, connecting the historical site of Derrynaflan to Loch Doire Bhile amenity, via Lanespark. Killeen is proposed for the Coillte/BnM Midlands Native Woodland Project. 31 ha is proposed for planting at this site. This proposed project is currently being considered for consent by the Forest Service .		Updated 2025 Phase 2 PCAS measures ongoing 2026
Littleton	1,020 ha	Cutaway Bog Littleton is a relatively old industrial peat production bog. Large-scale industrial peat production began in the 1940's where sod peat was produced for fuel. Sod peat production was mechanised during the 1950's. Milled peat production began in the 1970's and milled peat was supplied to the Briquette factory (constructed in 1981) at Lanespark. Peat extraction ceased and cutaway habitats developed on a phased basis since the 1890s and some well-established cutaway habitats have developed. Industrial peat extraction finally ceased in 2018. Littleton has a partially pumped drainage system.	Littleton Bog formerly supplied sod peat before supplying peat to the Littleton briquette factory. Older cutaway has already extensively colonised with pioneer cutaway, wetland and scrub habitats. Part of the site has been developed for conifer forestry and is leased to Coillte. A small area (10 ha) was used as a pilot biomass project and Eucalyptus was planted in 2018. Some pumps in Littleton Bog have been decommissioned and some have been retained but are non-functional.	2017	Finalised 2018 Rehab measures implemented 2018-2021 Updated 2026

See Drawing number *BNM-ECO-26-11-24 Littleton: Bog Group Map*, included in the accompanying Mapbook which illustrates the location of Longford Pass Bog and the Littleton Bog Group in context to the surrounding area.

APPENDIX II: ECOLOGICAL SURVEY REPORT

Ecological Survey Report

Note: This report outlines an ecological survey of the bog. This report should not be taken as a management plan for the site as other land-uses may still be considered. Information within this report may inform the development of other land-uses and identify areas with particular biodiversity value.

Sections of this report were written pre cessation of industrial peat production. Updated information post peat production is indicated as 2026 data.

Bog Name:	**Longford Pass (Pope's Bog**	**Area (ha):**	278ha
Works Name:	Littleton	**County:**	Tipperary
Recorder(s):	MMC & BO'L	**Survey Date(s):**	28/04/2010 (section adjacent to motorway) 10/09/2012 11/12/2017

Habitats present (in order of dominance)

The most common habitats present at this site include:

- Bare peat
- Poor fen vegetation (pJeff/pEang) (in mosaic) (Codes refer BnM classification of pioneer habitats of production bog)
- Dry heath (dHeath) (in mosaic)
- Open Birch scrub (oBir) (in mosaic)
- Dry/wet grassland (gMol)
- Temporary open water (TOW) (wet sections)
- Riparian zones (old silt ponds and culverted streams/drains along motorway embankment)
- Small wetland pools with open water and poor fen vegetation (pRos)
- Access routes (Acc) (railways, travel paths and gravel paths with associated scrub/dry heath verges)

Description of site

Longford Pass (Pope's Bog) is located in Co. Tipperary, 5 km south-west of Urlingford. It is part of the Littleton Bog Group. Littleton Bog is located to the south of Longford Pass and Bawnmore is located to the north. A BnM railway passes through Longford Pass Bog along the eastern margin and connects this bog and bogs to the north to the wider Littleton network, where milled peat is transferred to Lanespark Briquette factory. The bog is also situated adjacent to the old N8 Cork-Dublin road and the new M8 motorway bisects the southern part of the site. The bog is located in a lowland landscape and is surrounded on two sides by farmland. Peatland to the north and south of the main site has been developed for conifer forestry and is also used for private sod peat cutting. The main section can be accessed from the northern end with a travel path along the eastern margin leading south to a tea centre. A local road marks the northern boundary of the site.

Former production bog section

The majority of the main part of the bog was in active milled peat production until recently and is bare peat. The southern margin of this section is marked by the railway and this divides this section from the adjacent cutaway. The railway also branches at the southern end and there is a small side-branch that extens along the south-west and southern margins to the south-west corner of the site. There are several small areas where the underlying glacial sub-soil is being exposed and there is some colonisation at the drain margins. These areas are generally associated with low mounds and ridges underlying the bog that are now being exposed. This vegetation is generally dominated by Soft Rush (pJeff) but can also contain Purple Moorgrass (gMol) and other frequent grasses like Bog Cotton, Creeping Bent and Sweet Vernal-grass (gAn-Ho-Eq). Other typical species include Rosebay Willowherb and Colt's-foot. A small area at the south-west corner has come out of production recently and is being vegetated by pioneer poor fen (pJeff). There is also some open water and several small pools in this small section.

There are several small areas around the industrial peat production bog that contain open water. This is probably temporary as there is very little wetland development or any emergent vegetation associated with these pools. A deep outfall has been dug in the south-west section and left open. Both sides are now vegetated by Birch scrub that has colonised the spoil from the outfall, some of which is dense. The southern end has some exposed gravel (glacial

mixed till) and some more open grassland habitat (gCal, gMol, DisTuss). The most recent survey (December 2017) noted areas of open water present in parts of the northern, southern and eastern sections of the site. Surface water ponding in these areas is considered to be temporary in some areas with no wetland vegetation recorded within areas of open water.

The very southern part of this section has a small area of industrial peat production bog west of the railway. A small pool was located just north of the spilt in the railway. This was filled with water during the first survey (2010) but has subsequently been drained and is vegetated by pioneer Bulbous Rush-dominated poor fen. Further west there is a small depression where there is some Bog Cotton colonisation along the southern margin.

The majority of the northern part of the bog has been developed for industrial peat production and there is very little typical marginal peatland habitat along the eastern margin. A small section at the north-east corner has some remnant peat and is dominated by Gorse scrub and some dry heath and Purple Moorgrass-dominated vegetation, as it is so disturbed. Scrub extends along the eastern margin but only really forms a hedgerow. The western margin of the bog supports mature birch woodland in association with Holly (*Ilex aquifolium*). The ground flora constitutes Honeysuckle (*Lonicera periclymenum*), Ivy (*Hedera helix*), Bramble (*Rubus fruticosus* agg.), Fern sp. (*Dryopteris* sp.) and the mosses *Pseudoscleropodium purum* and *Thuidium tamariscinum*. There are also several open sections with degraded bog habitats (Heather-dominated vegetation). There are also several small sections along the south-west margin that have remnant high bog (one of which was developed for milled peat production in past) and now contain typical very degraded high bog or secondary cutover bog habitats with scrub, Heather-dominated dry heath and Purple Moor-grass (*Molinia caerulea*) dominated vegetation. Furthermore, there is an area of remnant raised bog located in the north-western section of the site which supports degraded raised bog communities (facebank and marginal ecotopes) and supports several relic high hummocks (>25cm) of *Sphagnum capillifolium* (subsp. *rubellum*) and *Sphagnum subnitens*. Other typical raised bog plant communities and mosses included Ling Heather (*Calluna vulgaris*), Deer-grass (*Trichophorum germanicum*), Cross-leaved Heath (*Erica tetralix*), Common Cotton-grass (*Eriophorum angustifolium*), Hare's-tail Cotton-grass (*Eriophorum vaginatum*), Reindeer Lichen (*Cladonia portentosa*) and *Sphagnum papillosum*. Sphagnum cover is less than 10%.

Former production-related cutaway north of motorway

The eastern side of the area between railway and the motorway has been out of production for some time (prior to 2000) and has naturally recolonised with a mosaic of pioneer habitats. These pioneer habitats are mainly dry and dominated by dry heath (Heather dominated), open Birch scrub and poor fen vegetation dominated by Soft Rush. They are still in the pioneer stage and there are still significant patches of bare peat or areas covered just with bryophytes within the vegetation mosaic. Some Rowan, Pine and Sitka Spruce are present in the scrub along with Birch and Willow. There are a series of small pools present towards the eastern side of this mosaic that contain Bottle Sedge (pRos) and other aquatic and emergent species such as Mint, Bog Cotton and Pondweed. These pools may be the result of some more recent activity or disturbance as they look to be younger than the surrounding cutaway. *Calliergonella cuspidata* and *Fissidens* sp. were present in a drain with some impeded drainage. The central zone contains small patches with exposed sub-soil that are also being colonised by Heather, Birch, Soft Rush and mosses such as *Campylopus introflexus* and *Polytrichum juniperum.* These habitats extend north in sections as far as the BnM railway. The railway side of this area is more open and there are several sections of bare peat and/or bare peat/poor fen mosaics where there has been more recent industrial peat production.

The western side of this area (adjacent to the railway) is not so well-developed and is dominated by bare peat. These fields have been out of production for a shorter period (between 2000-2004) compared to the western side. There are small areas of bare peat/poor fen vegetation dominated by Soft Rush. This section is at a somewhat lower level compared to the adjacent higher ground being vegetated by the mosaic. Some of the ground is wet and the drainage is impeded and some of the ground has heavy bog timber cover.

Plastic located in this section of bog has now been removed.

Former production-related cutaway south of motorway

This area has been leased and is now being developed for agriculture.

Isolated sections at the south of the site

There are two separate sections of bog at the southern end that lie south of the old N8 Dublin-Cork road and adjacent to Littleton bog to the south. These sections were never developed for milled peat production. The railway passes along the eastern side of the western section. Both sections are used for private sod peat production. The eastern section is also used by Littleton Shooting Club. A band of conifer plantation has been planted along the road to form a screen.

The western section still has some intact high bog, although much of the surface of this section is now bare peat, and has been developed in the past 12 years. . The eastern section is much more disturbed and contains some sections that are in active use, which have bare peat, and some inactive sections of various ages that are recolonising with a range of typical pioneer cutaway habitats.

Designated areas on site (SAC, NHA, pNHA, SPA other)

None

There are no European Designated Sites in close proximity (i.e. within a 5km radius at minimum) to Longford Pass Bog.

The nearest European Designate Site is the The Loughans SAC (site code: 000407) which is located approximately 7.4km to the east of Longford Pass Bog.

There are also no NHA's (Natural Heritage Areas) or pNHA's (Proposed Natural Heritage Areas) within a 5km radius of Longford Pass Bog.

Adjacent habitats and land-use

The area surrounding the site is dominated by improved farmland, which is grazed by cattle or being used for production of potatoes. Some adjacent peatland was developed for conifer forestry (WD4) and some remnant high bog (PB1) is also being cut privately for sod peat (PB4).

Watercourses (major water features on/off site)

- Longford Pass is located within the River Suir catchment.
- The main section of bog is divided into two main catchments. The western half flows towards the south-west corner of the bog and is treated by a silt-pond at this location. This silt-pond drains west via channelized streams/drains to the Dinish River.
- The eastern section flows north and is treated by a silt-pond north of the road. A pump has been installed to pump water from this catchment across the road. This silt-pond drains north via a drain to meet the Black River.
- There are no significant rivers or lakes on or adjacent to this site.
- A small stream/drain that flows along the southern boundary of part of the site has been culverted and has a typical riparian zone. A second new drain has been developed along the embankment of the new motorway. A settlement pond is located adjacent to the site and the motorway at the eastern side.

Peat type and sub-soils

Dark fen peat is the main peat type exposed in the northern section of bog. There may be some patches of more acidic peat exposed in the production-related cutaway areas that have now colonised with Heather-dominated vegetation.

The main section of production bog seems to be underlain by a glacial mixed till, which is found under most of the other bogs in the Littleton group. This till is a mixture of gravel, pebble, rock and silty marl.

The eastern section of the main production bog has a relatively deep peat reserve with between 4-5 m of peat. This section may have been the original basin where there bog formed and therefore may be underlain by some lacustrine shell marl deposits.

Fauna biodiversity

Several species were noted on the site during the survey.

- Bird species recorded include Willow Warbler, Blackbird, Swallow, Wren, Chiffchaff and Grey Crow (2010)
- Bird species recorded in 2012 included Wood Pigeon, Wren, Rook (40), Grey Crow (5), Redpoll, Goldcrest, Blackbird and Swallow.
- Birds recorded in 2017 included Chaffinch, Great Tit, Redpoll, Blackbird, Robin, Wren, Meadow Pipit, Buzzard and Snipe.
- Mammal species noted on site included Fox and Rabbit (2010 & 2017).
- Signs of Rabbit noted at several locations around the bog (2012).

References

Cross, J.R. 2006. The Potential Natural Vegetation of Ireland. Biology and Environment: Proceeding of the Royal Irish Academy, Vol. 106B, No. 2, 65-116 (2006).

European Commission (2013). Interpretation manual of European Union Habitats. European Commission DG Environment Nature ENV B.3.

Fossitt, J. (2000). A guide to habitats in Ireland. Kilkenny. The Heritage Council.

NRA (2009). Guidelines for Assessment of Ecological Impacts of National Road Schemes (Revision 2). National Roads Authority.

APPENDIX III: ENVIRONMENTAL CONTROL MEASURES TO BE APPLIED TO BOG REHABILITATION

- Bog restoration/rehabilitation measures will be restricted to within the footprint of the proposed rehabilitation area.
- The proposed rehabilitation will have due regard to noise limits and hours of operation (i.e. dusk and dawn) to minimise any potential disturbance on resident and local fauna that utilise the site and immediate environs.
- All plant and equipment for use will comply with the Construction Plant and Equipment Permissible Noise Levels Regulations (SI 359/1996).
- The proposed activities will be restricted to daylight hours and there will be no requirement for artificial lighting.
- Silt ponds will be inspected and maintained as per the IPC Licence.
- During periods of heavy precipitation and run-off, activities will be halted.
- Measures will be carried out using a suitably sized machine and in all circumstances, excavation depths and volumes will be minimised where possible.
- All machines will be regularly checked and maintained prior to arrival at the site to prevent hydrocarbon leakage.
- Hoses and valves will be checked regularly for signs of wear and will be closed and securely locked when not in use.
- Fuelling and lubrication of equipment shall only be carried out in designated areas away from surface water drainage features and ecologically sensitive areas.
- Waste oils and hydraulic fluids will be collected in leak-proof containers and removed from the site for disposal or re-cycling.
- Vehicles will never be left unattended during refuelling.
- No direct discharges to waters will be made. No washings from vehicles, plant or equipment will be carried out on site.
- All plant refuelling will take place using mobile fuel bowsers. Only dedicated trained and competent personnel will carry out refuelling operations.
- Mobile storage such as fuel bowsers will be bunded to 110% capacity to prevent spills. Tanks for bowsers and generators shall be double skinned. When not in use, all valves and fuel trigger guns from fuel storage containers will be locked. All pumps using fuel or containing oil will be locally and securely bunded where there is the possibility of discharge to waters.
- Potential impacts caused by spillages etc. during rehabilitation will be reduced by keeping spill kits and other appropriate equipment on-site.
- Site activities will be carried out in accordance with 'best practice'. In order to ensure compliance and implementation of 'best practice', these measures will be communicated to relevant BnM staff and updated as required.

APPENDIX IV: BIOSECURITY

The potential for importation or introduction of non-native plant species (such as Japanese Knotweed, Himalayan Balsam, etc.) during future rehabilitation management, such as drain-blocking using excavators, has the potential to result in the establishment of invasive species within the site. Section 49 of the European Communities (Birds and Natural Habitats) Regulations 2011 prohibits the introduction and dispersal of invasive alien species (particularly plant species) listed on Part 1 (third column) of the 'Third Schedule'.

This section aims to reduce the risk from, and impacts of, invasive species and protecting biodiversity on lands under BnM ownership. Rehabilitation and decommissioning in the bog will have due regard to the relevant biosecurity measures outlined below:

- Records of problematic invasive species within the various bog units will be marked out with signs to highlight areas of infestation to personnel.
- All plant machinery will be restricted from disturbing known colonies of invasive species.
- All plant machinery will avoid unnecessary crossings to adjoining lands.
- Good site hygiene will be employed to prevent the introduction and spread of problematic invasive alien plant species (i.e. Japanese Knotweed (*Fallopia japonica*), Himalayan Balsam (*Impatiens glandulifera*), Himalayan Knotweed (*Persicaria wallichii*), etc.) by thoroughly washing vehicles prior to entering the area.

The biosecurity measures outlined above are in line with best practice guidelines issued by the National Roads Authority (NRA, 2010) – The Management of Noxious Weeds and Non-native Invasive Plant Species on National Roads and broadly based on the Environment Agency's (2013) – The Knotweed Code of Practice: Managing Japanese Knotweed on Development Sites (Version 3, amended in 2013).

In addition to the above, Best Practice measures around the prevention and spread of Crayfish plague[5] will be adhered with throughout all rehabilitation measures and activities.

[5] https://www.biodiversityireland.ie/projects/invasive-species/crayfish-plague/

APPENDIX V: POLICY AND REGULATORY FRAMEWORK

BnM Plc (BnM) is a publicly owned company, originally established in 1934 to develop some of Ireland's extensive peat resources for the purposes of economic development and to support energy security. In the decades since its establishment the company has employed tens of thousands of people in its fuel, energy, and horticultural growing media businesses. For much of its history the company's support of important national policy aims has been enabled and encouraged in a variety of ways by Government.

Today, BnM is undertaking a number of highly significant actions in support of climate policy. These actions involve a radical transformation and decarbonisation of nearly the entire BnM business. This transformation will be driven by unlocking the full potential of our land and creating significant value for Ireland and the Midlands in particular.

BnM is an integral part of the economic, social, and environmental fabric of Ireland and Irish life. As a key employer in the Midlands, the company is conscious that its obligations go beyond purely commercial and environmental – there is also a social responsibility to employees and the communities served by BnM. It is the company's role and absolute priority to ensure that its long-term strategy delivers on all of these important areas in a robust and balanced way.

There are a wide range of policies, plans, legislation and land designations that inform the development of this BnM peatland rehabilitation plan. BnM have also developed and operate various policies and strategies that also inform the development of this rehabilitation plan.

1 EPA IPC Licence

BnM operates under IPC Licence issued and administered by the EPA to extract peat within the Littleton Bog group (Ref. P0-499-01). As part of Condition 10.2 of this licence, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area. The bog is part of the Littleton Bog group. This regulatory requirement is the main driver of the development of this rehabilitation plan.

2 The Peatlands Climate Action Scheme (PCAS)

BnM (BnM) understand that it is the Minister's (DECC) intention to impose an obligation on BnM to develop a programme of measures, 'the Scheme', for the enhanced decommissioning, rehabilitation and restoration of boglands previously used to supply peat for electricity generation within the State. The enhanced decommissioning, rehabilitation and restoration of the peatlands funded by the Scheme (PCAS) will deliver benefits across climate action (GHG mitigation through reduced carbon emissions and acceleration towards carbon sequestration), enrich the State's natural capital, increase eco-system services, strengthen biodiversity, improve water quality and storage attenuation as well as developing the amenity potential of the peatlands.

It is envisaged that BnM carry out an enhanced decommissioning, rehabilitation and restoration, under the Scheme (PCAS), and supported by the Climate Action Fund and Ireland's National Recovery and Resilience Plan across a footprint of 33,000 ha. This scheme will significantly go beyond what is required to meet rehabilitation and decommissioning obligations under existing EPA IPC licence conditions. Interventions and measures supported by the Scheme will ensure that environmental stabilisation is achieved (meaning IPC obligations are met), and importantly, significant additional benefits, particularly relating to climate action and other ecosystem services, will also be delivered. However, only the additional costs associated with the additional and enhanced

rehabilitation, i.e., those activities which go beyond the existing decommissioning and rehabilitation requirements arising from Condition 10 will be eligible for support under the Scheme.

3 National Climate Policy

The National Policy Position establishes the fundamental national objective of achieving a transition to a competitive, low carbon, climate-resilient and environmentally sustainable economy by 2050. It sets out:

- the context for the objective;
- clarifies the level of GHG mitigation ambition envisaged; and
- establishes the process to pursue and achieve the overall objective.

The evolution of climate policy in Ireland will be an iterative process based on the adoption by government of a series of national plans over the period to 2050. GHG mitigation and adaptation to the impacts of climate change are to be addressed in parallel national plans – respectively through the National Climate Action Plan. The plans will be continually updated, as well as being reviewed on a structured basis at appropriate intervals and, at a minimum, every five years. This will include early identification and ongoing updating of possible transition pathways to 2050 to inform sectoral strategic choices.

BnM is following a decarbonisation programme aimed at reducing the carbon emissions from its activities. Industrial peat production has now ceased, and several other decarbonisation measures are being implemented. The company aims to further develop renewable energy and resource recovery markets with a key objective of reducing the carbon intensity of all products. In addition, the carbon emission mitigation benefits associated with the post-peat extraction rehabilitated peatland following re-wetting, revegetation and colonisation of significant areas with native woodland will make a significant contribution to achieving the State's carbon emission reduction targets.

4 National Peatlands Strategy

The National Peatlands Strategy (2015) contains a comprehensive list of actions, necessary to ensure that Ireland's peatlands are preserved, nurtured and become living assets within the communities that live beside them. It sets out a cross-governmental approach to managing issues that relate to peatlands, including compliance with EU environmental law, climate change, forestry, flood control, energy, nature conservation, planning, and agriculture. The Strategy has been developed in partnership between relevant Government Departments/State bodies and key stakeholders through the Peatlands Council.

The strategy recognises that Ireland's peatlands will continue to contribute to a wide variety of human needs and to be put to many uses. It aims to ensure that Ireland's peatlands are sustainably managed so that their benefits can be enjoyed responsibly. It aims to inform appropriate regulatory systems to facilitate good decision making in support of responsible use. It also aims to inform the provision of appropriate incentives, financial supports and disincentives where required. The strategy attempts to strike an appropriate balance between different needs, including local stakeholders like turf-cutters and semi-state bodies such as BnM.

In line with a National Peatlands Strategy recommendation, a Peatlands Strategy Implementation Group (PSIG), was established, assisted in the finalisation of the Strategy, is overseeing subsequent implementation and will report to Government on an annual basis on the implementation of the actions and principles contained within the Strategy.

BnM is a key stakeholder in the National Peatlands Strategy and the Peatlands Strategy Implementation Group. The strategy recognises the potential for some BnM sites to be restored and to contribute to the national SAC and NHA network of protected raised bog sites. The strategy (agreed in 2015) also recognises the various different values of cutaway bog and developed six key principles (with BnM) for the after-use of cutaway bog.

- BnM will continue to assess and evaluate the potential of the company's land bank, using a land use review system. The assessment will help prepare a set of evidence-based management plans for the various areas of peatland. These plans will also inform its cutaway bog rehabilitation.
- The policy of BnM is not to open up any undrained new bogs for peat production.
- Lands identified by BnM as having high biodiversity value and/or priority habitats will be reserved for these purposes as the principal future land use.
- Generally, BnM cutaway bogs that flood naturally will be permitted to flood unless there is a clear environmental and/or economic case to maintain pumped drainage.
- In deciding on the most appropriate afteruse of cutaway peatlands, consideration shall be given to encouraging, where possible, the return to a natural functioning peatland ecosystem.
- This will require re-wetting of the cutaway peatlands which may lead in time to the restoration of the peatland ecosystem.
- Environmentally, socially and economically viable options should be analysed to plan the future use of industrial cutaway peatlands, in conjunction with limiting factors as outlined in BnM's Strategic Framework for the Future Use of Peatlands.

The National Peatlands Strategy highlights the importance and value of developing peatland rehabilitation plans for BnM cutaway sites and implementing this peatland rehabilitation. Some of these principles have now been superseded by the company's decision to cease industrial peat extraction. The National Peatlands Strategy is currently being reviewed by Government.

5 National River Basin Management Plan 2022-2027 (Water Framework Directive)

The River Basin Management Plan for Ireland 2022-2027 (Department of Housing, Local Government and Heritage, 2022) is the key national plan for Ireland to achieve the objectives of the Water Framework Directive (WFD). In broad terms, the objectives of the WFD are (1) to prevent the deterioration of water bodies and to protect, enhance and restore them with the aim of achieving at least good status and (2) to achieve compliance with the requirements for designated protected areas.

The NRBMP 2022-2027 outlined how peat extraction can be a potentially significant pressure on various water quality parameters. Peatland rehabilitation of BnM cutaway (in addition to other measures) was part of the WFD (2022-2027) programme of measures. The NRBMP 2022-2027 takes account of the fact that BnM was in the process of phasing out the extraction of peat for energy production, that it set a target to rehabilitate 9,000 ha of cutaway bogs (covering 25 peatlands) by 2021 (in 2018) and will look to implement best-available mitigation measures to further reduce water quality impacts caused by peat extraction while the phasing-out process is taking place. This NRBMP 2022-2027 rehabilitation target was superseded by the acceleration of the BnM de-carbonisation programme and the Scheme (PCAS).

The development of site rehabilitation plans and the delivery of peatland rehabilitation by BnM was expected to have a positive impact on water quality and will help the NRBMP 2022-2027 deliver its objectives in relation to the Water Framework Directive and is one of the five key principal actions.

The NRBMP 2022-2027 describes how the number of waterbodies impacted by peat, industry and forestry have decreased by 10, 10 and 5 waterbodies, respectively since the second cycle. Impacts on water quality and river habitat arising from peat and peat extraction and associated drainage include the release of ammonium and fine-grained suspended sediments, and physical alteration of aquatic habitats. Drainage of peatlands also results in changes to the hydromorphological condition of rivers.

The NRBMP 2022-2027 outlines how maintaining and restoring Irish bogs will lead to a decrease in waterborne carbon leaching to levels comparable with intact bogs as well as reducing losses of peat silt and ammonia. Vegetation on the surface of the peat can also slow the flow of water over the land surface. Based on the EPA's most recent reports, peat extraction and drainage is impacting on 106 water bodies across the country, with peat the single pressure on 28 of these water bodies. However, compared to the data in the second-cycle plan, the number of water bodies impacted by peat has decreased.

The cessation of industrial peat extraction by BnM in 2021 was expected to have a significant positive impact on water quality of receiving water courses by reducing the impact of peat extraction as a key pressure on particular water courses. This is now being supported by the results and conclusions of the draft NRBMP 2022-2027.

6 4th National Biodiversity Action Plan 2023-2030

Ireland's 4th National Biodiversity Action Plan (NBAP) sets the national biodiversity agenda for the period 2023-2030 and aims to deliver the transformative changes required to the ways in which we value and protect nature. The 4th NBAP has been developed with the support, advice and input of the interdepartmental Biodiversity Working Group and the independent Biodiversity Forum. Ireland's 2nd National Biodiversity Conference was held to gather insights and recommendations for the development of the NBAP and a public consultation process was held to provide further opportunities to engage with the Plan.

The 4th NBAP strives for a "whole of government, whole of society" approach to the governance and conservation of biodiversity. The aim is to ensure that every citizen, community, business, local authority, semi-state and state agency has an awareness of biodiversity and its importance, and of the implications of its loss, while also understanding how they can act to address the biodiversity emergency as part of a renewed national effort to "act for nature".

The delivery of rehabilitation is expected to significantly contribute in the future to actions and targets of the 4th National Biodiversity Action Plan 2023-2030, particularly in relation to peatland restoration, nature restoration and creation of new habitats such as wetlands and woodlands.

7 EU Nature Restoration Law

The EU Nature Restoration Law is a key element of the EU Biodiversity Strategy, which sets binding targets to restore degraded ecosystems, in particular those with the most potential to capture and store carbon and to prevent and reduce the impact of natural disasters. The regulation combines an overarching restoration objective for the long-term recovery of nature in the EU's land and sea areas with binding restoration targets for specific habitats and species. These measures should cover at least 20% of the EU's land and sea areas by 2030, and ultimately all ecosystems in need of restoration by 2050.

This regulation has now been adapted and it is expected that all Member States will be required to produce a National Restoration Plan within two years of adoption. This will be led by the National Parks and Wildlife Service

and will comprise a broad and deep public participation process, informed by robust ecological and socio-economic impact assessments. BnM are working with NPWS to identify bog restoration and other re-wetted cutaway sites that can contribute towards Irelands targets for the Nature Restoration Law.

8 National conservation designations

BnM operates in a wider landscape that also includes a network of European and National nature conservation sites (Special Areas of Conservation (SACs), Special Protection Areas (SPAs), National Heritage Areas (NHAs, pNHAs) and National Nature Reserves). BnM will take account of this network of conservation objectives and their conservation objectives when developing these rehabilitation plans. It is expected that peatland rehabilitation will, in general, benefit the conservation objectives of this network of nature conservation sites.

9 National Raised Bog Special Area of Conservation Management Plan 2017-2022.

The National Raised Bog Special Area of Conservation Management Plan 2017-2022 sets out a roadmap for the long-term management, restoration and conservation of protected raised bogs in Ireland. The Plan strikes an appropriate balance between the need to conserve and restore Ireland's raised bog network as part of Ireland's commitments towards the EU Habitats Directive, and the needs of stakeholders and gives recognition to the important role that communities have to play in the conservation and restoration of raised bogs. The National Raised Bog Special Areas of Conservation (SACs) Management Plan 2017-2022 is part of the measures being implemented in response to the on-going infringement action against Ireland in relation to the implementation of the EU Habitats Directive, with regard to the regulation of turf cutting on the Special Areas of Conservation (SACs). The then Minister for Arts, Heritage and the Gaeltacht, also published a **Review of Raised Bog Natural Heritage Area Network** in 2014.

BnM has also responded to the needs of the National Raised Bog Special Area of Conservation Management Plan (NRBMP) and provided several sites to the government for the relocation of turf-cutters from SACs. This is part of a suite of ongoing bog conservation measures in the NRBMP to manage turf-cutting in protected sites. BnM and the National Parks and Wildlife Service continues to engage regarding the ongoing relocation of turf-cutters from protected raised bog sites.

10 All-Ireland Pollinator Plan 2021-2025

The All-Ireland Pollinator Plan 2021-2025 outlines key objectives and actions to protect and support pollinating insects and the habitats they rely on. A BnM specific action in this plan includes the adoption of pollinator-friendly management within the BnM network of sites. One action to help achieve this objective is habitat rehabilitation and restoration, where possible, of pollinator-friendly habitats, including peatland habitats.

11 Land-use planning policies

As BnM operates in many counties across Ireland, it is important to note the respective development plans in these counties. Many of the existing development plans recognise the potential that exists in the after-use of cutover/cutaway peatlands. BnM seeks to work with all of the relevant local authorities to ensure that the most appropriate after-uses are reflected in local planning policy. The following areas of consistent importance are of

both direct and indirect relevance to BnM: heritage, tourism, biodiversity/conservation, landscape, renewable energy, and economy/enterprise.

12 National Archaeology Code of Practice

BnM operated under an agreed Code of Practice (COP) regarding archaeology with the Department of Arts, Heritage and the Gaeltacht and the National Museum of Ireland which provided a framework to enable the Company to progress peat extraction whilst carrying out archaeological mitigation. (https://www.archaeology.ie/sites/default/files/media/publications/cop-bord-na-mona-en.pdf).

Under the Code, BnM, the Minister and Director worked together to ensure that appropriate archaeological survey and mitigation was carried out in advance of peat extraction.

As peat extraction ceased in 2019, the remaining elements of the COP that are still applicable include:

- BnM must ensure that any newly discovered monuments on BnM lands are reported in a timely manner to the National Monuments Service of the Department of Arts, Heritage and the Gaeltacht.
- BnM must ensure that any archaeological objects discovered on BnM lands are reported immediately to the Duty Officer of the National Museum of Ireland.
- BnM will adhere to the Archaeology Code of Practice relating to management of any archaeological finds that may arise during cutaway peatland rehabilitation and decommissioning.

13 Bord na Móna Biodiversity Action Plan 2016-2021

Rehabilitation of industrial peatlands is a key objective of the Bord na Móna Biodiversity Action Plan 2016-2021. This action plan outlines the main objectives and actions around biodiversity on BnM lands. The Bord na Móna Biodiversity Action Plan also outlines key International and European policy in relation to biodiversity. This includes the **United Nations Convention on Biodiversity 2011-2020 (CBD)** and **European Biodiversity Strategy to 2020**. Further details of these policies and BnM s responses can be found in the Bord na Móna Biodiversity Action Plan (Bord na Móna, 2016). Both policy documents highlight targets such as reducing pressure on biodiversity, promoting sustainability, habitat restoration and benefits of ecosystem services.

One example of a key CBD target is:

- *"Restore at least 15% of degraded areas through conservation and restoration activities."*

The EUs headline target for progress by 2020 is to:

- *"halt the loss of biodiversity and the degradation of ecosystems in the EU by 2020, restore them as far as feasible, while stepping up the EU contribution to averting global biodiversity loss."*

This rehabilitation plan is aligned to the CBD target and the EU Biodiversity Strategy target and will help Ireland meet its commitment to these international Biodiversity polices.

14 BnM commitments

BnM made the commitment in 2009 not to develop any new peatland sites for industrial peat production. The company has continued to work with different stakeholders.

In line with BnM's accelerated decarbonisation programme, the company made a further commitment to a significantly larger rehabilitation target. This was reflected in our plans to rehabilitate a further 20,000 hectares of cutaway and cutover bog to wetland and woodland mosaics by 2025. In addition, we planned to restore a further 1,000 hectares of raised bog habitat by 2025. These initial targets have been achieved.

The company announced the cessation of industrial peat production in 2021 and that it would rehabilitate a target of 33,000 ha between 2021-2026. Rehabilitation measures will continue to be carried out with the focus on re-wetting and rehabilitation of cutover and cutaway areas in line with national policies (such as the National Peatland Strategy, the National Biodiversity Action Plan, The Nature Restoration Law, the Climate Action Plan, the Water Framework Directive, etc.) and rehabilitation guidelines set down by the Environmental Protection Agency. BnM has now transitioned to a Climate Solutions company with a key commercial and development focus being the delivery of renewable energy to support Ireland's Climate Action Plan. In general, BnM will seek to balance and optimise commercial, social, and environmental value of its bogs, and develop integrated land-uses, while taking account of the need for sustainability and their biodiversity value.

These commitments outline the importance of peatland rehabilitation to BnM. The company will continue to demonstrate environmental responsibility and continue to deliver on these commitments in relation to peatland rehabilitation and in relation to the future management of these lands to maximise their benefits, particularly their ecosystem service benefits, along with the sustainable development of a portion of the land bank for other uses, such as renewable energy.

APPENDIX VI: DECOMMISSIONING

1. Condition 10 Decommissioning

Under condition 10.1, BnM must decommission relevant infrastructure and other materials that supported peat extraction, that may result in environmental pollution.

10.1.1 Decommission, render safe or remove for disposal/recovery, any soil, subsoils, buildings, plant or equipment, or any waste, materials or substances or other matter contained therein or thereon, that may result in environmental pollution.

To date across all of BnM's peatlands that have been rehabilitated, this has entailed removal of rail infrastructure, plant, equipment, materials, and waste.

In relation to this bog, this was primarily rail to be lifted and any associated polybrane materials, production plant and equipment, any waste materials including stockpile covering, stored at production centres.

During the decommissioning of this bog, these materials were either brought to a central roadside location to be removal via a licensed waste provider or brought centrally to the nearest main works site, either Littleton or Templetuohy for removal as waste, to be either recycled or deposited to landfill.

Records, EWC codes, waste treatment operations, weights, descriptions and final destinations of these wastes are reported each year in the Annual Environmental Report (AER) and the Environmental Performance Report (EPR) and are available at the EPA's Licensing & Enforcement Access Portal (LEAP).

Rail lifting is ongoing in Longford Pass in 2026 and is expected to be completed this year, as is the removal of some residual pumping infrastructure.

In relation to this bog, the list and tasks would be as follows:

Item	Description	Longford Pass Decommissioning Plan
1	Clean-up of remaining or unconsolidated waste or materials located in Bogs, Yards, Buildings and Offices	Clean-up of Bog
2	Cleaning Silt Ponds	Cleaning Silt Ponds
3	Decommissioning Peat Stockpiles	Peat Stockpile Management
4	Decommissioning or Removal of Buildings and Compounds	Decommissioning or Removal of Buildings and Compounds
5	Decommissioning Fuel Tanks and associated facilities	Where relevant
6	Decommissioning and Removal of Bog Pump Sites	Where relevant
7	Decommissioning or Removal of Septic Tanks	Where relevant

In addition, condition 7 of the licence requires these now defined waste items to be disposed of or recovered as follows:

7.1 Disposal or recovery of waste shall take place only as specified in *Schedule 2(i) Hazardous Wastes for Disposal/Recovery* and *Schedule 2(ii) Other Wastes for Disposal/Recovery* of this licence and in accordance with the appropriate National and European legislation and protocols. No other waste shall be disposed of/recovered either on-site or off-site without prior notice to, and prior written agreement of, the Agency.

7.2 Waste sent off-site for recovery or disposal shall only be conveyed to a waste contractor, as agreed by the Agency, and only transported from the site of the activity to the site of recovery/disposal in a manner which will not adversely affect the environment.

7.3 A full record, which shall be open to inspection by authorized persons of the Agency at all times, shall be kept by the licensee on matters relating to the waste management operations and practices at this site. This record shall as a minimum contain details of the following:

7.3.1 The names of the agent and transporter of the waste.

7.3.2 The name of the persons responsible for the ultimate disposal/recovery of the

waste.

7.3.3 The ultimate destination of the waste.

7.3.4 Written confirmation of the acceptance and disposal/recovery of any hazardous waste consignments sent off-site.

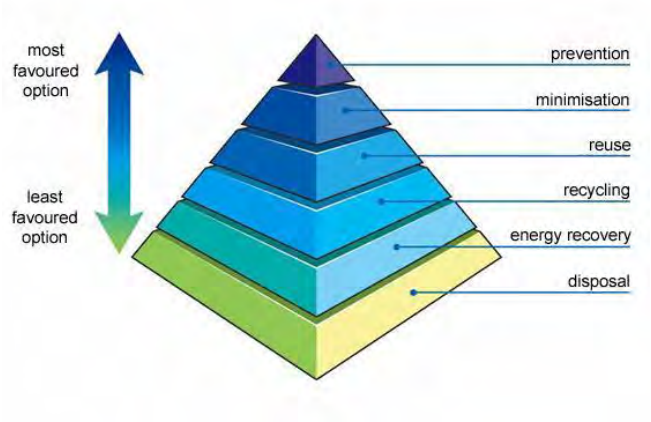
7.3.5 The tonnages and EWC Code for the waste materials listed in *Schedule 2(i) Hazardous Wastes for Disposal/Recovery* and *Schedule 2(ii) Other Wastes for Disposal/Recovery* sent off-site for disposal/recovery.

7.3.6 Details of any rejected consignments.

A copy of this Waste Management record shall be submitted to the Agency as part of the AER for the site.

As required by the licence, these waste items will be removed for recycling or disposal, using external contractors with the required waste collection permits, approved under 7.2, with waste records maintained as required under 7.3.

Where possible, BnM will utilize the appropriate waste hierarchy to identify waste that can reused or recycled ahead of disposal.



The validation of the success of condition 10.1 is carried out through an Independent Closure Audit (ICA), followed by and EPA Exit Audit (EA) and the eventual partial or full surrender of the licence.

2. Enhanced Decommissioning.

The remaining infrastructure does not constitute a risk to the environment and would not be a requirement of condition 10 of the licence. The removal of these are deemed as enhanced measures. These may enhance the future after use of the bog for amenity value, security against access for illegal and unsocial activities and general State and community benefit. In relation to this bog, this would include the infrastructure defined below:

Item	Enhanced Decommissioning Type	Longford Pass Decommissioning Plan
1	Removal of Railway Lines	Removal of Railway Lines
2	Decommissioning Bridges and Underpasses	Where Applicable
3	Decommissioning Railway Level Crossing	Where Applicable
4	Restricting Access (bogs and silt ponds)	Restricting Access to Bog
5	Removal of High Voltage Power Lines	Where Applicable

APPENDIX VII: GLOSSARY

Cutaway Bog: A BnM site generally becomes cutaway when it is economically unviable to continue industrial peat extraction or when the majority of peat has been removed.

Deep peat cutover bog. Deep peat cutover bog is defined as former raised bogs that have been in industrial peat production, where production has ceased but the residual peat depth is typically in excess of 2m. *Sphagnum* mosses are key species of raised bogs and the majority of the peat mass is formed from these mosses. *Sphagnum* species and other raised bog species are a key part of raised bog habitat function and prefer more acidic, nutrient poor, water-logged conditions. Typical raised bog *Sphagnum* mosses and other bog species do not thrive with the more typical alkaline water chemistry of cutaway bog but do grow well in these more acidic conditions where peat has been re-wetted. There is potential to re-develop *Sphagnum*-rich plant communities in these conditions if the peat can be re-wetted. This brings the opportunity of re-developing *Sphagnum*-rich vegetation communities that are considered Carbon sinks or peat-forming habitats and restoring the carbon sequestration function of these sites.

Dry cutaway bog: Cutaway bog is categorised as dry cutaway where it is not practical or feasible to re-wet these areas completely. It is inevitable that some areas of cutaway will remain relatively dry due to the heterogenous topography of the cutaway, as well as requirements for continued drainage on site for identified after-uses, or off site in relation to neighbouring lands or other infrastructure. Ridges and mounds of glacial deposits can become exposed during peat extraction and form a heterogenous topographical mosaic separated by basins. Dry cutaway may have very thin or no residual peat where ridges and mounds have been exposed. The exposed sub-soils are a mix of glacial gravels, muds and tills that can be quite free-draining. Dry cutaway may also have deeper residual peat, but in a location (i.e. at the margin) where the peat cannot be re-wetted due to boundary constraints. Dry cutaway may also develop in situations where there a relatively steep slope that inhibits re-wetting. The majority of dry cutaway will develop towards grassland, heath, scrub and dry woodland habitats.

Enhanced decommissioning: This is defined as decommissioning carried out under the Scheme, which is proposed to be externally funded.

Enhanced rehabilitation: This is defined as rehabilitation carried out under Scheme, which is proposed to be externally funded. It is proposed by Government that BnM be obligated to carry out enhanced decommissioning, rehabilitation and restoration on peatlands. This Scheme will significantly go beyond what is required to meet rehabilitation and decommissioning obligations under existing EPA IPC licence conditions. Interventions and activities supported by the Scheme will ensure that environmental stabilisation is achieved (meaning IPC obligations are met), and importantly, significant additional benefits, particularly relating to climate action and other ecosystem services, will also be delivered. However, only the costs associated with the additional, enhanced and accelerated measures, i.e., those interventions which go beyond the existing decommissioning and rehabilitation requirements arising from Condition 10 will be eligible for support under the Scheme.

Environmental stabilisation: The key objective of peatland rehabilitation is environmental stabilisation. This means developing habitats and vegetation back onto the bare peat, slowing water movement across the bog, minimising effects to downstream waterbodies and meeting the conditions of the IPC Licence. This is achieved by a combination of re-wetting, where possible, and natural colonisation of the former cutaway, with or without intervention**.** Habitats will develop that reflect the underlying environmental conditions. Other after-use development may also serve to act as environmental stabilisation.

Marginal land. Marginal land is defined as land around the margin of the industrial peat production area. This margin generally contains a range of habitats including scrub, birch woodland, cutover bog and raised bog remnants. It has a variety of land-uses including turf-cutting (private turbary). The Scheme will consider potential rehabilitation and restoration actions (e.g. drain blocking) within marginal land zones, where appropriate.

Rehabilitation: Rehabilitation is defined in general by BnM as environmental stabilisation of the former cutaway. This is generally achieved via re-wetting, where possible, and natural colonisation of the former cutaway, with or without intervention. It is not possible to restore raised bog habitats on BnM cutaway in general in the short-term. In general, most of the peat mass has been removed from many BnM cutaway sites and the environmental characteristics of these areas have therefore changed radically (peat depths, hydrology, water chemistry, substrate type, nutrient status. This means there will therefore be different habitat outcomes (wetlands, fen, heathland, grassland and Birch woodland). Other after-use development may also serve to act as rehabilitation.

Restoration: Ecological restoration is defined as the process of re-establishing to the extent possible the structure, function and integrity of indigenous ecosystems and the sustaining habitats they provide" (SER, 2004). Defined in this way, restoration encompasses the repair of ecosystems (Whisenant, 1999) and the **improvement of ecological conditions in damaged wildlands** through the **reinstatement of ecological processes**. In general, BnM cutaway peatlands cannot be restored back to raised bog in a reasonable timeframe as their environmental conditions has changed so radically (with the removal of the acrotelm – the living layer and much of the peat mass). However, they can be returned to a **trajectory** towards a naturally functioning peatland system (Renou-Wilson, 2012). **Raised bog restoration** is an objective of some BnM sites where there is residual natural raised bog vegetation and where the majority of the peat is still intact.

Standard rehabilitation: This is defined as rehabilitation that is designed to meet the conditions of the EPA IPC Licence. The key objective of rehabilitation is environmental stabilisation. This is achieved by a combination of re-wetting, where possible, and natural colonisation of the former cutaway, with or without intervention**.** Other after-use development may also serve to act as rehabilitation.

Standard decommissioning: This is defined as decommissioning that is designed to meet the conditions of the EPA IPC Licence. This is defined as to render safe or remove for disposal/recovery, any soil, subsoils, buildings, plant or equipment, or any waste, materials or substances or other matter contained therein or thereon, that may result in environmental pollution.

Wetland cutaway bog. Wetland cutaway bog is defined as former raised bogs that have been in industrial peat production, where production has ceased and the majority of peat has been cutaway, and where this cutaway has the potential to be re-wetted. A significant number of BnM sites have pumped drainage and these sites are likely to develop a mosaic of wetland habitats when pumping in reduced or stopped. The water chemistry of wetland cutaway frequently is strongly influenced by the more alkaline sub-soils that have been exposed during peat production. This means that pioneer vegetation is more typical of fen and wetland, rather than raised bog. Wetland cutaway will have a broad range of hydrological conditions depending on the local topography. In some cases, these wetlands may form deep water (> 0.5 m) whilst other areas may have the water table at or just below the surface of the ground.

APPENDIX VIII: EXTRACTIVE WASTE MANAGEMENT PLAN

(Minimisation, treatment, recovery and disposal)

Objective:
The objective of this generic plan is to comply with the requirements of regulation 5 of the Waste Management (Management of Waste from Extractive Industries) Regulations, and to prevent or reduce waste production and its harmfulness.

Scope:
This plan covers IPPC Licence's Ref P0499-01, Littleton Group of Bogs located in Co. Tipperary.

1.0 Extractive Waste:
Waste classified as extractive waste from peat extraction operations arise from three operations associated with this activity.

1.1 Silt Pond excavations and maintenance.
All peat extraction activities in the Littleton bog group are serviced by silt lagoons/ponds. During the excavation of these silt ponds, pre IPPC Licensing in 1999 and since licensing, the excavated material is stored adjacent to the silt pond, where it either remains in situ ores levelled out. As required by condition 6.6, these silt lagoons are cleaned twice per annum or more often if inspections dictate. These silt cleanings are also deposited on the same location, adjacent to the silt pond, where they may be levelled periodically to allow room for subsequent cleanings. These mounds of silt pond excavation material and cleanings are generally no higher that 2-3 metres.

1.2 Power Station screenings:
Lough Ree Power Station screens the peat from the bogs prior to processing. This screening removes oversized peat, stones and bogs timbers. Schedule 3 (ii) of the IPPC licence permits disposal of these peat screenings back to the bog, where it is levelled and graded into the surrounding peat landscape. These locations have been agreed with the Agency as per condition 7.4 of the IPPC Licence, and as per the attached locations.

1.3 Bog Timbers:
During peat extraction operations, bog timbers often arise in the bog surface and are required to be cleared. These timbers consist of bog pine, oak and some yew. Some of these timbers, such as the oak and yew are removed for use in the wood craft industry, with the remaining bog pine stockpiled in locations at the opposite end of each bog, where it generally becomes a habitat for flora and fauna. These piles of timber are generally no higher than 1-2 metres.

2.0 P0499-01 IPPC Licence Extractive Waste Conditions

2.1 Condition 7.5 Extractive Waste Management
The licensee shall draw up a Waste Management Plan (to be known as an Extractive Waste Management Plan) for the minimisation, treatment, recovery and disposal of extractive waste. This Plan shall meet the requirements of regulation 5 of the Waste Management (Management of Waste from the Extractive Industries) Regulations,2009. The Plan shall be submitted for agreement by the Agency by the 31' December 2012. The Plan shall be reviewed at least once every five years thereafter in a manner agreeable to the Agency and amended in the event of substantial changes to the operation of a waste facility or to the waste deposited. Any amendments shall be notified to the Agency.
All extractive waste shall be managed in accordance with the Extractive Waste Management Plan. A report on the implementation of the Extractive Waste Management Plan shall be provided in the AER.

2.2 Condition 7.6 Waste Facility

(i) No new waste facility may be developed or an existing waste facility modified unless agreed by the Agency.
(ii) The licensee shall ensure that all existing waste facilities are managed and maintained to ensure their physical stability and to prevent pollution or contamination of soil, air, surface water or groundwater.
(iii) The licensee shall ensure that all new waste facilities are constructed, managed and maintained to ensure their physical stability and to prevent pollution or contamination of soil, air, surface water or groundwater.
(iv) Operational measures shall be continuously employed to prevent damage to waste facilities from personnel, plant or equipment.
(v) The licensee shall establish and maintain a system for regular monitoring and inspection of waste facilities.
(vi) All records of monitoring and inspection of waste facilities, as required under the licence, shall be maintained on-site in order to ensure the appropriate handover of information in the event of a change of operator or relevant personnel.

2.3 Condition 7.7 Excavation Voids

7.7.1 Unless otherwise agreed by the Agency, only extractive waste shall be placed in excavation voids.
7.7.2 When placing extractive waste into excavation voids for rehabilitation and construction purposes, the licensee shall, in accordance with regulation 10 of the Waste Management (Management of Waste from the Extractive Industries) Regulations, 2009, and the Extractive Waste Management Plan:

- Secure the stability of the waste
- Put in place measures to prevent pollution of soil, surface water and ground water.
- Carry out monitoring of the extractive waste and excavation void.

Condition 7.5. Extractive Waste Management Plan. 5 (1)

3.0 Minimisation.

3.1 Silt pond excavation material and cleanings.

IPPC Licence conditions require all production areas to be serviced by an appropriately designed silt pond based on storage volume and retention time. Condition 6.6 requires all ponds to be cleaned bi-annually and more often if inspections dictate, so the only opportunity for minimisation of same is through Standard Operating Procedures. These are required under condition 2.2.2 (i) regarding minimisation of suspended solids, and are in-place to minimise the generation of silt, which in-turn will minimise the generation of silt pond waste.

3.2 Power Station Screenings.

These screenings cannot be minimised as they are a consequence of peat production, stones, timbers and oversize peat materials are naturally occurring on the bog, and are required to be removed prior to processing.

3.3 Bog Timbers.

Bog timbers are also naturally occurring materials within a bog and are required to be removed prior for production. The volume of these bog timbers varies from bog to bog and as such their minimisation is not controllable or quantifiable.

4.0 Treatment

4.1 Silt pond excavation material and cleanings.

The silt pond excavation material and silt cleanings do not require any treatment for its end use which will be either backfilling these silt pond voids as per condition 7.7.1 above as part of the Bog Rehabilitation Plan, or reincorporated into the surrounding peatlands.

4.2 Power Station Screenings.

The factory screenings are permitted to be returned to the bog as they were naturally occurring materials from the bog, and as such do not require any treatment to serve this purpose.

4.3 Bog Timbers
As per 1.3 above, these timbers are stockpiled at two locations in each bog, as per the attached list of sites and become habitats for various flora and fauna.

5.0 Recovery
5.1 Silt pond excavation material and cleanings.
Condition 2.2.2 (vi) requires the reuse of silt pond waste to be examined. This was undertaken in 2006, the outcome of which was that this waste peat silt material, as a fuel, was contaminated with sub-soils, rendering it unsuitable for combustion. In addition, volumes are small compared to overall peat production volumes.

5.2 Power Station Screenings.
Given the nature of these screenings as outlined in 1.2 above, there is no further use identified and they are permitted to be disposed of back to the bog.

5.3 Bog Timbers
Investigations into processing these materials into smaller fractions for potential heating purposes did not yield any viable results. In addition, these older stockpiles are now classified as habitats and as such would not be considered for reuse as a fuel.

6.0 Disposal
6.1 Silt pond excavation material and cleanings.
Schedule 3 (ii) permits the disposal of silt pond cleanings (Lagoon Sediments) to the bog and these locations, adjacent to the silt pond site, are presented in the attached spreadsheet, with associated grid coordinates.

6.2 Power Station Screenings.
Schedule 3 (ii) permits the disposal of screenings (Peat Screenings) to the bog at designated locations agreed under Condition 7.4, and these locations, are presented in the attached spreadsheet, with associated grid coordinates.

6.3 Bog Timbers
These naturally occurring bog timbers are stockpiled at locations in each bog, grid coordinates attached.

7.0 Extractive Waste Management Plan

5 (2a)(i)
The vast majority of peat extraction bogs were all designed and drained for production prior to the 1960's and as such the production fields layout cannot' be altered. Under our Cleaner Reduction Procedures, various design changes have been implemented to the production machines and process to reduce lost peat which eventually is captured in the silt ponds and requires removal as waste peat silt. This along with training and ongoing research and development will continuously reduce waste peat and subsequently waste silt pond cleanings. Bog timbers are present naturally in various volumes and quantities in different bogs and as peat production involves stripping peat in layers, the exposure, generation and removal of these timbers is unavoidable. Work has been undertaken recently into project looking at grinding of these bog timbers in situ using a timber miller, and if this project becomes viable it will contribute to the reduction of bog timbers.

5 (2a)(ii)
Given the nature and expanse of peat bogs, the stockpiling and storage of these waste materials do not present a visual, storage or stability problem. As required under Condition 10 of the IPPC Licence, the silt pond excavations and screenings will be utilised to backfill the silt pond voids once the bogs have finished and stabilised in accordance with out Bog Rehabilitation Plan. Storage of these wastes in the interim, open to the elements does

not present a change on the nature of these wastes that will threaten the environment or prevent their reuse during the bog rehabilitation process.

5 (2a)(iii)
Under Condition 10 of the IPPC Licence, all silt ponds will be decommissioned once the bog surface has stabilised, in agreement with the Agency. This will involve the removal of weirs and flow controls, returning the silt pond back to its original drain or removing the silt pond from the drainage system. Both of these activities will involve placing the silt pond extraction and cleaning material back into the excavation void.

5 (2a)(iv)
The peat bogs do not contain any topsoil, so this is not required.

5 (2a)(v)
Peat mineral resources do not undergo any treatment.

5 (2b)
These three extractive waste are all being reused and recovered back to their original extraction points and have not undergone any physical, chemical, or biological change.

5 (2c)(i, ii & iii)
These three extractive wastes, stored on the bog for reuse or recovery during the bog rehabilitation phase, do not require any management or monitoring during the operation of these bogs. Silt pond excavations and cleanings are stored adjacent to the silt pond and quickly revegetated and stabilise, the screenings are graded back into the bog at the agreed locations upon disposal and the bog timbers do not prevent any water or airborne danger to the environment.

5 (3)
The three extractive wastes arising from peat extraction operations at this site are classified wastes from mineral non-metalliferous excavation, with an EWC code of 0101 02. The materials are not classified as hazardous under Directive 91/689/EEC20, and do not contain substances or preparations classified as dangerous under Directives 67/548/EEC5 or 1999/45/EC6 above a certain threshold.
The peat excavations and cleanings are stored in locations and in a manner that they could not collapse, and are remote in their nature. The stockpiles are located adjacent to silt ponds that are cleaned regularly and as such these stockpiles are managed and levelled to facilitate further cleanings.
Therefore the material stored at these waste facilities would not be considered to be a Category A waste facility.

Classification in accordance Annex II.

Waste Material	Description	Classification	Chemical Process treatment	Deposition description	Transport System
Silt Pond Excavations and cleanings	Peat and mineral soils associated with peatlands. Stored for reuse during bog rehabilitation, with no displacement of overburden	01 01 02	None	Excavated from silt ponds by excavator and deposited adjacent to the silt pond.	Excavator
Peat Screenings	Stones, timbers and oversized peat particles, reincorporated into low	01 01 02	None	Removed by screen at the factory and	Tractor and trailer.

Waste Material	Description	Classification	Chemical Process treatment	Deposition description	Transport System
	areas, agreed with the Agency, and stabilized under normal natural bog conditions			transported by tractor and trailer to the designated and agreed locations	
Bog Timbers	Pine, Oak and Yew species, stored at locations in each bog. Not subject to any stability issues due to exposure to atmospheric/meteorological conditions.	01 01 02	None	Removed from the bog surface by excavator and transported by tractor and trailer to the agreed locations	Tractor and Trailer

Description of operations.
Silt pond excavations arise from the requirement to have silt ponds treating all peat extraction sites. Silt pond cleanings arise from the removal of peat silt from silt ponds as required under IPPC Licence. Bog timbers arise from preparation of the bogs surface for peat production. Estimated quantities of materials are below:

Closure plan. (Bog Rehabilitation Plan).
Condition 10.1 – 10.3 of the IPPC Licence requires the following:

- 10.1 Following termination of use or involvement of all or part of the site in the licensed activity, the licensee shall:
- 10.1.1 Decommission, render safe or remove for disposal/recovery, any soil, subsoils, buildings, plant or equipment, or any waste, materials or substances or other matter contained therein or thereon, that may result in environmental pollution.
- 10.1.2 Implement the agreed cutaway bog rehabilitation plan (refer Condition 10.2).

10.2 Cutaway Bog Rehabilitation Plan:

- 10.2.1 The licensee shall prepare, to the satisfaction of the Agency, a fully detailed and costed plan for permanent rehabilitation of the cutaway boglands within the licensed area. This plan shall be submitted to the Agency for agreement within eighteen months of the date of grant of this licence.
- 10.2.2 The plan shall be reviewed every two years and proposed amendments thereto notified to the Agency for agreement as part of the AER. No amendments may be implemented without the written agreement of the Agency.

10.3 The Rehabilitation Plan shall include as a minimum, the following:

- 10.3.1 A scope statement for the plan; to include outcome of consultations with relevant Agencies, Authorities and affected parties (to be identified by the licensee).
- 10.3.2 The criteria which define the successful rehabilitation of the activity or part thereof, which ensures minimum impact to the environment.
- 10.3.3 A programme to achieve the stated criteria.
- 10.3.4 Where relevant, a test programme to demonstrate the successful implementation of the rehabilitation plan.
- 10.3.5 A programme for aftercare and maintenance.

10.4 A final validation report to include a certificate of completion for the Rehabilitation Plan, for all or part of the site as necessary, shall be submitted to the Agency within six months of execution of the plan. The licensee shall carry out such tests, investigations or submit certification, as requested by the Agency, to confirm that there is no continuing risk to the environment. This plan including maps and ecological classifications are available on file at the Allen Clonsast IPPC Licence Coordinators office.
The location in relation to the silt pond excavations and cleanings are adjacent to the silt ponds, which are considered under the Shannon River Basin Management Plan in accordance with the requirements of Directive 2000/60/EC.
Screenings and bog timbers are all naturally occurring elements of peatland and there placement back to the bog in smaller concentrated designated waste facilities does not constitute a risk to the prevention of water compliance.
The lands under where these materials are deposited are peatlands and are un-effected by the placing of this material.

Review.
This plan will be reviewed every five years, the first review to take place in September 2017. This review will entail an inspection of these waste facilities to ensure their placing, management, maintenance and stability comply with the requirements of the Extractive Waste Management requirements and condition 7.5, 7.6 and 7.7 of the Littleton IPPC Licence P0499-01.

APPENDIX IX: MITIGATION MEASURES FOR THE APPLICATION OF FERTILISER

- Any fertiliser used will be Rock Phosphate and will not be applied in the following conditions:
    1. The land is waterlogged;
    2. The land is flooded, or it is likely to flood;
    3. The land is frozen, or covered with snow;
    4. Heavy rain is forecast within 48 hours (forecasts will be checked from Met Éireann).
    5. The ground slopes steeply and there is a risk of water pollution, when factors such as surface run-off pathways, the presence of land drains, the absence of hedgerows to mitigate surface flow, soil condition and ground cover are taken into account.
- No fertiliser will be spread on land within 2 metres of a surface watercourse.
- Buffer zones in respect of waterbodies, as specified on https://www.epa.ie/resources/faqs/environment--you/faq-listing/ will be adhered with at all times with regard to fertiliser application. Reproduced as follows:

Water body / Feature	Buffer zone
Any water supply source providing 100m^3 or more of water per day, or serving 500 or more people	200 metres (or as little as 30 metres where a local authority allows)
Any water supply source providing 10m^3 or more of water per day, or serving 50 or more people	100 metres (or as little as 30 metres where a local authority allows)
Any other water supply for human consumption	25 metres (or as little as 30 metres where a local authority allows)
Lake shoreline	20 metres
Exposed cavernous or karstified limestone features (such as swallow holes or collapse features)	15 metres
Any surface watercourse where the slope towards the watercourse exceeds 10%	10 metres
Any other surface waters	5 metres*

APPENDIX X: CONSULTATION SUMMARIES

Table APX -1 Consultees contacted.

Bog Name	Contact Organisation	Contact Name	Date of Issue	Format	Date Response Received	Response Format
Consultation undertaken in 2017-2018						
Baunmore	Private individual A		27/11/2017	Letter		
Littleton Bog Group	Irish Peatland Conservation Council	Several staff members		letter	14/02/2018	
Ballysorrell, Templetouhy, Baunmore	National Parks and Wildlife Service	Several staff members	6/02/2018	Site meeting	8/3/2018	
Lanespark	Private individual B		11/04/2018	Site Visit	11/04/2018	
Ballysorrell, Carrickhill Baunmore	NUIG	Several staff members	23/04/2018	Site Visit	23/04/2018	
Littleton Bog Group	Private individual C		25/04/2018	Phone	25/04/2018	
Derryvilla	Slieve Ardagh Rural Development Group	Several members	1/06/2018	Meeting	1/6/2018	
Littleton Bog Group	National Parks and Wildlife Service	Regional staff	24/05/2018	Email	1/06/2018	
Littleton Bog Group	General community meeting – Loch Doire Bhile, site visit to Baunmore		12/06/2018	Site Visit/meeting	12/06/2018	
Littleton Bog Group	National Parks and Wildlife Service	Regional staff	14/06/2018	Site visit	14/06/2018	
Littleton Bog Group	Tipperary County Council	Heritage Officer	23/06/2018	Phone	23/06/2018	
Derryvilla	Private Individual D		27/06/2018	Meeting	27/06/2018	
Littleton Bog Group	Birdwatch Ireland	Several staff members	1/08/2018	Email	3/08/2018	
Littleton Bog Group	Irish Peatland Conservation Council	Several staff members	1/08/2018	Letter	15/08/2018	

Bog Name	Contact Organisation	Contact Name	Date of Issue	Format	Date Response Received	Response Format
Littleton Bog Group	Kilkenny County Council	Heritage Officer	1/08/2018	Email	3/08/2018	
Littleton Bog Group	National Parks and Wildlife Service	Several staff members	1/08/2018	Letter	9/10/2018	
Littleton Bog Group	Irish Peatland Conservation Council	Several staff members	30/08/2018	Meeting	30/08/2018	
Littleton	Forest Service	Several staff members	14/08/2018	Email	14/08/2018	
Baunmore & Littleton	Birdwatch Ireland – Tipperary Branch	Several staff members	1/10/2018	Site visit	1/10/2018	
Littleton Bog Group	Tipperary County Council	Several staff members	5/11/2018	Email	19/11/2018	
Littleton Bog Group	Tipperary Heritage Forum	Several staff members	15/02/2019	Presentation	15/02/2019	
Knockahaw	Private Individual E		1/02/2019	Site Visit	1/02/2019	
Littleton Bog Group	Environmental Protection Agency, National Parks and Wildlife Service, Irish Peatland Conservation Council	Several staff members	26/02/2019	Presentation meeting	26/02/2019	
Baunmore	Irish Wildlife Trust	Several staff members	12/05/2019	Site Visit/Walk	12/05/2019	
Lanespark Derryvilla	National Parks and Wildlife Service and Slieve Ardagh Rural Development Group – Loch Doire Bhile	Several staff members	22/05/2019	Meeting	22/05/2019	
Longfordpass	Private Individual F		5/07/2019	Site visit	5/07/2019	
Ballysorrell	Heritage Week Walk - Ballysorrell	Several staff members	17/08/2019	Site Visit/Wak	17/08/2019	
Baunmore Carrickhill	Limerick Institute of Technology (LIT)	Several staff members	13/09/2019	Site visit	13/09/2019	

APX -2 Response summary from Consultees contacted

Organisation	Summary of Response by Stakeholder	BnM Response
NPWS 8/3/2018	Ballysorrell All walked over the bog and viewed the bog restoration works. MCC outlined work carried out so far and work planned for the future. Planned work is > 75% complete. NPWS staff very complementary of the bog restoration work (drain-blocking with peat dams) carried out so far. All agreed that the bog had significant potential for bog restoration, and future nature conservation. Signs that the bog is already re-wetting in places due to drain-blocking. Review and discussion of NPWS degraded raised bog model outputs for Ballysorrell. Model predicted that 9 ha would have potential for development into active raised bog in the future. General view was that this was probably an under-estimate and that the model likely to be affected by the intensive BnM drainage network. Discussion of potential measures to further increase re-wetting of the bog including berms across high bog at southern section. Bruckana All visited the Bruckana Windfarm. Viewed a cutaway bog area within the windfarm complex where there has been significant natural colonisation for at least 20 years and some targeted hydrological management. Discussion of the former history of Templetuohy Bog as a sod turf production bog. Sod turf cutaway tends to have deeper remnant peat, which in turn can develop Sphagnum-rich vegetation, where conditions suit. Attendees viewed some wet cutaway where there has been some Sphagnum colonisation. Discussion of environmental conditions that led to the development of this specific vegetation type. Discussion of potential to re-wet similar cutaway, with similar environmental conditions and deeper peat, to encourage development of Sphagnum-rich peat-forming vegetation. Discussion of different constraints and opportunities for this type of re-wetting. This Sphagnum-rich peat-forming vegetation only has potential to develop in certain environmental conditions in association with deeper peat. NPWS staff suggested that intensive bunding would have potential to increase the overall re-wetted area. There was general discussion of potential larger project opportunities, in association with planned BnM rehabilitation or future BnM afteruse development. These larger projects could potentially focus on GHG emission reduction, creation of peat-forming habitats, biodiversity enhancement, other ecosystem services enhancement/restoration. Baunmore All visited Baunmore cutaway. Baunmore is a typical milled peat cutaway with pumped drainage and with shallower remnant peat more typical of milled cutaway in the Littleton Bog Group, in contrast to Bruckana. All walked part of the bog where some recent rehabilitation trials have been carried out. MMC pointed out the recent field drain blocking using a bull-dozer that has been carried out so far. The target here was to block drains, re-establish surface drainage and re-wet peat. This work has already successfully held back surface water in places. The cambered fields and variable topography mean that a proportion of the peat fields remain dry. The expected habitat development is a mosaic of poor fen wetland communities, Reed swamp and scrub/wet woodland. MMC explained how blocking the field drains is Phase 1 of the planned rehab trial and that Phase 2 will involve blocking outfalls and cutting new overflow drains to further manipulate overall water levels. The overall strategy is to maximise the area of re-wetted peat with water levels close to the peat surface and emergent wetland communities. NPWS staff also suggested that more intensive bunding would have potential to increase the overall re-wetted area and help manage water levels. All then examined some cutaway that is colonising naturally with pioneer vegetation. This cutaway is much more alkaline compared to Bruckana with indicators such as the presence of Black Bog-rush.	

Organisation	Summary of Response by Stakeholder	BnM Response
Tipperary Cunty Council	The draft plan is an overview of the rehabilitation within the Littleton bog group this comprises of 12 bog areas. The plan is developed under Condition 10 of IPC Licence Ref. P0499-01. (An incorrect licence ref. is given in the plan.) Any consideration for future after uses for the bog areas will be subject to the planning regulatory framework and the Environment section will be obliged to comment at this time on a more detailed proposal. The rehabilitation plan should include best practice measures for the restoration of an optimal range of biodiversity and ecosystems. The aftercare management activities on the level, quantity and quality of water both on site and in the surrounding landscape should avoid any unnecessary deterioration in the quality and quantity of ground and surface waters. After use, peatland water levels and flow regimes should be restored to as close to the natural reference conditions as possible. Any works carried out must be detailed and all stakeholders consulted.	
Irish Peatland Conservation Council	The IPCC welcome the zonation of Ballysorrell Bog for biodiversity and the decision not to develop it for peat resources (Page 3). Ballysorrell Bog is quite southerly in its location and its rehabilitation and zonation for biodiversity will help to extend the range of raised bog habitat in Ireland, which according to "The Status of EU Protected Habitats and Species in Ireland | 2013" (NPWS, 2013) is "BAD". We have a few questions and points to make on the draft rehabilitation plan with the aim to improving its content. It is good to see that BnM will be restoring the hydrology of the high bog through drain blocking as mentioned on Page 4 and that you also intend to carry out a trial rehab programme of a selected area for training purposes. Could you please elaborate on this? What training/trials do you intend to conduct and is it only inhouse training for BnM staff? The rehabilitation process may be a good time to test the Canadian method of Sphagnum transfer as there would be time to prepare the site prior to drain blocking. Please give this suggestion consideration as you indicated the peat present as light red brown Sphagnum peat (Page 9). There is Sphagnum on site that could be harvested and used as a donor inoculum for a Sphagnum trial. Page 5 gives information on the short and long-term time-frames of the plan. Could you give more details on the methods that will be utilised to monitor the hydrology i.e. will piezometers be used to measure water levels and will they be measured before drain blocking? This could ensure that any hydrological successes will be shown. In addition, how frequently will the ecotope mapping be conducted? Page 3 details the time-line for the development of Ballysorrell ("Ballysorrell was originally developed....."). Could this historical timeline be re-written as it is difficult to follow. For instance, when did the private sodpeat cutting around the bog cease? When did the milled peat production cease? Could you please specify how Ballysorrell Bog will help to achieve the national conservation target for active raised bog and supporting habitat in Ireland? Are there plans to formally designate this site in the future? Thank you for giving us this opportunity to make some comments on this welcome initiative by Bord na Mona.	
NPWS 9/10/2018	The Department, particularly, welcomes the restoration measures proposed for Ballysorrell Bog and Knockahaw Bog which will result in the development of active raised bog habitat and acknowledge that this will significantly aid Ireland in meeting its commitments under the EU Habitats Directive. Whilst it is appreciated that "the rehabilitation measures will be adapted to the various baseline conditions" (Part 1, pg.20) the Department recommends that BnM consider more fully the potential for forward-planning during production phases of its operation so that the topography of the commercial fields could be engineered so as to best facilitate rewetting of the sites. Such an approach would better conform to Principle 17 (afteruse of cutaway peatlands) of the National Peatlands Strategy (2015). The Department recommends that the ongoing research into the interaction between rehabilitation measures and carbon emissions is prioritized so as to better inform future rehabilitation plans. In the absence of the assimilation of such research outputs into rehabilitation planning it is nonetheless recommended that serious consideration is giving to reprofiling works within the Littleton Bog Group. In relevant sites this could greatly improve the baseline conditions for rewetting and would be justified on the basis that rewetted cutaway has lower carbon emissions that dry, bare cutaway. The foregoing is in line with Principle 19 (contribution of peatland rehabilitation and restoration to climate change mitigation and adaption) of the National Peatlands Strategy. There is some difficulty interpreting the maps due to their complexity and the size of the legend. Maps showing specific restoration actions would be useful, possibly in the form of an	

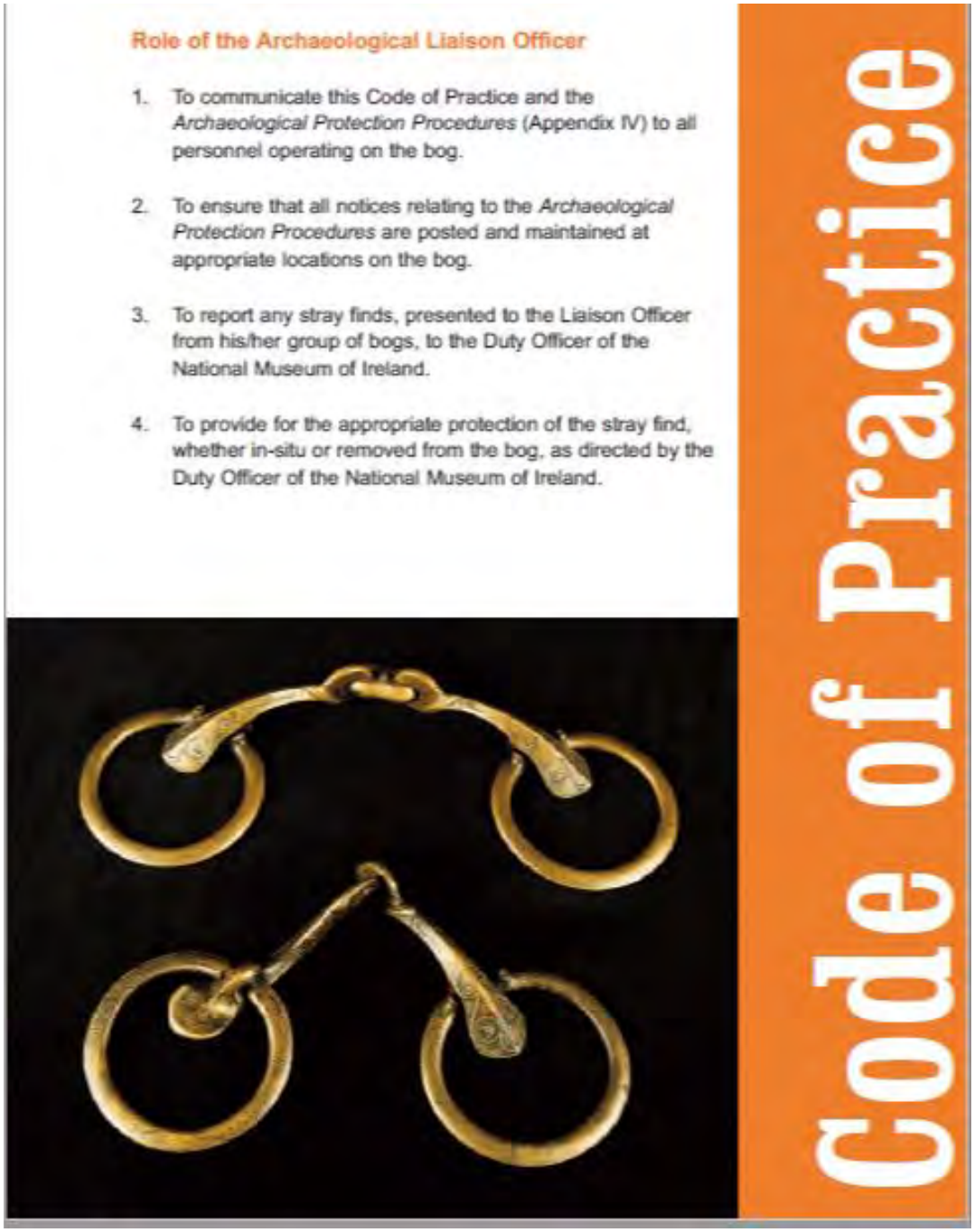
Organisation	Summary of Response by Stakeholder	BnM Response
	overview grid at a scale 1:35,000 with more detailed mapping as per grid squares. Eco-hydrological modelling based on LiDAR/DTM would be essential to ascertain the potential to achieve wet habitats with the potential to turn into carbon sinks. ….. 2 The Department is keen to continue engagement with BnM as regards investigating more engineered restoration techniques likely to provide results in line with the principles of the National Peatlands Strategy. The NPWS of the Department would welcome an opportunity to meet with you to allow for the Plan to be presented by your Ecology Team and to further explore the options of external funding such as EU LIFE funding, as discussed in previous meetings.	
IPCC 15/08/2018	Could you please clarify the correct area for the group of 12 sites included: is it 5050ha (Page 11, Section 4.2) or is it 4824ha (Page 11, Table 1). If it is the latter could you clarify what the other 226ha constitutes please. IPCC's principal interest in this plan lies in the future of existing acid peat bog remnants, the potential of the cutaway areas to provide biodiversity value and priority habitats for nature conservation, climate change mitigation and the extent to which the plan meets requirements of the National Peatlands Strategy 2015. The area of peatland included in the Littleton Bog Group is significant in the county of Tipperary as it represents one third of the original area of raised bog that occurred in the whole County particularly concentrated in South Tipperary (Hammond 1979 Peatland Map of Ireland) the southern distribution range for raised bogs described in the Status of EU Protected Habitats and Species. In your plan on Table 5 only two bog restoration sites (Ballysorrell and Knockahaw) are proposed covering an area of 567ha. Can you explain the method used in choosing these areas for bog restoration and were any other sites considered within the group? IPCC maintain that two sites is far too little considering the area of the land in the Littleton Group and the lack of any sites of conservation value in this area of former raised bog distribution. We note that Killeens Bog contains acidic peat and that it appears to be earmarked for horticultural peat (sod moss judging from the satellite photograph) should this be required. On Page 16 in conclusion 5 the plan states that this bog could be restored if horticultural peat extraction is stopped. IPCC strongly recommend the immediate cessation of this activity on this site and its inclusion in the restoration sites plan. We have reasoned with BnM on numerous occasions about the continued national production of horticultural peat as we do not agree that this use represents responsible management as defined in principle P24 in the National Peatlands Strategy. We understand that Sod Moss is regarded in economic terms as a "lost leader" product which negates any economic argument for keeping this site in production. Here in Littleton where BnM have exploited over 5000ha of Tipperary's natural peatland resources, all peat production should cease and every effort should be made to restore suitable acid peat resources to living bog where they exist. In this regard on Page 15 (Section 4.3.1.1 [ii]) two further sites with acid peat are mentioned - Carrickhill (substantial raised bog cutover east and west of the cutaway) & Inch (raised bog cutover to the south west of the cutaway) - why are these sites not being included in the bog restoration sites line-up? In the IPCC Sites Database we have a site named Longford Pass - Littleton Bog which is a remnant raised bog that we surveyed with a former BnM employee Sean Canney and which we subsequently used for educational purposes with local schools with the agreement of BnM. We would like to see this site included in the bog sites restoration list. (Grid ref. = S 23023 59319). IPCC are very unclear about your aims for the non-designated sites with considerable wildlife interest described on Page 21 of the plan. We estimate that there are 10 sites mentioned that are noteworthy for birds, crustaceans and invertebrates. In addition a further 3 rehabilitation sites are included in the BnM Biodiversity Plan. On the one hand BnM makes use of the fact that cutaway bogs are rich in biodiversity as part of the "Naturally Driven" image you like to portray but we can see no substantial commitment to undertake targeted management actions in relation to enhancing and maintaining these species on the sites. For example on Page 19 you state that without additional funding targeted conservation works for breeding birds will not be a feature of this plan. This is wrong and is at odds with Principle 15 in the National Peatlands Strategy 2015. In relation to climate	

Organisation	Summary of Response by Stakeholder	BnM Response
	change this rehabilitation plan needs to ensure that all of the cutaway bogs within the Littleton Group are rewetted to prevent carbon leakage. In our experience through visits to Mount Lucas, Ballycon and Lullymore cutaway bogs there are substantial areas within these rehabilitated sites that are dry and emitting carbon. Why does BnM not recontour sites with un-even topography to ensure that the majority of the bare peat is rewetted? Surely at the peat production stage more effort could be made to extract the peat so that flat substrate remains. Can you indicate within the plan the percentage of peat that will be rewetted and be carbon neutral? This is an important consideration in line with national climate change policy. IPCC find that the plan is overstating the company's intention to cease peat production for electricity by 2030 as their contribution to climate change policy	
Private Individual C	Phone call to discuss potential to develop greenway amenity across the Littleton Bog Group.	
Private Individual D	Meeting to discuss boundary issues and potential impact of rehabilitation on adjoining land	
Private Individual F	Meeting to discuss rare orchids at Longfordpass railway cutting	
PCAS consultation undertaken in 2025		
Uisce Éireann (formerly Irish Water)	In their response, Uisce Éireann stated that they are 'supportive of the key objective of achieving environmental stabilisation of the bog and stabilising/improving key emissions to water. Uisce Éireann understand that restored peatlands are generally beneficial for drinking water sources downstream by improving water quality and by creating water retention and slowing the flow from the site. We are therefore in support of the Cutaway Bog Decommissioning and Rehabilitation Plan and believe that it could help to achieve to improvements the quality of drinking water sources downstream in terms of suspended sediment, colour, ammonia and dissolved organic carbon. Erenagh Bog is located within the drinking water abstraction catchment for five public water supplies. The closest abstraction point is located approximately 32 km downstream of the site, where the Athlone Public Water Supply abstracts from the River Shannon. 'Uisce Éireann has undertaken a review of the plan and Killeen Bog is not located within any drinking water abstraction catchments directly nor is Killeen Bog directly associated with any surface water abstraction catchments downstream. However, the zone of contribution (ZOC) for the Horse & Jockey Water Supply is located approximately 200m to east of Killeen Bog, with the abstraction borehole at Curraheen being located a further 1.5km east of the Killeen Bog'. Uisce Éireann provided suggestions and recommendations around water quality monitoring and the management of silt ponds during and post rehabilitation.	BnM acknowledged the response and responded to the queries raised. Consultation is ongoing.
Iarnród Éireann/Irish Rail	The location is approximately 10km from the nearest Iarnród Éireann railway line in Thurles, so Iarnród Éireann have no comments to make about the proposed work.	BnM acknowledges the response.
Minister of State with responsibility for Nature, Heritage	Acknowledge receipt of consultation.	BnM acknowledges the response.

Organisation	Summary of Response by Stakeholder	BnM Response
and Biodiversity - Christopher O'Sullivan TD.		
Tipperary County Council	In their submission, Tipperary County Council highlighted that the rehabilitation plan should 'ensure that future options for amenity or tourism uses of the lands are not discounted, having regard to the Council's aspirations to develop eco-tourism projects throughout the county'. Further, it was highlighted that archaeological impacts associated with rehabilitation of Killeen bog, given the rich archaeological heritage of the lands, should be assessed. Recognition of the Littleton Labyrinth projects is welcomed by Tipperary County Council. The rehabilitation of the bog should have regard to future access and way-leaves for access and services of the adjacent Lisheen Mines National Bioeconomy Campus. Tipperary County Council provided information on the relevant policies and objectives within the Tipperary County Council's Climate Action Plan 2024-2029 that aligned with peatland restoration. Other information focused on the Tipperary Decarbonising Zone, and how peatland restoration would benefit such decarbonisation. Other information was provided on the council's policies on Land-use, Land-use Change and Forestry (LULUCF). It notes that the 'management of agricultural ecosystems, such as grasslands and peatlands' are emitters of CO2 and 'the management of agricultural ecosystems, such as grasslands and peatlands 'an important area for climate mitigation measures'. 'For example, alternative land management measures such as raising the water table in existing pastures and peatlands, new crop types, forestry etc could make this sector a net remover of GHGs'. The submission notes that 'BnM is to be commended for its decarbonisation programme aimed at reducing the carbon emissions from its activities. This programme supports the National policy position and objective of achieving a transition to a competitive, low carbon, climate-resilient and environmentally sustainable economy by 2050'. The submission requests: • 'stakeholder collaboration to deliver concerted efforts towards carbon and GHG emissions reductions within the DZ, which can lead the way for wider application across Tipperary'. • 'BnaM are requested to considered if there are opportunities for collaboration with stakeholders, including Tipperary County Council, as part of the delivery of their PCAS programme'. • 'The Mid-Tipperary Decarbonising Zone is within the JTF area and thus there are opportunities to engage local communities, including those previously employed in the peat harvesting industry, in areas related to training and upskilling and sustainable local job creation'. • 'BnaM are requested to consider the referring of the Mid-Tipperary DZ in their relevant publications and projects. In particular to include details on the Mid-Tipperary Decarbonising Zone in the relevant Rehabilitation Plans and associated Map Books'. • 'The strategic location of the national Bioeconomy Campus (Irish Bioeconomy Foundation) at Lisheen should be noted and it is requested that BnaM consider the vision for the National Bioeconomy campus as part of their overall plans in the Mid-Tipperary DZ areas'. 'BnaM are requested to consider, given the particular role of the national DZ programme in emissions reduction, if there is an opportunity to monitor the changes in carbon emissions from a current baseline within the Killeen bog and report on reduced the carbon emissions in support of the national objective of achieving a transition to a competitive, low carbon, climate-resilient and environmentally sustainable economy by 2050. Thus, the rehabilitation plans can explicitly state how emissions will be monitored and reported. Such reporting will also support Tipperary County Council objectives for supporting moves towards low-carbon communities within the Decarbonising Zone'.	BnM acknowledged the response. Consultation is ongoing.

Organisation	Summary of Response by Stakeholder	BnM Response
An Taisce	In their submission, An Taisce welcomed 'any efforts made to rehabilitate and eventually restore Ireland's network of heavily degraded bog lands. This is crucial in the context of the intertwined biodiversity and climate emergencies, and the crucial carbon sequestration function of healthy bogland alongside other ecosystem services'. Expressed that peatlands should not be subject to future development 'which could have negative ecological impacts in terms of hydrological regime, critical wildlife habitat, carbon sequestration function and other ecosystem services' An Taisce 'highlight an example of a rare species returning to a naturally regenerating bog on BnM lands, namely the Crane, which was absent as a successfully breeding species in Ireland for hundreds of years.2 This demonstrates the positive and regenerative cascading effects across an ecosystem when it is devoid of intensive industrial activity and allowed to regenerate and eventually flourish. We submit that the subject rehabilitation should be considered with these benefits in mind, and that resumption of any type of industrial activity should be excluded within boglands with the highest restoration potential or in those which have already been rehabilitated/restored'. Queries if Coillte conifer plantation forestry could be included in the rehabilitation plan. For Bord na Mona to prevent small-scale illegal turf cutting within the subject site. A request for continuous ecological monitoring to be carried out at the site to ascertain its full ecological value and potential. An Taisce 'welcome the commitment to bunding as a measure throughout the peatland restoration proposal, which is recognised by stakeholders such as the NPWS and IPCC as effective for rewetting purposes'. Concerns were raised 'about the effects of drought and wildfire risk, as well as excess rainfall events and subsequent flooding effects'.	BnM acknowledged the response. Consultation is ongoing.

APPENDIX XI: ARCHAEOLOGY



22

Code of Practice

5. To arrange for the delivery or collection of the stray find, as directed by the Duty Officer of the National Museum of Ireland.

6. To complete the Report of Discovery of Archaeological Object(s) in Bogs (Appendix V), as directed by the Duty Officer of the National Museum of Ireland.

7. To maintain a file of all stray finds and associated documentation and provide copies to the Project Archaeologist.

8. To provide assistance, where required, to the Department during archaeological surveys.

9. To provide assistance, where required, to Bord na Móna's Consultant Archaeologists, during investigation and mitigation of monuments.

10. To report to the Bord na Móna members on the Archaeology Management Liaison Committee any planned developments or new activities on cutaway peatland areas within his/her group of bogs.

1. Purpose

The purpose of this procedure is to describe the arrangements within Bord na Móna (BnM) for the identification, protection and reporting of archaeological material, including stray finds and known archaeological features.

All objects, sites or monuments, no matter how fragmentary, are important elements of our national heritage. The protection of archaeological resources is a legal requirement and forms part of Bord na Móna's environmental and cultural heritage responsibilities.

This procedure also sets out operational controls to ensure that archaeological features and their associated buffer zones are protected during rehabilitation activities.

---

2. Procedure

2.1 Archaeological Awareness

1. Verify whether any known archaeological monuments or constraints exist within the proposed work area prior to commencing works. These can be identified using the BnM GIS system, including the relevant PCAS layers and associated field maps.
2. All archaeological locations and their associated buffer zones shall be clearly marked on the bog in advance of any rehabilitation activities, irrespective of whether works are planned within those areas. The Survey Team will endeavour to mark all zones prior to commencement of rehabilitation works on a given bog; however, this is subject to the availability of survey resources. Where features are located in areas that are unsafe to access (e.g. water-covered areas), physical marking is not required.
3. These markings must be installed prior to machinery entering the field where all rehabilitation measures are taking place.
4. Archaeological features located within fields will be marked by the Survey Team using a visible red "X" to clearly alert operators to the presence of an archaeological constraint. These features are typically accompanied by a 20 m buffer zone, which may restrict access to up to three adjacent fields.
5. Operators must not drive over or across these markers, including when moving between work areas. Operators must navigate around the marked locations and their associated buffer zones.
6. If operators are observed driving over archaeological markers in order to move to the next work area, this must be reported to the Site Supervisor or **Archaeological Liaison Officer** immediately so corrective action can be taken.
7. Archaeological areas and their associated buffer zones must not be used for machine travel, idle travel, turning, or equipment positioning.

2.2 Stray Finds Procedure

1 Be vigilant at all times. Objects or traces of structures may be found:

- on field surfaces
- in drain faces
- on bog margins
- caught within the mechanics of machinery.

2 If a n object is discovered:

- Leave it in place if it is safe to do so.
- Note its position.
- Immediately contact the **Archaeological Liaison Officer**, who will assess the situation and contact the Duty Officer of the National Museum of Ireland where required.

3 Resist the temptation to investigate the find spot further, as this may disturb fragile archaeological deposits.

4 If the object has already been dislodged or is in imminent danger:

- Remove it carefully.
- Mark the find location.
- Report it immediately to the **Archaeological Liaison Officer**.

5 Objects made of **wood, leather or textile**, particularly those removed from peat, must be kept in conditions similar to those in which they were found. This may include:

- packing the object in peat, or
- placing waterlogged items in a clean basin of water and sealing the container.

6 Do not attempt to clean or remove peat from the object.

7 If **timbers, gravel, stones or other materials that may form part of a man-made structure** are discovered:

- mark the location
- report immediately to the **Archaeological Liaison Officer**
- do not expose the structure further.

8 Report anything that appears **unnatural or unusual in the bog**. The **Archaeological Liaison Officer** will determine whether the find requires referral to the relevant authorities.

---

3. Important Note

Our archaeological heritage is a finite and non-renewable resource. Once a site is destroyed, its information is lost forever. Protecting archaeological remains allows us to better understand our past, our landscape and the people who lived here before us.

All Bord na Móna staff and contractors must therefore ensure that archaeological features, buffer zones and potential stray finds are treated with care and protected at all times during operations.

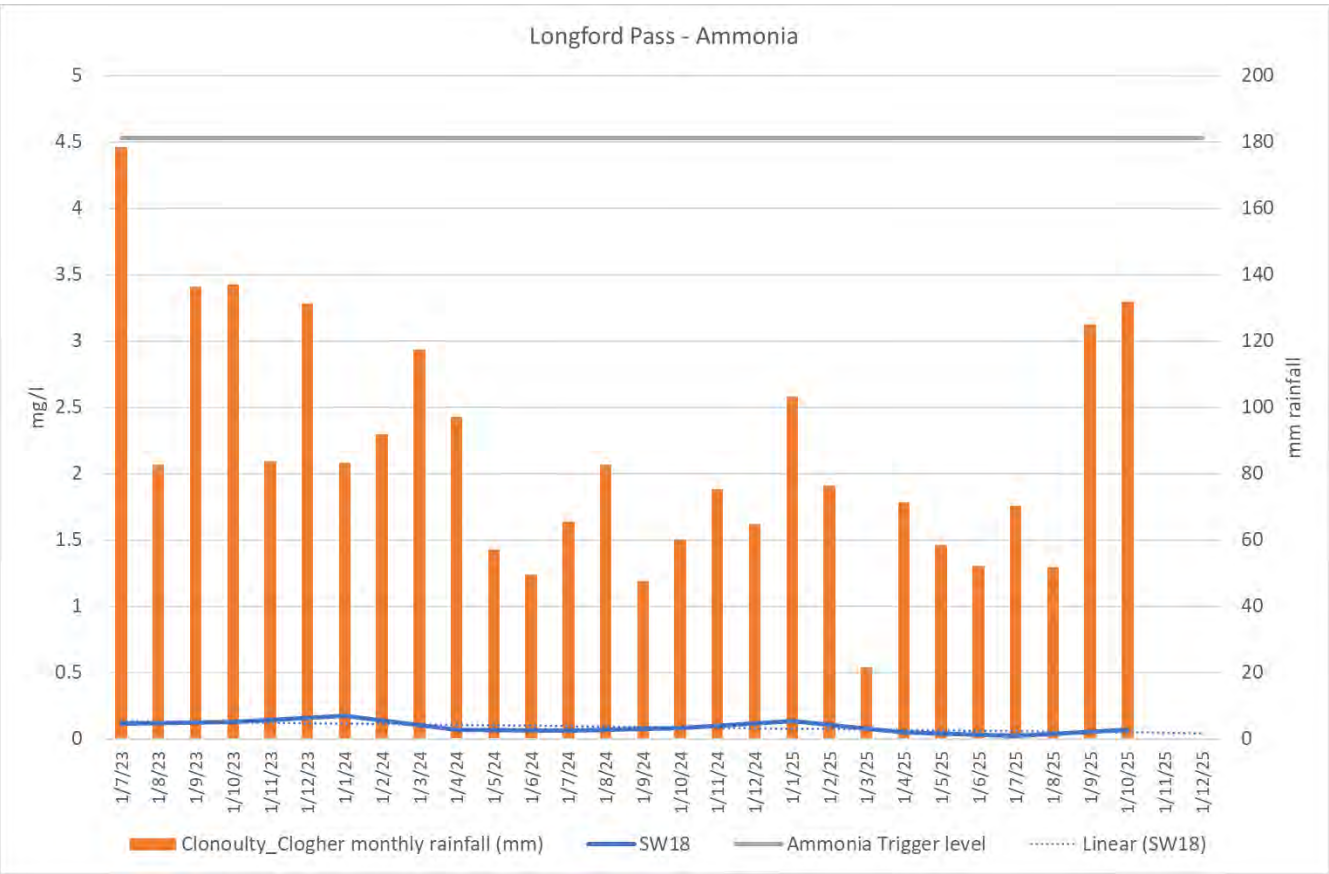
Your Archaeological Liaison Officer is Enda McDonagh

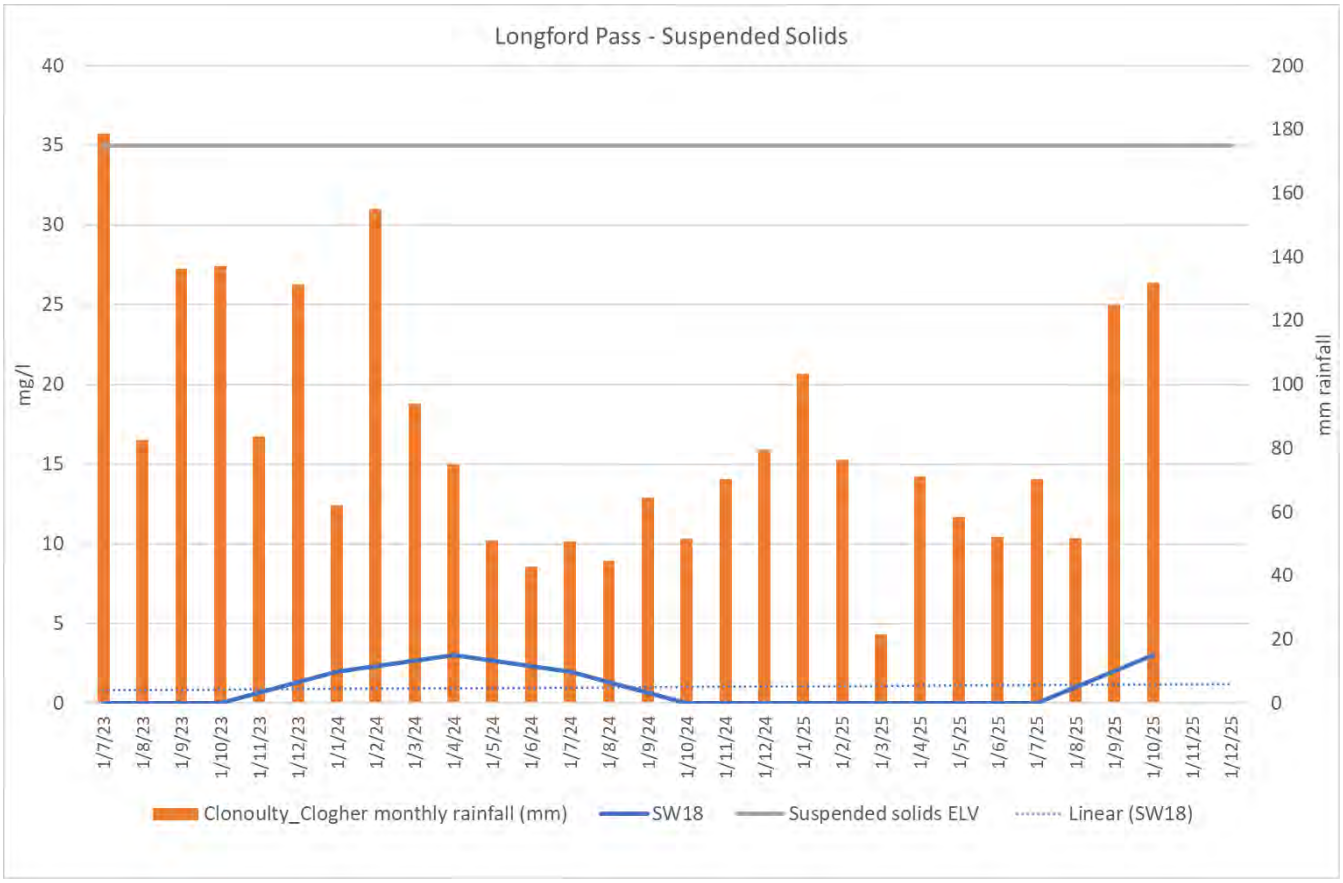
Revision Index

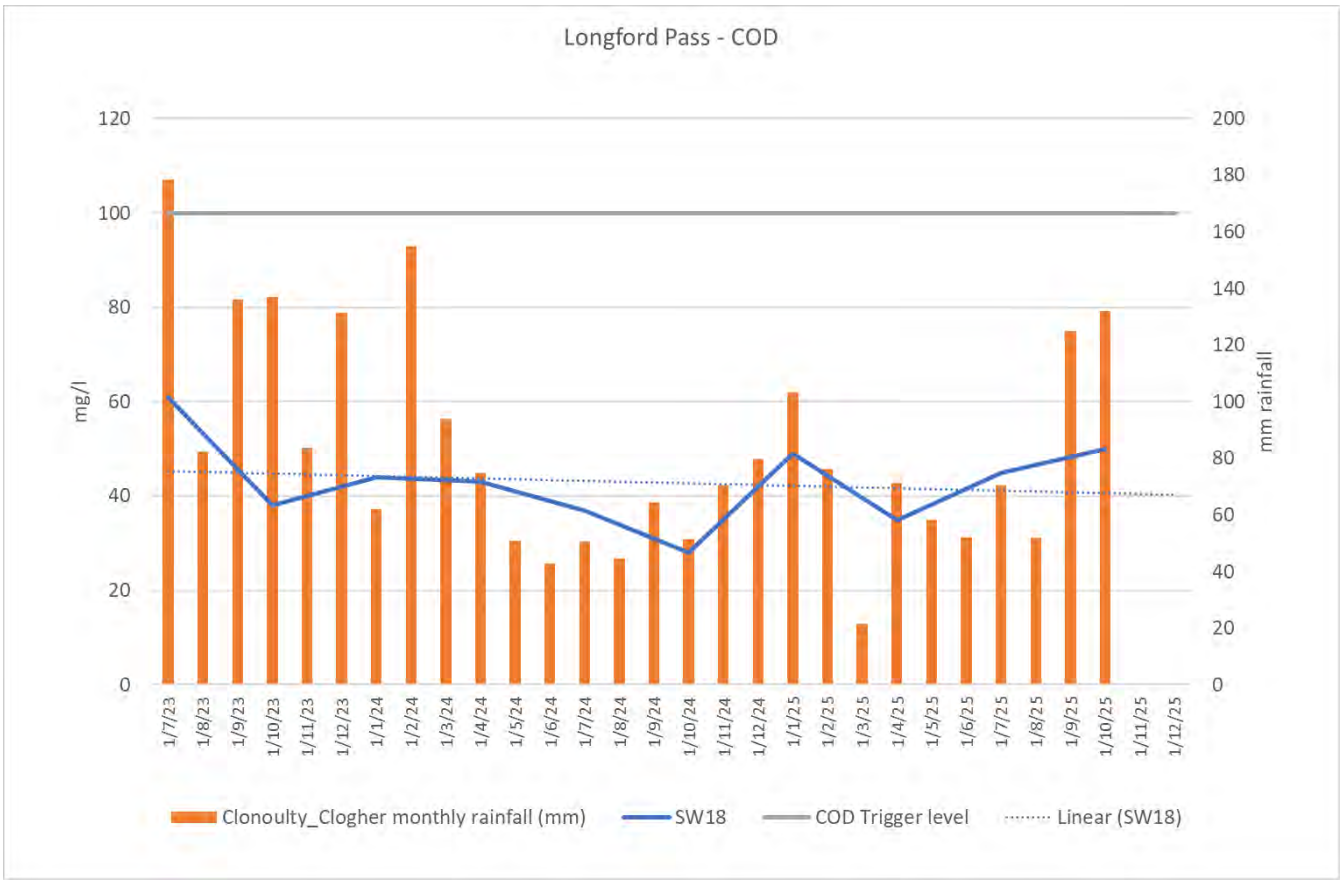
Revision	Date	Description of change	Approved
1	13/19/2020	First release	EMcD
1	24/11/2025	Change to logo and header	SG
2	10/03/2026	Addition of Archaeological Awareness and change of SOP Title	EMcD

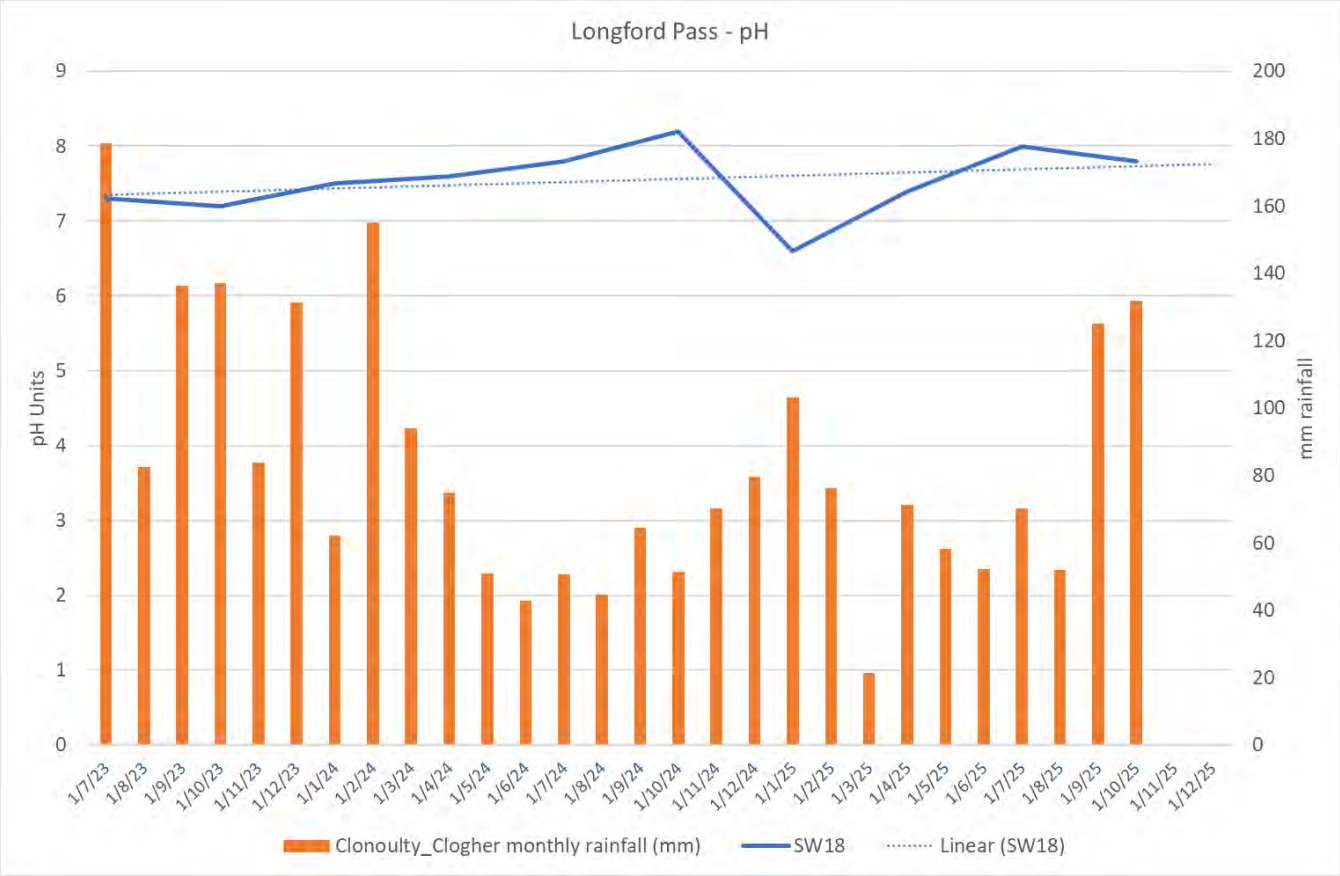
APPENDIX XII: WATER QUALITY MONITORING RESULTS FOR LONGFORD PASS BOG

Water quality monitoring indicates that suspended solids are well below the emission limit value and would have reached expected background levels having stabilised over the period. Ammonia and COD concentrations are well below the associated trigger levels and are remaining fairly level and consistent. The following graphs provide the water quality monitoring results for Longford Pass Bog from 2023 to 2025.




Longford Pass - Suspended Solids
mg/l
mm rainfall
Clonoulty_Clogher monthly rainfall (mm)
SW18
Suspended solids ELV
Linear (SW18)


Longford Pass - COD
mg/l
mm rainfall
Clonoulty_Clogher monthly rainfall (mm)
SW18
COD Trigger level
Linear (SW18)


Longford Pass - pH
pH Units
mm rainfall
9
8
7
6
5
4
3
2
1
0
200
180
160
140
120
100
80
60
40
20
0
1/7/23
1/8/23
1/9/23
1/10/23
1/11/23
1/12/23
1/1/24
1/2/24
1/3/24
1/4/24
1/5/24
1/6/24
1/7/24
1/8/24
1/9/24
1/10/24
1/11/24
1/12/24
1/1/25
1/2/25
1/3/25
1/4/25
1/5/25
1/6/25
1/7/25
1/8/25
1/9/25
1/10/25
1/11/25
1/12/25
Clonoulty_Clogher monthly rainfall (mm)
SW18
Linear (SW18)

Longford Pass Bog
Rehab Plan
GIS Map Book
2026

Document Control Sheet	
Document Name:	Longford Pass Bog Rehab Plan GIS Map Book 2026
Document File Path:	
Document Status:	**Final v1.0**

This document comprises:	DCS	TOC	Text (Body)	References	Maps	No. of Appendices
	1	1	0	0	13	0

Rev. 0.1	Author(s):	Checked By:	Approved By:
Name(s):	BG	JOS	MMcC
Date:	16/04/2026	16/04/2026	16/04/2026

Rev. 0.1	Author(s):	Checked By:	Approved By:
Name(s):	BG	EC	MMcC
Date:		15/05/2026	15/05/2026

Table of Contents

Bog Site Information Maps 4

BNM-ECO-26-11-01: Site Location Map 5

BNM-ECO-26-11-02: Structures and Sampling 6

BNM-ECO-26-11-04: Peat Depths 7

BNM-ECO-26-11-17: Habitat Map – General Cutaway Habitats (2018) 8

BNM-ECO-26-11-21: Aerial Imagery 2000 9

BNM-ECO-26-11-22: Aerial Imagery 2020 10

BNM-ECO-26-11-23: Proximity Designated Sites 11

BNM-ECO-26-11-24: Bog Group Map 12

Hydrology / Topography Maps 13

BNM-ECO-26-11-WQ01: Water Quality Map 14

BNM-ECO-26-11-03: LiDAR Map 15

BNM-ECO-26-11-09: Depression Analysis 16

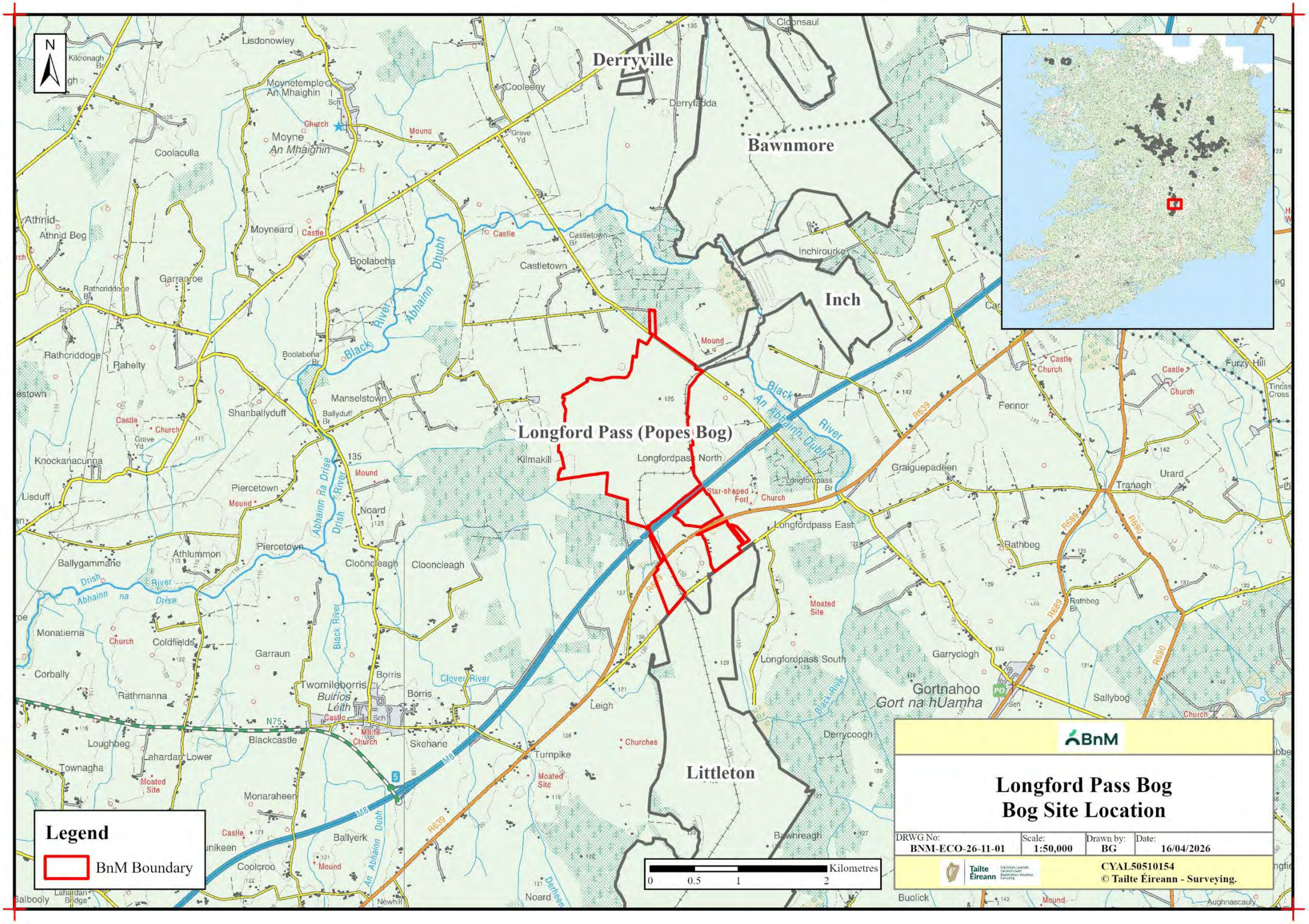
Rehabilitation Maps 17

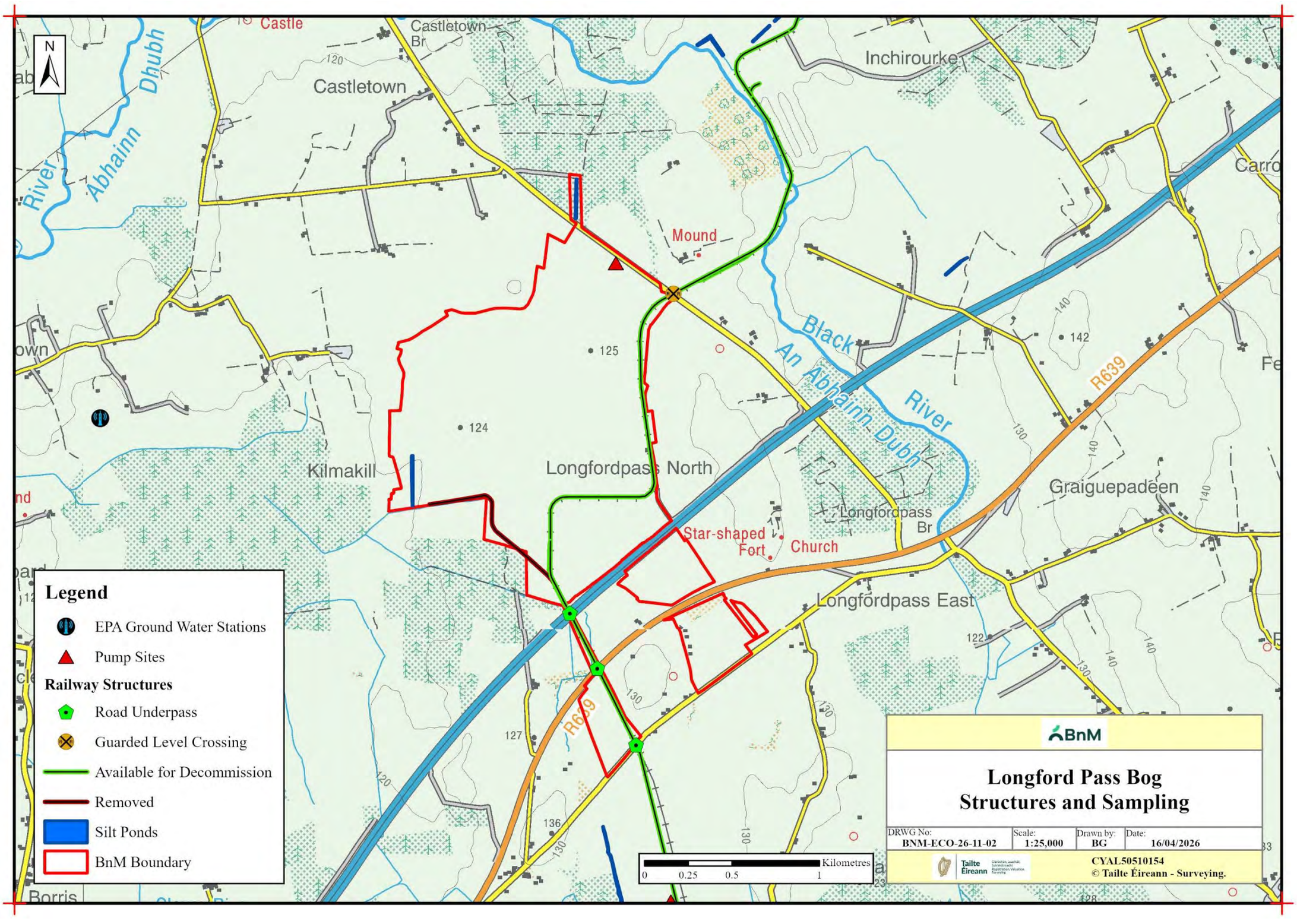
BNM-ECO-26-11-20: Standard Rehab Measures 18

Bog Site Information Maps

BNM-ECO-26-11-01: Site Location Map

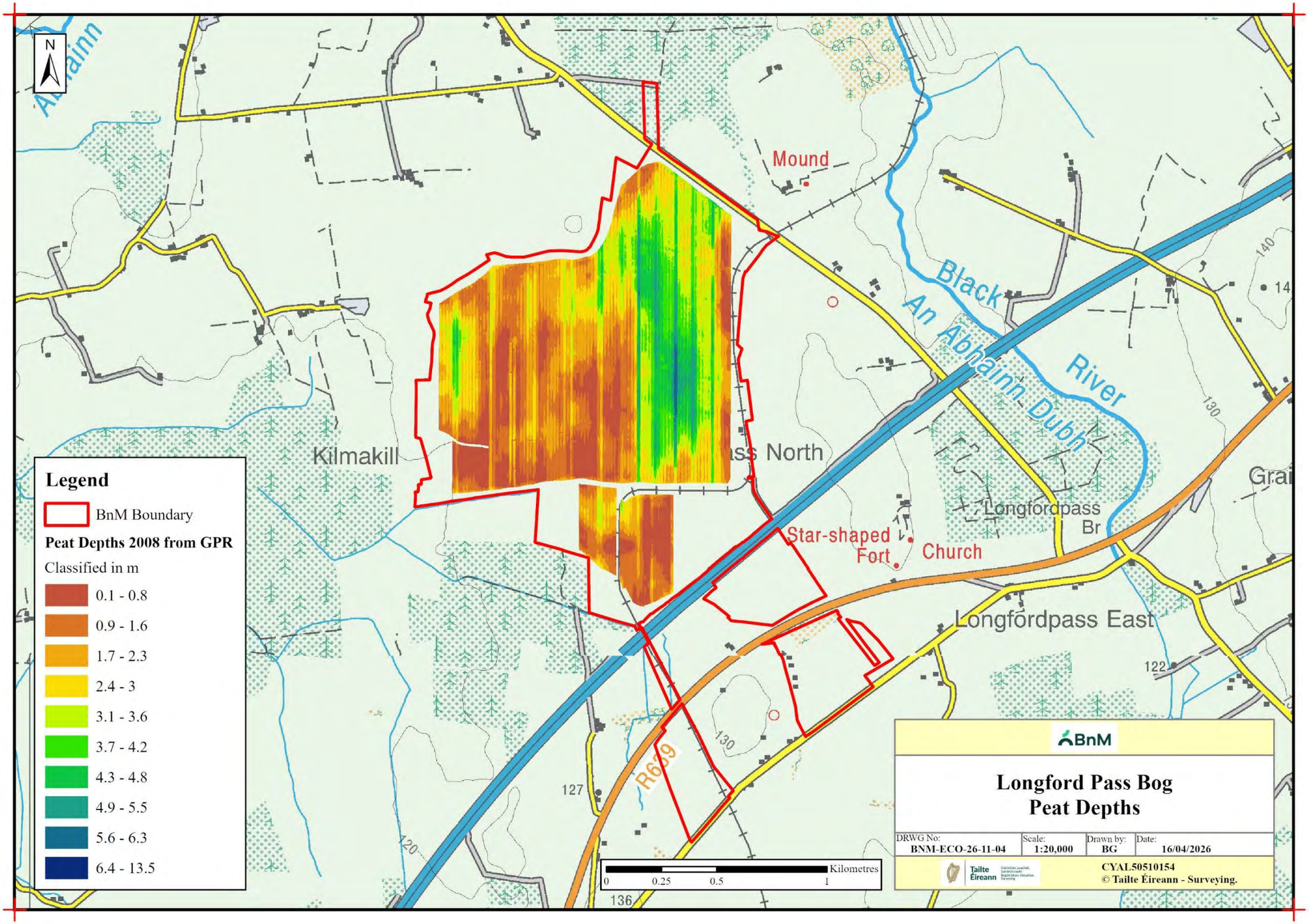
Back to TOC




N
Castle
Castletown Br
Castletown
Inchirourke
River Abhainn Dhubh
Mound
Black An Abhainn Dubh River
R639
Kilmakill
Longfordpass North
Graiguepadeen
Longfordpass Br
Star-shaped Fort
Church
Longfordpass East
Legend
EPA Ground Water Stations
Pump Sites
Railway Structures
Road Underpass
Guarded Level Crossing
Available for Decommission
Removed
Silt Ponds
BnM Boundary
0 0.25 0.5 1 Kilometres
BnM
Longford Pass Bog
Structures and Sampling
DRWG No: BNM-ECO-26-11-02
Scale: 1:25,000
Drawn by: BG
Date: 16/04/2026
Tailte Éireann
CYAL50510154
© Tailte Éireann - Surveying.

BNM-ECO-26-11-04: Peat Depths

Back to TOC

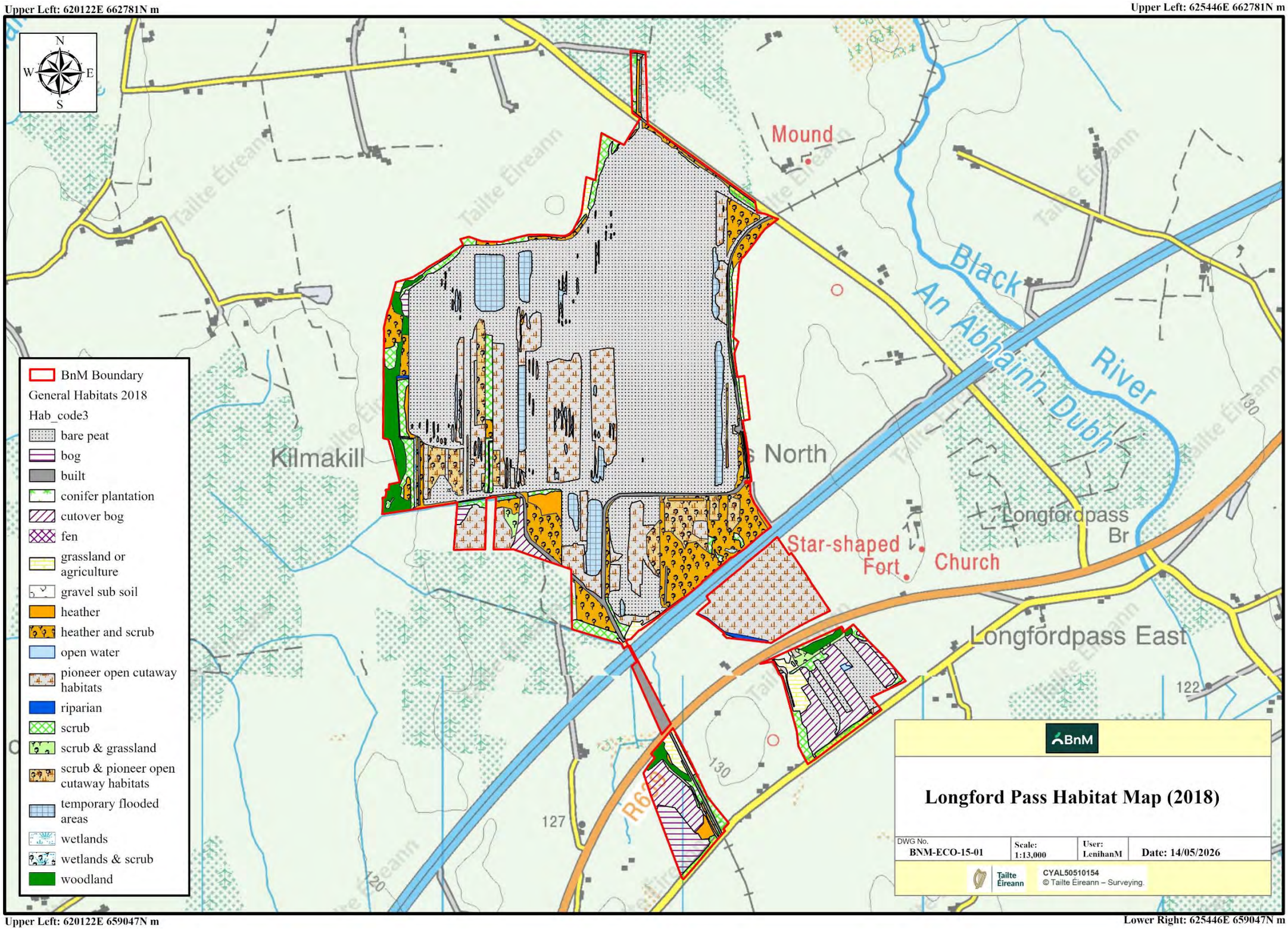


BNM-ECO-26-11-17: Habitat Map – General Cutaway Habitats (2018)

Back to TOC

Upper Left: 620122E 662781N m

Upper Left: 625446E 662781N m

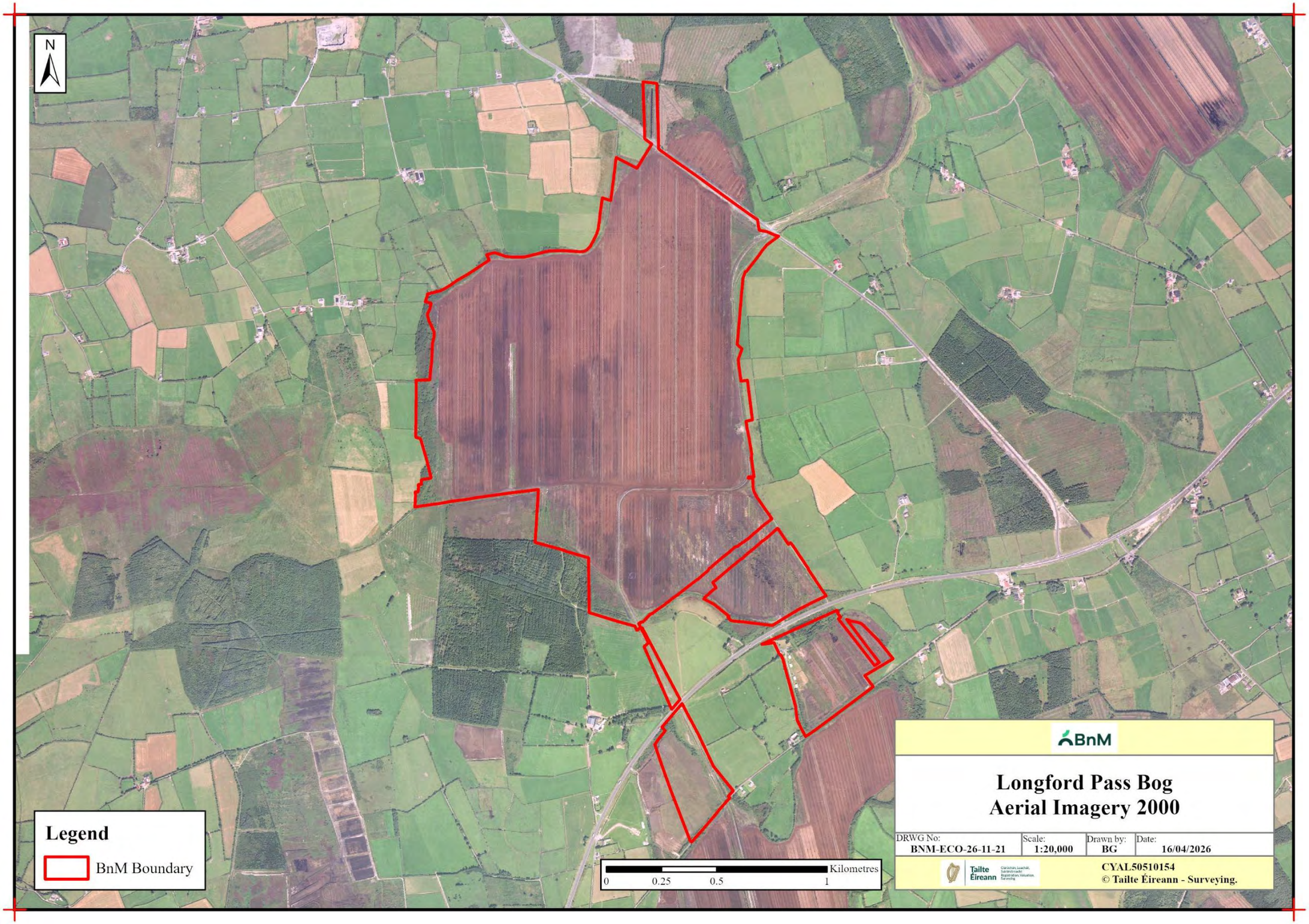


Upper Left: 620122E 659047N m

Lower Right: 625446E 659047N m

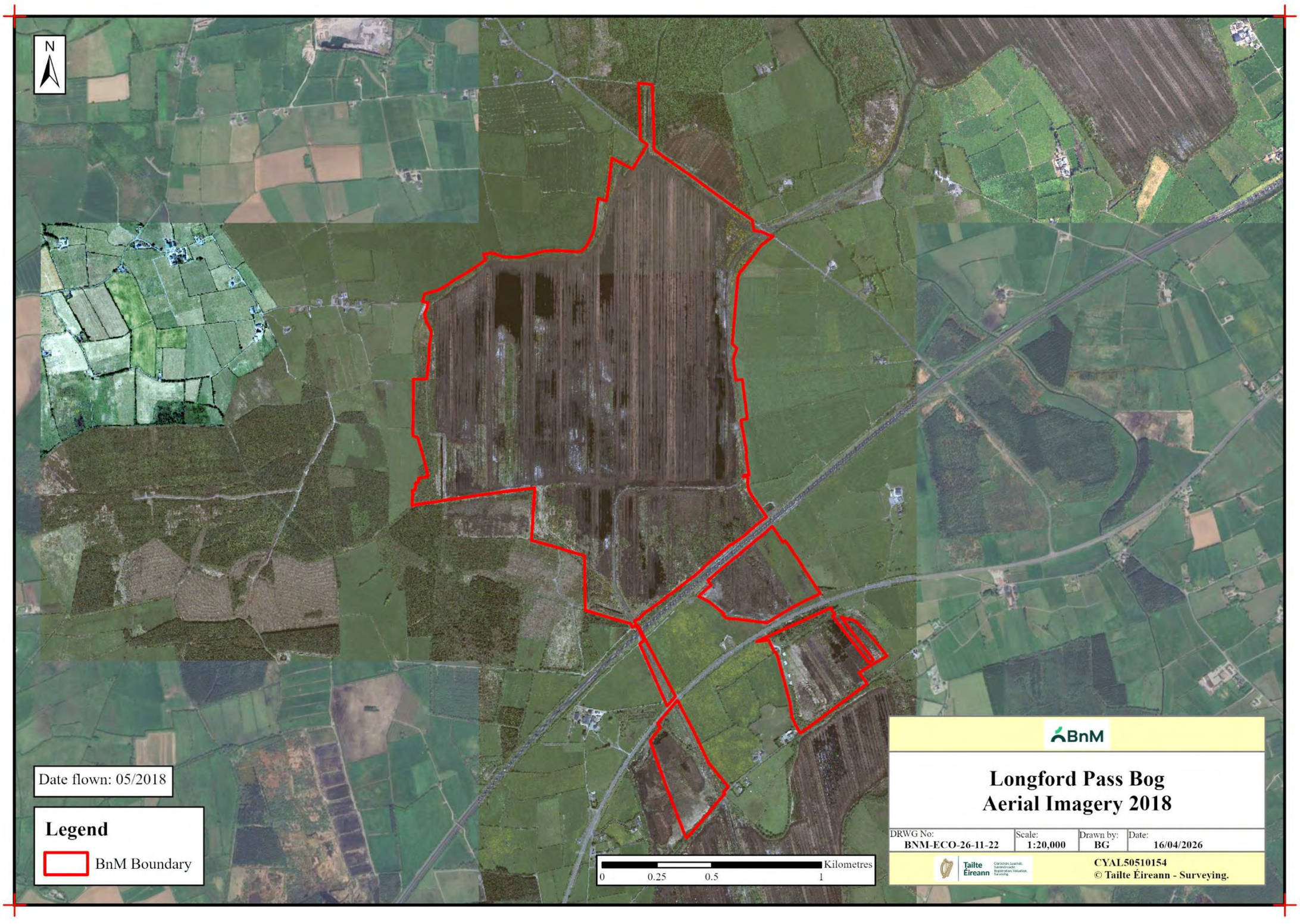
BNM-ECO-26-11-21: Aerial Imagery 2000

Back to TOC



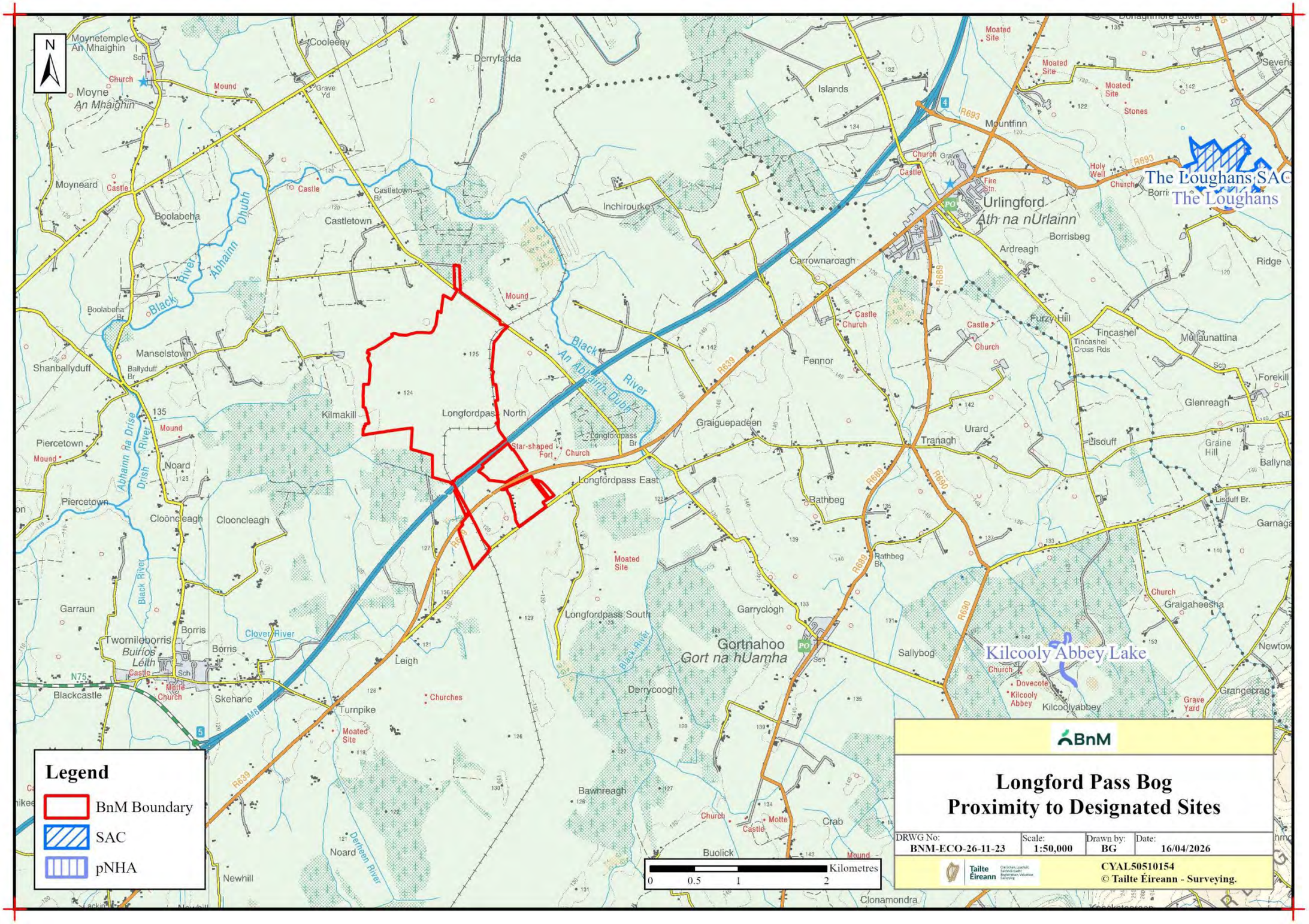
BNM-ECO-26-11-22: Aerial Imagery 2020

Back to TOC



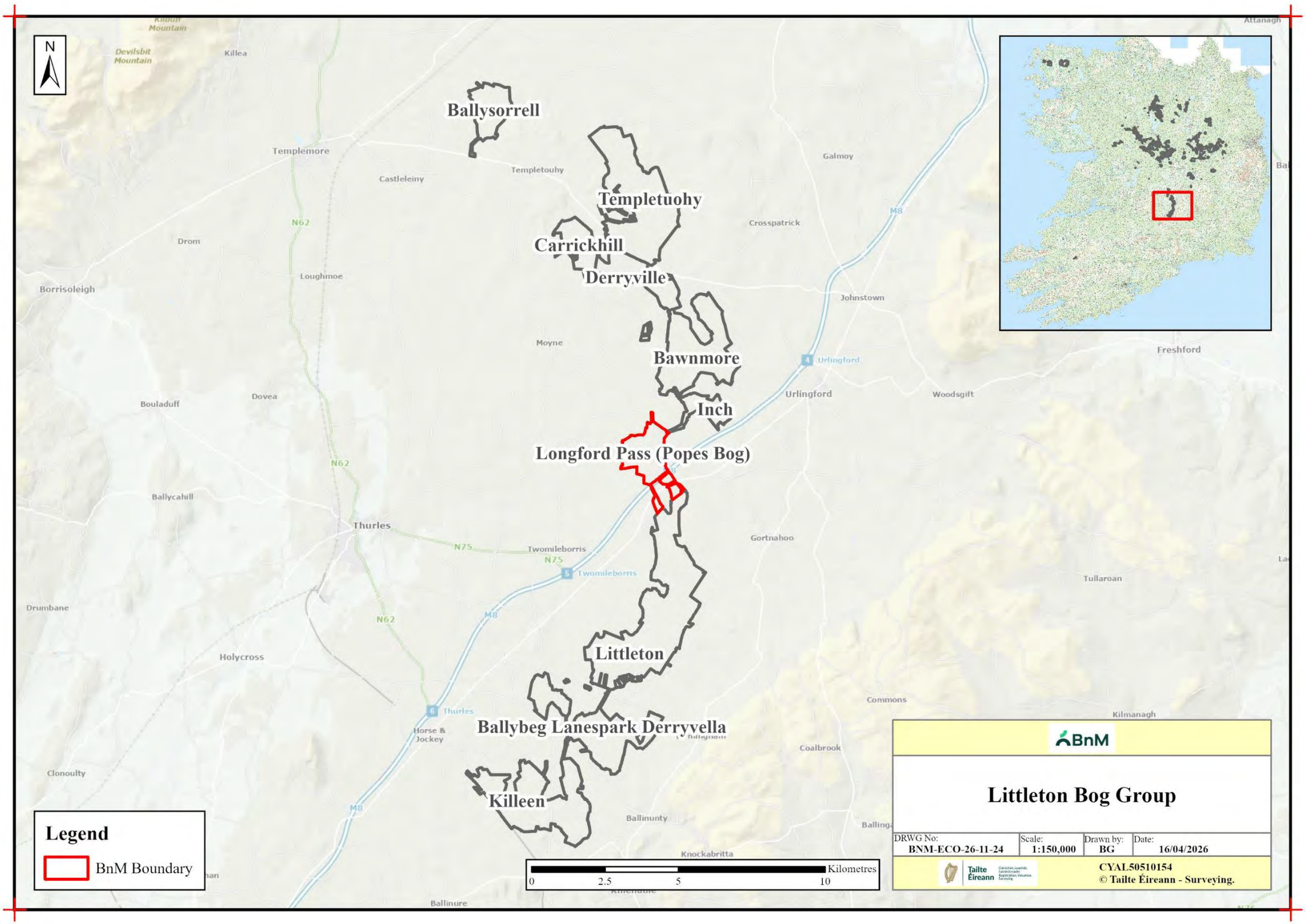
BNM-ECO-26-11-23: Proximity Designated Sites

Back to TOC



BNM-ECO-26-11-24: Bog Group Map

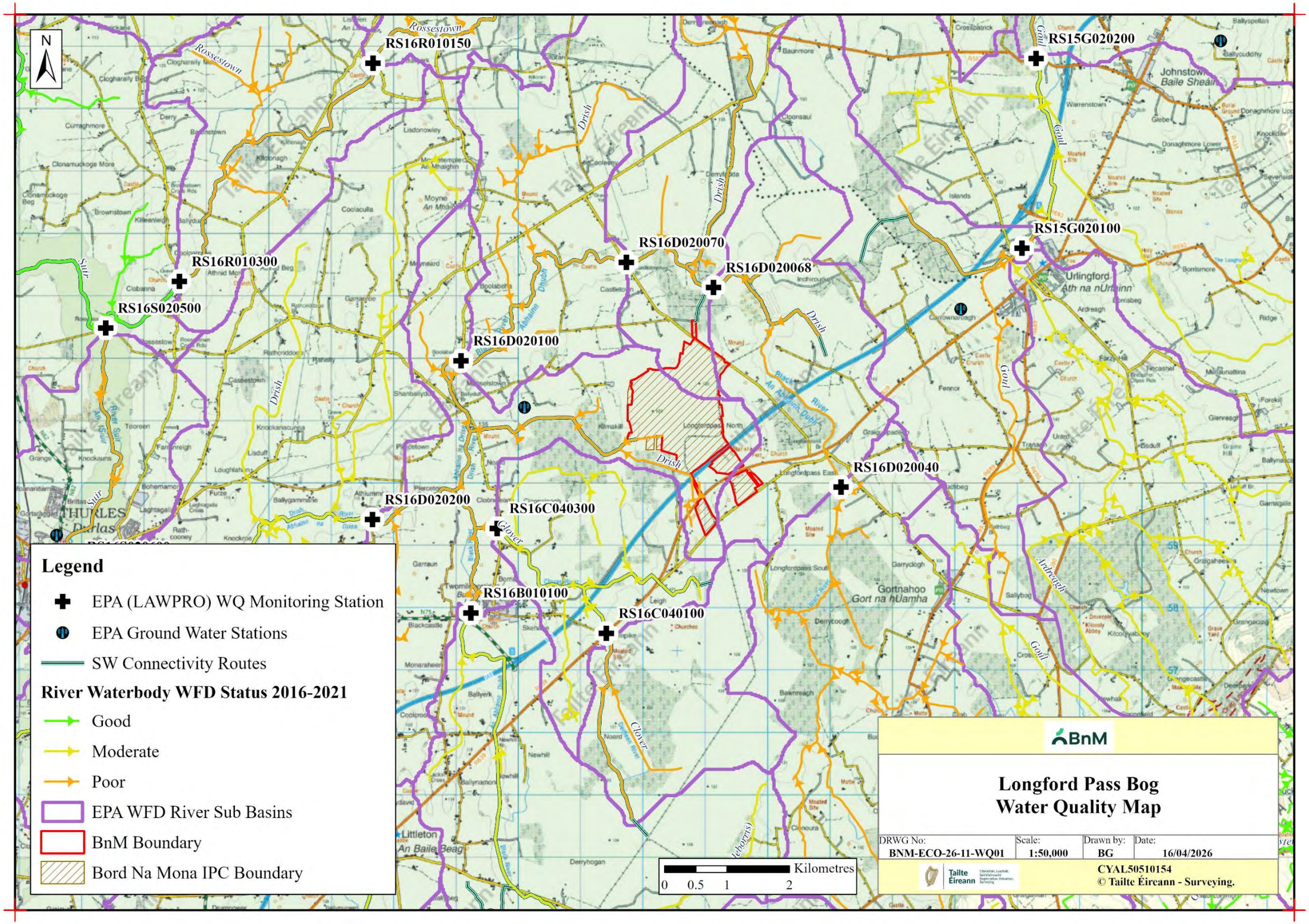
Back to TOC



Hydrology / Topography Maps

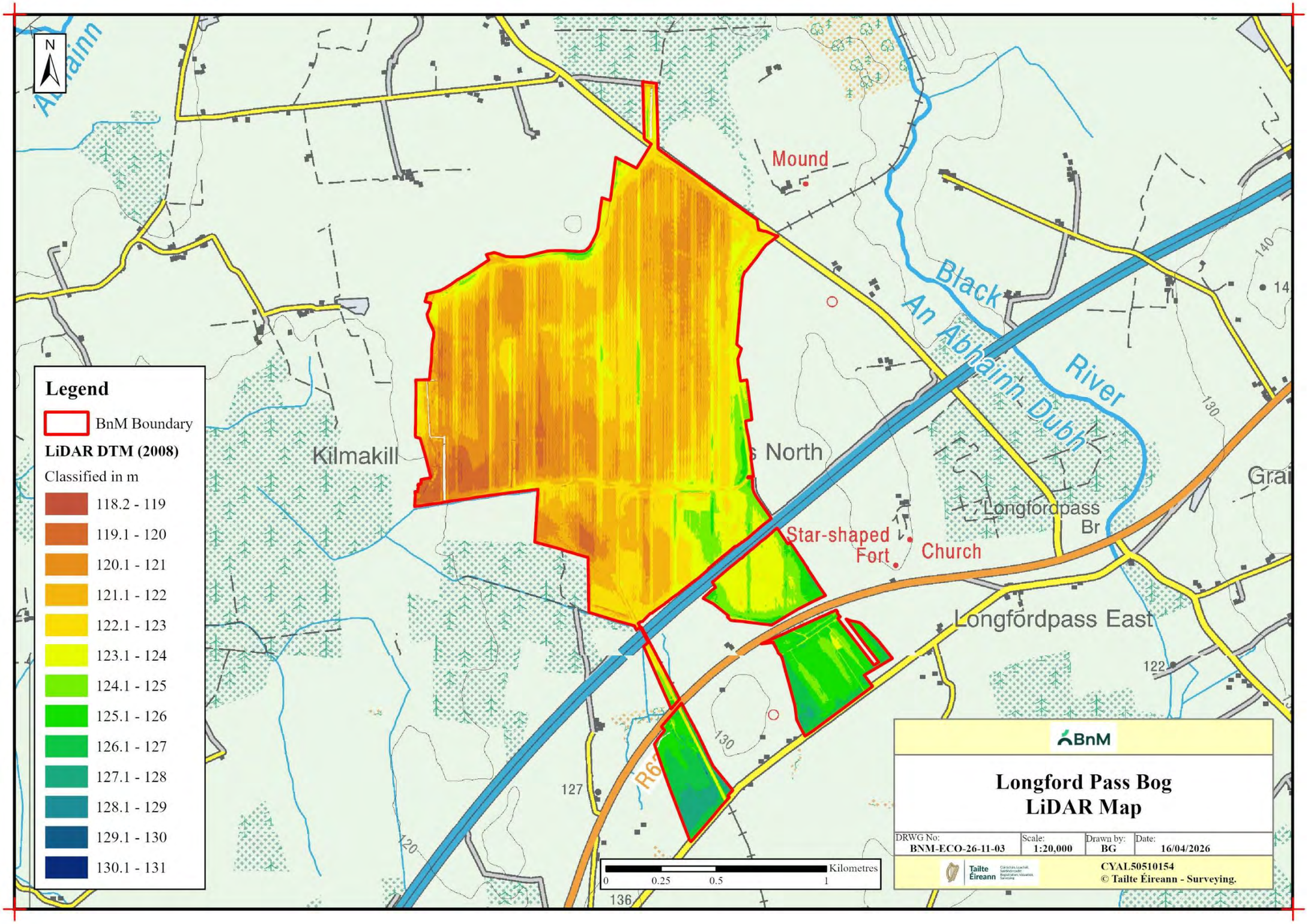
BNM-ECO-26-11-WQ01: Water Quality Map

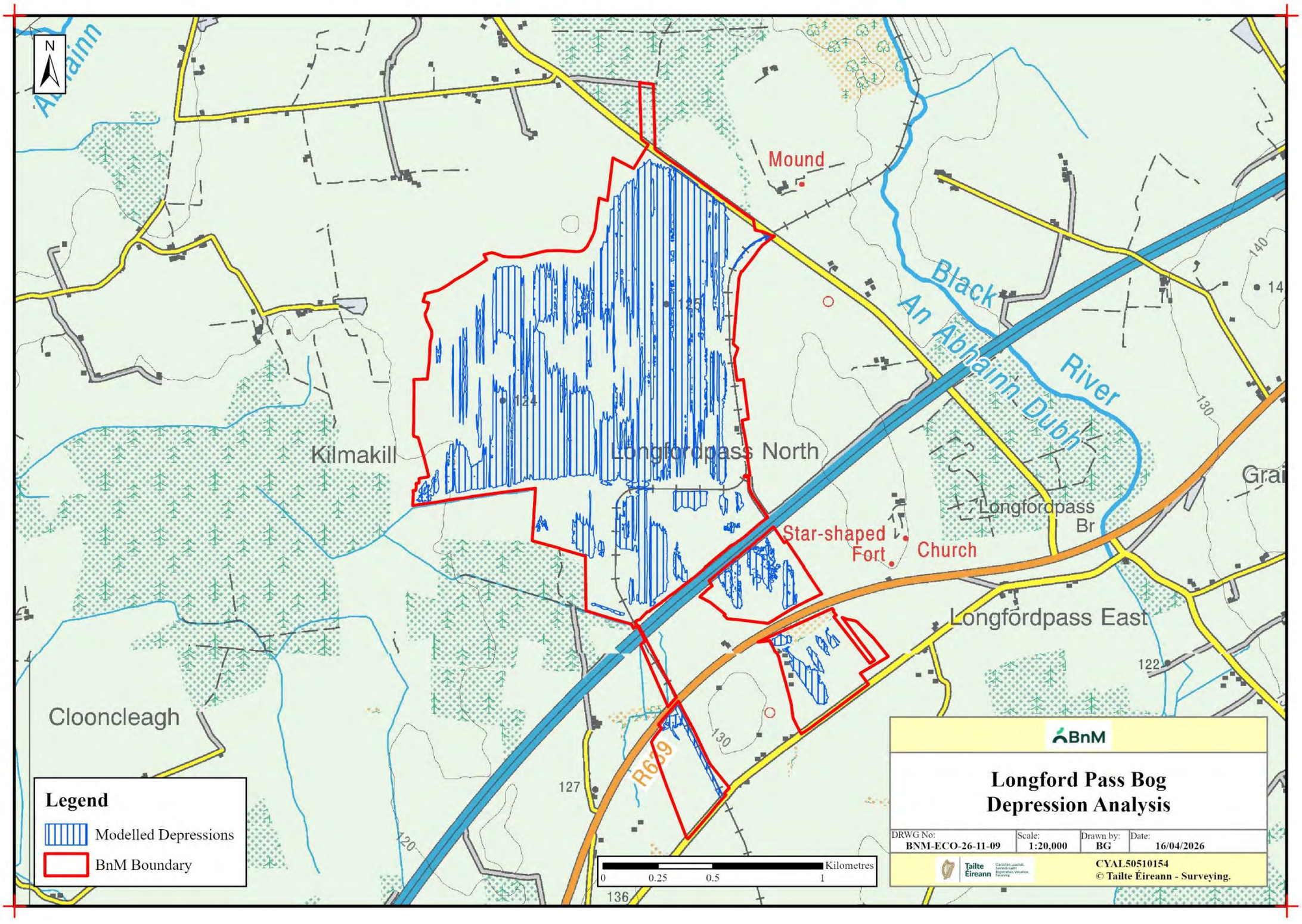
Back to TOC



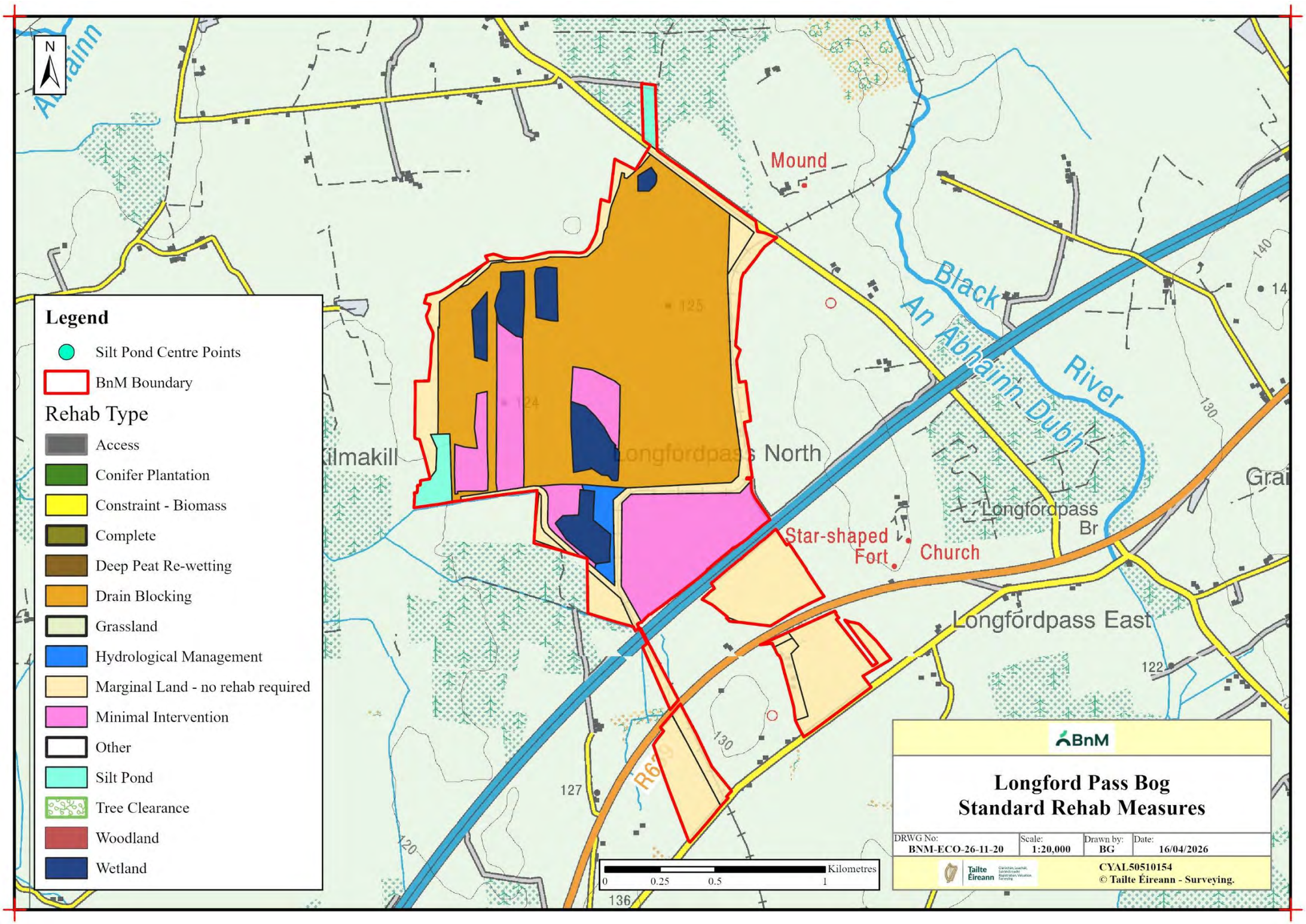
BNM-ECO-26-11-03: LiDAR Map

Back to TOC




N
Mound
Black
An Abhainn Dubh
River
Kilmakill
Longfordpass North
Longfordpass
Br
Star-shaped
Fort
Church
Longfordpass East
Clooncleagh
R639
Legend
Modelled Depressions
BnM Boundary
0
0.25
0.5
1
Kilometres
BnM
Longford Pass Bog
Depression Analysis
DRWG No:
BNM-ECO-26-11-09
Scale:
1:20,000
Drawn by:
BG
Date:
16/04/2026
Tailte Éireann
CYAL50510154
© Tailte Éireann - Surveying.

Rehabilitation Maps


N
Mound
Black
An Abhainn Dubh
River
Longfordpass North
Longfordpass Br
Star-shaped Fort
Church
Longfordpass East
R671
125
124
140
130
127
120
122
136
Legend
Silt Pond Centre Points
BnM Boundary
Rehab Type
Access
Conifer Plantation
Constraint - Biomass
Complete
Deep Peat Re-wetting
Drain Blocking
Grassland
Hydrological Management
Marginal Land - no rehab required
Minimal Intervention
Other
Silt Pond
Tree Clearance
Woodland
Wetland
Kilometres
0 0.25 0.5 1
BnM
Longford Pass Bog
Standard Rehab Measures
DRWG No: BNM-ECO-26-11-20
Scale: 1:20,000
Drawn by: BG
Date: 16/04/2026
Tailte Éireann
CYAL50510154
© Tailte Éireann - Surveying.

Littleton Bog

Cutaway Bog Decommissioning and Rehabilitation Plan

2026

This document seeks to address the requirements of Condition 10.2 of IPC Licence Ref. P0499-01:

> "*The licensee shall prepare, to the satisfaction of the Agency, a fully detailed and costed plan for permanent rehabilitation of the cutaway boglands within the licensed area.*"

This licence condition requires BnM agree with the EPA the measures that will provide for rehabilitation, i.e., stabilisation of Littleton Bog upon cessation of peat production and compliments the licence requirement to decommission the site.

***Rehabilitation** generally comprises site stabilisation with natural colonisation with or without targeted management.*

Industrial peat production has now fully ceased at Littleton Bog. A rehabilitation programme was carried out at Littleton Bog in 2018-2021.

BnM have defined the key rehabilitation outcome at Littleton Bog as environmental stabilisation, re-wetting and setting the bog on a trajectory towards development of naturally functioning peatland and wetland habitats.

Any consideration of any other future after-uses for Littleton Bog will be conducted in adherence to the relevant planning guidelines and consultation with relevant authorities and will be considered within the framework of this rehabilitation plan.

Document Control Sheet	
Document Name:	Littleton Bog Cutaway Bog Decommissioning and Rehabilitation Plan 2026
Document File Path:	Q:\Ecology Team\EPA draft rehab plans 2017 word docs\Littleton ref.499 (Littleton)\Littleton
Document Status:	Final

This document comprises:	DCS	TOC	Text (Body)	References	Maps	No. of Appendices
	1	2	37	4	0	11

Rev. 0.1	Author(s):	Checked By:	Approved By:
Name(s):	MMC	CS	EMcD
Date:	14/04/2026	23/04/2026	23/04/2026

Rev. 1	Author(s):	Checked By:	Approved By:
Name(s):		MG	MMC
Date:		05/05/2026	05/05/2026
Rev. 1.1	**Author(s):**	**Checked By:**	**Approved By:**
Name(s):		CS	MG
Date:		12/05/2026	12/05/2026

Table of Contents

Non-technical summary 1
1. Introduction 3
1.1 Constraints and Limitations 3
2. Methodology 5
2.1 Desk Study 5
2.2 Consultation 7
2.3 Field Surveys 7
3. Site Description 8
3.1 Status and Situation 9
3.1.1 Site history 9
3.1.2 Current land-use 9
3.1.3. Socio-Economic conditions 9
3.2 Geology and Peat Depths 10
3.3 Key Biodiversity Features of Interest 11
3.3.1 Current habitats 11
3.3.2 Species of conservation interest 15
3.3.3 Invasive species 16
3.4 Statutory Nature Conservation Designations 16
3.4.1 Other Nature Conservation Designations 16
3.5 Hydrology and Hydrogeology 17
3.6 Emissions to surface-water and watercourses 17
3.7 Fugitive Emissions to air 19
3.8 Carbon emissions 19
3.9 Current ecological rating 20
4. Consultation 21
4.1 Consultation to date 21
Consultation with interested parties. 21
4.2 Issues raised by Consultees 22
4.3 BnM response to issues raised during consultation and rehabilitation 2018-2021 23
5. Rehabilitation Goals and Outcomes 26
6. Scope of Rehabilitation 28
6.1 Key constraints 28
6.2 Key Assumptions 29

6.3 Key Exclusions 29
7. Criteria for successful rehabilitation 30
7.1 Criteria for successful rehabilitation to meet EPA IPC licence conditions: 30
7.2. Critical success factors needed to achieve successful rehabilitation as outlined in the plan 31
8. Rehabilitation Actions and Time Frame 33
8.1 Completed 34
8.2 Short-term planning actions (0-1 years) 35
8.3 Short-term practical actions (0-2 years) 35
8.4 Long-term (>5 years) 35
8.5 Timeframe 35
8.6 Budget and costing 35
9. Aftercare and Maintenance 36
9.1 Programme for monitoring, aftercare and maintenance 36
9.2 Rehabilitation plan validation and licence surrender – report as required under condition 10.4 36
10. References 38
APPENDIX I: Bog Group Context 42
APPENDIX II: Ecological Survey Report 47
APPENDIX III: Environmental Control Measures to be applied to bog rehabilitation 52
APPENDIX IV: Biosecurity 53
Appendix V: Policy and Regulatory Framework 54
APPENDIX VI: Decommissioning 61
APPENDIX VII: Glossary 64
APPENDIX VIII: Extractive Waste Management Plan 66
APPENDIX IX: Consultation Summaries 72
APPENDIX X: Archaeology 80
APPENDIX XI: Water Quality Monitoring Results for Littleton Bog 85

NON-TECHNICAL SUMMARY

- BnM (formerly known as Bord na Móna) is updating the rehabilitation plan prepared in 2018 for Littleton Bog, located in Co. Tipperary.
- BnM Industrial peat harvesting ceased at Littleton Bog in 2017.
- Littleton Bog was in industrial peat production since 1940s and formerly supplied peat to the Littleton Briquette Factory.
- In 2017, BnM announced the closure of the Littleton Briquette factory and the cessation of industrial peat production in a number of cutaway bogs within the Littleton Bog Group.
- A rehabilitation programme was carried out by BnM between 2018-2021 (Phase 1) with targeted drain-blocking through the site.
- Littleton Bog is now developing a mosaic of cutaway peatland habitats including Birch woodland and scrub, bog vegetation and wetlands.
- Littleton Bog has a partially pumped drainage regime. Pumps have been decommissioned.
- This rehabilitation plan has been prepared by BnM as part of obligations to carry out peatland rehabilitation via an IPC licence issued by the Environmental Protection Agency.
- The key objective of peatland rehabilitation is environmental stabilisation. This means developing habitats and vegetation back onto the bare peat (putting a “skin” back onto the peat), and minimising effects to downstream waterbodies.
- In general, soggy ground conditions are preferred. This means the remaining peat is wet and that plants that prefer wetter conditions, like Bog Cotton will thrive.
- Rehab measures included drain-blocking and other measures to raise water levels to the surface of the bog, thus encouraging the development of naturally functioning cutaway peatland habitats.
- These rehabilitation measures were planned by a team consisting of expert ecologists and engineers. It is a guiding principle of BnM rehabilitation planning that no actions or activities will be undertaken that would negatively impact on adjacent land. No boundary drains will be blocked. Water will still leave the bog via the existing outlets.
- Peatland rehabilitation of this bog will bring a range of benefits to the local community via improvements to the local landscape and is also important for supporting national policies and strategies in relation to reduction of carbon emissions from these peatlands, supporting biodiversity and improvements to water quality.
- Rehabilitation at Littleton Bog will result in improved water quality, climate benefits with the reduction of carbon emissions and enhanced biodiversity when the residual peat is re-wetted.
- Many BnM bogs cannot be restored back to raised bog, as the majority of peat has been removed and the environmental conditions have been modified. However other natural habitats will develop, like poor fen and regenerating wet deep peat vegetation communities (on deeper peat); and wetlands with Reedbeds and Birch woodland on shallower peat. In time a naturalised peatland can be developed.
- It will take some time for vegetation and habitats to fully develop at Littleton Bog, and a peatland ecosystem to be restored. However, it is expected that any bare peat will be developing pioneer habitats after 5-10 years.
- The development of a range of habitats at Littleton Bog will support biodiversity including plants, insects, birds and mammals. This includes some species that are rare and protected in the wider landscape.
- This peatland rehabilitation plan does not consider future after-use or development. BnM continually reviews its land-bank to consider future commercial or industrial developments. Any other proposed

development will be planned in adherence to relevant planning guidelines and will consider the rehabilitation and the condition of the bog.

1. INTRODUCTION

BnM (formerly known as Bord na Móna) operates under IPC Licence issued and administered by the EPA to extract peat within the Littleton Bog Group (Ref. P0499-01) (see Appendix I for details of the bog areas within this Group). As part of Condition 10.2 of this licence, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area. Littleton Bog is located in Co. Tipperary.

This document seeks to address the requirements of Condition 10.2 of IPC Licence Ref. P0499-01:

> "*The licensee shall prepare, to the satisfaction of the Agency, a fully detailed and costed plan for permanent rehabilitation of the cutaway boglands within the licensed area.*"

It also seeks to outline measures to optimise climate action and other ecosystem services benefits, mainly through hydrological management.

This plan is a specific rehabilitation plan for the bog and outlines:

- Description of site management and status.
- Main issues and approaches to rehabilitation.
- Consultation to date with interested parties.
- Interaction with other policy and legislative frameworks (Appendix V).
- The planned rehabilitation goals and outcomes.
- The scope of the rehabilitation plan.
- Criteria which define the successful rehabilitation and key targets to validate rehabilitation.
- Proposed rehabilitation actions.
- Proposed timeframe to implement these measures.
- Budget and Costings.
- Associated aftercare, maintenance, and monitoring.

Note: This plan should be read in conjunction with the accompanying Map book.

Littleton Bog is part of the Littleton Bog Group and supplied the Littleton Brickette Factory. BnM made the decision to close this brickette factory in 2017 and to rehabilitate the Littleton Bog group. Littleton Bog was rehabilitated by BnM during 2018-2021.

This updated rehabilitation plan supersedes the previous rehabilitation plan prepared and submitted to the EPA in 2018.

1.1 Constraints and Limitations

This document covers the area of **Littleton Bog** shown in drawing number *BNM-ECO-26-11B-01: Site Location Map*.

There are areas of active turf cutting (turbary) on the margins of the bog which have been mapped as a constraint. The parts of Littleton Bog (within the areas owned by BnM) that are currently used by domestic turf cutters to harvest peat are ecologically and hydrologically linked to the area owned by BnM. BnM are aware of such issues which may constrain the proposed rehabilitation actions, and this rehabilitation plan considered potential impacts of turf cutting on the delivery of the stated objectives.

Part of Littleton Bog was developed as Conifer forestry by Coillte. This is mapped as a constraint.

Rehabilitation in other areas of the bog may also be constrained due to other property issues or archaeological features. There is known archaeology close to Littleton Bog. There are some areas of agricultural grassland along the margins of Littleton Bog. These areas will not be subject to rehabilitation and have been identified as constrained land.

2. METHODOLOGY

This rehabilitation plan was developed with a combination of desktop and field surveys, consultations with internal and external stakeholders. The development of this rehabilitation plan considered recently published guidance issued by the EPA, '*Guidance on the Process of Preparing and Implementing a Bog Rehabilitation Plan' (EPA, 2020)*.

The ecological information and site information collected during the BnM ecological baseline survey, additional confirmatory site visits (covering the period 2011 to 2025 inclusive) and monitoring and desktop analysis forms the basis for the development of the rehabilitation plan for the bog, along with:

- Experience of 40 years of research on the after-use development and rehabilitation of the Bord na Móna cutaway bogs (Clarke, 2010; Bord na Móna, 2016)
- Significant international engagement during this period with other counties in relation to best practice regarding peatland rehabilitation and after-use through the International Peat Society and the Society for Ecological Restoration (Joosten & Clarke, 2002; Clarke & Rieley, 2010; Gann *et al*., 2019),
- Consultation and engagement with internal and external stakeholders,
- GIS Mapping,
- BnM drainage surveys,
- Bog topography and LIDAR data,
- Previous research studies on site,
- Hydrological modelling.

2.1 Desk Study

The desk study involved collecting all relevant environmental and ecological data for the study area. The development of the rehabilitation plan also takes account of research, experience and engagement with other peatland restoration and rehabilitation projects and peatland research including Irish, UK, European and International best practice guidance (full citations are in the References Section):

- Anderson *et al*. (2017). An overview of the progress and challenges of peatland restoration in Western Europe.
- Barry, T.A. *et al*. (1973). A survey of cutover peats and underlying mineral soils. Soil Survey Bulletin No. 30. Dublin, Bord na Móna and An Foras Taluntais.
- Bonn *et al*. (2017). Peatland restoration and ecosystem services- science, policy and practice.
- Carroll *et al*. (2009). *Sphagnum* in the Peak District. Current Status and Potential for Restoration. Moors for the Future Report No 16.
- Clark & Rieley (2010). Strategy for responsible peatland management.
- Eades *et al*. (2003). The Wetland Restoration Manual.
- Farrell & Doyle (2003). Rehabilitation of Industrial Cutaway Atlantic Blanket Bog, NW Mayo, Ireland.
- Gann *et al*. (2019). International Principles and Standards for the practice of Ecological Restoration.
- Hinde *et al*. (2010). *Sphagnum* re-introduction project: A report on research into the re-introduction of *Sphagnum* mosses to degraded moorland. Moors for the Future Research Report 18.
- Joosten & Clarke (2002). Wise Use of mires and peatlands – Background and Principles including a framework for Decision-making.

- Lindsay (2010). Peatbogs and Carbon: a Critical Synthesis to Inform Policy Development in Oceanic Peat Bog Conservation and Restoration in the Context of Climate Change.
- Mackin *et al*. (2017). Best practice in raised bog restoration in Ireland. Irish Wildlife Manuals, No. 99. National Parks and Wildlife Service,
- McBride *et al*. (2011). The Fen Management Handbook (2011), Scottish Natural Heritage.
- McDonagh (1996). Drain blocking by machines on Raised Bogs. Unpublished report for National Parks and Wildlife Service.
- NPWS (2017a). National Raised Bog Special Areas of Conservation management plan. Department of Arts, Heritage and the Gaeltacht.
- Pschenyckyj et al., (2021). Optimising Water Quality Returns from Peatland Management while Delivering Co-Benefits for Climate and Biodiversity. An Fóram Uisce.
- Quinty & Rochefort (2003). Peatland Restoration Guide, second edition. Canadian *Sphagnum* Peat Moss Association and New Brunswick Department of Natural Resources and Energy.
- Regan*, et. al.* (2020). Ecohydrology, Greenhouse Gas Dynamics and Restoration Guidelines for Degraded Raised Bogs. EPA Research Report. Prepared for the Environmental Protection Agency by Trinity College Dublin.
- Renou-Wilson *et al*. (2011). BOGLAND - Sustainable Management of Peatlands in Ireland. STRIVE Report No 75 prepared for the Environmental Protection Agency.
- Schouten (2002). Conservation and Restoration of Raised Bogs: Geological, Hydrological and Ecological Studies. Dúchas - The Heritage Service of the Department of the Environment and Local Government, Ireland.
- Thom (2019). Conserving Bogs – Management Handbook.
- Wheeler & Shaw (1995). Restoration of Damaged Peatlands – with Particular Reference to Lowland Raised Bogs Affected by Peat Extraction.
- Wittram *et al*. (2015). A Practitioners Guide to Sphagnum Reintroduction. Moors for the Future Partnership.

Additional on-line resources were also incorporated into the desk study, including:

- Littleton Integrated Pollution Control Licence
- Littleton Annual Environmental Reports
- Review of the National Biodiversity Data Centre (NBDC) webmapper
- Inland Fisheries Ireland (IFI) Reports
- Environmental Protection Agency database (www.epa.ie)
- EPA Guidance on Requests for Alterations to a Licensed Industrial or Waste Activity
- Birdwatch Ireland online data (including I-WeBS and CBS datasets; www.birdwatchireland.ie)
- Geological Survey of Ireland - National Draft Bedrock Aquifer map
- Geological Survey of Ireland - Groundwater Database (www.gsi.ie)
- Historic Environment Viewer at https://webgis.archaeology.ie/historicenvironment/
- National Parks & Wildlife Services Public Map Viewer (www.npws.ie)
- Water Framework Directive catchments.ie/maps/ Map Viewer (www.catchments.ie)
- OPW Indicative Flood Maps (www.floodmaps.ie)
- CFRAM Preliminary Flood Risk Assessment (PFRA) maps (www.cfram.ie)
- River Basin Management Plan for Ireland 2022-2027

- BnM Annual Report 2025
- Spatial data in respect of Article 17 reporting, available online at https://www.npws.ie/maps-and-data/habitat-and-species-data/article-17

2.2 Consultation

A number of stakeholders have been identified during the course of BnM's rehabilitation and Biodiversity Action Plan activities and are contacted during the rehabilitation planning process for their views. See Section 4.

2.3 Field Surveys

BnM carried out a baseline ecological survey of all of its properties in 2009-2012 and developed habitat maps. As part of this exercise, Littleton Bog was surveyed in 2012, with additional surveys in 2013 and 2016. Habitat maps were updated in 2018. Habitat maps have been updated, where required. This rehabilitation plan is informed by the original baseline survey as well as subsequent confirmatory site walk-over surveys and visits, and updates to baseline data.

Habitat mapping followed best practice guidance from Smith *et al.* (2011). Map outputs including all habitat maps and target notes were produced using GIS software application packages (ArcGIS). General marginal habitats and other habitats that had not been modified significantly by industrial peat extraction were classified using Fossitt *et al*. (2000). Plant nomenclature for vascular plants follows Stace (2019), while moss and liverwort nomenclature follow identification keys published by the British Bryological Society (2010).

The original ecological survey report for Littleton Bog is contained in Appendix II.

3. SITE DESCRIPTION

Littleton Bog is located in Co. Tipperary, 3 km east of Littleton Village. The total combined area of the rehabilitation footprint of the bog is 995 ha. It is part of the Littleton Bog group with Longford Pass Bog to the north and Ballybeg bog to the south. A former BnM industrial railway passes through the site. Littleton bog is situated in a lowland landscape and is mostly surrounded by farmland and Coillte forestry. It is a relatively long (extending for 7 km along the railway) and narrow bog. It is bordered to the north by a minor road (that separates Littleton from the adjacent Longford Pass BnM property).

Industrial peat extraction started in the 1940s and finally ceased in 2017 with the announcement of the closure of the Littleton Brickette Factory.

Rehabilitation took place at Littleton Bog between 2018-2021. Targeted measures were applied to areas that had already vegetated or had maturing habitats and were stabilised. Some outfalls were blocked or adjusted with hydrological management. More intensive rehabilitation was carried out across the bare peat areas. Field drains were regularly blocked.

The central part of the bog has been developing as cutaway for some time. The underlying glacial topography is quite influential. There are many localised wetlands where there are basins with open water and wet peatland vegetation, and some of these are divided by mounds or ridges where there is drier habitat development with Birch scrub, Heather and some pioneer grassland communities. Pine is colonising the north-east section from an adjacent conifer plantation. This area has also been further sub-divided by a series of deep trench drains and associated high fields. These divide the bog into regularly grouped series of fields. The high fields act as berms to maintain small wetland areas.

Littleton Bog has a partially pumped drainage system with pumps located in three locations along the spine of the bog. The central pump ceased pumping in 2018. Pumping ceased in the northern section of the site in 2022. Some additional drainage was carried out in 2022 to alleviate flooding that was occurring in this area and that was impacting on adjacent land and the rail underpass at the N9 motorway. Pumps at Littleton Bog are now permanently depowered and scheduled for removal, although some pumping may be required in the future for maintenance.

These are several old former sod peat production areas that have naturally re-colonised over a long period (50-60 years). Re-vegetation tends to be dominated by Heather-dominated and Bog Cotton-dominated vegetation, in mosaic with scattered Birch scrub and small amounts of Purple Moor-grass dominated vegetation. There are also other elements of raised bog vegetation present, due to the presence of more acidic deeper peat, although *Sphagnum* re-generation in the drier areas is poor. Some of the wetter areas have excellent *Sphagnum* re-generation and can be classed as embryonic peat-forming *Sphagnum* communities. Overall re-vegetation has been excellent with only the travel paths still having significant bare peat. Several sod peat bays have been cut to a much lower level than the surrounding bog and have now developed as wet peatlands. These wetlands attract significant amount of wildfowl.

See Drawing number *BNM-ECO-26-11B-01: Site Location Map*, included in the accompanying Mapbook[1] , which illustrates the location of Littleton Bog in context to the surrounding area.

[1] Cutaway Bog Decommissioning and Rehabilitation Plan – Littleton Bog Map Book

3.1 Status and Situation

3.1.1 Site history

Large-scale industrial peat production began at Littleton Bog in the 1940's when sod turf was produced for fuel, by manual labour. Sod peat production was mechanised during the 1950's. Milled peat production began in the 1970's and milled peat was supplied to the Briquette factory at Lanespark, which was constructed in 1981. Some of the sod peat production areas in the bog were converted to milled peat production. Littleton Bog formerly supplied peat to the Littleton briquette factory.

Some conifer plantation was developed at the southern end of the bog in the 1980's by Coillte. The main central part of the bog came out of production prior to 2000 and has been developing as cutaway since then. Much of the peat was cut out of this section and the underlying glacial subsoil was exposed in places, and some wetlands had developed by this stage. A small part of the site was used for industrial peat extraction between 2010-2018.

In 2017, BnM announced the closure of the Littleton Briquette factory and the cessation of industrial peat production in the majority of cutaway bogs within the Littleton Bog Group including Littleton Bog.

Rehabilitation commenced at Littleton Bog in 2018, with a program of targeted drain blocking and other measures.

3.1.2 Current land-use

Industrial peat extraction by BnM ceased in 2017. There is some active private sod-peat cutting around the margins of the site.

A small area (10 ha) at the northern end of Littleton Bog has recently been planted with Eucalyptus as a commercial biomass trial (2018).

Coillte have developed a relatively large area of conifer forestry on the site (85 ha leased from BnM).

Littleton Bog has a particularly pumped drainage regime. Two pumps are still present on site and remain non-functional. The former BnM industrial railway is still present on site. This former railway is expected to be decommissioned shortly.

BnM and Tipperary County Council carried out a feasibility study of the potential for amenity development across the Littleton Bog Group called Littleton Labyrinth. The first phase of this amenity has been completed, and a greenway has been constructed at Killeen Bog to Loch Doire Bhile. A further extension (Phase 2) is proposed at Ballybeg and Derryvilla Bog. There is potential for future extensions to this greenway network through Littleton Bog.

Tipperary County Council has currently included the area of Littleton Bog within the Mid-Tipperary Decarbonising Zone in the Tipperary Climate Action Plan.

3.1.3. Socio-Economic conditions

BnM has historically been a vital employer for the rural communities in the Irish Midlands. BnM compiled a report on the role of peat extraction in the midlands historically in which they report that in 1986, by the end of BnM's Third Development Programme, a total of twenty-three work locations had been established around the country. The company had an average employment of approximately 4,688 in the mid 1980's, with a peak employment of 6,100 during the production season, which placed it among the country's largest commercial employers. The

importance of such levels of employment were largely due to its regional concentration in the Midlands and the lack of alternative employment opportunities in these areas at the time.

According to the Energy Crop Socio-Economic Study undertaken by Fitzpatrick Associates in 2011, there were an estimated 1,443 jobs supported by the peat-to-power industry in Ireland at the time, some 81% of which were located in the catchment areas of the three peat-fired generating stations (Lough Ree, West Offaly, and Edenderry Power Stations). These constituted jobs in the plants and in peat extraction, jobs indirectly supported in upstream supply industries and jobs induced through the trickle-down effects of the wages and salaries of those supported directly or indirectly. These job numbers have now declined with the cessation of peat extraction.

In respect of Littleton Bog, jobs included in the above study would have included those to facilitate extraction of peat at this bog and associated processing and transfer to Littleton Briquette Factory.

As the primary employer in many Midland counties, BnM played a central role in building communities through several initiatives, including development and construction of local housing complexes, education bursaries, support of local sporting clubs, the provision of community gain funds, charity programmes and the provision and building of amenity areas.

Employment numbers have now declined significantly following the cessation of peat extraction at this bog.

3.2 Geology and Peat Depths

3.2.1 Sub-soil geology

The underlying geology[2] at Littleton Bog is limestone-based and comprises three different bedrock units; Ballysteen Formation (Dark muddy limestone and shale), Waulsortian Limestones (Massive unbedded lime-mudstone) and a small area of Lisduff Oolite (Oolitic limestone).

Quaternary subsoil mapping maps most of the Littleton area as cut peat, underlain by till derived from limestones and some small pockets of gravels derived from limestones.

3.2.2 *Peat type and depths*

Much of the peat exposed in the cutaway is fen peat. The conifer plantation was planted on a range of *Phragmites* peat and Sphagnum peat. The northern area (formerly managed for industrial peat production) is somewhat younger and exposed comprising light brown peat. The old sod peat areas along the western side have much deeper remnant acidic peat.

There is limited peat depth information for Littleton Bog. Parts of the site have been mapped across the bog using GPR and are provided in figure *BNM-ECO-26-11B-04: Peat depths*. The majority of the site has very shallow peat remaining (0-1m), with several areas where subsoil is exposed. Thicker deposits remain in the lobe of intact raised bog around the margins and in a pocket of cutover bog at the north-east end of the site (> 2 m).

[2] https://www.gsi.ie/en-ie/data-and-maps/Pages/Bedrock.aspx

3.3 Key Biodiversity Features of Interest

3.3.1 Current habitats

The most common vegetation communities/habitats[3] present in the former production areas at Littleton Bog include:

- Bare peat (BP),
- Birch/Willow scrub (eBir/oBir/cBir),
- Pine-dominated scrub (ePine/oPine),
- Pioneer Soft Rush-dominated or Bog Cotton-dominated poor fen (pJeff/pEang),
- Open water (wetlands also contain emergent pioneer poor fen – pEang/pJeff/pRos),
- Pioneer Heather in mosaic frequently with pEang,
- Embryonic raised bog community (Bog Cotton-dominated vegetation with Sphagnum (EM –pEangS),
- Embryonic raised bog community (Sphagnum-rich vegetation with PB1 species),
- Pioneer Purple Moorgrass-dominated vegetation (gMol) (frequently in mosaic with dHeath and oBir along high fields and other areas),
- Bulrush-dominated Reedbeds (pTyph) (small infilled wetlands),
- Common Reed-dominated Reedbeds (pPhrag),
- Pioneer poor fen with Marsh Arrowgrass (pTrig),
- Pioneer acidic grassland (gAn-H-Eq) (in mosaic with scrub, gMol and pJeff on some of the drier mounds where gravel was exposed),
- Pioneer potential rich fen (pRos/pVir with some Black Bog-rush),
- Railway (Acc) (with some exposed gravel - ED2/ED3/DisTuss).

The most common habitats[4] found around the margins include:

- Conifer plantation (WD4) (Codes refer to Heritage Council habitat classification, Fossitt 2000),
- Cutover Bog (PB4)
- Secondary cutover bog – now mosaic of Heather, poor fen and scrub (PB/PF2/WS1)
- Scrub (WS1),
- Raised bog (PB1) (minor remnants) with poor fen flushes (PF2),
- Birch woodland (WN7),
- Dense Bracken (HH3),
- Acid grassland (GS3),

[3] Codes refer BnM classification of pioneer habitats of production bog

[4] Codes refer to Heritage Council habitat classification, Fossitt 2000

- Improved grassland (GA1) (privately-managed land along margins).

See Drawing number *BNM-ECO-26-11B-17: Habitat Map (2018)*, included in the accompanying Mapbook.

- Littleton contains a significant amount of wetland and open water scattered across the site. Some of this wet peatland provides breeding habitat for wetland birds (Copland, 2011)) as well as refuge for wintering wildfowl. Some duck (Mallard and Teal) were noted on one of the larger wetlands close to the margin of the site. The extent of wet peatland habitat is likely to increase in the future when the bog comes out of production. These wetland areas are likely to continue to mature and become more structurally diverse in the future. Shoveler Duck, a scarce breeder in Ireland, was confirmed breeding on the site in 2018 (Birdwatch Ireland Tipp).
- Littleton also contains a significant area of bog remnant that was formerly partially used for sod peat cutting. Much of these bog remnants and former sod peat areas have completely re-vegetated and have been zoned for biodiversity by BnM. The relatively deep remnant peat is indicative that there is a large mainly Heather-dominated area on the site. *Sphagnum*-rich vegetation is also present, indicating some regeneration. As much of the bog has developed secondary peatland habitats, it forms a relatively large refuge for wildlife.

Photos of Habitats at Littleton Bog (2024)	
	Littleton Bog SW Derryhogan Bog 2021 New wetlands evident across the landscape.
	Littleton South 2021 Conifer plantation evident to the left of the picture. Extensive Birch woodland and mosaic of wetlands developing. Bare peat strip is a travel path along the railway. .
	Littleton South 2022 Looking south towards the conifer plantation Mosaic of wetland (open water, poor fen, wet scrub and woodland) and drier woodland and open habitats developing across this area.

	Littleton North 2021 Old wetland along the western margin (looking south). Adjacent area has been out of peat extraction since 1980s and has re-vegetated.
	Littleton North 2021 New wetland creation and development of cutaway habitats in central section (looking south
	Embryonic *Sphagnum* rich vegetation developing in the former trenches at Derryhogan Bog. This cutaway vegetation has been developing for > 40 years and is one of the best examples of typical future habitat on re-wetted acidic deep peat bog. The *Sphagnum* moss forms an extensive mat in places. No re-wetting was carried out in these trenches as it was deemed in good condition and providing significant habitat for wintering and breeding birds.

	Re-wetted area in Derryhogan 2025. This area has radically transformed compared to pre-rehab.

3.3.2 Species of conservation interest

A number of species of conservation interest utilize the habitats available at Littleton Bog. The following is a summary of the records of these species available within both BnM and NBDC records.

- Multiple mammal species have been recorded as part of BnM surveys on or in close proximity to the bog including Otter (*Lutra lutra*), Hare (*Lepus timidus spp. hibernicus*), Eurasian Red Squirrel (Sciurus vulgaris), Badger (*Meles meles*) and the bat species Leislers Bat (*Nyctalus leisleri*) and Soprano Pipistrelle (*Pipistrellus pygmaeus*).
- There are records of Marsh Fritillary (*Euphydryas aurinia*) along the margins of Littleton Bog, including larval webs and butterflies in flight. Marsh Fritillary is a species of significant conservation interest (Annex II species – EU Habitats Directive).
- Littleton contains a significant amount of wetland and open water scattered across the site. Some of this wet peatland provides breeding habitat for wetland birds (Copland, 2011)) as well as refuge for wintering wildfowl. Some duck (Mallard and Teal) were noted on one of the larger wetlands close to the margin of the site. These wetland areas are likely to continue to mature and become more structurally diverse in the future. Shoveler Duck, a scarce breeder in Ireland, was confirmed breeding on the site in 2018 (Birdwatch Ireland Tipp).
- Littleton is used by wintering Hen Harrier, Merlin and by small flocks of Whooper Swans (Biosphere Environmental Services 2014). The small wetlands are regularly used by wintering wildfowl. Breeding Curlew has also been recorded on the site at Derryhogan in the south-west part of the site. This is a particularly rare Red-listed bird species. The wetlands also support a colony of Black-headed Gull, another Red-listed breeding species. Curlew are still confirmed breeding on the site (2025).
- Bird species of conservation interest recorded from the bog include the BOCCI[5] red listed species Snipe (*Gallinago gallinago*), Kestrel (*Falco tinnunculus*), Lapwing (*Vanellus vanellus*), Meadow Pipit (*Anthus pratensis*) and small flocks of Golden Plover (*Pluvialis apricaria*). The BOCCI amber listed species Willow

[5] https://birdwatchireland.ie/app/uploads/2021/04/BOCCI4-leaflet-2-1.pdf

Warbler (*Phylloscopus trochilus*), Mallard (*Anas platyrhynchos*), Swallow (*Hirundo rustica*), Northern Wheatear (*Oenanthe Oenanthe*), Lesser Black-backed Gull (*Larus fuscus*), Linnet (*Linaria cannabina*) and House Martin (*Delichon urbicum*) have also been recorded at Littleton Bog.

- Plant species of particular conservation value that were recorded on the site include Blue Fleabane and Marsh Hellebore. Blue Fleabane is a Red Data Book species.

3.3.3 Invasive species

There are BnM records for the high impact invasive species Japanese Knotweed (*Fallopia japonica*) recorded from the northern gate at Littleton Bog. Some herbicide control has been carried out over the past few years.

3.4 Statutory Nature Conservation Designations

There are no European Designated Sites in close proximity (i.e. within a 5km radius at minimum) to Littleton Bog.

The nearest European Designate Sites to Littleton Bog are as follows:

- The Loughans SAC (000407)- located approximately 8km northeast,
- Lower Suir SAC (site code: 002137) - located approximately 9.5km west (at the closest point,)
- River Barrow and River Nore SAC (002162) (002162)-10km east (at the closest point),
- Spahill and Clomantagh Hill SAC (000849)- located approximately 10.3km northeast,
- Galmoy Fen SAC (001858) - located approximately 13.7km northeast,
- Cullahill Mountain SAC (000831)- located approximately 14.8km northeast,

There are also no NHA's (Natural Heritage Areas) within a 5km radius of this site. There is only one proposed NHA (Proposed Natural Heritage Area) within a 5km radius of this site, i.e. Kilcooly Abbey Lake pNHA (site code: 000958) which is located approximately 5km east of Littleton Bog. A number of non-statutory designated sites which overlap with European designated sites occur in the wider area. There are also a number of pNHA's that occur within 10km of Littleton Bog including:

- Kilcooly Abbey Lake pNHA (site code: 000958), located approximately 5km east.
- Laffansbridge pNHA (000965) - located approximately 6.3km south,
- The Loughans pNHA (000407)- located approximately 8km northeast,
- Killough Hill pNHA (000959) - located approximately 9.2km to the southwest,
- Cabragh Wetlands pNHA (001934) – located approximately 9.5km to the west,
- Spahill and Clomantagh Hill pNHA (000849) - 10.3km northeast.

See drawing *BNM-ECO-26-11B-23: Proximity to Designated Sites* in the accompanying map book.

3.4.1 Other Nature Conservation Designations

The Ramsar Convention entered into force in Ireland on 15th March 1985. Ireland currently has 45 sites/wetlands designated as Wetlands of International Importance (Ramsar Sites). These cover a surface area of 66,994ha.

There are no Ramsar sites in close proximity to Littleton Bog.

3.5 Hydrology and Hydrogeology

Littleton Bog forms part of the Suir Catchment (Catchment ID: 16) as defined by the EPA under the Water Framework Directive (WFD). The bog lies within several sub-catchments including Black (Twomileborris_SC_10) Clover_010 and Drish_010. Littleton Bog had a partially based pumped drainage system. The bog contains several drainage pathways and discharge locations, with most of the bog discharging to streams (via silt ponds), which eventually flow into the River Suir.

The northern part of the site is considered a locally important aquifer (LI) as the bedrock is moderately productive only in specific zones. The southern part of the site is classified as a regionally important (Rk) as it is subject to karstificaiton.

An aquifer is an underground body of water-bearing rock or unconsolidated materials (gravel or sand) from which groundwater can be extracted in useful amounts. GSIs Aquifer classes are divided into three main groups based on their resource potential, and further subdivided based on the type of openings through which groundwater flows. There are nine aquifer categories in total. Locally important aquifers are capable of supplying locally important abstractions (e.g. smaller public water supplies, group schemes), or good yields (100-400 m3/d). This data gives an indication of sub-surface deposits (bedrock and unconsolidated materials) in terms of their groundwater resource potential and dominant groundwater flow type.

Regionally important aquifers are those in which the network of fractures, fissures and joints, through which groundwater flows, is well connected and widely dispersed, resulting in a relatively even distribution of highly permeable zones. There is good aquifer storage and groundwater flow paths can be up to several kilometres in length. There is likely to be substantial groundwater discharge to surface waters (‘baseflow’) and large (>2,000 m3/d), dependable springs may be associated with these aquifers.

The majority of the cutover bog is located in an area mapped by GSI as of moderate groundwater vulnerability with some peripheral sections having low groundwater vulnerability (GSI Mapviewer). Groundwater vulnerability for the area surrounding Littleton Bog ranges from moderate to low vulnerability. Groundwater Vulnerability is a term used to represent the intrinsic geological and hydrogeological characteristics that determine the ease with which groundwater may be contaminated by human activities. Groundwater vulnerability maps are based on the type and thicknesses of subsoils (sands, gravels, glacial tills (or boulder clays), peat, lake and alluvial silts and clays), and the presence of karst features. Groundwater is most at risk where the subsoils are absent or thin and, in areas of karstic limestone, where surface streams sink underground at swallow holes. These data indicate there is generally low risk of any groundwater contamination occurring at this site. Groundwater Vulnerability is typically used to indicate the susceptibility to groundwater pollution.

3.6 Emissions to surface-water and watercourses

Littleton Bog has 2 treated surface water outlets (SW34 and SW35) from previously active peat extraction catchment. SW34 and SW35 discharge to unnamed streams eventually meeting the Clover River (IE_SE_16C040300). The Clover River is classed as Good water quality status (Ecological Status or Potential SW 2019-2024 – Water Framework Directive) but the unnamed streams leading to the Clover River are classed as having poor/moderate water quality.

The locations of silt ponds, associated surface water emission points and those being monitored and sampled as part of the IPC licence are detailed on the BNM-ECO-26-11B-02 Littleton Bog: Structures and Sampling, along with the water quality map (BNM-ECO-26-11-WQ01 Littleton Bog: Water Quality Map) in the associated map book.

Peat extraction continues to be identified as a pressure in the third cycle of the River Basin Management Plan (Water Action Plan for Ireland). The main emission limit value (ELV) associated with these bogs is 35mg/l suspended solids, with trigger levels for ammonia of 3.6 mg/l and COD 100mg/l.

An analysis of the results over a number of years of the IPC licence environmental monitoring of some of the discharges from this bog indicates that results were well under the Emission Limit Value for Suspended Solids for the last 30 months of monitoring up to December 2025, with a similar level of compliance for COD at 95% and 100% under the trigger level for Ammonia.

Ammonia averaged 0.301mg/l and ranged from 0.028 to 1.78 mg/l with Suspended Solids ranging from 2 to 7 mg/l and averaging 3.54 mg/l.

The Annual Monitoring Return (AMR) for the period up to December 2025 is due to be submitted to the EPA in May 2026.

Rehabilitation of cutaway peatland is closely linked with control of emissions. One of the criteria for successful rehabilitation is stabilisation through re-vegetation, which will stabilise all substrates and in turn remove the need for further silt control measures. This site is already vegetated in some areas. Re-wetted peat also aids the primary objective of stabilizing peat, as when peat is re-wetted it is not vulnerable to wind erosion. Re-wetted peat and the development of wet peatland habitats can also act as sinks for silt and mobile peat, and increases additional retention time for solids, and the peatland vegetation can quickly stabilise this material within blocked drains on site (by acting like constructed wetlands).

Water quality of water discharges from restored peatlands normally improves as a result of bog restoration measures and the restoration of natural peatland processes (Bonn *et al*., 2017). Bog restoration is also expected to improve water attenuation of the site as the drains are blocked, slowing water movement and water release from the site. Restored peatlands help slow the release of water and aid the natural regulation of floods downstream (Minayeva *et al*., 2017). The draft National River Basin Management Plan (NRBMP) 2022-2027 (DHPCLG, 2022) is the key national plan for Ireland to achieve the objectives of the Water Framework Directive (WFD). The NRBMP outlines how key actions such as the BnM peatland rehabilitation is expected to have a positive impact on water quality and help the NRBMP deliver its objectives in relation to the WFD.

Water will still discharge from designated emission points when rehabilitation at Littleton Bog has been completed. This discharge will have improving water quality and there will be increased wetland attenuation, meaning slower release of water. This is expected to have a positive impact on status of downstream water bodies. While water quality improvements assist in meeting water frameworks directive ambitions and targets, they can also improve drinking water sources in applicable catchments with drained peatlands and the potential for associated reduction in treatment requirements at drinking water treatment facilities.

Decommissioning and Rehabilitation Programme Water Quality Monitoring.

Results for the quarterly monitoring programme for the last 3 yrs are included in Appendix XI, for Littleton.

BnM have been providing the Local Authority Water Programme (LAWPRO) with details of the surface water emissions points associated with this bog.

This is necessary to ensure that there is alignment with the WFD monitoring programme and that where possible, the monitoring programme will enable any improvements in water quality or establishing trends to be quantified against any available WFD monitoring data. It will also enable the periodic sharing of data which will inform the monitoring reports, success criteria and enable LAWPRO under the Water Framework Directive to track any changes in pressures and be aware of changes in water chemistry.

Monitoring results will be maintained, trended every six months and reported on each year and as required, as part of the requirement to report on Condition 10.1 of the IPC Licence on Bog Rehabilitation in the Annual Environmental Report, and will be provided to LAWPRO and the EPA as required to inform progress and national monitoring requirements under the WFD.

These results will also be available in May each year as a requirement of the Annual Environmental Report at www.epa.ie.

The parameters to include as per condition 6.2 of the IPC Licence include monthly monitoring for pH, Flow, Suspended Solids, Total Solids, Total Phosphorus, Total Ammonia, Colour & COD.

3.7 Fugitive Emissions to air

None.

The bog is no longer in industrial peat production. Rehabilitation of the cutaway peatland will seek to re-wet the dry peat where possible and re-vegetate all areas (whether wet or dry). Collectively, ceasing industrial peat production, re-wetting and re-vegetating will minimise any risk of emission to air from dust.

3.8 Carbon emissions

Irish peatlands are a huge carbon store, containing more than 75% of the national soil organic carbon (Renou-Wilson *et al.* 2012). Peatland drainage and extraction transforms a natural peatland which acts as a modest carbon sink (taking in 0.1 to 1.1 t of carbon as CO_2-C /ha/yr) into a cutaway ecosystem which is a large source of carbon dioxide (releasing 1.3 to 2.2 t of carbon as CO_2-C /ha/yr) based on Tier 1 Emission factors (Evans *et al*. 2017). Renou-Wilson *et al.* (2018) reported losses of between 0.81 – 1.51 CO_2-C /ha/yr from drained peatlands located in Ireland.

Re-wetting of dry peatlands will increase methane emissions (Gunther *et al*. 2020) as a consequence of the anoxic conditions within the peat body that provide a suitable environment for the microbial breakdown of plant litter and root exudates. Tanneberger *et al.* (2021) describes how peatland management has to choose between CO_2 emissions from drained peatlands or increased methane (CH_4) emissions from rewetted industrial peatlands. However, when radiative effects and atmospheric lifetimes of both GHG gases are considered and modelled, postponing rewetting increases the long-term warming effect of continued CO_2 emissions (Gunther *et al*. 2020). This means the increase in methane due to rewetting of dry peatlands is still negated by the CO_2 emissions reductions. Further, Wilson *et al.* (2022) confirmed the benefit of rapid rewetting to achieve strong carbon reductions and potentially altering the warming dynamics from warming to cooling depending upon the climate scenario.

It is expected that Littleton Bog will become a reduced carbon source following rehabilitation. The potential of any cutaway site to develop as a carbon sink in the longer-term depends on the success of the rehabilitation measures, the extent of development of *Sphagnum*-rich or other peat-forming habitats, the balance of carbon

fluxes from different cutaway habitats and future climatic conditions. Much of this bog is expected to develop wetland habitats on shallow peat with open water, reed swamp and fen habitats with alkaline emission factors and a smaller proportion will develop as regenerating wet deep peat vegetation on deep peat areas. Birch woodland is expected to develop on the drier mounds and along peripheral headlands.

3.9 Current ecological rating

(Following NRA (2009) Evaluation Criteria)

Parts of this site are deemed to be of **County-National Importance**. The site supports breeding Curlew, a species whose breeding population has experienced drastic declines on a national level, presence of wintering Hen Harrier; and the establishment of *Sphagnum*-rich poor fen habitat deemed to be of County Importance.

Other sections of the site support semi-natural habitats such as Birch woodland, pioneer cutaway habitats and smaller sections of high bog deemed to be of **local importance; higher value**.

4. CONSULTATION

4.1 Consultation to date

Consultation with interested parties.

There has been ongoing consultation about rehabilitation, biodiversity and other general issues over the years about Littleton bog group, including Littleton Bog, with various stakeholders in relation to:

- General consultation with range of stakeholders at annual Bord na Móna Biodiversity Action Plan review days 2010-2018.
- Open consultation with range of stakeholders at annual BAP review days 2010-2018.
- Consultation with the North Tipperary Heritage Forum during the period 2010-2015.
- General consultation at a local community event in Littleton in Dec 2016.
- General consultation with Tipperary County Council and other stakeholders in relation to the Littleton Labyrinth Project Feasibility Study.
- Ongoing engagement with Lisheen Mine.
- Archaeological Liaison Committee (National Museum of Ireland & Dept of Culture Heritage and the Gaeltacht).
- Midlands & East Regional WFD Operational Committee (River Basin Management Plans).
- Ongoing consultation with Coillte – proposed Coillte/BnM Midlands Native Woodland Project.
- Ongoing consultation with Slieve Ardagh Rural Development Group.
- General consultation with Tipperary County Council and other stakeholders in relation to the Midlands Network Trail.
- Specific Consultation with Tipperary Climate Action Officer and Biodiversity Officer relating to the Tipperary Climate Action Plan and the Mid-Tipperary Decarbonising Zone.

There was specific consultation and engagement about rehabilitation of the Littleton Bog group, including Littleton Bog, with various stakeholders during the period 2018-2021:

- Lisheen Mine.
- Irish Peatland Conservation Council.
- NPWS (site visits).
- Tipperary County Council (2018).
- Tipperary Heritage Forum.
- Kilkenny County Council.
- Consultation with members of the local community.
- Consultation with local community groups.
- Slieve Ardagh Rural Development.
- National University of Galway.
- Limerick Institute of Technology.
- Irish Wildlife Trust.
- Environmental Protection Agency.
- Birdwatch Ireland.
- Birdwatch Ireland Tipperary Branch.
- Forest Service.

- Coillte.

To inform the original Plan (Phase 1 Rehabilitation), both national and local stakeholders, local representatives of national bodies (such as Regional National Parks and Wildlife Service staff) and relevant offices in County Councils (such as the Heritage or Environmental Offices) were contacted. Any identified local interest groups were informed of the opportunity to engage with this rehabilitation plan and were invited to submit their comments or observations in relation to the proposed rehabilitation (Phase 1) at Littleton Bog or the programme in general.

4.2 Issues raised by Consultees

Some issues were raised by consultees during the consultation process for the rehabilitation plan for Ballybeg/Lanespark/Derryvella Bog and for response to consultation for rehabilitation across the Littleton Bog Group between 2018-2025, and these are summarised below.

NPWS welcomed the restoration and rehabilitation measures proposed for the Littleton Bog Group in 2018, particularly where it could result in the development of Annex I active raised bog or would significantly aid Ireland in meeting its commitments under the EU Habitats Directive.

NPWS (2018) suggested that BnM consider more fully the potential for forward-planning during production phases of its operation so that the topography of the commercial fields could be engineered so as to best facilitate rewetting of the sites. Consideration should be given to reprofiling works within the Littleton Bog Group.

NPWS (2018) highlighted the potential for more intensive rehabilitation during initial consultation and the potential for larger project opportunities focusing on GHG emission reduction creation of peat-forming habitats, biodiversity enhancement, other ecosystem services enhancement/restoration. The use of bunding at several sites was discussed.

Birdwatch Ireland (2018) welcomed the proposed restoration/rehabilitation of the Littleton Bog Group and highlighted need to take consideration of bird nesting season when carrying out works, particularly for Lapwing and Curlew.

IPCC (2018) requested clarity around the scope of sites included in the Littleton Rehabilitation Programme and recommended that priority be given to raised bog restoration, where possible. IPCC were concerned about the fact that milled peat extraction was projected to continue at Killeen Bog (in 2018, subsequently ceased in 2021). The IPCC were also unclear about the aims and objectives for sites with biodiversity interest. The IPCC recommended the use of contouring as a methodology to improve re-wetting outcomes.

The IPCC (2018) highlighted that monitoring of changes to water-levels as a result of rehabilitation could be improved using piezometers and queried the frequency of ecotope mapping. NPWS (2018) recommended that ongoing research into the interaction between rehabilitation measures and carbon emissions is prioritized so as to better inform future rehabilitation plans.

The Irish Farmers Association (IFA), The Department of Agriculture Food and the Marine, individual local residents and ICMSA queried likely impacts relating to the finalisation of several bog rehabilitation plans in 2021 and 2022. They raised concerns based on the proposed re-wetting in relation to flooding on adjoining lands and, specifically, with regards to the maintenance of drains. In previous submissions, the IFA also raised the issue of Health and Safety in relation to raising water levels as well as possible impacts on land and property prices.

Several individuals who owed adjacent land to bogs within the Littleton Bog Group expressed concerns about the potential impacts of re-wetting to their land (2018).

Several individuals and organisations expressed interest in the development of amenity and greenways through the Littleton Bog Group (2018). IPCC highlighted a bog area at the north of Littleton Bog that had been used for educational purposes in the past.

Tipperary County Council (2018) highlighted the need to avoid any unnecessary deterioration in the quality and quantity of ground and surface waters. Tipperary County Council (2018) also suggested that peatland water levels and flow regimes should be restored to as close to the natural reference conditions as possible.

Queries about future nature conservation designations were also submitted by IPCC, discussed with IWT and with Birdwatch Ireland Tipperary Branch. Birdwatch Ireland, Tipperary Branch (2018) suggested further management of sites for to improve habitat for breeding wetland birds.

The Irish Farmers Association (IFA) (2021-2022) expressed concerns regarding the future ownership of the BnM bogs subject to rehabilitation, in submissions made on earlier rehabilitation plans. They expressed a desire for contingency planning for potential future ownership of designated bogs so as to ensure no negative impacts arise on adjacent properties from any new ownership. A local landowner (2017) with a holding adjacent to a Littleton Bog made some enquires about the return of land originally CPOed by BnM.

University of Galway (2017) were interested in developing an INTEREG Project on peatland sites and were discussing the inclusion of several BnM sites in this proposed project. (This subsequently became the CarePeat INTEREG Project and Cavemount Bog Co. Offaly was included in the project, which is now completed).

Limerick Institute of Technology (LIT) were interested in developing a project on peatlands and paludiculture and were discussing the potential availability of land within the Littleton Bog Group. This proposal ultimately did not develop into a project on BnM lands.

An individual highlighted the presence of several rare Bee Orchid varieties along the BnM railway at Longford Pass.

Tipperary County Council developed a Climate Action Plan in 2024 and have developed an area called the Mid Tipperary Decarbonizing Zone. This Decarbonising Zone within the local authority area is to act as a test bed for a range of climate mitigation, adaptation and biodiversity measures in a specifically defined area through the identification of projects and outcomes that will assist in the delivery of the National Climate Objective (Tipperary County Council 2024).

4.3 BnM response to issues raised during consultation and rehabilitation 2018-2021

BnM carried out extensive consultation and engagement with all interested parties during 2018-2021.

Consultees during the Phase 1 rehabilitation (2018-2021), including NPWS and the IPCC, suggested the use of more intensive rehabilitation measures such as contouring and bunding. These ultimately were beyond the scope of the rehabilitation budget allocated to these sites by BnM at the time (2018-2021). PCAS is now an opportunity to carry out some of these suggested measures (e.g. bunding, recontouring) through the Littleton Bog Group as part of Phase 2 rehabilitation and various additional phase 2 rehab has been proposed for Templetouhy,

Carrickhill, Derryville, Baunmore, Inch, Ballybeg, Derryvilla and Killeen. This additional Phase 2 rehab is dealt with by the 2025 update to the Ballybeg-Lanespark-Derryvilla Rehabilitation Plan 2025.

Sphagnum inoculation is one measure that was initially suggested by IPCC (in 2018) for use at Ballysorrell to support raised bog restoration. This measure was ruled out initially by BnM in 2018 due to its relatively high cost, lack of resources and other logistical issues such as lack of suitable local *Sphagnum* donor sites. Since then, BnM has developed the Peatlands and People LIFE Project (Home | Ireland's Climate Action Catalyst | Peatlands & People) and one of the main objectives of this project on BnM land is to inoculate approx. 800 ha of suitable residual deep peat with *Sphagnum* plugs to speed up the trajectory of development of *Sphagnum*-rich embryonic bog vegetation. So far, 350 ha has been inoculated across midlands bogs. The future selection of sites within the Littleton Bog Group for *Sphagnum* inoculation will be dependent on availability of resources for planting. Site visits to Lanespark and Littleton (2025) has also shown that *Sphagnum* is present on site and is recolonising and spreading in certain areas quickly in response to the re-wetting in 2018-2021.

Rehabilitation measures should positively impact the water quality in receiving water bodies through enhancing the water attenuation across rehabilitated sites. The robust water monitoring programme implemented will be used to assess water quality leaving rehabilitated sites at designated points. BnM also advised that decommissioning of silt ponds will only be carried out when the EPA are satisfied that adequate stabilisation of the bog has been achieved and silt ponds are no longer required. This decommissioning will be determined by water quality results and EPA approval.

During Phase 1 of the rehabilitation across Littleton Bogs, individual landowners who expressed concerns were met on site. No boundary drains were blocked and, in several instances, (Ballybeg) some internal drainage was modified to allow water draining from external lands to flow through these sites unhindered. It is the intention of BnM that the re-wetting of the bogs will be carried out in such a manner that does not impact on third party lands. Where it is deemed that blocking of a shared drain would cause any adjoining lands to be adversely affected, this will be avoided, and alterations made to the rehabilitation plan. In general, drains around the margins of the bog will not be blocked. It is intended that rehabilitation measures will not significantly alter the existing topographical catchments and that the spine of the drainage networks, those which the upstream catchments drain through, will be retained by BnM. If issues arise with boundary drainage in the future, then these will be dealt with by BnM.

BnM and Tipperary County Council carried out a feasibility study of the potential for amenity development across the Littleton Bog Group called Littleton Labyrinth in 2018-2020. The first phase of this amenity has been completed and a greenway has been constructed at Killeen Bog to Loch Doire Bhile. A further extension (Phase 2) is proposed at Ballybeg and Derryvella Bog. There is potential for future extensions to this greenway network in the future. These greenways can be integrated into the rehabilitated landscape with no significant impact to the previous re-wetting.

Rehabilitation plans are not intended to plan out future management of these sites. Known or planned after-use (way-leave, Littleton Labyrinth greenway feasibility) has been incorporated, where possible, in the rehabilitation plan. Peatland rehabilitation is not intended to constrain future land-uses, where they are compatible with this environment.

Ballybeg Bog is proposed to be included in the Coillte/BnM Midlands Native Woodland Project (Midlands Native Woodland - Coillte). The main objective of this proposed project is to develop and enhance native woodland in areas of cutaway that would remain naturally dry, developing woodland habitat that would naturally complement wetland and peatland habitats already developing across these sites. An area of 11.2 ha is proposed for planting

at this Bog. This proposed project is currently being considered for consent by the Forest Service. Areas proposed to be included in Native Woodland Project have also been mapped as constrained land in the rehabilitation plan.

BnM will continue to manage their land bank into the future. As industrial peat production has now ceased on BnM lands and rehabilitation measures carried out, a regular drainage maintenance programme will not be required or carried out as would have been the case in the past. However, if issues arise with the BnM internal drainage system that affects upstream or downstream landowners, then these issues will be addressed by BnM.

BnM considers issues regarding estate security, fire risk, invasive species and water pollution of utmost importance. BnM intends to maintain security and manage fire risk over the entirety of the estate. In this regard, rehabilitation should have no detrimental impact on these issues. Regarding water pollution, BnM is regulated by the EPA and as such adheres to the strict water pollution measures laid out by the same. BnM will consider future opportunities for biodiversity enhancement, subject to availability of resources and funding, where possible. BnM intends to maintain a “No Shooting” policy on Littleton Bog.

It is the intention of BnM to keep secure the estate and ensure that any anti-social behaviour that occurs within the estate is reported and dealt with by the appropriate authorities.

5. REHABILITATION GOALS AND OUTCOMES

The rehabilitation goals and outcomes outline what BnM want to achieve by implementing the rehabilitation. These include:

- Meeting conditions of IPC Licence.
- Stabilisation or reduction in water quality parameters of water discharging from the site (e.g. suspended solids).
- Reducing pressure on receiving waterbodies that have been classified as *At Risk* from peatlands and from peat extraction, via stabilization or improving water-quality from this bog, and therefore, reducing pressures.
- Optimising hydrological conditions for **climate action benefits**.
- Optimising hydrological conditions for the protection of exposed archaeological structures, their retention in situ and preservation into the future.
- Integrating rehabilitation measures with existing land-use (e.g. conifer forestry). Supporting other potential future land-uses. Integrating rehabilitation measures with future potential land-uses on site. It is not proposed to carry out any rehabilitation actions to change or negatively affect any infrastructure.
- The main goal and outcome of this plan is the successful rehabilitation (environmental stabilisation) of peatlands used for industrial peat production at the bog in a manner that is acceptable to both external stakeholders and to BnM and which optimise climate action and other ecosystem service benefits.

The rehabilitation goals and outcomes take account of the following issues.

- BnM have carried out rehabilitation at Littleton Bog in 2018-2021. Significant drain-blocking and re-wetting was carried out during this phase.
- It will take some time for stable naturally functioning habitats to fully develop at Littleton Bog. This will happen over a longer timeframe than the implementation of this rehabilitation plan.
- Re-wetting residual peat will initially maintain and enhance the carbon storage capacity of the bog. There is scientific consensus that restoration of hydrology in damaged bog can improve carbon storage, water storage and attenuation and help support biodiversity both on the site and in the catchment (See Section 3.8). This will reduce carbon emissions from the site from a larger carbon source to a smaller carbon source. In time, the site has the capacity to develop in part as a carbon sink.
- It is not expected that the cutover bog in the former production area has the potential to develop active raised bog (ARB) analogous to the priority EU Habitats Directive Annex I habitat within the foreseeable future (c.50 years). Littleton Bog has relatively some sections with relatively deep residual peat across the site, with sections of the bog containing shallow residual peat and proportions of the bog cutaway with exposed gravel ridges. Therefore, there are areas that have potential to develop *Sphagnum*-rich habitats in this timeframe. Nevertheless, re-wetting across the entire bog, as part of the Scheme, will improve habitat conditions of the whole bog. Other peatland habitats such as wetland or scrub/woodland will develop in a wider mosaic that reflects underlying conditions.
- Rehabilitating former industrial peat production bog will also in the longer-term support other ecosystem services such as such the development of new habitat to support biodiversity and local attenuation of water flows from the bog.
- WFD status in receiving water bodies can be affected by peatlands and peat extraction but is also affected by other sources such as agriculture. In addition, receiving water bodies that are assessed as At Risk from

peatlands and from peat extraction are likely to have several contributary sources of impacts (private peat extraction and BnM). Reducing pressures due to former peat extraction activities at Littleton Bog will contribute to stabilising or improving water quality status of receiving water bodies in general. Ultimately, improving the WFD status of the receiving water body will depend on reducing pressure from a range of different sources, including peatlands in general (private and BnM).

- Re-wetting in general will benefit the future preservation of most known and unknown archaeological features.

6. SCOPE OF REHABILITATION

The principal scope of this enhanced rehabilitation plan is to rehabilitate the bog. This is defined by:

- The area of Littleton Bog within the rehabilitation footprint.
- EPA IPC Licence - Ref. P0499-01. As part of Condition 10.2 of this licence, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area.
- Much of the site already has establishing pioneer cutaway habitats with some areas having well-developed habitats. Targeted drain-blocking, wetland outfall management and deep peat measures are the most suitable rehabilitation approach for the site.
- BnM have defined the key goal and outcome of rehabilitation at Littleton Bog as **environmental stabilisation** and **optimising residual peat re-wetting,** to enhance the development of compatible habitats.
- Rehabilitation of Littleton Bog will support multiple national strategies of climate action, biodiversity action and other key environmental strategies such was the Water Framework Directive.
- Rehabilitation of Littleton Bog also supports and aligns with the goals and objectives of the Tipperary Decarbonizing Zone.

6.1 Key constraints

- **Bog conditions.** Rehabilitation outcomes are constrained by the environmental characteristics of the particular bog. For example, there is potential for raised bog restoration at some sites where there has not been significant industrial peat extraction, and the peat body is largely intact (deep peat sites that are drained). At other sites, most of the peat mass has been removed, the environmental characteristics of these areas have therefore changed radically (peat depths, hydrology, water chemistry, substrate type, nutrient status, etc.) and there will therefore be different habitat outcomes (wetlands, fen, heathland, grassland and Birch woodland).
- The majority of Littleton Bog has shallow residual peat with some deeper peats. The bog has a partially pumped drainage regime. Two pumps are still present on site but remain non-functional. Wetland habitats (fen, wetland, reedswamp) and dry cutaway habitats (Birch woodland, scrub and grassland) are the most likely habitats to develop in areas with shallower peat. Areas of residual deeper peat are likely to develop *Sphagnum* rich bog vegetation in time. These habitats are already developing in places on older cutaway.
- **Surrounding landscape and neighbours.** Another key constraint is the interaction between the BnM bogs and the surrounding landscape. Care has to be taken that no active rehabilitation management is carried out that could negatively and knowingly impact on surrounding land. This includes any hydrological management on neighbouring farmland. It is anticipated that the work carried out at Littleton (blocking drains and re-wetting cutaway peatlands) will not have any flooding impacts on adjacent land.
- **Archaeology**. The discovery of monuments or archaeological objects during peatland rehabilitation may potentially constrain the rehabilitation measures proposed for a particular area. The rehabilitation will optimise hydrological conditions for the protection of exposed archaeological structures, their retention in situ and preservation into the future. Any newly discovered archaeology may require rehabilitation measures to be reviewed and adapted. Should any previously unknown archaeological material be uncovered during the rehabilitation works, it will be avoided and reported to the BnM Archaeological Liaison Officer and the National Museum of Ireland.

- **Turf-cutting.** There are areas of active turf cutting (turbary) on the margins of the bog. No rehabilitation measures will be carried out that affect turbary rights.
- **Coillte Conifer Plantation.** No measures will take place that will affect Coillte conifer forestry.
- **Biomass**. A small area (10 ha) used as a pilot Eucalyptus biomass project was constrained.
- **Conifer plantation/agricultural grassland**. Conifer plantation forestry and parcels of agricultural grassland border the bog. These areas have been identified as constrained land where they overlap the rehabilitation footprint.
- **Potential Future Amenity development.** BnM and Tipperary County Council carried out a feasibility study of the potential for amenity development across the Littleton Bog Group called Littleton Labyrinth. There is potential for future extensions to this greenway network through Littleton Bog. The proposed rehabilitation measures will not impact on the delivery of any future amenity as a route is still available across the bog, and there is no constraint to rehabilitation.

6.2 Key Assumptions

- It is assumed that BnM will have all resources required to deliver this project.
- It is expected that weather conditions will be within normal limits over the rehabilitation plan timeframe. Long periods of wet weather have the capacity to significantly affect ground conditions and constrain drain blocking and other ground activities.

6.3 Key Exclusions

The scope of this rehabilitation plan does not cover:

- Areas subject to turf cutting are excluded.
- Coillte conifer plantation.
- The longer-term development of stable naturally functioning habitats at Littleton Bog. The plan covers the short-term rehabilitation **actions** and **an additional monitoring and after-care programme** to monitor the rehabilitation and to respond to any needs.
- This plan is not intended to be an after-use or future land-use plan for Littleton Bog.
- The longer-term management of this site, potentially as a nature conservation site, or for amenity, or for other uses in the future.

7. CRITERIA FOR SUCCESSFUL REHABILITATION

This section outlines what criteria will be used to indicate successful rehabilitation and what critical success factors are needed to achieve successful rehabilitation. All criteria used will be measured to validate the achievement of the rehabilitation goals and outcomes and validate the completion of the rehabilitation.

The key objective of this enhanced rehabilitation plan is **environmental stabilisation** and the stabilisation of any emissions from the site that related to the former industrial peat extraction activities.

Rehabilitation is generally defined by BnM as:

- stabilisation of bare peat areas via targeted active management (e.g. drain-blocking/re-wetting) slowing movement of water across the site and encouraging natural colonisation; and
- mitigation of key emissions (e.g. potential run-off of suspended solids).

In addition, BnM wish to optimise climate action and other ecosystem service benefits.

7.1 Criteria for successful rehabilitation to meet EPA IPC licence conditions:

- Rewetting of residual peat in the former area of industrial peat production to offset potential silt run off and to encourage and accelerate development of vegetation cover via natural colonisation and reducing the area of bare exposed peat. See Table 7.1 for a summary of the criteria for successful rehabilitation and associated monitoring. The target will be the delivery of measures and this will be measured by an aerial survey after rehabilitation is completed.
- That there is a stabilizing/improving concentration of suspended solids and ammonia in discharges from BnM sites, associated with the measures undertaken to stabilize the peat surface by the blocking of the internal drainage system and the maximized rewetting of the peat surface. This will be demonstrated by developing a stable or downward trajectory of water quality indicators (suspended solids and ammonia) towards what would be typical of a re-wetted cutaway bog. This will be measured via water quality monitoring (suspended solids and ammonia) for at least 2 years after the rehabilitation has been completed.
- Receiving water bodies have been classified under the River Basin Management Plan and this classification includes waters that are *At Risk* from peatlands and peat extraction. The success criteria will be that the *At Risk* classification will see improvements in the associated pressures from this peatland or if remaining *At Risk*, that there is an improving trajectory in the pressure from this peatland.

Table 7-1 Summary of Success criteria, targets, how various success criteria will be measured and expected timeframes.

Criteria type	Criteria	Target	Measured by	Expected Timeframe
IPC validation	Rewetting in the former area of industrial peat production	Delivery of rehabilitation measures Reduction in bare peat.	Aerial photography after rehabilitation has been completed – to demonstrate measures (drain-blocking)	2025-2027

Criteria type	Criteria	Target	Measured by	Expected Timeframe
			Establishment of a baseline for future monitoring of bare peat, vegetation establishment and habitat condition.	
IPC validation	Key water quality parameters Ammonia, Phosphorous, Suspended solids, pH and conductivity	Reduction or stabilisation of key water quality parameters associated with this bog	Water quality monitoring for a period after rehabilitation has been completed	2025-2027
IPC validation	Reducing pressure from peat production on the local water body catchment (WFD)	Where this section of the water body, that this bog drains to, has not been identified as under pressure from peat extraction, that the intervening EPA monitoring programme associated with its Programme of Measures for this water body, confirms that its classification remains at not being at risk from peat extraction associated with activities at this bog.	EPA WFD monitoring programme	WFD schedule

Meeting climate action verification criteria and monitoring of these criteria after the scheme has been completed is dependent on support from the Climate Action Fund or other sources of funding. Note that monitoring and verification of the overall scheme will be stratified – not all these criteria will be measured at each individual site. Baseline monitoring to be carried out during the scheme when rehabilitation is complete. Sites can be re-monitored in the future and compared against this baseline.

7.2. Critical success factors needed to achieve successful rehabilitation as outlined in the plan

The achievement of successful rehabilitation as outlined in the plan requires:

- **Funding to pay for resources required to deliver the planned rehabilitation (BnM and external).** BnM maintains a provision on its balance sheet to pay for these future costs. BnM is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control

Licence. It is expected that additional costs of enhanced rehabilitation will be supported by Government through the Climate Action Fund and Ireland's National Recovery and Resilience Plan.

- **BnM to have sufficient resources (staff and training) to deliver the planned rehabilitation with required associated skills and competencies.**
- **BnM to have sufficient resources (suitable machinery) and staff to maintain this machinery.**
- **Weather conditions to be within normal limits over the rehabilitation plan timeframe.** Long periods of wet weather have the capacity to significantly affect ground conditions and constrain the delivery of rehabilitation. The potential impact of wet weather on ground conditions can be reduced by appropriate planning and management. BnM have significant experience of managing these issues through 70 years of working in these peatland environments.
- **Rehabilitation measures to be effective.** The rehabilitation measures proposed in this plan are based on 40 years of BnM experience of peatland management and best practice applied internationally in peatland management. Measures proposed in this plan have already been shown to be affective at other sites. BnM will apply a flexible and adaptable approach to the more innovative rehabilitation measures proposed in this plan**.** If measures are not initially effective, BnM will review any requirement for additional practical rehabilitation.
- **Natural colonisation of vegetation to develop semi-natural habitats at a rate within the normal limits.** The development of naturally functioning semi-natural habitats on degraded bog takes time. It may take 30-50 years for active raised bog vegetation to re-develop on suitable cutaway that was previously bare peat. However, BnM experience has demonstrated the effectiveness of these type of measures for re-wetting bog and creating carbon sinks (Renou-Wilson *et al*. 2018).
- Rehabilitation measures have been designed to accelerate and work with natural colonisation and other natural processes. BnM experience of rehabilitation has shown that re-wetting improves conditions for natural colonisation and that natural colonisation is accelerated where the environmental conditions are most suitable. Rehabilitation measures have been designed to modify the conditions of areas within sites where conditions are less suitable for natural colonisation (modifying hydrology, topography, nutrient status or availability of potential seed sources).
- **Monitoring to be robust and effective.** Rehabilitation Monitoring will be established to validate the success of rehabilitation as required by Condition 10 of the IPC Licence and to verify the benefits of the proposed enhanced measures to optimise climate action. This will focus on a collecting a range of scientific data that can then quickly be adapted and into metrics that can be used to measure changes in various ecosystem services.

8. Rehabilitation Actions and Time Frame

Peatland rehabilitation requires detailed planning and the use of data from desktop surveys and field surveys. This data in association with topographical and hydrological modelling will be important in planning the future peatland landscapes and planning the use of the most appropriate rehabilitation methodologies to maximise climate action benefits. Hydrological modelling indicates those areas that are likely to re-wet when drains are blocked, based on the current topography, and areas where water levels may have to be modified, where needed. Enhanced rehabilitation measures will look to optimise hydrological conditions for re-wetting peat in other areas. This planning is also essential for matching the most sustainable rehabilitation methodology to the most suitable cutaway environment to maximise the benefits of the resource outlay (maximising cost/benefit).

A number of illustrative figures have been produced to inform Rehab Planning and Design, including Aerial Photography, Peat Depths, LiDAR Surface Maps, and Depression Analysis modelling; these are included in the accompanying Mapbook as the drawings referenced below:

BNM-ECO-26-11B-21 Littleton Bog: Aerial Imagery 2000

BNM-ECO-26-11B-22 Littleton Bog: Aerial Imagery 2020

BNM-ECO-26-11B-04 Littleton Bog: Peat Depths

BNM-ECO-26-11B-03 Littleton Bog: LiDAR Map

BNM-ECO-26-11B-09 Littleton Bog: Depression Analysis

The rehabilitation actions themselves will be a combination of measures to re-wet peat and encourage natural colonisation. The distribution of these measures is provisionally outlined in drawing titled *BNM-ECO-26-11B-20 Littleton Bog: Standard Rehab Measures* in the accompanying Mapbook**.**

Extensive drain-blocking was already carried out as part of the rehabilitation programme between 2018-2022.

Rehabilitation measures for Littleton included (see Table 8.1):

- Re-assessment of the pumping regime and removing pumps if this was desired and had no significant external impact or impacts on proposed future land-uses. Initial hydrological modelling indicated that a part of the site would develop a mosaic of wetland habitats with some permanent deeper water if pumps were decommissioned. Hydrological management looked to optimise summer water levels to maximise the development of wetland vegetation (by looking to set water depths at < 0.5 m, where possible. It is inevitable that some sections will naturally have deeper water due to the topography at this site). Water-levels were adjusted at outfalls and by adjusting piped drainage, where possible. More sustainable permanent gravity drainage solutions were examined. It is expected that a natural seasonal regime of water fluctuation will develop, with water-levels fluctuating in association with levels of surrounding rivers.
- A targeted drain-blocking programme was implemented across the cutaway, where possible. In general, field drains were blocked where possible to re-wet cutaway and re-wet to the optimum water-level. More intensive measures were targeted towards the bare peat.
- Less intensive measures (targeted drain-blocking) were used in areas where habitats have already established.
- Hydrological measures included modifying outfalls and managing water levels with overflow pipes.

The existing silt pond was retained and maintained during the rehabilitation phase. During the monitoring and verification phase the silt pond wase continually inspected and maintained, where appropriate. When it is deemed that the silt pond is not required, as the bog has been successfully stabilised and there is no silt run-off, the condition of the silt pond will be reviewed. The silt pond will either be de-watered (water levels lowered to a level where the silt pond will naturally develop as a small wetland feature), left in situ, or infilled (where discharges do not require silt control).

8.1 Completed

- A rehabilitation programme was carried out in Littleton between 2018-2021. This comprised of a range of measures outlined in *BNM-ECO-26-11B-20 Littleton Bog: Standard Rehab Measures*. These measures varied in intensity, were targeted in places and reflected the existing environmental conditions.
- Some areas of bare peat had regular drain-blocking (Drain-blocking).
- Southwest portion of Littleton Bog (Derryhogan Bog subsite) had a combination of regular drain blocking, trench drain blocking and outfall management to encourage re-wetting and bog restoration (Deep peat re-wetting).
- Some areas were subject to reducing or ceasing pumping (Hydrological management).
- Some areas had minimal intervention as there were already re-vegetated and developing a mosaic of wetland, woodland and peatland habitats (Minimal intervention).
- Some areas were allowed to continue to develop as wetland due to the natural breakdown of drainage and ceasing drain maintenance (Wetland).
- Southwest portion of Littleton Bog (Derryhogan Bog subsite) was also subject to some tree clearance (removal of feral conifers) to encourage breeding Curlew on site (Tree clearance).
- Pumping ceased in the northern section of the site in 2022. Some additional drainage was carried out in 2022 to alleviate flooding that was occurring in this area and that was impacting on adjacent land and the rail underpass at the N9 motorway. Pumps at Littleton Bog are now permanently depowered and scheduled for removal.
- The majority of Littleton Bog is now vegetated or re-vegetating. Some sections have been developing as secondary habitats for a significant period of time (40 years). Birch woodland and scrub has significantly expanded across the site on some of the drier ground. The central part of the site is developed a mosaic of wetland and woodland habitats, on mostly shallow residual peat. The wetland habitats include some Reedbeds and wet scrub where the water is deeper, and some poor fen vegetation with Bog Cotton and Bottle Sedge dominating where there are water levels closer to the peat surface.
- The western margins have several lobes where there is deeper residual peat and more typical bog vegetation is developing. The wetter areas and the flooded trenches have developed mats of *Sphagnum* moss. The drier areas have developed a drier Heather-dominated bog vegetation type, particularly where there are relatively steep slopes. Drain-blocking in these areas with residual deep peat is encouraging the development of bog vegetation and *Sphagnum*-rich embryonic bog vegetation.
- In general, cutaway habitats are developing according to the underlying environmental conditions and reflect the varying topography, hydrology and peat depths. Drain-blocking and other rehabilitation measures have had a significant positive impact across the site in re-wetting residual peat and enhancing the development of wetter peatland and wetland habitats. Ceasing pumping has also had a significant impact and has led to the development or a large wetland in the north-western corner of the site.

8.2 Short-term planning actions (0-1 years)

- Seek formal approval of this plan.
- Ensure all activities comply with the environmental protection requirements of the IPC Licence.

8.3 Short-term practical actions (0-2 years)

- Silt ponds will be monitored during this period and there will be continued maintenance and cleaning to prevent potential run-off of suspended solids from the site during the rehabilitation phase.

8.4 Long-term (>5 years)

- Evaluate success of short-term rehabilitation measures outlined above and remediate where necessary.
- Delivery of a monitoring, aftercare and maintenance programme (See section 9 below).
- Decommissioning of silt-ponds will be assessed and carried out, where required.
- Reporting to the EPA will continue until the IPC Licence is surrendered.

8.5 Timeframe

- **2026**: Short-term planning actions.
- **2025-2026**: Short-term delivery actions.
- **2026**: Long term delivery actions. Evaluate success of short-term rehabilitation measures outlined above and remediate where necessary.
- **2028**: Decommission silt-ponds, if necessary.

8.6 Budget and costing

BnM maintains a provision on its balance sheet to pay for the future costs of standard rehabilitation and decommissioning. This is updated every year - for more information see the BnM Annual Report (BnM, 2025). BnM is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence.

At this time, a ‘standard’ rehabilitation provision (sufficient to discharge the requirement of Condition 10 in the licence) has been allocated to the site based on the area of different cutaway types across the site.

9. AFTERCARE AND MAINTENANCE

9.1 Programme for monitoring, aftercare and maintenance

This programme for monitoring, aftercare and maintenance has been designed to meet the Conditions of the IPC Licence. This is defined as:

- There will be **initial monitoring assessments** of the site to determine the general status of the site, the condition of the silt ponds, assess the condition of the rehabilitation work, monitoring of any potential impacts on neighbouring land, general land security, boundary management, dumping and littering.
- These monitoring visits will also consider any requirements for further practical rehabilitation measures.
- **Water quality monitoring** at the bog will be maintained. The main objective of this water quality monitoring will be to establish a baseline and then monitor the impact of peatland rehabilitation on water quality from the bog.
- Monitoring results will be maintained, trended and reported on each year as part of the requirement to report on Condition 10.1 of the IPC Licence on Bog Rehabilitation in the Annual Environmental Report, which will be available in April each year at www.epa.ie.
- The parameters to be included (as per condition 6.2 of the IPC Licence) include monthly monitoring for pH, Suspended Solids, Total Solids, Total Phosphorus, Total Ammonia, Colour, and COD and DOC.
- If, after two years, key criteria for successful rehabilitation are being achieved and key targets are being met, then the water quality monitoring will be reviewed, with consideration of potential ongoing research on site. The water quality data, the aerial surveys and the habitat mapping will be collated and will be submitted to the EPA as part of the final validation report.
- If, after two years, key criteria for successful rehabilitation have **not** been achieved and key targets have **not** been met, then the rehabilitation measures and status of the site will be evaluated and enhanced, where required. This evaluation may indicate no requirement for additional enhancement of rehabilitation measures but may demonstrate that more time is required before key criteria for rehabilitation has been achieved. Monitoring of water quality will then also continue for another period to be defined.
- Where other uses are proposed for the site that are compatible the provision of biodiversity and ecosystem services, these will be assessed by BnM in consultation with interested parties. Other after-uses can be proposed for licensed areas and must go through the required assessment process and planning procedures.

9.2 Rehabilitation plan validation and licence surrender – report as required under condition 10.4

IPC Licence Condition 10.4. *A final validation report to include a certificate of completion for the Rehabilitation Plan, for all or part of the site as necessary, shall be submitted to the Agency within six months of execution of the plan. The licensee shall carry out such tests, investigations or submit certification, as requested by the Agency, to confirm that there is no continuing risk to the environment.*

Reporting to the EPA will continue until the IPC Licence is surrendered. The bog will be included in the full licence surrender process as per the Guidance to Licensees on Surrender, Cessation and Closure of Licensed Sites EPA, 2012, when:

- The planned rehabilitation has been completed.

- The key criteria for successful rehabilitation have been achieved and key targets have been met;
- Water quality monitoring demonstrates that water quality of discharge is stabilising or improving; and
- The site has been environmentally stabilised.

10. REFERENCES

Atherton, I, Bosanquet, SDS & Lawley, M (2010). Mosses and liverworts of Britain and Ireland - a field guide. British Bryological Society.

Anderson, R., Farrell, C., Graf, M., Muller, F., Calvar, E., Frankard, P., Caporn, S., Anderson, P. (2017). An overview of the progress and challenges of peatland restoration in Western Europe. Restoration Ecology, Issue 2 Pages 271-282.

Barry, T.A. *et al.* (1973). A survey of cutover peats and underlying mineral soils. Soil Survey Bulletin No. 30. Dublin, Bord na Móna and An Foras Taluntais.

BnM (2025). BnM Annual Report 2025. BnM_Annual-Report-2025_English.pdf

Bonn, A., Allott, T., Evans, M., Joosten, H. & Stoneman, R. (2017) Peatland restoration and ecosystem Services-science, policy and practice. Cambridge University Press.

Bord na Móna 2014. Blocking Drains in Irish raised bogs. The Bord na Móna Raised Bog Restoration Project. Cris, R. Buckmaster, S. Bain, C. Reed, M. (Eds) (2014) Global Peatland Restoration demonstrating SUCCESS. IUCN UK National Committee Peatland Programme, Edinburgh. http://www.iucn-uk-peatlandprogramme.org/sites/www.iucn-uk-peatlandprogramme.org/files/IUCNGlobalSuccessApril2014.pdf

Bord na Móna. 2016. Bord na Móna Biodiversity Action Plan 2016-2021. Brosna Press, Ferbane. http://www.bordnamona.ie/wp-content/uploads/2016/04/Biodiversity-Action-Plan-2016-2021.pdf.

Bord na Móna (2022). *Methodology Paper for the Enhanced Decommissioning, Rehabilitation and Restoration on Bord na Móna Peatlands – Preliminary Study Nov 2022 Version 19. Bord na Móna*. Available online at : https://www.bnmpcas.ie/supporting-material/

Carroll, J., Anderson, P., Caporn, S., Eades, P., O'Reilly C. & Bonn, A. 2009. Sphagnum in the Peak District. Current Status and Potential for Restoration. Moors for the Future Report No 16. Moors for the Future Partnership.

Clark, D. and Rieley, J. 2010. Strategy for responsible peatland management. International Peat Society, Finland.

Clark, D. (2010). Brown Gold. A history of BnM and the Irish peat industry. Gill Books.

Cross, J.R. (2006). The Potential Natural Vegetation of Ireland. Biology and Environment: Proceeding of the Royal Irish Academy, Vol. 106B, No. 2, 65-116 (2006).

Department of Communications, Climate Action and Environment 2019. National Climate Action Plan 2019. https://www.dccae.gov.ie/en-ie/climate-action/publications/Pages/Climate-Action-Plan.aspx

Department of Arts, Heritage and the Gaeltacht 2015. National Peatland Strategy. Department of Arts, Heritage and the Gaeltacht. http://www.npws.ie/sites/default/files/general/Final%20National%20Peatlands%20Strategy.pdf

Department of Housing, Local Government and Heritage (2024). Water Action Plan2024. A River basin Management Plan for Ireland 2022 – 2027. www.gov.ie/pdf/?file=https://assets.gov.ie/303156/b0c6512b-2579-4296-9abe-ffdb1ddd6157.pdf#page=null

Eades, P., Bardsley, L., Giles, N. & Crofts, A. (2003). The Wetland Restoration Manual. The Wildlife Trusts, Newark.

Environment Agency (2013). The Knotweed code of practice. Managing Japanese Knotweed on development sites. Environment Agency, Bristol, UK. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/536762/LIT_2695.pdf

European Commission (2013). Interpretation manual of European Union Habitats. European Commission DG Environment Nature ENV B.3.

EPA (2012). Guidance to Licensees on Surrender, Cessation and Closure of Licensed Sites. https://www.epa.ie/publications/licensing--permitting/industrial/ied/Guidance-on-Cessation_.pdf

EPA (2020). Guidance on the process of preparing and implementing a bog rehabilitation plan. http://www.epa.ie/pubs/reports/enforcement/guidanceontheprocessofpreparingandimplementingabogrehabilitationplan.html.

EPA (2026). http://gis.epa.ie/Envision. EPA Envision Map Viewer. (Last Viewed: 09/04/2026)

Farrell, C. A. and Doyle, G. J. 2003. Rehabilitation of Industrial Cutaway Atlantic Blanket Bog, NW Mayo, Ireland. Wetlands Ecology and Management, 11, 21-35.

Fernandez, F., Connolly K., Crowley W., Denyer J., Duff K. & Smith G. (2014) Raised Bog Monitoring and Assessment Survey (2013). Irish Wildlife Manuals, No. 81. National Parks and Wildlife Service, Department of Arts, Heritage and Gaeltacht, Dublin, Ireland.

Fossitt, J. (2000). A guide to habitats in Ireland. Kilkenny. The Heritage Council.

Gann, G.D., McDonald, T., Walder, B., Aronson, J., Nelson, C.R., Jonson, J., Hallett, ,J.G., Eisenberg, C., Guariguata, M.R., Liu, J., Hua,F., Echeverría, C., Gonzales, E., Shaw, N., Decleer, K. & Dixon, K.W. (2019). International Principles and Standards for the practice of Ecological Restoration. Restoration Ecology 27(S1): S1–S46.

Grand-Clement, E., Anderson, K., Smith D., Angus, M., Luscombe D.J., Gatis, N., Bray L.S., Brazier R.E. (2015). New approaches to the restoration of shallow marginal peatlands Journal of Environmental Management 161.

Hinde, S., Rosenburgh, A., Wright, N., Buckler, M. and Caporn, S. 2010. *Sphagnum* re-introduction project: A report on research into the re-introduction of Sphagnum mosses to degraded moorland. Moors for the Future Research Report 18. Moors For the Future Partnership.

Holden, J., Walker, J., Evans, M.G., Worrall, F., Bonn, A., 2008. In: DEFRA (Ed.), A Compendium of Peat Restoration and Management Projects.

Joosten, H. and Clarke, D. 2002. Wise Use of mires and peatlands – Background and Principles including a framework for Decision-making. I.M.C.G. – I.P.S., Jyväskylä, Finland.

Lindsay, R., 2010. Peatbogs and Carbon: a Critical Synthesis to Inform Policy Development in Oceanic Peat Bog Conservation and Restoration in the Context of Climate Change (Report to RSPB Scotland, Edinburgh).

Mackin, F., Barr, A., Rath, P., Eakin, M., Ryan, J., Jeffrey, R. & Fernandez Valverde, F. (2017) Best practice in raised bog restoration in Ireland. Irish Wildlife Manuals, No. 99. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Ireland.

McBride, A., Diack, I., Droy, N., Hamill, B., Jones, P., Schutten, J., Skinner, A. and Street, M. 2011. The Fen Management Handbook, (2011), Scottish Natural Heritage, Perth.

Minayeva, T. *et al.* (2017). Towards ecosystem-based restoration of peatland biodiversity. Mires and Peat, Volume 19 (2017), Article 01, 1–36, http://www.mires-and-peat.net

McDonagh, E. (1996). Drain blocking by machines on Raised Bogs. Unpublished report for National Parks and Wildlife Service. https://www.npws.ie/sites/default/files/publications/pdf/McDonagh_1996_Drain_Blocking_Raised_Bogs.pdf.

NPWS. (2014). Review of the raised bog Natural Heritage Area network. Department of Arts, Heritage and the Gaeltacht.

NPWS. (2017a). National Raised bog Special Areas of Conservation management plan. Department of Arts, Heritage and the Gaeltacht. https://www.npws.ie/sites/default/files/files/FOR%20UPLOAD%20Plan(WEB_English)_05_02_18%20(1).pdf

NPWS. (2017b). Actions for biodiversity 2017-2021. Ireland's 3rd national biodiversity plan. Department of Arts, Heritage and the Gaeltacht. https://www.npws.ie/sites/default/files/publications/pdf/National%20Biodiversity%20Action%20Plan%20English.pdf

NPWS (2025). The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitat Assessments. Unpublished NPWS report. Edited by: Domhnall Finch, Aoife Delany, Fionnuala O'Neill and Deirdre Lynn. npws.ie/sites/default/files/publications/pdf/article-17-report-2025-volume-2.pdf

NRA (2009). Guidelines for Assessment of Ecological Impacts of National Road Schemes (Revision 2). National Roads Authority.

NRA (2010). Guidelines on The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads. National Roads Authority. https://www.tii.ie/technical-services/environment/construction/Management-of-Noxious-Weeds-and-Non-Native-Invasive-Plant-Species-on-National-Road-Schemes.pdf

Pschenyckyj, C., Riondata, E., Wilson, D., Flood, K., O'Driscoll, C., Renou-Wilson, F. (2021). Optimising Water Quality Returns from Peatland Management while Delivering Co-Benefits for Climate and Biodiversity, Report produced for An Fóram Uisce, Online, Available at: https://thewaterforum.ie/app/uploads/2021/04/Peatlands_Full_Report_Final_March2021b.pdf, Accessed 18/10/2023

Quinty, F. and L. Rochefort, 2003. Peatland Restoration Guide, second edition. Canadian Sphagnum Peat Moss Association and New Brunswick Department of Natural Resources and Energy. Québec, Québec.

Regan, S., Swenson, M., O'Connor, M. & Gill, L. (2020). Ecohydrology, Greenhouse Gas Dynamics and Restoration Guidelines for Degraded Raised Bogs. EPA RESEARCH PROGRAMME 2014–2020. Report No.342. (2014-NC-MS-2). EPA Research Report. Prepared for the Environmental Protection Agency by Trinity College Dublin. www.epa.ie.

Renou-Wilson F., Bolger T., Bullock C., Convery F., Curry J. P., Ward S., Wilson D. & Müller C. (2011). BOGLAND - Sustainable Management of Peatlands in Ireland. STRIVE Report No 75 prepared for the Environmental Protection Agency. Johnstown Castle, Co. Wexford.

Renou-Wilson, F., Wilson, D., Rigney, D., Byrne, K., Farrell, C. and Müller C. (2018). Network Monitoring Rewetted and Restored Peatlands/Organic Soils for Climate and Biodiversity Benefits (NEROS). Report No. 238. Report prepared for the Environmental Protection Agency. Johnstown Castle, Co. Wexford.

Schouten, M.G.C. 2002. Conservation and Restoration of Raised Bogs: Geological, Hydrological and Ecological Studies. Dúchas - The Heritage Service of the Department of the Environment and Local Government, Ireland; Staatsbosbeheer, the Netherlands; Geological Survey of Ireland; Dublin.

Smith, G., O'Donoghue, P., O'Hora, K. & Delaney, E. (2011). Best Practice Guidance for Habitat Survey and Mapping. The Heritage Council.

Stace, C. A. (1997). New Flora of the British Isles. Cambridge: Cambridge University Press.

Thom, T., Hanlon, A., Lindsay, R., Richards, J., Stoneman R. & Brooks, S. (2019). Conserving Bogs – Management Handbook. https://www.iucn-uk-peatlandprogramme.org/sites/default/files/header-images/Conserving%20Bogs%20the%20management%20handbook.pdf.

Wilson, D., Renou-Wilson, F., Farrell, C., Bullock, C. and Muller, C. (2012). Carbon Restore – the potential of restored Irish peatlands for carbon uptake and storage; CCRP Report. EPA Wexford.

Wilson, D., Dixon, S.D., Artz, R.R., Smith, T.E.L., Evans, C.D., Owen, H.J.F., Archer, E., & Renou-Wilson, F. (2015). Derivation of greenhouse gas emission factors for peatlands managed for extraction in the Republic of Ireland and the UK. Biogeosciences Discuss., 12, 7491–7535.

Wheeler, B. D., & Shaw, S. C. (1995). Restoration of Damaged Peatlands – with Particular Reference to Lowland Raised Bogs Affected by Peat Extraction. London: HMSO.

Wittram, B. W., Roberts, G., Buckler, M., King, L., & Walker, J. S. (2015). A Practitioners Guide to Sphagnum Reintroduction. Edale: Moors for the Future Partnership.

APPENDIX I: BOG GROUP CONTEXT

The Littleton Bog Group IPC Licenced area was in industrial peat production for several decades until 2017. There are 11 defined bog units covering a total area of 4,421 ha. Each bog area further comprises a range of habitats from bare milled peat former production areas to re-colonising cutaway to workshops areas and transport infrastructure. Industrial peat extraction from these sites mainly supplied briquettes (Littleton Brickette Factory), horticulture and commercial turf for domestic use.

Industrial peat extraction across the majority of the Littleton Bog Group ceased in 2017. (Killeen extended to 2021). Littleton Brickette Factory finally ceased production in 2021. All licences for sod turf production also ceased during this period.

The Littleton Rehabilitation Programme started in 2018. Rehabilitation was planned and implemented across all of the Littleton Bogs. A range of different strategies was implemented across different sites, which reflect variable underlying environmental conditions and land-uses and potential future land-uses at the time.

Drain-blocking was carried out at Ballysorrell Bog and Knockahaw Bogs with the objective of raised bog restoration. These bogs had not had significant peat extraction and retained raised bog restoration potential. Rehabilitation measures at Templetouhy took account of the Bruckana Windfarm, which was is operational since 2015. Bawnmore, Littleton, and Derryville were developing cutaway habitats already as scrub and wetland, and targeted measures were carried out through these sites to enhance these developing habitats. More intensive drain-blocking was carried out across Carrickhill, Inch, Ballybeg, Derryvilla, Longford Pass and Killeen Bogs, particularly where there was recent industrial peat extraction and there were functional drains and bare peat dominated. Pumping ceased at Carrickhill, Inch and Baunmore. Some pumping continued for various periods at Derryville, Longford Pass and Littleton, due to operational issues. Some fertiliser treatments were carried out at Carrickhill and Derryvilla in 2020 as a pilot rehabilitation project.

Rehabilitation measures so far has been very effective. The majority of the targeted areas have been re-wetted. Ballysorrell and Knockahaw Bogs are responding quite quickly to the new conditions with the development of Sphagnum and improvement in bog conditions. Areas at Templetuohy, Bawnmore, Littleton and Derryvilla are changing quickly with the development of existing habitats and new pioneer vegetation where there was bare peat. Habitats at Killeen and Lanespark are developing and integrating with the new greenway amenity. Areas in Carrickhill, Inch and Killens that where large areas of bare peat in 2018 have been slower to recolonise due to underlying environmental factors (deeper residual peat).

A project called the BnM/Coillte Midlands Native Woodland Project was developed over the same period (Midlands Native Woodland - Coillte). It was proposed to be funded and administered by the Forest Service. The main objective of this proposed project is to develop and enhance native woodland in areas of cutaway that would remain naturally dry, developing woodland habitat that would naturally complement wetland and peatland habitats already developing across these sites. An initial feasibility study was carried out in 2018 and a project was developed across the Littleton bogs, which finally identified 120 ha of cutaway to be developed as woodland. This project has piloted alternative methods to establish native woodland, including seeding, and these trials were carried out at Bawnmore. This proposed project has not been approved by the Forest Service yet. Areas of cutaway at Carrickhill, Bawnmore, Inch, Ballybeg and Killeen have been proposed as part of this project.

The Littleton Labyrinth is a proposed amenity project that was also developed during this period, in partnership with Tipperary County Council. Initially a feasibility study was carried out that looked at developing greenway

amenity, and associated facilities across the Littleton Bogs, and potential links to existing infrastructure and local villages/towns. The first phase of this project was developed by Tipperary County Council in 2023/24, and a greenway was constructed on former BnM industrial railway though Killeen and Lanespark Bog to link with Loch Doire Bhile amenity, north of Lanespark. There are proposals to develop a Phase 2 shortly, with additional links being planned in Ballybeg and Derryvilla Bogs. This project is in pre-planning and is funded via Failte Ireland.

BnM rehabilitated several bogs in the Littleton Bog Group via Peatland Climate Action Scheme in 2025. The main objective of this proposed Phase 2 rehabilitation is to look at enhancing re-wetting and development of pioneer vegetation to support climate action, where possible. Measures are likely to include targeted drain-blocking, use of fertiliser to encourage pioneer vegetation growth, water-level management (adjustment of outfalls and use of over-flows). Bogs included Templetouhy, Derryville, Carrickhill, Baunmore, Inch, Ballybeg, Inch and Killeens.

A breakdown of the component bog areas for the Littleton Bog Group IPC Licence Ref. P0499-01 is outlined in Table Ap-2. Industrial peat production history varies across the Littleton bog group, so there is a wide range of peat depths at present.

Table Ap-2: Littleton Bog Group names, area and indicative status

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
Carrickhill	170 ha	Cutover Bog Industrial peat production started in the 1970's and ceased in 2017. There is residual deep peat across much of this site. Carrickhill had a partially pumped drainage system.	Carrickhill Bog formerly supplied peat to the Littleton briquette factory. Some areas of shallow peat cutaway on site are developing pioneer cutaway vegetation communities. The pump was decommissioned in 2018. Drain blocking was carried out in 2018. A fertiliser treatment on part of the headland was carried out in 2021. The majority of the site is still mostly bare peat. Carrickhill is proposed for the Coillte/BnM Midlands Native Woodland Project. 28 ha is proposed for planting at this site. This proposed project is currently being considered for consent by the Forest Service.	2017	Draft 2018 Phase 1 Rehab measures implemented 2018-2021. Updated 2025. Phase 2 PCAS measures ongoing 2026
Templetuohy	737 ha	Cutover Bog Industrial peat production commenced at Templetuohy Bog in 1940's. Areas began to develop as cutaway during the 1980s as peat extraction ceased on a phased basis. Industrial peat extraction finally ceased in 2017. This bog has a partially pumped drainage system. Part of the site has developed pioneer cutaway habitats. Areas re-developed for peat extraction in 2015-17 are now revegetating quickly. Areas that were used for peat extraction upto 2017 are a	Templetuohy Bog formerly was developed to supply fuel sod peat and also supplied peat to the Littleton briquette factory. BnM have constructed a 40MW Wind Farm with 14 turbines and road network on cutaway at Templetuohy bog called Bruckana Wind Farm. This windfarm is operational. Pumping is still operational across this site to support the windfarm infrastructure.	2017	Draft 2018 Phase 1 Rehab measures implemented 2018-2021 Updated 2025. Phase 2 PCAS measures ongoing 2026

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
		mosaic of re-wetted bare peat and pioneer communities.			
Derryville	250 ha	Cutover Bog Industrial peat production commenced at Derryville Bog in 1970's. Areas began to develop as cutaway during the 2000s as peat extraction ceased on a phased basis. Peat extraction finally ceased in 2017. This bog has a partially pumped drainage system.	Derryville Bog formerly supplied peat to the Littleton briquette factory. Part of the site has been developed for conifer forestry and is leased to Coillte. Part of the site was sold to Lisheen Mine and removed from the IPC Licence in the 2000s. Much of the former production area on site is developing pioneer cutaway vegetation communities, the remainder of the site is bare peat and developing wetland. Pumping continued at Derryville until 2022. Pumping has now ceased, and measures have been implemented in 2024 to manage water levels across the site and to decommission the pump.	2017	Finalised 2018 Phase 1 Rehab measures implemented 2018-2021 Updated 2025 Phase 2 PCAS measures ongoing 2026
Bawnmore	531 ha	Revegetating cutover bog. Industrial peat production commenced at Baunmore Bog in 1970's. Areas began to develop as cutaway during the 2000s as peat extraction ceased on a phased basis. Peat extraction finally ceased in 2017. Much of the site is now developing a mosaic of woodland, peatland and wetland habitats. Baunmore had a partially pumped drainage regime.	Bawnmore Bog formerly supplied peat to the Littleton briquette factory. Much of the site is developing pioneer cutaway habitats and the site has significant biodiversity value. Pumping ceased in 2018. Part of the access is used for log biomass storage (for Edenderry Power). Bawnmore is proposed for the Coillte/BnM Midlands Native Woodland Project. 39 ha is proposed for planting at this site. This proposed project is currently being considered for consent by the Forest Service.	2017	Finalised 2018 Phase 1 Rehab measures implemented 2018-2021 Updated 2025 Phase 2 PCAS measures ongoing 2026
Ballysorrel	196 ha	Drained raised bog – This site was initially drained for peat extraction. It was developed for peat production in the 1970s, but milled peat harvesting only occurred over a short 2 year timeframe. The site was then left as a peat reserve to be re-developed in the future. Restoration/drain blocking carried out in in 2018.	Much of the site was bare peat in the early 2000s. The site has since re-vegetated naturally (in a drier situation) since then and is now responding quickly to the recent re-wetting. Much of the high bog has re-colonised with Heather-dominated vegetation. Small hummocks of *Sphagnum* capillifolium and S. subnitens are present. *Sphagnum* spp. are also present in some low-lying areas that are permanently waterlogged and are spreading.	2017	Finalised 2018 Phase 1 Rehab measures implemented 2018-2021 Updated 2025 Phase 2 PCAS measures ongoing 2026
Inch	120 ha	Cutover Bog Industrial peat production since 1970s. Finally ceased in 2017. Inch had a partially pumped drainage regime.	Inch Bog formerly supplied peat to the Littleton briquette factory. Some areas of shallow peat cutaway on site are developing pioneer cutaway vegetation communities with deep peat areas slow to colonise and remaining mostly bare peat.	2017	Finalised 2018 Phase 1 Rehab measures implemented 2018-2021

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
			Pumping ceased in 2018. Inch is proposed for the Coillte/BnM Midlands Native Woodland Project. 19 ha is proposed for planting at this site. This proposed project is currently being considered for consent by the Forest Service.		Updated 2025 Phase 2 PCAS measures ongoing 2026
Longford Pass (Popes Bog)	214 ha	Cutaway Bog Peat production at Longford Pass bog commenced in the 1940's and finally ceased in 2017. Peat extraction ceased and cutaway habitats began to develop on a phased basis. Longford Pass has a partially pumped drainage system.	Longford Pass Bog initially was developed as a sod turf production site. It then formerly supplied peat to the Littleton briquette factory. The site was bisected by the construction of the N8 Motorway in 2000s. A small area between the new motorway and R639 (old main road) was leased and developed for farmland in 2018. Longford Pass is part of the proposed Littleton Windfarm Project. This project is currently in pre-planning. Some areas of shallow peat cutaway on site are developing pioneer cutaway vegetation communities with deep peat areas slower to colonise. Pumping continued at the site until 2022, when the pumping failed. Since then, measures have been carried out to manage water-levels.	2017	Finalised 2018 Rehab measures implemented 2018-2021 Updated 2026
Ballybeg, Lanespark and Derryvilla	474 ha	Cutaway Bog Industrial peat production since 1970s and finally ceased in 2017. Peat extraction ceased and cutaway habitats developed on a phased basis during this period. .	Ballybeg, Lanespark and Derryvilla initially were developed for sod turf production, and then formerly supplied peat to the Littleton briquette factory. Part of the site has been developed for conifer forestry and is leased to Coillte. Part of Lanespark/Derryvilla (Loch Doire Bhile) was developed as fishing lake and an amenity site in 1999-2002. This site is leased to Slieve Ardagh Rural Development. A greenway was constructed across the site as part of the Littleton Labyrinth Project in 2024, connecting the historical site of Derrynaflan to Loch Doire Bhile amenity, via Lanespark. Additional greenway is proposed to extend amenity through Derryvilla and Ballybeg as part of Failte Ireland. Midlands Trail project. This is currently in pre-planning. Ballybeg and Lanespark are proposed for the Coillte/BnM Midlands Native Woodland Project. 21 ha is proposed for planting at this site. This proposed project is currently being considered for consent by the Forest Service .	2017	Finalised 2018 Phase 1 Rehab measures implemented 2018-2021 Updated 2025 Phase 2 PCAS measures ongoing 2026
Killeen	632 ha	Industrial peat production commenced at Killeen Bog in 1980s. Industrial peat extraction finally ceased in 2021.	Killeen bog formerly supplied peat to the Littleton briquette factory and the horticultural market. Re-wetting was carried out across the site in 2021.	2017	Finalised 2018 Phase 1 Rehab measures

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
			Some areas of shallow peat cutaway on site are developing pioneer cutaway vegetation communities with deep peat areas slower to colonise since the site was re-wetted. A greenway was constructed across the site as part of the Littleton Labyrinth Project in 2024, connecting the historical site of Derrynaflan to Loch Doire Bhile amenity, via Lanespark. Killeen is proposed for the Coillte/BnM Midlands Native Woodland Project. 31 ha is proposed for planting at this site. This proposed project is currently being considered for consent by the Forest Service .		implemented 2018-2021 Updated 2025 Phase 2 PCAS measures ongoing 2026
Littleton	1,020 ha	Cutaway Bog Littleton is a relatively old industrial peat production bog. Large-scale industrial peat production began in the 1940's where sod peat was produced for fuel. Sod peat production was mechanised during the 1950's. Milled peat production began in the 1970's and milled peat was supplied to the Briquette factory (constructed in 1981) at Lanespark. Peat extraction ceased and cutaway habitats developed on a phased basis since the 1890s and some well-established cutaway habitats have developed. Industrial peat extraction finally ceased in 2018. Littleton has a partially pumped drainage system.	Littleton Bog formerly supplied sod peat before supplying peat to the Littleton briquette factory. Older cutaway has already extensively colonised with pioneer cutaway, wetland and scrub habitats. Part of the site has been developed for conifer forestry and is leased to Coillte. A small area (10 ha) was used as a pilot biomass project and Eucalyptus was planted in 2018. Some pumps in Littleton Bog have been decommissioned and some have been retained but are non-functional.	2017	Finalised 2018 Rehab measures implemented 2018-2021 Updated 2026

See Drawing number *BNM-ECO-26-11B-24: Littleton Bog Group*, included in the accompanying Mapbook which illustrates the location of Killeen Bog and the Littleton Bog Group in context to the surrounding area.

APPENDIX II: ECOLOGICAL SURVEY REPORT

Ecological Survey Report

Note: This report outlines an ecological survey of the bog. This report should not be taken as a management plan for the site as other land-uses may still be considered. Information within this report may inform the development of other land-uses and identify areas with particular biodiversity value. The report outlines potential options for biodiversity management after industrial peat production has ceased, (if this is the proposed main land-use for the site).

Bog Name:	**Littleton**	**Area (ha):**	995 ha
Works Name:	Littleton	**County:**	Tipperary
Recorder(s):	MMC	**Survey Date(s):**	23-24/08/2012

Habitats present (in order of dominance)

The most common pioneer habitats present in the former production areas include:

- Bare peat (BP) (Codes refer BnM classification of pioneer habitats of production bog.
- Birch/Willow scrub (eBir/oBir/cBir)
- Pine-dominated scrub (ePine/oPine)
- Pioneer Soft Rush-dominated or Bog Cotton-dominated poor fen (pJeff/pEang)
- Open water (wetlands also contain emergent pioneer poor fen – pEang/pJeff/pRos)
- Pioneer dry heath (dHeath) (in mosaic frequently with pEang)
- Embryonic raised bog community (Bog Cotton-dominated vegetation with *Sphagnum* (EM –pEangS)
- Embryonic raised bog community (*Sphagnum*-rich vegetation with PB1 species)
- Pioneer Purple Moorgrass-dominated vegetation (gMol) (frequently in mosaic with dHeath and oBir along high fields and other areas),
- Bulrush-dominated Reedbeds (pTyph) (small infilled wetlands)
- Common Reed-dominated Reedbeds (pPhrag)
- Pioneer poor fen with Marsh Arrowgrass (pTrig)
- Pioneer acidic grassland (gAn-H-Eq) (in mosaic with scrub, gMol and pJeff on some of the drier mounds where gravel was exposed)
- Pioneer potential rich fen (pRos/pVir with some Black Bog-rush)
- Railway (Acc) (with some exposed gravel - ED2/ED3/DisTuss)

The most common habitats found around the margins of the former production bog and other sections include:

- Conifer plantation (WD4) (Codes refer to Heritage Council habitat classification, Fossitt 2000),
- Cutover Bog (PB4)
- Secondary cutover bog – now mosaic of dry heath, poor fen and scrub (HH1/HH3/PF2/WS1)
- Scrub (WS1)
- Raised bog (PB1) (minor remnants) with poor fen flushes (PF3)
- Birch woodland (WN7)
- Dense Bracken (HH3)
- Acid grassland (GS3)
- Improved grassland (GA1) (privately-managed land along margins)

Description of site

Littleton is located in north Co. Tipperary, 3km from Littleton village. It is part of the Littleton Bog group with Longford Pass Bog to the north and Ballybeg bog to the south. A BnM railway passes through the site and connects the northern BnM sites to the wider Littleton network. Littleton bog is found in a lowland landscape and is mostly surrounded by farmland and Coillte forestry. The bog has developed in a basin in the landscape and one noticeable feature of the site is that parts of the western margin are at a much higher level (10 m) compared to the central section along the railway and in the former milled peat production areas. The site comprises a relatively long and narrow bog (extending for 7 km along the railway). It is bordered to the north by a minor road (that separates Littleton from the adjacent Longford Pass BnM property). One feature of Littleton Bog is that much of it is relatively remote and inaccessible and the main access points are at the northern and southern ends where there are railway crossings. There is also a travel path along the railway, but this is over peat in places and in poor condition. This inaccessibility probably means that there is less unauthorised access to this bog compared to other BnM bogs in the Littleton group. As of 2017/2018, industrial peat production has ceased on all parts of the bog with onset closure of Littleton Briquette factory.

Some of the marginal remnant high bog at the southern end is being privately cut for sod peat. There is also some sod peat production along the eastern boundary. Some of this turbary overlaps with the BnM property line. There are several large private sod peat production areas adjacent to the bog. One of these areas at the south-west corner of the bog is expanding quite rapidly and beginning to use some of the remnant high bog within the BnM property line that was previously designated as a peat reserve prior to the cessation of industrial peat production at Littleton Bog.

Littleton is a relatively old industrial peat production bog. Large-scale industrial peat production began in the 1940's where sod peat was produced for fuel. Sod peat production was mechanised during the 1950's. Milled peat production began in the 1970's and milled peat was supplied to the Briquette factory (constructed in 1981) at Lanespark up until 2017/2018. Some of the former sod peat production areas in the bog were converted to milled peat production in the past. However, some of the former sod peat production areas along the western side were abandoned and have naturally re-colonised and since this time. The main central part of the bog was out of production prior to 2000. Much of the peat was cut out of this section and the underlying glacial subsoil was exposed in places and some wetlands had developed by this stage.

Northern area (former milled-peat production bog)

This sub-section is divided into two main parts by the BnM railway and central travel path. It extends to the west where it borders an area formerly classed as a peat reserve area with a deep trench drain marking the boundary. The majority of this northern sub-section was managed for milled peat production prior to the cessation of industrial peat production in 2017/2018. The north-east section has the deepest remnant peat and some of the peat is still relatively light and brown in colour. Several fields within this area were developing dry bog vegetation (Ling Heather) where there has not been any activity for several years. There is some recent drainage development with a new pipe being constructed at the northern end of the site to drain a localised basin towards a new pump at the outfall.

There is some recent wetland development in localised basins in small sections in the southern end. The south-west part of this sub-section has also come out of industrial peat production recently (prior to 2017/2018). Fields on both sides of the railway have also been out of production for some time. Those nearest to the railway and travel path tend to have somewhat deeper peat and the vegetation is dominated by dry heath with Heather and Birch scrub, with small amounts of Purple Moor-grass. Some of this has developed into closed Birch scrub and woodland. Other fields further out from the railway (and lower down) have been out of production for a shorter period and are also on thinner fen peat. The vegetation tends to be dominated by Soft Rush-dominated poor fen with patches of emerging or open Birch scrub. There are also some intermediate vegetation communities with mixed Heather and Purple Moor-grass as well as Soft Rush. The youngest fields out of production tend to have scattered patches of pioneer poor fen vegetation with Marsh Arrow-grass, Bog Cotton and/or Soft Rush dominating. Bog Cotton tends to dominate in the wetter sections, while Soft Rush tends to dominate where it is drier and where the peat is thinner and some sub-soil may be exposed.

The central railway has been constructed on the underlying glacial sub-soil. Marsh Hellebore was noted at several locations along the travel path adjacent to the railway. There has been some excavation along the railway towards the southern end associated with the re-alignment of the track. This produced a large spoil heap of sub-soil adjacent to the travel path. This spoil heap is now vegetating with several species of conservation interest including Blue Fleabane and Marsh Helleborine.

Central area (former production-related cutaway)

The majority of this sub-section has been out of industrial peat production for some time (prior to 2017/2018). It is bordered to the south by the BnM/Coillte conifer plantation and to the west by the railway. Much of the cutaway area is almost completely vegetated, apart from high fields and travel paths. Some of the younger cutaway areas to the east are still vegetating, as is the central mound around the old tea centre. Comparison of 2000 aerial photos to more recent aerial photo series shows that there have been significant changes in this sub-section in the past 12 years as there seemed to be much more bare peat visible in 2000. Only a small portion of the cutaway seemed to be vegetated at this stage.

The landscape of this sub-section is more typical of midlands cutaway and not like adjacent bogs such as Bawnmore. Much of the peat seems to have been cutaway so the remaining peat is fen peat and much of the habitat development is dominated by pioneer poor fen communities. There is less influence from acidic peat and less dry heath/Purple Moor-grass dominated communities. As peat has been cutaway, the underlying topography is also quite influential. There are many localised wetlands were there are basins and some of these are divided by mounds or ridges where there is drier habitat development with Birch scrub and some pioneer grassland communities. This area has also been further sub-divided by a series of deep trench drains and associated high fields. These divide the bog into regularly grouped series of fields. The high fields act as berms to enhance wetland development and hold water within these areas. The high fields tend to be vegetated with dry heath, Purple Moor-grass-dominated vegetation and scrub.

The wetland development is likely to have been enhanced by the pumped drainage in this area and the fact that some of the pumps have been turned off in the past. There are significant wetlands scattered across this area. The largest and deepest wetlands have open water and are fringed by Bog Cotton-dominated poor fen. Some smaller wetlands have infilled with poor fen vegetation usually dominated by Bog Cotton, but also containing Soft Rush. There are also several small wetlands that have infilled with Reedmace. There is some development of Bottle-Sedge-dominated vegetation associated with the wetlands towards the northern end, perhaps indicating some shell-marl influence (although no shell marl was noted on the site). The lower lying drier land is usually vegetated with Birch scrub and with Soft Rush-dominated pioneer poor fen. Gravel mounds also tend to have well-developed Birch scrub development, and this is associated with somewhat more grassy vegetation with Sweet Vernal-grass (gAn-HO-Eq) and Purple Moor-grass (gMol). Some of the younger cutaway towards the east and the south also has Marsh Arrow-grass present.

Comparison of aerial photo series (2000 and 2009) seems to indicate that there has been significant re-vegetation and development of scrub and wetlands within this period. This comparison also indicates that there has also been new wetland development (possibly attributed to pumps being turned off). There also seems to have been some new re-wetting and wetland development between 2009-2012 in the south-east section.

The central area (where railway branches) around the old tea centre is located on a low mound. This area is still re-vegetating and there is a significant amount of bare peat. The re-vegetation along the railway tracks tends to be dominated by Purple Moor-grass with some open Birch and dry heath mosaic where there has been no disturbance for a longer period of time.

There is a small area of cutaway located south-east of the conifer plantation. This area seems to have been developed for milled peat production but had much less production compared to the other central cutaway. However, there is much more dry heath development in this section, perhaps indicating that there is deeper remnant peat.

Dry Heath was developing in association with open Birch scrub and with Bog Cotton-dominated poor fen. There were also patches of purple Moor-grass vegetation. *Sphagnum* was also noted in this area, although not in any great quantity and the drains tends to have a poor fen influence, rather than a more acidic influence.

The north-east section is located adjacent to conifer plantation. This is having a significant impact on the re-vegetation of the cutaway, with much of the drier sections being colonised by Pine-dominated scrub. There is a similar topography/landscape and Pine-dominated areas and high fields are interspersed with wetlands. Some of the wetlands contain significant Reedbed development. The proportion of Pine decreased further away from the plantation, but was significant over a relatively large area. Some of the Pine scrub was burnt in the recent past but is regenerating (ca. 2006). A small part of the cutaway was developing potential rich fen vegetation where there was some wetland development close to the margin that was dominated by Yellow Sedge and Bottle Sedge. Black Bog-rush was also present. Other species present included Star Sedge and Flea Sedge and Large-leaved Sundew. However, there was no indication of any brown moss development. This area is located adjacent to a natural poor fen area, some of which is found in the marginal remnant bog. This section was dominated by Purple Moor-grass dominated vegetation and also contains patches of Bog Myrtle, as well as scattered Birch scrub. It has also been burnt in the recent past.

South-western area (former peat reserve area)

This sub-section includes all of the bog between the railway/conifer plantation and the south-west margin. A portion of this area along the railway was developed for milled peat production in the past. The majority of this area was re-vegetating with pioneer habitats and there seemed to be no production in this area in recent times. The habitat development is similar to the central cutaway area in that pioneer poor fen communities dominate. It also has a similar topography with dry mounds and wet basins appearing. A pump is located midway along this section. These communities are much younger in terms of development, and the majority of this area was in full production in 2004 (apart from mounds). The wet basins are vegetating with a range of poor fen communities including Bog Cotton, Marsh Arrowgrass and Soft Rush, depending on water depth. There is also some permanent open water and a significant proportion of bare peat with scattered pioneer vegetation. As of 2017/2018, industrial peat production has ceased on all parts of the bog with onset closure of Littleton Briquette factory.

The adjacent old sod peat sections are somewhat different in character. These are divided into long wide bays and are also drained by deep trench drains. There are also some high travel fields separating the bays. The bays to the east have been cut to some extent and are lower than bog to the west. Re-vegetation tends to be dominated by dry heath and Bog Cotton-dominated vegetation, in mosaic with scattered Birch scrub and small amounts of Purple Moorgrass-dominated vegetation. This section was abandoned in ca. 1970's and has been subject to approximately 40 years of regeneration. Overall, re-vegetation has been performing well with only the travel paths still having significant bare peat.

Bog Cotton-dominated vegetation dominates in the wetter areas while Heather dominates in drier sections. Some the drier Heather-dominated sections still have a proportion of bare peat between the Heather stands and the moss layer is poorly developed, being dominated by *Campylopus introflexus* and *Hypnum jutlandicum*. The peat is generally quite firm. The wettest vegetation also contains elements of high bog not usually found on typical cutaway such as Hare's-tail Bog Cotton, White-beak Sedge, Carnation Sedge, Bog Asphodel and Deer-grass. There is also some extensive *Sphagnum* development. This includes a mat of dense *S. cuspidatum* associated with the Bog Cotton where there is surface water and extensive hummocks of *S. subnitens*, *S. palustre*, S. *papillosum* and *S. capillifolium* where it is just water-logged . The areas of standing water with the *Sphagnum* mat and Bog Cotton had generally developed over firm peat (not quaking bog). Some of the *S. subnitens* hummocks are up to 40 cm high. Some of the wetter sections are dominated by White-beak Sedge, creating a pool/hollow type raised bog community. *Sphagnum* cover reaches 100% in small patches. Birch, Pine and Willow saplings and young trees are also present. Much of this vegetation has been classified as an embryonic raised bog vegetation type rather than pioneer poor fen. Other sections of similar vegetation have less scattered *Sphagnum* cover. There has been some recent drainage work (in past few years) to let off water from some of these areas. It is likely that the *Sphagnum* regeneration was greater in the past prior to this recent drainage work.

Further west, there is a wide sod peat bay that was cut to a much greater extent and is therefore much lower, and sandwiched between two higher bays. This section has re-wetted to create a large wetland. There is a significant area of open water along with emergent wetland vegetation. This wetland vegetation is dominated by Bog Cotton with a small amount of Bottle Sedge. There are also extensive patches of *S. cuspidatum* mat associated with the emergent Bog Cotton, and this vegetation has been classified as an embryonic bog vegetation community (similar to those found in Mayo). This mat of *Sphagnum*-dominated vegetation is similar to transnational mire communities found at some other intact peatland sites. Patches that are intermediate in elevation have greater Heather cover as well as scrub with Pine and Birch. This wetland had attracted a large flock of Mallard as well as some Teal.

The northern margin around this section is planted with conifer forestry. Pine and some Spruce are spreading from this plantation and into the scrub areas with Birch. These trees are growing in association with Heather-dominated vegetation.

There is a small high bog remnant (PB1) at the north-east corner of this section. This area of bog is in relatively good condition. It was wet in places with a high *Sphagnum* cover. Other sections were firm and dried out. Ecotope quality varies between sub-central and sub-marginal. Bog Rosemary and Cranberry were both present.

Mid-western area (former peat reserve area)

This sub-section is found about midway along the western margin of the bog. It includes the lobe of the bog found west of the railway and the central production related cutaway area. Two series of fields adjacent to the railway were converted to milled peat production but have since been abandoned. These fields were in industrial peat production in 2000. In the intervening period, peat production stopped and these fields have generally re-vegetated with Soft Rush-dominated poor fen and emergent Birch scrub. There is also some Bog Cotton-dominated poor fen.

Further west, there is a large old sod peat area that was abandoned and has now regenerated. The main feature is a wide bay where sod peat was cut with bagger machines that was largely cutaway and has re-wetted, sandwiched between two higher bays where there was less production. A large wetland has been created with a significant area of open water and emergent vegetation. There is also some development of embryonic raised bog vegetation with the development of *Sphagnum* mats associated with the Bog Cotton. There is some development of scrub and Birch woodland at both ends of this bay with occasional Spruce and Pine. The intermediate zones tend to have good *Sphagnum* hummock development with *S. palustre* and *S. subnitens*.

The high bog areas on the edge of the wetland area contain deep peat. Some of this high bog had been developed for milled peat production with field drains in the past but production had never started. The vegetation is dominated by Heather in the dry sections and is typical of pioneer dry heath communities on cutaway. However, there are wetter areas where water accumulates midway along the bay and these sections have more Hare's-tail Bog Cotton, as well as some *Sphagnum* cover. The *Sphagnum* development is less impressive compared to the south-west sod peat area. Some wet areas are also dominated by White-beak sedge. Overall, vegetation cover is about 90%, with a small amount of bare peat cover still present. There is not likely to have been significant peat production over these high bog areas however these areas have been disturbed or had vegetation cleared in the past. There are no indications of original *Sphagnum* hummocks present or old features such as pools.

Further west, there is some old remnant high bog that has been drained with field drains but has not been significantly disturbed with industrial peat production in the past.

A mineral ridge divides this mid-west sod peat production area (and peat reserve) from the north-west sod peat production area. This ridge extends to the edge of the bog and there is a small section within the BnM property on this high bog where acidic grassland (GS3) has developed. This grassland has developed on a thin layer of peat that is relatively dry. It contains Sweet Vernal-grass, Red Clover, Creeping Bent, Heath Bedstraw Bramble, Purple Moorgrass, Heather, Silverweed, Hawthorn, Yorkshire Fog, Tormentil, Heath Sorrel, Soft Rush, Devil's Bit and Wild Rose. This is an area of high ground with significant slopes and a fall towards the adjacent cutaway areas.

North-western area (former peat reserve area)

This sub-section includes the old sod peat production area along the north-west margin of the site. There are significant slopes and falls from high ground towards the western margin towards the lower cutaway close to the railway. The eastern margin is marked by a deep trench drain that separates this section from the adjacent former area previously managed for milled peat production (ceased 2017/2018).

There is another wetland found on the higher slopes along the western margin. Again, this was created by old sod peat production with baggers. The wetland is similar in nature to the previous two sod peat wetlands and contains a large open water area with emergent vegetation. One feature of note is that the water level within the wetland is at a significant elevation above the adjacent cutaway areas. The surrounding high bog is dominated by dry heath and Bog Cotton-dominated vegetation. There seems to have been some milled peat bog development on the lower slopes of this section, with fields and bare peat present in the aerial photos in 2000. However, this area is now re-vegetating with pioneer dry heath and Bog Cotton (poor fen). *Sphagnum* is much rarer in this section compared to the other old sod peat production areas. There is some Birch scrub, but this is relatively light and there is a wide expanse of Heather-dominated vegetation.

Pine and Birch have colonised the bog towards the northern end of this section. These trees are found in association with Heather-dominated dry heath. Some wetter communities have developed down the slope and adjacent to the deep trench drain. Bog Cotton-dominated vegetation has developed in one section and further north there is some Reed Bed development.

Designated areas on site (cSAC, NHA, pNHA, SPA other)

None in the immediate vicinity of Littleton bog.

Adjacent habitats and land-use

Adjacent habitats include conifer plantation (WD4), wet grassland (GS4), improved agricultural grassland (GA1), scrub (WS1), Birch woodland (WD7) and cutover bog (PB4).

Watercourses (major water features on/off site)

- Littleton is located within the Suir catchment.
- There are several main sub-catchments within the bog. These drain off the bog at various locations, with the majority of the bog draining to the west. There are several channelized streams/drains that drain the bog towards the Clover River, which drains towards the Dinish River. Some of the southern section drains south towards the Black River, which also drains towards the Dinsh River.
- The majority of the northern area (formerly managed for industrial peat production) is the only section where the catchment runoff is treated by silt-ponds. Part of this production area is not treated at all. Silt-ponds are required in some other sections of the bog. Much of the catchment runoff from the cutaway areas is treated by outfalls.

Peat type and sub-soils

Much of the peat exposed in the cutaway is fen peat. The conifer plantation was planted on a range of *Phragmites* peat and *Sphagnum* peat. The northern area (formerly managed for industrial peat production) is somewhat younger and exposed comprising light brown peat. The old sod peat areas along the western side have much deeper remnant acidic peat.

The bog is generally underlain by a mixed glacial till. This is exposed around the site at various locations. There are no indications of any significant shell-marl deposits exposed around the site.

Fauna biodiversity

Birds

Several bird species were noted on the site during the survey.

- Hen Harrier. This bird was noted roosting in the centre of the site.
- Kestrel. Kestrel was noted hunting over the site several times during both days of the survey.
- The large wetlands associated with the old sod peat cutting areas attracted some wildfowl. A small flock of Teal (6) were noted roosting on the south-west wetland in the old sod peat cutting areas. A larger flock of Mallard (60) were also noted at this location. The northern wetland also had Teal (9) and Mallard (1).
- The smaller wetlands towards the centre of the site had relatively few wildfowl, apart from 1 pair of Mallard.
- Other species noted on the site included Snipe, Heron, Magpie, Pheasant, Rook (2) Raven, Swallow (30) northern section), Grey Crow, Wren, Blackbird, Blue Tit, Goldcrest, Wood Pigeon, Meadow Pipit and Reed Bunting.
- This site was also surveyed by Copland (2011). Breeding Lapwing and Common Sandpiper were noted using the more exposed sections of cutaway to the east of the site. Curlew was recorded on the bog to the west and was suspected of breeding.

Mammals

Signs of several mammal species were noted on the site during the survey.

- Rabbit – at several places along the central line
- Signs of Fox were noted around the site.
- Signs of Badger were noted around the site.
- Several Hares were noted on the site.

Other species

- Butterfly species noted on the site included Meadow Brown, Ringlet and Small Tortoise-shell

References

Cross, J.R. 2006. The Potential Natural Vegetation of Ireland. Biology and Environment: Proceeding of the Royal Irish Academy, Vol. 106B, No. 2, 65-116 (2006).

European Commission (2013). Interpretation manual of European Union Habitats. European Commission DG Environment Nature ENV B.3.

Fossitt, J. (2000). A guide to habitats in Ireland. Kilkenny. The Heritage Council.

NRA (2009). Guidelines for Assessment of Ecological Impacts of National Road Schemes (Revision 2). National Roads Authority.

APPENDIX III: ENVIRONMENTAL CONTROL MEASURES TO BE APPLIED TO BOG REHABILITATION

- Bog restoration/rehabilitation measures will be restricted to within the footprint of the proposed rehabilitation area.
- The proposed rehabilitation will have due regard to noise limits and hours of operation (i.e. dusk and dawn) to minimise any potential disturbance on resident and local fauna that utilise the site and immediate environs.
- All plant and equipment for use will comply with the Construction Plant and Equipment Permissible Noise Levels Regulations (SI 359/1996).
- The proposed activities will be restricted to daylight hours and there will be no requirement for artificial lighting.
- Silt ponds will be inspected and maintained as per the IPC Licence.
- During periods of heavy precipitation and run-off, activities will be halted.
- Measures will be carried out using a suitably sized machine and in all circumstances, excavation depths and volumes will be minimised where possible.
- All machines will be regularly checked and maintained prior to arrival at the site to prevent hydrocarbon leakage.
- Hoses and valves will be checked regularly for signs of wear and will be closed and securely locked when not in use.
- Fuelling and lubrication of equipment shall only be carried out in designated areas away from surface water drainage features and ecologically sensitive areas.
- Waste oils and hydraulic fluids will be collected in leak-proof containers and removed from the site for disposal or re-cycling.
- Vehicles will never be left unattended during refuelling.
- No direct discharges to waters will be made. No washings from vehicles, plant or equipment will be carried out on site.
- All plant refuelling will take place using mobile fuel bowsers. Only dedicated trained and competent personnel will carry out refuelling operations.
- Mobile storage such as fuel bowsers will be bunded to 110% capacity to prevent spills. Tanks for bowsers and generators shall be double skinned. When not in use, all valves and fuel trigger guns from fuel storage containers will be locked. All pumps using fuel or containing oil will be locally and securely bunded where there is the possibility of discharge to waters.
- Potential impacts caused by spillages etc. during rehabilitation will be reduced by keeping spill kits and other appropriate equipment on-site.
- Site activities will be carried out in accordance with 'best practice'. In order to ensure compliance and implementation of 'best practice', these measures will be communicated to relevant BnM staff and updated as required.

APPENDIX IV: BIOSECURITY

The potential for importation or introduction of non-native plant species (such as Japanese Knotweed, Himalayan Balsam, etc.) during future rehabilitation management, such as drain-blocking using excavators, has the potential to result in the establishment of invasive species within the site. Section 49 of the European Communities (Birds and Natural Habitats) Regulations 2011 prohibits the introduction and dispersal of invasive alien species (particularly plant species) listed on Part 1 (third column) of the 'Third Schedule'.

This section aims to reduce the risk from, and impacts of, invasive species and protecting biodiversity on lands under BnM ownership. Rehabilitation and decommissioning in the bog will have due regard to the relevant biosecurity measures outlined below:

- Records of problematic invasive species within the various bog units will be marked out with signs to highlight areas of infestation to personnel.
- All plant machinery will be restricted from disturbing known colonies of invasive species.
- All plant machinery will avoid unnecessary crossings to adjoining lands.
- Good site hygiene will be employed to prevent the introduction and spread of problematic invasive alien plant species (i.e. Japanese Knotweed (*Fallopia japonica*), Himalayan Balsam (*Impatiens glandulifera*), Himalayan Knotweed (*Persicaria wallichii*), etc.) by thoroughly washing vehicles prior to entering the area.

The biosecurity measures outlined above are in line with best practice guidelines issued by the National Roads Authority (NRA, 2010) – The Management of Noxious Weeds and Non-native Invasive Plant Species on National Roads and broadly based on the Environment Agency's (2013) – The Knotweed Code of Practice: Managing Japanese Knotweed on Development Sites (Version 3, amended in 2013).

In addition to the above, Best Practice measures around the prevention and spread of Crayfish plague[6] will be adhered with throughout all rehabilitation measures and activities.

[6] https://www.biodiversityireland.ie/projects/invasive-species/crayfish-plague/

APPENDIX V: POLICY AND REGULATORY FRAMEWORK

BnM Plc is a publicly owned company, originally established in 1934 to develop some of Ireland's extensive peat resources for the purposes of economic development and to support energy security. In the decades since its establishment the company has employed tens of thousands of people in its fuel, energy, and horticultural growing media businesses. For much of its history the company's support of important national policy aims has been enabled and encouraged in a variety of ways by Government.

Today, BnM is undertaking a number of highly significant actions in support of climate policy. These actions involve a radical transformation and decarbonisation of nearly the entire BnM business. This transformation will be driven by unlocking the full potential of our land and creating significant value for Ireland and the Midlands in particular.

BnM is an integral part of the economic, social, and environmental fabric of Ireland and Irish life. As a key employer in the Midlands, the company is conscious that its obligations go beyond purely commercial and environmental – there is also a social responsibility to employees and the communities served by BnM. It is the company's role and absolute priority to ensure that its long-term strategy delivers on all of these important areas in a robust and balanced way.

There are a wide range of policies, plans, legislation and land designations that inform the development of this BnM peatland rehabilitation plan. BnM have also developed and operate various policies and strategies that also inform the development of this rehabilitation plan.

1 EPA IPC Licence

BnM operates under IPC Licence issued and administered by the EPA to extract peat within the Littleton Bog group (Ref. P0-499-01). As part of Condition 10.2 of this licence, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area. The bog is part of the Littleton Bog group. This regulatory requirement is the main driver of the development of this rehabilitation plan.

2 The Peatlands Climate Action Scheme (PCAS)

BnM (BnM) understand that it is the Minister's (DECC) intention to impose an obligation on BnM to develop a programme of measures, 'the Scheme', for the enhanced decommissioning, rehabilitation and restoration of boglands previously used to supply peat for electricity generation within the State. The enhanced decommissioning, rehabilitation and restoration of the peatlands funded by the Scheme (PCAS) will deliver benefits across climate action (GHG mitigation through reduced carbon emissions and acceleration towards carbon sequestration), enrich the State's natural capital, increase eco-system services, strengthen biodiversity, improve water quality and storage attenuation as well as developing the amenity potential of the peatlands.

BnM is carrying out an enhanced decommissioning, rehabilitation and restoration, under the Scheme (PCAS), and supported by the Climate Action Fund and Ireland's National Recovery and Resilience Plan across a footprint of 24,500 ha between 2021-2026. This scheme will significantly go beyond what is required to meet rehabilitation and decommissioning obligations under existing EPA IPC licence conditions. Interventions and measures supported by the Scheme will ensure that environmental stabilisation is achieved (meaning IPC obligations are met), and importantly, significant additional benefits, particularly relating to climate action and other ecosystem services, will also be delivered. However, only the additional costs associated with the additional and enhanced

rehabilitation, i.e., those activities which go beyond the existing decommissioning and rehabilitation requirements arising from Condition 10 will be eligible for support under the Scheme.

3 National Climate Policy

The National Policy Position establishes the fundamental national objective of achieving a transition to a competitive, low carbon, climate-resilient and environmentally sustainable economy by 2050. It sets out:

- the context for the objective;
- clarifies the level of GHG mitigation ambition envisaged; and
- establishes the process to pursue and achieve the overall objective.

The evolution of climate policy in Ireland will be an iterative process based on the adoption by government of a series of national plans over the period to 2050. GHG mitigation and adaptation to the impacts of climate change are to be addressed in parallel national plans – respectively through the National Climate Action Plan. The plans will be continually updated, as well as being reviewed on a structured basis at appropriate intervals and, at a minimum, every five years. This will include early identification and ongoing updating of possible transition pathways to 2050 to inform sectoral strategic choices.

BnM is following a decarbonisation programme aimed at reducing the carbon emissions from its activities. Industrial peat production has now ceased, and several other decarbonisation measures are being implemented. The company aims to further develop renewable energy and resource recovery markets with a key objective of reducing the carbon intensity of all products. In addition, the carbon emission mitigation benefits associated with the post-peat extraction rehabilitated peatland following re-wetting, revegetation and colonisation of significant areas with native woodland will make a significant contribution to achieving the State's carbon emission reduction targets.

4 National Peatlands Strategy

The National Peatlands Strategy (2015) contains a comprehensive list of actions, necessary to ensure that Ireland's peatlands are preserved, nurtured and become living assets within the communities that live beside them. It sets out a cross-governmental approach to managing issues that relate to peatlands, including compliance with EU environmental law, climate change, forestry, flood control, energy, nature conservation, planning, and agriculture. The Strategy has been developed in partnership between relevant Government Departments/State bodies and key stakeholders through the Peatlands Council.

The strategy recognises that Ireland's peatlands will continue to contribute to a wide variety of human needs and to be put to many uses. It aims to ensure that Ireland's peatlands are sustainably managed so that their benefits can be enjoyed responsibly. It aims to inform appropriate regulatory systems to facilitate good decision making in support of responsible use. It also aims to inform the provision of appropriate incentives, financial supports and disincentives where required. The strategy attempts to strike an appropriate balance between different needs, including local stakeholders like turf-cutters and semi-state bodies such as BnM.

In line with a National Peatlands Strategy recommendation, a Peatlands Strategy Implementation Group (PSIG), was established, assisted in the finalisation of the Strategy, is overseeing subsequent implementation and will report to Government on an annual basis on the implementation of the actions and principles contained within the Strategy.

BnM is a key stakeholder in the National Peatlands Strategy and the Peatlands Strategy Implementation Group. The strategy recognises the potential for some BnM sites to be restored and to contribute to the national SAC and NHA network of protected raised bog sites. The strategy (agreed in 2015) also recognises the various different values of cutaway bog and developed six key principles (with BnM) for the after-use of cutaway bog.

- BnM will continue to assess and evaluate the potential of the company's land bank, using a land use review system. The assessment will help prepare a set of evidence-based management plans for the various areas of peatland. These plans will also inform its cutaway bog rehabilitation.
- The policy of BnM is not to open up any undrained new bogs for peat production.
- Lands identified by BnM as having high biodiversity value and/or priority habitats will be reserved for these purposes as the principal future land use.
- Generally, BnM cutaway bogs that flood naturally will be permitted to flood unless there is a clear environmental and/or economic case to maintain pumped drainage.
- In deciding on the most appropriate afteruse of cutaway peatlands, consideration shall be given to encouraging, where possible, the return to a natural functioning peatland ecosystem.
- This will require re-wetting of the cutaway peatlands which may lead in time to the restoration of the peatland ecosystem.
- Environmentally, socially and economically viable options should be analysed to plan the future use of industrial cutaway peatlands, in conjunction with limiting factors as outlined in BnM's Strategic Framework for the Future Use of Peatlands.

The National Peatlands Strategy highlights the importance and value of developing peatland rehabilitation plans for BnM cutaway sites and implementing this peatland rehabilitation. Some of these principles have now been superseded by the company's decision to cease industrial peat extraction. The National Peatlands Strategy is currently being reviewed by Government.

5 National River Basin Management Plan 2022-2027 (Water Framework Directive)

The River Basin Management Plan for Ireland 2022-2027 (Department of Housing, Local Government and Heritage, 2022) is the key national plan for Ireland to achieve the objectives of the Water Framework Directive (WFD). In broad terms, the objectives of the WFD are (1) to prevent the deterioration of water bodies and to protect, enhance and restore them with the aim of achieving at least good status and (2) to achieve compliance with the requirements for designated protected areas.

The NRBMP 2022-2027 outlined how peat extraction can be a potentially significant pressure on various water quality parameters. Peatland rehabilitation of BnM cutaway (in addition to other measures) was part of the WFD (2022-2027) programme of measures. The NRBMP 2022-2027 takes account of the fact that BnM was in the process of phasing out the extraction of peat for energy production, that it set a target to rehabilitate 9,000 ha of cutaway bogs (covering 25 peatlands) by 2021 (in 2018) and will look to implement best-available mitigation measures to further reduce water quality impacts caused by peat extraction while the phasing-out process is taking place. This NRBMP 2022-2027 rehabilitation target was superseded by the acceleration of the BnM de-carbonisation programme and the Scheme (PCAS).

The development of site rehabilitation plans and the delivery of peatland rehabilitation by BnM was expected to have a positive impact on water quality and will help the NRBMP 2022-2027 deliver its objectives in relation to the Water Framework Directive and is one of the five key principal actions.

The NRBMP 2022-2027 describes how the number of waterbodies impacted by peat, industry and forestry have decreased by 10, 10 and 5 waterbodies, respectively since the second cycle. Impacts on water quality and river habitat arising from peat and peat extraction and associated drainage include the release of ammonium and fine-grained suspended sediments, and physical alteration of aquatic habitats. Drainage of peatlands also results in changes to the hydromorphological condition of rivers.

The NRBMP 2022-2027 outlines how maintaining and restoring Irish bogs will lead to a decrease in waterborne carbon leaching to levels comparable with intact bogs as well as reducing losses of peat silt and ammonia. Vegetation on the surface of the peat can also slow the flow of water over the land surface. Based on the EPA's most recent reports, peat extraction and drainage is impacting on 106 water bodies across the country, with peat the single pressure on 28 of these water bodies. However, compared to the data in the second-cycle plan, the number of water bodies impacted by peat has decreased.

The cessation of industrial peat extraction by BnM in 2021 was expected to have a significant positive impact on water quality of receiving water courses by reducing the impact of peat extraction as a key pressure on particular water courses. This is now being supported by the results and conclusions of the draft NRBMP 2022-2027.

6 4th National Biodiversity Action Plan 2023-2030

Ireland's 4th National Biodiversity Action Plan (NBAP) sets the national biodiversity agenda for the period 2023-2030 and aims to deliver the transformative changes required to the ways in which we value and protect nature. The 4th NBAP has been developed with the support, advice and input of the interdepartmental Biodiversity Working Group and the independent Biodiversity Forum. Ireland's 2nd National Biodiversity Conference was held to gather insights and recommendations for the development of the NBAP and a public consultation process was held to provide further opportunities to engage with the Plan.

The 4th NBAP strives for a "whole of government, whole of society" approach to the governance and conservation of biodiversity. The aim is to ensure that every citizen, community, business, local authority, semi-state and state agency has an awareness of biodiversity and its importance, and of the implications of its loss, while also understanding how they can act to address the biodiversity emergency as part of a renewed national effort to "act for nature".

The delivery of rehabilitation via PCAS is expected to significantly contribute in the future to actions and targets of the 4th National Biodiversity Action Plan 2023-2030, particularly in relation to peatland restoration, nature restoration and creation of new habitats such as wetlands and woodlands.

7 EU Nature Restoration Law

The EU Nature Restoration Law is a key element of the EU Biodiversity Strategy, which sets binding targets to restore degraded ecosystems, in particular those with the most potential to capture and store carbon and to prevent and reduce the impact of natural disasters. The regulation combines an overarching restoration objective for the long-term recovery of nature in the EU's land and sea areas with binding restoration targets for specific habitats and species. These measures should cover at least 20% of the EU's land and sea areas by 2030, and ultimately all ecosystems in need of restoration by 2050.

This regulation has now been adapted and it is expected that all Member States will be required to produce a National Restoration Plan within two years of adoption. This will be led by the National Parks and Wildlife Service

and will comprise a broad and deep public participation process, informed by robust ecological and socio-economic impact assessments. BnM are working with NPWS and DAFM to identify bog restoration and other re-wetted cutaway sites that can contribute towards Irelands targets for the Nature Restoration Law.

8 National conservation designations

BnM operates in a wider landscape that also includes a network of European and National nature conservation sites (Special Areas of Conservation (SACs), Special Protection Areas (SPAs), National Heritage Areas (NHAs, pNHAs) and National Nature Reserves). BnM will take account of this network of conservation objectives and their conservation objectives when developing these rehabilitation plans. It is expected that peatland rehabilitation will, in general, benefit the conservation objectives of this network of nature conservation sites.

9 National Raised Bog Special Area of Conservation Management Plan 2017-2022.

The National Raised Bog Special Area of Conservation Management Plan 2017-2022 sets out a roadmap for the long-term management, restoration and conservation of protected raised bogs in Ireland. The Plan strikes an appropriate balance between the need to conserve and restore Ireland's raised bog network as part of Ireland's commitments towards the EU Habitats Directive, and the needs of stakeholders and gives recognition to the important role that communities have to play in the conservation and restoration of raised bogs. The National Raised Bog Special Areas of Conservation (SACs) Management Plan 2017-2022 is part of the measures being implemented in response to the on-going infringement action against Ireland in relation to the implementation of the EU Habitats Directive, with regard to the regulation of turf cutting on the Special Areas of Conservation (SACs). The then Minister for Arts, Heritage and the Gaeltacht, also published a **Review of Raised Bog Natural Heritage Area Network** in 2014.

BnM has also responded to the needs of the National Raised Bog Special Area of Conservation Management Plan (NRBMP) and provided several sites to the government for the relocation of turf-cutters from SACs. This is part of a suite of ongoing bog conservation measures in the NRBMP to manage turf-cutting in protected sites. BnM and the National Parks and Wildlife Service continues to engage regarding the ongoing relocation of turf-cutters from protected raised bog sites.

10 All-Ireland Pollinator Plan 2021-2025

The All-Ireland Pollinator Plan 2026-2031 outlines key objectives and actions to protect and support pollinating insects and the habitats they rely on. A BnM specific action in this plan includes the adoption of pollinator-friendly management within the BnM network of sites. One action to help achieve this objective is habitat rehabilitation and restoration, where possible, of pollinator-friendly habitats, including peatland habitats.

11 Land-use planning policies

As BnM operates in many counties across Ireland, it is important to note the respective development plans in these counties. Many of the existing development plans recognise the potential that exists in the after-use of cutover/cutaway peatlands. BnM seeks to work with all of the relevant local authorities to ensure that the most appropriate after-uses are reflected in local planning policy. The following areas of consistent importance are of

both direct and indirect relevance to BnM: heritage, tourism, biodiversity/conservation, landscape, renewable energy, and economy/enterprise.

12 National Archaeology Code of Practice

BnM operated under an agreed Code of Practice (COP) regarding archaeology with the Department of Arts, Heritage and the Gaeltacht and the National Museum of Ireland which provided a framework to enable the Company to progress peat extraction whilst carrying out archaeological mitigation. (https://www.archaeology.ie/sites/default/files/media/publications/cop-bord-na-mona-en.pdf)

Under the Code, BnM, the Minister and Director worked together to ensure that appropriate archaeological survey and mitigation was carried out in advance of peat extraction.

As peat extraction ceased in 2018, the remaining elements of the COP that are still applicable include:

- BnM must ensure that any newly discovered monuments on BnM lands are reported in a timely manner to the National Monuments Service of the Department of Arts, Heritage and the Gaeltacht.
- BnM must ensure that any archaeological objects discovered on BnM lands are reported immediately to the Duty Officer of the National Museum of Ireland.
- BnM will adhere to the Archaeology Code of Practice relating to management of any archaeological finds that may arise during cutaway peatland rehabilitation and decommissioning.

13 Bord na Móna Biodiversity Action Plan 2016-2021

Rehabilitation of industrial peatlands is a key objective of the Bord na Móna Biodiversity Action Plan 2016-2021. This action plan outlines the main objectives and actions around biodiversity on BnM lands. The Bord na Móna Biodiversity Action Plan also outlines key International and European policy in relation to biodiversity. This includes the **United Nations Convention on Biodiversity 2011-2020 (CBD)** and **European Biodiversity Strategy to 2020**. Further details of these policies and BnM s responses can be found in the Bord na Móna Biodiversity Action Plan (Bord na Móna , 2016). Both policy documents highlight targets such as reducing pressure on biodiversity, promoting sustainability, habitat restoration and benefits of ecosystem services.

One example of a key CBD target is:

- *“Restore at least 15% of degraded areas through conservation and restoration activities.”*

The EUs headline target for progress by 2020 is to:

- *“halt the loss of biodiversity and the degradation of ecosystems in the EU by 2020, restore them as far as feasible, while stepping up the EU contribution to averting global biodiversity loss.”*

This rehabilitation plan is aligned to the CBD target and the EU Biodiversity Strategy target and will help Ireland meet its commitment to these international Biodiversity polices.

14 BnM commitments

BnM made the commitment in 2009 not to develop any new peatland sites for industrial peat production. The company has continued to work with different stakeholders.

In line with BnM's accelerated decarbonisation programme, the company made a further commitment to a significantly larger rehabilitation target. This was reflected in our plans to rehabilitate a further 20,000 hectares of cutaway and cutover bog to wetland and woodland mosaics by 2025. In addition, we planned to restore a further 1,000 hectares of raised bog habitat by 2025. These initial targets have been achieved.

The company announced the cessation of industrial peat production in 2021 and that it would rehabilitate a target of 33,000 ha between 2021-2026 . Rehabilitation measures will continue to be carried out with the focus on re-wetting and rehabilitation of cutover and cutaway areas in line with national policies (such as the National Peatland Strategy, the National Biodiversity Action Plan, The Nature Restoration Law, the Climate Action Plan, the Water Framework Directive, etc.) and rehabilitation guidelines set down by the Environmental Protection Agency. BnM has now transitioned to a Climate Solutions company with a key commercial and development focus being the delivery of renewable energy to support Ireland's Climate Action Plan. In general, BnM will seek to balance and optimise commercial, social, and environmental value of its bogs, and develop integrated land-uses, while taking account of the need for sustainability and their biodiversity value.

These commitments outline the importance of peatland rehabilitation to BnM. The company will continue to demonstrate environmental responsibility and continue to deliver on these commitments in relation to peatland rehabilitation and in relation to the future management of these lands to maximise their benefits, particularly their ecosystem service benefits, along with the sustainable development of a portion of the land bank for other uses, such as renewable energy.

APPENDIX VI: DECOMMISSIONING

1. Condition 10 Decommissioning

Under condition 10.1, BnM must decommission relevant infrastructure and other materials that supported peat extraction, that may result in environmental pollution.

10.1.1 Decommission, render safe or remove for disposal/recovery, any soil, subsoils, buildings, plant or equipment, or any waste, materials or substances or other matter contained therein or thereon, that may result in environmental pollution.

To date across all of BnM's peatlands that have been rehabilitated, this has entailed removal of rail infrastructure, plant, equipment, materials, and waste.

In relation to this bog, this was primarily rail to be lifted and any associated polybrane materials, production plant and equipment, any waste materials including stockpile covering, stored at production centers.

During the decommissioning of this bog, these materials were either brought to a central roadside location to be removal via a licensed waste provider or brought centrally to the nearest main works site, either Littleton or Templetuohy for removal as waste, to be either recycled or deposited to landfill.

Records, EWC codes, waste treatment operations, weights, descriptions and final destinations of these wastes are reported each year in the Annual Environmental Report (AER) and the Environmental Performance Report (EPR) and are available at the EPA's Licensing & Enforcement Access Portal (LEAP).

Rail lifting is ongoing in Littleton Bog in 2026 and is expected to be completed this year, as is the removal of some residual pumping infrastructure.

In relation to this bog, the list and tasks would be as follows:

Item	Description	Littleton Decommissioning Plan
1	Clean-up of remaining or unconsolidated waste or materials located in Bogs, Yards, Buildings and Offices	Clean-up of Bog
2	Cleaning Silt Ponds	Cleaning Silt Ponds
3	Decommissioning Peat Stockpiles	Peat Stockpile Management
4	Decommissioning or Removal of Buildings and Compounds	Decommissioning or Removal of Buildings and Compounds
5	Decommissioning Fuel Tanks and associated facilities	Where relevant
6	Decommissioning and Removal of Bog Pump Sites	Where relevant
7	Decommissioning or Removal of Septic Tanks	Where relevant

In addition, condition 7 of the licence requires these now defined waste items to be disposed of or recovered as follows:

7.1 Disposal or recovery of waste shall take place only as specified in *Schedule 2(i) Hazardous Wastes for Disposal/Recovery* and *Schedule 2(ii) Other Wastes for Disposal/Recovery* of this licence and in accordance with the appropriate National and European legislation and protocols. No other waste shall be disposed of/recovered either on-site or off-site without prior notice to, and prior written agreement of, the Agency.

7.2 Waste sent off-site for recovery or disposal shall only be conveyed to a waste contractor, as agreed by the Agency, and only transported from the site of the activity to the site of recovery/disposal in a manner which will not adversely affect the environment.

7.3 A full record, which shall be open to inspection by authorized persons of the Agency at all times, shall be kept by the licensee on matters relating to the waste management operations and practices at this site. This record shall as a minimum contain details of the following:

7.3.1 The names of the agent and transporter of the waste.

7.3.2 The name of the persons responsible for the ultimate disposal/recovery of the

waste.

7.3.3 The ultimate destination of the waste.

7.3.4 Written confirmation of the acceptance and disposal/recovery of any hazardous waste consignments sent off-site.

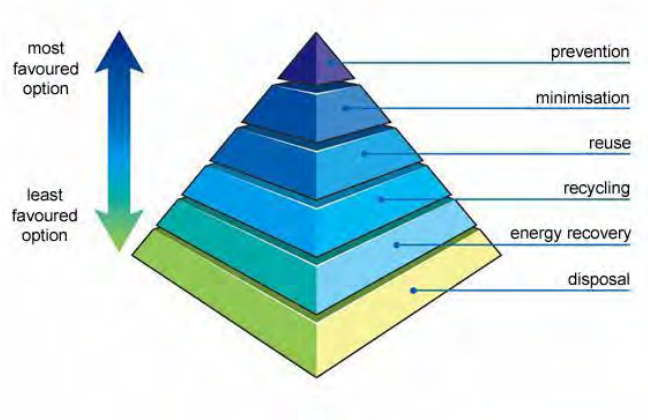
7.3.5 The tonnages and EWC Code for the waste materials listed in *Schedule 2(i) Hazardous Wastes for Disposal/Recovery* and *Schedule 2(ii) Other Wastes for Disposal/Recovery* sent off-site for disposal/recovery.

7.3.6 Details of any rejected consignments.

A copy of this Waste Management record shall be submitted to the Agency as part of the AER for the site.

As required by the licence, these waste items will be removed for recycling or disposal, using external contractors with the required waste collection permits, approved under 7.2, with waste records maintained as required under 7.3.

Where possible, BnM will utilize the appropriate waste hierarchy to identify waste that can reused or recycled ahead of disposal.



The validation of the success of condition 10.1 is carried out through an Independent Closure Audit (ICA), followed by and EPA Exit Audit (EA) and the eventual partial or full surrender of the licence.

2. Enhanced Decommissioning.

The remaining infrastructure does not constitute a risk to the environment and would not be a requirement of condition 10 of the licence. The removal of these are deemed as enhanced measures. These may enhance the future after use of the bog for amenity value, security against access for illegal and unsocial activities and general State and community benefit. In relation to this bog, this would include the infrastructure defined below:

Item	Enhanced Decommissioning Type	Littleton Decommissioning Plan
1	Removal of Railway Lines	Removal of Railway Lines
2	Decommissioning Bridges and Underpasses	Where Applicable
3	Decommissioning Railway Level Crossing	Where Applicable
4	Restricting Access (bogs and silt ponds)	Restricting Access to Bog
5	Removal of High Voltage Power Lines	Where Applicable

APPENDIX VII: GLOSSARY

Cutaway Bog: A BnM site generally becomes cutaway when it is economically unviable to continue industrial peat extraction or when the majority of peat has been removed.

Deep peat cutover bog. Deep peat cutover bog is defined as former raised bogs that have been in industrial peat production, where production has ceased but the residual peat depth is typically in excess of 2m. *Sphagnum* mosses are key species of raised bogs and the majority of the peat mass is formed from these mosses. *Sphagnum* species and other raised bog species are a key part of raised bog habitat function and prefer more acidic, nutrient poor, water-logged conditions. Typical raised bog *Sphagnum* mosses and other bog species do not thrive with the more typical alkaline water chemistry of cutaway bog but do grow well in these more acidic conditions where peat has been re-wetted. There is potential to re-develop *Sphagnum*-rich plant communities in these conditions if the peat can be re-wetted. This brings the opportunity of re-developing *Sphagnum*-rich vegetation communities that are considered Carbon sinks or peat-forming habitats and restoring the carbon sequestration function of these sites.

Dry cutaway bog: Cutaway bog is categorised as dry cutaway where it is not practical or feasible to re-wet these areas completely. It is inevitable that some areas of cutaway will remain relatively dry due to the heterogenous topography of the cutaway, as well as requirements for continued drainage on site for identified after-uses, or off site in relation to neighbouring lands or other infrastructure. Ridges and mounds of glacial deposits can become exposed during peat extraction and form a heterogenous topographical mosaic separated by basins. Dry cutaway may have very thin or no residual peat where ridges and mounds have been exposed. The exposed sub-soils are a mix of glacial gravels, muds and tills that can be quite free-draining. Dry cutaway may also have deeper residual peat, but in a location (i.e. at the margin) where the peat cannot be re-wetted due to boundary constraints. Dry cutaway may also develop in situations where there a relatively steep slope that inhibits re-wetting. The majority of dry cutaway will develop towards grassland, heath, scrub and dry woodland habitats.

Enhanced decommissioning: This is defined as decommissioning carried out under the Scheme, which is proposed to be externally funded.

Enhanced rehabilitation: This is defined as rehabilitation carried out under Scheme, which is proposed to be externally funded. It is proposed by Government that BnM be obligated to carry out enhanced decommissioning, rehabilitation and restoration on peatlands. This Scheme will significantly go beyond what is required to meet rehabilitation and decommissioning obligations under existing EPA IPC licence conditions. Interventions and activities supported by the Scheme will ensure that environmental stabilisation is achieved (meaning IPC obligations are met), and importantly, significant additional benefits, particularly relating to climate action and other ecosystem services, will also be delivered. However, only the costs associated with the additional, enhanced and accelerated measures, i.e., those interventions which go beyond the existing decommissioning and rehabilitation requirements arising from Condition 10 will be eligible for support under the Scheme.

Environmental stabilisation: The key objective of peatland rehabilitation is environmental stabilisation. This means developing habitats and vegetation back onto the bare peat, slowing water movement across the bog, minimising effects to downstream waterbodies and meeting the conditions of the IPC Licence. This is achieved by a combination of re-wetting, where possible, and natural colonisation of the former cutaway, with or without intervention**.** Habitats will develop that reflect the underlying environmental conditions. Other after-use development may also serve to act as environmental stabilisation.

Marginal land. Marginal land is defined as land around the margin of the industrial peat production area. This margin generally contains a range of habitats including scrub, birch woodland, cutover bog and raised bog remnants. It has a variety of land-uses including turf-cutting (private turbary). The Scheme will consider potential rehabilitation and restoration actions (e.g. drain blocking) within marginal land zones, where appropriate.

Rehabilitation: Rehabilitation is defined in general by BnM as environmental stabilisation of the former cutaway. This is generally achieved via re-wetting, where possible, and natural colonisation of the former cutaway, with or without intervention. It is not possible to restore raised bog habitats on BnM cutaway in general in the short-term. In general, most of the peat mass has been removed from many BnM cutaway sites and the environmental characteristics of these areas have therefore changed radically (peat depths, hydrology, water chemistry, substrate type, nutrient status. This means there will therefore be different habitat outcomes (wetlands, fen, heathland, grassland and Birch woodland). Other after-use development may also serve to act as rehabilitation.

Restoration: Ecological restoration is defined as the process of re-establishing to the extent possible the structure, function and integrity of indigenous ecosystems and the sustaining habitats they provide" (SER, 2004). Defined in this way, restoration encompasses the repair of ecosystems (Whisenant, 1999) and the **improvement of ecological conditions in damaged wildlands** through the **reinstatement of ecological processes**. In general, BnM cutaway peatlands cannot be restored back to raised bog in a reasonable timeframe as their environmental conditions has changed so radically (with the removal of the acrotelm – the living layer and much of the peat mass). However, they can be returned to a **trajectory** towards a naturally functioning peatland system (Renou-Wilson, 2012). **Raised bog restoration** is an objective of some BnM sites where there is residual natural raised bog vegetation and where the majority of the peat is still intact.

Standard rehabilitation: This is defined as rehabilitation that is designed to meet the conditions of the EPA IPC Licence. The key objective of rehabilitation is environmental stabilisation. This is achieved by a combination of re-wetting, where possible, and natural colonisation of the former cutaway, with or without intervention**.** Other after-use development may also serve to act as rehabilitation.

Standard decommissioning: This is defined as decommissioning that is designed to meet the conditions of the EPA IPC Licence. This is defined as to render safe or remove for disposal/recovery, any soil, subsoils, buildings, plant or equipment, or any waste, materials or substances or other matter contained therein or thereon, that may result in environmental pollution.

Wetland cutaway bog. Wetland cutaway bog is defined as former raised bogs that have been in industrial peat production, where production has ceased and the majority of peat has been cutaway, and where this cutaway has the potential to be re-wetted. A significant number of BnM sites have pumped drainage and these sites are likely to develop a mosaic of wetland habitats when pumping in reduced or stopped. The water chemistry of wetland cutaway frequently is strongly influenced by the more alkaline sub-soils that have been exposed during peat production. This means that pioneer vegetation is more typical of fen and wetland, rather than raised bog. Wetland cutaway will have a broad range of hydrological conditions depending on the local topography. In some cases, these wetlands may form deep water (> 0.5 m) whilst other areas may have the water table at or just below the surface of the ground.

APPENDIX VIII: EXTRACTIVE WASTE MANAGEMENT PLAN

(Minimisation, treatment, recovery and disposal)

Objective:
The objective of this generic plan is to comply with the requirements of regulation 5 of the Waste Management (Management of Waste from Extractive Industries) Regulations, and to prevent or reduce waste production and its harmfulness.

Scope:
This plan covers IPPC Licence's Ref P0499-01, Littleton Group of Bogs located in Co. Tipperary.

1.0 Extractive Waste:
Waste classified as extractive waste from peat extraction operations arise from three operations associated with this activity.

1.1 Silt Pond excavations and maintenance.
All peat extraction activities in the Littleton bog group are serviced by silt lagoons/ponds. During the excavation of these silt ponds, pre IPPC Licensing in 1999 and since licensing, the excavated material is stored adjacent to the silt pond, where it either remains in situ ores levelled out. As required by condition 6.6, these silt lagoons are cleaned twice per annum or more often if inspections dictate. These silt cleanings are also deposited on the same location, adjacent to the silt pond, where they may be levelled periodically to allow room for subsequent cleanings. These mounds of silt pond excavation material and cleanings are generally no higher that 2-3 metres.

1.2 Power Station screenings:
Lough Ree Power Station screens the peat from the bogs prior to processing. This screening removes oversized peat, stones and bogs timbers. Schedule 3 (ii) of the IPPC licence permits disposal of these peat screenings back to the bog, where it is levelled and graded into the surrounding peat landscape. These locations have been agreed with the Agency as per condition 7.4 of the IPPC Licence, and as per the attached locations.

1.3 Bog Timbers:
During peat extraction operations, bog timbers often arise in the bog surface and are required to be cleared. These timbers consist of bog pine, oak and some yew. Some of these timbers, such as the oak and yew are removed for use in the wood craft industry, with the remaining bog pine stockpiled in locations at the opposite end of each bog, where it generally becomes a habitat for flora and fauna. These piles of timber are generally no higher than 1-2 metres.

2.0 P0499-01 IPPC Licence Extractive Waste Conditions

2.1 Condition 7.5 Extractive Waste Management
The licensee shall draw up a Waste Management Plan (to be known as an Extractive Waste Management Plan) for the minimisation, treatment, recovery and disposal of extractive waste. This Plan shall meet the requirements of regulation 5 of the Waste Management (Management of Waste from the Extractive Industries) Regulations,2009. The Plan shall be submitted for agreement by the Agency by the 31' December 2012. The Plan shall be reviewed at least once every five years thereafter in a manner agreeable to the Agency and amended in the event of substantial changes to the operation of a waste facility or to the waste deposited. Any amendments shall be notified to the Agency.
All extractive waste shall be managed in accordance with the Extractive Waste Management Plan. A report on the implementation of the Extractive Waste Management Plan shall be provided in the AER.

2.2 Condition 7.6 Waste Facility

(i) No new waste facility may be developed or an existing waste facility modified unless agreed by the Agency.
(ii) The licensee shall ensure that all existing waste facilities are managed and maintained to ensure their physical stability and to prevent pollution or contamination of soil, air, surface water or groundwater.
(iii) The licensee shall ensure that all new waste facilities are constructed, managed and maintained to ensure their physical stability and to prevent pollution or contamination of soil, air, surface water or groundwater.
(iv) Operational measures shall be continuously employed to prevent damage to waste facilities from personnel, plant or equipment.
(v) The licensee shall establish and maintain a system for regular monitoring and inspection of waste facilities.
(vi) All records of monitoring and inspection of waste facilities, as required under the licence, shall be maintained on-site in order to ensure the appropriate handover of information in the event of a change of operator or relevant personnel.

2.3 Condition 7.7 Excavation Voids

7.7.1 Unless otherwise agreed by the Agency, only extractive waste shall be placed in excavation voids.
7.7.2 When placing extractive waste into excavation voids for rehabilitation and construction purposes, the licensee shall, in accordance with regulation 10 of the Waste Management (Management of Waste from the Extractive Industries) Regulations, 2009, and the Extractive Waste Management Plan:

- Secure the stability of the waste
- Put in place measures to prevent pollution of soil, surface water and ground water.
- Carry out monitoring of the extractive waste and excavation void.

Condition 7.5. Extractive Waste Management Plan. 5 (1)

3.0 Minimisation.

3.1 Silt pond excavation material and cleanings.

IPPC Licence conditions require all production areas to be serviced by an appropriately designed silt pond based on storage volume and retention time. Condition 6.6 requires all ponds to be cleaned bi-annually and more often if inspections dictate, so the only opportunity for minimisation of same is through Standard Operating Procedures. These are required under condition 2.2.2 (i) regarding minimisation of suspended solids, and are in-place to minimise the generation of silt, which in-turn will minimise the generation of silt pond waste.

3.2 Power Station Screenings.

These screenings cannot be minimised as they are a consequence of peat production, stones, timbers and oversize peat materials are naturally occurring on the bog, and are required to be removed prior to processing.

3.3 Bog Timbers.

Bog timbers are also naturally occurring materials within a bog and are required to be removed prior for production. The volume of these bog timbers varies from bog to bog and as such their minimisation is not controllable or quantifiable.

4.0 Treatment

4.1 Silt pond excavation material and cleanings.

The silt pond excavation material and silt cleanings do not require any treatment for its end use which will be either backfilling these silt pond voids as per condition 7.7.1 above as part of the Bog Rehabilitation Plan, or reincorporated into the surrounding peatlands.

4.2 Power Station Screenings.

The factory screenings are permitted to be returned to the bog as they were naturally occurring materials from the bog, and as such do not require any treatment to serve this purpose.

4.3 Bog Timbers
As per 1.3 above, these timbers are stockpiled at two locations in each bog, as per the attached list of sites and become habitats for various flora and fauna.

5.0 Recovery
5.1 Silt pond excavation material and cleanings.
Condition 2.2.2 (vi) requires the reuse of silt pond waste to be examined. This was undertaken in 2006, the outcome of which was that this waste peat silt material, as a fuel, was contaminated with sub-soils, rendering it unsuitable for combustion. In addition, volumes are small compared to overall peat production volumes.

5.2 Power Station Screenings.
Given the nature of these screenings as outlined in 1.2 above, there is no further use identified and they are permitted to be disposed of back to the bog.

5.3 Bog Timbers
Investigations into processing these materials into smaller fractions for potential heating purposes did not yield any viable results. In addition, these older stockpiles are now classified as habitats and as such would not be considered for reuse as a fuel.

6.0 Disposal
6.1 Silt pond excavation material and cleanings.
Schedule 3 (ii) permits the disposal of silt pond cleanings (Lagoon Sediments) to the bog and these locations, adjacent to the silt pond site, are presented in the attached spreadsheet, with associated grid coordinates.

6.2 Power Station Screenings.
Schedule 3 (ii) permits the disposal of screenings (Peat Screenings) to the bog at designated locations agreed under Condition 7.4, and these locations, are presented in the attached spreadsheet, with associated grid coordinates.

6.3 Bog Timbers
These naturally occurring bog timbers are stockpiled at locations in each bog, grid coordinates attached.

7.0 Extractive Waste Management Plan

5 (2a)(i)
The vast majority of peat extraction bogs were all designed and drained for production prior to the 1960's and as such the production fields layout cannot' be altered. Under our Cleaner Reduction Procedures, various design changes have been implemented to the production machines and process to reduce lost peat which eventually is captured in the silt ponds and requires removal as waste peat silt. This along with training and ongoing research and development will continuously reduce waste peat and subsequently waste silt pond cleanings. Bog timbers are present naturally in various volumes and quantities in different bogs and as peat production involves stripping peat in layers, the exposure, generation and removal of these timbers is unavoidable. Work has been undertaken recently into project looking at grinding of these bog timbers in situ using a timber miller, and if this project becomes viable it will contribute to the reduction of bog timbers.

5 (2a)(ii)
Given the nature and expanse of peat bogs, the stockpiling and storage of these waste materials do not present a visual, storage or stability problem. As required under Condition 10 of the IPPC Licence, the silt pond excavations and screenings will be utilised to backfill the silt pond voids once the bogs have finished and stabilised in accordance with out Bog Rehabilitation Plan. Storage of these wastes in the interim, open to the elements does

not present a change on the nature of these wastes that will threaten the environment or prevent their reuse during the bog rehabilitation process.

5 (2a)(iii)
Under Condition 10 of the IPPC Licence, all silt ponds will be decommissioned once the bog surface has stabilised, in agreement with the Agency. This will involve the removal of weirs and flow controls, returning the silt pond back to its original drain or removing the silt pond from the drainage system. Both of these activities will involve placing the silt pond extraction and cleaning material back into the excavation void.

5 (2a)(iv)
The peat bogs do not contain any topsoil, so this is not required.

5 (2a)(v)
Peat mineral resources do not undergo any treatment.

5 (2b)
These three extractive waste are all being reused and recovered back to their original extraction points and have not undergone any physical, chemical, or biological change.

5 (2c)(i, ii & iii)
These three extractive wastes, stored on the bog for reuse or recovery during the bog rehabilitation phase, do not require any management or monitoring during the operation of these bogs. Silt pond excavations and cleanings are stored adjacent to the silt pond and quickly revegetated and stabilise, the screenings are graded back into the bog at the agreed locations upon disposal and the bog timbers do not prevent any water or airborne danger to the environment.

5 (3)
The three extractive wastes arising from peat extraction operations at this site are classified wastes from mineral non-metalliferous excavation, with an EWC code of 0101 02. The materials are not classified as hazardous under Directive 91/689/EEC20, and do not contain substances or preparations classified as dangerous under Directives 67/548/EEC5 or 1999/45/EC6 above a certain threshold.
The peat excavations and cleanings are stored in locations and in a manner that they could not collapse, and are remote in their nature. The stockpiles are located adjacent to silt ponds that are cleaned regularly and as such these stockpiles are managed and levelled to facilitate further cleanings.
Therefore the material stored at these waste facilities would not be considered to be a Category A waste facility.

Classification in accordance Annex II.

Waste Material	Description	Classification	Chemical Process treatment	Deposition description	Transport System
Silt Pond Excavations and cleanings	Peat and mineral soils associated with peatlands. Stored for reuse during bog rehabilitation, with no displacement of overburden	01 01 02	None	Excavated from silt ponds by excavator and deposited adjacent to the silt pond.	Excavator
Peat Screenings	Stones, timbers and oversized peat particles, reincorporated into low	01 01 02	None	Removed by screen at the factory and	Tractor and trailer.

Waste Material	Description	Classification	Chemical Process treatment	Deposition description	Transport System
	areas, agreed with the Agency, and stabilized under normal natural bog conditions			transported by tractor and trailer to the designated and agreed locations	
Bog Timbers	Pine, Oak and Yew species, stored at locations in each bog. Not subject to any stability issues due to exposure to atmospheric/meteorological conditions.	01 01 02	None	Removed from the bog surface by excavator and transported by tractor and trailer to the agreed locations	Tractor and Trailer

Description of operations.
Silt pond excavations arise from the requirement to have silt ponds treating all peat extraction sites. Silt pond cleanings arise from the removal of peat silt from silt ponds as required under IPPC Licence. Bog timbers arise from preparation of the bogs surface for peat production. Estimated quantities of materials are below:

Closure plan. (Bog Rehabilitation Plan).
Condition 10.1 – 10.3 of the IPPC Licence requires the following:

- 10.1 Following termination of use or involvement of all or part of the site in the licensed activity, the licensee shall:
- 10.1.1 Decommission, render safe or remove for disposal/recovery, any soil, subsoils, buildings, plant or equipment, or any waste, materials or substances or other matter contained therein or thereon, that may result in environmental pollution.
- 10.1.2 Implement the agreed cutaway bog rehabilitation plan (refer Condition 10.2).

10.2 Cutaway Bog Rehabilitation Plan:

- 10.2.1 The licensee shall prepare, to the satisfaction of the Agency, a fully detailed and costed plan for permanent rehabilitation of the cutaway boglands within the licensed area. This plan shall be submitted to the Agency for agreement within eighteen months of the date of grant of this licence.
- 10.2.2 The plan shall be reviewed every two years and proposed amendments thereto notified to the Agency for agreement as part of the AER. No amendments may be implemented without the written agreement of the Agency.

10.3 The Rehabilitation Plan shall include as a minimum, the following:

- 10.3.1 A scope statement for the plan; to include outcome of consultations with relevant Agencies, Authorities and affected parties (to be identified by the licensee).
- 10.3.2 The criteria which define the successful rehabilitation of the activity or part thereof, which ensures minimum impact to the environment.
- 10.3.3 A programme to achieve the stated criteria.
- 10.3.4 Where relevant, a test programme to demonstrate the successful implementation of the rehabilitation plan.
- 10.3.5 A programme for aftercare and maintenance.

10.4 A final validation report to include a certificate of completion for the Rehabilitation Plan, for all or part of the site as necessary, shall be submitted to the Agency within six months of execution of the plan. The licensee

shall carry out such tests, investigations or submit certification, as requested by the Agency, to confirm that there is no continuing risk to the environment. This plan including maps and ecological classifications are available on file at the Allen Clonsast IPPC Licence Coordinators office.
The location in relation to the silt pond excavations and cleanings are adjacent to the silt ponds, which are considered under the Shannon River Basin Management Plan in accordance with the requirements of Directive 2000/60/EC.
Screenings and bog timbers are all naturally occurring elements of peatland and there placement back to the bog in smaller concentrated designated waste facilities does not constitute a risk to the prevention of water compliance.
The lands under where these materials are deposited are peatlands and are un-effected by the placing of this material.

Review.
This plan will be reviewed every five years, the first review to take place in September 2017. This review will entail an inspection of these waste facilities to ensure their placing, management, maintenance and stability comply with the requirements of the Extractive Waste Management requirements and condition 7.5, 7.6 and 7.7 of the Littleton IPPC Licence P0499-01.

APPENDIX IX: CONSULTATION SUMMARIES

Table APXI -1 Consultees contacted.

Bog Name	Contact Organisation	Contact Name	Date of Issue	Format	Date Response Received	Response Format
Consultation undertaken in 2017-2018						
Baunmore	Private individual A		27/11/2017	Letter		
Littleton Bog Group	Irish Peatland Conservation Council	Several staff members		letter	14/02/2018	
Ballysorrell, Templetouhy, Baunmore	National Parks and Wildlife Service	Several staff members	6/02/2018	Site meeting	8/3/2018	
Lanespark	Private individual B		11/04/2018	Site Visit	11/04/2018	
Ballysorrell, Carrickhill Baunmore	NUIG	Several staff members	23/04/2018	Site Visit	23/04/2018	
Littleton Bog Group	Private individual C		25/04/2018	Phone	25/04/2018	
Derryvilla	Slieve Ardagh Rural Development Group	Several members	1/06/2018	Meeting	1/6/2018	
Littleton Bog Group	National Parks and Wildlife Service	Regional staff	24/05/2018	Email	1/06/2018	
Littleton Bog Group	General community meeting – Loch Doire Bhile, site visit to Baunmore		12/06/2018	Site Visit/meeting	12/06/2018	
Littleton Bog Group	National Parks and Wildlife Service	Regional staff	14/06/2018	Site visit	14/06/2018	
Littleton Bog Group	Tipperary County Council	Heritage Officer	23/06/2018	Phone	23/06/2018	
Derryvilla	Private Individual D		27/06/2018	Meeting	27/06/2018	
Littleton Bog Group	Birdwatch Ireland	Several staff members	1/08/2018	Email	3/08/2018	
Littleton Bog Group	Irish Peatland Conservation Council	Several staff members	1/08/2018	Letter	15/08/2018	
Littleton Bog Group	Kilkenny County Council	Heritage Officer	1/08/2018	Email	3/08/2018	

Bog Name	Contact Organisation	Contact Name	Date of Issue	Format	Date Response Received	Response Format
Littleton Bog Group	National Parks and Wildlife Service	Several staff members	1/08/2018	Letter	9/10/2018	
Littleton Bog Group	Irish Peatland Conservation Council	Several staff members	30/08/2018	Meeting	30/08/2018	
Littleton	Forest Service	Several staff members	14/08/2018	Email	14/08/2018	
Baunmore & Littleton	Birdwatch Ireland – Tipperary Branch	Several staff members	1/10/2018	Site visit	1/10/2018	
Littleton Bog Group	Tipperary County Council	Several staff members	5/11/2018	Email	19/11/2018	
Littleton Bog Group	Tipperary Heritage Forum	Several staff members	15/02/2019	Presentation	15/02/2019	
Knockahaw	Private Individual E		1/02/2019	Site Visit	1/02/2019	
Littleton Bog Group	Environmental Protection Agency, National Parks and Wildlife Service, Irish Peatland Conservation Council	Several staff members	26/02/2019	Presentation meeting	26/02/2019	
Baunmore	Irish Wildlife Trust	Several staff members	12/05/2019	Site Visit/Walk	12/05/2019	
Lanespark Derryvilla	National Parks and Wildlife Service and Slieve Ardagh Rural Development Group – Loch Doire Bhile	Several staff members	22/05/2019	Meeting	22/05/2019	
Longford Pass	Private Individual F		5/07/2019	Site visit	5/07/2019	
Ballysorrell	Heritage Week Walk - Ballysorrell	Several staff members	17/08/2019	Site Visit/Wak	17/08/2019	
Baunmore Carrickhill	Limerick Institute of Technology (LIT)	Several staff members	13/09/2019	Site visit	13/09/2019	

APXI -2 Response summary from Consultees contacted (*Note: This includes consultation undertaken as part of the Phase 1 rehabilitation plan).*

Organisation	Summary of Response by Stakeholder	BnM Response
NPWS 8/3/2018	Ballysorrell All walked over the bog and viewed the bog restoration works. MCC outlined work carried out so far and work planned for the future. Planned work is > 75% complete. NPWS staff very complementary of the bog restoration work (drain-blocking with peat dams) carried out so far. All agreed that the bog had significant potential for bog restoration, and future nature conservation. Signs that the bog is already re-wetting in places due to drain-blocking. Review and discussion of NPWS degraded raised bog model outputs for Ballysorrell. Model predicted that 9 ha would have potential for development into active raised bog in the future. General view was that this was probably an under-estimate and that the model likely to be affected by the intensive BnM drainage network. Discussion of potential measures to further increase re-wetting of the bog including berms across high bog at southern section. Bruckana All visited the Bruckana Windfarm. Viewed a cutaway bog area within the windfarm complex where there has been significant natural colonisation for at least 20 years and some targeted hydrological management. Discussion of the former history of Templetuohy Bog as a sod turf production bog. Sod turf cutaway tends to have deeper remnant peat, which in turn can develop Sphagnum-rich vegetation, where conditions suit. Attendees viewed some wet cutaway where there has been some Sphagnum colonisation. Discussion of environmental conditions that led to the development of this specific vegetation type. Discussion of potential to re-wet similar cutaway, with similar environmental conditions and deeper peat, to encourage development of Sphagnum-rich peat-forming vegetation. Discussion of different constraints and opportunities for this type of re-wetting. This Sphagnum-rich peat-forming vegetation only has potential to develop in certain environmental conditions in association with deeper peat. NPWS staff suggested that intensive bunding would have potential to increase the overall re-wetted area. There was general discussion of potential larger project opportunities, in association with planned BnM rehabilitation or future BnM afteruse development. These larger projects could potentially focus on GHG emission reduction, creation of peat-forming habitats, biodiversity enhancement, other ecosystem services enhancement/restoration. Baunmore All visited Baunmore cutaway. Baunmore is a typical milled peat cutaway with pumped drainage and with shallower remnant peat more typical of milled cutaway in the Littleton Bog Group, in contrast to Bruckana. All walked part of the bog where some recent rehabilitation trials have been carried out. MMC pointed out the recent field drain blocking using a bull-dozer that has been carried out so far. The target here was to block drains, re-establish surface drainage and re-wet peat. This work has already successfully held back surface water in places. The cambered fields and variable topography mean that a proportion of the peat fields remain dry. The expected habitat development is a mosaic of poor fen wetland communities, Reed swamp and scrub/wet woodland. MMC explained how blocking the field drains is Phase 1 of the planned rehab trial and that Phase 2 will involve blocking outfalls and cutting new overflow drains to further manipulate overall water levels. The overall strategy is to maximise the area of re-wetted peat with water levels close to the peat surface and emergent wetland communities. NPWS staff also suggested that more intensive bunding would have potential to increase the overall re-wetted area and help manage water levels. All then examined some cutaway that is colonising naturally with pioneer vegetation. This cutaway is much more alkaline compared to Bruckana with indicators such as the presence of Black Bog-rush.	

Organisation	Summary of Response by Stakeholder	BnM Response
Tipperary Cunty Council	The draft plan is an overview of the rehabilitation within the Littleton bog group this comprises of 12 bog areas. The plan is developed under Condition 10 of IPC Licence Ref. P0499-01. (An incorrect licence ref. is given in the plan.) Any consideration for future after uses for the bog areas will be subject to the planning regulatory framework and the Environment section will be obliged to comment at this time on a more detailed proposal. The rehabilitation plan should include best practice measures for the restoration of an optimal range of biodiversity and ecosystems. The aftercare management activities on the level, quantity and quality of water both on site and in the surrounding landscape should avoid any unnecessary deterioration in the quality and quantity of ground and surface waters. After use, peatland water levels and flow regimes should be restored to as close to the natural reference conditions as possible. Any works carried out must be detailed and all stakeholders consulted.	
Irish Peatland Conservation Council	The IPCC welcome the zonation of Ballysorrell Bog for biodiversity and the decision not to develop it for peat resources (Page 3). Ballysorrell Bog is quite southerly in its location and its rehabilitation and zonation for biodiversity will help to extend the range of raised bog habitat in Ireland, which according to "The Status of EU Protected Habitats and Species in Ireland | 2013" (NPWS, 2013) is "BAD". We have a few questions and points to make on the draft rehabilitation plan with the aim to improving its content. It is good to see that BnM will be restoring the hydrology of the high bog through drain blocking as mentioned on Page 4 and that you also intend to carry out a trial rehab programme of a selected area for training purposes. Could you please elaborate on this? What training/trials do you intend to conduct and is it only inhouse training for BnM staff? The rehabilitation process may be a good time to test the Canadian method of Sphagnum transfer as there would be time to prepare the site prior to drain blocking. Please give this suggestion consideration as you indicated the peat present as light red brown Sphagnum peat (Page 9). There is Sphagnum on site that could be harvested and used as a donor inoculum for a Sphagnum trial. Page 5 gives information on the short and long-term time-frames of the plan. Could you give more details on the methods that will be utilised to monitor the hydrology i.e. will piezometers be used to measure water levels and will they be measured before drain blocking? This could ensure that any hydrological successes will be shown. In addition, how frequently will the ecotope mapping be conducted? Page 3 details the time-line for the development of Ballysorrell ("Ballysorrell was originally developed....."). Could this historical timeline be re-written as it is difficult to follow. For instance, when did the private sodpeat cutting around the bog cease? When did the milled peat production cease? Could you please specify how Ballysorrell Bog will help to achieve the national conservation target for active raised bog and supporting habitat in Ireland? Are there plans to formally designate this site in the future? Thank you for giving us this opportunity to make some comments on this welcome initiative by Bord na Mona.	
NPWS 9/10/2018	The Department, particularly, welcomes the restoration measures proposed for Ballysorrell Bog and Knockahaw Bog which will result in the development of active raised bog habitat and acknowledge that this will significantly aid Ireland in meeting its commitments under the EU Habitats Directive. Whilst it is appreciated that "the rehabilitation measures will be adapted to the various baseline conditions" (Part 1, pg.20) the Department recommends that BnM consider more fully the potential for forward-planning during production phases of its operation so that the topography of the commercial fields could be engineered so as to best facilitate rewetting of the sites. Such an approach would better conform to Principle 17 (afteruse of cutaway peatlands) of the National Peatlands Strategy (2015). The Department recommends that the ongoing research into the interaction between rehabilitation measures and carbon emissions is prioritized so as to better inform future rehabilitation plans. In the absence of the assimilation of such research outputs into rehabilitation planning it is nonetheless recommended that serious consideration is giving to reprofiling works within the Littleton Bog Group. In relevant sites this could greatly improve the baseline conditions for rewetting and would be justified on the basis that rewetted cutaway has lower carbon emissions that dry, bare cutaway. The foregoing is in line with Principle 19 (contribution of peatland rehabilitation and restoration to climate change mitigation and adaption) of the National Peatlands Strategy. There is some difficulty interpreting the maps due to their complexity and the size of the legend. Maps showing specific restoration actions would be useful, possibly in the form of an	

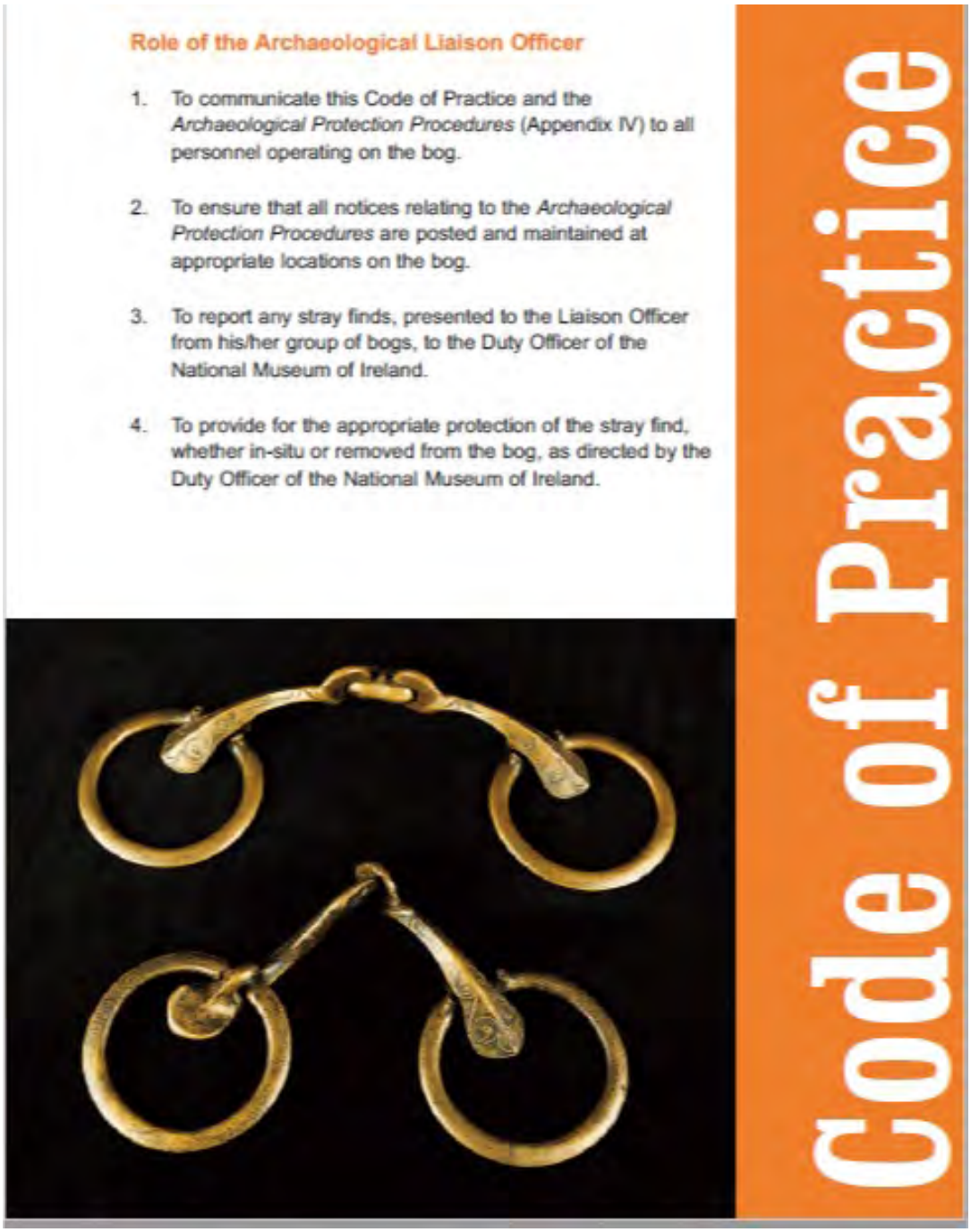
Organisation	Summary of Response by Stakeholder	BnM Response
	overview grid at a scale 1:35,000 with more detailed mapping as per grid squares. Eco-hydrological modelling based on LiDAR/DTM would be essential to ascertain the potential to achieve wet habitats with the potential to turn into carbon sinks. ….. 2 The Department is keen to continue engagement with BnM as regards investigating more engineered restoration techniques likely to provide results in line with the principles of the National Peatlands Strategy. The NPWS of the Department would welcome an opportunity to meet with you to allow for the Plan to be presented by your Ecology Team and to further explore the options of external funding such as EU LIFE funding, as discussed in previous meetings.	
IPCC 15/08/2018	Could you please clarify the correct area for the group of 12 sites included: is it 5050ha (Page 11, Section 4.2) or is it 4824ha (Page 11, Table 1). If it is the latter could you clarify what the other 226ha constitutes please. IPCC's principal interest in this plan lies in the future of existing acid peat bog remnants, the potential of the cutaway areas to provide biodiversity value and priority habitats for nature conservation, climate change mitigation and the extent to which the plan meets requirements of the National Peatlands Strategy 2015. The area of peatland included in the Littleton Bog Group is significant in the county of Tipperary as it represents one third of the original area of raised bog that occurred in the whole County particularly concentrated in South Tipperary (Hammond 1979 Peatland Map of Ireland) the southern distribution range for raised bogs described in the Status of EU Protected Habitats and Species. In your plan on Table 5 only two bog restoration sites (Ballysorrell and Knockahaw) are proposed covering an area of 567ha. Can you explain the method used in choosing these areas for bog restoration and were any other sites considered within the group? IPCC maintain that two sites is far too little considering the area of the land in the Littleton Group and the lack of any sites of conservation value in this area of former raised bog distribution. We note that Killeens Bog contains acidic peat and that it appears to be earmarked for horticultural peat (sod moss judging from the satellite photograph) should this be required. On Page 16 in conclusion 5 the plan states that this bog could be restored if horticultural peat extraction is stopped. IPCC strongly recommend the immediate cessation of this activity on this site and its inclusion in the restoration sites plan. We have reasoned with BnM on numerous occasions about the continued national production of horticultural peat as we do not agree that this use represents responsible management as defined in principle P24 in the National Peatlands Strategy. We understand that Sod Moss is regarded in economic terms as a "lost leader" product which negates any economic argument for keeping this site in production. Here in Littleton where BnM have exploited over 5000ha of Tipperary's natural peatland resources, all peat production should cease and every effort should be made to restore suitable acid peat resources to living bog where they exist. In this regard on Page 15 (Section 4.3.1.1 [ii]) two further sites with acid peat are mentioned - Carrickhill (substantial raised bog cutover east and west of the cutaway) & Inch (raised bog cutover to the south west of the cutaway) - why are these sites not being included in the bog restoration sites line-up? In the IPCC Sites Database we have a site named Longford Pass - Littleton Bog which is a remnant raised bog that we surveyed with a former BnM employee Sean Canney and which we subsequently used for educational purposes with local schools with the agreement of BnM. We would like to see this site included in the bog sites restoration list. (Grid ref. = S 23023 59319). IPCC are very unclear about your aims for the non-designated sites with considerable wildlife interest described on Page 21 of the plan. We estimate that there are 10 sites mentioned that are noteworthy for birds, crustaceans and invertebrates. In addition a further 3 rehabilitation sites are included in the BnM Biodiversity Plan. On the one hand BnM makes use of the fact that cutaway bogs are rich in biodiversity as part of the "Naturally Driven" image you like to portray but we can see no substantial commitment to undertake targeted management actions in relation to enhancing and maintaining these species on the sites. For example on Page 19 you state that without additional funding targeted conservation works for breeding birds will not be a feature of this plan. This is wrong and is at odds with Principle 15 in the National Peatlands Strategy 2015. In relation to climate	

Organisation	Summary of Response by Stakeholder	BnM Response
	change this rehabilitation plan needs to ensure that all of the cutaway bogs within the Littleton Group are rewetted to prevent carbon leakage. In our experience through visits to Mount Lucas, Ballycon and Lullymore cutaway bogs there are substantial areas within these rehabilitated sites that are dry and emitting carbon. Why does BnM not recontour sites with un-even topography to ensure that the majority of the bare peat is rewetted? Surely at the peat production stage more effort could be made to extract the peat so that flat substrate remains. Can you indicate within the plan the percentage of peat that will be rewetted and be carbon neutral? This is an important consideration in line with national climate change policy. IPCC find that the plan is overstating the company's intention to cease peat production for electricity by 2030 as their contribution to climate change policy	
Private Individual C	Phone call to discuss potential to develop greenway amenity across the Littleton Bog Group.	
Private Individual D	Meeting to discuss boundary issues and potential impact of rehabilitation on adjoining land	
Private Individual F	Meeting to discuss rare orchids at Longford Pass railway cutting	
Littleton Bog Group PCAS Consultation undertaken in 2025		
Uisce Éireann (formerly Irish Water)	In their response, Uisce Éireann stated that they are 'supportive of the key objective of achieving environmental stabilisation of the bogs and stabilising/improving key emissions to water. Uisce Éireann understand that restored peatlands are generally beneficial for drinking water sources downstream by improving water quality and by creating water retention and slowing the flow from the site. We are therefore in support of the Cutaway Bog Decommissioning and Rehabilitation Plan and believe that it could help to achieve to improvements the quality of drinking water sources downstream in terms of suspended sediment, colour, ammonia and dissolved organic carbon. Uisce Éireann provided suggestions and recommendations around water quality monitoring and the management of silt ponds during and post rehabilitation.	BnM acknowledged the response and responded to the queries raised. Consultation is ongoing.
Iarnród Éireann/Irish Rail	The location is approximately 10km from the nearest Iarnród Éireann railway line in Thurles, so Iarnród Éireann have no comments to make about the proposed work.	BnM acknowledges the response.
Minister of State with responsibility for Nature, Heritage and Biodiversity - Christopher O'Sullivan TD.	Acknowledge receipt of consultation.	BnM acknowledges the response.
Tipperary County Council	In their submission, Tipperary County Council highlighted that the rehabilitation plan should 'ensure that future options for amenity or tourism uses of the lands are not discounted, having regard to the Council's aspirations to develop eco-tourism projects throughout the county'. Further, it was	BnM acknowledged the response. Consultation is ongoing.

Organisation	Summary of Response by Stakeholder	BnM Response
	highlighted that archaeological impacts associated with rehabilitation of Killeen bog, given the rich archaeological heritage of the lands, should be assessed. Recognition of the Littleton Labyrinth projects is welcomed by Tipperary County Council. The rehabilitation of the bog should have regard to future access and way-leaves for access and services of the adjacent Lisheen Mines National Bioeconomy Campus. Tipperary County Council provided information on the relevant policies and objectives within the Tipperary County Council's Climate Action Plan 2024-2029 that aligned with peatland restoration. Other information focused on the Tipperary Decarbonising Zone, and how peatland restoration would benefit such decarbonisation. Other information was provided on the council's policies on Land-use, Land-use Change and Forestry (LULUCF). It notes that the 'management of agricultural ecosystems, such as grasslands and peatlands' are emitters of CO2 and 'the management of agricultural ecosystems, such as grasslands and peatlands 'an important area for climate mitigation measures'. 'For example, alternative land management measures such as raising the water table in existing pastures and peatlands, new crop types, forestry etc could make this sector a net remover of GHGs'. The submission notes that 'BnM is to be commended for its decarbonisation programme aimed at reducing the carbon emissions from its activities. This programme supports the National policy position and objective of achieving a transition to a competitive, low carbon, climate-resilient and environmentally sustainable economy by 2050'. The submission requests: • 'stakeholder collaboration to deliver concerted efforts towards carbon and GHG emissions reductions within the DZ, which can lead the way for wider application across Tipperary'. • 'BnaM are requested to considered if there are opportunities for collaboration with stakeholders, including Tipperary County Council, as part of the delivery of their PCAS programme'. • 'The Mid-Tipperary Decarbonising Zone is within the JTF area and thus there are opportunities to engage local communities, including those previously employed in the peat harvesting industry, in areas related to training and upskilling and sustainable local job creation'. • 'BnaM are requested to consider the referring of the Mid-Tipperary DZ in their relevant publications and projects. In particular to include details on the Mid-Tipperary Decarbonising Zone in the relevant Rehabilitation Plans and associated Map Books'. • 'The strategic location of the national Bioeconomy Campus (Irish Bioeconomy Foundation) at Lisheen should be noted and it is requested that BnaM consider the vision for the National Bioeconomy campus as part of their overall plans in the Mid-Tipperary DZ areas'. 'BnaM are requested to consider, given the particular role of the national DZ programme in emissions reduction, if there is an opportunity to monitor the changes in carbon emissions from a current baseline within the Killeen bog and report on reduced the carbon emissions in support of the national objective of achieving a transition to a competitive, low carbon, climate-resilient and environmentally sustainable economy by 2050. Thus, the rehabilitation plans can explicitly state how emissions will be monitored and reported. Such reporting will also support Tipperary County Council objectives for supporting moves towards low-carbon communities within the Decarbonising Zone'.	
An Taisce	In their submission, An Taisce welcomed 'any efforts made to rehabilitate and eventually restore Ireland's network of heavily degraded bog lands. This is crucial in the context of the intertwined biodiversity and climate emergencies, and the crucial carbon sequestration function of healthy bogland alongside other ecosystem services'. Expressed that peatlands should not be subject to future development 'which could have negative ecological impacts in terms of hydrological regime, critical wildlife habitat, carbon sequestration function and other ecosystem services'	BnM acknowledged the response. Consultation is ongoing.

Organisation	Summary of Response by Stakeholder	BnM Response
	An Taisce 'highlight an example of a rare species returning to a naturally regenerating bog on BnM lands, namely the Crane, which was absent as a successfully breeding species in Ireland for hundreds of years.2 This demonstrates the positive and regenerative cascading effects across an ecosystem when it is devoid of intensive industrial activity and allowed to regenerate and eventually flourish. We submit that the subject rehabilitation should be considered with these benefits in mind, and that resumption of any type of industrial activity should be excluded within boglands with the highest restoration potential or in those which have already been rehabilitated/restored'. Queries if Coillte conifer plantation forestry could be included in the rehabilitation plan. For Bord na Mona to prevent small-scale illegal turf cutting within the subject site. A request for continuous ecological monitoring to be carried out at the site to ascertain its full ecological value and potential. An Taisce 'welcome the commitment to bunding as a measure throughout the peatland restoration proposal, which is recognised by stakeholders such as the NPWS and IPCC as effective for rewetting purposes'. Concerns were raised 'about the effects of drought and wildfire risk, as well as excess rainfall events and subsequent flooding effects'.	

APPENDIX X: ARCHAEOLOGY



22

Code of Practice

5. To arrange for the delivery or collection of the stray find, as directed by the Duty Officer of the National Museum of Ireland.

6. To complete the Report of Discovery of Archaeological Object(s) in Bogs (Appendix V), as directed by the Duty Officer of the National Museum of Ireland.

7. To maintain a file of all stray finds and associated documentation and provide copies to the Project Archaeologist.

8. To provide assistance, where required, to the Department during archaeological surveys.

9. To provide assistance, where required, to Bord na Móna's Consultant Archaeologists, during investigation and mitigation of monuments.

10. To report to the Bord na Móna members on the Archaeology Management Liaison Committee any planned developments or new activities on cutaway peatland areas within his/her group of bogs.

1. Purpose

The purpose of this procedure is to describe the arrangements within Bord na Móna (BnM) for the identification, protection and reporting of archaeological material, including stray finds and known archaeological features.

All objects, sites or monuments, no matter how fragmentary, are important elements of our national heritage. The protection of archaeological resources is a legal requirement and forms part of Bord na Móna's environmental and cultural heritage responsibilities.

This procedure also sets out operational controls to ensure that archaeological features and their associated buffer zones are protected during rehabilitation activities.

---

2. Procedure

2.1 Archaeological Awareness

1. Verify whether any known archaeological monuments or constraints exist within the proposed work area prior to commencing works. These can be identified using the BnM GIS system, including the relevant PCAS layers and associated field maps.
2. All archaeological locations and their associated buffer zones shall be clearly marked on the bog in advance of any rehabilitation activities, irrespective of whether works are planned within those areas. The Survey Team will endeavour to mark all zones prior to commencement of rehabilitation works on a given bog; however, this is subject to the availability of survey resources. Where features are located in areas that are unsafe to access (e.g. water-covered areas), physical marking is not required.
3. These markings must be installed prior to machinery entering the field where all rehabilitation measures are taking place.
4. Archaeological features located within fields will be marked by the Survey Team using a visible red "X" to clearly alert operators to the presence of an archaeological constraint. These features are typically accompanied by a 20 m buffer zone, which may restrict access to up to three adjacent fields.
5. Operators must not drive over or across these markers, including when moving between work areas. Operators must navigate around the marked locations and their associated buffer zones.
6. If operators are observed driving over archaeological markers in order to move to the next work area, this must be reported to the Site Supervisor or **Archaeological Liaison Officer** immediately so corrective action can be taken.
7. Archaeological areas and their associated buffer zones must not be used for machine travel, idle travel, turning, or equipment positioning.

2.2 Stray Finds Procedure

1 Be vigilant at all times. Objects or traces of structures may be found:

- on field surfaces
- in drain faces
- on bog margins
- caught within the mechanics of machinery.

2 If a n object is discovered:

- Leave it in place if it is safe to do so.
- Note its position.
- Immediately contact the **Archaeological Liaison Officer**, who will assess the situation and contact the Duty Officer of the National Museum of Ireland where required.

3 Resist the temptation to investigate the find spot further, as this may disturb fragile archaeological deposits.

4 If the object has already been dislodged or is in imminent danger:

- Remove it carefully.
- Mark the find location.
- Report it immediately to the **Archaeological Liaison Officer**.

5 Objects made of **wood, leather or textile**, particularly those removed from peat, must be kept in conditions similar to those in which they were found. This may include:

- packing the object in peat, or
- placing waterlogged items in a clean basin of water and sealing the container.

6 Do not attempt to clean or remove peat from the object.

7 If **timbers, gravel, stones or other materials that may form part of a man-made structure** are discovered:

- mark the location
- report immediately to the **Archaeological Liaison Officer**
- do not expose the structure further.

8 Report anything that appears **unnatural or unusual in the bog**. The **Archaeological Liaison Officer** will determine whether the find requires referral to the relevant authorities.

---

3. Important Note

Our archaeological heritage is a finite and non-renewable resource. Once a site is destroyed, its information is lost forever. Protecting archaeological remains allows us to better understand our past, our landscape and the people who lived here before us.

All Bord na Móna staff and contractors must therefore ensure that archaeological features, buffer zones and potential stray finds are treated with care and protected at all times during operations.

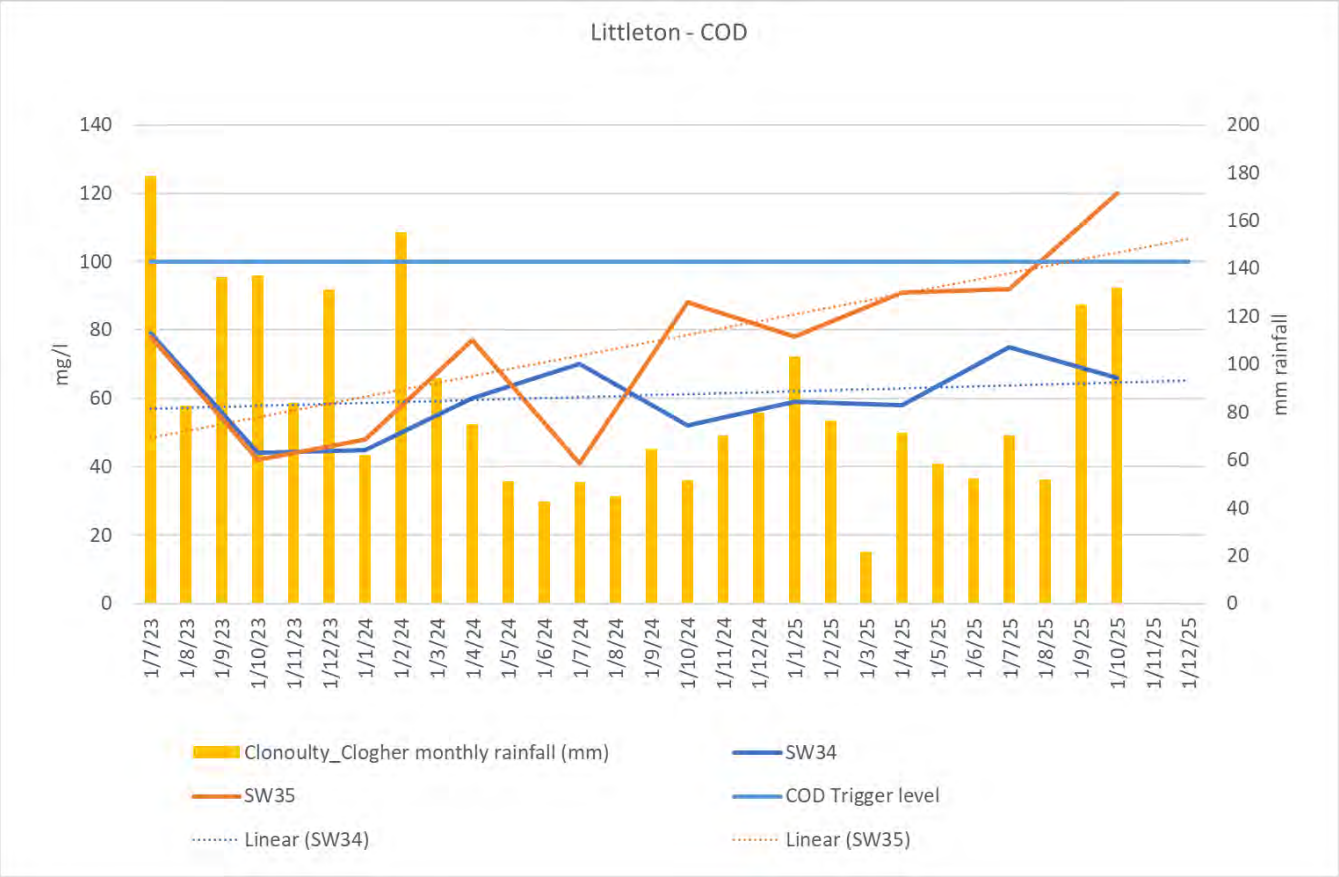
Your Archaeological Liaison Officer is Enda McDonagh

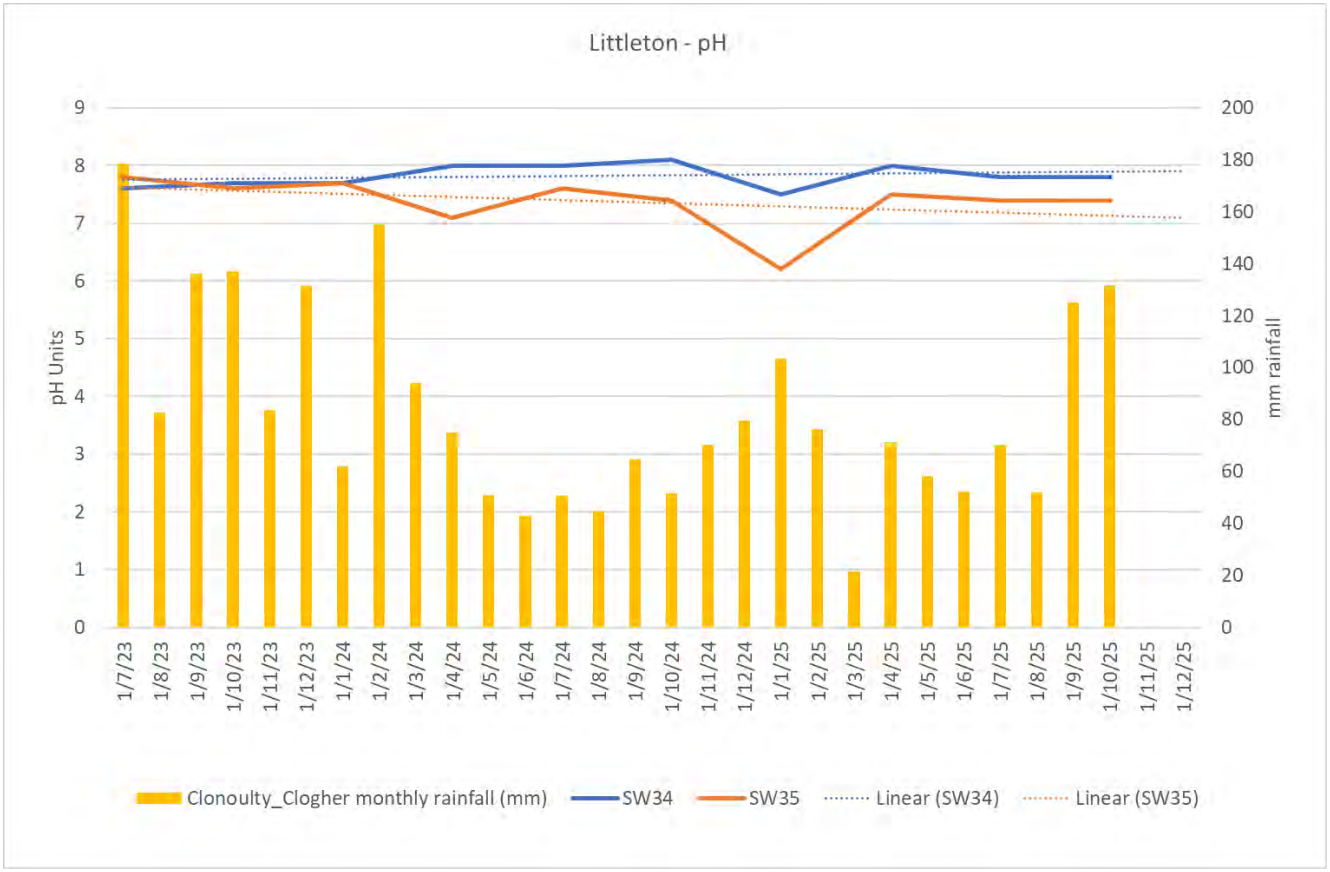
Revision Index			
Revision	**Date**	**Description of change**	**Approved**
1	13/19/2020	First release	EMcD
1	24/11/2025	Change to logo and header	SG

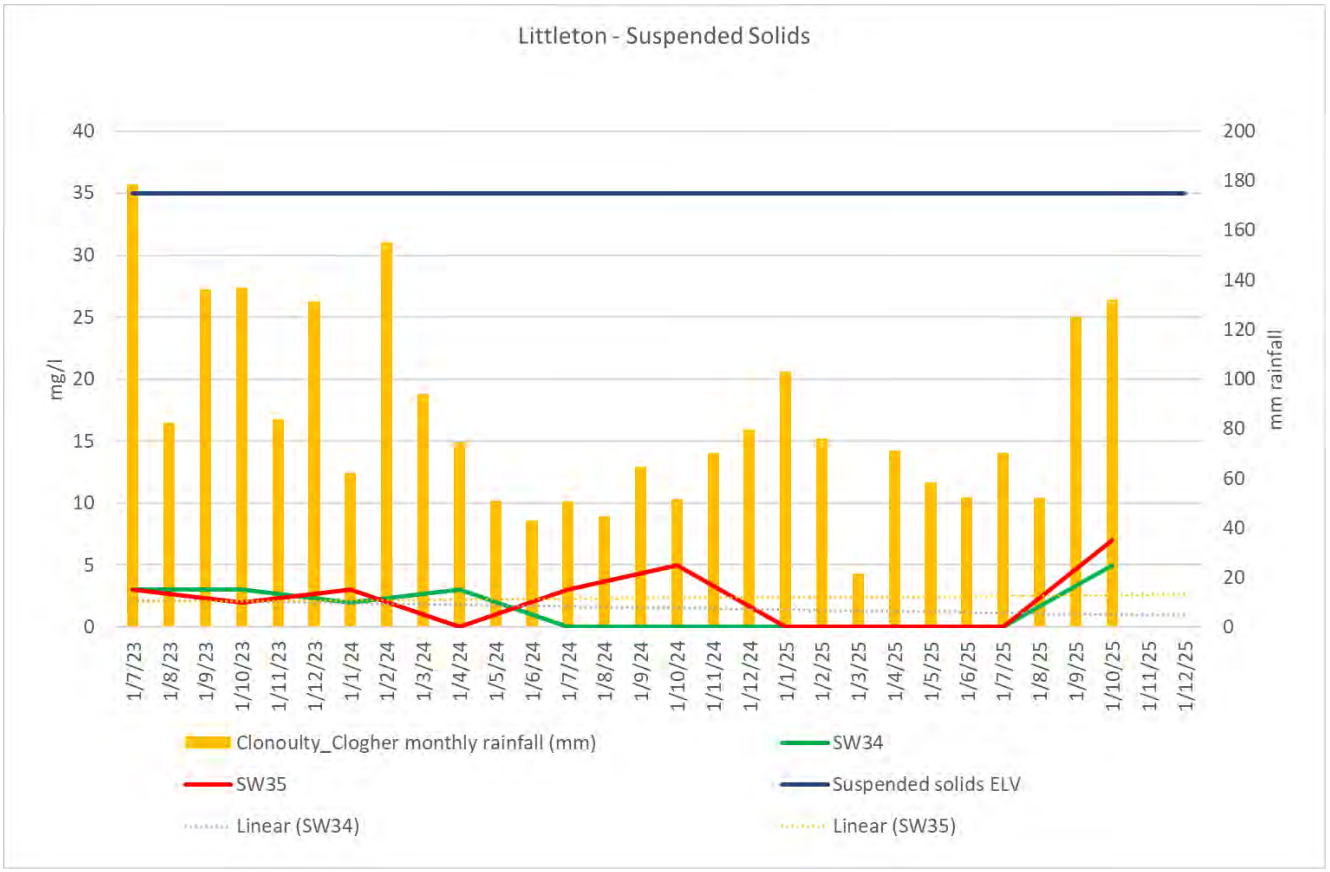
2	10/03/2026	Addition of Archaeological Awareness and change of SOP Title	EMcD

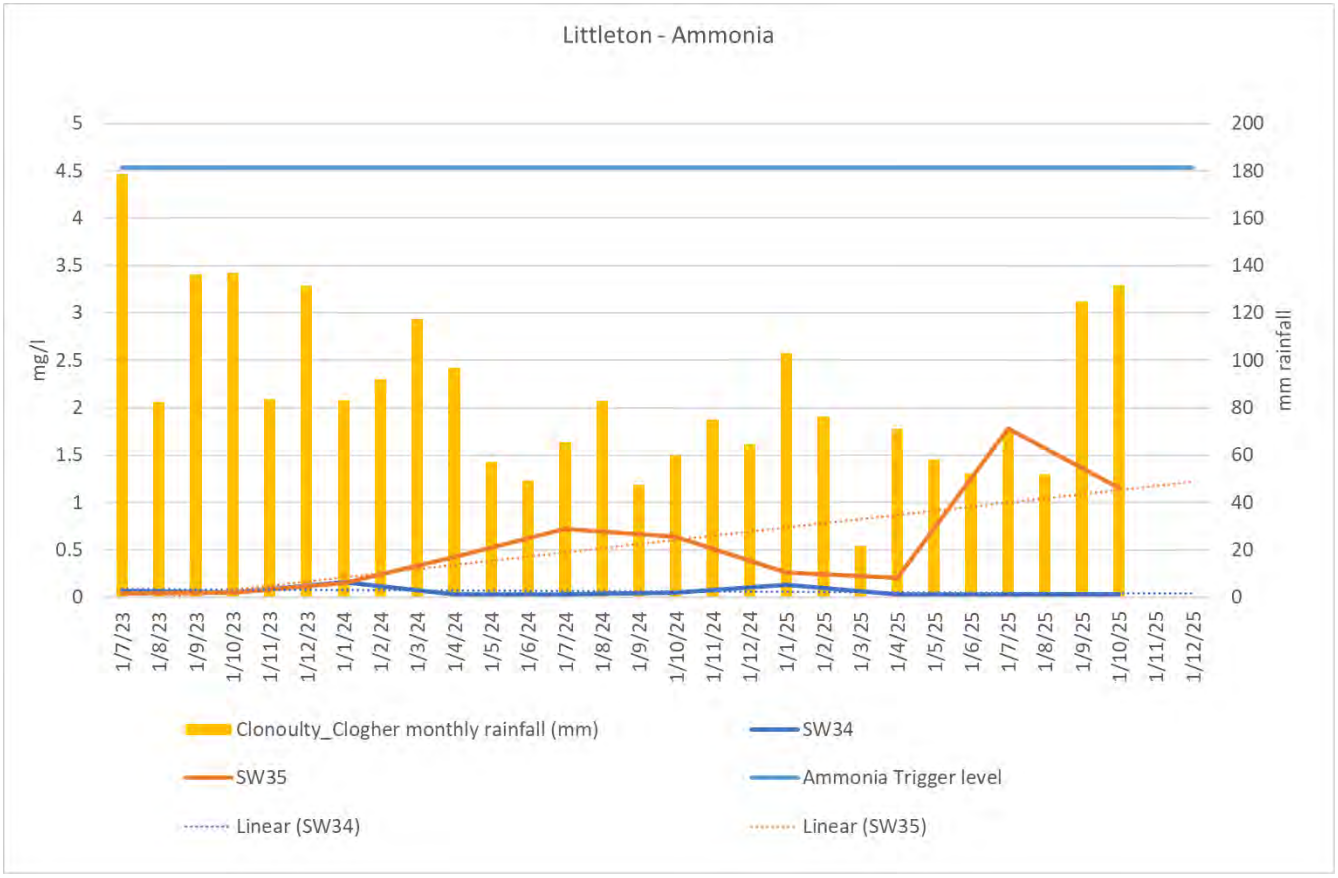
APPENDIX XI: WATER QUALITY MONITORING RESULTS FOR LITTLETON BOG

Water quality monitoring (2023-2025) indicates that suspended solids are well below the emission limit value and continuing to trend downwards, with ammonia trending upwards in one of the sites, as is COD, which would be indicative of naturally occurring nutrient, associated chemical oxygen demand and higher water retention periods. They remain below the associated trigger levels with one exceedance at SW 35 in October 2025. Ammonia levels would be indicative of background levels and would be expected to stabilise as the bogs rehabilitates further and bare peat gets revegetated. The following graphs provide the water quality monitoring results for 2 of the surface water emission locations at Littleton from July 2023 onwards.




Littleton - pH
pH Units
mm rainfall
0
1
2
3
4
5
6
7
8
9
0
20
40
60
80
100
120
140
160
180
200
1/7/23
1/8/23
1/9/23
1/10/23
1/11/23
1/12/23
1/1/24
1/2/24
1/3/24
1/4/24
1/5/24
1/6/24
1/7/24
1/8/24
1/9/24
1/10/24
1/11/24
1/12/24
1/1/25
1/2/25
1/3/25
1/4/25
1/5/25
1/6/25
1/7/25
1/8/25
1/9/25
1/10/25
1/11/25
1/12/25
Clonoulty_Clogher monthly rainfall (mm)
SW34
SW35
Linear (SW34)
Linear (SW35)


Littleton - Suspended Solids
mg/l
mm rainfall
0
5
10
15
20
25
30
35
40
0
20
40
60
80
100
120
140
160
180
200
1/7/23
1/8/23
1/9/23
1/10/23
1/11/23
1/12/23
1/1/24
1/2/24
1/3/24
1/4/24
1/5/24
1/6/24
1/7/24
1/8/24
1/9/24
1/10/24
1/11/24
1/12/24
1/1/25
1/2/25
1/3/25
1/4/25
1/5/25
1/6/25
1/7/25
1/8/25
1/9/25
1/10/25
1/11/25
1/12/25
Clonoulty_Clogher monthly rainfall (mm)
SW34
SW35
Suspended solids ELV
Linear (SW34)
Linear (SW35)


Littleton - Ammonia
mg/l
mm rainfall
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
200
180
160
140
120
100
80
60
40
20
0
1/7/23
1/8/23
1/9/23
1/10/23
1/11/23
1/12/23
1/1/24
1/2/24
1/3/24
1/4/24
1/5/24
1/6/24
1/7/24
1/8/24
1/9/24
1/10/24
1/11/24
1/12/24
1/1/25
1/2/25
1/3/25
1/4/25
1/5/25
1/6/25
1/7/25
1/8/25
1/9/25
1/10/25
1/11/25
1/12/25
Clonoulty_Clogher monthly rainfall (mm)
SW34
SW35
Ammonia Trigger level
Linear (SW34)
Linear (SW35)

Littleton Bog
Rehab Plan
GIS Map Book
2026

Document Control Sheet

Document Name:	Littleton Bog Rehab Plan GIS Map Book 2026
Document File Path:	
Document Status:	**Final v1.0**

This document comprises:	DCS	TOC	Text (Body)	References	Maps	No. of Appendices
	1	1	0	0	13	0

Rev. 0.1	Author(s):	Checked By:	Approved By:
Name(s):	BG	JOS	MMC
Date:	16/04/2026	16/04/2026	16/04/2026

Rev. 0.1	Author(s):	Checked By:	Approved By:
Name(s):	BG	EC	MMC
Date:		15/05/2026	15/05/2026

Table of Contents

Bog Site Information Maps 4

BNM-ECO-26-11B-01: Site Location Map 5

BNM-ECO-26-11B-02: Structures and Sampling 6

BNM-ECO-26-11B-04: Peat Depths 7

BNM-ECO-26-11B-17: Habitat Map- General Cutaway habitats (2018) 8

BNM-ECO-26-11B-21: Aerial Imagery 2000 9

BNM-ECO-26-11B-22: Aerial Imagery 2020 10

BNM-ECO-26-11B-23: Proximity Designated Sites 11

BNM-ECO-26-11B-24: Bog Group Map 12

Hydrology / Topography Maps 13

BNM-ECO-26-11-WQ01: Water Quality Map 14

BNM-ECO-26-11B-03: LiDAR Map 15

BNM-ECO-26-11B-09: Depression Analysis 16

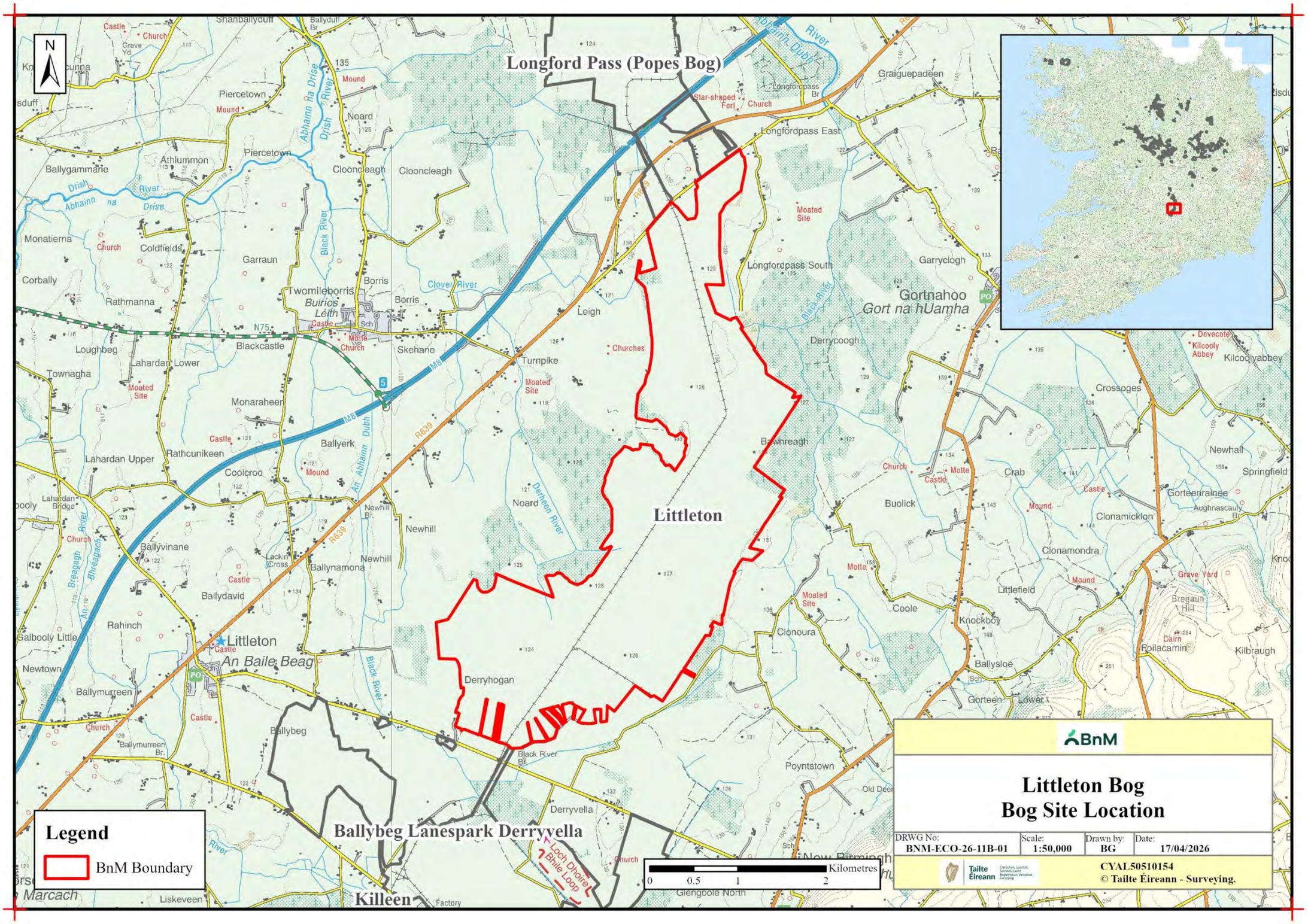
Rehabilitation Maps 17

BNM-ECO-26-11B-20: Standard Rehab Measures 18

Bog Site Information Maps

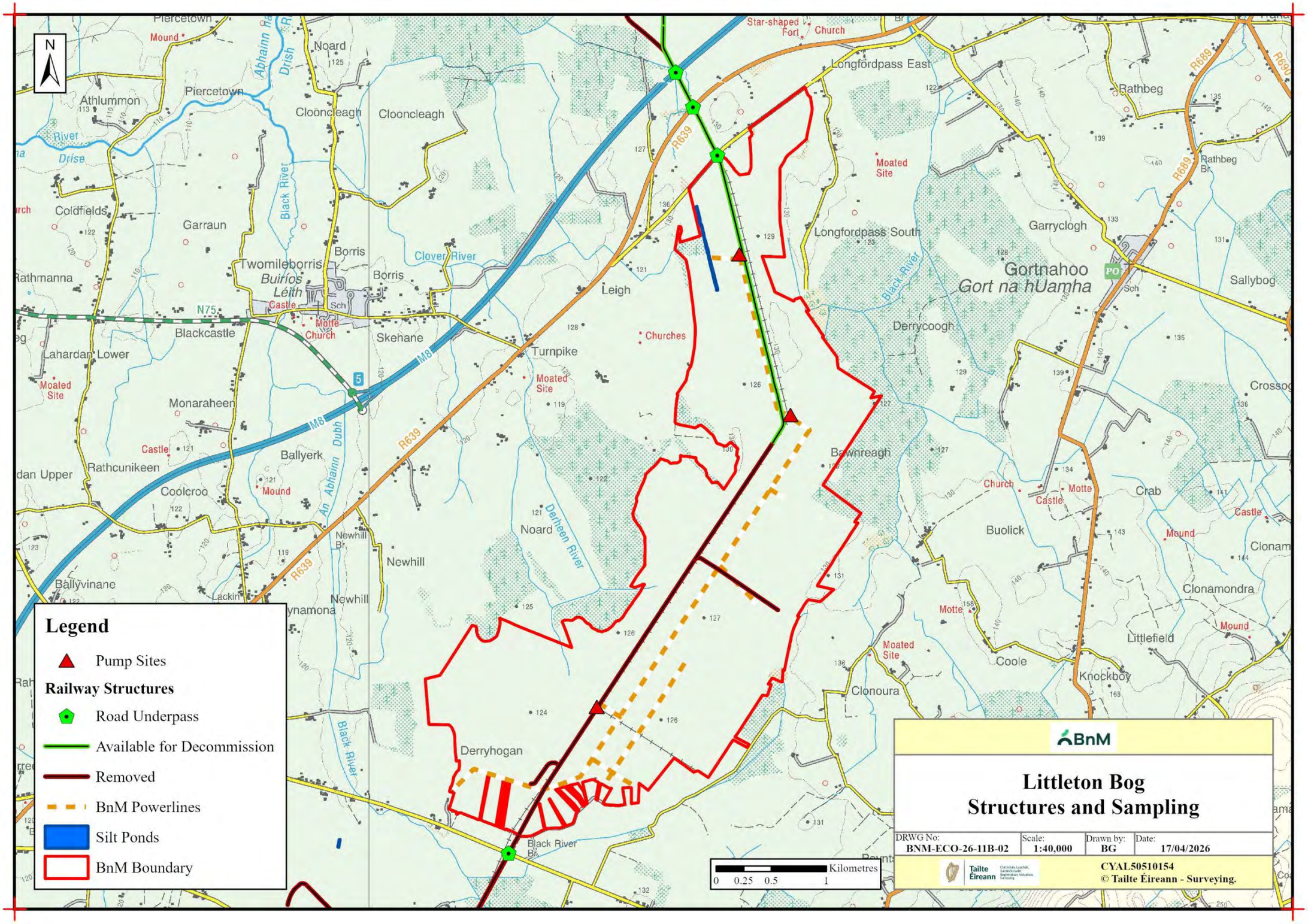
BNM-ECO-26-11B-01: Site Location Map

Back to TOC



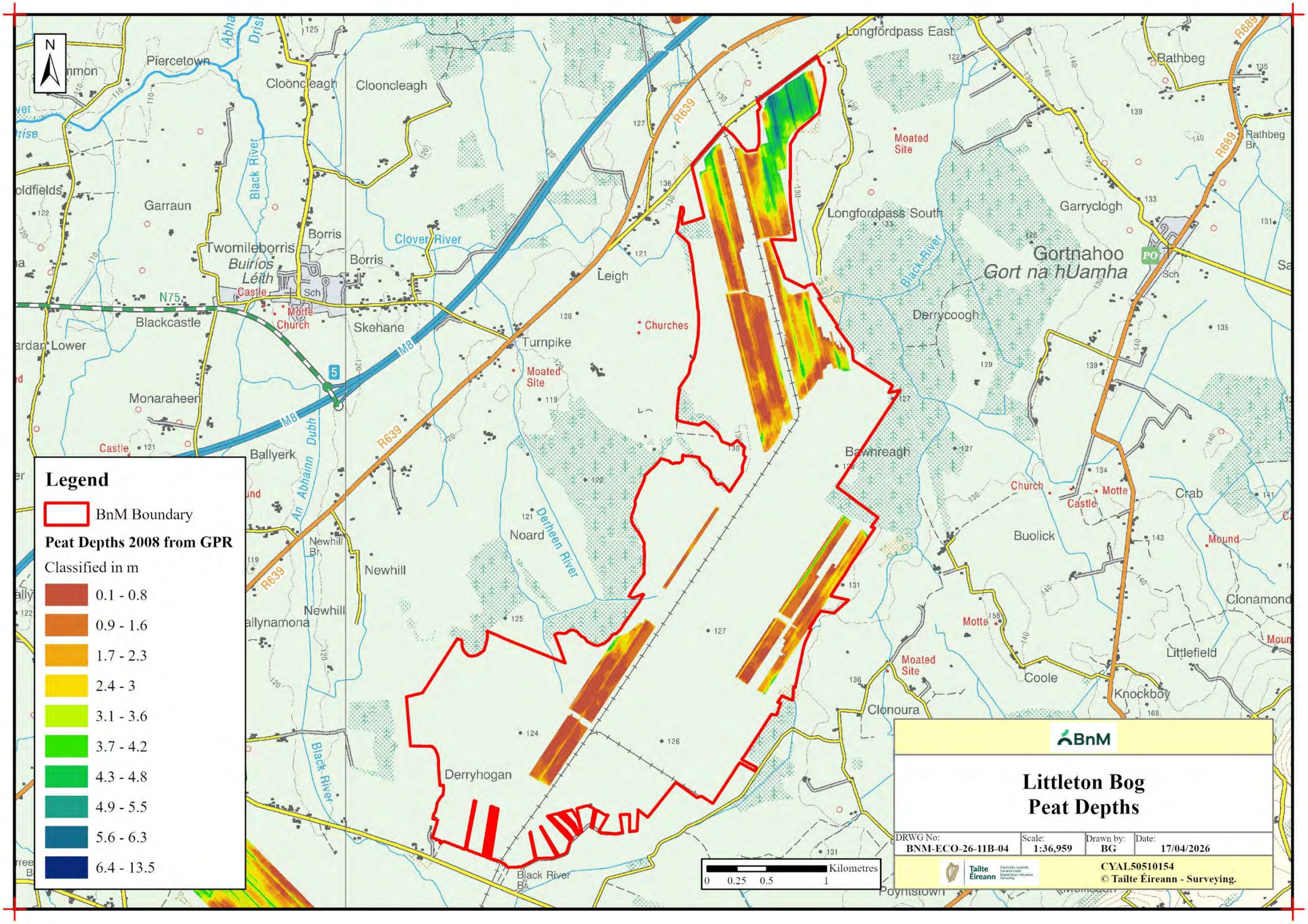
BNM-ECO-26-11B-02: Structures and Sampling

Back to TOC



BNM-ECO-26-11B-04: Peat Depths

Back to TOC

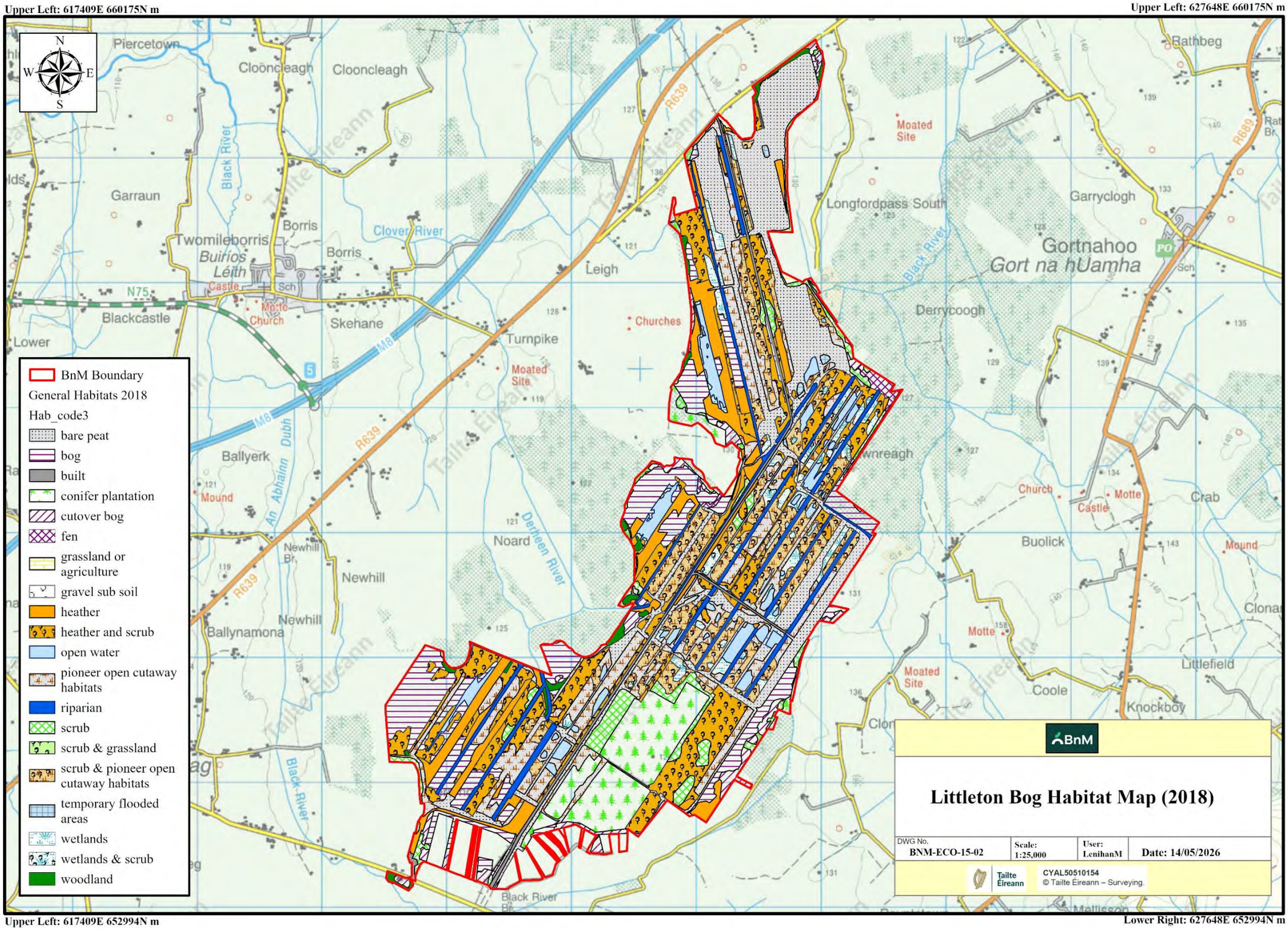


BNM-ECO-26-11B-17: Habitat Map- General Cutaway habitats (2018)

Back to TOC

Upper Left: 617409E 660175N m

Upper Left: 627648E 660175N m

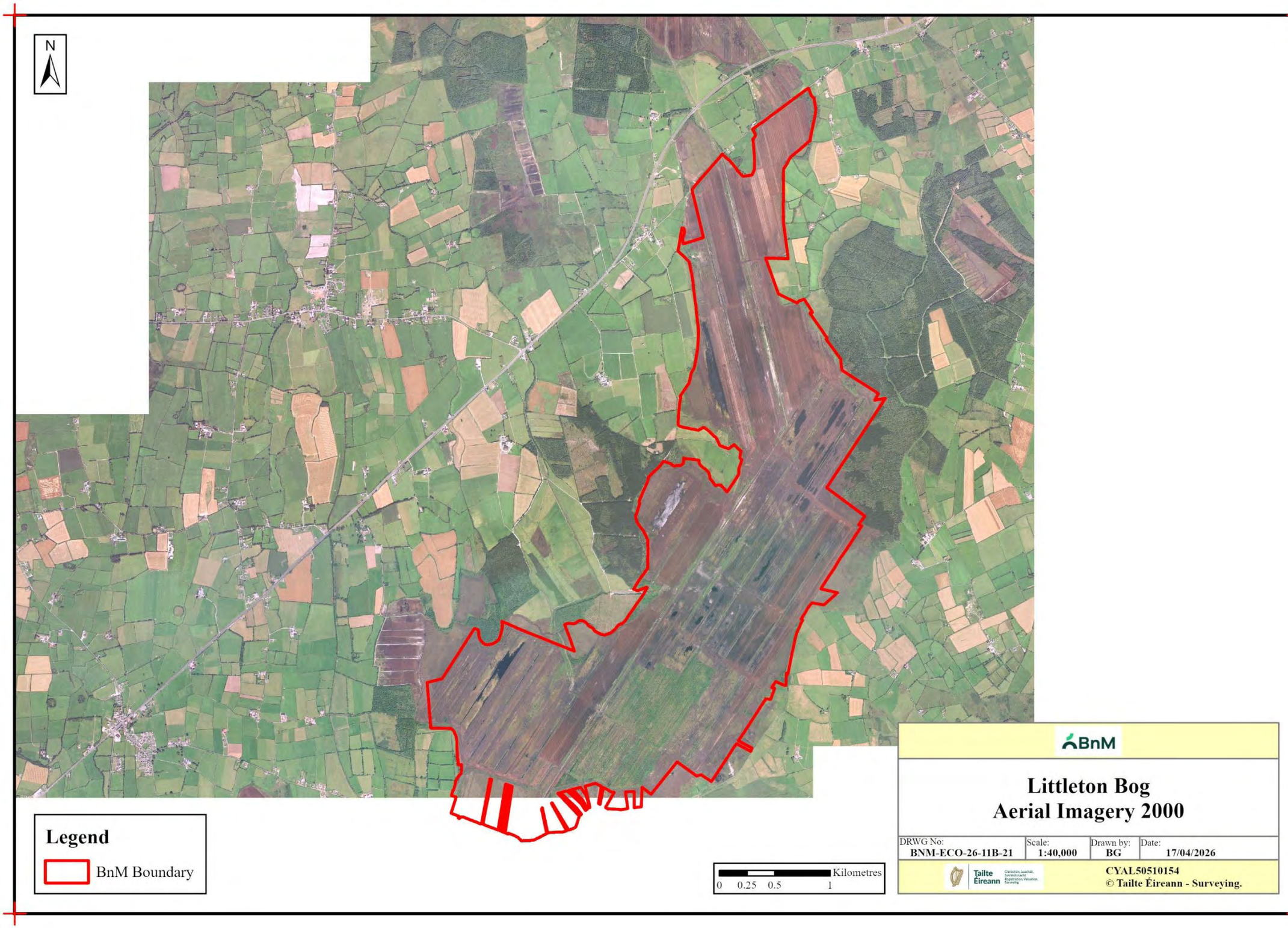


Upper Left: 617409E 652994N m

Lower Right: 627648E 652994N m

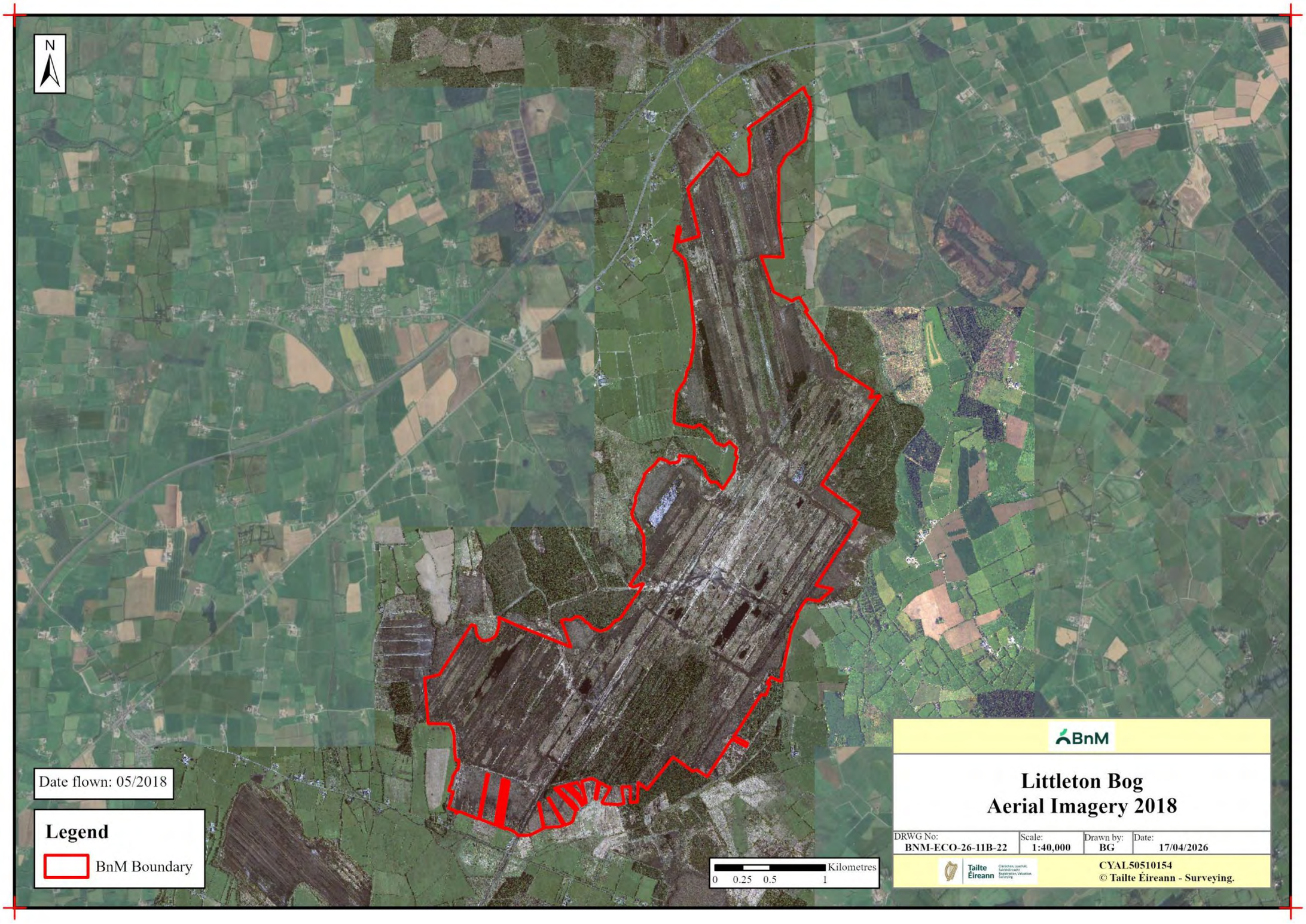
BNM-ECO-26-11B-21: Aerial Imagery 2000

Back to TOC



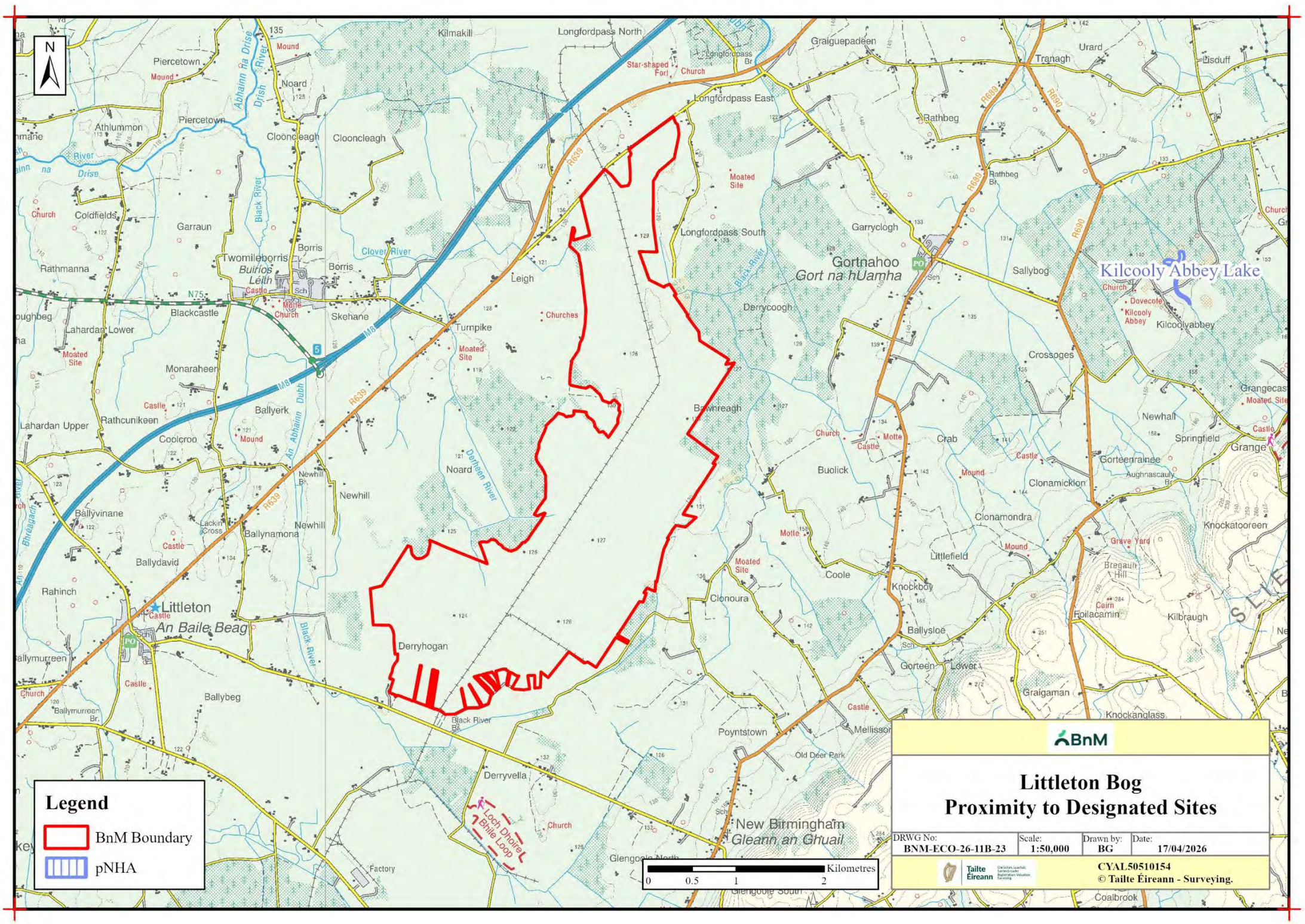
BNM-ECO-26-11B-22: Aerial Imagery 2020

Back to TOC



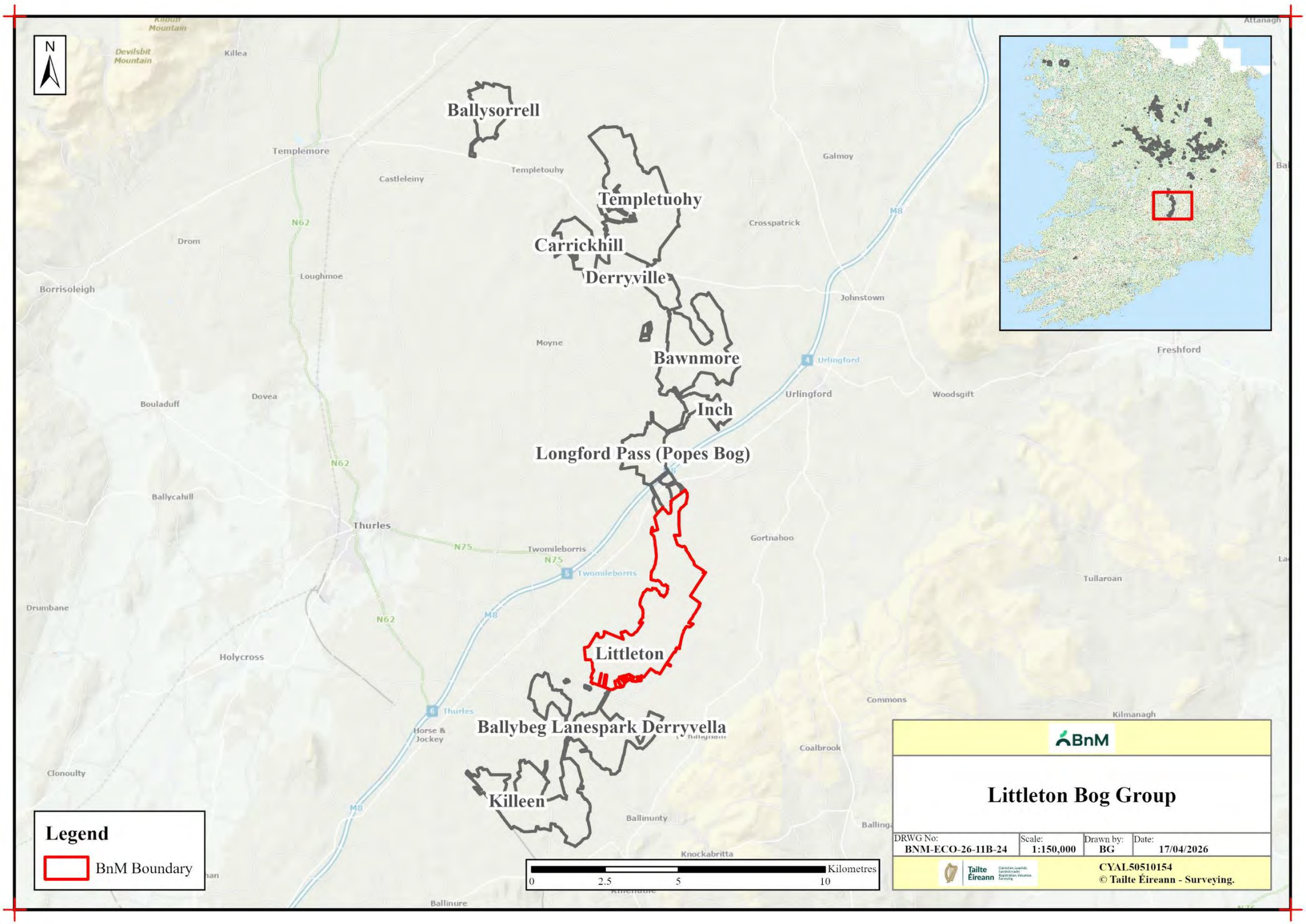
BNM-ECO-26-11B-23: Proximity Designated Sites

Back to TOC



BNM-ECO-26-11B-24: Bog Group Map

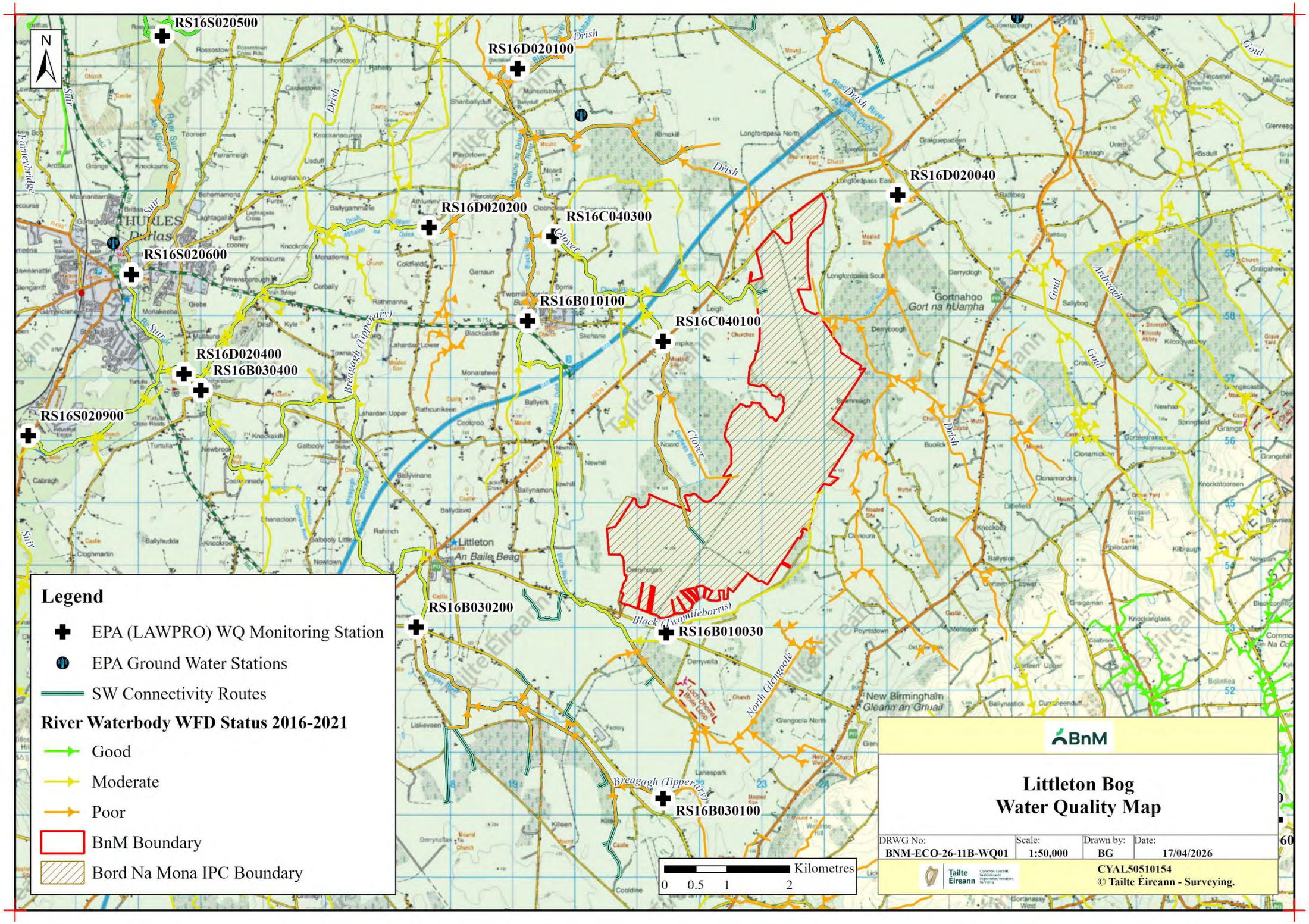
Back to TOC



Hydrology / Topography Maps

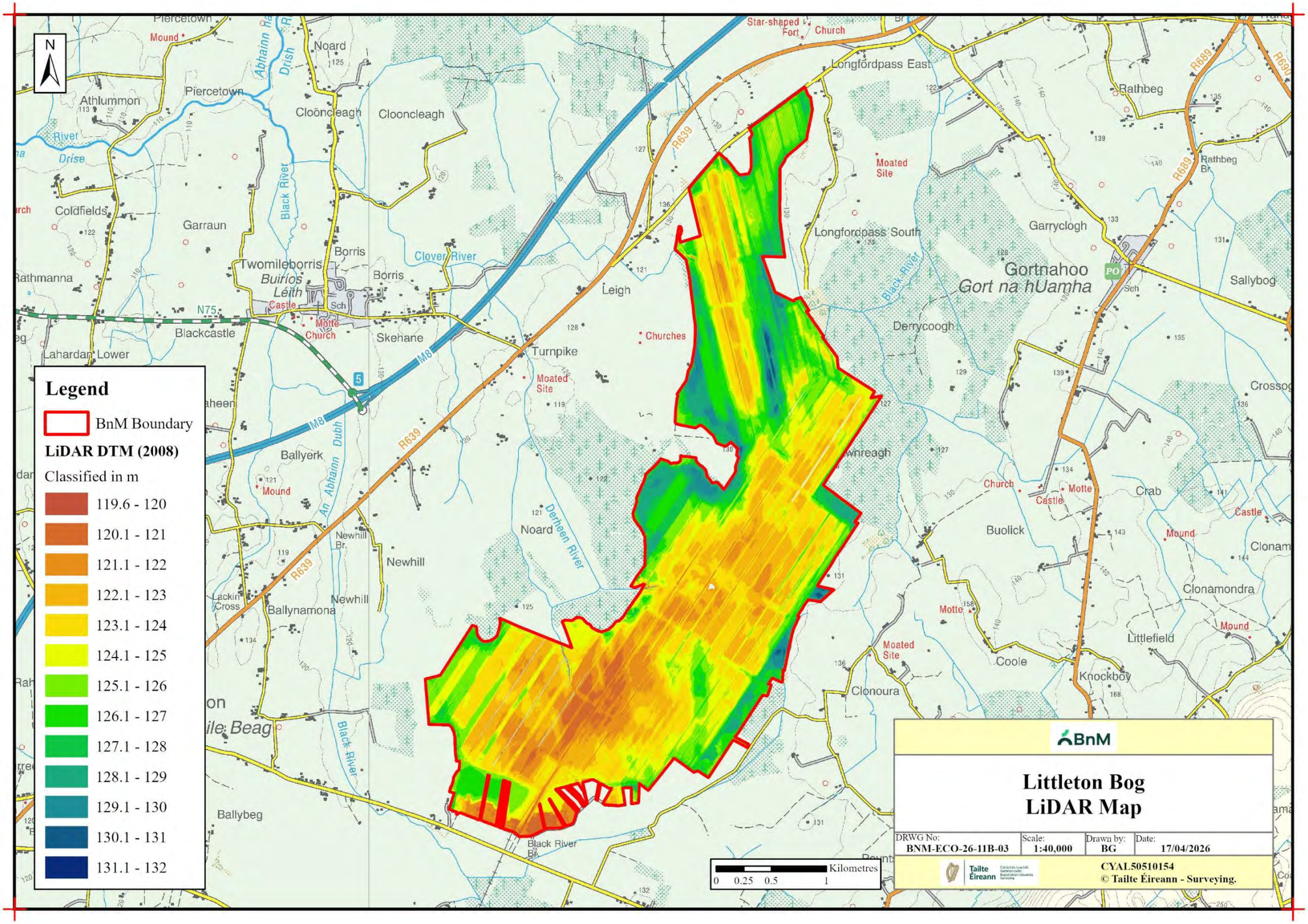
BNM-ECO-26-11-WQ01: Water Quality Map

Back to TOC



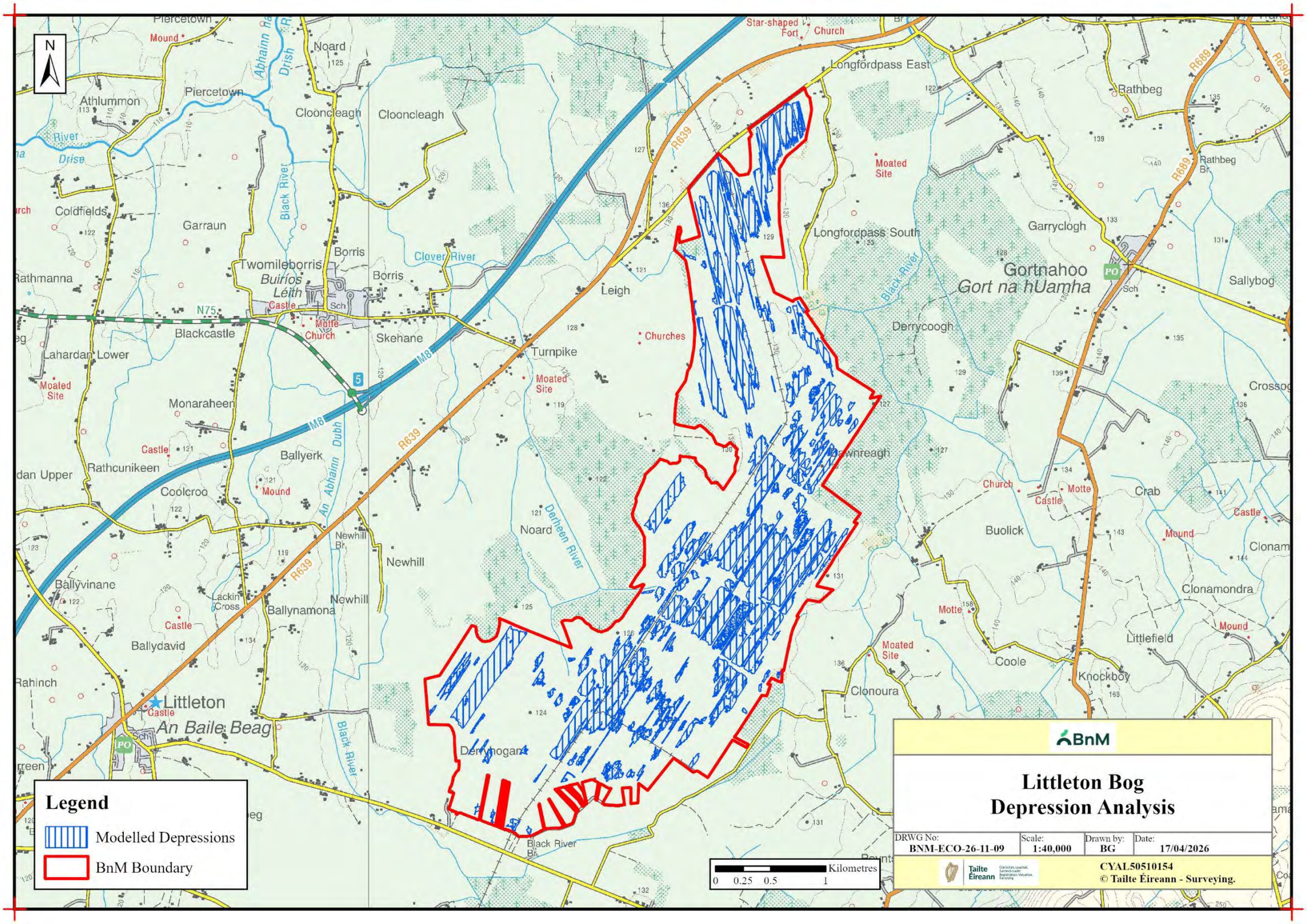
BNM-ECO-26-11B-03: LiDAR Map

Back to TOC



BNM-ECO-26-11B-09: Depression Analysis

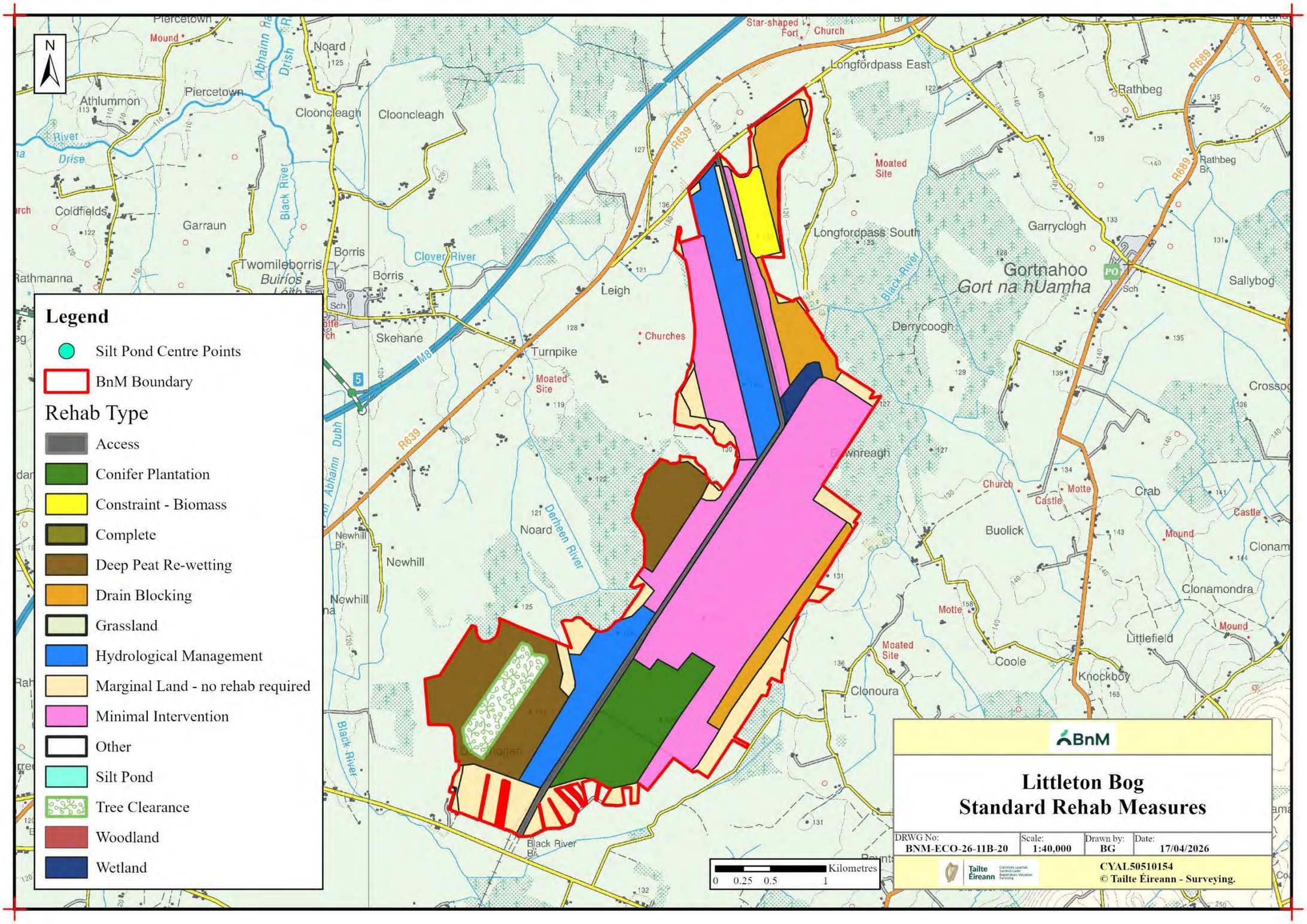
Back to TOC



Rehabilitation Maps

BNM-ECO-26-11B-20: Standard Rehab Measures

Back to TOC



Ballybeg/Lanespark/Derryvella Bog

Cutaway Bog Decommissioning and Rehabilitation Plan

2025

This document seeks to address the requirements of Condition 10.2 of IPC Licence Ref. P0-499-01:

> "*The licensee shall prepare, to the satisfaction of the Agency, a fully detailed and costed plan for permanent rehabilitation of the cutaway boglands within the licensed area.*"

This licence condition requires Bord na Móna (now called BnM) agree with the EPA the measures that will provide for rehabilitation, i.e., stabilisation of Ballybeg/Lanespark/Derryvella Bog upon cessation of peat production and complements the licence requirement to decommission the site.

***Rehabilitation** generally comprises site stabilisation with natural colonisation with or without targeted management.*

Industrial peat production has now fully ceased at Ballybeg/Lanespark/Derryvella Bog.

In addition, to preparing this document to comply with Condition 10 of IPC Licence Ref. PO-499-01, due regard was also given to the Peatlands Climate Action Scheme (PCAS) announced by the Minster. This Scheme will see the Minister support, via the Climate Action Fund and Ireland's National Recovery and Resilience Plan*, Bord na Móna in developing a package of measures, 'the Scheme', for enhanced decommissioning, rehabilitation and restoration of cutaway peatlands referred to as, the Peatlands Climate Action Scheme'. However, only the additional costs associated with the additional and enhanced rehabilitation, i.e., measures which go beyond the existing standard mandatory decommissioning and rehabilitation requirements arising from Condition 10 will be eligible for support. The additional costs of the Scheme will be supported by Government, administered by the Department of Environment, Climate and Communications (DECC), while the National Parks and Wildlife Service (NPWS) will act as the Scheme regulator.*

While this document outlines the enhanced rehabilitation measures planned for Ballybeg/Lanespark/Derryvella Bog, activities which goes beyond that required by Condition 10 in the Licence, rehabilitation necessary to comply with the 'standard' requirement of Condition 10 (in the absence of the Scheme) is also included, to estimate costs. The inclusion of the 'standard' rehabilitation together with the enhanced rehabilitation in this document allows the Scheme Regulator to distinguish and objectively determine the specific activities (and their associated costs) eligible for support under the Scheme.

Bord na Móna have defined the key rehabilitation outcome at Ballybeg/Lanespark/Derryvella Bog as environmental stabilisation, re-wetting and setting the bog on a trajectory towards development of naturally functioning peatland and wetland habitats.

Bord na Móna are planning to develop a potential renewable energy project at Lanespark Bog as part of the proposed Littleton Wind Farm. This project is currently in the pre-planning stages and is expected to be submitted for planning permission in 2026.

Any consideration of any other future after-uses for Ballybeg/Lanespark/Derryvella Bog will be conducted in adherence to the relevant planning guidelines and consultation with relevant authorities and will be considered within the framework of this rehabilitation plan.

Document Control Sheet	
Document Name:	Ballybeg/Lanespark/Derryvella Bog Cutaway Bog Decommissioning and Rehabilitation Plan 2025
Document File Path:	Decomm and Rehab Programme - Rehab and Decomm Docs\ 06D Rehab Plans FY26\ Ballybeg/Lanespark/Derryvella Bog
Document Status:	Final

This document comprises:	DCS	TOC	Text (Body)	References	Maps	No. of Appendices
	1	2	39	4	0	14

Rev. 0.1	Author(s):	Checked By:	Approved By:
Name(s):	EOB	JOS	MMC
Date:	13/01/2025	15/04/2025	29/04/2025

Rev. 1	Author(s):	Checked By:	Approved By:
Name(s):			DMN
Date:			17/09/2025
Rev. 1.1	**Author(s):**	**Checked By:**	**Approved By:**
Name(s):			
Date:			

Note: This finalised version of the Rehabilitation Plan has been updated to take account that several planning actions listed in Section 8.1 have been completed and have been incorporated into the plan. This includes an Appropriate Assessment of the rehabilitation plan. See Killeen Bog Decommissioning and Rehabilitation Plan – Addendum 1 for more details.

Table of Contents

Non-technical summary 1
1. Introduction 3
1.1 Constraints and Limitations 4
2. Methodology 5
2.1 Desk Study 6
2.2 Consultation 7
2.3 Field Surveys 7
3. Site Description 9
3.1 Status and Situation 9
3.1.1 Site history 9
3.1.2 Current land-use 10
3.1.3 Socio-Economic conditions 11
3.2 Geology and Peat Depths 11
3.3 Key Biodiversity Features of Interest 12
3.3.1 Current habitats 12
3.3.3 Invasive species 18
3.4 Statutory Nature Conservation Designations 19
3.4.1 Other Nature Conservation Designations 19
3.5 Hydrology and Hydrogeology 19
3.6 Emissions to surface-water and watercourses 21
3.7 Fugitive Emissions to air 26
3.8 Carbon emissions 26
3.9 Current ecological rating 27
4. Consultation 28
4.1 Consultation to date 28
4.2 Issues raised by Consultees 29
4.3 Bord na Móna response to issues raised during consultation 32
5. Rehabilitation Goals and Outcomes 36
6. Scope of Rehabilitation 38
6.1 Key constraints 38
6.2 Key Assumptions 40
6.3 Key Exclusions 40
7. Criteria for successful rehabilitation 41

7.1 Criteria for successful rehabilitation to meet EPA IPC licence conditions: 41
7.2. Critical success factors needed to achieve successful rehabilitation as outlined in the plan 45
8. Rehabilitation Actions and Time Frame 47
8.1 Completed and ongoing 48
8.2 Short-term planning actions (0-1 years) 49
8.3 Short-term practical actions (0-2 years) 49
8.4 Long-term (>3 years) 50
8.5 Timeframe 50
8.6 Budget and costing 50
9. Aftercare and Maintenance 51
9.1 Programme for monitoring, aftercare and maintenance 51
9.2 Rehabilitation plan validation and licence surrender – report as required under condition 10.4 52
10. References 53
Appendix I: Standard peatland rehabilitation that has already been completed to meet conditions of the IPC Licence 57
APPENDIX II: Bog Group Context 61
APPENDIX III: Ecological Survey Report 67
Derryvella Bog 67
Ballybeg Bog 69
ADDENDUM 1- Appropriate Assessment Report Findings 72
APPENDIX IV: Environmental Control Measures to be applied to bog rehabilitation 73
APPENDIX V: Biosecurity 74
Appendix VI: Policy and Regulatory Framework 75
APPENDIX VII: Decommissioning 82
APPENDIX VIII: Glossary 85
APPENDIX IX: Extractive Waste Management Plan 87
APPENDIX X: Mitigation Measures for the Application of Fertiliser 93
APPENDIX XI: Consultation Summaries 94
APPENDIX XII: Archaeology 108
APPENDIX XIII: Water Quality Monitoring Results for Ballybeg bog & Derryvella Bog 112
APPENDIX XIV: Stockpile Decommissioning Procedure 116

NON-TECHNICAL SUMMARY

- Bord na Móna (now known as BnM) is updating its rehabilitation plan for Ballybeg/Lanespark/Derryvella Bog located in Co. Tipperary.
- Ballybeg/Lanespark/Derryvella Bog is a series of three bogs that are closely linked. Ballybeg Bog is located 1.4 km northwest of Derryvella Bog. Lanespark Bog is located between the two bogs.
- Lanespark Bog has been mapped as a constraint on rehabilitation maps, as the bog is included in the proposed Littleton Wind Farm footprint. Only Ballybeg Bog and Derryvella Bog are considered for Phase 2 measures within this rehabilitation plan.
- Industrial peat harvesting has now finished at Ballybeg/Lanespark/Derryvella Bogs.
- Ballybeg/Lanespark/Derryvella Bogs were in industrial peat production from the 1970s until 2017.
- In 2017, Bord na Móna announced the closure of the Littleton Briquette factory and the cessation of industrial peat production in a number of cutaway bogs within the Littleton Bog Group, including Ballybeg/Lanespark/Derryvella Bogs.
- Bord na Móna are obliged to carry out peatland rehabilitation via an IPC Licence issued by the Environmental Protection Agency. In addition, the Government has agreed to support peatland rehabilitation via the establishment of the Peatland Climate Action Scheme (PCAS). This is funded via the Government and by Bord na Móna.
- Peatland rehabilitation (Phase 1 rehabilitation) was carried out at Ballybeg/Lanespark/Derryvella Bog in 2018-2021 with extensive drain-blocking and hydrological management.
- The bog has been re-wetted. Pioneer cutaway vegetation is beginning to develop across these bogs and pioneer habitats and vegetation are establishing.
- Bord na Móna are proposing to carry out additional rehabilitation in Ballybeg Bog and Derryvella Bog in 2025 (Phase 2).
- The key objective of peatland rehabilitation is environmental stabilisation. This means developing habitats and vegetation back onto the bare peat (putting a “skin” back onto the peat), and minimising effects to downstream waterbodies. Ballybeg/Lanespark/Derryvella Bog were drained in the past to allow peat production. Better results for water quality improvements, climate action, the reduction of carbon emissions and biodiversity are achieved when the remaining peat is re-wetted.
- Measures proposed for the bog include optimisation of water levels within existing waterbodies and drain blocking. Some fertiliser will be spread on headlands and other areas (a small part of the overall area) to encourage vegetation growth.
- In general, soggy ground conditions are preferred whereby the remaining peat is wet and plants that prefer wetter conditions, like Bog Cotton, will thrive.
- Areas with deeper residual peat have the capacity to regrow *Sphagnum* moss again, where there are suitable hydrological conditions. *Sphagnum* is a key species for restoring naturally functioning raised bog conditions.
- Many BnM bogs cannot be restored back to raised bog in the short-term, as so much peat has been removed and the environmental conditions have been modified. However other peatland habitats with Heather, Bog Cotton, Rushes, Purple Moor-grass, Bog-mosses and scattered trees will develop, and in time a naturalised peatland can be restored.
- The development of a range of habitats in Ballybeg/Lanespark/Derryvella Bog will support biodiversity including plants, insects, birds and mammals. This includes some species that are rare and protected in the wider landscape. It will increase the national area of native woodland. Many wetland habitats in the

Draft

wider landscape have been reclaimed for agriculture and other uses, and peatland rehabilitation is an opportunity to create new peatland and wetland habitats.

- Most of the bog comprises of shallow peat depths. Some deeper peat remains in Derryvella Bog.
- The environmental conditions of Ballybeg/Lanespark/Derryvella Bog mean that wetland habitats (reedbeds, fen, wet woodland, open water) will develop across the majority of the site in mosaic with some embryonic bog habitats in areas with deeper residual peat, and Birch woodland in the drier areas.
- Ballybeg/Lanespark/Derryvella Bog has a gravity drainage regime.
- Rehabilitation measures will be planned by a team consisting of expert ecologists, hydrologists and engineers. It is a guiding principle of BnM rehabilitation planning that no actions or activities will be undertaken that would negatively impact on adjacent land. No boundary drains will be blocked. Water will still leave the bog via the existing outlets.
- It will take some time for vegetation and habitats to fully develop at the most recently peat harvested areas of the bog, and a wetland/peatland ecosystem to developed. However, it is expected that most of these areas will be developing pioneer vegetation after 5-10 years.
- This is a peatland rehabilitation plan. This plan does not consider future after-use or development. BnM continually reviews its land-bank to consider future commercial or industrial developments. Any other proposed development will be planned in adherence to relevant planning guidelines and will consider the rehabilitation and the condition of the bog.
- This is a peatland rehabilitation plan. BnM are planning to develop a potential renewable energy project at Lanespark Bog as part of the proposed Littleton Wind Farm. The Wind Farm project is currently in the pre-planning stage and is expected to be submitted for planning permission in 2026. Lanespark has already been rehabilitated during 2018-2021. Any other proposed development will be planned in adherence to relevant planning guidelines and will consider the rehabilitation and the condition of the site.
- Peatland rehabilitation of this bog will bring a range of benefits to the local community via improvements to the local landscape and is also important for supporting national policies and strategies in relation to reduction of carbon emissions from these peatlands, supporting biodiversity and improvements to water quality.
- Ballybeg/Lanespark/Derryvella partially overlaps the Tipperary Decarbonising Zone. A Decarbonising Zone (DZ) is a spatial area, identified by each local authority in Ireland, in which a range of climate change mitigation measures are identified, whilst enhancing and embracing adaptation and biodiversity measures to contribute to reaching wider national climate action targets. DZs are a demonstration and testbed of what is possible for decarbonisation and climate action at a local and community level. Through a feedback loop of experimentation and evaluation, the DZ enables a flexible, incremental and community-driven approach to ensure that its objectives are delivered. No constraint is required in respect of this spatial overlap.

Draft

1. INTRODUCTION

Bord na Móna (now known as BnM) operates under IPC Licence issued and administered by the EPA to extract peat within the Littleton Bog Group (Ref. P0-499-01) (see Appendix II for details of the bog areas within this Group). As part of Condition 10.2 of this license, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area. Ballybeg/Lanespark/Derryvella Bog is located in Co. Tipperary, 1 km south-east of Littleton Village and approximately 7 km southeast of Thurles.

This document seeks to address the requirements of Condition 10.2 of IPC Licence Ref. P0-499-01:

> "*The licensee shall prepare, to the satisfaction of the Agency, a fully detailed and costed plan for permanent rehabilitation of the cutaway boglands within the licensed area.*"

It also seeks to outline measures to optimise climate action and other ecosystem services benefits, mainly through hydrological management.

This plan is a specific rehabilitation plan for the bog and outlines:

- Description of site management and status.
- Main issues and approaches to rehabilitation.
- Consultation to date with interested parties.
- Interaction with other policy and legislative frameworks (Appendix VI).
- The planned rehabilitation goals and outcomes.
- The scope of the rehabilitation plan.
- Criteria which define the successful rehabilitation and key targets to validate rehabilitation.
- Proposed rehabilitation actions.
- Proposed timeframe to implement these measures.
- Budget and Costings.
- Associated aftercare, maintenance, and monitoring.

Note: This plan should be read in conjunction with the accompanying Map book.

Ballybeg/Lanespark/Derryvella Bog is part of the Littleton Bog Group and supplied the Littleton Brickette Factory. Bord na Móna made the decision to close this brickette factory in 2017 and to rehabilitate the Littleton Bog group.

It is proposed by Government that Bord na Móna carry out a Peatlands Enhanced Decommissioning, Rehabilitation and Restoration Scheme on its peatlands. Note this proposal is also known colloquially as the 'Peatlands Climate Action Scheme' (PCAS). The additional costs of the Scheme will be supported by Government through Ireland's National Recovery and Resilience Plan administered by the Department of Environment, Climate and Communications (DECC), while the National Parks and Wildlife Service (NPWS) acts as the Scheme regulator. This Scheme will significantly go beyond what is required to meet rehabilitation and decommissioning obligations (Appendix VII & IX) under existing EPA IPC licence conditions. Improvements supported by the Scheme will ensure that environmental stabilisation is achieved (meaning IPC obligations are met), and importantly, significant additional benefits, particularly relating to climate action and other ecosystem services, will also be delivered. The Scheme commenced in 2021.

Ballybeg/Lanespark/Derryvella Bog was rehabilitated by Bord na Móna between 2018-2021 (Phase 1 rehabilitation). This updated rehabilitation plan supersedes the previous rehabilitation plan prepared in 2018.

Ballybeg Bog and Derryvella Bog are proposed to be part of this Scheme (PCAS), and this updated rehabilitation plan outlines the approach to be taken. Additional peatland rehabilitation (Phase 2 Rehabilitation) has been

proposed for Ballybeg and Derryvella Bogs, with the objective of improving hydrological conditions across these bogs and targeting bare peat areas to speed up the trajectory of natural vegetation colonisation. Measures will include:

- More intensive management of water levels through pump management/adaption, drain-blocking and bunding.
- Re-profiling that will deliver suitable conditions for development of wetlands, fens and bog habitats.
- Targeted fertiliser applications.

These measures are collectively designed to optimise hydrological conditions (ideally and where possible water-levels <10 cm) for climate action benefits and to accelerate the trajectory of the site towards a naturally functioning ecosystem, and eventually a reduced carbon source/carbon sink again. In some areas of dry cutaway this trajectory will be significantly longer, and it is not feasible in the short-term to re-wet some areas. These areas will develop other habitats. The key to optimising climate action benefits is the restoration of suitable hydrological conditions and more intensive intervention means that the extent of suitable hydrological conditions can be optimised.

Only the costs associated with the additional, enhanced, and accelerated rehabilitation, i.e. those measures which go beyond the existing decommissioning and rehabilitation requirements arising from Condition 10, will be eligible for support under the Scheme. Bord na Móna announced the complete cessation of industrial peat production across its estate in January 2021.

It is expected that the Scheme (PCAS) will have benefits accruing from biodiversity provision, water quality and storage attenuation as well as increased carbon storage, reduced carbon emissions and acceleration towards carbon sequestration. The Scheme will also facilitate monitoring of carbon fluxes (Greenhouse Gases and fluvial carbon) in selected areas (in addition to other established Research programmes), to monitor changes in where the interventions will accelerate the trajectory towards a naturally functioning peatland ecosystem.

1.1 Constraints and Limitations

This document covers the area of Ballybeg/Lanespark/Derryvella Bog, shown in drawing number *BNM-DR-26-07-RP-01*.

Lanespark Bog is not being proposed for Phase 2 rehabilitation as part of this plan. Phase 1 rehabilitation across Lanespark has been completed between 2018-2021. Bord na Móna and SSE are currently developing a renewable energy project called Littleton Wind Farm, which will overlap Lanespark Bog, Littleton Bog and a small part of Longfordpass (Bord na Móna Wind Farm | Littleton Wind Farm). This renewable energy project is in pre-planning.

Several amenity developments have been developed at Ballybeg/Lanespark/Derryvella Bog. Part of the cutaway at Derryvella Bog was developed as Lough Doire Bhile amenity area (between 1999-2001) and is now leased to the Slieve Ardagh Rural Development Community Group. Glacial substrates were dug out to create a lake basin and the surrounding area was re-profiled. The Loch Dhoire Bhile loop, a 2.4 km walking trail, has also been developed in this area in recent years. Lough Doire Bhile Wildlife Reserve and amenity area are mapped as constraints on the rehabilitation plan.

The Littleton Labyrinth is an amenity project that was developed in partnership with Tipperary County Council. Initially a feasibility study was carried out that looked at developing greenway amenity, and associated facilities across the Littleton Bogs, and potential links to existing infrastructure and local villages/towns. Tipperary County Council and Bord na Móna developed an amenity walking/cycling track along the headland/former rail line

corridors along the northwestern margins of Derryvella Bog, linking to the Loch Doire Bhile amenity area, as part of the Littleton Labyrinth Greenway in 2024. The proposed rehabilitation measures will not overlap with these features and there is no constraint to rehabilitation.

Bord na Móna are planning the development of an additional amenity trail, along the eastern and southern headlands of Derryvella Bog and the eastern and northern headlands of Ballybeg, as part of the Midlands Network Trail, designed to link to the Littleton Labyrinth greenway. The amenity development will consist of shared cycle and walkways, associated signage and fencing. The planned amenity route has been mapped as a constraint on rehabilitation maps. This project has been submitted for planning permission (February 2025).

Ballybeg Bog is proposed to be included in the Coillte/BnM Midlands Native Woodland Project (Midlands Native Woodland - Coillte). The main objective of this proposed project is to develop and enhance native woodland in areas of cutaway that would remain naturally dry, developing woodland habitat that would naturally complement wetland and peatland habitats already developing across these sites. An area of 11.2 ha is proposed for planting at this Bog. This proposed project is currently being considered for consent by the Forest Service. Areas proposed to be included in Native Woodland Project have also been mapped as constrained land in the rehabilitation plan.

An area of Coillte forestry occurs at the western extent of Derryvella Bog. This area has been excluded from the rehabilitation plan. The southern extent of Derryvella Bog is proposed to be used as a Bushcraft Site and has been identified as constrained land. Local Roads, agricultural land and areas under grazing license occur around the margins and have been mapped as constraints on the rehabilitation plan. There are no known rights of way, or turbary areas, at either bog.

2. METHODOLOGY

This rehabilitation plan was developed with a combination of desktop and field surveys, consultations with internal and external stakeholders and cognisance of the Scheme (PCAS). The development of this rehabilitation plan considered recently published guidance issued by the EPA, *'Guidance on the Process of Preparing and Implementing a Bog Rehabilitation Plan' (EPA, 2020)*.

The ecological information and site information collected during the Bord na Móna ecological baseline survey, additional confirmatory site visits (covering the period 2011 to 2025 inclusive) and monitoring and desktop analysis forms the basis for the development of the rehabilitation plan for the bog, along with:

- Experience of 40 years of research on the after-use development and rehabilitation of the Bord na Móna cutaway bogs (Clarke, 2010; Bord na Móna, 2016);
- Significant international engagement during this period with other counties in relation to best practice regarding peatland rehabilitation and after-use through the International Peat Society and the Society for Ecological Restoration (Joosten & Clarke, 2002; Clarke & Rieley, 2010; Gann *et al*., 2019);
- Consultation and engagement with internal and external stakeholders;
- GIS Mapping;
- BNM drainage surveys;
- Bog topography and LIDAR data;
- Previous research studies on site;
- Hydrological modelling; and
- The development of a Methodology Paper outlining the Scheme (PCAS). This rehabilitation includes enhanced measures defined in the Methodology Paper which are designed to exceed the standard

stabilisation requirements as defined by the IPC Licence and to enhance the ecosystem services of Ballybeg/Lanespark/Derryvella Bog, in particular, optimising climate action benefits.

2.1 Desk Study

The desk study involved collecting all relevant environmental and ecological data for the study area. The development of the rehabilitation plan also takes account of research, experience and engagement with other peatland restoration and rehabilitation projects and peatland research including Irish, UK, European and International best practice guidance (full citations are in the References Section):

- Anderson *et al*. (2017). An overview of the progress and challenges of peatland restoration in Western Europe.
- Barry, T.A. *et al*. (1973). A survey of cutover peats and underlying mineral soils. Soil Survey Bulletin No. 30. Dublin, Bord na Móna and An Foras Taluntais.
- Bonn *et al*. (2017). Peatland restoration and ecosystem services- science, policy and practice.
- Carroll *et al*. (2009). *Sphagnum* in the Peak District. Current Status and Potential for Restoration. Moors for the Future Report No 16.
- Clark & Rieley (2010). Strategy for responsible peatland management.
- Eades *et al*. (2003). The Wetland Restoration Manual.
- Farrell & Doyle (2003). Rehabilitation of Industrial Cutaway Atlantic Blanket Bog, NW Mayo, Ireland.
- Gann *et al*. (2019). International Principles and Standards for the practice of Ecological Restoration.
- Joosten & Clarke (2002). Wise Use of mires and peatlands – Background and Principles including a framework for Decision-making.
- Lindsay (2010). Peatbogs and Carbon: a Critical Synthesis to Inform Policy Development in Oceanic Peat Bog Conservation and Restoration in the Context of Climate Change.
- Mackin *et al*. (2017). Best practice in raised bog restoration in Ireland. Irish Wildlife Manuals, No. 99. National Parks and Wildlife Service,
- McBride *et al*. (2011). The Fen Management Handbook (2011), Scottish Natural Heritage.
- McDonagh (1996). Drain blocking by machines on Raised Bogs. Unpublished report for National Parks and Wildlife Service.
- NPWS (2017a). National Raised Bog Special Areas of Conservation management plan. Department of Arts, Heritage and the Gaeltacht.
- Pschenyckyj et al., (2021), Optimising Water Quality Returns from Peatland Management while Delivering Co-Benefits for Climate and Biodiversity. An Fóram Uisce.
- Regan*, et. al.* (2020). Ecohydrology, Greenhouse Gas Dynamics and Restoration Guidelines for Degraded Raised Bogs. EPA Research Report. Prepared for the Environmental Protection Agency by Trinity College Dublin.
- Renou-Wilson *et al*. (2011). BOGLAND - Sustainable Management of Peatlands in Ireland. STRIVE Report No 75 prepared for the Environmental Protection Agency.
- Schouten (2002). Conservation and Restoration of Raised Bogs: Geological, Hydrological and Ecological Studies. Dúchas - The Heritage Service of the Department of the Environment and Local Government, Ireland.
- Thom (2019). Conserving Bogs – Management Handbook.

- Wheeler & Shaw (1995). Restoration of Damaged Peatlands – with Particular Reference to Lowland Raised Bogs Affected by Peat Extraction.

Additional on-line resources were also incorporated into the desk study, including:

- Littleton Integrated Pollution Control Licence.
- Littleton Annual Environmental Reports.
- Review of the National Biodiversity Data Centre (NBDC) webmapper;
- Inland Fisheries Ireland (IFI) Reports.
- Environmental Protection Agency database (www.epa.ie).
- EPA Guidance on Requests for Alterations to a Licensed Industrial or Waste Activity.
- Birdwatch Ireland online data (including I-WeBS and CBS datasets; www.birdwatchireland.ie).
- Geological Survey of Ireland - National Draft Bedrock Aquifer map.
- Geological Survey of Ireland - Groundwater Database (www.gsi.ie).
- Historic Environment Viewer at https://webgis.archaeology.ie/historicenvironment/
- National Parks & Wildlife Services Public Map Viewer (www.npws.ie).
- Water Framework Directive catchments.ie/maps/ Map Viewer (www.catchments.ie).
- OPW Indicative Flood Maps (www.floodmaps.ie).
- CFRAM Preliminary Flood Risk Assessment (PFRA) maps (www.cfram.ie).
- River Basin Management Plan for Ireland 2022-2027.
- Bord na Móna Annual Report 2024.
- Spatial data in respect of Article 17 reporting, available online at https://www.npws.ie/maps-and-data/habitat-and-species-data/article-17.

2.2 Consultation

A number of stakeholders have been identified during the course of Bord na Móna's rehabilitation and Biodiversity Action Plan activities and are contacted during the rehabilitation planning process for their views. See Section 4.

2.3 Field Surveys

Bord na Móna carried out a baseline ecological survey of all of its properties in 2012-2018 and developed habitat maps. As part of this exercise, Ballybeg/Lanespark/Derryvella Bog was surveyed in 2012. Habitat maps were updated in 2017. A survey also took place in January 2025 (at Ballybeg Bog and Derryvella bog only) in advance of the updating this rehabilitation plan. Habitat maps have been updated, where required. This rehabilitation plan is informed by the original baseline survey as well as subsequent confirmatory site walk-over surveys and visits, and updates to baseline data.

Habitat mapping followed best practice guidance from Smith *et al.* (2011). Map outputs including all habitat maps and target notes were produced using GIS software application packages (ArcGIS). General marginal habitats and other habitats that had not been modified significantly by industrial peat extraction were classified using Fossitt *et al*. (2000). Plant nomenclature for vascular plants follows Stace (2019), while moss and liverwort nomenclature follow identification keys published by the British Bryological Society (2010). A more detailed Bord na Móna classification system was previously developed for classifying pioneer cutaway habitats as Fossitt categories were deemed not to be detailed enough for cutaway bog (much of cutaway bog could be classified as Cutover Bog -

PB4). Much of the pioneer cutaway vegetation is still at an early stage of its development and cannot be assigned to Fossitt (2000) Level 3 categories yet.

A detailed ecological survey report for Ballybeg/Lanespark/Derryvella Bog is contained in Appendix III.

3. SITE DESCRIPTION

Ballybeg/Lanespark/Derryvella Bog is located in Co. Tipperary, 1 km south-east of Littleton Village and approximately 7 km southeast of Thurles. Ballybeg/Lanespark/Derryvella Bog is a series of three bogs that are closely linked. Ballybeg Bog is located 1.4 km northwest of Derryvella Bog. Lanespark Bog is located between the two bogs. Lanespark Bog has been mapped as a constraint on rehabilitation maps, as the bog is included in the proposed Littleton Wind Farm footprint. Only Ballybeg Bog and Derryvella Bog are considered for Phase 2 measures within this rehabilitation plan.

Ballybeg/Lanespark/Derryvella Bog is in the Littleton Bog group (Ref. P0499-01). Lanespark (the central bog) is the location of the former Lanespark Briquette factory. The total area of Ballybeg/Lanespark/Derryvella Bog is 473.3 ha (125.7 ha is within the rehabilitation footprint; 348.7 ha has been mapped as constrained land).

The majority of the former production area of Ballybeg Bog and Derryvella Bog are dominated by bare peat that is beginning to develop pioneer vegetation. In areas that have been cutaway for a longer period, the bog is developing pioneer vegetation, scrub, wetlands and emerging Birch/Willow woodland. The surrounding landscape is dominated by a mosaic of farmland, largely consisting of improved grassland, conifer plantations and other bogs, many owned and managed by Bord na Móna.

Bord na Móna ceased industrial peat extraction in 2017 and implemented a rehabilitation plan across Ballybeg/Lanespark/Derryvella Bog between 2018-2021 (Phase 1 rehabilitation), consisting of drain blocking and hydrological management. Large areas of the bog have been successfully rewet with water retained at, and above the surface of the bog as a result of drain-blocking and reduced drainage.

The North Glengoole Stream (EPA Code: 16N28) flows along the eastern boundary of the Derryvella section of the bog, originating from the northeast before flowing towards the northwest, along the southern boundary of Derryvella. It flows through Lanespark Bog, ultimately discharging into the Black (Two Mile Borris) Stream (EPA Code: 16B01). The Black Stream then continues northwest between Ballybeg and Littleton Bog before flowing north to join the River Drish (EPA Code: 16D02). The Breegagh Stream (EPA Code: 16B03) flows along the southern boundary of Lanespark in a northwest direction, flowing approximately 500m south of the southern boundary of Ballybeg, where it joins the River Drish. An unnamed stream flows southwest from its source beyond the southern boundary of the Ballybeg section of bog to join the Breegagh Stream. Both Derryvella and Ballybeg are gravity drained bogs.

Bord na Móna propose to carry additional rehabilitation (Phase 2) in Ballybeg and Derryvilla Bog in 2025. See Drawing number *BNM-DR-26-07-RP-01: Bog Site Location*, included in the accompanying Mapbook[1], which illustrates the location of Ballybeg/Lanespark/Derryvella Bog in context to the surrounding area.

3.1 Status and Situation

3.1.1 Site history

Ballybeg/Lanespark/Derryvella Bog was used to supply fuel peat to the Littleton Briquette Factory, Thurles, Co. Tipperary. Ballybeg/Lanespark/Derryvella Bog was in industrial peat production from 1970's to 2017. In 2017,

[1] Cutaway Bog Decommissioning and Rehabilitation Plan – Ballybeg/Lanespark/Derryvella Bog Map Book

Bord na Móna announced the closure of the Littleton Briquette factory and the cessation of industrial peat production in a number of cutaway bogs within the Littleton Bog Group, including Ballybeg/Lanespark/Derryvella.

Previous Phase 1 Peatland rehabilitation was carried out between 2018-2021 with measures including drain-blocking, berms and hydrological management (Phase 1 rehabilitation). See Figure *BNM-DR-26-07-30: Previous Rehabilitation* in the accompanying mapbook.

3.1.2 Current land-use

Ballybeg Bog and Derryvella Bog have some remaining peat stockpiles. The peat stock on the bog will be subject to decommissioning as part of the rehabilitation measures. This process is described fully in Appendix XIV.

Part of the cutaway at Derryvella Bog was developed as Lough Doire Bhile amenity area (between 1999-2001) and is now leased to the Slieve Ardagh Rural Development Community Group. Glacial substrates were dug out to create a lake basin and the surrounding area was re-profiled. The Loch Dhoire Bhile loop, a 2.4 km walking trail, has also been developed in this area in recent years. Lough Doire Bhile Wildlife Reserve and amenity area are mapped as constraints on the rehabilitation plan.

Tipperary County Council and Bord na Móna have developed an amenity walking/cycling track along the headland/former rail line corridors along the northwestern margins of Derryvella Bog, linking to the Loch Doire Bhile amenity area, as part of the Littleton Labyrinth Greenway in 2024. The proposed rehabilitation measures will not overlap with these features and there is no constraint to rehabilitation.

Bord na Móna are planning the development of an amenity trail, along the eastern and southern headlands of Derryvella Bog and the eastern and northern headlands of Ballybeg, as part of the Midlands Network Trail, designed to link to the Littleton Labyrinth greenway. The amenity development will consist of shared cycle and walkways, associated signage and fencing. The planned amenity route has been mapped as a constraint on rehabilitation maps. This project has been submitted for planning permission (February 2025).

Bord na Móna are planning to develop a potential renewable energy project at Lanespark Bog as part of the proposed Littleton Wind Farm, which will overlap Lanespark Bog, Littleton Bog and a small part of Longfordpass (Bord na Móna Wind Farm | Littleton Wind Farm). This renewable energy project is in pre-planning.

Ballybeg Bog is proposed to be included in the Coillte/BnM Midlands Native Woodland Project (Midlands Native Woodland - Coillte). The main objective of this proposed project is to develop and enhance native woodland in areas of cutaway that would remain naturally dry, developing woodland habitat that would naturally complement wetland and peatland habitats already developing across these sites. An area of 11.2 ha is proposed for planting at this Bog. This proposed project is currently being considered for consent by the Forest Service. Areas proposed to be included in Native Woodland Project have also been mapped as constrained land in the rehabilitation plan.

There are no known rights of way, or turbary areas, at either Ballybeg Bog or Derryvella Bog. Some areas of agricultural land occur along the margins and have been mapped as constrained land on rehabilitation mapping.

The southern extent of Derryvella Bog is proposed to be used as a Bushcraft Site and has been identified as constrained land.

Ballybeg/Lanespark/Derryvella partially overlaps the Tipperary Decarbonising Zone. A Decarbonising Zone (DZ) is a spatial area, identified by each local authority in Ireland, in which a range of climate change mitigation measures are identified, whilst enhancing and embracing adaptation and biodiversity measures to contribute to reaching wider national climate action targets. DZs are a demonstration and testbed of what is possible for decarbonisation

and climate action at a local and community level. Through a feedback loop of experimentation and evaluation, the DZ enables a flexible, incremental and community-driven approach to ensure that its objectives are delivered. No constraint is required in respect of this spatial overlap.

3.1.3 Socio-Economic conditions

Bord na Móna has historically been a vital employer for the rural communities in the Irish Midlands. Bord na Móna compiled a report on the role of peat extraction in the midlands historically in which they report that in 1986, by the end of Bord na Móna's Third Development Programme, a total of twenty-three work locations had been established around the country. The company had an average employment of approximately 4,688 in the mid 1980's, with a peak employment of 6,100 during the production season, which placed it among the country's largest commercial employers. The importance of such levels of employment were largely due to its regional concentration in the Midlands and the lack of alternative employment opportunities in these areas at the time.

According to the Energy Crop Socio-Economic Study undertaken by Fitzpatrick Associates in 2011, there were an estimated 1,443 jobs supported by the peat-to-power industry in Ireland at the time, some 81% of which were located in the catchment areas of the three peat-fired generating stations (Lough Ree, West Offaly, and Edenderry Power Stations). These constituted jobs in the plants and in peat extraction, jobs indirectly supported in upstream supply industries and jobs induced through the trickle-down effects of the wages and salaries of those supported directly or indirectly. These job numbers have now declined with the cessation of peat extraction.

In respect of Ballybeg/Lanespark/Derryvella Bog, jobs included in the above study would have included those to facilitate extraction of peat at this bog and associated processing and transfer to Littleton Briquette Factory.

As the primary employer in many Midland counties, Bord na Móna played a central role in building communities through several initiatives, including development and construction of local housing complexes, education bursaries, support of local sporting clubs, the provision of community gain funds, charity programmes and the provision and building of amenity areas.

In 2017, Bord na Móna announced the closure of the Littleton Briquette factory and the cessation of industrial peat production in a number of cutaway bogs within the Littleton Bog Group, including Ballybeg/Lanespark/Derryvella Bog. Employment numbers have now declined following the cessation of peat extraction at this bog. It is anticipated that the scheme (PCAS) will provide some employment for a team of workers at this site for a period of time (> 1 year).

There are approximately 1400 people working in Bord na Móna at present, with approximately 135 roles directly involved in PCAS.

3.2 Geology and Peat Depths

3.2.1 Sub-soil geology

GSI bedrock geology data indicates that Ballybeg/Lanespark/Derryvella Bog is underlain by several bedrock units. The Ballybeg section of the site is primarily underlain by the Aghmacart Formation, which consists of dark shaly micrite and peloidal limestone to the west of the site. A narrow strip of the Crosspatrick Formation, characterised by pale-grey cherty crinoidal limestone, runs in a northwest-southeast alignment through the centre of the site. To the east, the area is underlain by Waulsortian Limestone, which is divided by a boundary of dolomitization into dolomitised massive fine-grained limestone to the west and a more significant proportion of massive unbedded lime-mudstone to the east.

The embedded lime-mudstone unit also extends beneath the western boundary of the Derryvella section of the site, where Lough Derryvella is located. East of this lake, a southwest-northeast aligned fault separates this from a very narrow deposit of the Crosspatrick Formation, similar to that found beneath Ballybeg. Most of the Derryvella section is underlain by the Aghmacart Formation and a very narrow segment in the southeast corner of Derryvella is underlain by the Durrow Formation, containing shaly fossiliferous and oolitic limestone.

There is an anticlinal axis structural fault that extends southwest-northeast through the Waulsortian limestone unit between the Ballybeg and Derryvella sections of the bog.

Quaternary sediment data maps Ballybeg/Lanespark/Derryvella Bog as cut over raised peat, yet surrounded by inorganic deposits, which are predominantly till derived from limestone along with some localised pockets of gravels from limestones further south and small pockets of alluvium in the wider surroundings.

3.2.2 *Peat type and depths*

Peat depths have been mapped across the bog using GPR and are provided in figure *BNM-DR-26-07-RP-04: Peat depths*.

In general peat is relatively deep across much of Ballybeg/Lanespark/Derryvella Bog. On the Ballybeg section of the bog, most of the bog has typical peat depths of 1.5m – 4m, with shallow deposits close to the southern and eastern margins (<1m). On the Derryvella section of the bog peat is generally 1.5m -4m, with shallower deposits close to the southern margin.

3.3 Key Biodiversity Features of Interest

3.3.1 Current habitats

This section describes the habitats within the PCAS rehabilitation extent at Ballybeg/Lanespark/Derryvella Bog, which includes Ballybeg Bog and Derryvella Bog only.

The majority of the former production area of Ballybeg Bog and Derryvella Bog are dominated by bare peat that is beginning to develop pioneer vegetation and areas of open water. Ballybeg Bog and Derryvella Bog were subject to Phase 1 rehabilitation, between 2018-2021 (consisting of drain blocking and berms). Large areas of these bogs have been made wetter with water retained at and above the surface of the bog as a result of berms and reduced drainage.

In areas that have been cutaway for a longer period, particularly the western lobe of Derryvella, the bog is developing pioneer vegetation, scrub, wetlands and emerging Birch/Willow woodland.

The most common vegetation communities/habitats[2] present in the former production areas within the PCAS rehabilitation extent include:

- Bare peat (0-50% cover) (BP) (Plate 3-1 – Plate 3-3).

[2] Codes refer BnM classification of pioneer habitats of production bog

- Birch scrub including open *Betula/Salix*-dominated community (B) (Birch/Willow) (oBir) and closed *Betula/Salix*-scrub community (C) (Birch/Willow) (cBir) (generally in mosaic with other cutaway habitats) (Plate 3-1; Plate 3-8; Plate 3-9; Plate 3-11).
- Pioneer dry *Calluna vulgaris*-dominated community (Heather) (dHeath) (generally in mosaic with Birch scrub, *Molinia caerulea*-dominated community (dry) (Purple Moorgrass) (gMol) and *Ulex europaeus*-dominated community (Gorse) scrub (eGor)).
- Pioneer open habitats with pioneer *Campylopus*-dominated community (pCamp), pioneer *Juncus effusus*-dominated community (Soft Rush) (pJeff), pioneer *Eriophorum angustifolium*-dominated community (Bog Cotton) (pEang), Pioneer *Juncus bulbosus*-dominated community (Bulbous Rush) (pJbulb), pioneer *Carex viridula*/brown moss community (rich fen) (pVir), *Molinia caerulea*-dominated community (dry) (Purple Moorgrass) (gMol), open *Betula/Salix*-dominated community (B) (Birch/Willow) (oBir) (Plate 3-5; Plate 3-10).
- Pioneer open habitats and scrub with *Molinia caerulea*-dominated community (dry) (Purple Moorgrass) (gMol) and Pioneer *Juncus effusus*-dominated community (Soft Rush) (pJeff) in mosaic with open *Betula/Salix*-dominated community (B) (Birch/Willow) (oBir) and *Ulex europaeus*-dominated community (Gorse)(eGor).
- Wetlands with open water (OW), pioneer *Phragmites australis*-dominated community (Common Reed) (pPhrag), Pioneer *Typha latifolia*-dominated community (Reedmace) (pTyp) and Pioneer *Carex rostrata*-dominated community (Bottle Sedge) (pRos) (Plate 3-3; Plate 3-6; Plate 3-10).
- Pioneer poor fen dominated by *Juncus effusus*-dominated community (Soft Rush) (pJeff) and Pioneer *Eriophorum angustifolium*-dominated community (Bog Cotton) (pEang) (Plate 3-7).
- Woodland with Closed *Betula*/*Salix*-scrub community (C) (Birch/Willow) (cBir), Dense *Pteridium aquilinum* (Bracken) (dPter), *Molinia caerulea*-dominated community (dry) (Purple Moorgrass) (gMol) and dry *Calluna vulgaris*-dominated community (Heather) (dHeath) (Plate 3-9).
- Grassland dominated with *Molinia caerulea*-dominated community (dry) (Purple Moorgrass) and *Dactylis-Arrhenatherum* community (gDact-Arr) (around margins and in Derryvella western lobe).

The most common habitats[3] found around the margins include:

- Scrub (WS1)
- Birch woodland (WN7)
- Conifer plantation (WD4)
- Improved grassland (GA1)
- Raised bog (PB1)
- Treeline (WS2)

See Drawing number *BNM-DR-26-07-RP-17: Current Habitat Map*, included in the accompanying Mapbook, which illustrates the habitats at Ballybeg Bog and Derryvella Bog (including the Loch Doire Bhile amenity area). The

[3] Codes refer to Heritage Council habitat classification, Fossitt 2000

mapping excludes Lanespark bog as it was not included in recent habitat surveys. See below for photographic plates of habitats (taken in 2024 and 2025).

Photos of Habitats at Ballybeg/Lanespark/Derryvilla Bog (2024/2025)

Plate 3-1 Aerial of Ballybeg Bog, looking west. The bog is a mix of bare peat, wetlands and pioneer open habitats, with Birch woodland (BirWD) and Birch scrub (oBIR, cBir) along the margins.

Plate 3-2 Bare peat (0-50% cover) (BP) on a high field at Ballybeg Bog.

Plate 3-3 Open water (OW) and poineer open habitats in Ballybeg Bog.

Photos of Habitats at Ballybeg/Lanespark/Derryvilla Bog (2024/2025)

Plate 3-4 Pioneer heather dominated vegetation in Ballybeg Bog.

Plate 3-5 Pioneer open habitats in Ballybeg Bog.

Plate 3-6 Wetlands with Reedbeds in Ballybeg Bog.

Plate 3-7 Pioneer poor fen in Ballybeg Bog.

Plate 3-8 Birch Woodland (BirWD) in Ballybeg Bog.

Plate 3-9 Aerial showing mosaic of woodland and scrub, along margins of Ballybeg Bog.

Photos of Habitats at Ballybeg/Lanespark/Derryvilla Bog (2024/2025)

Plate 3-10 Derryvella Bog, eastern lobe (view looking north), showing wetlands, open water and pioneer open habitats that have developed following Phase 1 rehabilitation.

Plate 3-11 Derryvella Bog, eastern lobe, southern extent (view looking south) with dry heather dominated vegetation, bracken, gorse. This area has not been subject to any previous rehab.

3.3.2 Species of conservation interest

A number of species of conservation concern utilise the habitats available at Ballybeg/Lanespark/Derryvella Bog. The following is a summary of the records of these species available within both Bord na Móna and NBDC records.

- Mammal species have been recorded on or in close proximity to the bog including Badger (*Meles meles*), Red Fox (*Vulpes vulpes)*, European Otter (*Lutra lutra*), Irish Hare (*Lepus timidus subsp. hibernicus*), Pine Marten (*Martes martes*) and Eurasian Badger (*Meles meles*).
- Marsh Fritillary (*Euphydryas aurinia*) have been recorded at the Lough Doire Bhile, Derryvella and Ballybeg, including larval webs and butterflies in flight. Marsh Fritillary is a species of significant conservation interest (Annex II species – EU Habitats Directive).
- White-clawed Crayfish (*Austropotamobius pallipes*) are present in Loch Doire Bhile. White-clawed Crayfish is also listed on Annex II of the EU Habitats Directive.
- Black-headed Gulls (*Larus ridibundus*) have been recorded on Ballybeg Bog (in an area with extensive water cover) in 2024. Both juveniles (year 1 and 2) and an adult displaying potential breeding behaviour were recorded. A larger number of Black-headed gulls (11 birds in one flock) were recorded in Derryvella Bog in 2024, utilising the more developed wetland areas. Black-headed gull is a BOCCI[4] Amber listed bird species.
- Whooper Swans (*Cygnus cygnus*) (7 adults) were also recorded in Derryvella Bog. Whooper Swan is listed on Annex I of the EU Birds Directive and is a BOCCI Amber listed bird species.
- A pair of Peregrine Falcons (*Falco peregrinus*) (Ballybeg Bog) and a Hen Harrier (*Circus cyaneus*) (Derryvella Bog) were also recorded in 2024. Peregrine Falcon is listed on Annex I of the EU Birds Directive. Hen Harrier is a BOCCI Amber listed bird species.
- Records of other bird species of conservation interest associated with Ballybeg/Lanespark/Derryvella Bog available from BNM and NBDC records include BOCCI red listed species Eurasian Curlew (*Numenius arquata*), Common Kestrel (*Falco tinnunculus*), Snipe (*Gallinago gallinago*) and Meadow pipit (*Anthus pratensis),* and amber listed species Lesser Black-backed Gulls (*Larus fuscus*), Swallow *(Hirundo rustica)* and Skylark *(Alauda arvensis).*
- BOCCI amber listed species Teal (*Anas crecca*), Mallard (*Anas platyrhynchos*), Pintail (*Anas acuta*), and BOCCI red listed species Golden Plover (*Pluvialis apricaria*) and Lapwing (*Vanellus vanellus*) have previously recorded at the lake and wetlands of Lough Doire Bhile.

Peatland rehabilitation may result in positive quality effects on the relative abundance or proportion of species of conservation concern utilising bogs post rehabilitation. This may include Red or Amber listed species of breeding waders along with wintering species including Swans and other wildfowl.[5]

3.3.3 Invasive species

There is one Bord na Móna record for American Mink (*Mustela vison*), a high impact invasive species recorded from the bog. American Mink is also recorded on the NBDC data base in the area surrounding the bog.

A broad range of common garden escapes are occasionally present around the margins of Bord na Móna bogs, and although spatial overlap with the PCAS is expected to be limited, these are, where necessary, to be treated in line with best practice during PCAS activities.

[4] https://birdwatchireland.ie/app/uploads/2021/04/BOCCI4-leaflet-2-1.pdf

[5] https://www.bnmpcas.ie/wp-content/uploads/sites/18/2023/08/Annual-Monitoring-Report_Final-Rev-A_Redacted.pdf

3.4 Statutory Nature Conservation Designations

There are two European Sites within a 15km radius of Ballybeg/Lanespark/Derryvella Bog, including:

- River Barrow and River Nore SAC - Site code: 002162 - Distance: 10.6 km
- Lower River Suir SAC - Site code: 002137 - Distance: 10.km

No NHA's (Natural Heritage Areas) occur within 15km of Ballybeg/Lanespark/Derryvella Bog. However, several pNHA's (Proposed Natural Heritage Areas) occur:

- Laffansbridge pNHA – site code: 000965 – Distance: 5km
- Killough Hill pNHA – site code: 000959 – Distance: 9.4km
- Cabragh Wetlands pNHA – site code: 001934 – Distance: 10.5km
- Kilcooly Abbey Lake pNHA – site code: 000958 – Distance: 10.9km
- Power's Wood pNHA – site code: 000969 – Distance: 13.7km

3.4.1 Other Nature Conservation Designations

The Ramsar Convention entered into force in Ireland on 15th March 1985. Ireland currently has 45 sites/wetlands designated as Wetlands of International Importance (Ramsar Sites). These cover a surface area of 66,994ha.

There are no Ramsar sites in close proximity to Ballybeg/Lanespark/Derryvella Bog.

3.5 Hydrology and Hydrogeology

Ballybeg/Lanespark/Derryvella Bog forms part of the Suir Catchment (ID: 16) as defined by the EPA under the Water Framework Directive (WFD). It is situated within the Suir_SC_040 sub-catchment, which drains to the River Suir. The bog contains several drainage pathways and discharge locations, with most of the bog discharging to streams via silt ponds, which eventually flow into the River Suir. Ballybeg/Lanespark/Derryvella Bog has a gravity-based drainage system.

Hydrological modelling (*BNM-DR-26-07-RP-09: Depression analysis*) indicates that large parts of the bog are in natural basins with significant potential for re-wetting. It is likely that a portion of the basins in target areas will re-wet with deeper water, creating a mosaic of wetland habitats, when drains are blocked.

Regional hydrological data suggest that Ballybeg/Lanespark/Derryvella Bog receives an average precipitation of 941mm/yr (1981-2010), with an estimated annual effective rainfall rate of 512mm/yr based on GSI data. The GSI also estimate an annual average recharge rate of 17-18mm/year for Ballybeg/Lanespark/Derryvella Bog. In areas underlain by lacustrine clay, this is anticipated to be a reasonable estimate of recharge rate. However, in areas underlain by more permeable glacial material this is likely to be an underestimate, particularly where there are elevated mounds of glacial till combined with shallow peat deposits.

A higher recharge rate is expected in areas where shallow peat underlain by glacial till, which would lead to increased losses of water to depth. In these areas an estimated recharge rate of 50-100mm/yr would be considered a reasonable estimate, with a higher recharge rate expected where peat is shallow (<1m).

GSI bedrock geology data indicates that Ballybeg/Lanespark/Derryvella Bog is underlain by several bedrock units. The Ballybeg section of the site is primarily underlain by the Aghmacart Formation, which consists of dark shaly micrite and peloidal limestone to the west of the site. A narrow strip of the Crosspatrick Formation, characterised by pale-grey cherty crinoidal limestone, runs in a northwest-southeast alignment through the centre of the site.

To the east, the area is underlain by Waulsortian limestone, which is divided by a boundary of dolomitization into dolomitised massive fine-grained limestone to the west and a more significant proportion of massive unbedded lime-mudstone to the east.

The embedded lime-mudstone unit also extends beneath the western boundary of the Derryvella section of the site, where Lough Derryvella is located. East of this lake, a southwest-northeast aligned fault separates this from a very narrow deposit of the Crosspatrick Formation, similar to that found beneath Ballybeg. Most of the Derryvella section is underlain by the Aghmacart Formation and a very narrow segment in the southeast corner of Derryvella is underlain by the Durrow Formation, containing shaly fossiliferous and oolitic limestone.

There is an anticlinal axis structural fault that extends southwest-northeast through the Waulsortian limestone unit between the Ballybeg and Derryvella sections of the bog. The Aghmacart and Durrow Formations are classified as locally important aquifers (LI) as the bedrock units are considered to be moderately important only in local zones. The Crosspatrick Formation is locally important (Lm) as the bedrock is generally moderately productive. In contrast, the Waulsortian Limestone unit is described as a regionally important aquifer (Rk) as it is karstified.

A number of wells and springs have been drilled in Ballybeg and around Derryvella. Two wells were drilled close to Ballybeg in 1972 and 1974, reaching depths of 24.4 and 29.3m, respectively. These wells detected bedrock at depths of 3.6 and 3.3m below ground level, with reported yields of 98.2 m^3/day (moderate) and 41.5 m^3/day (moderate). Additionally, two wells were excavated near Derryvella in 1964 and 1971, with depths of 10.9 and 26.8m, respectively. The 1964 well reported bedrock at a depth of 4.8m below ground level, with yields of 152.7m^3/day (high) and 21.8m^3/day (low) for the two wells. (Note: the reported yields do not indicate the actual rate of abstraction. A license is required under the Water Environment (Abstractions and Associated Impoundments) Regulations 2024 for any abstraction that exceeds 25m^3/day. Locations for private abstraction licenses are not provided by the EPA, therefore it is not possible to determine whether any of these abstractions are licensed to exceed 25m^3/day.

An aquifer is an underground body of water-bearing rock or unconsolidated materials (gravel or sand) from which groundwater can be extracted in useful amounts. GSIs Aquifer classes are divided into three main groups based on their resource potential and further subdivided based on the type of openings through which groundwater flows. There are nine aquifer categories in total. Locally important aquifers are capable of supplying locally important abstractions (e.g. smaller public water supplies, group schemes), or good yields (100-400 m3/d). This data gives an indication of sub-surface deposits (bedrock and unconsolidated materials) in terms of their groundwater resource potential and dominant groundwater flow type.

Regionally important aquifers are those in which the network of fractures, fissures and joints, through which groundwater flows, is well connected and widely dispersed, resulting in a relatively even distribution of highly permeable zones. There is good aquifer storage and groundwater flow paths can be up to several kilometres in length. There is likely to be substantial groundwater discharge to surface waters (‘baseflow’) and large (>2,000 m3/d), dependable springs may be associated with these aquifers.

Groundwater vulnerability is classified as moderate across almost all of Ballybeg/Lanespark/Derryvella Bog, with the exception being the southeastern area of Ballybeg. This area is mapped as high due to the presence of rock or karst near the ground surface in a small, localised area approx. 250m south of the Ballybeg boundary. Subsoil permeability across the bog is mapped as being moderate by the GSI with an estimated recharge rate of 21-22mm/year across the bog.

Groundwater vulnerability for the area surrounding Ballybeg/Lanespark/Derryvella Bog ranges from moderate to extreme vulnerability in places. Groundwater Vulnerability is a term used to represent the intrinsic geological and hydrogeological characteristics that determine the ease with which groundwater may be contaminated by human activities. Groundwater vulnerability maps are based on the type and thicknesses of subsoils (sands, gravels, glacial tills (or boulder clays), peat, lake and alluvial silts and clays), and the presence of karst features. Groundwater is most at risk where the subsoils are absent or thin and, in areas of karstic limestone, where surface streams sink underground at swallow holes. These data indicate there is generally low risk of any groundwater contamination occurring at this site. Groundwater Vulnerability is typically used to indicate the susceptibility to groundwater pollution.

3.6 Emissions to surface-water and watercourses

The bog has 7 treated surface water outlets (SW10, SW11, SW12, SW13, SW14, SW15, and SW16) from previously active peat extraction catchment, all of which discharge to the Breagagh River (IE_SE_16B030200 Breagagh (Tipperary)_010)), the Black River (IE_SE_16B010100 Black (Twomileborris)_010)) and the North Glengoole River (IE_SE_16N280780 North Glengoole_010). The Breagagh River and the North Glengoole River are classed as Poor water quality status, with the Black River being classed as Moderate water quality status (Ecological Status or Potential SW 2016-2021) – Water Framework Directive.

The locations of silt ponds and associated surface water emission points, and those being monitored and sampled as part of the PCAS scheme are detailed on the attached water quality map (*BNM-DR-26-07-13: General Drainage Map*).

There is a robust monitoring program to track and verify any changes in baseline water quality conditions pre and post decommissioning and rehabilitation so that the success or otherwise can be tracked and verified for the National Parks & Wildlife Service, Environmental Protection Agency, and Local Authority Water Program, amongst a range of stakeholders.

Peat extraction is identified as a pressure in the third cycle of the River Basin Management Plan (Water Action Plan for Ireland). The main emission limit value (ELV) associated with these bogs is 35mg/l suspended solids, with trigger levels for ammonia of 3.6 mg/l and COD 100mg/l.

An analysis of the results over a number of years of the IPC licence environmental monitoring of some of the discharges from these bogs indicates that results were under the Emission Limit Value for Suspended Solids 99% of this period, with a similar level of compliance for COD and under the trigger level for Ammonia. Ammonia averaged 1.07mg/l and ranged from 0.006 to 19.5mg/l mg/l with Suspended Solids ranging from <2 to 50 mg/l and averaging 0.006 to 19.5mg/l

Table 3-1 Decommissioning and Rehabilitation Programme Water Quality Monitoring.

Bog	SW	Monitoring	SS	Colour	COD	pH	TS	TP	Ammonia
Lanespark	SW 15	Q1 06	26	178	101	7.4	50	0.05	3.32
Lanespark	SW 15	Q2 06	5	251	83	7.4	224	0.05	3.9
Lanespark	SW 15	Q3 06	5	67	37	7.9	314	0.05	3.06
Lanespark	SW 15	Q4 06	36	160	99	7.5	216	0.32	0.63
Lanespark	SW 15	Q1 07	50	220	104	7	142	0.1	1.52
Lanespark	SW 15	Q2 07	7	92	85	7.8	284	0.05	3.33
Lanespark	SW 15	Q3 07	18	333	114	7.2	232	0.05	2.27
Lanespark	SW 15	Q4 07	4	159	66	7.5	184	0.05	1.62
Lanespark	SW 15	Q1 08	40	130	110	7.5	192	0.06	1.21
Lanespark	SW 15	Q2 08	23	74	74	7.9	332	0.07	3.14
Lanespark	SW 15	Q3 08	34	384	130	7.3	163	0.04	1.91
Lanespark	SW 15	Q4 08	4	218	68	7.6	178	0.07	0.74
Lanespark	SW 15	Q1 09	4	223	60	6.7	111	0.04	0.56
Lanespark	SW 15	Q2 09	4	159	59	7.5	211	0.04	1.95
Lanespark	SW 15	Q3 09	7	326	111	7.5	170	0.04	1.7
Lanespark	SW 15	Q4 09	6	109	34	7.4	406	0.05	1.2
Lanespark	SW 15	Q1 10	5	157	43	7.4	240	0.05	3.36
Lanespark	SW 15	Q2 10	30	71	34	7.8	496	0.05	3.7
Lanespark	SW 15	Q3 10	7	89	42	7.6	294	0.05	2.61
Lanespark	SW 15	Q4 10	5	164	50	7.4	204	0.05	2.96
Lanespark	SW 15	Q1 11	5	285	65	7.2	164	0.05	2.1
Lanespark	SW 15	Q2 11	10	109	65	7.6	212	0.05	3.48
Lanespark	SW 15	Q3 11	5	27	10	8	768	0.11	0.64
Lanespark	SW 15	Q4 11	25	192	97	7.1	132	0.07	0.84
Lanespark	SW 15	Q1 12	21	193	34	7.5	214	<.05	2.68
Lanespark	SW 15	Q2 12	5	82	50	7.8	258	<.05	2.32
Lanespark	SW 15	Q3 12	7	331	67	6.9	134	<.05	1.2
Lanespark	SW 15	Q4 12	26	267	118	6.7	174	<.05	1
Ballybeg	SW 11	Q3 13	5	57	40	7.7	391	0.07	0.18
Lanespark	SW 10	Q3 13	5	177	91	7.6	272	0.05	0.07
Ballybeg	SW 12	Q3 14	<5	150	65	7.5	364	<0.05	0.04
Lanespark	SW 14	Q3 14	6	35	<10	7.8	452	<0.05	0.02
Lanespark	SW 15	Q3 14	<5	81	18	7.6	290	<0.05	4.5
Ballybeg	SW 11	Q1 15	<5	122	37	7.8	296	0.07	0.64
Lanespark	SW 10	Q1 15	<5	142	47	7.4	286	<0.05	1.9
Lanespark	SW 16	Q1 15	<5	85	30	7.8	352	<0.05	4.1
Ballybeg	SW 11	Q3 17	5	226	75	7.4	232	0.05	0.78
Ballybeg	SW 12	Q3 17	5	133	73	7.5	382	0.26	0.18
Ballybeg	SW 13	Q3 17	5	136	71	7.5	372	0.4	0.78
Lanespark	SW 10	Q3 17	6	75	25	7.7	302	0.05	0.02
Lanespark	SW 14	Q3 17	37	137	115	7.6	388	0.2	0.57
Ballybeg	SW 12	Q1 18	5	136	53	7.4	272	0.11	0.21
Ballybeg	SW 13	Q1 18	5	147	53	7.3	316	0.09	0.31
Lanespark	SW 15	Q1 18	5	107	36	7.3	178	0.05	0.35

Bog	SW	Monitoring	SS	Colour	COD	pH	TS	TP	Ammonia
Lanespark	SW 16	Q1 18	5	131	38	7.2	182	0.05	0.36
Ballybeg	SW 11	Q3 20	<2	239	57	7.1	175	<0.05	0.457
Ballybeg	SW 12	Q3 20	<2	237	55	7.6	184	<0.05	0.414
Ballybeg	SW 13	Q3 20	5	242	58	7.8	196	<0.01	0.403
Lanespark	SW 14	Q3 20	3	245	55	7.7	200	<0.01	0.127
Lanespark	SW 15	Q3 20	2	234	54	7.8	176	<0.01	0.471
Lanespark	SW 16	Q3 20	2	237	59	7.8	175	<0.01	0.447
Ballybeg	SW 11	Q4 20	6	250	79	7.5	270	0.07	0.204
Ballybeg	SW 12	Q4 20	3	290	68	7.2	251	<0.05	0.151
Ballybeg	SW 13	Q4 20	5	295	70	7.3	255	<0.01	0.196
Lanespark	SW 14	Q4 20	2	173	75	7.6	304	<0.01	0.395
Lanespark	SW 15	Q4 20	3	176	76	7.6	315	<0.01	0.316
Lanespark	SW 16	Q4 20	4	248	78	7.5	253	<0.01	0.151
Ballybeg	SW 11	Q1 21	<2	233	74	7.8	295	<0.05	0.269
Ballybeg	SW 12	Q1 21	<2	232	71	7.8	288	<0.05	0.272
Ballybeg	SW 13	Q1 21	<2	219	75	7.4	352	<0.01	0.308
Lanespark	SW 14	Q1 21	4	235	74	7.8	281	<0.01	0.293
Lanespark	SW 15	Q1 21	<2	219	72	7.3	331	<0.01	0.302
Lanespark	SW 16	Q1 21	<2	221	76	7.3	287	<0.01	0.31
Ballybeg	SW 11	Q3 21	6	106	13	7	388	<0.05	0
Ballybeg	SW 12	Q3 21	6	114	21	8	306	<0.05	0
Ballybeg	SW 13	Q3 21	8	106	15	7	372	<0.05	0
Lanespark	SW 14	Q3 21	8	120	16	7	275	<0.05	2
Lanespark	SW 15	Q3 21	<2	112	19	7	363	<0.05	0
Lanespark	SW 16	Q3 21	8	116	15	7	343	0	2
Ballybeg	SW 11	Q1 22	4	177	65	7	393	0	0
Ballybeg	SW 12	Q1 22	2	183	59	7	243	<0.05	0
Ballybeg	SW 13	Q1 22	<2	130	58	8	420	<0.05	0
Lanespark	SW 14	Q1 22	<2	179	57	7	390	0	0
Lanespark	SW 15	Q1 22	6	177	60	7	381	0	0
Lanespark	SW 16	Q1 22	3	190	58	7	260	<0.05	0
Ballybeg	SW 11	Q3 23	2	357	84	7	87	<0.05	0.135
Ballybeg	SW 12	Q3 23	6	329	81	7.5	454	0.26	0.258
Ballybeg	SW 13	Q3 23	10	396	77	7.3	310	<0.05	0.557
Lanespark	SW 14	Q3 23	15	340	80	7.2	569	0.07	0.379
Lanespark	SW 15	Q3 23	<2	119	39	7.7	468	<0.05	0.026
Lanespark	SW 16	Q3 23	4	306	81	7.2	341	<0.05	1.31
Ballybeg	SW 11	Q4 23	<2	309	75	7.1	224	<0.05	0.076
Ballybeg	SW 12	Q4 23	2	322	75	7.4	371	0.12	0.052
Ballybeg	SW 13	Q4 23	3	441	98	7.1	378	<0.05	0.198
Lanespark	SW 15	Q4 23	<2	439	126	6.9	268	<0.05	0.338
Lanespark	SW 16	Q4 23	<2	496	114	7.1	219	0.06	0.688
Ballybeg	SW 11	Q1 24	3	231	56	7.2	217	<0.05	0.169
Ballybeg	SW 12	Q1 24	4	194	42	7.4	335	0.08	0.03
Ballybeg	SW 13	Q1 24	4	356	76	7	245	<0.05	0.214

Bog	SW	Monitoring	SS	Colour	COD	pH	TS	TP	Ammonia
Lanespark	SW 14	Q1 24	<2	269	66	7.2	419	<0.05	0.283
Lanespark	SW 15	Q1 24	<2	145	43	7.5	202	<0.05	0.055
Lanespark	SW 16	Q1 24	18	76	14	7.9	416	0.07	0.045
Ballybeg	SW 11	Q2 24	<2	256	90	7.3	202	<0.05	0.102
Ballybeg	SW 12	Q2 24	<2	256	92	7.1	325	0.1	0.023
Ballybeg	SW 13	Q2 24	<2	442	116	7.1	207	<0.05	0.088
Lanespark	SW 14	Q2 24	2	350	76	7.2	217	<0.05	0.162
Lanespark	SW 15	Q2 24	<2	335	74	7.5	139	<0.05	0.697
Lanespark	SW 16	Q2 24	<2	141	40	7.7	270	<0.05	0.012
Lanespark	SW 14	Q3 24	13	174	41	6.9	839	<0.05	2.59
Lanespark	SW 15	Q3 24	3	165	37	7.4	327	<0.05	19.5
Lanespark	SW 16	Q3 24	3	54.9	10	7.8	388	<0.05	0.029
Ballybeg	SW 11	Q4 24	<2	234	74	7.2	257	<0.05	0.111
Ballybeg	SW 12	Q4 24	4	133	49	7.6	292	0.05	0.043
Ballybeg	SW 13	Q4 24	3	167	51	7.5	335	<0.05	0.595
Lanespark	SW 14	Q4 24	3	300	87	7.6	345	0.05	0.006
Lanespark	SW 15	Q4 24	<2	210	62	7.4	246	<0.05	1.55
Lanespark	SW 16	Q4 24	2	56.6	28	7.8	367	<0.05	0.028

Rehabilitation of cutaway peatland is closely linked with control of emissions. One of the criteria for successful rehabilitation is stabilisation through re-vegetation, which will stabilise all substrates and in turn remove the need for further silt control measures. This site is already vegetated in some areas. Re-wetted peat also aids the primary objective of stabilizing peat, as when peat is re-wetted it is not vulnerable to wind erosion. Re-wetted peat and the development of wet peatland habitats can also act as sinks for silt and mobile peat, and increases additional retention time for solids, and the peatland vegetation can quickly stabilise this material within blocked drains on site (by acting like constructed wetlands).

Water quality of water discharges from restored peatlands normally improves as a result of bog restoration measures and the restoration of natural peatland processes (Bonn *et al*., 20017). Bog restoration is also expected to improve water attenuation of the site as the drains are blocked, slowing water movement and water release from the site. Restored peatlands help slow the release of water and aid the natural regulation of floods downstream (Minayeva *et al*., 2017). The draft National River Basin Management Plan (NRBMP) 2022-2027 (DHPCLG, 2022) is the key national plan for Ireland to achieve the objectives of the Water Framework Directive (WFD). The NRBMP outlines how key actions such as the Bord na Móna peatland rehabilitation is expected to have a positive impact on water quality and help the NRBMP deliver its objectives in relation to the WFD.

Water will still discharge from designated emission points when rehabilitation at Ballybeg/Lanespark/Derryvella Bog has been completed. This discharge will have improving water quality and there will be increased wetland attenuation, meaning slower release of water. This is expected to have a positive impact on status of downstream water bodies. While water quality improvements assist in meeting water frameworks directive ambitions and targets, they can also improve drinking water sources in applicable catchments with drained peatlands and the potential for associated reduction in treatment requirements at drinking water treatment facilities.

Decommissioning and Rehabilitation Programme Water Quality Monitoring.

The licence obligation of quarterly sampling regime on a selected number of ponds to be sampled over a 3-year cycle would not be sufficient to be able to appropriately track the changing water chemistry that will occur as part of this enhanced rehabilitation programme, so this sampling regime will occur monthly.

To assist in monitoring surface water quality from this bog, it was agreed to increase the existing licence monitoring requirements of the IPC Licence, to sampling for the same parameters every month.

This new sampling programme commenced in July 2023 and is enabling a baseline to be established, with sampling to progress during the scheduled works, and for a period of up to 2 years post rehabilitation. Depending on the period required to confirm that the main two parameters, suspended solids, and ammonia as remaining compliant with the licence emission and trigger limit values and there is an improving trajectory in these two parameters i.e., reduction in concentration, the monitoring programme and intensity will be periodically reviewed and amended.

Initial quarterly results are included in Appendix XIII. These results cover the period from July 2023 to December 2024 and are from some of the surface water outlets from the sections of bog to be rehabilitated in 2025. Peat extraction ceased in these bogs in 2017 and as expected some of the key water quality parameters that can impact water quality from peat extraction activities, remain on a relatively static trajectory, with suspended solids indicating a level trend from all outlets during the period, all well below any limits of concern. During this same period there was a slight downward trend in Ammonia for emission points, with all other parameters fluctuating slightly, most likely influenced by normal weather patterns, including rainfall.

Monthly Ammonia concentrations from emission points from July 2023 to December 2024 averaged 0.4550mg/l and ranged from 0.006 to 2.59mg/l. Results for Suspended Solids for the same period ranged from <2 to 18 mg/l and averaged 6.31mg/l.

In the preparation of this monitoring programme, Bord na Mona have been providing the Local Authority Water Programme (LAWPRO) with details of the surface water emissions points associated with this bog. LAWPRO have in turn provided details of their monitoring programme and these are included in the Water Quality Map.

This is necessary to ensure that there is alignment with the WFD monitoring programme and that where possible, the monitoring programme will enable any improvements in water quality or establishing trends to be quantified against any available WFD monitoring data. It will also enable the periodic sharing of data which will inform the monitoring reports, success criteria and enable LAWPRO under the Water Framework Directive to track any changes in pressures and be aware of changes in water chemistry.

Monitoring results will be maintained, trended every six months and reported on each year and as required, as part of the requirement to report on Condition 10.1 of the IPC Licence on Bog Rehabilitation in the Annual Environmental Report, and will be provided to LAWPRO and the EPA as required to inform progress and national monitoring requirements under the WFD.

These results will also be available in April each year as a requirement of the Annual Environmental Report at www.epa.ie.

The parameters to include as per condition 6.2 of the IPC Licence include monthly monitoring for pH, Suspended Solids, Total Solids, Total Phosphorus, Total Ammonia, Colour & COD. In addition, DOC has been included as a parameter to try and identify any changes in carbon in the surface water, and where required by LAWPRO, to assist in investigating other changes in water chemistry, the series of parameters can be reviewed and amended.

Success criteria:

The key water quality success criteria associated with this enhanced rehabilitation are as follows:

- That there is a stabilizing/improving concentration of suspended solids and ammonia in discharges from Bord na Móna sites, associated with the measures undertaken to stabilize the peat surface by the blocking of the internal drainage system and the maximized rewetting of the peat surface.
- Receiving water bodies have been classified under the River Basin Management Plan and this classification includes waters that are At Risk from peatlands and peat extraction. The success criteria will be that any At Risk classification will see improvements in the associated pressures from this peatland or if remaining At Risk, that there is an improving trajectory in the pressure from this peatland.

As the monthly monitoring program at Ballybeg/Lanespark/Derryvella Bog continues in 2025 and during the rehabilitation works planned for 2025 further trending will be produced to verify any ongoing trends.

3.7 Fugitive Emissions to air

None.

The bog is no longer in industrial peat production. Rehabilitation of the cutaway peatland will seek to re-wet the dry peat where possible and re-vegetate all areas (whether wet or dry). Collectively, ceasing industrial peat production, re-wetting and re-vegetating will minimise any risk of emission to air from dust.

3.8 Carbon emissions

Irish peatlands are a huge carbon store, containing more than 75% of the national soil organic carbon (Renou-Wilson *et al.* 2012). Peatland drainage and extraction transforms a natural peatland which acts as a modest carbon sink (taking in 0.1 to 1.1 t of carbon as CO2-C /ha/yr) into a cutaway ecosystem which is a large source of carbon dioxide (releasing 1.3 to 2.2 t of carbon as CO2-C /ha/yr) based on Tier 1 Emission factors (Evans *et al*. 2017). Renou-Wilson *et al.* (2018) reported losses of between 0.81 – 1.51 CO2-C /ha/yr from drained peatlands located in Ireland.

Re-wetting of dry peatlands will increase methane emissions (Gunther *et al*. 2020) as a consequence of the anoxic conditions within the peat body that provide a suitable environment for the microbial breakdown of plant litter and root exudates. Tanneberger *et al.* (2021) describes how peatland management has to choose between CO2 emissions from drained peatlands or increased methane (CH4) emissions from rewetted industrial peatlands. However, when radiative effects and atmospheric lifetimes of both GHG gases are considered and modelled, postponing rewetting increases the long-term warming effect of continued CO2 emissions (Gunther *et al*. 2020). This means the increase in methane due to rewetting of dry peatlands is still negated by the CO2 emissions reductions. Further, Wilson *et al.* (2022) confirmed the benefit of rapid rewetting to achieve strong carbon reductions and potentially altering the warming dynamics from warming to cooling depending upon the climate scenario.

It is expected that Ballybeg/Lanespark/Derryvella Bog will become a reduced carbon source following rehabilitation. The potential of any cutaway site to develop as a carbon sink in the longer-term depends on the success of the rehabilitation measures, the extent of development of *Sphagnum*-rich or other peat-forming habitats, the balance of carbon fluxes from different cutaway habitats and future climatic conditions. Much of this bog is expected to develop wetland habitats on shallow peat with open water, reed swamp and fen habitats

with alkaline emission factors and a smaller proportion will develop as regenerating wet deep peat vegetation on deep peat areas. Birch woodland and heather dominated vegetation is expected to develop on the drier mounds and along peripheral headlands.

3.9 Current ecological rating

(Following NRA (2009) Evaluation Criteria)

The majority of the former production areas at Ballybeg Bog and Derryvella Bog are deemed to be of **Local Importance (lower value)** due to the dominance of bare peat. Pioneer and semi-natural habitats such as raised bog, scrub and pioneer fen are rated higher and are deemed to be of **Local Importance (higher value)**.

4. CONSULTATION

4.1 Consultation to date

Consultation seeks to engage an audience of relevant stakeholders at both a national and local level. National stakeholders have been identified from varied bog restoration and rehabilitation efforts undertaken by Bord na Móna over the past 40 years, with particular emphasis on engagement with stakeholders during their Biodiversity Action Plan programme, since 2010. National Stakeholders includes relevant government departments and agencies, relevant semi-state bodies, NGOs and other environmentally-focused groups with a national remit.

There has been ongoing consultation about the proposed wind farm development, rehabilitation, biodiversity and other general issues at Ballybeg/Lanespark/Derryvella Bog in relation to the proposed Littleton Wind Farm (Bord na Móna Wind Farm | Littleton Wind Farm). Specific consultation relating to the wind farm development is not listed here, although there has been detailed consultation with stakeholders in relation to these issues and overlap with rehabilitation and biodiversity.

There has been ongoing consultation about rehabilitation, biodiversity and other general issues over the years about Littleton bog group, including Ballybeg/Lanespark/Derryvella Bog, with various stakeholders in relation to:

- General consultation with range of stakeholders at annual Bord na Móna Biodiversity Action Plan review days 2010-2018.
- Open consultation with range of stakeholders at annual BAP review days 2010-2018.
- Consultation with the North Tipperary Heritage Forum during the period 2010-2015.
- General consultation at a local community event in Littleton in Dec 2016.
- General consultation with Tipperary County Council and other stakeholders in relation to the Littleton Labyrinth Project Feasibility Study.
- Ongoing engagement with Lisheen Mine.
- Archaeological Liaison Committee (National Museum of Ireland & Dept of Culture Heritage and the Gaeltacht).
- Midlands & East Regional WFD Operational Committee (River Basin Management Plans).
- Ongoing consultation with Coillte – proposed Coillte/BnM Midlands Native Woodland Project.
- Consultation with Tipperary Climate Action Officer and Biodiversity Officer during Baunmore site visit (April 2024).
- Ongoing consultation with Slieve Ardagh Rural Development Group.
- General consultation with Tipperary County Council and other stakeholders in relation to the Midlands Network Trail.
- Ongoing engagement with Slieve Ardagh Rural Recreation regarding Loch Doire Bhile.

There was specific consultation and engagement about rehabilitation of the Littleton Bog group, including Ballybeg/Lanespark/Derryvella Bog, with various stakeholders during the period 2018-2021:

- Lisheen Mine.
- Irish Peatland Conservation Council.
- NPWS (site visits).
- Tipperary County Council (2018).
- Tipperary Heritage Forum.
- Kilkenny County Council.

- Consultation with members of the local community.
- Consultation with local community groups.
- Slieve Ardagh Rural Development.
- National University of Galway.
- Limerick Institute of Technology.
- Irish Wildlife Trust.
- Environmental Protection Agency.
- Birdwatch Ireland.
- Birdwatch Ireland Tipperary Branch.
- Forest Service.
- Coillte.

To inform the original Plan (Phase 1 Rehabilitation), both national and local stakeholders, including neighbours whose land adjoins Ballybeg/Lanespark/Derryvella Bog and local representatives of national bodies (such as Regional National Parks and Wildlife Service staff) and relevant offices in County Councils (such as the Heritage or Environmental Offices) were contacted. Any identified local interest groups were informed of the opportunity to engage with this rehabilitation plan and were invited to submit their comments or observations in relation to the proposed rehabilitation (Phase 1) at Ballybeg/Lanespark/Derryvella Bog or the programme in general (see Appendix XI).

All correspondence was acknowledged and reviewed and evaluated against the rehabilitation measures proposed.

4.2 Issues raised by Consultees

Some issues were raised by consultees during the consultation process for both the current and previous drafts of the rehabilitation plan for Ballybeg/Lanespark/Derryvella Bog and these are summarised below. A number of general submissions in respect of previous PCAS consultation are also referenced where applicable.

4.2.1 Consultation

During the initial commencement of PCAS, a number of consultees including: the Irish Farmers Association (IFA), the Irish Creamery Milk Suppliers Association (ICMSA) and Trinity College Dublin raised concerns regarding the duration and scope of consultation period. Stakeholders suggested that the consultation period should be extended to allow all potential stakeholders to make submissions where required.

4.2.2 Assessments of rehabilitation

Queries on pre-rehabilitation assessments were raised by NPWS and the National Museum of Ireland relating to the finalisation of several bog rehab plans in 2021 in relation to Appropriate Assessment, Environmental Impact Assessment and Strategic Environmental Assessment.

4.2.3 Restoration scope

NPWS welcomed the restoration and rehabilitation measures proposed for the Littleton Bog Group in 2018, particularly where it could result in the development of Annex I active raised bog or would significantly aid Ireland in meeting its commitments under the EU Habitats Directive.

NPWS (pre-PCAS, 2018) suggested that BnM consider more fully the potential for forward-planning during production phases of its operation so that the topography of the commercial fields could be engineered so as to best facilitate rewetting of the sites. Consideration should be given to reprofiling works within the Littleton Bog Group.

NPWS (pre-PCAS, 2018) highlighted the potential for more intensive rehabilitation during initial consultation and the potential for larger project opportunities focusing on GHG emission reduction creation of peat-forming habitats, biodiversity enhancement, other ecosystem services enhancement/restoration. The use of bunding at several sites was discussed.

Birdwatch Ireland (pre-PCAS, 2018) welcomed the proposed restoration/rehabilitation of the Littleton Bog Group and highlighted need to take consideration of bird nesting season when carrying out works, particularly for Lapwing and Curlew.

Tipperary County Council (pre-PCAS, 2018) also suggested that peatland water levels and flow regimes should be restored to as close to the natural reference conditions as possible.

The Irish Peatland Conservation Council (pre-PCAS, 2018) expressed concerns that *Sphagnum* inoculation was not part of the rehabilitation/restoration measures being applied at Ballysorrel Bog.

IPCC (pre-PCAS, 2018) requested clarity around the scope of sites included in the Littleton Rehabilitation Programme and recommended that priority be given to raised bog restoration, where possible. IPCC were concerned about the fact that milled peat extraction was projected to continue at Killeen Bog (in 2018, subsequently ceased in 2021). The IPCC were also unclear about the aims and objectives for sites with biodiversity interest. The IPCC recommended the use of contouring as a methodology to improve re-wetting outcomes.

Restoration/rehabilitation of marginal habitats was raised by the IPCC and Butterfly Conservation Ireland (BCI) relating to the finalisation of several bog rehab plans in 2021 and 2022 as worthy of consideration within the rehabilitation measures to support carbon sequestration and biodiversity objectives.

4.2.4 Monitoring

Further details on monitoring of ecological metrics, and how and where reporting on this monitoring would take place, was raised by the IPCC, University College Dublin and Trinity College researchers in their respective submissions relating to the finalisation of several bog rehab plans in 2021. Uisce Éireann (formerly Irish Water) reiterated the requirement of a strong monitoring program with respect to water quality during and post rehabilitation.

The IPCC (pre-PCAS, 2018) highlighted that monitoring of changes to water-levels as a result of rehabilitation could be improved using piezometers and queries the frequency of ecotope mapping.

NPWS (pre-PCAS, 2018) recommended that ongoing research into the interaction between rehabilitation measures and carbon emissions is prioritized so as to better inform future rehabilitation plans.

NPWS (pre-PCAS, 2018) had some difficulty interpreting maps due to their complexity and the size of the legend.

4.2.5 Flooding, drainage or other impacts on adjacent land.

The Irish Farmers Association (IFA), The Department of Agriculture Food and the Marine, individual local residents and ICMSA queried likely impacts relating to the finalisation of several bog rehabilitation plans in 2021 and 2022. They raised concerns based on the proposed re-wetting in relation to flooding on adjoining lands and, specifically,

with regards to the maintenance of drains. In previous submissions, the IFA also raised the issue of Health and Safety in relation to raising water levels as well as possible impacts on land and property prices.

Several individuals who owed adjacent land to bogs within the Littleton Bog Group expressed concerns about the potential impacts of re-wetting to their land (pre-PCAS, 2018).

4.2.6 Amenity

Several individuals and organisations expressed interest in the development of amenity and greenways through the Littleton Bog Group (pre-PCAS, 2018).

IPCC highlighted a bog area at the north of Littleton Bog that had been used for educational purposes in the past.

Several consultees including various politicians have requested information regarding the development of amenities on BnM bogs since the beginning of consultation by BnM relating to the Peatlands Climate Action Scheme.

4.2.7 Water Quality

A number of consultees have contacted BnM to express their concerns regarding the potential impact of PCAS related activities on water quality within waterbodies that are hydrologically connected to BnM bogs. *Uisce Eireann* have expressed their support for PCAS in general and have also requested information regarding the potential hydrological impacts of PCAS.

Tipperary County Council (Pre-PCAS, 2018) highlighted the need to avoid any unnecessary deterioration in the quality and quantity of ground and surface waters.

4.2.8 Future management

NPWS (pre-PCAS, 2018) highlighted the potential for future nature conservation designations for several bogs in the Littleton Bog Group (Ballysorrell and Knockahaw). Queries about future nature conservation designations were also submitted by IPCC, discussed with IWT and with Birdwatch Ireland Tipperary Branch.

Birdwatch Ireland, Tipperary Branch (Pre-PCAS, 2018) suggested further management of sites for to improve habitat for breeding wetland birds.

The Irish Farmers Association (IFA) (2021-2022) expressed concerns regarding the future ownership of the BnM bogs subject to rehabilitation, in submissions made on earlier PCAS plans. They expressed a desire for contingency planning for potential future ownership of designated bogs so as to ensure no negative impacts arise on adjacent properties from any new ownership.

4.2.9 Other issues

Other issues (raised by IPCC) during the finalisation of several bog rehab plans in 2021, 2022 and in 2023 included after use of the bog and turf cutting on the margins of the bog (outside of the area owned by BnM). The IPCC have also requested information regarding the resilience of rehabilitation measures to climate change induced climatic alterations.

Archaeological end of life survey of all the bogs were requested by National Museum of Ireland and National Monuments Unit during the early stages of PCAS. The National Museum of Ireland also requested that due diligence be taken during works to protect any archaeologically significant findings or areas. They also reiterated the importance of peatlands for the preservation of archaeology and requested they be consulted as part of any EIA undertaken.

A local landowner (pre-PCAS, 2017) with a holding adjacent to a Littleton Bog made some enquires about the return of land originally CPOed by Bord na Móna.

University of Galway (pre-PCAS 2017) were interested in developing an INTEREG Project on peatland sites and were discussing the inclusion of several BnM sites in this proposed project. (This subsequently became the CarePeat INTEREG Project and Cavemount Bog Co. Offaly was included in the project, which is now completed).

Limerick Institute of Technology (LIT) were interested in developing a project on peatlands and paludiculture and were discussing the potential availability of land within the Littleton Bog Group. This proposal ultimately did not develop into a project on BnM lands.

An individual highlighted the presence of several rare Bee Orchid varieties along the BnM railway at Longfordpass.

For a complete summary of submissions received and replies, see Appendix XI.

4.3 Bord na Móna response to issues raised during consultation

4.3.1 Consultation

BnM carried out extensive consultation and engagement with all interested parties during 2018-2021. BnM are carrying out additional consultation as part of the process of updating the Phase 2 rehabilitation plan for Ballybeg/Lanespark/Derryvella. This is ongoing with a dedicated Community Liaison Officer communicating with affected and interested parties. A website has been developed to make information available. This will be continually updated. Some PCAS Bogs have been used as demonstration sites so that interested stakeholders can come to organised visits and observe the measures on the ground.

4.3.2 Assessments of rehabilitation

Appropriate Assessment screening will be undertaken on all the bogs as part of PCAS. This will be undertaken by external consultants for Ballybeg/Lanespark/Derryvella Bog.

Implementation of rehabilitation measures including machine access across the bog will be carried out in conjunction with BnM Ecology Department. Seasonal and other restrictions will be put in place to mitigate against any impacts on biodiversity.

An Archaeological Impact Assessment (AIA) has been undertaken on Ballybeg/Lanespark/Derryvella Bog (Appendix XII). The aim for known archaeology on these bogs is to accomplish preservation in situ and we are taking steps to identify and avoid all known archaeology. BnM aim to achieve this through including all known archaeology in the planning process of rehabilitation works and implementing and exclusion or buffer zone around these features. These measures should sufficiently protect any archaeology in these areas, during any ground works in the final plan. It is anticipated that any archaeology will benefit from the ultimate remit of the rehabilitation, in that water tables will be raised thereby preserving in-situ. There is also an identified procedure for managing reports of stray finds that may arise during rehabilitation. There is continuing consultation and engagement with the National Museum of Ireland and the National Monuments Unit.

4.3.3 Restoration scope

Consultees during the Phase 1 rehabilitation (2018-2021) including NPWS and the IPCC suggested the use of more intensive rehabilitation measures such as contouring and bunding. These ultimately were beyond the scope of the rehabilitation budget allocated to these sites by BnM at the time (2018-2021). The PCAS is an opportunity to

carry out some of these suggested measures (e.g. bunding, recontouring) through the Littleton Bog Group as part of Phase 2 rehabilitation.

As part of PCAS, all restoration/rehabilitation options have been developed to support climate action and biodiversity objectives. Other issues such as existing amenity, social impacts, industrial history, archaeology were not part of the direct scope of PCAS but were considered when developing the rehabilitation plan. After-use of the bog is outside the scope of PCAS. Rehabilitation will lead to the development of a stable diverse re-wetted cutaway landscape that will have added benefits for amenity in the future but will not rule out other after-uses such as amenity.

Sphagnum inoculation is one measure that was initially suggested by IPCC (in 2018) for use at Ballysorrel to support raised bog restoration. This measure was ruled out initially by Bord na Móna due to its relatively high cost, lack of resources and other logistical issues such as lack of suitable local *Sphagnum* donor sites. Since then, BnM has developed the Peatlands and People LIFE Project (Home | Ireland's Climate Action Catalyst | Peatlands & People) and one of the main objectives of this project on BnM land is to inoculate approx. 800 ha of suitable residual deep peat with *Sphagnum* plugs to speed up the trajectory of development of *Sphagnum*-rich embryonic bog vegetation. So far, 250 ha has been inoculated across midlands bogs. The future selection of sites within the Littleton Bog Group for *Sphagnum* inoculation will be dependent on availability of resources for planting. Site visits to Ballysorrell (2021-2023) has also shown that *Sphagnum* present on site is recolonising and spreading quickly in response to the re-wetting in 2018.

4.3.4 Monitoring

As part of the PCAS, a monitoring and verification plan has been developed to support climate action and biodiversity objectives. This will include stratified monitoring of bog condition, habitats and biodiversity at several different scales. It is proposed to monitor the improvement of some biodiversity ecosystem services. The appearance of key species such as *Sphagnum* moss will be monitored during walk-over surveys and general monitoring visits. It is not proposed to carry out any additional monitoring of biodiversity ecosystem services at this site. Biodiversity monitoring for PCAS planned for a stratified approach with different targeted monitoring at different sites based on the site characteristics.

It is the expectation of BnM that rehabilitation measures should positively impact the water quality in receiving water bodies through enhancing the water attenuation across rehabilitated sites. The robust water monitoring programme implemented as part of PCAS will be used to assess water quality leaving rehabilitated sites at designated points.

An overview of the Water Quality Monitoring plan was provided to Uisce Eireann, and confirmation given that water flow and dissolved organic carbon (DOC) is being monitored.

BnM also advised that decommissioning of silt ponds will only be carried out when the EPA are satisfied that adequate stabilisation of the bog has been achieved and silt ponds are no longer required. This decommissioning will be determined by water quality results and EPA approval.

It was also confirmed that rehabilitation of bogs in the same catchment is likely to result in beneficial impacts on water quality in the catchment. This will be captured by the results from EPA monitoring stations in the vicinity of the bogs.

4.3.5 Flooding, drainage or other impacts on adjacent land.

During Phase 1 of the rehabilitation across Littleton Bogs, individual landowners who expressed concerns were met on site. No boundary drains were blocked and, in several instances, (Baunmore and Ballybeg) some internal drainage was modified to allow water draining from external lands to flow through these sites unhindered.

It is the intention of BnM that the re-wetting of the bogs will be carried out in such a manner that does not impact on third party lands. Where it is deemed that blocking of a shared drain would cause any adjoining lands to be adversely affected, this will be avoided, and alterations made to the rehabilitation plan. In general, drains around the margins of the bog will not be blocked.

External consultants have been appointed to carry a hydrological assessment to identify any potential impacts to neighbouring lands and to mitigate against any such impacts. There is no potential for direct impacts on arterial drainage downstream.

It is intended that rehabilitation measures will not significantly alter the existing topographical catchments and that the spine of the drainage networks, those which the upstream catchments drain through, will be retained by BnM.

4.3.6 Amenity

Bord na Móna and Tipperary County Council carried out a feasibility study of the potential for amenity development across the Littleton Bog Group called Littleton Labyrinth in 2018-2020. The first phase of this amenity has been completed and a greenway has been constructed at Killeen Bog to Loch Doire Bhile. A further extension (Phase 2) is proposed at Ballybeg and Derryvella Bog. There is potential for future extensions to this greenway network at Derryville Bog in the future. The proposed rehabilitation measures will not constrain any future greenway development.

Creating amenity developments such as walking tracks is not included within the direct scope of PCAS. However, PCAS rehabilitation will enable and support potential amenity future amenity developments.

4.3.7 Water Quality

PCAS rehabilitation is expected to positively impact the water quality of surrounding water bodies through enhancing water attenuation across rehabilitated sites. The robust water quality monitoring programme implemented as part of PCAS will be used to assess the water quality leaving rehabilitated sites at designated points.

4.3.8 Future management

This rehabilitation plan is not intended to plan out future management of these sites. Known or planned after-use (renewable energy, way-leave, Littleton Labyrinth greenway feasibility) has been incorporated, where possible, in the rehabilitation plan. Peatland rehabilitation is not intended to constrain future land-uses, where they are compatible with this environment.

BnM will continue to manage their land bank into the future. As industrial peat production has now ceased on BnM lands and rehabilitation measures carried out, a regular drainage maintenance programme will not be required or carried out as would have been the case in the past. However, if issues arise with the BnM internal drainage system that affects upstream or downstream landowners, then these issues will be addressed by BnM.

BnM considers issues regarding estate security, fire risk, invasive species and water pollution of utmost importance. BnM intends to maintain security and manage fire risk over the entirety of the estate. In this regard,

PCAS activities, should have no detrimental impact on these issues. Regarding water pollution, BnM is regulated by the EPA and as such adheres to the strict water pollution measures laid out by the same.

The formal designation of sites for conservation is a matter for NPWS. BnM are happy to continue engaging on issues of conservation designations as part of the National Peatland Strategy and other initiatives.

4.3.9 Other issues

The National Museum of Ireland (NMI) and the National Monuments Service (NMS) were included in the stakeholder consultation process. Where available at the time of the submission of the rehabilitation packages to NPWS, the Archaeological Impact Assessment (AIA) is included. Where it is still in preparation, it will subsequently be provided. Both bodies acknowledge the AIA is a desk-based process and associated outputs designed to ensure any known archaeology is identified and protected during the implementation process, and the Project Archaeologist's recommendations regarding buffering and ongoing vigilance and reporting of any stray finds to NMI.

It is the intention of BnM to keep secure the estate and ensure that any anti-social behaviour that occurs within the estate is reported and dealt with by the appropriate authorities.

BnM will consider future opportunities for biodiversity enhancement, subject to availability of resources and funding, where possible.

4.3.10 Concluding statement

No specific issues were raised during consultation that required significant changes to the substance of the rehabilitation plan.

The PCAS has the potential to deliver some of the rehabilitation measures initially suggested by stakeholders but not included within Phase 1 rehabilitation.

Marginal drains will not be blocked to avoid impacts on adjacent lands or lands under the ownership of third parties or turf-banks. This does not change the overall rehabilitation goals and outcomes and can be integrated with the other rehabilitation measures to allow cutaway re-wetting.

BnM intend to continue management of this site into the future and issues such as security and trespass will be addressed on an ongoing basis in association with other stakeholders.

BnM intends to maintain a "No Shooting" policy on Ballybeg/Lanespark/Derryvella Bog.

5. REHABILITATION GOALS AND OUTCOMES

The rehabilitation goals and outcomes outline what Bord na Móna want to achieve by implementing the rehabilitation (Phase 1 and Phase 2). These include:

- Meeting conditions of IPC Licence.
- Stabilisation or reduction in water quality parameters of water discharging from the site (e.g. suspended solids).
- Reducing pressure on receiving waterbodies that have been classified as *At Risk* from peatlands and from peat extraction, via stabilization or improving water-quality from this bog, and therefore, reducing pressures.
- Optimising hydrological conditions and trajectories of natural colonisation and pioneer habitat development for **climate action benefits as part of PCAS**.
- Optimising hydrological conditions for the development of reed swamp and fen on shallow more alkaline peat and other subsoils, or *Sphagnum*-rich regenerating wet deep peat vegetation communities on deep residual peat, where present.
- Supporting current and potential future infrastructure, amenity, and other land-uses. Integrating rehabilitation measures with current amenity infrastructure on site. It is not proposed to carry out any rehabilitation actions to change or negatively affect any proposed infrastructure.
- Supporting potential future native woodland development. It is not proposed to carry out any rehabilitation actions to change or negatively affect the proposed Coillte/BnM Midlands Native Woodland Project.
- The main goal and outcome of this updated plan is the successful rehabilitation (environmental stabilisation) of peatlands used for industrial peat production at the bog in a manner that is acceptable to both external stakeholders and to Bord na Móna and which optimise climate action and other ecosystem service benefits.

The rehabilitation goals and outcomes take account of the following issues.

- Bord na Móna have carried out rehabilitation at Ballybeg/Lanespark/Derryvella Bog between 2018-2021 (Phase 1 rehabilitation). Significant drain-blocking and re-wetting was carried out during this phase.
- It will take some time for stable naturally functioning habitats to fully develop at Ballybeg/Lanespark/Derryvella Bog. This will happen over a longer timeframe than the implementation of this rehabilitation plan.
- Re-wetting residual peat will initially maintain and enhance the carbon storage capacity of the bog. There is scientific consensus that restoration of hydrology in damaged bog can improve carbon storage, water storage and attenuation and help support biodiversity both on the site and in the catchment (See Section 3.8). This will reduce carbon emissions from the site from a larger carbon source to a smaller carbon source.
- It is not expected that the cutover bog in the former milled peat production area has the potential to develop active raised bog (ARB) analogous to the priority EU Habitats Directive Annex I habitat within the foreseeable future (c.50 years). Furthermore, the majority of the bog is shallow peat and only a small proportion of the bog has potential to develop *Sphagnum*-rich habitats in this timeframe. Nevertheless, re-wetting across the entire bog, as part of the Scheme, will improve habitat conditions of the whole bog. Other peatland habitats will develop in a wider mosaic that reflects underlying environmental conditions.

- Rehabilitating former industrial peat production bog will also in the longer-term support other ecosystem services such as such the development of new habitat to support biodiversity and local attenuation of water flows from the bog.
- WFD status in receiving water bodies can be affected by peatlands and peat extraction but is also affected by other sources such as agriculture. In addition, receiving water bodies that are assessed as *At Risk* from peatlands and from peat extraction are likely to have several contributary sources of impacts (private peat extraction and Bord na Móna). Reducing pressures due to former peat extraction activities at Ballybeg/Lanespark/Derryvella Bog will contribute to stabilising or improving water quality status of receiving water bodies in general. Ultimately, improving the WFD status of the receiving water body will depend on reducing pressure from a range of different sources, including peatlands in general (private and Bord na Móna).
- Re-wetting in general will benefit the future preservation of most known and unknown archaeological features. An Archaeological Impact Assessment (AIA) is to be carried out under the PCAS scheme.
- Bord na Móna are planning to develop a potential renewable energy project at Lanespark Bog as part of the proposed Littleton Wind Farm, which will overlap Lanespark Bog, Littleton Bog and a small part of Longfordpass (Bord na Móna Wind Farm | Littleton Wind Farm). This renewable energy project is in pre-planning. No Phase 2 rehabilitation is being considered for Lanespark Bog. The proposed phase 2 rehabilitation at Ballybeg and Derryvella Bogs will have no impact on Lanespark Bog.

6. SCOPE OF REHABILITATION

The principal scope of this rehabilitation plan is to rehabilitate the bog. This is defined by:

- The area of Ballybeg and Derryvella Bog within the PCAS Phase 2rehabilitation footprint.
- EPA IPC Licence - Ref. P0-499-01. As part of Condition 10.2 of this license, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area.
- The Scheme is designed to exceed the stabilisation requirements as defined by the IPC Licence. This scheme is designed to enhance the ecosystem services of Ballybeg and Derryvella Bogs, in particular, optimising climate action benefits. The proposed interventions will mean that environmental stabilization is achieved (meaning IPC obligations are met) and, in addition, significant other ecosystem service benefits particularly for climate action will be accrued.
- The local environmental conditions of Ballybeg and Derryvella Bogs mean that a combination of dry cutaway measures, (Fertiliser treatment), targeted drain-blocking, wetland outfall management and deep peat measures are the most suitable rehabilitation approach for shallow peat areas (Phase 2 rehabilitation).
- Bord na Móna have defined the key goal and outcome of rehabilitation at Ballybeg and Derryvella as environmental stabilisation of the site via optimising climate action benefits, where possible. The re-wetting of residual peat in the cutaway will be optimised, setting the site on a trajectory towards the development of wetlands/Reed Swamp and fen on shallow more alkaline peat and other subsoils, and the development of peat-forming communities on areas of residual deep peat, where possible.
- Rehabilitation of Ballybeg and-Derryvella Bogs will support multiple national strategies of climate action, biodiversity action and other key environmental strategies such was the Water Framework Directive.
- The time frame for the delivery of the planned rehabilitation will be undertaken according to available resources and appropriate constraints.

6.1 Key constraints

- **Bog conditions.** Rehabilitation outcomes of sites are constrained by the environmental characteristics of these particular areas. For example, there is potential for raised bog restoration at some sites where there has not been significant industrial peat extraction, and the peat body is largely intact (deep peat sites that are drained). At other bogs, such as Ballybeg/Lanespark/Derryvella, most of the peat mass has been removed, the environmental characteristics of these areas have therefore changed radically (peat depths, hydrology, water chemistry, substrate type, nutrient status, etc.) and there will therefore be different habitat outcomes (regenerating *sphagnum*-rich deep peat vegetation, wetlands, fen, heathland, grassland and Birch woodland).
- The majority of Ballybeg/Lanespark/Derryvella Bog is cutaway with deep peat reserves and some shallow peat. The areas of residual deeper peat are likely to develop more typical bog vegetation communities in time. Wetland habitats (fen, wetland, reed swamp, wet woodland) and dry cutaway habitats (birch woodland, scrub and heath) are the most likely habitats to develop on shallower peat. The bog has a gravity-based regime.
- **Surrounding landscape and neighbours.** Another key constraint is the interaction between the Bord na Móna sites and the surrounding landscape. Care has to be taken that no active rehabilitation management is carried out that could negatively and knowingly impact on surrounding land. This includes any hydrological management on neighbouring farmland, amenity areas, and Lanespark bog, wich is

proposed for inclusion in the Littleton Wind Farm. It is anticipated that the rehabilitation work will not have any flooding impacts on adjacent land.

- **Archaeology**. The discovery of monuments or archaeological objects during peatland rehabilitation may potentially constrain the rehabilitation measures proposed for a particular area. The rehabilitation will optimise hydrological conditions for the protection of exposed archaeological structures, their retention in situ and preservation into the future. Any newly discovered archaeology may require rehabilitation measures to be reviewed and adapted. An Archaeological Impact Assessment (Appendix XII) will be carried out to mitigate against any impact on archaeology that may be found at Ballybeg/Lanespark/Derryvella Bog. Should any previously unknown archaeological material be uncovered during the rehabilitation works, it will be avoided and reported to the Bord na Móna Archaeological Liaison Officer and the National Museum of Ireland.
- **Public Rights of Way**. Where a public right of way or similar burden exists on Bord na Móna property, consideration will be given to ensuring that these remain intact where possible. In some instances, depending upon previous land uses and management, alternative solutions may be required. These will be explored in consultation with local communities and statutory bodies during the consultation work associated with the decommissioning and rehabilitation work described here.
- **Potential land-use.** Bord na Móna and SSE are currently developing a renewable energy project called Littleton Wind Farm, which will overlap Lanespark Bog, Littleton Bog and a small part of Longfordpass (Bord na Móna Wind Farm | Littleton Wind Farm). This project is in pre-planning. No Phase 2 rehabilitation is being considered for Lanespark Bog.
- **Lough Doire Bhile Amenity Development.** Part of the cutaway at Derryvella Bog (western lobe) was developed as Lough Doire Bhile amenity area (between 1999-2001) and is now leased to the Slieve Ardagh Rural Development community group. The Loch Dhoire Bhile loop, a 2.4 km walking trail, has also been developed in this area in recent years. Lough Doire Bhile Wildlife Reserve and amenity area are mapped as constraints on the rehabilitation plan.
- **Littleton Labyrinth** is an amenity project that was developed in partnership with Tipperary County Council. An amenity walking/cycling track has been along the headland/former rail line corridors along the northwestern margins of Derryvella Bog, linking to the Loch Doire Bhile amenity area, as part of the Littleton Labyrinth Greenway in 2024. This amenity track is constrained from the rehabilitation plan. The proposed rehabilitation measures will not overlap with these features and there is no constraint to rehabilitation.
- **Future Amenity development.** Bord na Móna are planning the development of an additional amenity trail, along the eastern and southern headlands of Derryvella Bog and the eastern and northern headlands of Ballybeg, as part of the Midlands Network Trail, designed to link to the Littleton Labyrinth greenway. The amenity development will consist of shared cycle and walkways, associated signage and fencing. The planned amenity route has been mapped as a constraint on rehabilitation maps. This project has been submitted for planning permission (February 2025).
- **Coillte/BnM Midlands Native Woodland Project.** Ballybeg Bog is proposed to be included in the Coillte/BnM Midlands Native Woodland Project (Midlands Native Woodland - Coillte). The main objective of this proposed project is to develop and enhance native woodland in areas of cutaway that would remain naturally dry, developing woodland habitat that would naturally complement wetland and peatland habitats already developing across these sites. This proposed project is currently being considered for consent by the Forest Service. Areas proposed to be included in Native Woodland Project have also been mapped as constrained land in the rehabilitation plan.

- **Bushcraft Site.** The southern extent of Derryvella Bog is proposed to be used as a Bushcraft Site and has been identified as constrained land.
- **Other constraints.** Coillte forestry, local roads, agricultural land and areas under grazing license occur around the margins and have been mapped as constraints on the rehabilitation plan.

6.2 Key Assumptions

- It is assumed that Bord na Móna will have all resources required to deliver this project.
- It is expected that weather conditions will be within normal limits over the rehabilitation plan timeframe. Long periods of wet weather have the capacity to significantly affect ground conditions and constrain drain blocking and other ground activities.

6.3 Key Exclusions

The scope of this rehabilitation plan does not cover:

- The longer-term development of stable naturally functioning habitats at Ballybeg/Lanespark/Derryvella Bog. The plan covers the short-term rehabilitation **actions** and **an additional monitoring and after-care programme** to monitor the rehabilitation and to respond to any needs.
- This plan is not intended to be an after-use or future land-use plan for Ballybeg/Lanespark/Derryvella Bog.
- The longer-term management of this site, potentially as a nature conservation site, or for amenity, or for other uses in the future.

7. CRITERIA FOR SUCCESSFUL REHABILITATION

This section outlines what criteria will be used to indicate successful rehabilitation and what critical success factors are needed to achieve successful rehabilitation. All criteria used to indicate successful rehabilitation will be measured to validate the achievement of the rehabilitation goals and outcomes and validate the completion of the rehabilitation.

The key objective of this enhanced rehabilitation plan is **environmental stabilisation** and the stabilisation of any emissions from the site that related to the former industrial peat extraction activities.

Rehabilitation is generally defined by Bord na Móna as:

- stabilisation of bare peat areas via targeted active management (e.g. drain-blocking/re-wetting) slowing movement of water across the site and encouraging natural colonisation; and
- mitigation of key emissions (e.g. potential run-off of suspended solids).

In addition, Bord na Móna wish to optimise climate action and other ecosystem service benefits via enhanced rehabilitation measures.

7.1 Criteria for successful rehabilitation to meet EPA IPC licence conditions:

- Rewetting of residual peat in the former area of industrial peat production to offset potential silt run off and to encourage and accelerate development of vegetation cover via natural colonisation and reducing the area of bare exposed peat. See Table 7.1 for a summary of the criteria for successful rehabilitation and associated monitoring. The target will be the delivery of measures, and this will be measured by an aerial survey after rehabilitation is completed.
- That there is a stabilizing/improving concentration of suspended solids and ammonia in discharges from Bord na Móna sites, associated with the measures undertaken to stabilize the peat surface by the blocking of the internal drainage system and the maximized rewetting of the peat surface. This will be demonstrated by developing a stable or downward trajectory of water quality indicators (suspended solids and ammonia) towards what would be typical of a re-wetted cutaway bog. This will be measured via water quality monitoring (suspended solids and ammonia) for at least 2 years after the rehabilitation has been completed.
- Receiving water bodies have been classified under the River Basin Management Plan and this classification includes waters that are *At Risk* from peatlands and peat extraction. The success criteria will be that the *At Risk* classification will see improvements in the associated pressures from this peatland or if remaining *At Risk*, that there is an improving trajectory in the pressure from this peatland.

With regard to predicting and estimating likely trends that might materialize or could be considered as a target, monitoring of surface water ammonia emissions from Longfordpass bog in Littleton over 3 years, post cessation of peat extraction with ongoing rehabilitation, were considered. These indicate a downward trend in Ammonia concentrations (Figure 7.1).

Similarly monitoring of surface water ammonia emissions from a Corlea bog in Littleton over the past 4 yrs. post cessation of peat extraction with ongoing rehabilitation, indicate downward trends.

As the monthly monitoring program at Ballybeg/Lanespark/Derryvella Bog continues in 2024/2025 during the rehabilitation measures planned for 2025, and data from the 2024 monitoring program is compiled, further analysis will be completed to identify any ongoing trends.

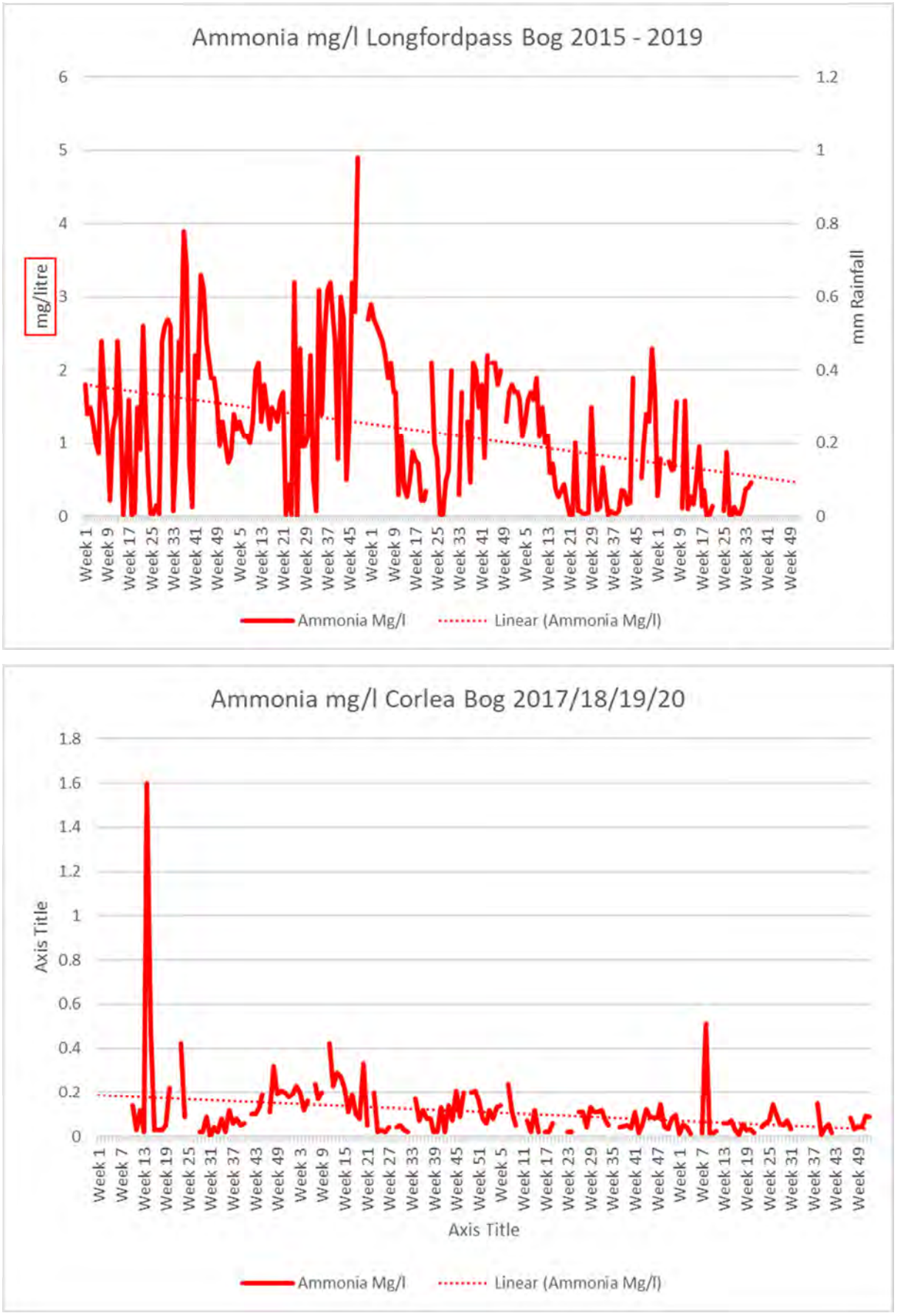


Figure 7.1. Ammonia levels over the period 2015-2019 at Longfordpass and the period 2017-2020 at Corlea.

Additional criteria for successful rehabilitation to optimise climate action and other ecosystem service benefits:

- Optimising the extent of suitable hydrological conditions to optimise climate action and other ecosystem service benefits (optimising and maximising residual peat re-wetting). This will be measured by an aerial survey after rehabilitation has been completed.
- Accelerating the trajectory of the bog towards becoming a reduced carbon source/carbon sink. This will be measured through habitat mapping and the development of cutaway bog condition assessment. This cutaway bog condition assessment will include assessment of environmental and ecological indicators such as vegetation cover, vegetation communities, presence of key species, *Sphagnum* cover, bare peat cover and water levels (similar to ecotope mapping). Baseline monitoring will be carried after rehabilitation is completed (during the scheme). It is proposed that sites can be monitored against this baseline in the future.
- Reduction in carbon emissions. This will be estimated via a combination of habitat condition assessment and application of appropriate carbon emission factors derived from other sites. Baseline monitoring (habitat condition) will be carried after rehabilitation is completed (during the scheme). It is proposed that sites can be monitored against this baseline in the future.
- Setting the site on a trajectory towards establishment of a mosaic of compatible habitats including *Sphagnum*-rich regenerating wet deep peat vegetation communities, wetland, fen, reed swamp, heath, scrub, poor fen, and birch woodland, where conditions are suitable. Some of these habitats have already in part established as pioneer vegetation/wetlands. It will take some time for stable naturally functioning habitats to fully develop at Ballybeg/Lanespark/Derryvella Bog. This will be demonstrated and measured via aerial photography, habitat mapping and cutaway/habitat condition assessment. Baseline monitoring will be carried after rehabilitation is completed (during the scheme). It is proposed that sites can be monitored against this baseline in the future.
- Improvement in biodiversity and ecosystem services. This will be demonstrated by metrics outlined in Section 9.1 that can be used to measure changes in ecosystem services (e.g. water quality parameters, development of pioneer habitats, breeding bird monitoring). This will be measured by collecting a range of scientific data that can then quickly be adapted and into metrics that can be used to measure changes in various ecosystem services. Baseline monitoring will be carried after rehabilitation is completed (during the scheme). It is proposed that sites can be monitored against this baseline in the future.

Table 7-1 Summary of Success criteria, targets, how various success criteria will be measured and expected timeframes.

Criteria type	Criteria	Target	Measured by	Expected Timeframe
IPC validation	Rewetting in the former area of industrial peat production	Delivery of rehabilitation measures Reduction in bare peat.	Aerial photography after rehabilitation has been completed – to demonstrate measures (drain-blocking) Establishment of a baseline for future monitoring of bare peat, vegetation establishment and habitat condition.	2025-2027
IPC validation	Key water quality parameters Ammonia, Phosphorous, Suspended solids, pH and conductivity	Reduction or stabilisation of key water quality parameters associated with this bog	Water quality monitoring for a period after rehabilitation has been completed	2025-2027
IPC validation	Reducing pressure from peat production on the local water body catchment (WFD)	Where this section of the water body, that this bog drains to, has not been identified as under pressure from peat extraction, that the intervening EPA monitoring programme associated with its Programme of Measures for this water body, confirms that its classification remains at not being at risk from peat extraction associated with activities at this bog.	EPA WFD monitoring programme	WFD schedule
Climate action verification	Optimising the extent of suitable hydrological conditions to optimise climate action	Optimal extent of suitable hydrological conditions	Aerial photography and Habitat mapping to map extent of suitable hydrological conditions. Baseline monitoring to be carried out during the scheme when rehabilitation is complete. Sites can be re-monitored in the future and	2025-2027

Criteria type	Criteria	Target	Measured by	Expected Timeframe
			compared against this baseline.	
Climate action verification	Reduction in carbon emissions.	Reduction in carbon emissions	Carbon emissions – estimated using a bog condition assessment and appropriate carbon emission factors.	2025-2027
Climate action verification	Setting the site on a trajectory towards establishment of a mosaic of compatible habitats	Establishment of compatible cutaway habitats	Habitat map, Cutaway bog condition map Baseline monitoring to be carried out during the scheme when rehabilitation is complete. Sites can be re-monitored in the future and compared against this baseline.	2025-2027

Meeting climate action verification criteria and monitoring of these criteria after the scheme has been completed is dependent on support from the Climate Action Fund or other sources of funding. Note that monitoring and verification of the overall scheme will be stratified – not all these criteria will be measured at each individual site. Baseline monitoring to be carried out during the scheme when rehabilitation is complete. Sites can be re-monitored in the future and compared against this baseline.

7.2. Critical success factors needed to achieve successful rehabilitation as outlined in the plan

The achievement of successful rehabilitation as outlined in the plan requires:

- **Funding to pay for resources required to deliver the planned rehabilitation (Bord na Móna and external).** Bord na Móna maintains a provision on its balance sheet to pay for these future costs. Bord na Móna is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence. It is expected that additional costs of rehabilitation will be supported by Government through the Climate Action Fund and Ireland's National Recovery and Resilience Plan.
- **Bord na Móna to have sufficient resources (staff and training) to deliver the planned rehabilitation with required associated skills and competencies.**
- **Bord na Móna to have sufficient resources (suitable machinery) and staff to maintain this machinery.**
- **Weather conditions to be within normal limits over the rehabilitation plan timeframe.** Long periods of wet weather have the capacity to significantly affect ground conditions and constrain the delivery of rehabilitation. The potential impact of wet weather on ground conditions can be reduced by appropriate planning and management. Bord na Móna have significant experience of managing these issues through 70 years of working in these peatland environments.

- **Rehabilitation measures to be effective.** The rehabilitation measures proposed in this plan are based on 40 years of Bord na Móna experience of peatland management and best practice applied internationally in peatland management. Measures proposed in this plan have already been shown to be affective at other sites. Bord na Móna will apply a flexible and adaptable approach to the more innovative rehabilitation measures proposed in this plan**.** If measures are not initially effective, Bord na Móna will review any requirement for additional practical rehabilitation.
- **Natural colonisation of vegetation to develop semi-natural habitats at a rate within the normal limits.** The development of naturally functioning semi-natural habitats on degraded bog takes time. It may take 30-50 years for active raised bog vegetation to re-develop on suitable cutaway that was previously bare peat. However, Bord na Móna experience has demonstrated the effectiveness of these type of measures for re-wetting bog and creating carbon sinks (Renou-Wilson *et al*. 2018).
- Rehabilitation measures have been designed to accelerate and work with natural colonisation and other natural processes. Bord na Móna experience of rehabilitation has shown that re-wetting improves conditions for natural colonisation and that natural colonisation is accelerated where the environmental conditions are most suitable. Rehabilitation measures have been designed to modify the conditions of areas within sites where conditions are less suitable for natural colonisation (modifying hydrology, topography, nutrient status or availability of potential seed sources).
- **Monitoring to be robust and effective.** Rehabilitation Monitoring will be established to validate the success of rehabilitation as required by Condition 10 of the IPC Licence and to verify the benefits of the proposed measures to optimise climate action. This will focus on a collecting a range of scientific data that can then quickly be adapted and into metrics that can be used to measure changes in various ecosystem services.

8. REHABILITATION ACTIONS AND TIME FRAME

Peatland rehabilitation requires detailed planning and the use of data from desktop surveys and field surveys. This data in association with topographical and hydrological modelling will be important in planning the future peatland landscapes and planning the use of the most appropriate rehabilitation methodologies to maximise climate action benefits. Hydrological modelling indicates those areas that are likely to re-wet when drains are blocked, based on the current topography, and areas where water levels may have to be modified, where needed. Enhanced rehabilitation measures will look to optimise hydrological conditions for re-wetting peat in other areas. This planning is also essential for matching the most sustainable rehabilitation methodology to the most suitable cutaway environment to maximise the benefits of the resource outlay (maximising cost/benefit).

A number of illustrative figures have been produced to inform Rehab Planning and Design, including Aerial Photography, Peat Depths, LiDAR Surface Maps, and Depression Analysis modelling; these are included in the accompanying Mapbook as the drawings referenced below:

BNM-DR-26-07-RP-22: Aerial Imagery 2021

BNM-DR-26-07-RP-04: Peat Depths

BNM-DR-26-07-RP-03: LiDAR Map

BNM-DR-26-07-RP-09: Depression Analysis

The rehabilitation actions themselves will be a combination of PCAS measures to re-wet peat. The distribution of these measures is provisionally outlined in drawing titled *BNM-DR-26-07-RP-05: Enhanced Rehabilitation Measures* in the accompanying Mapbook (note that the actual distribution of these measures may be subject to change in response to stakeholder consultation and refinement of the enhanced rehabilitation measures.)

Drain-blocking was already carried out as part of Phase 1 rehabilitation.

Proposed Phase 2 rehabilitation measures (Table 8.1) for Ballybeg/Lanespark/Derryvella Bog will include:

- Deep Peat measures including intensive drain blocking (max 7/100 m), field re-profiling, creation of shallow depressions on elevated deep peat and management of water levels with overflow pipes and blocking of outfalls and managing overflows.
- Wetland measures will be used across the former production area of Derryvella and the central section of Ballybeg that have been subject to phase 1 rehabilitation. This has increased the height of the water table and several areas of deep, enclosed basins with ponded water have formed. Some additional berms are proposed in these areas. Measures will also include managing outfalls, managing water levels with overflow pipes and targeted blocking of outfalls within the bogs.
- Targeted drain blocking (AW2 measures) is proposed in cutover that has now developed woodland and scrub around the margins of the former production area. This will optimise hydrological conditions/rewet the residual peat.
- Targeted fertiliser application to accelerate vegetation establishment on areas of bare peat on headlands and high fields, and within certain areas of dry cutaway. Areas where vegetation has established do not need fertiliser application.
- Initial hydrological modelling indicates low lying parts of the site will develop a mosaic of wetland habitats with the potential for some deeper water. Hydrological management will look to optimise summer water levels to maximise the development of wetland vegetation (by looking to set water depths at < 0.5 m, where possible. Water-levels will be adjusted at outfalls and by adjusting piped drainage.

Table 8.1: Phase 2 rehabilitation measures at Ballybeg/Lanespark/Derryvella Bog.

Type*	Rehab Code	Phase 2 Rehabilitation Measures	Extent (Ha)
Dry Cutaway	DCT1	Blocking outfalls and managing water levels with overflow pipes.	2.3
	DCT2	Regular drain blocking (3/100m), modifying outfalls and managing water levels with overflow pipes and targeted fertiliser treatment.	3.6
Wetland	WLT2	Turn off or reduce pumping to re-wet cutaway, blocking outfalls and managing water levels with overflow pipes, targeted blocking of outfalls within a site.	63.2
	WLT4	More intensive drain blocking (max 7/100 m), modifying outfalls and managing overflows, transplanting Reeds and other rhizomes.	2.5
Deep Peat	DPT2	More intensive drain blocking (max 7/100 m) and modifying outfalls and managing overflows.	1.0
	DPT7	More intensive drain blocking (max 7/100 m), + field reprofiling, creation of shallow depressions on elevated deep peat + blocking outfalls and managing overflows.	12.8
Marginal land	MLT1	No work required.	15.5
Additional Work	AW2	Targeted Drain Blocking.	24.7
Silt ponds	Silt pond	Silt ponds.	0.5
Constraint	Constraint	Other Constraints (proposed Littleton Wind Farm, Amenity trails, Lough Doire Bhile, Bushcraft site, Coillte/BnM Midlands Native Woodland Project, Littleton Labyrinth).	348.2
Total			474.3

* The types of rehab and areas of rehab may change in response to stakeholder consultation and refinement of the enhanced rehabilitation measures.

8.1 Completed and ongoing

- Previous rehabilitation was carried out in Ballybeg, Lanespark and Derryvella in 2018-2021 (Phase 1 rehabilitation), see Figure *BNM-DR-26-07-30: Previous Rehabilitation* in the accompanying mapbook. Measures included wide-spread drain-blocking, berms, and hydrological management. A pump in Lanespark Bog was decommissioned. There was some fertiliser treatment in Derryvella Bog.
- A significant part of the site has already re-vegetated, with significant cover of pioneer vegetation developing a mosaic of typical cutaway peatland and wetland habitats. The 2000 aerial photo shows that this side of the site was in peat extraction, with some emerging gravel mounds and ridges. By 2006 some areas were cutaway and peat extraction had stopped on a phased basis. Now there is a mosaic of pioneer habitats and the area has also been re-wetted, with wetlands developing in basins.

- Natural re-colonisation of the cutaway so far has been effective. Bare peat areas within the cutaway are reducing as vegetation develops and consolidates. Areas of bare peat treated with fertiliser in Derryvella have also revegetated quite well.

8.2 Short-term planning actions (0-1 years)

- Seek formal approval of the enhanced plan, noting the alternative standard plan should funding from the Scheme not materialise from the EPA.
- Agree an *ex ante* budget of eligible costs (based on the approved enhanced plan) with the Scheme regulator.
- Develop a detailed site plan with engineering drawings outlining how the various rehabilitation methodologies will be applied to Ballybeg/Lanespark/Derryvella Bog. This will take account of peat depths, topography, drainage, and hydrological modelling (see map for an indicative view of the application of different rehabilitation methodologies).
- A drainage management assessment of the proposed enhanced rehabilitation measures will be carried out and any issues identified resolved and the rehabilitation plan adapted.
- A review of known archaeology and an archaeological impact appraisal of the proposed rehabilitation will be carried out. The results of this assessment will be incorporated into the rehabilitation plan to minimise known archaeological disturbance, where possible.
- A review of issues that may constrain rehabilitation such as known rights of way and existing land agreements is to be carried out.
- An ecological appraisal of the potential impacts of the planned rehabilitation on the presence of sensitive ground-nesting bird breeding species (e.g. breeding waders) is to be carried out. The scheduling of rehabilitation operations will be adapted, where required.
- Ensure all activities comply with the environmental protection requirements of the IPC Licence.
- Carry out Appropriate Assessment of the Rehabilitation Plan.
- Track implementation and enforcement of the relevant IPC Licence conditions, the mitigation measures (AA) and other environmental control measures during the implementation of the rehabilitation plan.

8.3 Short-term practical actions (0-2 years)

- Carry out proposed measures as per the Phase 2 rehabilitation. This will include targeted drain-blocking, along with fertiliser application targeting bare peat areas of headlands, high fields and other areas (where required) and hydrological management. All rehabilitation measures will be carried out with regard to best practice environmental control measures (Appendix IV).
- Monitor the success of rehabilitation measures.
- Carry out the proposed monitoring, as outlined.
- Silt ponds will be monitored during this period and there will be continued maintenance and cleaning to prevent potential run-off of suspended solids from the site during the rehabilitation phase.
- Submit an ex-post report to the Scheme regulator to verify the eligible measures to be carried out in year 1 of the Scheme, and an ex-ante estimate for year 2 of the Scheme; and so on for each year of the Scheme.

8.4 Long-term (>3 years)

- Evaluate success of short-term rehabilitation measures outlined above and remediate where necessary.
- Delivery of a monitoring, aftercare and maintenance programme (See section 10.2 below).
- Decommissioning of silt-ponds will be assessed and carried out, where required.
- Reporting to the EPA will continue until the IPC Licence is surrendered.

8.5 Timeframe

- **2025**: Short-term planning actions.
- **2025-2026**: Short-term delivery actions.
- **2026**: Long term delivery actions. Evaluate success of short-term rehabilitation measures outlined above and remediate where necessary.
- **2028**: Decommission silt-ponds, if necessary.

8.6 Budget and costing

Bord na Móna (BnM) appreciates the Minister's intention to support Bord na Móna in developing a package of measures, 'the Scheme', for enhanced decommissioning, rehabilitation and restoration of cutaway peatlands referred to as, the Peatlands Climate Action Scheme'. *However, only the additional costs associated with the additional and enhanced rehabilitation, i.e., measures which go beyond the existing standard mandatory decommissioning and rehabilitation requirements arising from Condition 10 will be eligible for support.*

The enhanced decommissioning, rehabilitation and restoration of the peatlands funded by the Scheme will deliver benefits across climate action (GHG mitigation through reduced carbon emissions and acceleration towards carbon sequestration), enrich the State's natural capital, increase eco-system services, strengthen biodiversity, improve water quality and storage attenuation as well as developing the amenity potential of the peatlands.

Bord na Móna maintains a provision on its balance sheet to pay for the future costs of **standard** rehabilitation and decommissioning. This is updated every year - for more information see the Bord na Móna Annual Report (Bord na Móna, 2024). Bord na Móna is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence.

At this time, a 'standard' rehabilitation provision (sufficient to discharge the requirement of Condition 10 in the licence) has been allocated to the site based on the area of different cutaway types across the site (See Appendix I).

9. AFTERCARE AND MAINTENANCE

9.1 Programme for monitoring, aftercare and maintenance

This programme for monitoring, aftercare and maintenance has been designed to meet the Conditions of the IPC Licence. This is defined as:

- There will be **initial quarterly monitoring assessments** of the site to determine the general status of the site, the condition of the silt ponds, assess the condition of the rehabilitation work, monitoring of any potential impacts on neighbours land, general land security, boundary management, dumping and littering.
- The number of these site visits will reduce after 2 years to bi-annually and then after 5 years to annual visits.
- These monitoring visits will also consider any requirements for further practical rehabilitation measures.
- The **baseline condition of the site will be established** post-rehabilitation implementation by using an aerial survey to take an up to date aerial photo, when rehabilitation is completed. This will be used to verify completion of rehabilitation measures. The extent of bare peat will be assessed using this baseline data, and habitat maps will be updated, if needed. It is proposed that sites can be monitored against this baseline in the future.
- **Water quality monitoring** at the bog will be established. The main objective of this water quality monitoring will be to establish a baseline and then monitor the impact of peatland rehabilitation on water quality from the bog.
- In order to assist in monitoring surface water quality from this bog, it is planned to increase the existing licence monitoring requirements to sampling for the same parameters to every month during the scheduled activities and for a period up to two years post rehabilitation, depending on the period required to confirm that the main two parameters, suspended solids and ammonia are remaining compliant with the licence emission and trigger limit values and there is an improving trajectory in these two parameters i.e. reduction in concentration.
- Enhanced water quality monitoring will aim to include up to 70% of a bogs drainage catchments.
- Monitoring results will be maintained, trended and reported on each year as part of the requirement to report on Condition 10.1 of the IPC Licence on Bog Rehabilitation in the Annual Environmental Report, which will be available in April each year at www.epa.ie.
- The parameters to be included (as per condition 6.2 of the IPC Licence) include monthly monitoring for pH, Suspended Solids, Total Solids, Total Phosphorus, Total Ammonia, Colour, and COD and DOC.
- This monthly sampling regime on a selected number of silt ponds will be carried out over a two-year cycle. The original (licence) requirement was for a quarterly sampling regime, but this has been increased to a monthly regime to appropriately track the changing water chemistry that will occur as part of this enhanced rehabilitation. In addition, DOC will be included as a parameter to try and identify any changes in carbon in the surface water.
- If, after two years, key criteria for successful rehabilitation are being achieved and key targets are being met, then the water quality monitoring will be reviewed, with consideration of potential ongoing research on site. The water quality data, the aerial surveys and the habitat mapping will be collated and will be submitted to the EPA as part of the final validation report.
- If, after two years, key criteria for successful rehabilitation have **not** been achieved and key targets have **not** been met, then the rehabilitation measures and status of the site will be evaluated and enhanced, where required. This evaluation may indicate no requirement for additional enhancement of

rehabilitation measures but may demonstrate that more time is required before key criteria for rehabilitation has been achieved. Monitoring of water quality will then also continue for another period to be defined.

- Where other uses are proposed for the site that are compatible the provision of biodiversity and ecosystem services, these will be assessed by Bord na Móna in consultation with interested parties. Other after-uses can be proposed for licensed areas and must go through the required assessment process and planning procedures.

Additional monitoring measures are also proposed to monitor ecosystem service benefits that have been derived by enhanced rehabilitation. These proposed monitoring measures will be funded by the proposed Climate Action Fund Scheme or additional other funding. Monitoring of climate action and other ecosystem service benefits will be designed to take account of the requirements of monitoring benefits of the overall Scheme and will be stratified; that is not all monitoring will be carried out in each site. These are defined as:

- Vegetation and habitat monitoring after rehabilitation is completed using a cutaway bog condition assessment. This assessment will include assessment of on environmental and ecological indicators such as vegetation cover, vegetation communities, presence of key species, *Sphagnum* cover, bare peat cover and water levels. It is proposed that sites can be monitored against this baseline in the future.
- The condition of the bog can be assessed using the condition assessment and suitable Greenhouse Gas (GHG) emission factors can be assigned to different habitats. GHG emission factors have been determined for various peatland habitats in Ireland (Wilson *et al*., 2015) and are constantly being refined with more and more research. BnM is actively supporting research into GHG fluxes in different rehabilitated peatland habitats. This means that potential GHG emissions can be estimated from the site, as the site continues along its trajectory towards a naturally functioning peatland ecosystem.

9.2 Rehabilitation plan validation and licence surrender – report as required under condition 10.4

IPC Licence Condition 10.4. *A final validation report to include a certificate of completion for the Rehabilitation Plan, for all or part of the site as necessary, shall be submitted to the Agency within six months of execution of the plan. The licensee shall carry out such tests, investigations or submit certification, as requested by the Agency, to confirm that there is no continuing risk to the environment.*

Reporting to the EPA will continue until the IPC Licence is surrendered. The bog will be included in the full licence surrender process as per the Guidance to Licensees on Surrender, Cessation and Closure of Licensed Sites EPA, 2012, when:

- The planned rehabilitation has been completed.
- The key criteria for successful rehabilitation have been achieved and key targets have been met.
- Water quality monitoring demonstrates that water quality of discharge is stabilising or improving; and
- The site has been environmentally stabilised.

10. REFERENCES

Atherton, I, Bosanquet, SDS & Lawley, M (2010). Mosses and liverworts of Britain and Ireland - a field guide. British Bryological Society.

Anderson, R., Farrell, C., Graf, M., Muller, F., Calvar, E., Frankard, P., Caporn, S., Anderson, P. (2017). An overview of the progress and challenges of peatland restoration in Western Europe. Restoration Ecology, Issue 2 Pages 271-282.

Barry, T.A. *et al.* (1973). A survey of cutover peats and underlying mineral soils. Soil Survey Bulletin No. 30. Dublin, Bord na Móna and An Foras Taluntais.

Bord na Móna (2014). Blocking Drains in Irish raised bogs. The Bord na Móna Raised Bog Restoration Project. Cris, R. Buckmaster, S. Bain, C. Reed, M. (Eds) (2014) Global Peatland Restoration demonstrating SUCCESS. IUCN UK National Committee Peatland Programme, Edinburgh. http://www.iucn-uk-peatlandprogramme.org/sites/www.iucn-uk-peatlandprogramme.org/files/IUCNGlobalSuccessApril2014.pdf

Bord na Móna (2016). Bord na Móna Biodiversity Action Plan 2016-2021. Brosna Press, Ferbane. http://www.bordnamona.ie/wp-content/uploads/2016/04/Biodiversity-Action-Plan-2016-2021.pdf.

Bord na Móna (2024). Bord na Móna Annual Report 2024. Publications - Newsroom | Bord na Móna (bordnamona.ie)

Bord na Móna (2022). *Methodology Paper for the Enhanced Decommissioning, Rehabilitation and Restoration on Bord na Móna Peatlands – Preliminary Study Nov 2022 Version 19.* Bord na Móna. Available online at : https://www.bnmpcas.ie/supporting-material/

Bonn, A., Allott, T., Evans, M., Joosten, H. & Stoneman, R. (2017) Peatland restoration and ecosystem Services-science, policy and practice. Cambridge University Press.

Carroll, J., Anderson, P., Caporn, S., Eades, P., O'Reilly C. & Bonn, A. (2009). Sphagnum in the Peak District. Current Status and Potential for Restoration. Moors for the Future Report No 16. Moors for the Future Partnership.

Clark, D. and Rieley, J. (2010). Strategy for responsible peatland management. International Peat Society, Finland.

Clark, D. (2010). Brown Gold. A history of Bord na Móna and the Irish peat industry. Gill Books.

Cross, J.R. (2006). The Potential Natural Vegetation of Ireland. Biology and Environment: Proceeding of the Royal Irish Academy, Vol. 106B, No. 2, 65-116 (2006).

Department of Communications, Climate Action and Environment (2019). National Climate Action Plan 2019. https://www.dccae.gov.ie/en-ie/climate-action/publications/Pages/Climate-Action-Plan.aspx

Department of Housing, Planning, Community and Local Government (2017). Public consultation on the River Basin Management Plan for Ireland. Department of Housing, Planning, Community and Local Government. https://www.housing.gov.ie/sites/default/files/public-consultation/files/draft_river_basin_management_plan_1.pdf

Department of Arts, Heritage and the Gaeltacht (2015). National Peatland Strategy. Department of Arts, Heritage and the Gaeltacht. http://www.npws.ie/sites/default/files/general/Final%20National%20Peatlands%20Strategy.pdf

Department of Housing, Local Government and Heritage (2022). Draft River Basin Management Plan for Ireland 2022 – 2027.

Department of Housing, Local Government and Heritage (2024). Water Action Plan 2024. A River basin Management Plan for Ireland 2022 – 2027

Eades, P., Bardsley, L., Giles, N. & Crofts, A. (2003). The Wetland Restoration Manual. The Wildlife Trusts, Newark.

Environment Agency (2013). The Knotweed code of practice. Managing Japanese Knotweed on development sites. Environment Agency, Bristol, UK. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/536762/LIT_2695.pdf

European Commission (2013). Interpretation manual of European Union Habitats. European Commission DG Environment Nature ENV B.3.

EPA (2012). Guidance to Licensees on Surrender, Cessation and Closure of Licensed Sites. https://www.epa.ie/publications/licensing--permitting/industrial/ied/Guidance-on-Cessation_.pdf

EPA (2020). Guidance on the process of preparing and implementing a bog rehabilitation plan. http://www.epa.ie/pubs/reports/enforcement/guidanceontheprocessofpreparingandimplementingabogrehabilitationplan.html.

EPA (2025). http://gis.epa.ie/Envision. EPA Envision Map Viewer. (Last Viewed: 28/05/2025)

Farrell, C. A. and Doyle, G. J. (2003). Rehabilitation of Industrial Cutaway Atlantic Blanket Bog, NW Mayo, Ireland. Wetlands Ecology and Management, 11, 21-35.

Fernandez, F., Connolly K., Crowley W., Denyer J., Duff K. & Smith G. (2014) Raised Bog Monitoring and Assessment Survey (2013). Irish Wildlife Manuals, No. 81. National Parks and Wildlife Service, Department of Arts, Heritage and Gaeltacht, Dublin, Ireland.

Fossitt, J. (2000). A guide to habitats in Ireland. Kilkenny. The Heritage Council.

Gann, G.D., McDonald, T., Walder, B., Aronson, J., Nelson, C.R., Jonson, J., Hallett, ,J.G., Eisenberg, C., Guariguata, M.R., Liu, J., Hua,F., Echeverría, C., Gonzales, E., Shaw, N., Decleer, K. & Dixon, K.W. (2019). International Principles and Standards for the practice of Ecological Restoration. Restoration Ecology 27(S1): S1–S46.

Grand-Clement, E., Anderson, K., Smith D., Angus, M., Luscombe D.J., Gatis, N., Bray L.S., Brazier R.E. (2015). New approaches to the restoration of shallow marginal peatlands Journal of Environmental Management 161.

Holden, J., Walker, J., Evans, M.G., Worrall, F., Bonn, A., (2008). In: DEFRA (Ed.), A Compendium of Peat Restoration and Management Projects.

Joosten, H. and Clarke, D. (2002). Wise Use of mires and peatlands – Background and Principles including a framework for Decision-making. I.M.C.G. – I.P.S., Jyväskylä, Finland.

Lindsay, R., (2010). Peatbogs and Carbon: a Critical Synthesis to Inform Policy Development in Oceanic Peat Bog Conservation and Restoration in the Context of Climate Change (Report to RSPB Scotland, Edinburgh).

Mackin, F., Barr, A., Rath, P., Eakin, M., Ryan, J., Jeffrey, R. & Fernandez Valverde, F. (2017) Best practice in raised bog restoration in Ireland. Irish Wildlife Manuals, No. 99. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Ireland.

McBride, A., Diack, I., Droy, N., Hamill, B., Jones, P., Schutten, J., Skinner, A. and Street, M. (2011). The Fen Management Handbook, (2011), Scottish Natural Heritage, Perth.

Minayeva, T. *et al.* (2017). Towards ecosystem-based restoration of peatland biodiversity. Mires and Peat, Volume 19 (2017), Article 01, 1–36, http://www.mires-and-peat.net

McDonagh, E. (1996). Drain blocking by machines on Raised Bogs. Unpublished report for National Parks and Wildlife Service. https://www.npws.ie/sites/default/files/publications/pdf/McDonagh_1996_Drain_Blocking_Raised_Bogs.pdf.

NPWS. (2014). Review of the raised bog Natural Heritage Area network. Department of Arts, Heritage and the Gaeltacht.

NPWS. (2017a). National Raised bog Special Areas of Conservation management plan. Department of Arts, Heritage and the Gaeltacht. https://www.npws.ie/sites/default/files/files/FOR%20UPLOAD%20Plan(WEB_English)_05_02_18%20(1).pdf

NPWS. (2017b). Actions for biodiversity 2017-2021. Ireland's 3rd national biodiversity plan. Department of Arts, Heritage and the Gaeltacht. https://www.npws.ie/sites/default/files/publications/pdf/National%20Biodiversity%20Action%20Plan%20English.pdf

NPWS (2019). The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitat Assessments. Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neill. https://www.npws.ie/sites/default/files/publications/pdf/NPWS_2019_Vol2_Habitats_Article17.pdf

NRA (2009). Guidelines for Assessment of Ecological Impacts of National Road Schemes (Revision 2). National Roads Authority.

NRA (2010). Guidelines on The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads. National Roads Authority. https://www.tii.ie/technical-services/environment/construction/Management-of-Noxious-Weeds-and-Non-Native-Invasive-Plant-Species-on-National-Road-Schemes.pdf

Pschenyckyj, C., Riondata, E., Wilson, D., Flood, K., O'Driscoll, C., Renou-Wilson, F. (2021). Optimising Water Quality Returns from Peatland Management while Delivering Co-Benefits for Climate and Biodiversity, Report produced for An Fóram Uisce, Online, Available at: https://thewaterforum.ie/app/uploads/2021/04/Peatlands_Full_Report_Final_March2021b.pdf, Accessed 18/10/2023

Quinty, F. and L. Rochefort, (2003). Peatland Restoration Guide, second edition. Canadian *Sphagnum* Peat Moss Association and New Brunswick Department of Natural Resources and Energy. Québec, Québec.

Regan, S., Swenson, M., O'Connor, M. & Gill, L. (2020). Ecohydrology, Greenhouse Gas Dynamics and Restoration Guidelines for Degraded Raised Bogs. EPA RESEARCH PROGRAMME 2014–2020. Report

No.342. (2014-NC-MS-2). EPA Research Report. Prepared for the Environmental Protection Agency by Trinity College Dublin. www.epa.ie.

Renou-Wilson F., Bolger T., Bullock C., Convery F., Curry J. P., Ward S., Wilson D. & Müller C. (2011). BOGLAND - Sustainable Management of Peatlands in Ireland. STRIVE Report No 75 prepared for the Environmental Protection Agency. Johnstown Castle, Co. Wexford.

Renou-Wilson, F., Wilson, D., Rigney, D., Byrne, K., Farrell, C. and Müller C. (2018). Network Monitoring Rewetted and Restored Peatlands/Organic Soils for Climate and Biodiversity Benefits (NEROS). Report No. 238. Report prepared for the Environmental Protection Agency. Johnstown Castle, Co. Wexford.

Schouten, M.G.C. (2002). Conservation and Restoration of Raised Bogs: Geological, Hydrological and Ecological Studies. Dúchas - The Heritage Service of the Department of the Environment and Local Government, Ireland; Staatsbosbeheer, the Netherlands; Geological Survey of Ireland; Dublin.

Smith, G., O'Donoghue, P., O'Hora, K. & Delaney, E. (2011). Best Practice Guidance for Habitat Survey and Mapping. The Heritage Council.

Stace, C. A. (1997). New Flora of the British Isles. Cambridge: Cambridge University Press.

Thom, T., Hanlon, A., Lindsay, R., Richards, J., Stoneman R. & Brooks, S. (2019). Conserving Bogs – Management Handbook. https://www.iucn-uk-peatlandprogramme.org/sites/default/files/header-images/Conserving%20Bogs%20the%20management%20handbook.pdf.

Wilson, D., Renou-Wilson, F., Farrell, C., Bullock, C. and Muller, C. (2012). Carbon Restore – the potential of restored Irish peatlands for carbon uptake and storage; CCRP Report. EPA Wexford.

Wilson, D., Dixon, S.D., Artz, R.R., Smith, T.E.L., Evans, C.D., Owen, H.J.F., Archer, E., & Renou-Wilson, F. (2015). Derivation of greenhouse gas emission factors for peatlands managed for extraction in the Republic of Ireland and the UK. Biogeosciences Discuss., 12, 7491–7535.

Wheeler, B. D., & Shaw, S. C. (1995). Restoration of Damaged Peatlands – with Particular Reference to Lowland Raised Bogs Affected by Peat Extraction. London: HMSO.

APPENDIX I: STANDARD PEATLAND REHABILITATION THAT HAS ALREADY BEEN COMPLETED TO MEET CONDITIONS OF THE IPC LICENCE

A standard peatland rehabilitation has already been completed to meet conditions of the IPC Licence.

Bord na Móna operates under IPC Licence issued and administered by the EPA to extract peat within the Littleton Bog Group (Ref. PO-499-01). As part of Condition 10.2 of this licence, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area.

This document seeks to address the requirements of Condition 10.2 of IPC Licence Ref. PO-499-01:

> "*The licensee shall prepare, to the satisfaction of the Agency, a fully detailed and costed plan for permanent rehabilitation of the cutaway boglands within the licensed area.*"

Ballybeg/Lanespark/Derryvella Bog was used to supply fuel peat to the Littleton Briquette Factory, Killeen, Thurles, Co. Tipperary. Ballybeg/Lanespark/Derryvella Bog was in industrial peat production from 1970's to 2017. In 2017, Bord na Móna announced the closure of the Littleton Briquette factory and the cessation of industrial peat production in a number of cutaway bogs within the Littleton Bog Group, including Ballybeg/Lanespark/Derryvella Bog. Peatland rehabilitation was carried out in 2018-2021 with extensive drain-blocking and hydrological management (Phase 1 rehabilitation). This standard peatland rehabilitation plan is outlined here to **demonstrate rehabilitation that was completed** between 2018-2021.

Bord na Móna covered the costs that have accrued from these standard decommissioning and rehabilitation activities, as part of its original obligations. The existing costs associated with both the removal of potentially polluting materials and the environmental stabilisation of the peatlands resides with Bord na Móna. However, the expenditure necessary to deliver the additional and enhanced decommissioning, rehabilitation and restoration (EDRRS/PCAS) proposed for 2025 and the benefits that flow from these measures and interventions/improvements will be eligible for funding by the EU through Ireland's National Recovery and Resilience Plan.

Scope of rehabilitation

The principal scope of this rehabilitation plan is to rehabilitate the bog. This is defined by:

- The area of Ballybeg/Lanespark/Derryvella Bog.
- EPA IPC Licence - Ref. P0-499-01. As part of Condition 10.2 of this license, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area. Ballybeg/Lanespark/Derryvella Bog is part of the Littleton Bog Group.
- The current condition of Ballybeg/Lanespark/Derryvella Bog.
- The key objective of rehabilitation, as defined by this licence, is **environmental stabilisation** of the bog.
- To minimise potential impacts on neighbouring land. Boundary drains around Ballybeg/Lanespark/Derryvella Bog will be left unblocked as blocking boundary drains could affect adjacent land.
- Land-use.

Rehabilitation goals and outcomes

The key rehabilitation goal and outcome for Ballybeg/Lanespark/Derryvella Bog is environmental stabilisation of the site via wetland creation. This is defined as:

- Carrying out drain blocking to re-wet peat and slow runoff.
- Stabilising potential emissions from the site (e.g. suspended solids).
- Environmental stabilisation.

The outcome is setting the site on a trajectory towards establishment of natural habitats.

Criteria for successful rehabilitation:

- Rewetting of residual peat and shallow cutaway in the former area of industrial peat production to offset potential silt run off and to encourage development of vegetation cover via natural colonisation and reducing the area of bare exposed peat.
- That there is a stabilising/improving concentration of suspended solids and ammonia associated with the measures undertaken to stabilise the peat surface by the blocking of the internal drainage system and the maximised rewetting of the peat surface. This will be demonstrated by developing a stable or downward trajectory of water quality indicators (suspended solids and ammonia) towards what would be typical of a re-wetted cutaway bog. This will be measured via water quality monitoring (suspended solids and ammonia).
- Receiving water bodies have been classified under the River Basin Management Plan and this classification includes waters that are 'At Risk' from peatlands and peat extraction. The success criteria will be that the 'At Risk' classification will see improvements in the associated pressures from this peatland or if remaining At Risk, that there is an improving trajectory in the pressure from this peatland.

Rehabilitation targets

- Demonstrating the delivery of the rehabilitation through site visits and through updated aerial photography (indicating presence of peat blockages and re-wetting). This will be demonstrated by a post rehab aerial survey.
- Stabilising potential emissions from the site (e.g. suspended solids). The key target will be developing a stable or downward trajectory of water quality indicators (suspended solids and ammonia) towards what would be typical of a re-wetted cutaway bog. This will be demonstrated by water quality monitoring results.

Rehabilitation measures:

- Blocking field drains in drier sections of the former industrial production area to create regular peat blockages (three blockages per 100 m) along each field drain.
- Re-alignment of piped drainage; and management of water levels to create/enhance existing wetlands.
- Decommissioning of a pump in Lanespark Bog.
- Fertiliser application over high fields and headlands in Derryvella Bog.
- No measures are planned for the majority of surrounding marginal peatland habitats.
- Silt ponds will continue to be maintained during the rehabilitation and decommissioning phase.
- Evaluate success of short-term rehabilitation measures and enhance where necessary.

- Decommissioning of silt-ponds will be assessed and carried out, where required.

Timeframe:

- 2018-2021. 1st phase of rehabilitation. Removal of milled peat stock. Field drain blocking.
- 2018-2019. 1st phase of rehabilitation. Field drain blocking across the bog. Removal of the pump.
- 2021. Application of fertiliser along the headland.
- >2027: Decommission silt-ponds, if necessary.

Table AP-1. Rehabilitation measures and target area.

Type	Code	Description	Area (Ha)
Dry cutaway	DCT1	Blocking outfalls and managing water levels with overflow pipes	5.9
Deep peat	DPT1	Regular drain blocking (3/100 m) + blocking outfalls and managing water levels with overflow pipes	13.8
Wetland	WLT1	Turn off or reduce pumping to re-wet cutaway + blocking outfalls and managing water levels with overflow pipes	65.7
Additional Works	AW	Targeted drain blocking	27.4
Marginal Land	MLT1	No work required	15.5
Other	Silt Pond	Silt ponds	0.5
Other	Constraint		348.2
Total			474.3

See Drawing number *BNM-DR-26-07-RP-20 Ballybeg/Lanespark/Derryvella Bog: Standard Rehab Measures* included in the accompanying Mapbook which illustrates the standard rehab measures to be applied.

Monitoring, after-care and maintenance

- There will be initial quarterly monitoring assessments of the site to determine the general status of the site, the condition of the silt-ponds, assess the condition of the rehabilitation work, assess the progress of natural colonisation, monitoring of any potential impacts on neighbouring land and general land security. The number of site visits will reduce after 2 years to bi-annually. These site visits will assess the need to additional rehabilitation.
- Water quality monitoring will be established.
- Monitoring results will be maintained, trended and reported on each year as part of the requirement to report on Condition 10.1 of the IPC Licence on Bog Rehabilitation in the Annual Environmental Report, which will be available in April each year at www.epa.ie.
- The parameters to be included (as per condition 6.2 of the IPC Licence) include monthly monitoring for pH, Flow, Suspended Solids, Total Solids, Total Phosphorus, Total Ammonia, Colour, and COD.
- This sampling regime on a selected number of silt ponds will be carried out over a two-year cycle. The original (licence) requirement was for a quarterly sampling regime.

- Where other uses are proposed for the site, these will be assessed by Bord na Móna in consultation with interested parties. Other after-uses can be proposed for licensed areas and must go through the required assessment and planning procedures.

Validation and IPC Licence surrender

Reporting to the EPA will continue until the IPC Licence is surrendered. The bog will be included in the full licence surrender process as per the Guidance to Licensees on Surrender, Cessation and Closure of Licensed Sites (EPA, 2012) when:

- The planned rehabilitation has been completed;
- Water quality monitoring demonstrates that water quality of discharge is stabilising or improving; and
- The site has been environmentally stabilised.

APPENDIX II: BOG GROUP CONTEXT

The Littleton Bog Group IPC Licenced area has been in industrial peat production for several decades. There are 11 defined bog units covering a total area of 4,421 ha. Each bog area further comprises a range of habitats from bare milled peat former production areas to re-colonising cutaway to workshops areas and transport infrastructure. Industrial peat extraction from these sites mainly supplied briquettes, horticulture and commercial turf for domestic use.

Industrial peat extraction in the Littleton Bog Group ceased in 2017. Some remnant small stockpiles which were harvested within the Bog Group prior to 2017 remain on the bogs. Some rehabilitation has already been undertaken at some of the Littleton bogs, including Carrickhill, Templetuohy, Bawnmore, Inch, Ballybeg, Derryvella and Killeen Bogs.

The rehabilitation plan for the Littleton Bog Group encompasses all areas involved in industrial peat production including former industrial production areas and associated facilities.

A breakdown of the component bog areas for the Littleton Bog Group IPC Licence Ref. P0-499-01 is outlined in Table Ap-2. Industrial peat production history varies across the Littleton bog group, so there is a wide range of peat depths at present.

Table Ap-2: Littleton Bog Group names, area and indicative status

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
Carrickhill	170 ha	Cutover Bog Industrial peat production started in the 1970's and ceased in 2017. There is residual deep peat across much of this site. Carrickhill had a partially pumped drainage system.	Carrickhill Bog formerly supplied peat to the Littleton briquette factory. Some areas of shallow peat cutaway on site are developing pioneer cutaway vegetation communities. The pump was decommissioned in 2018. Drain blocking was carried out in 2018. A fertiliser treatment on part of the headland was carried out in 2021. The majority of the site is still mostly bare peat. Carrickhill is proposed for the Coillte/BnM Midlands Native Woodland Project. 28 ha is proposed for planting at this site. This proposed project is currently being considered for consent by the Forest Service.	2017	Draft 2018 Phase 1 Rehab measures implemented 2018-2021 Updated 2025
Templetuohy	737 ha	Cutover Bog	Templetuohy Bog formerly was developed to supply fuel sod peat	2017	Draft 2018

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
		Industrial peat production commenced at Templetuohy Bog in 1940's. Areas began to develop as cutaway during the 1980s as peat extraction ceased on a phased basis. Industrial peat extraction finally ceased in 2017. This bog has a partially pumped drainage system. Part of the site has developed pioneer cutaway habitats. Areas re-developed for peat extraction in 2015-17 are now revegetating quickly. Areas that were used for peat extraction upto 2017 are a mosaic of re-wetted bare peat and pioneer communities.	and also supplied peat to the Littleton briquette factory. Bord na Móna have constructed a 40MW Wind Farm with 14 turbines and road network on cutaway at Templetuohy bog called Bruckana Wind Farm. This wind farm is operational. Pumping is still operational across this site to support the wind farm infrastructure.		Phase 1 Rehab measures implemented 2018-2021 Updated 2025
Derryville	250 ha	Cutover Bog Industrial peat production commenced at Derryville Bog in 1970's. Areas began to develop as cutaway during the 2000s as peat extraction ceased on a phased basis. Peat extraction finally ceased in 2017. This bog has a partially pumped drainage system.	Derryville Bog formerly supplied peat to the Littleton briquette factory. Part of the site has been developed for conifer forestry and is leased to Coillte. Part of the site was sold to Lisheen Mine and removed from the IPC Licence in the 2000s. Much of the former production area on site is developing pioneer cutaway vegetation communities, the remainder of the site is bare peat and developing wetland. Pumping continued at Derryville until 2022. Pumping has now ceased, and measures have been implemented in 2024 to manage water levels across the site and to decommission the pump.	2017	Updated 2025

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
Bawnmore	531 ha	Revegetating cutover bog. Industrial peat production commenced at Baunmore Bog in 1970's. Areas began to develop as cutaway during the 2000s as peat extraction ceased on a phased basis. Peat extraction finally ceased in 2017. Much of the site is now developing a mosaic of woodland, peatland and wetland habitats. Baunmore had a partially pumped drainage regime.	Bawnmore Bog formerly supplied peat to the Littleton briquette factory. Much of the site is developing pioneer cutaway habitats and the site has significant biodiversity value. Pumping ceased in 2018. Part of the access is used for log biomass storage (for Edenderry Power). Bawnmore is proposed for the Coillte/BnM Midlands Native Woodland Project. 39 ha is proposed for planting at this site. This proposed project is currently being considered for consent by the Forest Service.	2017	Updated 2025
Ballysorrel	196 ha	Drained raised bog – This site was initially drained for peat extraction. It was developed for peat production in the 1970s, but milled peat harvesting only occurred over a short 2 year timeframe. The site was then left as a peat reserve to be re-developed in the future. Restoration/drain blocking carried out in in 2018.	Much of the site was bare peat in the early 2000s. The site has since re-vegetated naturally (in a drier situation) since then and is now responding quickly to the recent re-wetting. Much of the high bog has re-colonised with Heather-dominated vegetation. Small hummocks of *Sphagnum* capillifolium and S. subnitens are present. *Sphagnum* spp. are also present in some low-lying areas that are permanently waterlogged and are spreading.	2017	Final 2019
Inch	120 ha	Cutover Bog Industrial peat production since 1970s. Finally ceased in 2017. Inch had a partially pumped drainage regime.	Inch Bog formerly supplied peat to the Littleton briquette factory. Some areas of shallow peat cutaway on site are developing pioneer cutaway vegetation communities with deep peat areas slow to colonise and remaining mostly bare peat. Pumping ceased in 2018. Inch is proposed for the Coillte/BnM Midlands Native Woodland Project. 19 ha is proposed for planting at this site.	2017	Updated 2025

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
			This proposed project is currently being considered for consent by the Forest Service.		
Longford Pass (Popes Bog)	214 ha	Cutaway Bog Peat production at Longfordpass bog commenced in the 1940's and finally ceased in 2017. Peat extraction ceased and cutaway habitats began to develop on a phased basis. Longfordpass has a partially pumped drainage system.	Longford Pass Bog initially was developed as a sod turf production site. It then formerly supplied peat to the Littleton briquette factory. The site was bisected by the construction of the N8 Motorway in 2000s. A small area between the new motorway and R639 (old main road) was leased and developed for farmland in 2018. Longford Pass is part of the proposed Littleton Wind Farm Project. This project is currently in pre-planning. Some areas of shallow peat cutaway on site are developing pioneer cutaway vegetation communities with deep peat areas slower to colonise. Pumping continued at the site until 2022, when the pumping failed. Since then, measures have been carried out to manage water-levels.	2017	Draft 2018
Ballybeg, Lanespark and Derryvilla	474 ha	Cutaway Bog Industrial peat production since 1970s and finally ceased in 2017. Peat extraction ceased and cutaway habitats developed on a phased basis during this period. .	Ballybeg, Lanespark and Derryvilla initially were developed for sod turf production, and then formerly supplied peat to the Littleton briquette factory. Part of the site has been developed for conifer forestry and is leased to Coillte. Part of Lanespark/Derryvilla (Loch Doire Bhile) was developed as fishing lake and an amenity site in 1999-2002. This site is leased to Slieve Ardagh Rural Development. Lanespark is part of the proposed Littleton Wind Farm Project. This project is currently in pre-planning.	2017	Draft 2018 Ballybeg & Derryvella Updated 2025

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
			A greenway was constructed across the site as part of the Littleton Labyrinth Project in 2024, connecting the historical site of Derrynaflan to Loch Doire Bhile amenity, via Lanespark. Additional greenway is proposed to extend amenity through Derryvilla and Ballybeg as part of Failte Ireland. Midlands Trail project. This is currently in pre-planning. Ballybeg and Lanespark are proposed for the Coillte/BnM Midlands Native Woodland Project. 21 ha is proposed for planting at this site. This proposed project is currently being considered for consent by the Forest Service .		
Killeen	632 ha	Industrial peat production commenced at Killeen Bog in 1980s. Industrial peat extraction finally ceased in 2021.	Killeen bog formerly supplied peat to the Littleton briquette factory and the horticultural market. Re-wetting was carried out across the site in 2021. Some areas of shallow peat cutaway on site are developing pioneer cutaway vegetation communities with deep peat areas slower to colonise since the site was re-wetted. A greenway was constructed across the site as part of the Littleton Labyrinth Project in 2024, connecting the historical site of Derrynaflan to Loch Doire Bhile amenity, via Lanespark. Killeen is proposed for the Coillte/BnM Midlands Native Woodland Project. 31 ha is proposed for planting at this site. This proposed project is currently being considered for consent by the Forest Service .	2017	Draft 2018 Phase 1 Rehab measures implemented 2018-2021 Updated 2025

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
Littleton	1,020 ha	Cutaway Bog Littleton is a relatively old industrial peat production bog. Large-scale industrial peat production began in the 1940's where sod peat was produced for fuel. Sod peat production was mechanised during the 1950's. Milled peat production began in the 1970's and milled peat was supplied to the Briquette factory (constructed in 1981) at Lanespark. Peat extraction ceased and cutaway habitats developed on a phased basis since the 1890s and some well-established cutaway habitats have developed. Industrial peat extraction finally ceased in 2018. Littleton has a partially pumped drainage system.	Littleton Bog formerly supplied sod peat before supplying peat to the Littleton briquette factory. Older cutaway has already extensively colonised with pioneer cutaway, wetland and scrub habitats. Part of the site has been developed for conifer forestry and is leased to Coillte. A small area (10 ha) was used as a pilot biomass project and Eucalyptus was planted in 2018. Littleton is part of the proposed Littleton Wind Farm Project. This project is currently in pre-planning. Some pumps in Littleton Bog have been decommissioned and some have been retained and are still operational.	2017	Draft 2018

See Drawing number *BNM-DR-26-07-RP-24: Bog Group,* included in the accompanying Mapbook which illustrates the location of Ballybeg/Lanespark/Derryvella Bog and the Littleton Bog Group in context to the surrounding area.

APPENDIX III: ECOLOGICAL SURVEY REPORT

The ecological survey reports for Ballybeg/Lanespark/Derryvella Bog are presented as two standalone reports below. The areas of Lough Doire Bhile and Lanespark Bog have been constrained out of the PCAS rehabilitation extent; therefore the ecological reports for these areas are not included here.

Derryvella Bog

Ecological Survey Report

Note: This report outlines an ecological survey of the bog. This report should not be taken as a management plan for the site as other land-uses may still be considered. Information within this report may inform the development of other land-uses and identify areas with particular biodiversity value. The report outlines potential options for biodiversity management after industrial peat production has ceased.

Bog Name:	**Derryvella (Lanespark)**	**Area (ha):**	123.3 ha
Works Name:	Littleton	**County:**	Tipperary
Recorder(s):	MMC	**Survey Date(s):**	28/08/2012

Habitats present (in order of dominance)

The most common habitats present at this site include:

- Bare peat (Codes refer BnM classification of pioneer habitats of former peat production areas. See Appendix II).
- Pioneer poor fen dominated by Soft Rush (pJeff) and or Bog Cotton (pEang)
- Pioneer Purple Moorgrass-dominated communities (gMol) (around margins and in mosaic)
- Exposed gravel (Gr)
- Birch scrub (oBir, cBir) (generally in mosaic with other cutaway habitats)
- Pioneer dry heath (developing on some stock-piles and high fields)

- Scrub (WS1) (Codes refer to Heritage Council habitat classification, Fossitt 2000), See Appendix II)
- Birch woodland (WN7)
- Improved grassland (GA1)

Description of site

Derryvella Bog is located in Co. Tipperary, 5 km south-east of Littleton Village. Derryvella is part of the Littleton Bog group and is located north of the former Littleton/Lanespark briquette factory, and to the east of the Lough Doire Bhile amenity area and biodiversity area. A branch of the BnM railway network connects Derryvella and Lanespark.

Derryvella is a relatively small bog and is a sub-section of the larger Ballybeg/Lanespark/Derryvella bog unit. Former peat fields are orientated north to south. The bog property extends north to a local road that marks the northern boundary. The BnM railway extends along the southern margin of the site. The majority of the bog was formerly developed for peat production and the marginal zones within the BnM property line are rather narrow and dominated by scrub on old high bog. Improved grassland in adjacent farmland extends up to the BnM bog margin along the west side of the bog. There is some recent conifer forestry planted along the eastern margin of the site.

Up until 2017/2018, the majority of the bog was managed for milled peat production and is dominated by bare peat as a result. The narrower southern end of the site has been out of industrial peat production for several years. A ridge of glacial till extends under the peat layer and is exposed in parts. A new deep outfall has been recently dug through this ridge to help drain former production areas to the north. There is some light vegetation over this mound of glacial sub-soil and in the small area of peat trapped to the south of the mound that is now out of production. Purple Moorgrass and Soft Rush dominate the vegetation over the mound with some scattered Heather. However, it has been disturbed recently by the construction of the outfall. There is still significant bare substrate cover with exposed gravel. There is some Gorse scrub developed to the west of the mound and outfall on an old high field that is no longer in use. To the south and on remnant peat there is typical colonisation of pioneer Poor Fen with Soft Rush and Bog Cotton. There is also some scattered Birch scrub but again there is also significant bare peat cover still present. A small sub-basin has developed in this area between the margin of the bog and the mound and the lowest section is wetter and being vegetated by Bog Cotton. There is also a small sub-basin to the east of the mound where there was water lying at the time of the survey. Both Bog Cotton and Bottle Sedge were present in this section.

Other sections that are vegetated include an old stock-pile that has been colonised with Heather and Purple Moorgrass. The south-east margin of the former production bog is situated along a channelized stream and there is a verge of grazed grassland (GS2) developed along this drain on spoil taken from the drain. Purple Moorgrass dominates the marginal vegetation along the western margin of the former production bog.

Designated areas on site (cSAC, NHA, pNHA, SPA other)

None

Adjacent habitats and land-use

The surrounding area is largely dominated by farmland, with improved agricultural grassland (GA1) and some wet grassland (GS4) that extends to the majority of the margins around the bog. Conifer Plantation has been developed along the eastern margin of the bog.

Watercourses (major water features on/off site)

- Derryvella is located within the River Suir catchment.
- Derryvella has a single catchment. The bog drains south towards the new outfall and on to a drain that flows east along the northern margin of Lough Doire Bhile amenity area and biodiversity area. The catchment is treated by a silt-pond that is located to the west of Lough Doire Bhile, where it then drains into the Black River.
- The Black River drains west towards the River Suir. It flows along the south-east and southern margins of the bog.

Peat type and sub-soils

Dark fen peat is exposed over most of this site.

The bog is underlain by mixed glacial till.

Fauna biodiversity

Birds

Several bird species were noted on the site during the survey.

- Blackbird, Wren, Meadow Pipit, Grey Crow (4), Kestrel, Wood Pigeon and Swallow.

Mammals

Signs of several mammal species were noted on the site during the survey.

- Rabbit were sighted along south-west margin and there are frequent signs of grazing.

- Fox droppings and Hare droppings were noted around the site.

Other species

- Butterfly species noted on the site included Large White and Meadow Brown.

Ballybeg Bog

Ecological Survey Report

Note: This report outlines an ecological survey of the bog. This report should not be taken as a management plan for the site as other land-uses may still be considered. Information within this report may inform the development of other land-uses and identify areas with particular biodiversity value. The report outlines potential options for biodiversity management after industrial peat production has ceased.

Bog Name:	**Ballybeg (Lanespark)**	**Area (ha):**	123.3 ha
Works Name:	Littleton	**County:**	Tipperary
Recorder(s):	MMC	**Survey Date(s):**	20/09/2012 11/2017

Habitats present (in order of dominance)

The most common habitats present at this site include:

- Bare peat (Codes refer BnM classification of pioneer habitats of production bog. See Appendix II).
- Birch scrub (oBir, cBir) (generally in mosaic with other cutaway habitats)
- Pioneer dry heath (generally in mosaic with Birch scrub and Purple Moorgrass-dominated grassland)
- Pioneer poor fen dominated by Soft Rush (pJeff)
- Pioneer Purple Moorgrass-dominated communities (gMol) (around margins and in mosaic)
- Open water (OW)
- Bog timber
- Scrub (WS1) (Codes refer to Heritage Council habitat classification, Fossitt 2000), See Appendix II)
- Birch woodland (WN7)
- Improved grassland (GA1)
- Raised bog (PB1)
- Treeline (WS2)

Description of site

Ballybeg Bog is located in Co. Tipperary, 1 km south-east of Littleton Village. Ballybeg is part of the Littleton Bog group and is located adjacent to Lanespark and the former briquette factory. There is a branch of the railway connecting Ballybeg and Lanespark.

Ballybeg is a small bog and has a dog-leg shape with a narrower eastern portion. Peat fields are orientated south-east to north-west. The bog property extends south to a local road that accesses the former Lanespark Briquette Factory. Another local road crosses the travel path to the east the bog that links Ballybeg and Lanespark. The BnM railway extends along this travel path and along the southern margins of the east half of the bog, with a branch along the eastern margin.

The majority of the bog was managed for milled peat production and is dominated by bare peat. There are only several tiny sections beginning to develop pioneer cutaway habitats. A low mound is beginning to be exposed at the east end of the site with gravel appeared with some vegetation along the edges of the drains. A small part of the north-west corner was wet at the time of the survey and colonised by species associated with pioneer poor fen habitats (i.e. Soft Rush (*Juncus effusus*) and Bulbous Rush (*Juncus bulbosus*). The majority of this former production area is considered to comprise relatively deep peat with some exposed lighter peat present also. In contrast, the eastern half of the bog has a relatively thin layer of peat remaining. The southern part of the site appears to have more potential for wet peatland habitat development with a basin developed around the main outfall.

A small section at the southern end has been out of production for some time (cutaway) (prior to the 2017 decision to close Littleton Briquette Factory). Silt-ponds have been developed adjacent to the road and grassland (likely grazed) has developed between the silt-ponds. Several fields to the north have been out of industrial peat production for some time or had limited production. They are developing dense Birch scrub/woodland with a mosaic of lighter Birch scrub and pioneer dry heath in sections. Purple Moor-grass (*Molinia caerulea*) and Common Cotton-grass and Hare's-tail Cotton-grass (*Eriophorum angustifolium* and *Eriophorum vaginatum*) are also prominent around the margin of this section and in some parts of the fields where the drainage is impeded. The majority of this section is vegetated.

Several fields along the western part of the northern margin have also developed dry heath and Birch/Gorse scrub mosaics. There has been limited industrial peat production along these fields (fields are relatively high). There are also some sections of bare peat with occasional stands of Ling Heather (*Calluna vulgaris*) re-colonising this area. An area within this section has been developed for the creation of silt-ponds.

Similar vegetation is found in the eastern part of the northern margin. This area is in a localised basin. A dense mosaic of dry Heath, Purple Moorgrass-dominated grassland and Birch scrub form the main part of the mosaic. The marginal areas tend to be Heather dominated. Some sections are wetter and contain more frequent Soft Rush-dominated poor fen with the Birch scrub. The majority of this area is completely vegetated. Several portions of fields adjacent to the milled peat production area have been out of production for a shorter amount of time and are developing Soft Rush-dominated poor fen vegetation with some emergent Birch scrub.

Part of the western production bog margin seems to have been planted with broad-leaved saplings, including Alder), to help form a screen between the bog and an adjacent farmyard. A tall Grey Popular-dominated tree-line is present along the travel path entrance into the bog.

Designated areas on site (cSAC, NHA, pNHA, SPA other)

None

Adjacent habitats and land-use

The surrounding area is largely dominated by farmland, with improved agricultural grassland (GA1) and some wet grassland (GS4) that extends to the majority of the margins around the bog.

Watercourses (major water features on/off site)

- Ballybeg is located within the River Suir catchment.
- Ballybeg is separated into three separate catchments. The northern half of the bog is divided into two separate catchments that both drain north to silt-ponds on the margins of the site. Both ponds drain north towards the Black River via drains.

- The southern catchment drains south through silt-ponds to the Ballyley River. Both rivers drain west towards the River Suir.

Peat type and sub-soils

Dark fen peat is exposed over most of this site. Lighter *Sphagnum*-type peat is also exposed in places where there is deeper peat.

The bog is underlain by mixed glacial till.

Fauna biodiversity

Birds

Several bird species were noted on the site during the survey.

- Blackbird, Mistle Thrush (4), Wren, Robin and Rook (2).

Mammals

Signs of several mammal species were noted on the site during the survey.

- Rabbit were sighted along the railway.
- Fox droppings and Hare droppings were noted around the site.

Other species

N/A

ADDENDUM 1- APPROPRIATE ASSESSMENT REPORT FINDINGS

Bord na Móna operates under IPC Licence issued and administered by the EPA to extract peat within the Littleton bog group (Ref. P0409-01). As part of Condition 10.2 of this license, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area. Ballybeg/Lanespark/Derryvella Bog is located in Co. Tipperary, 1 km south-east of Littleton Village and approximately 7 km southeast of Thurles. The bog unit consists of three closely linked bogs. This addendum outlines the findings of the Appropriate Assessment reporting carried out in respect of proposed PCAS activities at Ballybeg/Lanespark/Derryvella Bog.

An Appropriate Assessment Report[6] was commissioned by Bord na Móna to inform whether the proposed PCAS activities at Ballybeg/Lanespark/Derryvella Bog Bog had the potential to result in Likely Significant Effects on European Sites.

The concluding statement of this report reads as follows:

> *'In light of this conclusion, it is the considered opinion of ROD, as the author of this AA Screening Report, that the competent authority, BnM, may find in completing its AA Screening in respect of the Ballybeg-Lanespark-Derryvella Bog Decommissioning and Rehabilitation Plan, that the project, either individually or in combination with other plans and projects, is not likely to have a significant effect on any European site, in view of best scientific knowledge and the Conservation Objectives of the sites concerned. Therefore, it is the recommendation of the author of this AA Screening Report that the competent authority may determine that AA is not required in respect of the project'.*

Therefore, following screening, Appropriate Assessment is not required for the project as it is not directly connected with or necessary to the management of any European Site(s) and as it can be concluded, on the basis of objective information, that the project, individually or in combination with other plans or projects is not likely to have a significant effect on any European Site(s).

[6] ROD (2025). Ballybeg/Lanespark/Derryvella Bog Bog Decommissioning and Rehabilitation Plan 2025, Screening for Appropriate Assessment.

APPENDIX IV: ENVIRONMENTAL CONTROL MEASURES TO BE APPLIED TO BOG REHABILITATION

- Bog restoration/rehabilitation measures will be restricted to within the footprint of the proposed rehabilitation area.
- The proposed rehabilitation will have due regard to noise limits and hours of operation (i.e. dusk and dawn) to minimise any potential disturbance on resident and local fauna that utilise the site and immediate environs.
- All plant and equipment for use will comply with the Construction Plant and Equipment Permissible Noise Levels Regulations (SI 359/1996).
- The proposed activities will be restricted to daylight hours and there will be no requirement for artificial lighting.
- Silt ponds will be inspected and maintained as per the IPC Licence.
- During periods of heavy precipitation and run-off, activities will be halted.
- Measures will be carried out using a suitably sized machine and, in all circumstances, excavation depths and volumes will be minimised where possible.
- All machines will be regularly checked and maintained prior to arrival at the site to prevent hydrocarbon leakage.
- Hoses and valves will be checked regularly for signs of wear and will be closed and securely locked when not in use.
- Fuelling and lubrication of equipment shall only be carried out in designated areas away from surface water drainage features and ecologically sensitive areas.
- Waste oils and hydraulic fluids will be collected in leak-proof containers and removed from the site for disposal or re-cycling.
- Vehicles will never be left unattended during refuelling.
- No direct discharges to waters will be made. No washings from vehicles, plant or equipment will be carried out on site.
- All plant refuelling will take place using mobile fuel bowsers. Only dedicated trained and competent personnel will carry out refuelling operations.
- Mobile storage such as fuel bowsers will be bunded to 110% capacity to prevent spills. Tanks for bowsers and generators shall be double skinned. When not in use, all valves and fuel trigger guns from fuel storage containers will be locked. All pumps using fuel or containing oil will be locally and securely bunded where there is the possibility of discharge to waters.
- Potential impacts caused by spillages etc. during rehabilitation will be reduced by keeping spill kits and other appropriate equipment on-site.
- Site activities will be carried out in accordance with 'best practice'. In order to ensure compliance and implementation of 'best practice', these measures will be communicated to relevant Bord na Móna staff and updated as required.

APPENDIX V: BIOSECURITY

The potential for importation or introduction of non-native plant species (such as Japanese Knotweed, Himalayan Balsam, etc.) during future rehabilitation management, such as drain-blocking using excavators, has the potential to result in the establishment of invasive species within the site. Section 49 of the European Communities (Birds and Natural Habitats) Regulations 2011 prohibits the introduction and dispersal of invasive alien species (particularly plant species) listed on Part 1 (third column) of the 'Third Schedule'.

This section aims to reduce the risk from, and impacts of, invasive species and protecting biodiversity on lands under Bord na Móna ownership. Rehabilitation and decommissioning in the bog will have due regard to the relevant biosecurity measures outlined below:

- Records of problematic invasive species within the various bog units will be marked out with signs to highlight areas of infestation to personnel.
- All plant machinery will be restricted from disturbing known colonies of invasive species.
- All plant machinery will avoid unnecessary crossings to adjoining lands.
- Good site hygiene will be employed to prevent the introduction and spread of problematic invasive alien plant species (i.e. Japanese Knotweed (*Fallopia japonica*), Himalayan Balsam (*Impatiens glandulifera*), Himalayan Knotweed (*Persicaria wallichii*), etc.) by thoroughly washing vehicles prior to entering the area.

The biosecurity measures outlined above are in line with best practice guidelines issued by the National Roads Authority (NRA, 2010) – The Management of Noxious Weeds and Non-native Invasive Plant Species on National Roads and broadly based on the Environment Agency's (2013) – The Knotweed Code of Practice: Managing Japanese Knotweed on Development Sites (Version 3, amended in 2013).

In addition to the above, Best Practice measures around the prevention and spread of Crayfish plague[7] will be adhered with throughout all rehabilitation measures and activities.

[7] https://www.biodiversityireland.ie/projects/invasive-species/crayfish-plague/

APPENDIX VI: POLICY AND REGULATORY FRAMEWORK

Bord na Móna Plc is a publicly owned company, originally established in 1934 to develop some of Ireland's extensive peat resources for the purposes of economic development and to support energy security. In the decades since its establishment the company has employed tens of thousands of people in its fuel, energy, and horticultural growing media businesses. For much of its history the company's support of important national policy aims has been enabled and encouraged in a variety of ways by Government.

Today, Bord na Móna is undertaking a number of highly significant actions in support of climate policy. These actions involve a radical transformation and decarbonisation of nearly the entire Bord na Móna business. This transformation will be driven by unlocking the full potential of our land and creating significant value for Ireland and the Midlands in particular.

Bord na Móna is an integral part of the economic, social, and environmental fabric of Ireland and Irish life. As a key employer in the Midlands, the company is conscious that its obligations go beyond purely commercial and environmental – there is also a social responsibility to employees and the communities served by Bord na Móna. It is the company's role and absolute priority to ensure that its long-term strategy delivers on all of these important areas in a robust and balanced way.

There are a wide range of policies, plans, legislation and land designations that inform the development of this Bord na Móna peatland rehabilitation plan. Bord na Móna have also developed and operate various policies and strategies that also inform the development of this rehabilitation plan.

1 EPA IPC Licence

Bord na Móna operates under IPC Licence issued and administered by the EPA to extract peat within the Littleton bog group (Ref. PO-499-01). As part of Condition 10.2 of this license, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area. The bog is part of the Littleton group. This regulatory requirement is the main driver of the development of this rehabilitation plan.

2 The Peatlands Climate Action Scheme (PCAS)

Bord na Móna (BnM) understand that it is the Minister's (DECC) intention to impose an obligation on Bord na Móna to develop a programme of measures, 'the Scheme', for the enhanced decommissioning, rehabilitation and restoration of boglands previously used to supply peat for electricity generation within the State. The enhanced decommissioning, rehabilitation and restoration of the peatlands funded by the Scheme (PCAS) will deliver benefits across climate action (GHG mitigation through reduced carbon emissions and acceleration towards carbon sequestration), enrich the State's natural capital, increase eco-system services, strengthen biodiversity, improve water quality and storage attenuation as well as developing the amenity potential of the peatlands.

It is envisaged that Bord na Móna carry out an enhanced decommissioning, rehabilitation and restoration, under the Scheme (PCAS), and supported by the Climate Action Fund and Ireland's National Recovery and Resilience Plan across a footprint of 33,000 ha. This scheme will significantly go beyond what is required to meet rehabilitation and decommissioning obligations under existing EPA IPC licence conditions. Interventions and measures supported by the Scheme will ensure that environmental stabilisation is achieved (meaning IPC obligations are met), and importantly, significant additional benefits, particularly relating to climate action and other ecosystem services, will also be delivered. However, only the additional costs associated with the additional

and enhanced rehabilitation, i.e., those activities which go beyond the existing decommissioning and rehabilitation requirements arising from Condition 10 will be eligible for support under the Scheme.

The proposed enhanced rehabilitation detailed in this document, are predicated on the understanding that the element of the activities, over and above the 'standard' rehabilitation necessary to comply with pre-existing Condition 10 IPC Licence requirements, will be deemed eligible costs by the Scheme regulator and funded by the Climate Action Fund and Ireland's National Recovery and Resilience Plan.

For the avoidance of doubt, should the Scheme and the associated statutory obligation on Bord na Móna not materialise, Bord na Móna will not carry out the enhanced decommissioning, rehabilitation and restoration measures described in this plan. Bord na Móna will instead plan to complete an adapted standard decommissioning and rehabilitation measures required under Condition 10 and outlined in Appendix I.

3 National Climate Policy

The National Policy Position establishes the fundamental national objective of achieving a transition to a competitive, low carbon, climate-resilient and environmentally sustainable economy by 2050. It sets out:

- the context for the objective;
- clarifies the level of GHG mitigation ambition envisaged; and
- establishes the process to pursue and achieve the overall objective.

The evolution of climate policy in Ireland will be an iterative process based on the adoption by government of a series of national plans over the period to 2050. GHG mitigation and adaptation to the impacts of climate change are to be addressed in parallel national plans – respectively through the National Climate Action Plan. The plans will be continually updated, as well as being reviewed on a structured basis at appropriate intervals and, at a minimum, every five years. This will include early identification and ongoing updating of possible transition pathways to 2050 to inform sectoral strategic choices.

Bord na Móna is following a decarbonisation programme aimed at reducing the carbon emissions from its activities. Industrial peat production has now ceased, and several other decarbonisation measures are being implemented. The company aims to further develop renewable energy and resource recovery markets with a key objective of reducing the carbon intensity of all products. In addition, the carbon emission mitigation benefits associated with the post-peat extraction rehabilitated peatland following re-wetting, revegetation and colonisation of significant areas with native woodland will make a significant contribution to achieving the State's carbon emission reduction targets.

4 National Peatlands Strategy

The National Peatlands Strategy (2015) contains a comprehensive list of actions, necessary to ensure that Ireland's peatlands are preserved, nurtured and become living assets within the communities that live beside them. It sets out a cross-governmental approach to managing issues that relate to peatlands, including compliance with EU environmental law, climate change, forestry, flood control, energy, nature conservation, planning, and agriculture. The Strategy has been developed in partnership between relevant Government Departments/State bodies and key stakeholders through the Peatlands Council.

The strategy recognises that Ireland's peatlands will continue to contribute to a wide variety of human needs and to be put to many uses. It aims to ensure that Ireland's peatlands are sustainably managed so that their benefits

can be enjoyed responsibly. It aims to inform appropriate regulatory systems to facilitate good decision making in support of responsible use. It also aims to inform the provision of appropriate incentives, financial supports and disincentives where required. The strategy attempts to strike an appropriate balance between different needs, including local stakeholders like turf-cutters and semi-state bodies such as Bord na Móna.

In line with a National Peatlands Strategy recommendation, a Peatlands Strategy Implementation Group (PSIG), was established, assisted in the finalisation of the Strategy, is overseeing subsequent implementation and will report to Government on an annual basis on the implementation of the actions and principles contained within the Strategy.

Bord na Móna is a key stakeholder in the National Peatlands Strategy and the Peatlands Strategy Implementation Group. The strategy recognises the potential for some Bord na Móna sites to be restored and to contribute to the national SAC and NHA network of protected raised bog sites. The strategy (agreed in 2015) also recognises the various different values of cutaway bog and developed six key principles (with Bord na Móna) for the after-use of cutaway bog.

- Bord na Móna will continue to assess and evaluate the potential of the company's land bank, using a land use review system. The assessment will help prepare a set of evidence-based management plans for the various areas of peatland. These plans will also inform its cutaway bog rehabilitation.
- The policy of Bord na Móna is not to open up any undrained new bogs for peat production.
- Lands identified by Bord na Móna as having high biodiversity value and/or priority habitats will be reserved for these purposes as the principal future land use.
- Generally, Bord na Móna cutaway bogs that flood naturally will be permitted to flood unless there is a clear environmental and/or economic case to maintain pumped drainage.
- In deciding on the most appropriate afteruse of cutaway peatlands, consideration shall be given to encouraging, where possible, the return to a natural functioning peatland ecosystem.
- This will require re-wetting of the cutaway peatlands which may lead in time to the restoration of the peatland ecosystem.
- Environmentally, socially and economically viable options should be analysed to plan the future use of industrial cutaway peatlands, in conjunction with limiting factors as outlined in Bord na Móna's Strategic Framework for the Future Use of Peatlands.

The National Peatlands Strategy highlights the importance and value of developing peatland rehabilitation plans for Bord na Móna cutaway sites and implementing this peatland rehabilitation. Some of these principles have now been superseded by the company's decision to cease industrial peat extraction. The National Peatlands Strategy is currently being reviewed by Government.

5 National River Basin Management Plan 2022-2027 (Water Framework Directive)

The River Basin Management Plan for Ireland 2022-2027 (DHLGH 2024) is the key national plan for Ireland to achieve the objectives of the Water Framework Directive (WFD). In broad terms, the objectives of the WFD are (1) to prevent the deterioration of water bodies and to protect, enhance and restore them with the aim of achieving at least good status and (2) to achieve compliance with the requirements for designated protected areas.

The NRBMP 2022-2027 outlined how peat extraction can be a potentially significant pressure on various water quality parameters. Peatland rehabilitation of Bord na Móna cutaway (in addition to other measures) was part of

the WFD (2022-2027) programme of measures. The NRBMP 2022-2027 takes account of the fact that Bord na Móna was in the process of phasing out the extraction of peat for energy production, that it set a target to rehabilitate 9,000 ha of cutaway bogs (covering 25 peatlands) by 2021 (in 2018) and will look to implement best-available mitigation measures to further reduce water quality impacts caused by peat extraction while the phasing-out process is taking place. This NRBMP 2022-2027 rehabilitation target was superseded by the acceleration of the Bord na Móna de-carbonisation programme and the Scheme (PCAS).

The development of site rehabilitation plans and the delivery of peatland rehabilitation by Bord na Móna was expected to have a positive impact on water quality and will help the NRBMP 2022-2027 deliver its objectives in relation to the Water Framework Directive and is one of the five key principal actions.

The NRBMP 2022-2027 describes how the number of waterbodies impacted by peat, industry and forestry have decreased by 10, 10 and 5 waterbodies, respectively since the second cycle. Impacts on water quality and river habitat arising from peat and peat extraction and associated drainage include the release of ammonium and fine-grained suspended sediments, and physical alteration of aquatic habitats. Drainage of peatlands also results in changes to the hydromorphological condition of rivers.

The NRBMP 2022-2027 outlines how maintaining and restoring Irish bogs will lead to a decrease in waterborne carbon leaching to levels comparable with intact bogs as well as reducing losses of peat silt and ammonia. Vegetation on the surface of the peat can also slow the flow of water over the land surface. Based on the EPA's most recent reports, peat extraction and drainage is impacting on 106 water bodies across the country, with peat the single pressure on 28 of these water bodies. However, compared to the data in the second-cycle plan, the number of water bodies impacted by peat has decreased.

The cessation of industrial peat extraction by Bord na Móna in 2021 was expected to have a significant positive impact on water quality of receiving water courses by reducing the impact of peat extraction as a key pressure on particular water courses. This is now being supported by the results and conclusions of the draft NRBMP 2022-2027.

6 4th National Biodiversity Action Plan 2023-2030

Ireland's 4th National Biodiversity Action Plan (NBAP) sets the national biodiversity agenda for the period 2023-2030 and aims to deliver the transformative changes required to the ways in which we value and protect nature. The 4th NBAP has been developed with the support, advice and input of the interdepartmental Biodiversity Working Group and the independent Biodiversity Forum. Ireland's 2nd National Biodiversity Conference was held to gather insights and recommendations for the development of the NBAP and a public consultation process was held to provide further opportunities to engage with the Plan.

The 4th NBAP strives for a "whole of government, whole of society" approach to the governance and conservation of biodiversity. The aim is to ensure that every citizen, community, business, local authority, semi-state and state agency has an awareness of biodiversity and its importance, and of the implications of its loss, while also understanding how they can act to address the biodiversity emergency as part of a renewed national effort to "act for nature".

The delivery of rehabilitation via PCAS is expected to significantly contribute in the future to actions and targets of the 4th National Biodiversity Action Plan 2023-2030, particularly in relation to peatland restoration, nature restoration and creation of new habitats such as wetlands and woodlands.

7 EU Nature Restoration Law

The EU Nature Restoration Law is a key element of the EU Biodiversity Strategy, which sets binding targets to restore degraded ecosystems, in particular those with the most potential to capture and store carbon and to prevent and reduce the impact of natural disasters. The regulation combines an overarching restoration objective for the long-term recovery of nature in the EU's land and sea areas with binding restoration targets for specific habitats and species. These measures should cover at least 20% of the EU's land and sea areas by 2030, and ultimately all ecosystems in need of restoration by 2050.

This regulation has now been adapted and it is expected that all Member States will be required to produce a National Restoration Plan within two years of adoption. This will be led by the National Parks and Wildlife Service and will comprise a broad and deep public participation process, informed by robust ecological and socio-economic impact assessments. Bord na Móna are working with NPWS to identify bog restoration and other re-wetted cutaway sites that can contribute towards Irelands targets for the Nature Restoration Law.

8 National conservation designations

Bord na Móna operates in a wider landscape that also includes a network of European and National nature conservation sites (Special Areas of Conservation (SACs), Special Protection Areas (SPAs), National Heritage Areas (NHAs, pNHAs) and National Nature Reserves). Bord na Móna will take account of this network of conservation objectives and their conservation objectives when developing these rehabilitation plans. It is expected that peatland rehabilitation will, in general, benefit the conservation objectives of this network of nature conservation sites.

9 National Raised Bog Special Area of Conservation Management Plan 2017-2022.

The National Raised Bog Special Area of Conservation Management Plan 2017-2022 sets out a roadmap for the long-term management, restoration and conservation of protected raised bogs in Ireland. The Plan strikes an appropriate balance between the need to conserve and restore Ireland's raised bog network as part of Ireland's commitments towards the EU Habitats Directive, and the needs of stakeholders and gives recognition to the important role that communities have to play in the conservation and restoration of raised bogs. The National Raised Bog Special Areas of Conservation (SACs) Management Plan 2017-2022 is part of the measures being implemented in response to the on-going infringement action against Ireland in relation to the implementation of the EU Habitats Directive, with regard to the regulation of turf cutting on the Special Areas of Conservation (SACs). The then Minister for Arts, Heritage and the Gaeltacht, also published a **Review of Raised Bog Natural Heritage Area Network** in 2014.

Bord na Móna has played a key role in the development of the National Raised Bog Special Area of Conservation Management Plan 2017-2022 and the Review of the Raised Bog Natural Heritage Area Network. Several Bord na Móna sites were assessed by the National Parks and Wildlife Service as part of the above Plan and Review and there is an expectation that several Bord na Móna sites will be designated as SACs and NHAs in the future. This will reinforce the network of protected raised bog sites and replace in part sites that will be de-designated as they have been deemed to be significantly damaged and are deemed to have no raised bog restoration prospects. PCAS is expected to restore several sites that will contribute to The National Raised Bog Special Areas of Conservation (SACs) Management Plan 2017-2022 targets in relation to the restoration of raised bog habitat.

Bord na Móna has also responded to the needs of the NRBMP and provided several sites to the government for the relocation of turf-cutters from SACs. This is part of a suite of ongoing bog conservation measures in the NRBMP to manage turf-cutting in protected sites. Bord na Móna and the National Parks and Wildlife Service continues to engage regarding the ongoing relocation of turf-cutters from protected raised bog sites.

10 All-Ireland Pollinator Plan 2021-2025

The All-Ireland Pollinator Plan 2021-2025 outlines key objectives and actions to protect and support pollinating insects and the habitats they rely on. A Bord na Móna specific action in this plan includes the adoption of pollinator-friendly management within the Bord na Móna network of sites. One action to help achieve this objective is habitat rehabilitation and restoration, where possible, of pollinator-friendly habitats, including peatland habitats.

11 Land-use planning policies

As Bord na Móna operates in many counties across Ireland, it is important to note the respective development plans in these counties. Many of the existing development plans recognise the potential that exists in the after-use of cutover/cutaway peatlands. Bord na Móna seeks to work with all of the relevant local authorities to ensure that the most appropriate after-uses are reflected in local planning policy. The following areas of consistent importance are of both direct and indirect relevance to Bord na Móna: heritage, tourism, biodiversity/conservation, landscape, renewable energy, and economy/enterprise.

12 National Archaeology Code of Practice

Bord na Móna operates under an agreed Code of Practice regarding archaeology with the Department of Arts, Heritage and the Gaeltacht and the National Museum of Ireland which provides a framework to enable the Company to progress peat extraction whilst carrying out archaeological mitigation. (https://www.archaeology.ie/sites/default/files/media/publications/cop-bord-na-mona-en.pdf

The Code replaced a set of Principles agreed with the Department of Arts, Heritage and the Gaeltacht in the 1990s. Under the Code Bord na Móna, the Minister and Director work together to ensure that appropriate archaeological mitigation is carried out in advance of peat extraction.

- BNM must ensure that any monuments or archaeological objects discovered during peat extraction are protected in an appropriate manner by following the Archaeological Protection Procedures.
- BNM must ensure that any newly discovered monuments on Bord na Móna lands are reported in a timely manner to the National Monuments Service of the Department of Arts, Heritage and the Gaeltacht.
- BNM must ensure that any archaeological objects discovered on Bord na Móna lands are reported immediately to the Duty Officer of the National Museum of Ireland.
- Bord na Móna will adhere to the Archaeology Code of Practice relating to management of any archaeological finds that may arise during cutaway peatland rehabilitation and decommissioning.

13 Bord na Móna Biodiversity Action Plan 2016-2021

Rehabilitation of industrial peatlands is a key objective of the Bord na Móna Biodiversity Action Plan 2016-2021. This action plan outlines the main objectives and actions around biodiversity on Bord na Móna lands. The Bord na Móna Biodiversity Action Plan also outlines key International and European policy in relation to biodiversity. This includes the **United Nations Convention on Biodiversity 2011-2020 (CBD)** and **European Biodiversity Strategy to 2020**. Further details of these policies and Bord na Móna s responses can be found in the Bord na Móna Biodiversity Action Plan (Bord na Móna, 2016). Both policy documents highlight targets such as reducing pressure on biodiversity, promoting sustainability, habitat restoration and benefits of ecosystem services.

One example of a key CBD target is:

- *"Restore at least 15% of degraded areas through conservation and restoration activities."*

The EUs headline target for progress by 2020 is to:

- *"halt the loss of biodiversity and the degradation of ecosystems in the EU by 2020, restore them as far as feasible, while stepping up the EU contribution to averting global biodiversity loss."*

This rehabilitation plan is aligned to the CBD target and the EU Biodiversity Strategy target and will help Ireland meet its commitment to these international Biodiversity polices.

14 Bord na Móna commitments

Bord na Móna made the commitment in 2009 not to develop any new peatland sites for industrial peat production. The company has continued to work with different stakeholders.

In line with Bord na Móna's accelerated decarbonisation programme, the company made a further commitment to a significantly larger rehabilitation target. This was reflected in our plans to rehabilitate a further 20,000 hectares of cutaway and cutover bog to wetland and woodland mosaics by 2025. In addition, we planned to restore a further 1,000 hectares of raised bog habitat by 2025. These initial targets have been achieved.

The company announced the cessation of industrial peat production in 2021 and that it would rehabilitate a target of 33,000 ha between 2021-2026 . Rehabilitation measures will continue to be carried out with the focus on re-wetting and rehabilitation of cutover and cutaway areas in line with national policies (such as the National Peatland Strategy, the National Biodiversity Action Plan, The Nature Restoration Law, the Climate Action Plan, the Water Framework Directive, etc.) and rehabilitation guidelines set down by the Environmental Protection Agency. Bord na Móna has now transitioned to a Climate Solutions company with a key commercial and development focus being the delivery of renewable energy to support Ireland's Climate Action Plan. In general, Bord na Móna will seek to balance and optimise commercial, social, and environmental value of its bogs, and develop integrated land-uses, while taking account of the need for sustainability and their biodiversity value.

These commitments outline the importance of peatland rehabilitation to Bord na Móna. The company will continue to demonstrate environmental responsibility and continue to deliver on these commitments in relation to peatland rehabilitation and in relation to the future management of these lands to maximise their benefits, particularly their ecosystem service benefits, along with the sustainable development of a portion of the land bank for other uses, such as renewable energy.

APPENDIX VII: DECOMMISSIONING

1. Condition 10 Decommissioning

Decommissioning is a requirement of the applicable Integrated Pollution Control Licence issued by the Environmental Protection Agency. This condition 10.1 requires the following:

10.1 Following termination of use or involvement of all or part of the site in the licensed activity, the licensee shall:

10.1.1 Decommission, render safe or remove for disposal/recovery, any soil, subsoils, buildings, plant or equipment, or any waste, materials or substances or other matter contained therein or thereon, that may result in environmental pollution.

The main success criteria pertaining to successfully complying with this condition is ensuring that no environmental liability remains from this infrastructure and material and that the bog can be deemed suitable for surrender of the licence under section 95 of the EPA Acts. This is achieved by Bord na Móna identifying and quantifying any mechanical and infrastructural resources that were installed in the bog to enable the development and production operation at the site. This list is then refined to identify any items that would be deemed as possibly resulting in environmental pollution, should they not be removed.

Typically, these items/infrastructures would be any remaining, unconsolidated plant, equipment and attachments, waste materials, unused raw materials such as land drainage pipes, remaining peat stockpiles, stock pile covering, pumps, septic tanks and fuel tanks.

In relation to this bog, the list and tasks would be as follows:

Item	Description	Ballybeg/Lanespark/Derryvella Decommissioning Plan
1	Clean-up of remaining or unconsolidated waste or materials located in Bogs, Yards, Buildings and Offices	Clean-up of Bog
2	Cleaning Silt Ponds	Cleaning Silt Ponds
3	Decommissioning Peat Stockpiles	Peat Stockpile Management
4	Decommissioning or Removal of Buildings and Compounds	Decommissioning or Removal of Buildings and Compounds
5	Decommissioning Fuel Tanks and associated facilities	Where relevant
6	Decommissioning and Removal of Bog Pump Sites	Where relevant
7	Decommissioning or Removal of Septic Tanks	Where relevant

In addition, condition 7 of the licence requires these now defined waste items to be disposed of or recovered as follows:

7.1 Disposal or recovery of waste shall take place only as specified in *Schedule 2(i) Hazardous Wastes for Disposal/Recovery* and *Schedule 2(ii) Other Wastes for Disposal/Recovery* of this licence and in accordance with the appropriate National and European legislation and protocols. No other waste shall be disposed of/recovered either on-site or off-site without prior notice to, and prior written agreement of, the Agency.

7.2 Waste sent off-site for recovery or disposal shall only be conveyed to a waste contractor, as agreed by the Agency, and only transported from the site of the activity to the site of recovery/disposal in a manner which will not adversely affect the environment.

7.3 A full record, which shall be open to inspection by authorized persons of the Agency at all times, shall be kept by the licensee on matters relating to the waste management operations and practices at this site. This record shall as a minimum contain details of the following:

7.3.1 The names of the agent and transporter of the waste.

7.3.2 The name of the persons responsible for the ultimate disposal/recovery of the

waste.

7.3.3 The ultimate destination of the waste.

7.3.4 Written confirmation of the acceptance and disposal/recovery of any hazardous waste consignments sent off-site.

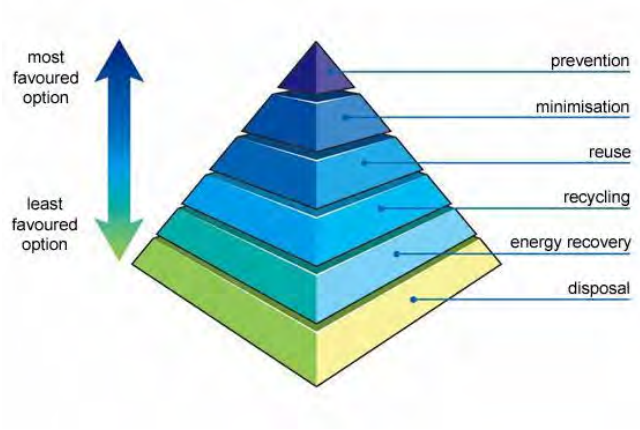
7.3.5 The tonnages and EWC Code for the waste materials listed in *Schedule 2(i) Hazardous Wastes for Disposal/Recovery* and *Schedule 2(ii) Other Wastes for Disposal/Recovery* sent off-site for disposal/recovery.

7.3.6 Details of any rejected consignments.

A copy of this Waste Management record shall be submitted to the Agency as part of the AER for the site.

As required by the licence, these waste items will be removed for recycling or disposal, using external contractors with the required waste collection permits, approved under 7.2, with waste records maintained as required under 7.3.

Where possible, Bord na Móna will utilize the appropriate waste hierarchy to identify waste that can reused or recycled ahead of disposal.



The validation of the success of condition 10.1 is carried out through an Independent Closure Audit (ICA), followed by and EPA Exit Audit (EA) and the eventual partial or full surrender of the licence.

2. Enhanced Decommissioning.

The remaining infrastructure does not constitute a risk to the environment and would not be a requirement of condition 10 of the licence. The removal of these are deemed as enhanced measures. These may enhance the future after use of the bog for amenity value, security against access for illegal and unsocial activities and general State and community benefit. In relation to this bog, this would include the infrastructure defined below:

Item	Enhanced Decommissioning Type	Ballybeg/Lanespark/Derryvella Decommissioning Plan
1	Removal of Railway Lines	Removal of Railway Lines
2	Decommissioning Bridges and Underpasses	Where Applicable
3	Decommissioning Railway Level Crossing	Where Applicable
4	Restricting Access (bogs and silt ponds)	Restricting Access to Bog
5	Removal of High Voltage Power Lines	Where Applicable

APPENDIX VIII: GLOSSARY

Cutaway Bog: A Bord na Móna site generally becomes cutaway when it is economically unviable to continue industrial peat extraction or when the majority of peat has been removed.

Deep peat cutover bog. Deep peat cutover bog is defined as former raised bogs that have been in industrial peat production, where production has ceased but the residual peat depth is typically in excess of 2m. *Sphagnum* mosses are key species of raised bogs and the majority of the peat mass is formed from these mosses. *Sphagnum* species and other raised bog species are a key part of raised bog habitat function and prefer more acidic, nutrient poor, water-logged conditions. Typical raised bog *Sphagnum* mosses and other bog species do not thrive with the more typical alkaline water chemistry of cutaway bog but do grow well in these more acidic conditions where peat has been re-wetted. There is potential to re-develop *Sphagnum*-rich plant communities in these conditions if the peat can be re-wetted. This brings the opportunity of re-developing *Sphagnum*-rich vegetation communities that are considered Carbon sinks or peat-forming habitats and restoring the carbon sequestration function of these sites.

Dry cutaway bog: Cutaway bog is categorised as dry cutaway where it is not practical or feasible to re-wet these areas completely. It is inevitable that some areas of cutaway will remain relatively dry due to the heterogenous topography of the cutaway, as well as requirements for continued drainage on site for identified after-uses, or off site in relation to neighbouring lands or other infrastructure. Ridges and mounds of glacial deposits can become exposed during peat extraction and form a heterogenous topographical mosaic separated by basins. Dry cutaway may have very thin or no residual peat where ridges and mounds have been exposed. The exposed sub-soils are a mix of glacial gravels, muds and tills that can be quite free-draining. Dry cutaway may also have deeper residual peat, but in a location (i.e. at the margin) where the peat cannot be re-wetted due to boundary constraints. Dry cutaway may also develop in situations where there a relatively steep slope that inhibits re-wetting. The majority of dry cutaway will develop towards grassland, heath, scrub and dry woodland habitats.

Enhanced decommissioning: This is defined as decommissioning carried out under the Scheme, which is proposed to be externally funded.

Enhanced rehabilitation: This is defined as rehabilitation carried out under Scheme, which is proposed to be externally funded. It is proposed by Government that Bord na Móna be obligated to carry out enhanced decommissioning, rehabilitation and restoration on peatlands. This Scheme will significantly go beyond what is required to meet rehabilitation and decommissioning obligations under existing EPA IPC licence conditions. Interventions and activities supported by the Scheme will ensure that environmental stabilisation is achieved (meaning IPC obligations are met), and importantly, significant additional benefits, particularly relating to climate action and other ecosystem services, will also be delivered. However, only the costs associated with the additional, enhanced and accelerated measures, i.e., those interventions which go beyond the existing decommissioning and rehabilitation requirements arising from Condition 10 will be eligible for support under the Scheme.

Environmental stabilisation: The key objective of peatland rehabilitation is environmental stabilisation. This means developing habitats and vegetation back onto the bare peat, slowing water movement across the bog, minimising effects to downstream waterbodies and meeting the conditions of the IPC Licence. This is achieved by a combination of re-wetting, where possible, and natural colonisation of the former cutaway, with or without intervention**.** Habitats will develop that reflect the underlying environmental conditions. Other after-use development may also serve to act as environmental stabilisation.

Marginal land. Marginal land is defined as land around the margin of the industrial peat production area. This margin generally contains a range of habitats including scrub, birch woodland, cutover bog and raised bog remnants. It has a variety of land-uses including turf-cutting (private turbary). The Scheme will consider potential rehabilitation and restoration actions (e.g. drain blocking) within marginal land zones, where appropriate.

Rehabilitation: Rehabilitation is defined in general by Bord na Móna as environmental stabilisation of the former cutaway. This is generally achieved via re-wetting, where possible, and natural colonisation of the former cutaway, with or without intervention. It is not possible to restore raised bog habitats on BnM cutaway in general in the short-term. In general, most of the peat mass has been removed from many BnM cutaway sites and the environmental characteristics of these areas have therefore changed radically (peat depths, hydrology, water chemistry, substrate type, nutrient status. This means there will therefore be different habitat outcomes (wetlands, fen, heathland, grassland and Birch woodland). Other after-use development may also serve to act as rehabilitation.

Restoration: Ecological restoration is defined as the process of re-establishing to the extent possible the structure, function and integrity of indigenous ecosystems and the sustaining habitats they provide" (SER, 2004). Defined in this way, restoration encompasses the repair of ecosystems (Whisenant, 1999) and the **improvement of ecological conditions in damaged wildlands** through the **reinstatement of ecological processes**. In general, Bord na Móna cutaway peatlands cannot be restored back to raised bog in a reasonable timeframe as their environmental conditions has changed so radically (with the removal of the acrotelm – the living layer and much of the peat mass). However, they can be returned to a **trajectory** towards a naturally functioning peatland system (Renou-Wilson, 2012). **Raised bog restoration** is an objective of some BnM sites where there is residual natural raised bog vegetation and where the majority of the peat is still intact.

Standard rehabilitation: This is defined as rehabilitation that is designed to meet the conditions of the EPA IPC Licence. The key objective of rehabilitation is environmental stabilisation. This is achieved by a combination of re-wetting, where possible, and natural colonisation of the former cutaway, with or without intervention**.** Other after-use development may also serve to act as rehabilitation.

Standard decommissioning: This is defined as decommissioning that is designed to meet the conditions of the EPA IPC Licence. This is defined as to render safe or remove for disposal/recovery, any soil, subsoils, buildings, plant or equipment, or any waste, materials or substances or other matter contained therein or thereon, that may result in environmental pollution.

Wetland cutaway bog. Wetland cutaway bog is defined as former raised bogs that have been in industrial peat production, where production has ceased and the majority of peat has been cutaway, and where this cutaway has the potential to be re-wetted. A significant number of Bord na Móna sites have pumped drainage and these sites are likely to develop a mosaic of wetland habitats when pumping in reduced or stopped. The water chemistry of wetland cutaway frequently is strongly influenced by the more alkaline sub-soils that have been exposed during peat production. This means that pioneer vegetation is more typical of fen and wetland, rather than raised bog. Wetland cutaway will have a broad range of hydrological conditions depending on the local topography. In some cases, these wetlands may form deep water (> 0.5 m) whilst other areas may have the water table at or just below the surface of the ground.

APPENDIX IX: EXTRACTIVE WASTE MANAGEMENT PLAN

(Minimisation, treatment, recovery and disposal)

Objective:
The objective of this generic plan is to comply with the requirements of regulation 5 of the Waste Management (Management of Waste from Extractive Industries) Regulations, and to prevent or reduce waste production and its harmfulness.

Scope:
This plan covers IPPC Licence's Ref PO-499-01, Littleton Group of Bogs located in Counties Kilkenny and Tipperary.

1.0 Extractive Waste:
Waste classified as extractive waste from peat extraction operations arise from three operations associated with this activity.

1.1 Silt Pond excavations and maintenance.
All peat extraction activities in the Littleton bog group are serviced by silt lagoons/ponds. During the excavation of these silt ponds, pre IPPC Licensing in 1999 and since licensing, the excavated material is stored adjacent to the silt pond, where it either remains in situ ores levelled out. As required by condition 6.6, these silt lagoons are cleaned twice per annum or more often if inspections dictate. These silt cleanings are also deposited on the same location, adjacent to the silt pond, where they may be levelled periodically to allow room for subsequent cleanings. These mounds of silt pond excavation material and cleanings are generally no higher that 2-3 metres.

1.2 Bog Timbers:
During peat extraction operations, bog timbers often arise in the bog surface and are required to be cleared. These timbers consist of bog pine, oak and some yew. Some of these timbers, such as the oak and yew are removed for use in the wood craft industry, with the remaining bog pine stockpiled in locations at the opposite end of each bog, where it generally becomes a habitat for flora and fauna. These piles of timber are generally no higher than 1-2 metres.

2.0 PO-499-01 IPPC Licence Extractive Waste Conditions

2.1 Condition 7.5 Extractive Waste Management
The licensee shall draw up a Waste Management Plan (to be known as an Extractive Waste Management Plan) for the minimisation, treatment, recovery and disposal of extractive waste. This Plan shall meet the requirements of regulation 5 of the Waste Management (Management of Waste from the Extractive Industries) Regulations,2009. The Plan shall be submitted for agreement by the Agency by the 31st of December 2012. The Plan shall be reviewed at least once every five years thereafter in a manner agreeable to the Agency and amended in the event of substantial changes to the operation of a waste facility or to the waste deposited. Any amendments shall be notified to the Agency.
All extractive waste shall be managed in accordance with the Extractive Waste Management Plan. A report on the implementation of the Extractive Waste Management Plan shall be provided in the AER.

2.2 Condition 7.6 Waste Facility

(i) No new waste facility may be developed or an existing waste facility modified unless agreed by the Agency.
(ii) The licensee shall ensure that all existing waste facilities are managed and maintained to ensure their physical stability and to prevent pollution or contamination of soil, air, surface water or groundwater.
(iii) The licensee shall ensure that all new waste facilities are constructed, managed and maintained to ensure their physical stability and to prevent pollution or contamination of soil, air, surface water or groundwater.
(iv) Operational measures shall be continuously employed to prevent damage to waste facilities from personnel, plant or equipment.
(v) The licensee shall establish and maintain a system for regular monitoring and inspection of waste facilities.
(vi) All records of monitoring and inspection of waste facilities, as required under the licence, shall be maintained on-site in order to ensure the appropriate handover of information in the event of a change of operator or relevant personnel.

2.3 Condition 7.7 Excavation Voids

7.7.1 Unless otherwise agreed by the Agency, only extractive waste shall be placed in excavation voids.
7.7.2 When placing extractive waste into excavation voids for rehabilitation and construction purposes, the licensee shall, in accordance with regulation 10 of the Waste Management (Management of Waste from the Extractive Industries) Regulations, 2009, and the Extractive Waste Management Plan:

- Secure the stability of the waste
- Put in place measures to prevent pollution of soil, surface water and ground water.
- Carry out monitoring of the extractive waste and excavation void.

Condition 7.5. Extractive Waste Management Plan. 5 (1)

3.0 Minimisation.

3.1 Silt pond excavation material and cleanings.

IPPC Licence conditions require all production areas to be serviced by an appropriately designed silt pond based on storage volume and retention time. Condition 6.6 requires all ponds to be cleaned bi-annually and more often if inspections dictate, so the only opportunity for minimisation of same is through Standard Operating Procedures. These are required under condition 2.2.2 (i) regarding minimisation of suspended solids, and are in-place to minimise the generation of silt, which in-turn will minimise the generation of silt pond waste.

3.2 Power Station Screenings.

These screenings cannot be minimised as they are a consequence of peat production, stones, timbers and oversize peat materials are naturally occurring on the bog, and are required to be removed prior to processing.

3.3 Bog Timbers.

Bog timbers are also naturally occurring materials within a bog and are required to be removed prior for production. The volume of these bog timbers varies from bog to bog and as such their minimisation is not controllable or quantifiable.

4.0 Treatment

4.1 Silt pond excavation material and cleanings.

The silt pond excavation material and silt cleanings do not require any treatment for its end use which will be either backfilling these silt pond voids as per condition 7.7.1 above as part of the Bog Rehabilitation Plan, or reincorporated into the surrounding peatlands.

4.2 Power Station Screenings.

The factory screenings are permitted to be returned to the bog as they were naturally occurring materials from the bog, and as such do not require any treatment to serve this purpose.

4.3 Bog Timbers

As per 1.3 above, these timbers are stockpiled at two locations in each bog, as per the attached list of sites and become habitats for various flora and fauna.

5.0 Recovery

5.1 Silt pond excavation material and cleanings.

Condition 2.2.2 (vi) requires the reuse of silt pond waste to be examined. This was undertaken in 2006, the outcome of which was that this waste peat silt material, as a fuel, was contaminated with sub-soils, rendering it unsuitable for combustion. In addition, volumes are small compared to overall peat production volumes.

5.2 Power Station Screenings.

Given the nature of these screenings as outlined in 1.2 above, there is no further use identified and they are permitted to be disposed of back to the bog.

5.3 Bog Timbers

Investigations into processing these materials into smaller fractions for potential heating purposes did not yield any viable results. In addition, these older stockpiles are now classified as habitats and as such would not be considered for reuse as a fuel.

6.0 Disposal

6.1 Silt pond excavation material and cleanings.

Schedule 3 (ii) permits the disposal of silt pond cleanings (Lagoon Sediments) to the bog and these locations, adjacent to the silt pond site, are presented in the attached spreadsheet, with associated grid coordinates.

6.2 Power Station Screenings.

Schedule 3 (ii) permits the disposal of screenings (Peat Screenings) to the bog at designated locations agreed under Condition 7.4, and these locations, are presented in the attached spreadsheet, with associated grid coordinates.

6.3 Bog Timbers

These naturally occurring bog timbers are stockpiled at locations in each bog, grid coordinates attached.

7.0 Extractive Waste Management Plan

5 (2a)(i)

The vast majority of peat extraction bogs were all designed and drained for production prior to the 1960's and as such the production fields layout cannot' be altered. Under our Cleaner Reduction Procedures, various design

changes have been implemented to the production machines and process to reduce lost peat which eventually is captured in the silt ponds and requires removal as waste peat silt. This along with training and ongoing research and development will continuously reduce waste peat and subsequently waste silt pond cleanings. Bog timbers are present naturally in various volumes and quantities in different bogs and as peat production involves stripping peat in layers, the exposure, generation and removal of these timbers is unavoidable. Work has been undertaken recently into project looking at grinding of these bog timbers in situ using a timber miller, and if this project becomes viable it will contribute to the reduction of bog timbers.

5 (2a)(ii)

Given the nature and expanse of peat bogs, the stockpiling and storage of these waste materials do not present a visual, storage or stability problem. As required under Condition 10 of the IPPC Licence, the silt pond excavations and screenings will be utilised to backfill the silt pond voids once the bogs have finished and stabilised in accordance with out Bog Rehabilitation Plan. Storage of these wastes in the interim, open to the elements does not present a change on the nature of these wastes that will threaten the environment or prevent their reuse during the bog rehabilitation process.

5 (2a)(iii)

Under Condition 10 of the IPPC Licence, all silt ponds will be decommissioned once the bog surface has stabilised, in agreement with the Agency. This will involve the removal of weirs and flow controls, returning the silt pond back to its original drain or removing the silt pond from the drainage system. Both of these activities will involve placing the silt pond extraction and cleaning material back into the excavation void.

5 (2a)(iv)

The peat bogs do not contain any topsoil, so this is not required.

5 (2a)(v)

Peat mineral resources do not undergo any treatment.

5 (2b)

These three extractive waste are all being reused and recovered back to their original extraction points and have not undergone any physical, chemical, or biological change.

5 (2c)(i, ii & iii)

These three extractive wastes, stored on the bog for reuse or recovery during the bog rehabilitation phase, do not require any management or monitoring during the operation of these bogs. Silt pond excavations and cleanings are stored adjacent to the silt pond and quickly revegetated and stabilise, the screenings are graded back into the bog at the agreed locations upon disposal and the bog timbers do not prevent any water or airborne danger to the environment.

5 (3)

The three extractive wastes arising from peat extraction operations at this site are classified wastes from mineral non-metalliferous excavation, with an EWC code of 0101 02. The materials are not classified as hazardous under Directive 91/689/EEC20, and do not contain substances or preparations classified as dangerous under Directives 67/548/EEC5 or 1999/45/EC6 above a certain threshold.

The peat excavations and cleanings are stored in locations and in a manner that they could not collapse, and are remote in their nature. The stockpiles are located adjacent to silt ponds that are cleaned regularly and as such these stockpiles are managed and levelled to facilitate further cleanings.
Therefore the material stored at these waste facilities would not be considered to be a Category A waste facility.

Classification in accordance Annex II.

Waste Material	Description	Classification	Chemical Process treatment	Deposition description	Transport System
Silt Pond Excavations and cleanings	Peat and mineral soils associated with peatlands. Stored for reuse during bog rehabilitation, with no displacement of overburden	01 01 02	None	Excavated from silt ponds by excavator and deposited adjacent to the silt pond.	Excavator
Peat Screenings	Stones, timbers and oversized peat particles, reincorporated into low areas, agreed with the Agency, and stabilized under normal natural bog conditions	01 01 02	None	Removed by screen at the factory and transported by tractor and trailer to the designated and agreed locations	Tractor and trailer.
Bog Timbers	Pine, Oak and Yew species, stored at locations in each bog. Not subject to any stability issues due to exposure to atmospheric/meteorological conditions.	01 01 02	None	Removed from the bog surface by excavator and transported by tractor and trailer to the agreed locations	Tractor and Trailer

Description of operations.
Silt pond excavations arise from the requirement to have silt ponds treating all peat extraction sites. Silt pond cleanings arise from the removal of peat silt from silt ponds as required under IPPC Licence. Bog timbers arise from preparation of the bogs surface for peat production. Estimated quantities of materials are below:

Closure plan. (Bog Rehabilitation Plan).
Condition 10.1 – 10.3 of the IPPC Licence requires the following:

- 10.1 Following termination of use or involvement of all or part of the site in the licensed activity, the licensee shall:
- 10.1.1 Decommission, render safe or remove for disposal/recovery, any soil, subsoils, buildings, plant or equipment, or any waste, materials or substances or other matter contained therein or thereon, that may result in environmental pollution.
- 10.1.2 Implement the agreed cutaway bog rehabilitation plan (refer Condition 10.2).

10.2 Cutaway Bog Rehabilitation Plan:

- 10.2.1 The licensee shall prepare, to the satisfaction of the Agency, a fully detailed and costed plan for permanent rehabilitation of the cutaway boglands within the licensed area. This plan shall be submitted to the Agency for agreement within eighteen months of the date of grant of this licence.
- 10.2.2 The plan shall be reviewed every two years and proposed amendments thereto notified to the Agency for agreement as part of the AER. No amendments may be implemented without the written agreement of the Agency.

10.3 The Rehabilitation Plan shall include as a minimum, the following:

- 10.3.1 A scope statement for the plan; to include outcome of consultations with relevant Agencies, Authorities and affected parties (to be identified by the licensee).
- 10.3.2 The criteria which define the successful rehabilitation of the activity or part thereof, which ensures minimum impact to the environment.
- 10.3.3 A programme to achieve the stated criteria.
- 10.3.4 Where relevant, a test programme to demonstrate the successful implementation of the rehabilitation plan.
- 10.3.5 A programme for aftercare and maintenance.

10.4 A final validation report to include a certificate of completion for the Rehabilitation Plan, for all or part of the site as necessary, shall be submitted to the Agency within six months of execution of the plan. The licensee shall carry out such tests, investigations or submit certification, as requested by the Agency, to confirm that there is no continuing risk to the environment. This plan including maps and ecological classifications are available on file at the Allen Clonsast IPPC Licence Coordinators office.

The location in relation to the silt pond excavations and cleanings are adjacent to the silt ponds, which are considered under the Shannon River Basin Management Plan in accordance with the requirements of Directive 2000/60/EC.

Screenings and bog timbers are all naturally occurring elements of peatland and there placement back to the bog in smaller concentrated designated waste facilities does not constitute a risk to the prevention of water compliance.

The lands under where these materials are deposited are peatlands and are un-effected by the placing of this material.

Review.

This plan will be reviewed every five years, the first review to take place in September 2017. This review will entail an inspection of these waste facilities to ensure their placing, management, maintenance and stability comply with the requirements of the Extractive Waste Management requirements and condition 7.5, 7.6 and 7.7 of the Littleton IPPC Licence PO-499-01.

APPENDIX X: MITIGATION MEASURES FOR THE APPLICATION OF FERTILISER

- Any fertiliser used will be Rock Phosphate and will not be applied in the following conditions:
    1. The land is waterlogged;
    2. The land is flooded, or it is likely to flood;
    3. The land is frozen, or covered with snow;
    4. Heavy rain is forecast within 48 hours (forecasts will be checked from Met Éireann).
    5. The ground slopes steeply and there is a risk of water pollution, when factors such as surface run-off pathways, the presence of land drains, the absence of hedgerows to mitigate surface flow, soil condition and ground cover are taken into account.
- No fertiliser will be spread on land within 2 metres of a surface watercourse.
- Buffer zones in respect of waterbodies, as specified on https://www.epa.ie/about/faq/name,57156,en.html, will be adhered with at all times with regard to fertiliser application. Reproduced as follows:

Water body / Feature	Buffer zone
Any water supply source providing 100m^3 or more of water per day, or serving 500 or more people	200 metres (or as little as 30 metres where a local authority allows)
Any water supply source providing 10m^3 or more of water per day, or serving 50 or more people	100 metres (or as little as 30 metres where a local authority allows)
Any other water supply for human consumption	25 metres (or as little as 30 metres where a local authority allows)
Lake shoreline	20 metres
Exposed cavernous or karstified limestone features (such as swallow holes or collapse features)	15 metres
Any surface watercourse where the slope towards the watercourse exceeds 10%	10 metres
Any other surface waters	5 metres*

APPENDIX XI: CONSULTATION SUMMARIES

Table APXI -1 Consultees contacted. ***Note: This includes consultation undertaken as part of the Phase 1 rehabilitation plan.***

Bog Name	Contact Organisation	Contact Name	Date of Issue	Format	Date Response Received	Response Format
Consultation undertaken in 2017-2018						
Ballybeg-Lanespark-Derryvella	Private individual A					
Littleton Bog Group	Irish Peatland Conservation Council	Several staff members				
Ballysorrell, Templetouhy, Baunmore	National Parks and Wildlife Service	Several staff members				
Lanespark	Private individual B					
Ballysorrell, Carrickhill Baunmore	NUIG	Several staff members				
Littleton Bog Group	Private individual C					
Derryvilla	Slieve Ardagh Rural Development Group	Several members				
Littleton Bog Group	National Parks and Wildlife Service	Regional staff				
Littleton Bog Group	General community meeting – Loch Doire Bhile, site visit to Baunmore					
Littleton Bog Group	National Parks and Wildlife Service	Regional staff				
Littleton Bog Group	Tipperary County Council	Heritage Officer				
Derryvilla	Private Individual D					
Littleton Bog Group	Birdwatch Ireland	Several staff members				
Littleton Bog Group	Irish Peatland Conservation Council	Several staff members				
Littleton Bog Group	Kilkenny County Council	Heritage Officer				
Littleton Bog Group	National Parks and Wildlife Service	Several staff members				
Littleton Bog Group	Irish Peatland Conservation Council	Several staff members				
Littleton	Forest Service	Several staff members				
Baunmore & Littleton	Birdwatch Ireland – Tipperary Branch	Several staff members				
Littleton Bog Group	Tipperary County Council	Several staff members				

Bog Name	Contact Organisation	Contact Name	Date of Issue	Format	Date Response Received	Response Format
Littleton Bog Group	Tipperary Heritage Forum	Several staff members				
Knockahaw	Private Individual E					
Littleton Bog Group	Environmental Protection Agency, National Parks and Wildlife Service, Irish Peatland Conservation Council	Several staff members				
Baunmore	Irish Wildlife Trust	Several staff members				
Lanespark Derryvilla	National Parks and Wildlife Service and Slieve Ardagh Rural Development Group – Loch Doire Bhile	Several staff members				
Longfordpass	Private Individual F					
Ballysorrell	Heritage Week Walk - Ballysorrell	Several staff members				
Baunmore Carrickhill	Limerick Institute of Technology (LIT)	Several staff members				
Consultation undertaken in 2025						
Ballybeg-Lanespark-Derryvella	Department of Housing, Local Government and Heritage NPWS	General email contact	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella		General email contact	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella		General email contact	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella		General email contact	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella		General email contact	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella		General email contact	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella		General email contact	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella		General email contact	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella		General email contact	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella		General email contact	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella		General email contact	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Department of Agriculture, Food and the Marine	General email contact	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella		General email contact	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Head of Ecological Advisory Unit - NPWS	General email contact	23/07/2025	Email		

Bog Name	Contact Organisation	Contact Name	Date of Issue	Format	Date Response Received	Response Format
	Department of Housing, Local Government and Heritage NPWS					
Ballybeg-Lanespark-Derryvella	National Monuments Service	General email contact	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella		General email contact	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Department of Housing, Local Government and Heritage	General email contact	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Department of Housing, Local Government and Heritage	General email contact	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Dept of Agriculture Food & the Marine	General email contact	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella		General email contact	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Department of Climate, Energy and the Environment	General email contact	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella		General email contact	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella		General email contact	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella		General email contact	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella		General email contact	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella		General email contact	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Dept of Rural and Community Development	Minister Dara Calleary	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Department of the Housing Local Government and Heritage	(Minister of State at the Department of Housing, Local Government and Heritage) Minister James Browne	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Minister of state for Agriculture with responsibility for Land use and Biodiversity	Senator Pippa Hackett Minister of State for Land Use and Biodiversity)	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Minister of State with responsibility for Nature, Heritage and Biodiversity	Christopher O'Sullivan TD	23/07/2025	Email	24/07/2025	Email
Ballybeg-Lanespark-Derryvella	Iarnród Éireann/Irish Rail	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	An Taisce	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Environmental Protection Agency (EPA)	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Inland Fisheries Ireland	General email	23/07/2025	Email		

Bog Name	Contact Organisation	Contact Name	Date of Issue	Format	Date Response Received	Response Format
Ballybeg-Lanespark-Derryvella	Local Authority Waters Programme (West and Border Region)	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Local Authority Waters Programme	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella		General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Local Authority Waters Programme (Midlands and Eastern Region)	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Northern and Western Regional Assembly (NWRA)	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	National Museum of Ireland	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Teagasc	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	The Heritage Council	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Waterways Ireland	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	An Forum Uisce (The Water Forum)	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Coillte	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Irish Water- Water Supply Project Eastern and Midlands Region	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Uisce Éireann (formerly Irish Water)	General email	23/07/2025	Email	12/08/2025	Email
Ballybeg-Lanespark-Derryvella	Office of Public Works (OPW)	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	CARO (Climate Action Regional Office) Eastern and Midlands	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Bat Conservation Ireland	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Birdwatch Ireland	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Butterfly Conservation Ireland	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Eastern and Midland Regional Assembly	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Friends of the Irish Environment	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	ICMSA (Irish Creamery Milk Suppliers Association)	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	ICSA (Irish Cattle and Sheep Farmers Association	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Irish Environmental Network (Agriculture and Land Use Policy and Advocacy Officer)	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Irish Farmers Association	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Irish Farmers Association (Senior Policy Exec)	General email	23/07/2025	Email		

Bog Name	Contact Organisation	Contact Name	Date of Issue	Format	Date Response Received	Response Format
Ballybeg-Lanespark-Derryvella	Irish Farmers Association (Galway/Leitrim/Longford/Roscommon/Sligo)	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella		General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Irish Peatlands Conservation Council (IPCC)	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Irish Raptor Study Group	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Irish Rural Link	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Irish Wildlife Trust	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Inland Waterways Association of Ireland (IWAI)	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	National Association of Regional Game Councils	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	National Association of Regional Game Councils	Chairperson	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	NPWS Rangers North Midlands	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	NUIG Galway	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	PPN Roscommon Public Participation Network	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Outdoor Recreation NI	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Ranger Association Committee	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Mid-Shannon Wilderness Park Awareness Group	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Sustainable Water Action Network (SWAN)	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Trinity College Dublin	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Turf Cutters and Contractors Association	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	UCD / Irish Rural Link	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	University College Dublin	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Earthy Matters	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Waterways Ireland	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Waterways Ireland Org	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Woodlands of Ireland	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	University of Galway	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Iarnrod Eireann (Infrastructure)	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Iarnrod Eireann	General email	23/07/2025	Email		

Bog Name	Contact Organisation	Contact Name	Date of Issue	Format	Date Response Received	Response Format
Ballybeg-Lanespark-Derryvella	Tipperary County Council, General Address	General email	23/07/2025	Email	21/09/2025	Email
Ballybeg-Lanespark-Derryvella	Senior Executive Officer, Nenagh Municipal District Administrator	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Senior Executive Officer, Corporate Services	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Chief Executive	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Director of Services, roads and transportation, Health and Safety	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Director of Services, Economic and Rural Development (including just Transition)	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Director of Services, Environment and Climate Action.	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Director of Services, Local Authorities Water Programme (LAWPRO)	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Alan Kelly TD	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Michael Lowry TD	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Ryan O Meara TD	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Seamus Healy TD	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Mattie McGrath TD	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Michael Murphy TD	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Cllr Sean Ryan	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Cllr Shane Lee	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Cllr Siobhan Ambrose	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Cllr William Kennedy	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Cllr Michael O Meara	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Cllr Michael Smith Cathaoirleach	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Cllr Micheal Anglim	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Cllr Micheal Lowry Leas Chaoirleath	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Cllr Niall P Dennehy	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Cllr Pamela Quirke O Meara	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Cllr Pat English Deputy Mayor Clonmel BD	General email	23/07/2025	Email		

Bog Name	Contact Organisation	Contact Name	Date of Issue	Format	Date Response Received	Response Format
Ballybeg-Lanespark-Derryvella	Cllr Peggy Ryan	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Cllr Richie Molloy	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Cllr Roger Kennedy Leas Chathaoirleach	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Cllr Ryan O Meara	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Cllr Seamus Morris Leas Chathaoirleach	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Cllr John Fitzgerald	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Cllr John O Heney	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Cllr Kay Cahill Skehan	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Cllr Kieran Bourke	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Cllr Liam Browne	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Cllr Louise Morgan Walsh	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Cllr Mairin McGrath	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Cllr Marie Murphy	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Cllr Mark Fitzgerald Cathaoirleach	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Cllr Mary Hanna Hourigan	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Cllr Michael Brennan	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Cllr Micheal Murphy Mayor-Clonmel BD	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Cllr Jim Ryan	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Cllr Joe Hannigan	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Cllr John Carroll	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Cllr John Crosse Cathaoirleach	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Cllr Eddie Moran	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Cllr Fiona Bonfield Cathaoirleach	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Cllr Amy Goldsboro	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Cllr Declan Burgess Cathaoirleach	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Cllr Dr Phyll Bugler	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Cllr David Dunne	General email	23/07/2025	Email		

Bog Name	Contact Organisation	Contact Name	Date of Issue	Format	Date Response Received	Response Format
Ballybeg-Lanespark-Derryvella	Cllr Anne Maire Ryan-(Shiner)	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Cllr Tom Acheson	General email	23/07/2025	Email		
Ballybeg-Lanespark-Derryvella	Cllr JP O'Meara	General email	23/07/2025	Email		

APXI -2 Response summary from Consultees contacted (*Note: This includes consultation undertaken as part of the Phase 1 rehabilitation plan).*

Organisation	Summary of Response by Stakeholder	BnM Response
NPWS 8/3/2018	Ballysorrell All walked over the bog and viewed the bog restoration works. MCC outlined work carried out so far and work planned for the future. Planned work is > 75% complete. NPWS staff very complementary of the bog restoration work (drain-blocking with peat dams) carried out so far. All agreed that the bog had significant potential for bog restoration, and future nature conservation. Signs that the bog is already re-wetting in places due to drain-blocking. Discussions about potential for designation of the site for nature conservation by NPWS in future. Review and discussion of NPWS degraded raised bog model outputs for Ballysorrell. Model predicted that 9 ha would have potential for development into active raised bog in the future. General view was that this was probably an under-estimate and that the model likely to be affected by the intensive BnM drainage network. Discussion of potential measures to further increase re-wetting of the bog including berms across high bog at southern section. Bruckana All visited the Bruckana Windfarm. Viewed a cutaway bog area within the windfarm complex where there has been significant natural colonisation for at least 20 years and some targeted hydrological management. Discussion of the former history of Templetuohy Bog as a sod turf production bog. Sod turf cutaway tends to have deeper remnant peat, which in turn can develop Sphagnum-rich vegetation, where conditions suit. Attendees viewed some wet cutaway where there has been some Sphagnum colonisation. Discussion of environmental conditions that led to the development of this specific vegetation type. Discussion of potential to re-wet similar cutaway, with similar environmental conditions and deeper peat, to encourage development of Sphagnum-rich peat-forming vegetation. Discussion of different constraints and opportunities for this type of re-wetting. This Sphagnum-rich peat-forming vegetation only has potential to develop in certain environmental conditions in association with deeper peat. NPWS staff suggested that intensive bunding would have potential to increase the overall re-wetted area. There was general discussion of potential larger project opportunities, in association with planned BnM rehabilitation or future BnM afteruse development. These larger projects could potentially focus on GHG emission reduction, creation of peat-forming habitats, biodiversity enhancement, other ecosystem services enhancement/restoration. Baunmore All visited Baunmore cutaway. Baunmore is a typical milled peat cutaway with pumped drainage and with shallower remnant peat more typical of milled cutaway in the Littleton Bog Group, in contrast to Bruckana. All walked part of the bog where some recent rehabilitation trials have been carried out. MMC pointed out the recent field drain blocking using a bull-dozer that has been carried out so far. The target here was to block drains, re-establish surface drainage and re-wet peat. This work has already successfully held back surface water in places. The cambered fields and variable topography mean that a proportion of the peat fields remain dry. The expected habitat development is a mosaic of poor fen wetland communities, Reed swamp and scrub/wet woodland. MMC explained how blocking the field drains is Phase 1 of the planned rehab trial and that Phase 2 will involve blocking outfalls and cutting new overflow drains to further manipulate overall water levels. The overall strategy is to maximise the area of re-wetted peat with water levels close to the peat surface and emergent wetland communities. NPWS staff also suggested that more intensive bunding would have potential to increase the overall re-wetted area and help manage water levels. All then	

Organisation	Summary of Response by Stakeholder	BnM Response
	examined some cutaway that is colonising naturally with pioneer vegetation. This cutaway is much more alkaline compared to Bruckana with indicators such as the presence of Black Bog-rush.	
Tipperary Cunty Council	The draft plan is an overview of the rehabilitation within the Littleton bog group this comprises of 12 bog areas. The plan is developed under Condition 10 of IPC Licence Ref. P0499-01. (An incorrect licence ref. is given in the plan.) Any consideration for future after uses for the bog areas will be subject to the planning regulatory framework and the Environment section will be obliged to comment at this time on a more detailed proposal. The rehabilitation plan should include best practice measures for the restoration of an optimal range of biodiversity and ecosystems. The aftercare management activities on the level, quantity and quality of water both on site and in the surrounding landscape should avoid any unnecessary deterioration in the quality and quantity of ground and surface waters. After use, peatland water levels and flow regimes should be restored to as close to the natural reference conditions as possible. Any works carried out must be detailed and all stakeholders consulted.	
Irish Peatland Conservation Council	The IPCC welcome the zonation of Ballysorrell Bog for biodiversity and the decision not to develop it for peat resources (Page 3). Ballysorrell Bog is quite southerly in its location and its rehabilitation and zonation for biodiversity will help to extend the range of raised bog habitat in Ireland, which according to "The Status of EU Protected Habitats and Species in Ireland | 2013" (NPWS, 2013) is "BAD". We have a few questions and points to make on the draft rehabilitation plan with the aim to improving its content. It is good to see that Bord na Móna will be restoring the hydrology of the high bog through drain blocking as mentioned on Page 4 and that you also intend to carry out a trial rehab programme of a selected area for training purposes. Could you please elaborate on this? What training/trials do you intend to conduct and is it only inhouse training for Bord na Móna staff? The rehabilitation process may be a good time to test the Canadian method of Sphagnum transfer as there would be time to prepare the site prior to drain blocking. Please give this suggestion consideration as you indicated the peat present as light red brown Sphagnum peat (Page 9). There is Sphagnum on site that could be harvested and used as a donor inoculum for a Sphagnum trial. Page 5 gives information on the short and long-term time-frames of the plan. Could you give more details on the methods that will be utilised to monitor the hydrology i.e. will piezometers be used to measure water levels and will they be measured before drain blocking? This could ensure that any hydrological successes will be shown. In addition, how frequently will the ecotope mapping be conducted? Page 3 details the time-line for the development of Ballysorrell ("Ballysorrell was originally developed……."). Could this historical timeline be re-written as it is difficult to follow. For instance, when did the private sodpeat cutting around the bog cease? When did the milled peat production cease? Could you please specify how Ballysorrell Bog will help to achieve the national conservation target for active raised bog and supporting habitat in Ireland? Are there plans to formally designate this site in the future? Thank you for giving us this opportunity to make some comments on this welcome initiative by Bord na Mona.	
Private Individual A	Seeking return of land at Baunmore CPOed by Bord na Móna	

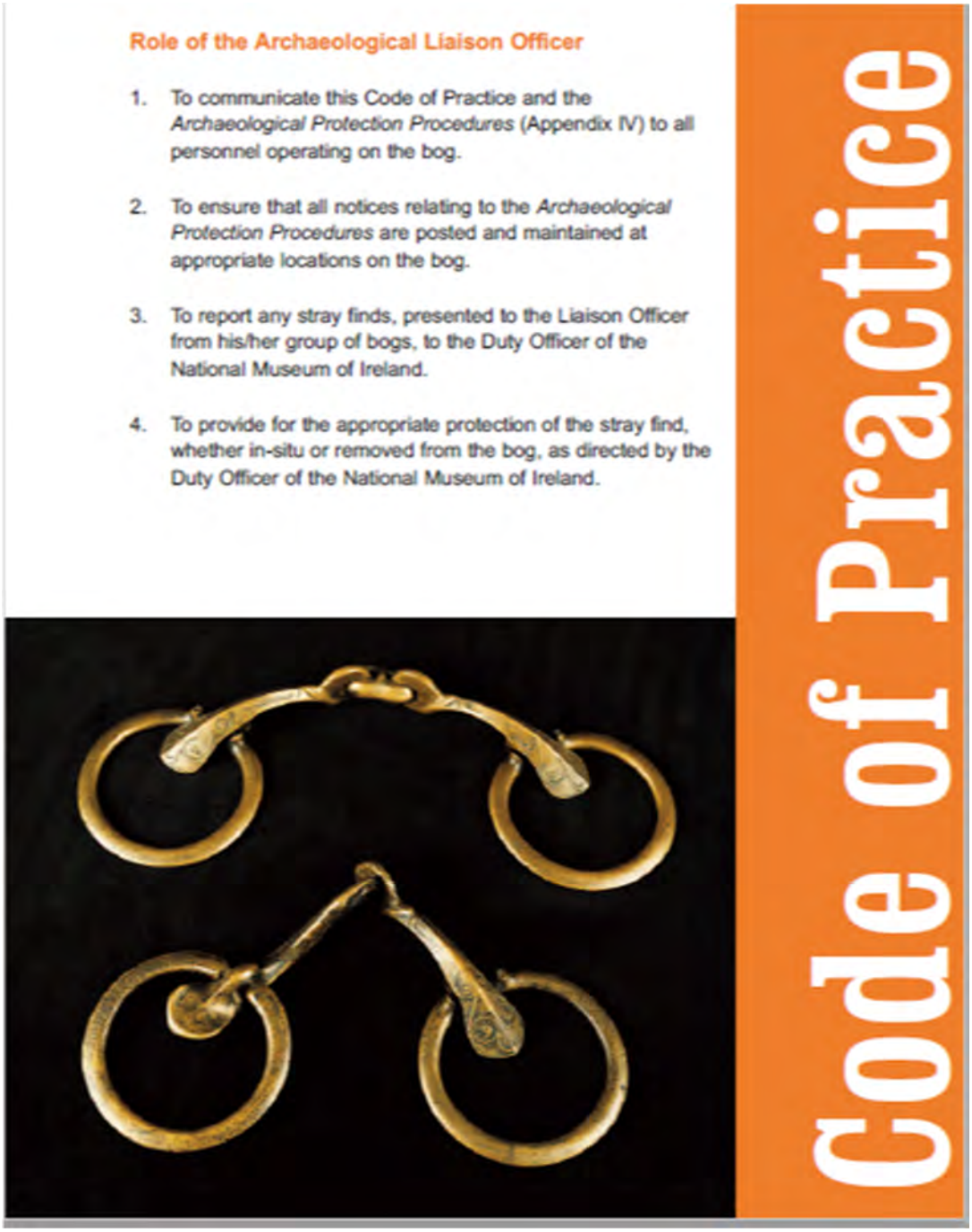
Organisation	Summary of Response by Stakeholder	BnM Response
NPWS 9/10/2018	The Department, particularly, welcomes the restoration measures proposed for Ballysorrell Bog and Knockahaw Bog which will result in the development of active raised bog habitat and acknowledge that this will significantly aid Ireland in meeting its commitments under the EU Habitats Directive. Whilst it is appreciated that "the rehabilitation measures will be adapted to the various baseline conditions" (Part 1, pg.20) the Department recommends that Bord na Móna consider more fully the potential for forward-planning during production phases of its operation so that the topography of the commercial fields could be engineered so as to best facilitate rewetting of the sites. Such an approach would better conform to Principle 17 (afteruse of cutaway peatlands) of the National Peatlands Strategy (2015). The Department recommends that the ongoing research into the interaction between rehabilitation measures and carbon emissions is prioritized so as to better inform future rehabilitation plans. In the absence of the assimilation of such research outputs into rehabilitation planning it is nonetheless recommended that serious consideration is giving to reprofiling works within the Littleton Bog Group. In relevant sites this could greatly improve the baseline conditions for rewetting and would be justified on the basis that rewetted cutaway has lower carbon emissions that dry, bare cutaway. The foregoing is in line with Principle 19 (contribution of peatland rehabilitation and restoration to climate change mitigation and adaption) of the National Peatlands Strategy. There is some difficulty interpreting the maps due to their complexity and the size of the legend. Maps showing specific restoration actions would be useful, possibly in the form of an overview grid at a scale 1:35,000 with more detailed mapping as per grid squares. Eco-hydrological modelling based on LiDAR/DTM would be essential to ascertain the potential to achieve wet habitats with the potential to turn into carbon sinks. ….. 2 The Department is keen to continue engagement with Bord na Móna as regards investigating more engineered restoration techniques likely to provide results in line with the principles of the National Peatlands Strategy. The NPWS of the Department would welcome an opportunity to meet with you to allow for the Plan to be presented by your Ecology Team and to further explore the options of external funding such as EU LIFE funding, as discussed in previous meetings.	
IPCC 15/08/2018	Could you please clarify the correct area for the group of 12 sites included: is it 5050ha (Page 11, Section 4.2) or is it 4824ha (Page 11, Table 1). If it is the latter could you clarify what the other 226ha constitutes please. IPCC's principal interest in this plan lies in the future of existing acid peat bog remnants, the potential of the cutaway areas to provide biodiversity value and priority habitats for nature conservation, climate change mitigation and the extent to which the plan meets requirements of the National Peatlands Strategy 2015. The area of peatland included in the Littleton Bog Group is significant in the county of Tipperary as it represents one third of the original area of raised bog that occurred in the whole County particularly concentrated in South Tipperary (Hammond 1979 Peatland Map of Ireland) the southern distribution range for raised bogs described in the Status of EU Protected Habitats and Species. In your plan on Table 5 only two bog restoration sites (Ballysorrell and Knockahaw) are proposed covering an area of 567ha. Can you explain the method used in choosing these areas for bog restoration and were any other sites considered within the group? IPCC maintain that two sites is far too little considering the area of the land in the Littleton Group and the lack of any sites of conservation value in this area of former raised bog distribution. We note that Killeens Bog contains acidic peat and that it appears to be earmarked for horticultural peat (sod moss judging from the satellite photograph) should this be required. On Page 16 in conclusion 5 the plan states that this bog could be restored if horticultural peat extraction is stopped. IPCC strongly recommend the immediate cessation of this activity on this site and its inclusion in the restoration sites plan. We have reasoned with Bord na Móna on numerous occasions about the continued national production of horticultural peat as we do not agree that this use represents responsible management as defined in principle P24 in the National Peatlands Strategy. We understand that Sod Moss is regarded in economic terms as a "lost leader" product which negates any economic argument for keeping this site in production. Here in Littleton where Bord na Móna have exploited over 5000ha of Tipperary's	

Organisation	Summary of Response by Stakeholder	BnM Response
	natural peatland resources, all peat production should cease and every effort should be made to restore suitable acid peat resources to living bog where they exist. In this regard on Page 15 (Section 4.3.1.1 [ii]) two further sites with acid peat are mentioned - Carrickhill (substantial raised bog cutover east and west of the cutaway) & Inch (raised bog cutover to the south west of the cutaway) - why are these sites not being included in the bog restoration sites line-up? In the IPCC Sites Database we have a site named Longford Pass - Littleton Bog which is a remnant raised bog that we surveyed with a former Bord na Móna employee Sean Canney and which we subsequently used for educational purposes with local schools with the agreement of Bord na Móna. We would like to see this site included in the bog sites restoration list. (Grid ref. = S 23023 59319). IPCC are very unclear about your aims for the non-designated sites with considerable wildlife interest described on Page 21 of the plan. We estimate that there are 10 sites mentioned that are noteworthy for birds, crustaceans and invertebrates. In addition a further 3 rehabilitation sites are included in the Bord na Móna Biodiversity Plan. On the one hand Bord na Móna makes use of the fact that cutaway bogs are rich in biodiversity as part of the "Naturally Driven" image you like to portray but we can see no substantial commitment to undertake targeted management actions in relation to enhancing and maintaining these species on the sites. For example on Page 19 you state that without additional funding targeted conservation works for breeding birds will not be a feature of this plan. This is wrong and is at odds with Principle 15 in the National Peatlands Strategy 2015. In relation to climate change this rehabilitation plan needs to ensure that all of the cutaway bogs within the Littleton Group are rewetted to prevent carbon leakage. In our experience through visits to Mount Lucas, Ballycon and Lullymore cutaway bogs there are substantial areas within these rehabilitated sites that are dry and emitting carbon. Why does Bord na Móna not recontour sites with un-even topography to ensure that the majority of the bare peat is rewetted? Surely at the peat production stage more effort could be made to extract the peat so that flat substrate remains. Can you indicate within the plan the percentage of peat that will be rewetted and be carbon neutral? This is an important consideration in line with national climate change policy. IPCC find that the plan is overstating the company's intention to cease peat production for electricity by 2030 as their contribution to climate change policy	
Private Individual B	Meeting to discuss land security issues and leasing of land at Lanespark and Derryvilla.	
Private Individual C	Phone call to discuss potential to develop greenway amenity across the Littleton Bog Group.	
Private Individual D	Meeting to discuss boundary issues and potential impact of rehabilitation on adjoining land	
Private Individual E	Meeting to discuss potential gun club project at Knockahaw Bog.	
Private Individual F	Meeting to discuss rare orchids at Longfordpass railway cutting	

Consultation undertaken in 2025		
Uisce Éireann (formerly Irish Water)	In their response, Uisce Éireann stated that 'UÉ has undertaken a review of the rehabilitation plan, and the bogs are not located within any public drinking water abstraction catchments, however, UÉ is supportive of the key environmental and water quality benefits of the proposed rehabilitation'. .	BnM acknowledged the response and consultation is ongoing.
Tipperary County Council	In their submission, Tipperary County Council highlighted that the rehabilitation plan should 'ensure that future options for amenity or tourism uses of the lands are not discounted, having regard to the Council's aspirations to develop eco-tourism projects throughout the county'. Further, it was highlighted that archaeological impacts associated with rehabilitation of Ballybeg Lanespark Derryvella bogs, given the rich archaeological heritage of the lands, should be assessed. Tipperary County Council provided information on the relevant policies and objectives within the Tipperary County Council's Climate Action Plan 2024-2029 that aligned with peatland restoration. Other information focused on the Tipperary Decarbonising Zone, and how peatland restoration would benefit such decarbonisation. Other information was provided on the council's policies on Land-use, Land-use Change and Forestry (LULUCF). It notes that the 'management of agricultural ecosystems, such as grasslands and peatlands' are emitters of CO2 and 'the management of agricultural ecosystems, such as grasslands and peatlands 'an important area for climate mitigation measures'. 'For example, alternative land management measures such as raising the water table in existing pastures and peatlands, new crop types, forestry etc could make this sector a net remover of GHGs'. The submission notes that 'Bord na Móna is to be commended for its decarbonisation programme aimed at reducing the carbon emissions from its activities. This programme supports the National policy position and objective of achieving a transition to a competitive, low carbon, climate-resilient and environmentally sustainable economy by 2050'. The submission requests: • 'stakeholder collaboration to deliver concerted efforts towards carbon and GHG emissions reductions within the DZ, which can lead the way for wider application across Tipperary'. • 'BnaM are requested to considered if there are opportunities for collaboration with stakeholders, including Tipperary County Council, as part of the delivery of their PCAS programme'. • 'The Mid-Tipperary Decarbonising Zone is within the JTF area and thus there are opportunities to engage local communities, including those previously employed in the peat harvesting industry, in areas related to training and upskilling and sustainable local job creation'. • 'BnaM are requested to consider the referring of the Mid-Tipperary DZ in their relevant publications and projects. In particular to include details on the Mid-Tipperary Decarbonising Zone in the relevant Rehabilitation Plans and associated Map Books'.	BnM acknowledged the response. Consultation is ongoing.

	• 'The strategic location of the national Bioeconomy Campus (Irish Bioeconomy Foundation) at Lisheen should be noted and it is requested that BnaM consider the vision for the National Bioeconomy campus as part of their overall plans in the Mid-Tipperary DZ areas'. 'BnaM are requested to consider, given the particular role of the national DZ programme in emissions reduction, if there is an opportunity to monitor the changes in carbon emissions from a current baseline within the Killeen bog and report on reduced the carbon emissions in support of the national objective of achieving a transition to a competitive, low carbon, climate-resilient and environmentally sustainable economy by 2050. Thus, the rehabilitation plans can explicitly state how emissions will be monitored and reported. Such reporting will also support Tipperary County Council objectives for supporting moves towards low-carbon communities within the Decarbonising Zone'.	
(Minister of State at the Department of Housing, Local Government and Heritage) Minister James Browne	Acknowledged receipt of rehabilitation plan.	BnM acknowledged the response. Consultation is ongoing.

APPENDIX XII: ARCHAEOLOGY



22

Code of Practice

5. To arrange for the delivery or collection of the stray find, as directed by the Duty Officer of the National Museum of Ireland.

6. To complete the Report of Discovery of Archaeological Object(s) in Bogs (Appendix V), as directed by the Duty Officer of the National Museum of Ireland.

7. To maintain a file of all stray finds and associated documentation and provide copies to the Project Archaeologist.

8. To provide assistance, where required, to the Department during archaeological surveys.

9. To provide assistance, where required, to Bord na Móna's Consultant Archaeologists, during investigation and mitigation of monuments.

10. To report to the Bord na Móna members on the Archaeology Management Liaison Committee any planned developments or new activities on cutaway peatland areas within his/her group of bogs.

Bord na Móna		Land & Habitats– Bog Operations **Archaeological Findings**	
Document Approved By:	**Revision Date:**	**Doc No:**	**Revision No:**
EMD	13/08/2024	ENV017	2
	Control Location		**Page**
	Environment Department		1 of 5

Purpose

The purpose of this procedure is to describe the arrangements in Bord na Móna for findings of Archaeological material (Stray Finds).
All objects, sites or monuments, no matter how fragmentary, are important elements of our heritage.

Procedure

1. Check whether there are any known archaeological monuments in your area.
2. Be vigilant at all times - objects or traces of structures can be found on the field surfaces, in the drain faces, on the bog margins or caught within the mechanics of machinery.
3. If an object is found leave it in place, if it is safe to do so, note its position and immediately contact your Archaeological Liaison Officer who will assess the situation and contact the Duty Officer of the National Museum of Ireland.
4. Resist the temptation to investigate the find spot as this may disturb fragile archaeological deposits.
5. If the object is already dislodged or is in imminent danger, remove it carefully, mark its find spot and report it immediately to your Archaeological Liaison Officer.
6. Objects made of wood, leather or textile, which are removed from peat should be kept in conditions similar to those in which they are found. This can be done by packing them in peat or, if waterlogged, placing them in a clean basin of water and sealing the container. Resist the temptation to clean or remove peat from the object.
7. If timbers or other materials, such as gravel or stones, which could be part of a manmade structure are noted on the bog, mark the location and report it immediately to your Archaeological Liaison Officer. If you suspect the find is of archaeological importance, resist the temptation to expose it any further as this could result in damage to the structure.
8. Report anything that looks unnatural in the bog – your Archaeological Liaison Officer will decide whether it should be referred to the appropriate authorities.

NOTE: Our archaeological heritage is a finite, non-renewable resource. Once a site is destroyed its information is lost forever and we have lost the chance to understand a little more about our past, where we have come from and perhaps the opportunity to learn for the future.

Your Archaeological Liaison Officer is Enda McDonagh.

2) Records

Revision Index			
Revision	Date	Description of change	Approved
1	13/19/2020	First release	EMcD
2	13/08/2024	Second release	EMcD

APPENDIX XIII: WATER QUALITY MONITORING RESULTS FOR BALLYBEG BOG & DERRYVELLA BOG

PCAS SW Sampling Scheme				Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids
Bog Group	**Licence No**	**Bog Name**	**SW Code GIS**	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
				1/7/23	1/8/23	1/9/23	1/10/23	1/11/23	1/12/23	1/1/24	1/2/24	1/3/24	1/4/24	1/5/24	1/6/24	1/7/24	1/8/24	1/9/24	1/10/24	1/11/24	1/12/24
Littleton Group	PO499-01	BALLYBEG	SW11	2			<2			3			<2			N/R			<2		
Littleton Group	PO499-01	BALLYBEG	SW13	10			3			4			<2			N/R			3		
Littleton Group	PO499-01	LANESPARK	SW14	15			13			<2			2			13			3		
Littleton Group	PO499-01	LANESPARK	SW15	<2			<2			<2			<2			3			<2		
Littleton Group	PO499-01	LANESPARK	SW16	4			<2			18			<2			3			2		
			Suspended Solids ELV	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35
		Rainfall (mm) CLONOULTY_Clogher		178.5	82.5	136.2	137	83.7	131.3	62.1	155	93.9	74.9	50.9	42.8	50.7	44.7	64.6	51.5	70.3	79.6

PCAS SW Sampling Scheme				Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour
Bog Group	**Licence No**	**Bog Name**	**SW Code GIS**	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co
				1/7/23	1/8/23	1/9/23	1/10/23	1/11/23	1/12/23	1/1/24	1/2/24	1/3/24	1/4/24	1/5/24	1/6/24	1/7/24	1/8/24	1/9/24	1/10/24	1/11/24	1/12/24
Littleton Group	PO499-01	BALLYBEG	SW11	357			359			231			256			N/R			234		
Littleton Group	PO499-01	BALLYBEG	SW13	396			441			356			442			N/R			167		
Littleton Group	PO499-01	LANESPARK	SW14	340			450			269			350			174			300		
Littleton Group	PO499-01	LANESPARK	SW15	119			439			145			335			165			210		
Littleton Group	PO499-01	LANESPARK	SW16	306			396			76			141			54.9			56.6		
		Rainfall (mm) CLONOULTY_Clogher		178.5	82.5	136.2	137	83.7	131.3	62.1	155	93.9	74.9	50.9	42.8	50.7	44.7	64.6	51.5	70.3	79.6

PCAS SW Sampling Scheme				COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD
Bog Group	**Licence No**	**Bog Name**	**SW Code GIS**	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
				1/7/23	1/8/23	1/9/23	1/10/23	1/11/23	1/12/23	1/1/24	1/2/24	1/3/24	1/4/24	1/5/24	1/6/24	1/7/24	1/8/24	1/9/24	1/10/24	1/11/24	1/12/24
Littleton Group	PO499-01	BALLYBEG	SW11	84			75			56			90			N/R			74		
Littleton Group	PO499-01	BALLYBEG	SW13	77			98			76			116			N/R			51		
Littleton Group	PO499-01	LANESPARK	SW14	80			103			66			76			41			87		
Littleton Group	PO499-01	LANESPARK	SW15	39			126			43			74			37			62		
Littleton Group	PO499-01	LANESPARK	SW16	81			114			14			40			10			28		
			COD Trigger Level	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
		Rainfall (mm) CLONOULTY_Clogher		178.5	82.5	136.2	137	83.7	131.3	62.1	155	93.9	74.9	50.9	42.8	50.7	44.7	64.6	51.5	70.3	79.6

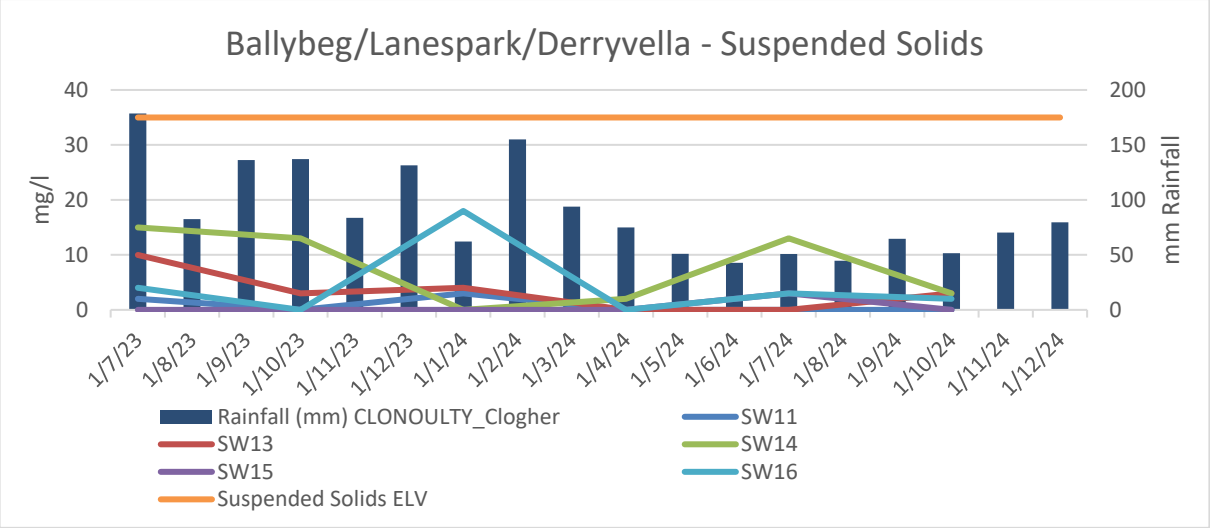
PCAS SW Sampling Scheme				pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH
Bog Group	**Licence No**	**Bog Name**	**SW Code GIS**	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units
				1/7/23	1/8/23	1/9/23	1/10/23	1/11/23	1/12/23	1/1/24	1/2/24	1/3/24	1/4/24	1/5/24	1/6/24	1/7/24	1/8/24	1/9/24	1/10/24	1/11/24	1/12/24
Littleton Group	PO499-01	BALLYBEG	SW11	7			7.1			7.2			7.3			N/R			7.2		
Littleton Group	PO499-01	BALLYBEG	SW13	7.3			7.1			7			7.1			N/R			7.5		
Littleton Group	PO499-01	LANESPARK	SW14	7.2			6.9			7.2			7.2			6.9			7.6		
Littleton Group	PO499-01	LANESPARK	SW15	7.7			6.9			7.5			7.5			7.4			7.4		
Littleton Group	PO499-01	LANESPARK	SW16	7.2			7.1			7.9			7.7			7.8			7.8		
		Rainfall (mm) CLONOULTY_Clogher		178.5	82.5	136.2	137	83.7	131.3	62.1	155	93.9	74.9	50.9	42.8	50.7	44.7	64.6	51.5	70.3	79.6

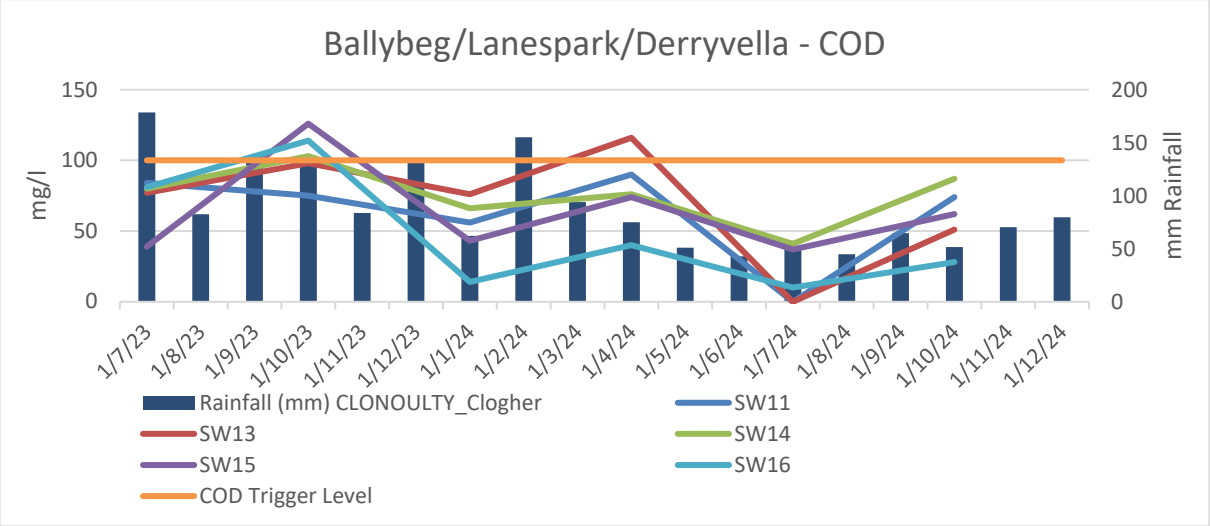
PCAS SW Sampling Scheme				TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P
Bog Group	**Licence No**	**Bog Name**	**SW Code GIS**	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
				1/7/23	1/8/23	1/9/23	1/10/23	1/11/23	1/12/23	1/1/24	1/2/24	1/3/24	1/4/24	1/5/24	1/6/24	1/7/24	1/8/24	1/9/24	1/10/24	1/11/24	1/12/24
Littleton Group	PO499-01	BALLYBEG	SW11	<0.05			<0.05			<0.05			<0.05			N/R			<0.05		
Littleton Group	PO499-01	BALLYBEG	SW13	<0.05			<0.05			<0.05			<0.05			N/R			<0.05		
Littleton Group	PO499-01	LANESPARK	SW14	0.07			<0.05			<0.05			<0.05			<0.05			0.05		
Littleton Group	PO499-01	LANESPARK	SW15	<0.05			<0.05			<0.05			<0.05			<0.05			<0.05		
Littleton Group	PO499-01	LANESPARK	SW16	<0.05			0.06			0.07			<0.05			<0.05			<0.05		
		Rainfall (mm) CLONOULTY_Clogher		178.5	82.5	136.2	137	83.7	131.3	62.1	155	93.9	74.9	50.9	42.8	50.7	44.7	64.6	51.5	70.3	79.6

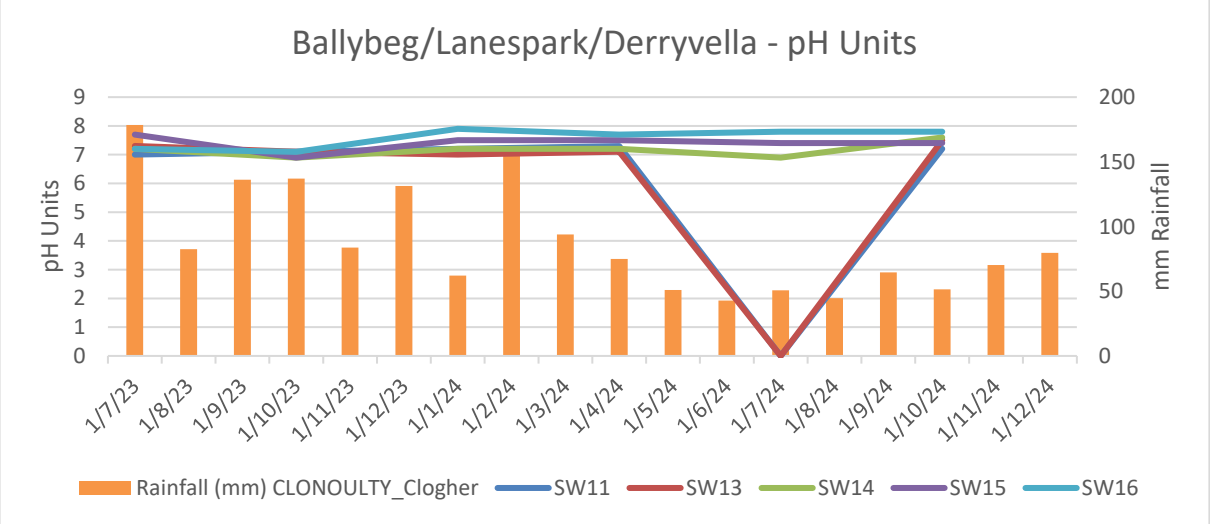
PCAS SW Sampling Scheme				TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS
Bog Group	**Licence No**	**Bog Name**	**SW Code GIS**	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
				1/7/23	1/8/23	1/9/23	1/10/23	1/11/23	1/12/23	1/1/24	1/2/24	1/3/24	1/4/24	1/5/24	1/6/24	1/7/24	1/8/24	1/9/24	1/10/24	1/11/24	1/12/24
Littleton Group	PO499-01	BALLYBEG	SW11	87			224			217			202			N/R			257		
Littleton Group	PO499-01	BALLYBEG	SW13	310			378			245			207			N/R			335		
Littleton Group	PO499-01	LANESPARK	SW14	569			258			419			217			838			345		
Littleton Group	PO499-01	LANESPARK	SW15	469			268			202			139			327			246		
Littleton Group	PO499-01	LANESPARK	SW16	341			219			416			270			388			367		
		Rainfall (mm) CLONOULTY_Clogher		178.5	82.5	136.2	137	83.7	131.3	62.1	155	93.9	74.9	50.9	42.8	50.7	44.7	64.6	51.5	70.3	79.6

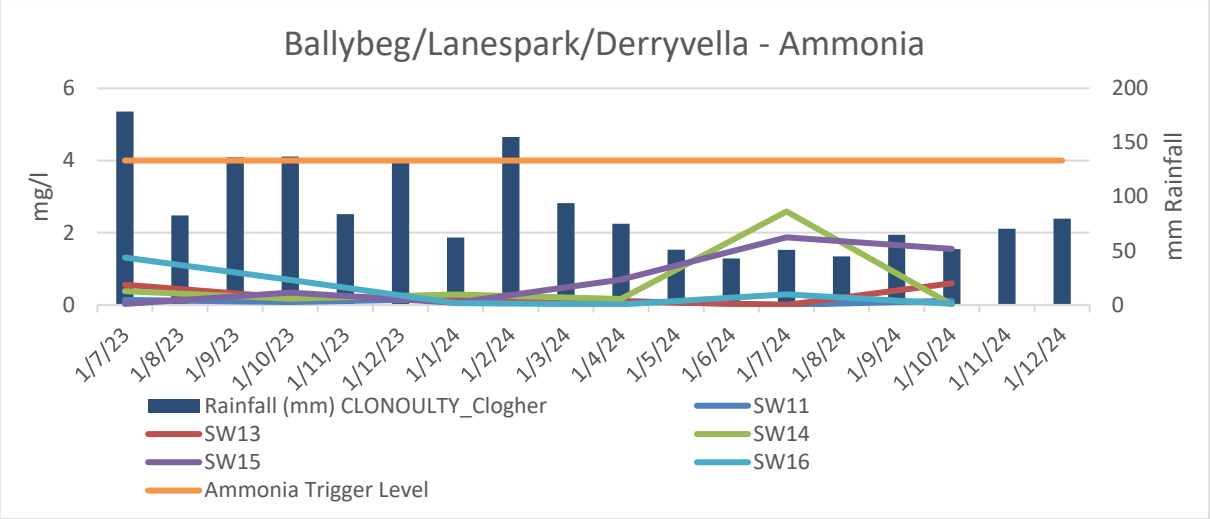
PCAS SW Sampling Scheme				Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N
Bog Group	**Licence No**	**Bog Name**	**SW Code GIS**	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
				1/7/23	1/8/23	1/9/23	1/10/23	1/11/23	1/12/23	1/1/24	1/2/24	1/3/24	1/4/24	1/5/24	1/6/24	1/7/24	1/8/24	1/9/24	1/10/24	1/11/24	1/12/24
Littleton Group	PO499-01	BALLYBEG	SW11	0.135			0.076			0.169			0.102			N/R			0.111		
Littleton Group	PO499-01	BALLYBEG	SW13	0.557			0.198			0.214			0.088			N/R			0.595		
Littleton Group	PO499-01	LANESPARK	SW14	0.379			0.168			0.283			0.162			2.59			0.006		
Littleton Group	PO499-01	LANESPARK	SW15	0.026			0.338			0.055			0.697			1.87			1.55		
Littleton Group	PO499-01	LANESPARK	SW16	1.31			0.688			0.045			0.012			0.29			0.028		
			Ammonia Trigger Level	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
		Rainfall (mm) CLONOULTY_Clogher		178.5	82.5	136.2	137	83.7	131.3	62.1	155	93.9	74.9	50.9	42.8	50.7	44.7	64.6	51.5	70.3	79.6

PCAS SW Sampling Scheme				DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC
Bog Group	**Licence No**	**Bog Name**	**SW Code GIS**	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
				1/7/23	1/8/23	1/9/23	1/10/23	1/11/23	1/12/23	1/1/24	1/2/24	1/3/24	1/4/24	1/5/24	1/6/24	1/7/24	1/8/24	1/9/24	1/10/24	1/11/24	1/12/24
Littleton Group	PO499-01	BALLYBEG	SW11	30			27.1			24.3			20.1			N/R			N/R		
Littleton Group	PO499-01	BALLYBEG	SW13	27.8			36.4			30.9			30.9			N/R					
Littleton Group	PO499-01	LANESPARK	SW14	31.4			32.7			28.6			28.6			17.6			27.3		
Littleton Group	PO499-01	LANESPARK	SW15	15.5			51.5			19.1			28.4			19.5			18.9		
Littleton Group	PO499-01	LANESPARK	SW16	29.7			42.4			8.59			14.3			8.75			7.38		
		Rainfall (mm) CLONOULTY_Clogher		178.5	82.5	136.2	137	83.7	131.3	62.1	155	93.9	74.9	50.9	42.8	50.7	44.7	64.6	51.5	70.3	79.6


Ballybeg/Lanespark/Derryvella - Suspended Solids
mg/l
mm Rainfall
40
30
20
10
0
200
150
100
50
0
1/7/23
1/8/23
1/9/23
1/10/23
1/11/23
1/12/23
1/1/24
1/2/24
1/3/24
1/4/24
1/5/24
1/6/24
1/7/24
1/8/24
1/9/24
1/10/24
1/11/24
1/12/24
Rainfall (mm) CLONOULTY_Clogher
SW11
SW13
SW14
SW15
SW16
Suspended Solids ELV


Ballybeg/Lanespark/Derryvella - COD
mg/l
mm Rainfall
150
100
50
0
200
150
100
50
0
1/7/23
1/8/23
1/9/23
1/10/23
1/11/23
1/12/23
1/1/24
1/2/24
1/3/24
1/4/24
1/5/24
1/6/24
1/7/24
1/8/24
1/9/24
1/10/24
1/11/24
1/12/24
Rainfall (mm) CLONOULTY_Clogher
SW11
SW13
SW14
SW15
SW16
COD Trigger Level


Ballybeg/Lanespark/Derryvella - pH Units
pH Units
mm Rainfall
9
8
7
6
5
4
3
2
1
0
200
150
100
50
0
1/7/23
1/8/23
1/9/23
1/10/23
1/11/23
1/12/23
1/1/24
1/2/24
1/3/24
1/4/24
1/5/24
1/6/24
1/7/24
1/8/24
1/9/24
1/10/24
1/11/24
1/12/24
Rainfall (mm) CLONOULTY_Clogher
SW11
SW13
SW14
SW15
SW16


Ballybeg/Lanespark/Derryvella - Ammonia
mg/l
mm Rainfall
6
4
2
0
200
150
100
50
0
1/7/23
1/8/23
1/9/23
1/10/23
1/11/23
1/12/23
1/1/24
1/2/24
1/3/24
1/4/24
1/5/24
1/6/24
1/7/24
1/8/24
1/9/24
1/10/24
1/11/24
1/12/24
Rainfall (mm) CLONOULTY_Clogher
SW11
SW13
SW14
SW15
SW16
Ammonia Trigger Level

APPENDIX XIV: STOCKPILE DECOMMISSIONING PROCEDURE

Scope
All IPC licensed peatlands with residual peat stockpiles requiring decommissioning and rehabilitation, as required by Condition 10.

The aim of this Stockpile Decommissioning Procedure is to stabilise any remaining stockpiles by depositing the peat in the two drains located immediately adjacent to the stockpile field, enabling the re-shaping of the stockpile to facilitate stabilization and revegetation.

Condition 10:
10.1 Following termination of use or involvement of all or part of the site in the licensed activity, the licensee shall:

10.1.1 Decommission, render safe or remove for disposal/recovery, any soil, subsoils, buildings, plant or equipment, or any waste, materials or substances or other matter contained therein or thereon, that may result in environmental pollution.

Procedure:

1. Strip any remaining stockpile protection and remove using the poly wrapper for recycling.
2. Ensure the silt pond servicing this pile field catchment has been cleaned within the last six months as per condition 6.8, and visually inspected as per condition 6.7, prior to any pile decommissioning.
3. Where stockpiles occur within areas planned for rehabilitation, such planned rehabilitation measures (regular drain blocking) will be implemented in advance of any stockpile decommissioning, with priority given to the required adjacent stockpile field drains.
4. Once the rehabilitation measure above has been completed, proceed to reprofile the stockpile as per below.
5. Using suitable available excavator/dozer to make a safe ramp up onto the end of the pile.
6. Track up onto the pile and establish a safe level base.
7. Using the machine to reduce and reprofile the pile height and deposit into the adjoining pile field drains. The residual height to be determined based on stockpile size and area required to reprofile.
8. Work along the pile using this method until reaching the pile end.
9. Using a suitable machine, track the peat into the pile field drain along both sides of the pile, ensuring the final level is below the existing drain blocks and any damage to existing drain blocks avoided.
10. If required, use a suitable machine to track along the top of the reprofiled stockpile to level and flatten the profile to reduce the runoff gradient.
11. Fertiliser application and any grass seed mix should be applied to each stockpile following completion of the above steps, to accelerate the stabilisation.

Ballybeg/Lanespark/Derryvella Bog Rehab Plan GIS Map Book 2025

Document Control Sheet	
Document Name:	Ballybeg/Lanespark/Derryvella Bog Rehab Plan GIS Map Book 2025
Document File Path:	
Document Status:	**Final v1.0**

This document comprises:	DCS	TOC	Text (Body)	References	Maps	No. of Appendices
	1	1	0	0	15	0

Rev. 0.1	Author(s):	Checked By:	Approved By:
Name(s):	BG	ML	CC
Date:	29/04/2025	29/04/2025	29/04/2025
Rev. 1.0	**Author(s):**	**Checked By:**	**Approved By:**
Name(s):	BG	ML	CC
Date:	27/05/2025	27/05/2025	27/05/2025

BnM would like to thank and acknowledge RPS Consultants for their input into this document and the provision of data for inclusion in these maps.

Table of Contents

Bog Site Information Maps 4

BNM-DR-26-07-RP-01: Site Location Map 5

BNM-DR-26-07-RP-02: Structures and Sampling 6

BNM-DR-26-07-RP-04: Peat Depths 7

BNM-DR-26-07-RP-17: Current Habitat Map 8

BNM-DR-26-07-RP-21: Aerial Imagery 2000 9

BNM-DR-26-07-RP-22: Aerial Imagery 2021 10

BNM-DR-26-07-RP-23: Proximity Designated Sites 11

BNM-DR-26-07-RP-24: Bog Group Map 12

BNM-DR-26-07-RP-30: Previous Rehabilitation 13

Hydrology / Topography Maps 14

BNM-DR-26-07-RP-WQ01: Water Quality Map 15

BNM-DR-26-07-RP-03: LiDAR Map 16

BNM-DR-26-07-RP-09: Depression Analysis 17

BNM-DR-26-07-RP-13: General Drainage Map 18

Rehabilitation Maps 19

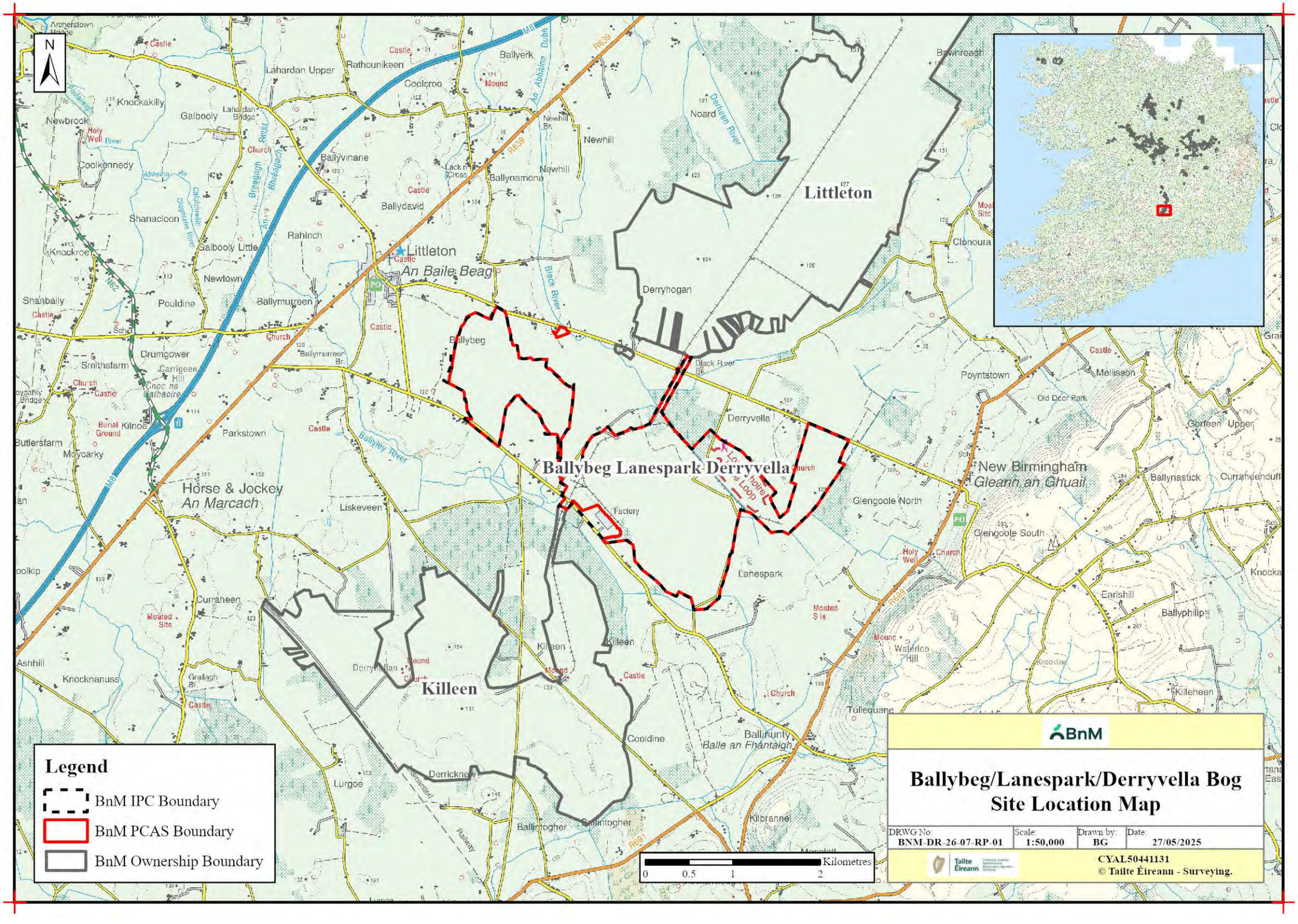
BNM-DR-26-07-RP-05: Enhanced Rehabilitation Measures 20

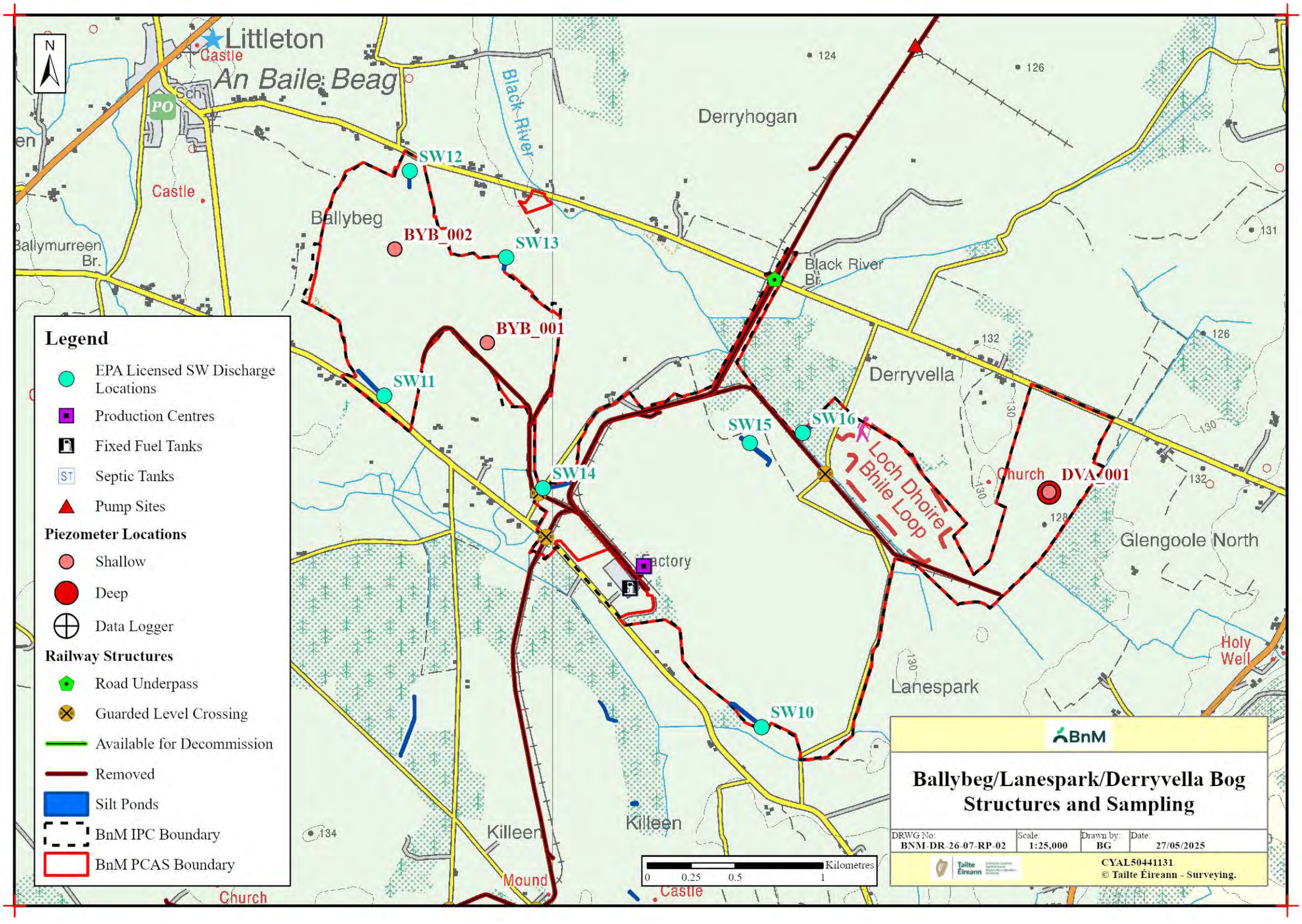
BNM-DR-26-07-RP-20: Standard Rehabilitation Measures 21

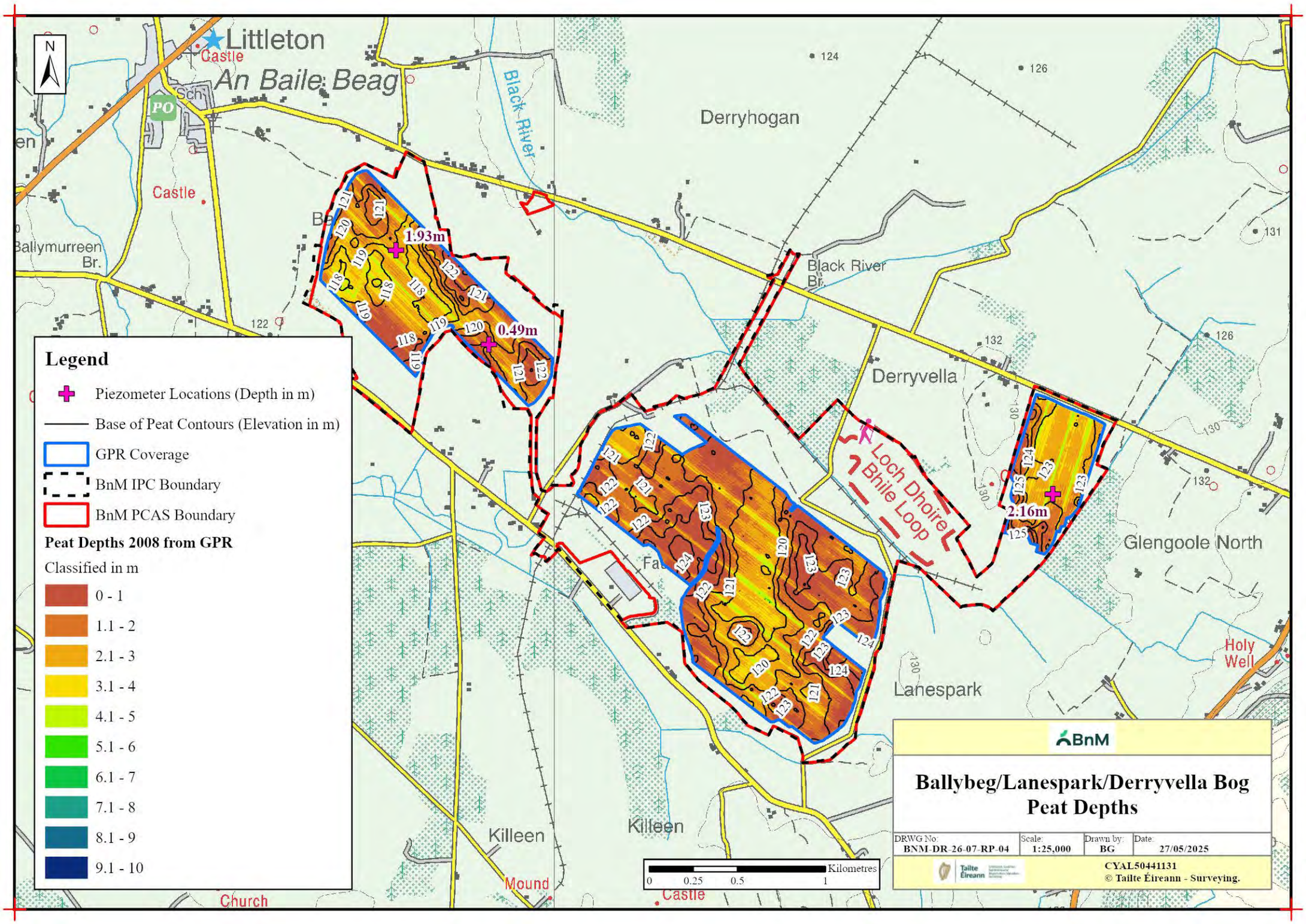
Bog Site Information Maps

BNM-DR-26-07-RP-01: Site Location Map

Back to TOC

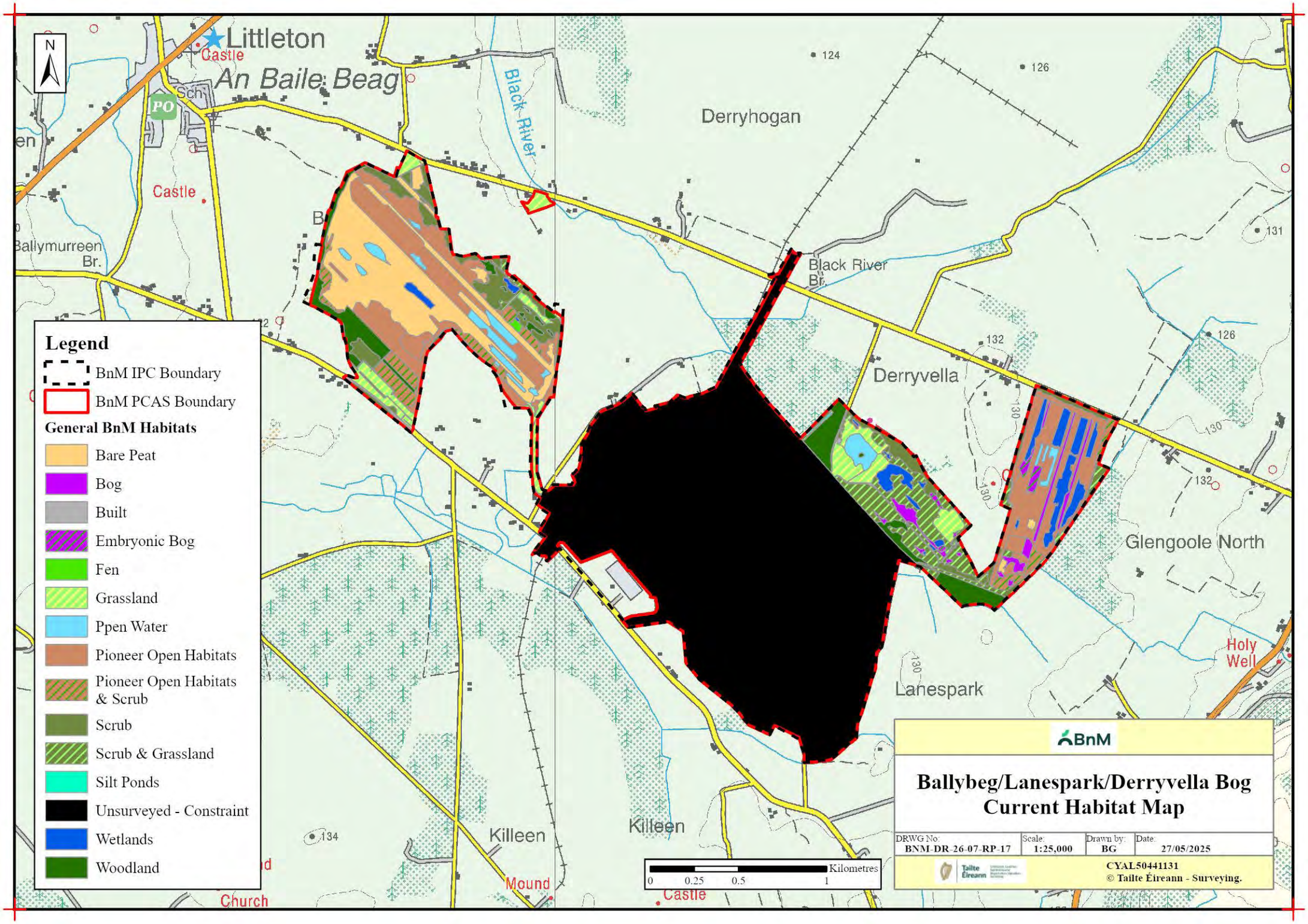



Littleton
An Baile Beag
Castle
Sch
PO
Castle
Ballymurreen Br.
Black River
Derryhogan
Ballybeg
Black River Br.
Derryvella
Glengoole North
Lanespark
Killeen
Killeen
Mound
Castle
Church
Church
Factory
Holy Well
Loch Dhoire Bhile Loop
SW10
SW11
SW12
SW13
SW14
SW15
SW16
BYB_001
BYB_002
DVA_001
124
126
131
132
130
128
134
Legend
EPA Licensed SW Discharge Locations
Production Centres
Fixed Fuel Tanks
Septic Tanks
Pump Sites
Piezometer Locations
Shallow
Deep
Data Logger
Railway Structures
Road Underpass
Guarded Level Crossing
Available for Decommission
Removed
Silt Ponds
BnM IPC Boundary
BnM PCAS Boundary
0 0.25 0.5 1 Kilometres
BnM
Ballybeg/Lanespark/Derryvella Bog
Structures and Sampling
DRWG No: BNM-DR-26-07-RP-02
Scale: 1:25,000
Drawn by: BG
Date: 27/05/2025
CYAL50441131
© Tailte Éireann - Surveying.


N
Littleton
Castle
An Baile Beag
PO
Sch
Castle
Ballymurreen Br.
Black River
Derryhogan
Black River Br.
Derryvella
Glengoole North
Lanespark
Holy Well
Loch Dhoire Bhile Loop
Killeen
Killeen
Mound
Castle
Church
1.93m
0.49m
2:16m
Legend
Piezometer Locations (Depth in m)
Base of Peat Contours (Elevation in m)
GPR Coverage
BnM IPC Boundary
BnM PCAS Boundary
Peat Depths 2008 from GPR
Classified in m
0 - 1
1.1 - 2
2.1 - 3
3.1 - 4
4.1 - 5
5.1 - 6
6.1 - 7
7.1 - 8
8.1 - 9
9.1 - 10
0 0.25 0.5 1 Kilometres
BnM
Ballybeg/Lanespark/Derryvella Bog
Peat Depths
DRWG No: BNM-DR-26-07-RP-04
Scale: 1:25,000
Drawn by: BG
Date: 27/05/2025
CYAL50441131
© Tailte Éireann - Surveying.

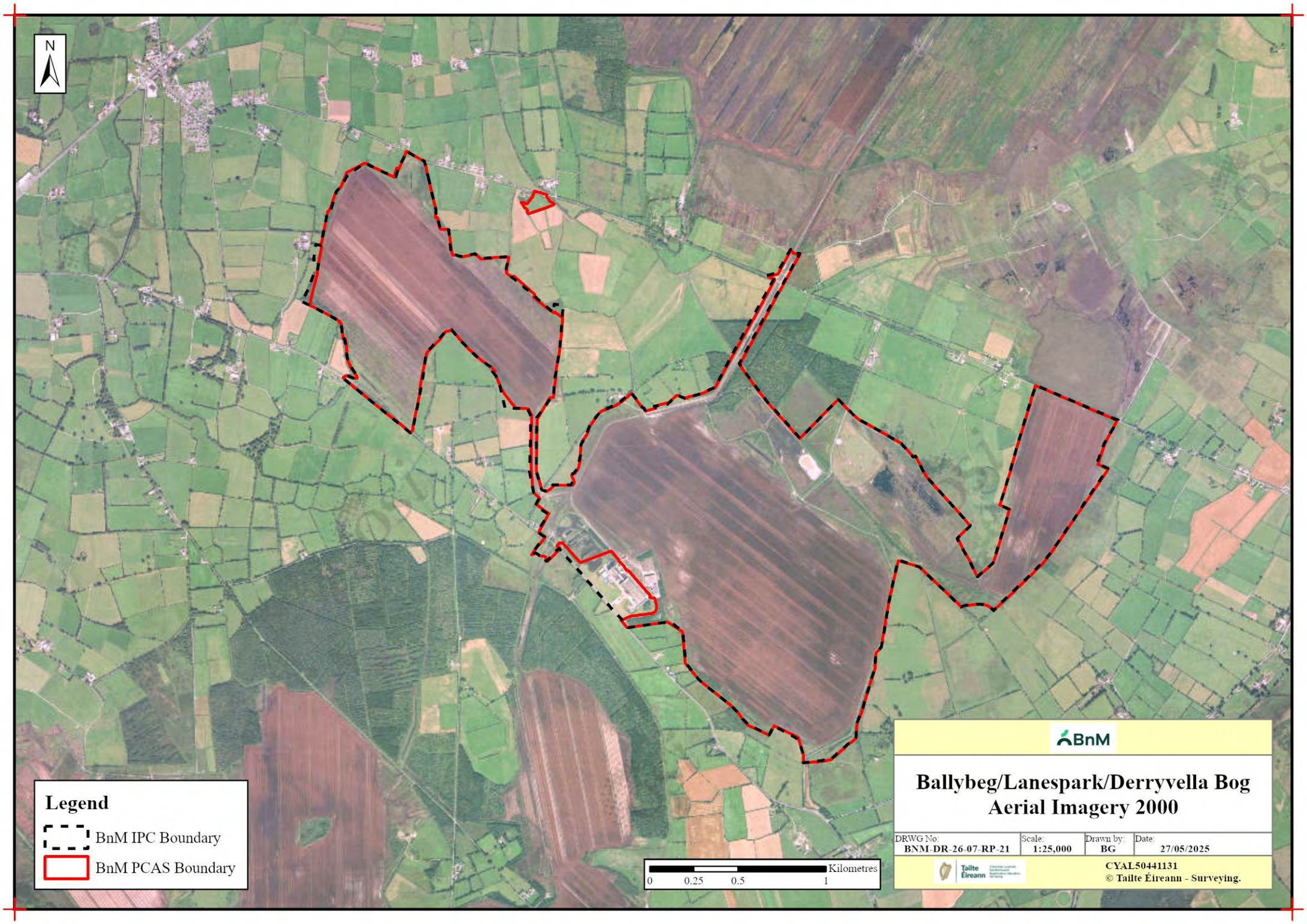
BNM-DR-26-07-RP-17: Current Habitat Map

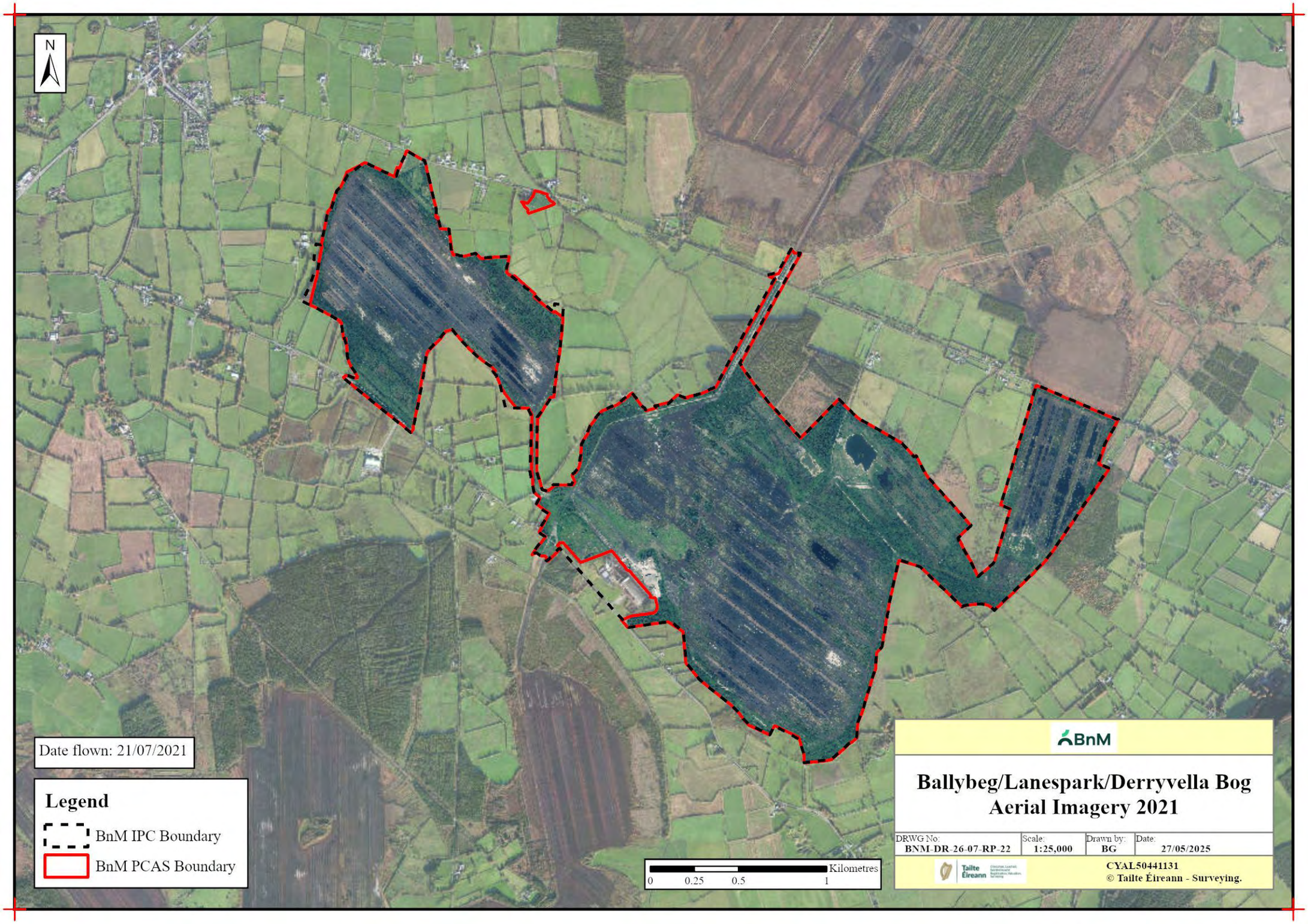
Back to TOC



BNM-DR-26-07-RP-21: Aerial Imagery 2000

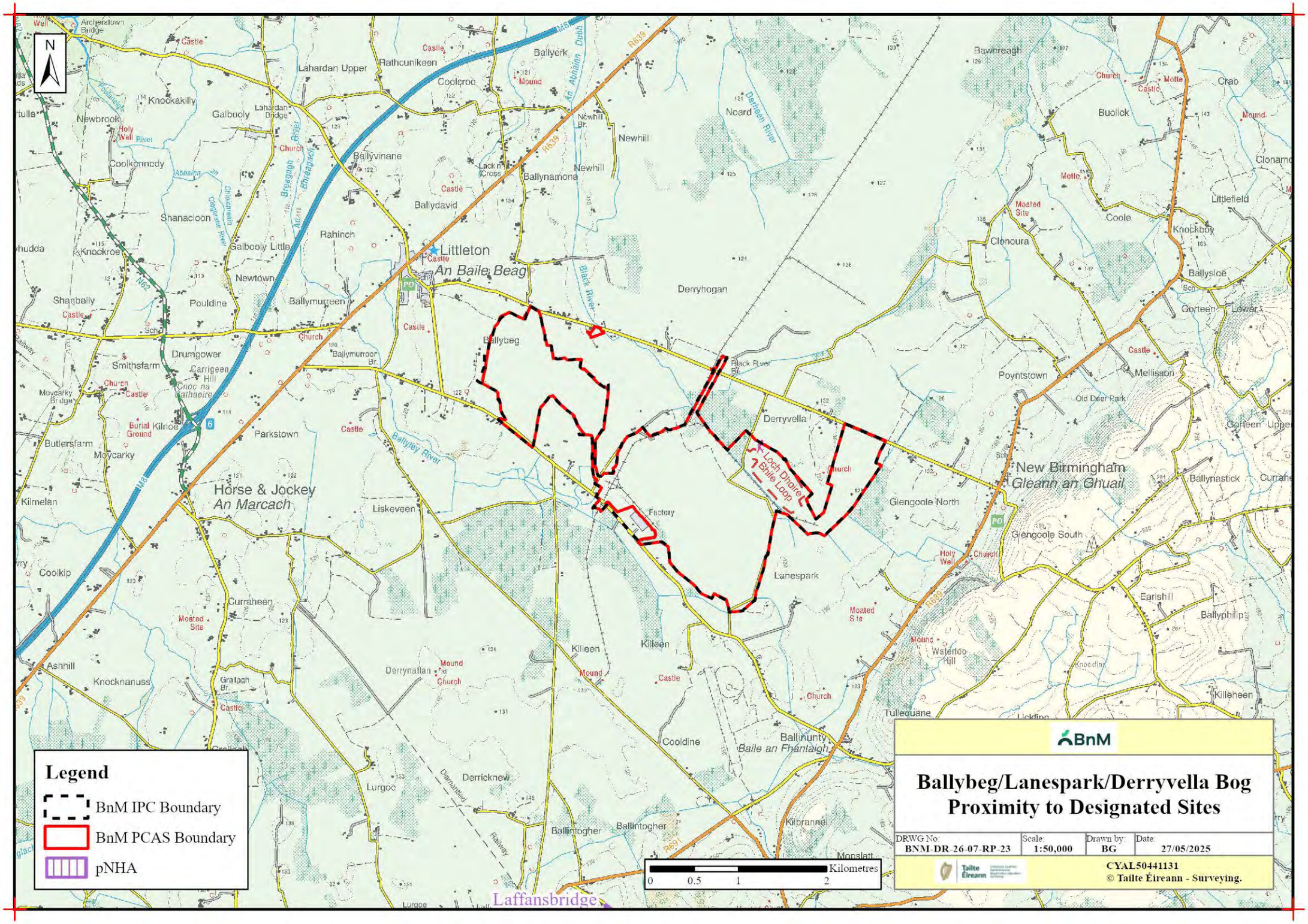
Back to TOC

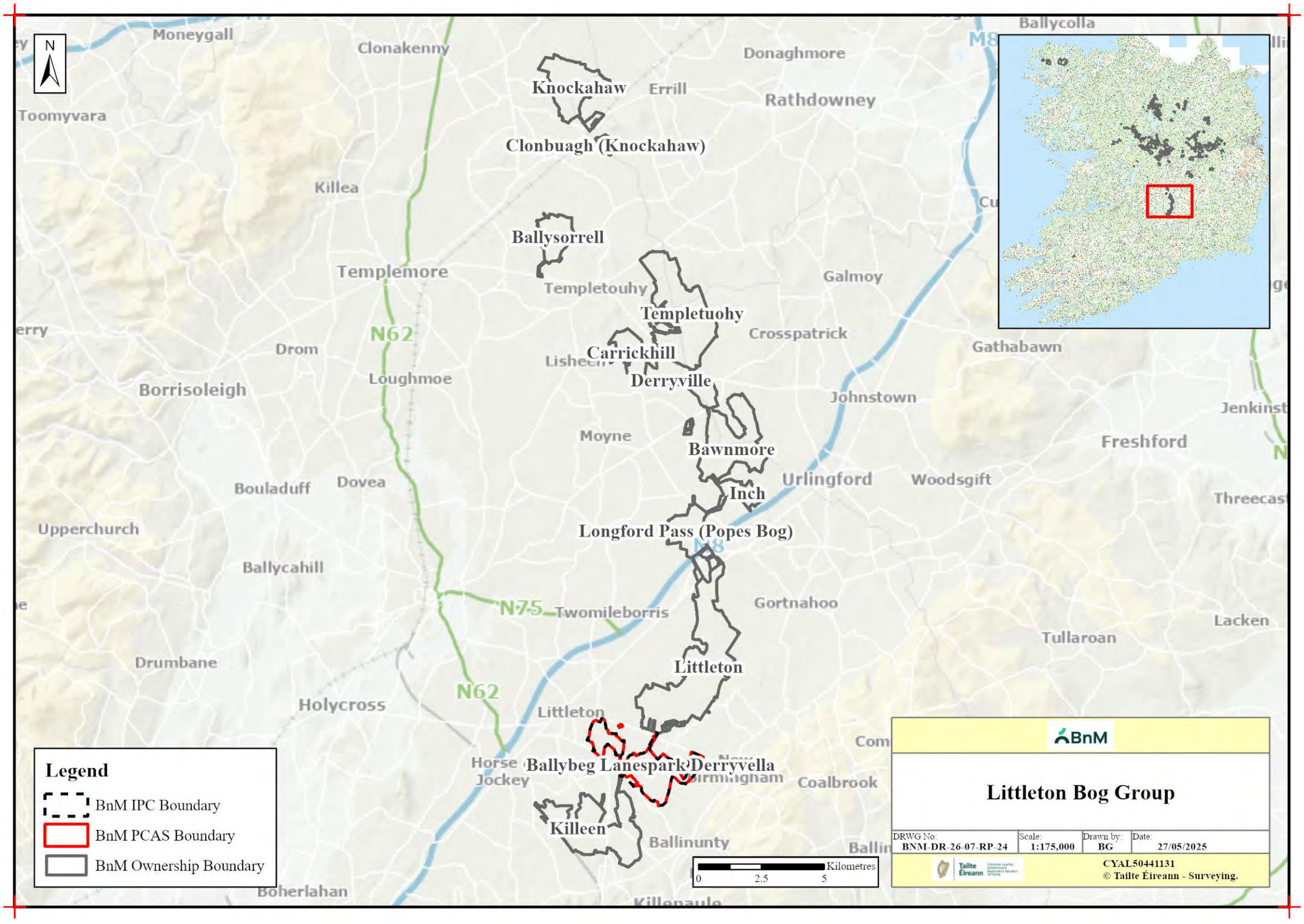


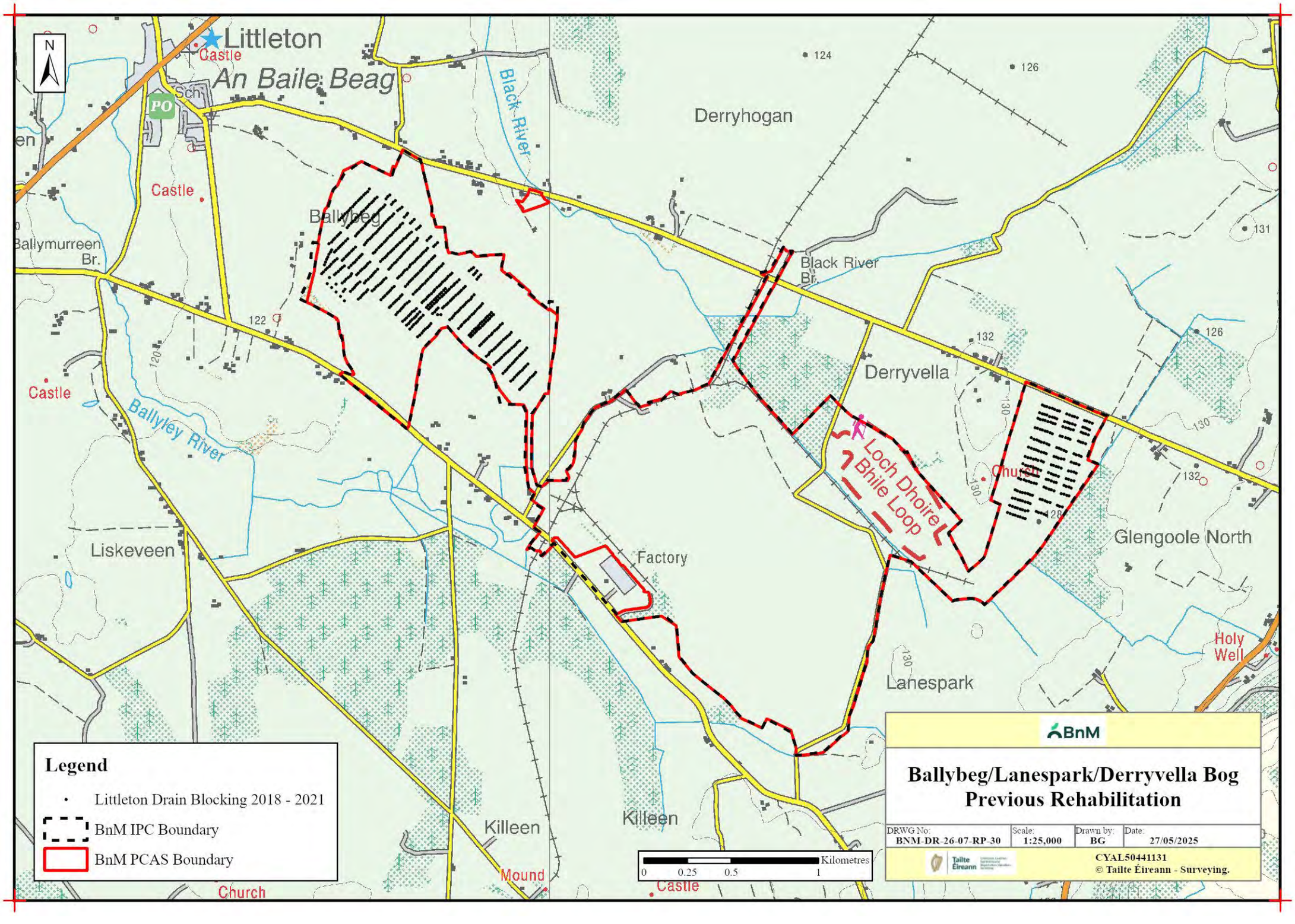

N
Date flown: 21/07/2021
Legend
BnM IPC Boundary
BnM PCAS Boundary
0 0.25 0.5 1 Kilometres
BnM
Ballybeg/Lanespark/Derryvella Bog
Aerial Imagery 2021
DRWG No: BNM-DR-26-07-RP-22
Scale: 1:25,000
Drawn by: BG
Date: 27/05/2025
Tailte Éireann
CYAL50441131
© Tailte Éireann - Surveying.

BNM-DR-26-07-RP-23: Proximity Designated Sites

Back to TOC



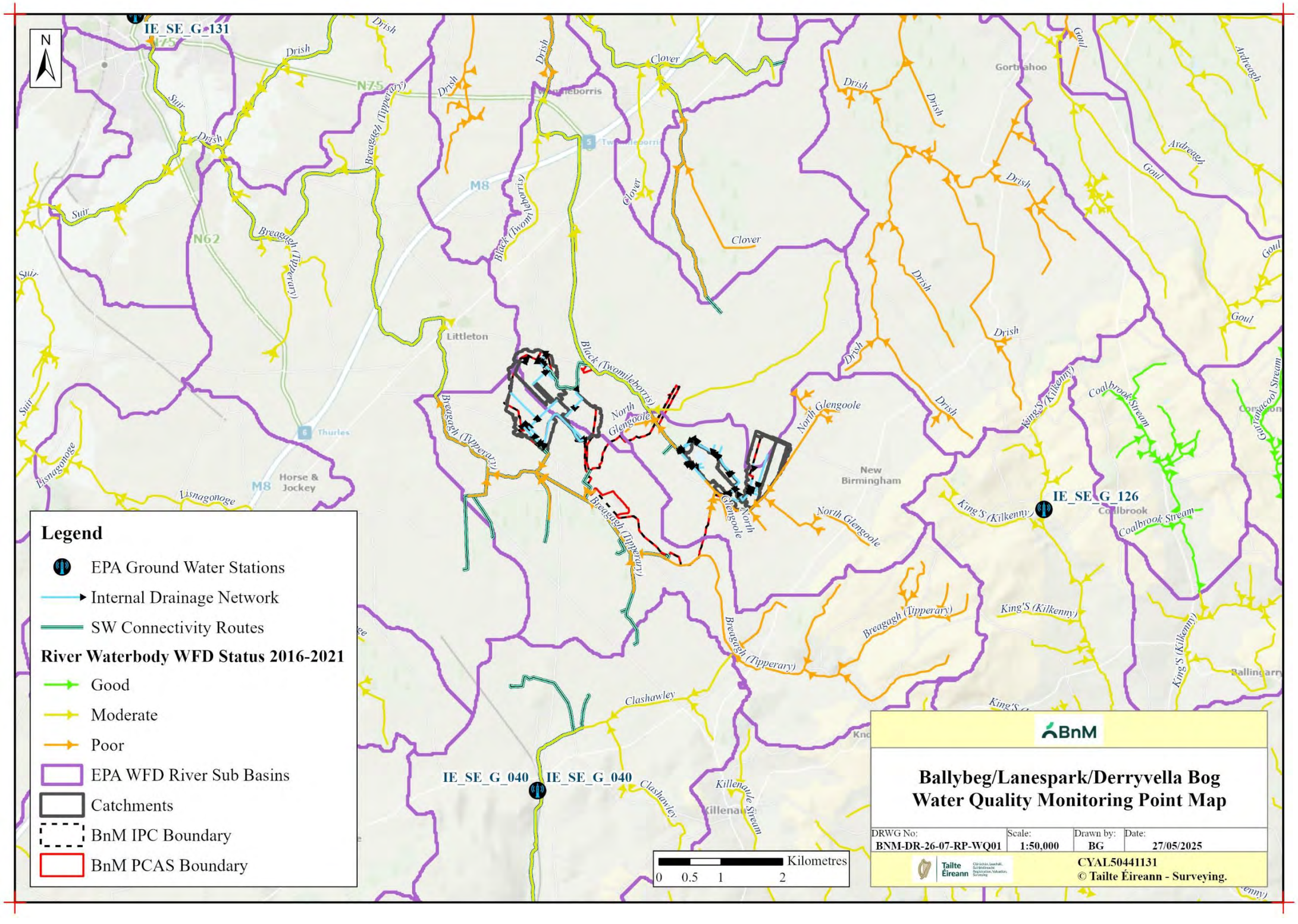

N
Moneygall
Clonakenny
Donaghmore
Ballycolla
Knockahaw
Errill
Rathdowney
Toomyvara
Clonbuagh (Knockahaw)
Killea
Ballysorrell
Templemore
Templetouhy
Templetuohy
Galmoy
N62
Crosspatrick
Drom
Carrickhill
Gathabawn
Derryville
Borrisoleigh
Loughmoe
Johnstown
Moyne
Bawnmore
Freshford
Bouladuff
Dovea
Urlingford
Woodsgift
Inch
Upperchurch
Longford Pass (Popes Bog)
Ballycahill
N75
Twomileborris
Gortnahoo
Lacken
Tullaroan
Drumbane
Littleton
Holycross
Littleton
Horse & Jockey
Ballybeg Lanespark
Derryvella
Coalbrook
Killeen
Ballinunty
Kilometres
0
2.5
5
Boherlahan
Legend
BnM IPC Boundary
BnM PCAS Boundary
BnM Ownership Boundary
BnM
Littleton Bog Group
DRWG No: BNM-DR-26-07-RP-24
Scale: 1:175,000
Drawn by: BG
Date: 27/05/2025
CYAL50441131
© Tailte Éireann - Surveying.


N
Littleton
Castle
An Baile Beag
Sch
PO
Black River
Derryhogan
124
126
131
Ballybeg
Castle
Ballymurreen Br.
122
120
Black River Br.
132
126
Derryvella
130
Castle
Ballyley River
Loch Dhoire Bhile Loop
Church
128
Glengoole North
Liskeveen
Factory
Holy Well
Lanespark
Killeen
Killeen
Mound
Church
Castle
Legend
Littleton Drain Blocking 2018 - 2021
BnM IPC Boundary
BnM PCAS Boundary
0 0.25 0.5 1 Kilometres
BnM
Ballybeg/Lanespark/Derryvella Bog
Previous Rehabilitation
DRWG No: BNM-DR-26-07-RP-30
Scale: 1:25,000
Drawn by: BG
Date: 27/05/2025
Tailte Éireann
CYAL50441131
© Tailte Éireann - Surveying.

Hydrology / Topography Maps

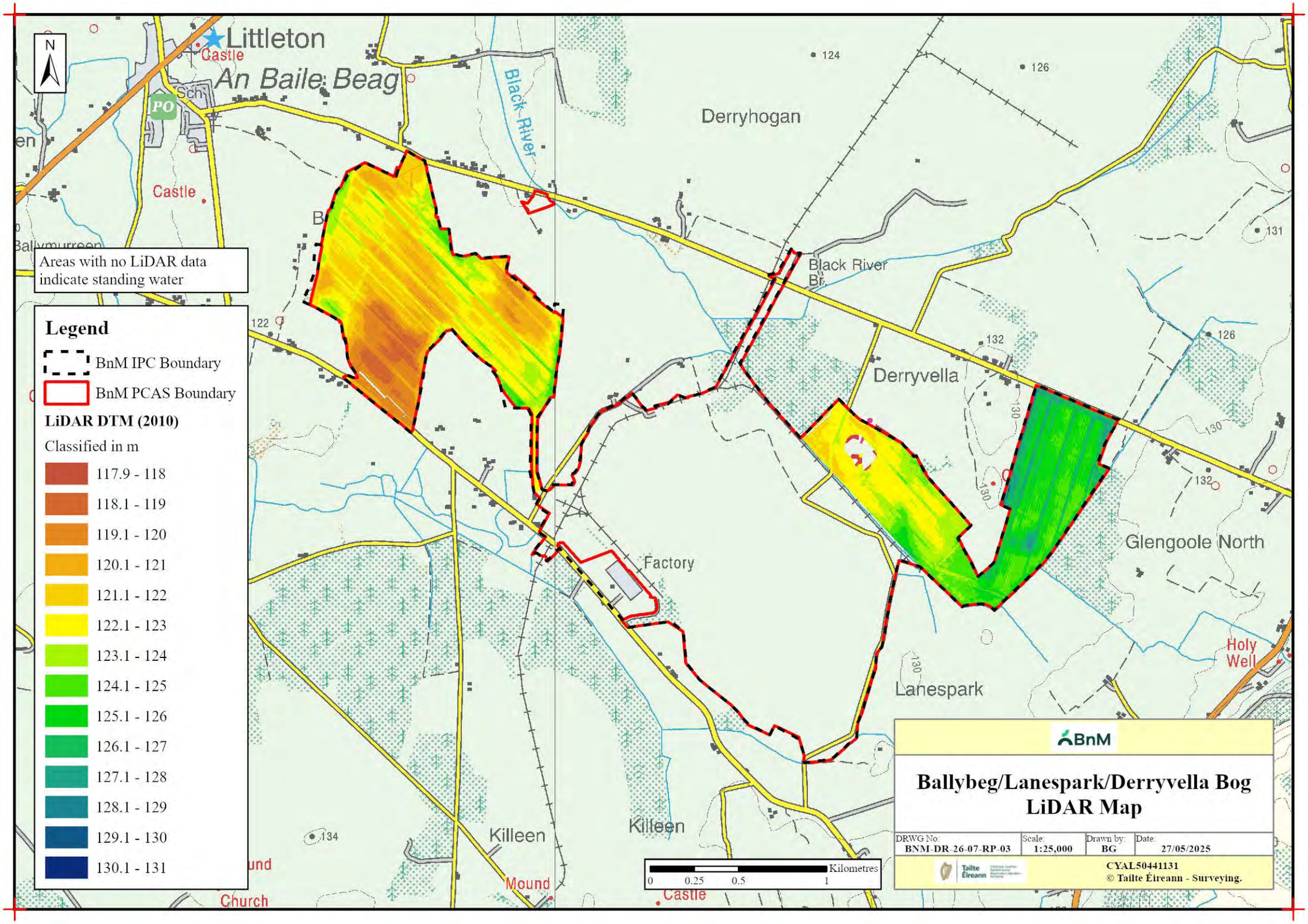
BNM-DR-26-07-RP-WQ01: Water Quality Map

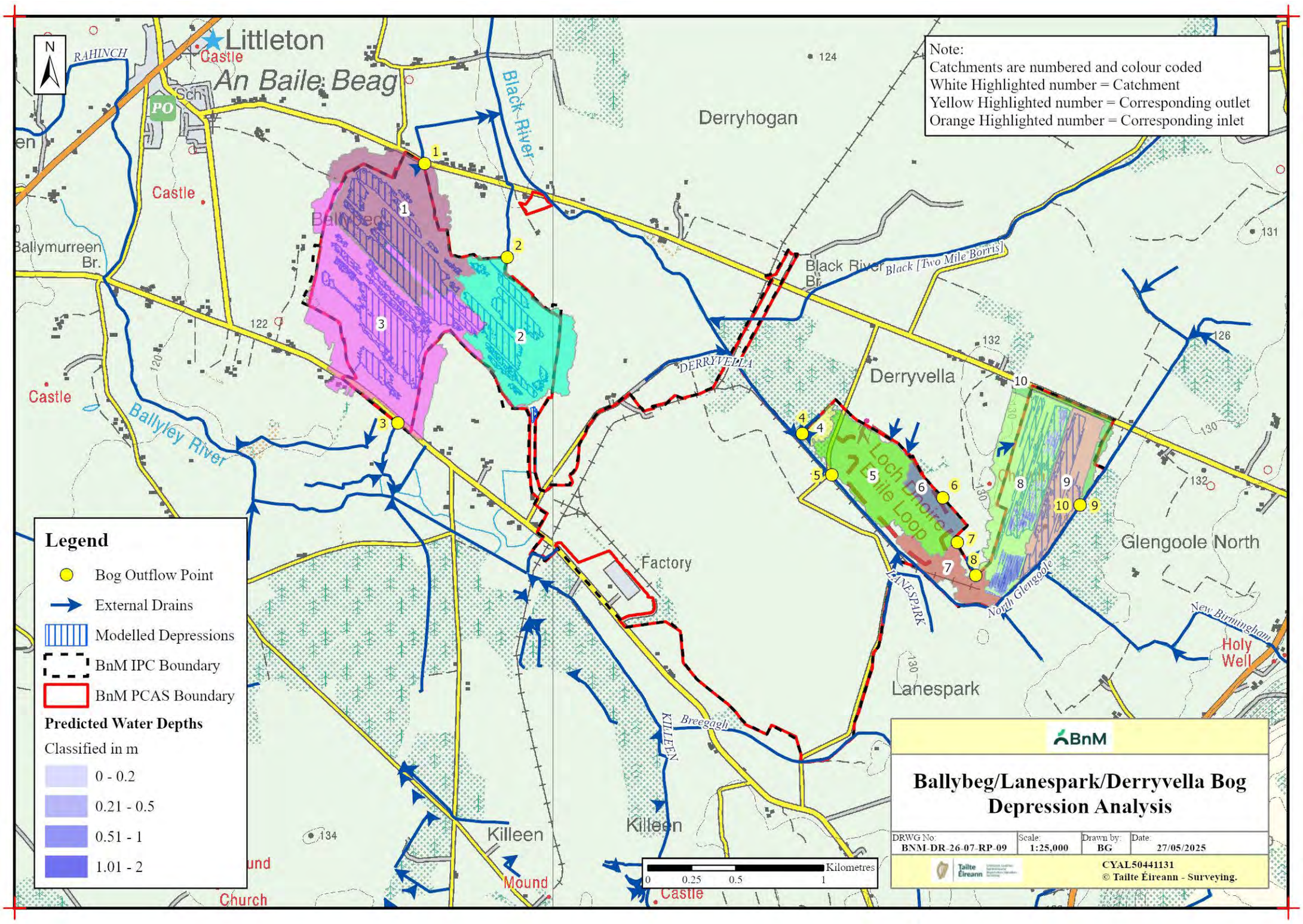
Back to TOC



BNM-DR-26-07-RP-03: LiDAR Map

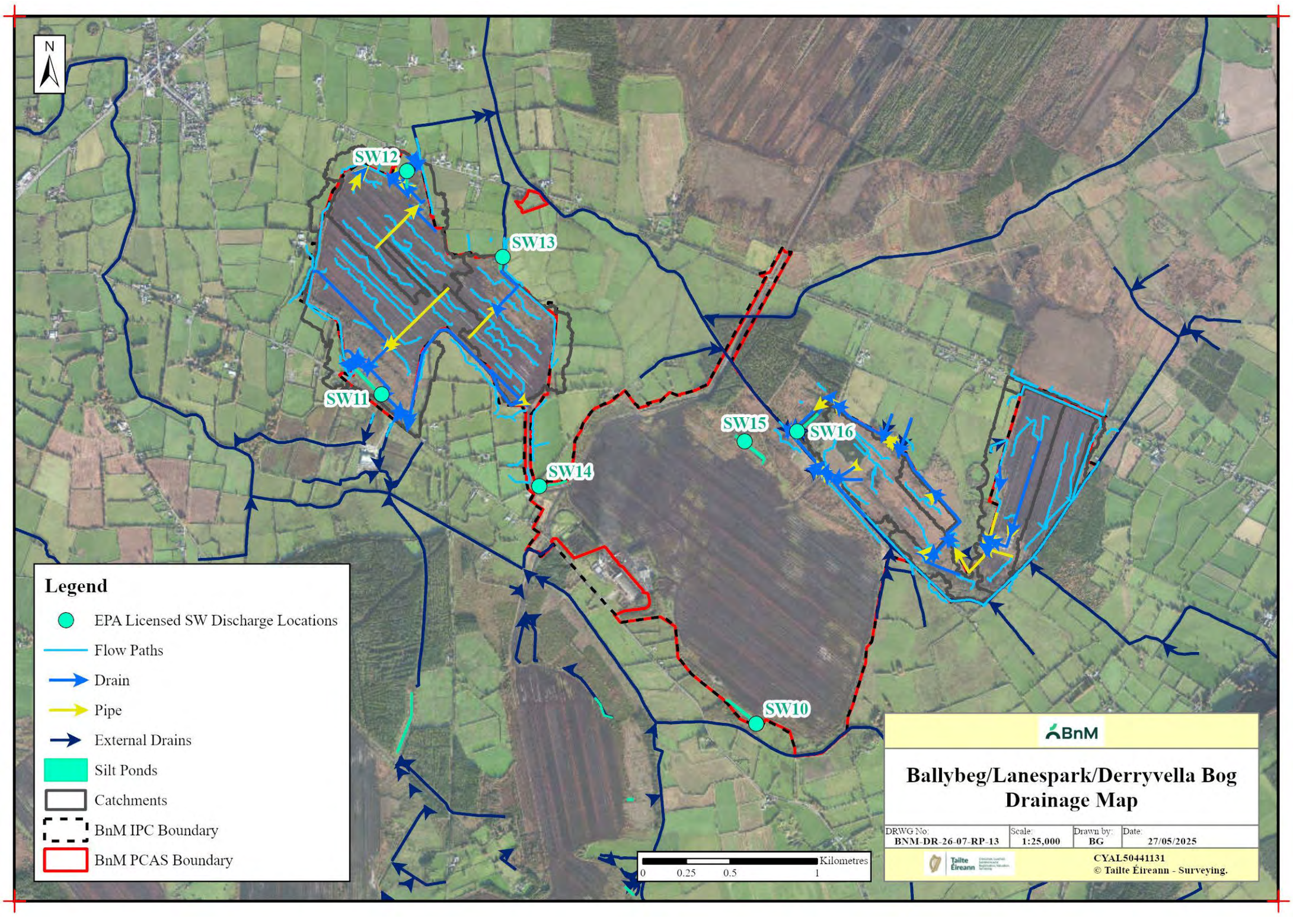
Back to TOC



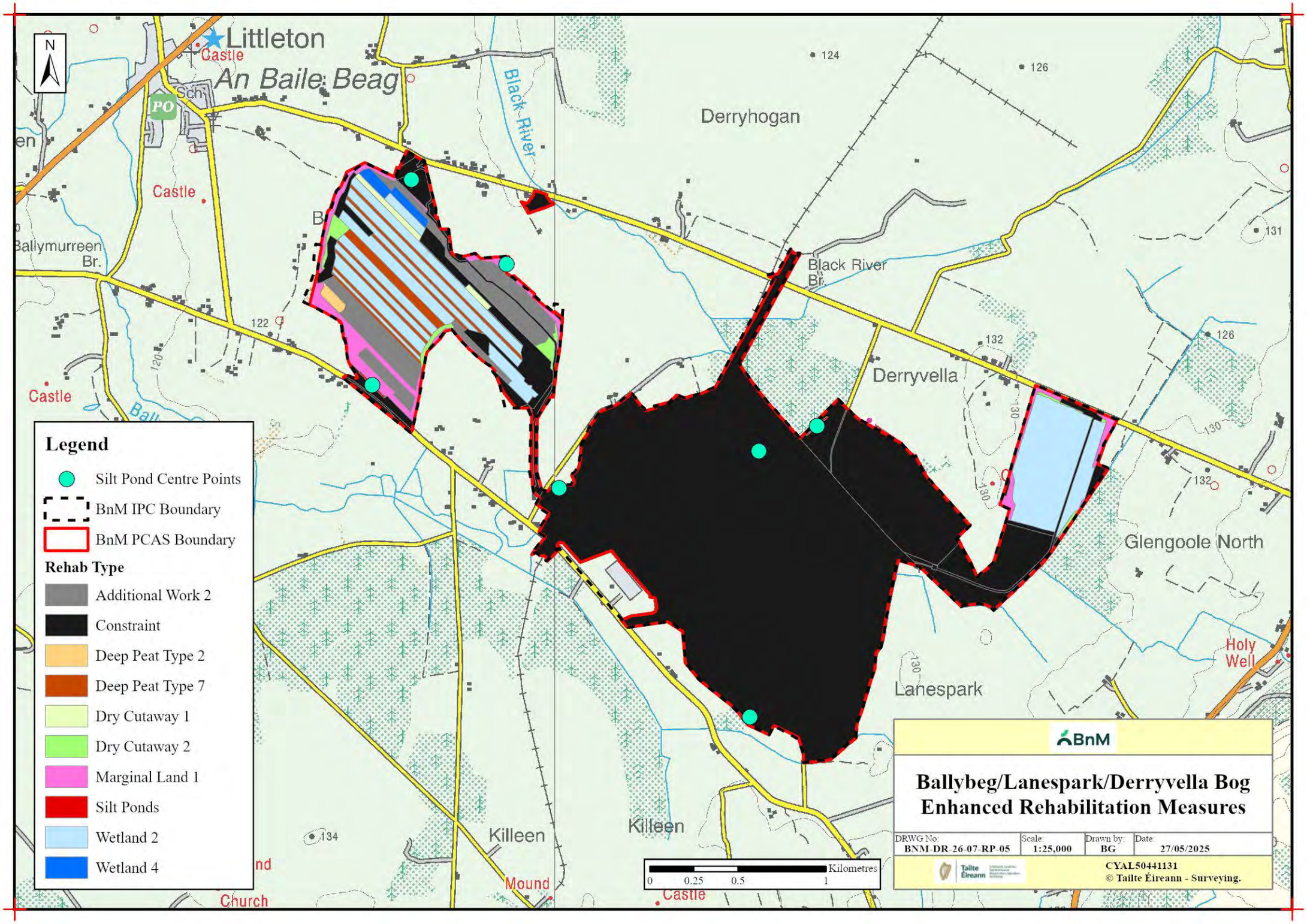

Note:
Catchments are numbered and colour coded
White Highlighted number = Catchment
Yellow Highlighted number = Corresponding outlet
Orange Highlighted number = Corresponding inlet
Littleton
An Baile Beag
Castle
RAHINCH
Derryhogan
Black River
Black [Two Mile Borris]
Ballybeg
Ballymurreen Br.
DERRYVELLA
Derryvella
Ballyley River
Loch Dhoire
Eaile Loop
Glengoole North
Factory
LANESPARK
North Glengoole
New Birmingham
Holy Well
Lanespark
KILLEEN
Breegagh
Killeen
Mound
Church
Legend
Bog Outflow Point
External Drains
Modelled Depressions
BnM IPC Boundary
BnM PCAS Boundary
Predicted Water Depths
Classified in m
0 - 0.2
0.21 - 0.5
0.51 - 1
1.01 - 2
Kilometres
0 0.25 0.5 1
BnM
Ballybeg/Lanespark/Derryvella Bog
Depression Analysis
DRWG No: BNM-DR-26-07-RP-09
Scale: 1:25,000
Drawn by: BG
Date: 27/05/2025
CYAL50441131
© Tailte Éireann - Surveying.

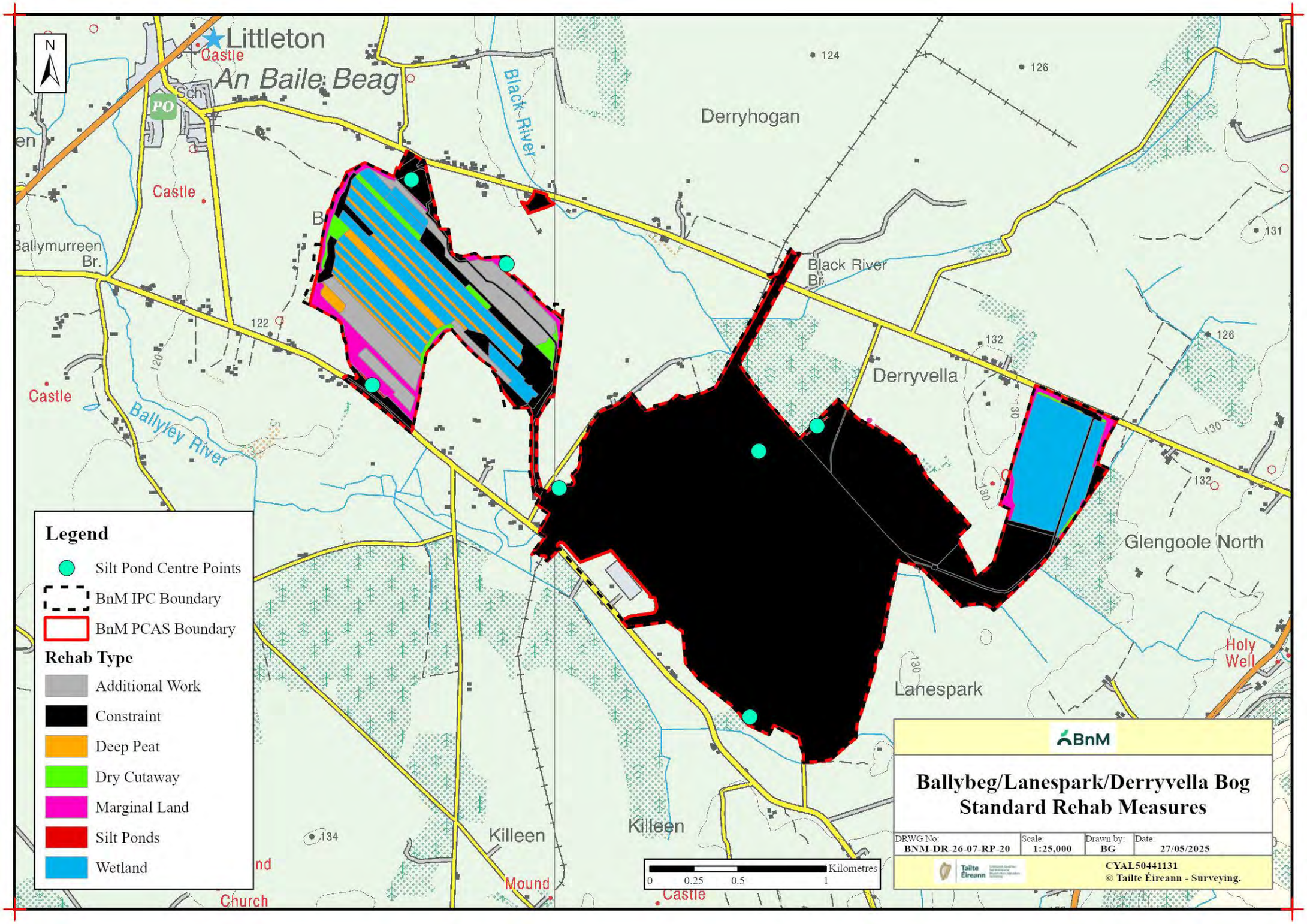
BNM-DR-26-07-RP-13: General Drainage Map

Back to TOC



Rehabilitation Maps


Littleton
An Baile Beag
Castle
PO
Black River
Derryhogan
Black River Br.
Ballymurreen Br.
Derryvella
Glengoole North
Lanespark
Holy Well
Killeen
Mound
Church
Legend
Silt Pond Centre Points
BnM IPC Boundary
BnM PCAS Boundary
Rehab Type
Additional Work 2
Constraint
Deep Peat Type 2
Deep Peat Type 7
Dry Cutaway 1
Dry Cutaway 2
Marginal Land 1
Silt Ponds
Wetland 2
Wetland 4
Kilometres
0 0.25 0.5 1
BnM
Ballybeg/Lanespark/Derryvella Bog
Enhanced Rehabilitation Measures
DRWG No: BNM-DR-26-07-RP-05
Scale: 1:25,000
Drawn by: BG
Date: 27/05/2025
CYAL50441131
© Tailte Éireann - Surveying.


N
Littleton
Castle
An Baile Beag
PO
Sch
Castle
Ballymurreen Br.
Castle
Ballyley River
Black River
Derryhogan
124
126
131
Black River Br.
122
120
132
126
Derryvella
130
132
Glengoole North
Holy Well
130
Lanespark
Killeen
Killeen
134
Mound
Castle
Church
Legend
Silt Pond Centre Points
BnM IPC Boundary
BnM PCAS Boundary
Rehab Type
Additional Work
Constraint
Deep Peat
Dry Cutaway
Marginal Land
Silt Ponds
Wetland
Kilometres
0 0.25 0.5 1
BnM
Ballybeg/Lanespark/Derryvella Bog
Standard Rehab Measures
DRWG No: BNM-DR-26-07-RP-20
Scale: 1:25,000
Drawn by: BG
Date: 27/05/2025
Tailte Éireann
CYAL50441131
© Tailte Éireann - Surveying.

Upper Left: 620122E 662781N m

Upper Left: 625446E 662781N m

N

W E

S

BnM Boundary

General Habitats 2018

Hab_code3

- bare peat
- bog
- built
- conifer plantation
- cutover bog
- fen
- grassland or agriculture
- gravel sub soil
- heather
- heather and scrub
- open water
- pioneer open cutaway habitats
- riparian
- scrub
- scrub & grassland
- scrub & pioneer open cutaway habitats
- temporary flooded areas
- wetlands
- wetlands & scrub
- woodland

Mound

Black

An Abhainn Dubh

River

Kilmakill

s North

Longfordpass Br

Star-shaped Fort

Church

Longfordpass East

R676

130

127

122

120

Tailte Éireann

BnM

Longford Pass Habitat Map (2018)

DWG No.	Scale:	User:	Date:
BNM-ECO-15-01	1:13,000	LenihanM	14/05/2026

Tailte Éireann

CYAL50510154

© Tailte Éireann – Surveying.

Upper Left: 620122E 659047N m

Lower Right: 625446E 659047N m

Upper Left: 617409E 660175N m

Upper Left: 627648E 660175N m

N

W E

S

- BnM Boundary
- General Habitats 2018
- Hab_code3
- bare peat
- bog
- built
- conifer plantation
- cutover bog
- fen
- grassland or agriculture
- gravel sub soil
- heather
- heather and scrub
- open water
- pioneer open cutaway habitats
- riparian
- scrub
- scrub & grassland
- scrub & pioneer open cutaway habitats
- temporary flooded areas
- wetlands
- wetlands & scrub
- woodland

BnM

Littleton Bog Habitat Map (2018)

DWG No.	Scale:	User:	Date:
BNM-ECO-15-02	1:25,000	LenihanM	14/05/2026

Tailte Éireann

CYAL50510154
© Tailte Éireann – Surveying.

Upper Left: 617409E 652994N m

Lower Right: 627648E 652994N m

Upper Left: 618005E 653859N m

Upper Left: 623464E 653859N m

N

W E

S

BnM Boundary

General Habitats 2018

Hab_code3

- bare peat
- bog
- built
- conifer plantation
- cutover bog
- fen
- grassland or agriculture
- gravel sub soil
- heather
- heather and scrub
- open water
- pioneer open cutaway habitats
- riparian
- scrub
- scrub & grassland
- scrub & pioneer open cutaway habitats
- temporary flooded areas
- wetlands
- wetlands & scrub
- woodland

Black River Br.

Derryvella

122

132

130

19

21

BnM

Ballybeg Lanespark Derryvilla Habitat Map (2018)

DWG No.	Scale:	User:	Date:
BNM-ECO-15-03	1:13,329	LenihanM	14/05/2026

Tailte Éireann

CYAL50510154
© Tailte Éireann – Surveying.

Upper Left: 618005E 650030N m

Lower Right: 623464E 650030N m

Appendix 4-3

AERs

Facility Information Summary	
AER Reporting Year	2014
Licence Register Number	P0499-01
Name of site	Bord na Mona Littleton
Site Location	Lanespark, Littleton, Thurles, Co Tipperary
NACE Code	0892
Class/Classes of Activity	1.4
National Grid Reference (6E, 6 N)	220443, 151233

A description of the activities/processes at the site for the reporting year. This should include information such as production increases or decreases on site, any infrastructural changes, environmental performance which was measured during the reporting year **and an overview of compliance with your licence** listing all exceedances of licence limits (where applicable) and what they relate to e.g. air, water, noise.

Activities on site can be divided into two components, firstly the milling, harrowing, ridiging and harvesting of peat into stockpiles and secondly the transportation of that peat via an internal rail network to the Briquette Factory for processing into peat briquettes. Production achieved was approximately 288733 tonnes of milled peat and 594 tonnes of machine turf during 2014. Infrastructurally bog development extended to approximately 110 hectares at Templetuohy and Littleton bogs. This work included levelling and ditching. In addition works were completed on the Wind Farm site in Templetuohy. There were 44 non-compliances/incidents/breach of ELV, 16 related to factory stack emissions, 23 related to emissions to water. Of these 9 were breaches of ELV non compliances. There was one environmental complaint received during the reporting period which was resolved. In relation to silt pond cleaning, 100% of ponds received one cleaning with some ponds receiving more depending on inspection results. The silt pond upgrade program was ongoing during the reporting year. There was a big effort made to recycle old sod turf machinery and obsolete rail line, this work is to be completed in 2015. Decommissioning and Rehabilitation works are described in an attachment.

Declaration:

All the data and information presented in this report has been checked and certified as being

Signature	Date: 07/05/2015
Group/Facility manager (or nominated, suitably qualified and	

AIR-summary template

Lic No: #REF! Year #REF!

Answer all questions and complete all tables where relevant

			Additional information
1	Does your site have licensed air emissions? If yes please complete table A1 and A2 below for the current reporting year and answer further questions. If **you do not have** licenced emissions and **do not complete a solvent management plan** (table A4 and A5) you do not need to complete the tables	Yes	Fugitive emissions also

Periodic/Non-Continuous Monitoring

2	Are there any results in breach of licence requirements? If yes please provide brief details in the comment section of TableA1 below	Yes	
3	Was all monitoring carried out in accordance with EPA guidance note AG2 and using the basic air monitoring checklist? Basic air monitoring checklist AGN2	Yes	

Table A1: Licensed Mass Emissions/Ambient data-periodic monitoring (non-continuous)

Emission reference no:	Parameter/ Substance	Frequency of Monitoring	ELV in licence or any revision therof	Licence Compliance criteria	Measured value	Unit of measurement	Compliant with licence limit	Method of analysis	Annual mass load (kg)	Comments - reason for change in % mass load from previous year if applicable
B101	Nitrogen oxides (NOx/NO2)	Annual	31536	100 % of values < ELV	15.02	kg/hour	no (if no please enter details in comments box)	ISO 10849:1996	81543.58	See Incidents section
B101	Sulphur oxides (SOx/SO2)	Annual	315360	100 % of values < ELV	2.9	kg/hour	yes	ISO 7935: 1992	15744	
B101	Carbon monoxide (CO)	Annual	NA	NA	26.19	kg/hour	yes	ISO 12039:2001	142185	
B101	Total Particulates	Annual	126114	100 % of values < ELV	43.04	kg/hour	no (if no please enter details in comments box)	OTH	233664	See Incidents section
A101	Total Particulates	Annual	45796	100 % of values < ELV	6.38	kg/hour	Yes	OTH	3.637	
A102	Total Particulates	Annual	55714	100 % of values < ELV	13.18	kg/hour	yes	OTH	71554	See Incidents section
A103	Total Particulates	Annual	61320	100 % of values < ELV	1.06	kg/hour	yes	OTH	5755	
A104	Total Particulates	Annual	52560	100 % of values < ELV	4.36	kg/hour	yes	OTH	23670	
A105	Total Particulates	Annual	8931	101 % of values < ELV	0.08	kg/hour	yes	OTH	434	
A106	Total Particulates	Annual	867	102 % of values < ELV	0.02	kg/hour	yes	OTH	109	

Note 1: Volumetric flow shall be included as a reportable parameter

AIR-summary template	Lic No:	#REF!	Year	#REF!

Continuous Monitoring

4	Does your site carry out continuous air emissions monitoring?	No	

If yes please review your continuous monitoring data and report the required fields below in Table A2 and compare it to its relevant Emission Limit Value (ELV)

5	Did continuous monitoring equipment experience downtime? If yes please record downtime in table A2 below	NA	
6	Do you have a proactive service agreement for each piece of continuous monitoring equipment?	NA	
7	Did your site experience any abatement system bypasses? If yes please detail them in table A3 below	NA	

Table A2: Summary of average emissions -continuous monitoring

Emission reference no:	Parameter/ Substance	ELV in licence or any revision therof	Averaging Period	Compliance Criteria	Units of measurement	Annual Emission	Annual maximum	Monitoring Equipment downtime (hours)	Number of ELV exceedences in current reporting year	Comments
DM-01	Total Particulates	350	308	Daily average < ELV	mg/m2/day	43148	391	0	1	
DM-02	Total Particulates	350	308	Daily average < ELV	mg/m2/day	64120	602	0	2	
DM-03	Total Particulates	350	308	Daily average < ELV	mg/m2/day	36764	258	0	0	
DM-04	Total Particulates	350	308	Daily average < ELV	mg/m2/day	44072	417	0	1	
	SELECT				SELECT					

note 1: Volumetric flow shall be included as a reportable parameter.

Table A3: Abatement system bypass reporting table Bypass protocol

Date*	Duration** (hours)	Location	Reason for bypass	Impact magnitude	Corrective action

* this should include all dates that an abatement system bypass occurred

** an accurate record of time bypass beginning and end should be logged on site and maintained for future Agency inspections please refer to bypass protocol link

AIR-summary template	Lic No:	#REF!	Year	#REF!

Solvent use and management on site

8 Do you have a total Emission Limit Value of direct and fugitive emissions on site? if yes please fill out tables A4 and A5

SELECT

Table A4: Solvent Management Plan Summary
Total VOC Emission limit value

Solvent regulations — Please refer to linked solvent regulations to complete table 5 and 6

Reporting year	Total solvent input on site (kg)	Total VOC emissions to Air from entire site (direct and fugitive)	Total VOC emissions as %of solvent input	Total Emission Limit Value (ELV) in licence or any revision therof	Compliance
					SELECT
					SELECT

Table A5: Solvent Mass Balance summary

	(I) Inputs (kg)	(O) Outputs (kg)						
Solvent	(I) Inputs (kg)	Organic solvent emission in waste	Solvents lost in water (kg)	Collected waste solvent (kg)	Fugitive Organic Solvent (kg)	Solvent released in other ways e.g.	Solvents destroyed onsite through	Total emission of Solvent to air (kg)
							Total	

AER Monitoring returns summary template-WATER/WASTEWATER(SEWER) Lic No: #REF! Year #REF!

			Additional information
1	Does your site have licensed emissions direct to surface water or direct to sewer? If yes please complete table W2 and W3 below for the current reporting year and answer further questions. If **you do not have** licenced emissions you only need to complete table W1 and or W2 for storm water analysis and visual inspections	Yes	
2	Was it a requirement of your licence to carry out visual inspections on any surface water discharges or watercourses on or near your site? If yes please complete table W2 below summarising only any evidence of contamination noted during visual inspections	Yes	Monthly COD analysis of yard runoff is attached in a separate document.

Table W1 Storm water monitoring

Location reference	Location relative to site activities	PRTR Parameter	Licenced Parameter	Monitoring date	ELV or trigger level in licence or any revision thereof*	Licence Compliance criteria	Measured value	Unit of measurement	Compliant with licence	Comments
	SELECT	SELECT	SELECT			SELECT		SELECT	SELECT	
	SELECT	SELECT	SELECT			SELECT		SELECT	SELECT	

*trigger values may be agreed by the Agency outside of licence conditions

Table W2 Visual inspections-Please only enter details where contamination was observed.

Location Reference	Date of inspection	Description of contamination	Source of contamination	Corrective action	Comments
			SELECT		
			SELECT		

Licensed Emissions to water and /or wastewater(sewer)-periodic monitoring (non-continuous)

3	Was there any result in breach of licence requirements? If yes please provide brief details in the comment section of Table W3 below			Yes	There was one breach at PW-102 however this can only be established at year end when 100% of results are assessed.
4	Was all monitoring carried out in accordance with EPA guidance and checklists for Quality of Aqueous Monitoring Data Reported to the EPA? If no please detail what areas require improvement in additional information box	External /Internal Lab Quality checklist	Assessment of results checklist	Yes	Surface water monitoring was carried out on a quarterly basis. The results of which are attached. Monthly COD yard runoff results are also attached.

Table W3: Licensed Emissions to water and /or wastewater (sewer)-periodic monitoring (non-continuous)

Emission reference no:	Emission released to	Parameter/ SubstanceNote 1	Type of sample	Frequency of monitoring	Averaging period	ELV or trigger values in licence or any revision thereof Note 2	Licence Compliance criteria	Measured value	Unit of measurement	Compliant with licence	Method of analysis	Procedural reference source	Procedural reference standard number	Annual mass load (kg)	Comments
									SELECT	SELECT	SELECT	SELECT			

Note 1: Volumetric flow shall be included as a reportable parameter

Note 2: Where Emission Limit Values (ELV) do not apply to your licence please compare results against EQS for Surface water or relevant receptor quality standards

AER Monitoring returns summary template-WATER/WASTEWATER(SEWER) Lic No: #REF! Year #REF!

Continuous monitoring

			Additional Information
5	Does your site carry out continuous emissions to water/sewer monitoring?	Yes	

If yes please summarise your continuous monitoring data below in Table W4 and compare it to its relevant Emission Limit Value (ELV)

6	Did continuous monitoring equipment experience downtime? **If yes please record downtime in table W4 below**	Yes	Down time is primarily due to no flow/discharge, battery failure and or frozen pipes.
7	Do you have a proactive service contract for each piece of continuous monitoring equipment on site?	Yes	Annual calibration schedule and trouble shooting service
8	Did abatement system bypass occur during the reporting year? **If yes please complete table W5 below**	No	

Table W4: Summary of average emissions -continuous monitoring

Emission reference no:	Emission released to	Parameter/ Substance	ELV or trigger values in licence or any revision thereof	Averaging Period	Compliance Criteria	Units of measurement	Annual Emission for current reporting year (kg)	% change +/- from previous reporting year	Monitoring Equipment downtime (hours)	Number of ELV exceedences in reporting year	Comments
SW18	Water	Suspended Solids	35	24 hour	All results < 1.5 times ELV, plus 8 from ten results must be < ELV	mg/L	52712	98%	5040	8	Down time primarily due to battery failure, frozen pipes and in particular at this site no flow as it is a pumped site.
SW18	Water	Ammonia (as N)	NA	Weekly	NA	mg/L	383.51	-45%			
SW18	Water	Total phosphorus	NA	Weekly	NA	mg/L	18.1	-38%			
SW18	Water	COD	NA	Weekly	NA	mg/L	29181	-43%			
SW18	Water	Total Dissolved Solids	NA	Weekly	NA	mg/L	395861	44%			
SW18	Water	volumetric flow	NA	24 hour	NA	m3/day	2789957	-45%			

note 1: Volumetric flow shall be included as a reportable parameter.

Table W5: Abatement system bypass reporting table

Date	Duration (hours)	Location	Resultant emissions	Reason for bypass	Corrective action*	Was a report submitted to the EPA?	When was this report submitted?
						SELECT	

*Measures taken or proposed to reduce or limit bypass frequency

Bund/Pipeline testing template

Lic No: #REF! Year #REF!

Bund testing

dropdown menu click to see options

			Additional information
1	Are you required by your licence to undertake integrity testing on bunds and containment structures ? if yes please fill out table B1 below listing all **new bunds and containment structures** on site, in addition to **all bunds which failed** the integrity test-**all bunding structures which failed including mobile bunds must be listed in the table below, please include all bunds outside the licenced testing period** (mobile bunds and chemstore included)	Yes	
2	Please provide integrity testing frequency period	2 Yearly	
3	Does the site maintain a register of bunds, underground pipelines (including stormwater and foul), Tanks, sumps and containers? (containers refers to "Chemstore" type units and mobile bunds)	Yes	
4	How many bunds are on site?	4	
5	How many of these bunds have been tested within the required test schedule?	3	3 Tested and passed, 4th due in 2015
6	How many mobile bunds are on site?	8	These include barrel trays located within workshops
7	Are the mobile bunds included in the bund test schedule?	No	
8	How many of these mobile bunds have been tested within the required test schedule?	NA	
9	How many sumps on site are included in the integrity test schedule?	NA	
10	How many of these sumps are integrity tested within the test schedule?	NA	
	Please list any sump integrity failures in table B1		
11	Do all sumps and chambers have high level liquid alarms?	N/A	
12	If yes to Q11 are these failsafe systems included in a maintenance and testing programme?	N/A	
13	Is the Fire Water Retention Pond included in your integrity test programme?	SELECT	

Table B1: Summary details of bund /containment structure integrity test

Bund/Containment structure ID	Type	Specify Other type	Product containment	Actual capacity	Capacity required*	Type of integrity test	Other test type	Test date	Integrity reports maintained on site?	Results of test	Integrity test failure explanation <50 words	Corrective action taken	Scheduled date for retest	Results of retest(if in current reporting year)
	SELECT					SELECT			SELECT	SELECT		SELECT		
	SELECT					SELECT			SELECT	SELECT		SELECT		

* Capacity required should comply with 25% or 110% containment rule as detailed in your licence

			Commentary
15	Has integrity testing been carried out in accordance with licence requirements and are all structures tested in line with BS8007/EPA Guidance?	bunding and storage guidelines	SELECT
16	Are channels/transfer systems to remote containment systems tested?		SELECT
17	Are channels/transfer systems compliant in both integrity and available volume?		SELECT

Pipeline/underground structure testing

1	Are you required by your licence to undertake integrity testing* on underground structures e.g. pipelines or sumps etc ? if yes please fill out table 2 below listing all underground structures and pipelines on site **which failed the integrity test and all which have not been tested withing the integrity test period as specified**	Yes	
2	Please provide integrity testing frequency period	3 years	

*please note integrity testing means water tightness testing for process and foul pipelines (as required under your licence)

Table B2: Summary details of pipeline/underground structures integrity test

Structure ID	Type system	Material of construction:	Does this structure have Secondary containment?	Type of secondary containment	Type integrity testing	Integrity reports maintained on site?	Results of test	Integrity test failure explanation <50 words	Corrective action taken	Scheduled date for retest	Results of retest(if in current reporting year)
	SELECT	SELECT	SELECT	SELECT	SELECT	SELECT	SELECT				SELECT

Please use commentary for additional details not answered by tables/ questions above

Groundwater/Soil monitoring template	Lic No:	#REF!	Year	#REF!

			Comments	
1	Are you required to carry out groundwater monitoring as part of your licence requirements?	no		Please provide an interpretation of groundwater monitoring data in the interpretation box below or if you require additional space please include a groundwater/contaminated land monitoring results interpretaion as an additional section in this AER
2	Are you required to carry out soil monitoring as part of your licence requirements?	no		
3	Do you extract groundwater for use on site? If yes please specify use in comment section	no	Process water extracted from surface water river.	
4	Do monitoring results show that groundwater generic assessment criteria such as GTVs or IGVs are exceeded or is there an upward trend in results for a substance? If yes, please complete the Groundwater Monitoring Guideline Template Report (link in cell G8) and submit separately through ALDER as a licensee return AND answer questions 5-12 below. Groundwater monitoring template	no		Please enter interpretation of data here
5	Is the contamination related to operations at the facility (either current and/or historic)	N/A		
6	Have actions been taken to address contamination issues?If yes please summarise remediation strategies proposed/undertaken for the site	NA		
7	Please specify the proposed time frame for the remediation strategy	NA		
8	Is there a licence condition to carry out/update ELRA for the site?	NA		
9	Has any type of risk assesment been carried out for the site?	NA		
10	Has a Conceptual Site Model been developed for the site?	NA		
11	Have potential receptors been identified on and off site?	NA		
12	Is there evidence that contamination is migrating offsite?	NA		

Table 1: Upgradient Groundwater monitoring results

Date of sampling	Sample location reference	Parameter/ Substance	Methodology	Monitoring frequency	Maximum Concentration++	Average Concentration+	unit	GTV's*	SELECT**	Upward trend in pollutant concentration over last 5 years of monitoring data
							SELECT			SELECT
							SELECT			SELECT

.+ where average indicates arithmetic mean

.++ maximum concentration indicates the maximum measured concentration from all monitoring results produced during the reporting year

Table 2: Downgradient Groundwater monitoring results

Date of sampling	Sample location reference	Parameter/ Substance	Methodology	Monitoring frequency	Maximum Concentration	Average Concentration	unit	GTV's*	SELECT**	Upward trend in yearly average pollutant concentration over last 5 years of monitoring data
							SELECT			SELECT
							SELECT			SELECT

Groundwater/Soil monitoring template	Lic No:	#REF!	Year	#REF!

*please note exceedance of generic assessment criteria (GAC) such as a Groundwater Threshold Value (GTV) or an Interim Guideline Value (IGV) or an upward trend in results for a substance indicates that further interpretation of monitoring results is required. In addition to completing the above table, please complete the Groundwater Monitoring Guideline Template Report at the link provided and submit separately through ALDER as a licensee return or as otherwise instructed by the EPA.	Groundwater monitoring template
More information on the use of soil and groundwater standards/ generic assessment criteria (GAC) and risk assessment tools is available in the EPA published guidance (see the link in G31)	Guidance on the Management of Contaminated Land and Groundwater at EPA Licensed Sites (EPA 2013).

**Depending on location of the site and proximity to other sensitive receptors alternative Receptor based Water Quality standards should be used in addition to the GTV e.g. if the site is close to surface water compare to Surface Water Environmental Quality Standards (SWEQS), If the site is close to a drinking water supply compare results to the Drinking Water Standards (DWS)	Surface water EQS	Groundwater regulations GTV's	Drinking water (private supply) standards	Drinking water (public supply) standards	Interim Guideline Values (IGV)

Table 3: Soil results

Date of sampling	Sample location reference	Parameter/ Substance	Methodology	Monitoring frequency	Maximum Concentration	Average Concentration	unit
							SELECT
							SELECT

Where additional detail is required please enter it here in 200 words or less

Environmental Liabilities template	Lic No:	#REF!	Year	#REF!

Click here to access EPA guidance on Environmental Liabilities and Financial provision

			Commentary
1	ELRA initial agreement status	Not a Licence Requirement	
2	ELRA review status	NA	
3	Amount of Financial Provision cover required as determined by the latest ELRA	NA	
4	Financial Provision for ELRA status	NA	
5	Financial Provision for ELRA - amount of cover	NA	
6	Financial Provision for ELRA - type	NA	
7	Financial provision for ELRA expiry date	NA	
8	Closure plan initial agreement status	NA	Internal Budget Provision
9	Closure plan review status	NA	Internal Budget Provision
10	Financial Provision for Closure status	NA	Internal Budget Provision
11	Financial Provision for Closure - amount of cover	NA	Internal Budget Provision
12	Financial Provision for Closure - type	NA	Internal Budget Provision
13	Financial provision for Closure expiry date	NA	

Environmental Management Programme/Continuous Improvement Programme template

Lic No: #REF! Year #REF!

Highlighted cells contain dropdown menu click to view

			Additional Information
1	Do you maintain an Environmental Mangement System (EMS) for the site. If yes, please detail in additional information	SELECT	
2	Does the EMS reference the most significant environmental aspects and associated impacts on-site	SELECT	
3	Does the EMS maintain an Environmental Management Programme (EMP) as required in accordance with the licence requirements	SELECT	
4	Do you maintain an environmental documentation/communication system to inform the public on environmental performance of the facility, as required by the licence	SELECT	

Environmental Management Programme (EMP) report

Objective Category	Target	Status (% completed)	How target was progressed	Responsibility	Intermediate outcomes
Reduction of emissions to Air	Training.Continue to train all employees in environmental matters. Training will be by means of the screening of an environmental DVD, followed by a power point presentation. Headland Peat Collection. Continue with the collection of headland peat, particularly at dust sensitive locations.	70	In total 31 Personnel received training in 2014. Approximately 6000 tonnes of headland peat was collected and returned as part of overall production figures. In addition six hydraulic harrows were deployed at dust sensitive locations.	Section Head	Reduced emissions
Waste reduction/Raw material usage efficiency	Waste Streamlining.It is planned to continue with and where possible improve the current waste management service provided by AES Ltd	100	Installed a waste management system. Quarterly waste reports are returned for records/filing and waste streams are segrated on site to maximise recycling potential.	Section Head	Improved Environmental Management Practices

Environmental Management Programme/Continuous Improvement Programme template			Lic No:	#REF!	Year	#REF!
Reduction of emissions to Water	Training. Continue to train all employees in environmental matters. Training will be by means of the screening of an environmental DVD, followed by a power point presentation. Silt Pond survey also planned.	100	In total 31 Personnel received training in 2014. Silt pond upgrade works were ongoing and forthnightly silt pond inspections.	Section Head	Reduced emissions	
Materials Handling/Storage/Bunding	Increased bund capacity will be provided where required.	100	There was no increased bund capacity provided or required.	Section Head	Improved Environmental Management Practices	
Waste reduction/Raw material usage efficiency	Continue with the recycling of polyethylene. The sourcing of more recycling contractors will be ongoing.	100	In total approximately 162.42 tonnes were sent off site for recycling. Procurement also exploring the possibility of securing further recyclers.	Section Head	Reduced emissions	
Energy Efficiency/Utility conservation	Carry out a review of energy aspects identifying significant energy users.	50	Workshop audits were carried out the purpose being to establish the possibility of utilising natural light. Pump sites in Templetuohy were rationalised to reduce consumption	Section Head	Improved Environmental Management Practices	

Noise monitoring summary report	Lic No:	#REF!	Year	#REF!

1	Was noise monitoring a licence requirement for the AER period? If yes please fill in table N1 noise summary below	No
2	Was noise monitoring carried out using the EPA Guidance note, including completion of the "Checklist for noise measurement report" included in the guidance note as table 6? (Noise Guidance note NG4)	NA
3	Does your site have a noise reduction plan	NA
4	When was the noise reduction plan last updated?	
5	Have there been changes relevant to site noise emissions (e.g. plant or operational changes) since the last noise survey?	NA

Table N1: Noise monitoring summary

Date of monitoring	Time period	Noise location (on site)	Noise sensitive location -NSL (if applicable)	LA_{eq}	LA_{90}	LA_{10}	LA_{max}	Tonal or Impulsive noise* (Y/N)	If tonal /impulsive noise was identified was 5dB penalty applied?	Comments (ex. main noise sources on site, & extraneous noise ex. road traffic)	Is site compliant with noise limits (day/evening/night)?
								SELECT	SELECT		SELECT

*Please ensure that a tonal analysis has been carried out as per guidance note NG4. These records must be maintained onsite for future inspection

If noise limits exceeded as a result of noise attributed to site activities, please choose the corrective action from the following options? SELECT

** please explain the reason for not taking action/resolution of noise issues?
Any additional comments? (less than 200 words)

Resource Usage/Energy efficiency summary

Lic No: #REF! Year #REF!

			Additional information
1	When did the site carry out the most recent energy efficiency audit? Please list the recommendations in table 3 below	2013	
2	Is the site a member of any accredited programmes for reducing energy usage/water conservation such as the SEAI programme linked to the right? If yes please list them in additional information	Yes	
3	Where Fuel Oil is used in boilers on site is the sulphur content compliant with licence conditions? Please state percentage in additional information	SELECT	

SEAI - Large Industry Energy Network (LIEN)

Table R1 Energy usage on site

Energy Use	Previous year	Current year	Production +/- % compared to previous reporting year**	Energy Consumption +/- % vs overall site production*
Total Energy Used (MWHrs)	143733	135852	-33%	-5.50%
Total Energy Generated (MWHrs)				
Total Renewable Energy Generated (MWHrs)				
Electricity Consumption (MWHrs)	1749.51	1820.19		4%
Fossil Fuels Consumption:				
Heavy Fuel Oil (m3)				
Light Fuel Oil (m3)	1130.12	917.64		-18.80%
Natural gas (m3)				
Coal/Solid fuel (metric tonnes)				
Peat (metric tonnes)	57376	57682		0.50%
Renewable Biomass				
Renewable energy generated on site				

* where consumption of energy can be compared to overall site production please enter this information as percentage increase or decrease compared to the previous reporting year.

** where site production information is available please enter percentage increase or decrease compared to previous year

Table R2 Water usage on site

					Water Emissions	Water Consumption	
Water use	Water extracted Previous year m3/yr.	Water extracted Current year m3/yr.	Production +/- % compared to previous reporting year**	Energy Consumption +/- % vs overall site production*	Volume Discharged back to environment(m^3yr):	Volume used i.e not discharged to environment e.g. released as steam m3/yr	Unaccounted for Water:
Groundwater							
Surface water							
Public supply							
Recycled water							
Total							

* where consumption of water can be compared to overall site production please enter this information as percentage increase or decrease compared to the previous reporting year.

** where site production information is available please enter percentage increase or decrease compared to previous year

Table R3 Waste Stream Summary

	Total	Landfill	Incineration	Recycled	Other
Hazardous (Tonnes)	9.629			9.629	
Non-Hazardous (Tonnes)	2163.98	128.02	0	270.96	1765

Resource Usage/Energy efficiency summary Lic No: #REF! Year #REF!

Table R4: Energy Audit finding recommendations

Date of audit	Recommendations	Description of Measures proposed	Origin of measures	Predicted energy savings %	Implementation date	Responsibility	Completion date	Status and comments
			SELECT					
			SELECT					
			SELECT					

Table R5: Power Generation: Where power is generated onsite (e.g. power generation facilities/food and drink industry)please complete the following information

	Unit ID	Unit ID	Unit ID	Unit ID	Station Total
Technology					
Primary Fuel					
Thermal Efficiency					
Unit Date of Commission					
Total Starts for year					
Total Running Time					
Total Electricity Generated (GWH)					
House Load (GWH)					
KWH per Litre of Process Water					
KWH per Litre of Total Water used on Site					

Complaints and Incidents summary template Lic No: #REF! Year #REF!

Complaints		
		Additional information
Have you received any environmental complaints in the current reporting year? If yes please complete summary details of complaints received on site in table 1 below	Yes	One complaint in relation to flooding

Table 1 Complaints summary

Date	Category	Other type (please specify)	Brief description of complaint (Free txt <20 words)	Corrective action< 20 words	Resolution status	Resolution date	Further information
22/09/2014	Water		Complaint of flooding on adjacent land to Bord na Mona.	Cleaned outfall which resolved complaint	Complete	Nov-14	
	SELECT				SELECT		
	SELECT				SELECT		
	SELECT				SELECT		
	SELECT				SELECT		

Total complaints open at start of reporting year	0
Total new complaints received during reporting year	1
Total complaints closed during reporting year	1
Balance of complaints end of reporting year	0

Complaints and Incidents summary template Lic No: #REF! Year #REF!

Incidents		Additional information
Have any incidents occurred on site in the current reporting year? Please list all incidents for current reporting year in Table 2 below	Yes	

*For information on how to report and what constitutes an incident	What is an incident

Table 2 Incidents summary

Date of occurrence	Incident nature	Location of occurrence	Incident category*please refer to guidance	Receptor	Cause of incident	Other cause(please specify)	Activity in progress at time of incident	Communication	Occurrence	Corrective action<20 words	Preventative action <20 words	Resolution status	Resolution date	Likelihood of reoccurence
20/02/2014	Breach of ELV	SW-18	1. Minor	Water	Adverse weather		Normal activities	EPA	New	Silt pond examined. Water level high at last inspection. Silt visible at surface on half pond on 22nd March. Scheduled for cleaning. Cleaning started on 24th March and finished on 26th March. Outlet also cleaned.	Survey of pond inlet and outlet to ascertain if outlet can be raised.	Complete	30/04/2014	Low
10/03/2014	Breach of ELV	B101	1. Minor	Air	Plant or equipment issues		Normal activities	EPA	New	Corrective action at time not an option	Air abatement system proposal with Agency	Ongoing	01/09/2015	Low
10/03/014	Breach of ELV	A101	1. Minor	Air	Plant or equipment issues		Normal activities	EPA	New	Analysis of previous results	Awaiting future results	Ongoing	30/06/2014	Low
10/03/2014	Breach of ELV	A102	1. Minor	Air	Plant or equipment issues		Normal activities	EPA	New	Analysis of previous results	Awaiting future results	Ongoing	30/06/2014	Low
10/03/2014	Breach of ELV	B101	1. Minor	Air	Plant or equipment issues		Normal activities	EPA	New	None Taken at time	Investigating possible technology to address issue	Ongoing	30/06/2014	Low
20/03/2014	Breach of ELV	SW-18	1. Minor	Water	Adverse weather		Normal activities	EPA	Recurring	Pond and outlet cleaned from 3/4/2014 to 8/4/2014.	Survey of pond inlet and outlet to ascertain if outlet can be raised.	Complete	30/04/2014	Medium
21/03/2014	Breach of ELV	SW-18	1. Minor	Water	Adverse weather		Normal activities	EPA	Recurring	Pond and outlet cleaned from 3/4/2014 to 8/4/2014.	Survey of pond inlet and outlet to ascertain if outlet can be raised.	Complete	30/04/2014	Medium
24/03/2014	Breach of ELV	SW-18	1. Minor	Water	Adverse weather		Normal activities	EPA	Recurring	Pond and outlet cleaned from 3/4/2014 to 8/4/2014.	Survey of pond inlet and outlet to ascertain if outlet can be raised.	Complete	30/04/2014	Medium
25/03/2014	Breach of ELV	SW-18	1. Minor	Water	Adverse weather		Normal activities	EPA	Recurring	Pond and outlet cleaned from 3/4/2014 to 8/4/2014.	Survey of pond inlet and outlet to ascertain if outlet can be raised.	Complete	30/04/2014	Medium
03/04/2014	Breach of ELV	SW - 18	1. Minor	Water	Operational controls		Normal activities	EPA	Recurring	Pond cleaned	Survey of pond inlet and outlet to ascertain if outlet can be raised.	Complete	30/04/2014	Medium

Complaints and Incidents summary template					Lic No:	#REF!		Year	#REF!					
11/04/2014	Breach of ELV	B101	1. Minor	Air	Plant or equipment issues		Normal activities	EPA	Recurring	None Taken at time	Investigating possible technology to address issue	Ongoing	01/04/2015	Low
11/04/2014	Breach of ELV	A102	1. Minor	Air	Plant or equipment issues		Normal activities	EPA	New	None Taken at time	Investigating possible technology to address issue	Ongoing	01/07/2014	Low
11/04/2014	Breach of ELV	B101	1. Minor	Air	Plant or equipment issues		Normal activities	EPA	Recurring	None Taken at time	Check plant at overhaul	Ongoing	01/07/2014	Low
11/04/2014	Breach of ELV	A101	1. Minor	Air	Plant or equipment issues		Normal activities	EPA	Recurring	None Taken at time	EPA guidance sought	Ongoing	11/04/2014	Low
11/04/2014	Breach of ELV	A102	1. Minor	Air	Plant or equipment issues		Normal activities	EPA	Recurring	None Taken at time	EPA guidance sought	Ongoing	11/04/2014	Low
17/04/2014	Breach of ELV	SW18	1. Minor	Water	Adverse weather		Normal activities	EPA	Recurring	Pond cleaning records inspected	Raise pond outlet to increase efficiency	Ongoing	30/06/2014	High
20/04/2014	Breach of ELV	SW18	1. Minor	Water	Adverse weather		Normal activities	EPA	Recurring	Pond cleaning records inspected	Raise pond outlet to increase efficiency	Ongoing	30/06/2014	High
21/04/2014	Breach of ELV	SW18	1. Minor	Water	Adverse weather		Normal activities	EPA	Recurring	Pond cleaning records inspected	Raise pond outlet to increase efficiency	Ongoing	30/06/2014	High
Apr-2014	Breach of ELV	DM-02	1. Minor	Air	Plant or equipment issues		Normal activities	EPA	New	Review position of gauge in relation to adjacent machine pass	Moved gauge away from machine pass	Complete	01/06/2014	Low
May-2014	Breach of ELV	DM-01	1. Minor	Air	Other (add details)	Potential 3rd party interference	Normal activities	EPA	Recurring	Report to Agency and investigate	Secure gauge to prevent further interference	Complete	01/06/2014	Low
May-2014	Breach of ELV	DM-04	1. Minor	Air	Other (add details)	Potential 3rd party interference	Normal activities	EPA	Recurring	Report to Agency and investigate	Secure gauge to prevent further interference	Complete	01/06/2014	Low
25/07/2014	Spillage	Other location (Factory Yard)	1. Minor	Ground	Plant or equipment issues		Normal activities	EPA	New	Outlet isolated and hose connection replaced. Boom and spill kit deployed.	Daily inspection of plant.	Complete	01/08/2014	Low
Sep-14	Breach of ELV	DM-02	1. Minor	Air	Plant or equipment issues		Normal activities	EPA	Recurring	Review position of gauge in relation to adjacent machine pass	Moved gauge away from machine pass	Complete	01/10/2014	Low
04/11/2014	Breach of ELV	B101	1. Minor	Air	Plant or equipment issues		Normal activities		Recurring	None Taken at time	Air abatement system proposal with Agency	Ongoing	01/04/2015	Low
04/11/2014	Breach of ELV	A101	1. Minor	Air	Plant or equipment issues		Normal activities		Recurring	None Taken at time	Abatement system to be checked during next outage	Complete	31/12/2014	Low

Complaints and Incidents summary template Lic No: #REF! Year #REF!

04/11/2014	Breach of ELV	A104	1. Minor	Air	Plant or equipment issues		Normal activities		Recurring	None Taken at time	Abatement system to be checked during next outage	Complete	04/11/2014	Low
04/11/2014	Breach of ELV	B101	1. Minor	Air	Plant or equipment issues		Normal activities		Recurring	None Taken at time	Check boiler during next outage	Complete	04/11/2014	Low
04/11/2014	Breach of ELV	B101	1. Minor	Air	Plant or equipment issues		Normal activities		Recurring	None Taken at time	Agency guidance currently being sought	Complete	04/11/2014	Low
04/11/2014	Breach of ELV	A101	1. Minor	Air	Plant or equipment issues		Normal activities		Recurring	None Taken at time	Agency guidance currently being sought	Complete	04/11/2014	Low
04/11/2014	Breach of ELV	A102	1. Minor	Air	Plant or equipment issues		Normal activities		Recurring	None Taken at time	Agency guidance currently being sought	Complete	04/11/2014	Low
26/11/2014	Other(Audit Finding)	IPPC Licence P0499-01	1. Minor	NA	Operational controls		Normal activities		New	Report on ALDER		Complete		Low
26/11/2014	Other(Audit Finding)	IPPC Licence P0499-02	1. Minor	NA	Operational controls		Normal activities		New	Report on ALDER		Complete		Low
Dec-14	Breach of ELV	PW-102	1. Minor	Water	Operational controls		Normal activities	EPA	New	Clean ponds when ELV exceeded	Include Factory ponds in forthnightly inspections	Complete		Low

Total number of incidents current year	33
Total number of incidents previous year	25
% reduction/ increase	32.00%

WASTE SUMMARY Lic No: #REF! Year #REF!

SECTION A-PRTR ON SITE WASTE TREATMENT AND WASTE TRANSFERS TAB- TO BE COMPLETED BY ALL IPPC AND WASTE FACILITIES PRTR facility logon dropdown list click to see options

SECTION B- WASTE ACCEPTED ONTO SITE-TO BE COMPLETED BY ALL IPPC AND WASTE FACILITIES

			Additional Information
1	Were any wastes accepted onto your site for recovery or disposal or treatment prior to recovery or disposal within the boundaries of your facility ?; (waste generated within your boundaries is to be captured through PRTR reporting) If yes please enter details in table 1 below	N/A	
2	Did your site have any rejected consignments of waste in the current reporting year? If yes please give a brief explanation in the additional information	SELECT	
3	Was waste accepted onto your site that was generated outside the Republic of Ireland? If yes please state the quantity in tonnes in additional information	SELECT	

Table 1 Details of waste accepted onto your site for recovery, disposal or treatment (do not include wastes generated at your site, as these will have been reported in your PRTR workbook)

Licenced annual tonnage limit for your site (total tonnes/annum)	EWC code European Waste Catalogue EWC codes	Source of waste accepted	Description of waste accepted **Please enter an accurate and detailed description - which applies to relevant EWC code** European Waste Catalogue EWC codes	Quantity of waste accepted in current reporting year (tonnes)	Quantity of waste accepted in previous reporting year (tonnes)	Reduction/ Increase over previous year +/ - %	Reason for reduction/ increase from previous reporting year	Packaging Content (%)- only applies if the waste has a packaging component	Disposal/Recovery or treatment operation carried out at your site and the description of this operation	Quantity of waste remaining on site at the end of reporting year (tonnes)	Comments -

SECTION C-TO BE COMPLETED BY ALL WASTE FACILITIES (waste transfer stations, Composters, Material recovery facilities etc) EXCEPT LANDFILL SITES

4	Is all waste processing infrastructure as required by your licence and approved by the Agency in place? If no please list waste processing infrastructure required onsite	SELECT
5	Is all waste storage infrastructure as required by your licence and approved by the Agency in place? If no please list waste storage infrastructure required on site	SELECT
6	Does your facility have relevant nuisance controls in place?	SELECT
7	Do you have an odour management system in place for your facility? If no why?	SELECT
8	Do you maintain a sludge register on site?	SELECT

SECTION D-TO BE COMPLETED BY LANDFILL SITES ONLY

Table 2 Waste type and tonnage-landfill only

Waste types permitted for disposal	Authorised/licenced annual intake for disposal (tpa)	Actual intake for disposal in reporting year (tpa)	Remaining licensed capacity at end of reporting year (m3)	Comments

Table 3 General information-Landfill only

Area ID	Date landfilling commenced	Date landfilling ceased	Currently landfilling	Private or Public Operated	Inert or non-hazardous	Predicted date to cease landfilling	Licence permits asbestos	Is there a separate cell for asbestos?	Accepted asbestos in reporting year	Total disposal area occupied by waste	Lined disposal area occupied by waste	Unlined area
										SELECT UNIT	SELECT UNIT	SELECT UNIT
Cell 8												

WASTE SUMMARY Lic No: #REF! Year #REF!

Table 4 Environmental monitoring-landfill only

Landfill Manual-Monitoring Standards

Was meterological monitoring in compliance with Landfill Directive (LD) standard in reporting year +	Was leachate monitored in compliance with LD standard in reporting year	Was Landfill Gas monitored in compliance with LD standard in reporting year	Was SW monitored in compliance with LD standard in reporting year	Have GW trigger levels been established	Were emission limit values agreed with the Agency (ELVs)	Was topography of the site surveyed in reporting year	Has the statement under S53(A)(5) of WMA been submitted in reporting year	Comments

.+ please refer to Landfill Manual linked above for relevant Landfill Directive monitoring standards

Table 5 Capping-Landfill only

Area uncapped*	Area with temporary cap	Area with final cap to LD Standard m2 ha, a	Area capped other	Area with waste that should be permanently capped to date under licence	What materials are used in the cap	Comments
SELECT UNIT	SELECT UNIT					

*please note this includes daily cover area

Table 6 Leachate-Landfill only

9	Is leachate from your site treated in a Waste Water Treatment Plant?	SELECT
10	Is leachate released to surface water? If yes please complete leachate mass load information below	SELECT

Volume of leachate in reporting year(m3)	Leachate (BOD) mass load (kg/annum)	Leachate (COD) mass load (kg/annum)	Leachate (NH4) mass load (kg/annum)	Leachate (Chloride) mass load kg/annum	Leachate treatment on-site	Specify type of leachate treatment	Comments

Please ensure that all information reported in the landfill gas section is consistent with the Landfill Gas Survey submitted in conjunction with PRTR returns

Table 7 Landfill Gas-Landfill only

Gas Captured&Treated by LFG System m3	Power generated (MW / KWh)	Used on-site or to national grid	Was surface emissions monitoring performed during the reporting year?	Comments
			SELECT	

Comments on liner type

Bord na Mona Littleton

IPPC Licence P0499-01

Siltpond Monitoring Frequency & Results

X	Y	Bog	SW	Monitoring	Sampled	pH	SS	TS	Ammonia	TP	COD	Colour	Ortho P
221701.79	170410.93	Templetouhy	SW-30	Q1 14	13/03/2014	7.3	5	354	1.7	<0.05	47	141	0.02
222828.25	162569.41	Longford Pass	SW-31	Q1 14	13/03/2014	7	<5	250	0.33	<0.05	127	398	<0.01
222828.25	162569.41	Longford Pass	SW-18	Q1 14	13/03/2014	8	9	326	1.3	0.08	70	161	0.02
222077.15	154331.42	Littleton	SW-35	Q2 14	23/06/2014	7.4	5	472	3	<0.05	<10	77	<0.01
219191.76	153609.45	Ballybeg	SW-12	Q2 14	23/06/2014	7.5	<5	364	0.04	<0.05	65	150	<0.01
219740.68	153117.34	Ballybeg	SW-13	Q2 14	23/06/2014	Emissions from SW13 discharging through SW11							
219951.49	151803.32	Lanespark	SW-14	Q3 14	24/09/2014	7.8	6	452	0.02	<0.05	<10	35	<0.01
221128.48	152059.46	Lanespark	SW-15	Q3 14	24/09/2014	7.6	<5	290	4.5	<0.05	18	81	<0.01
216744.59	150220.73	Killeen	SW-1	Q3 14	24/09/2014	7.7	13	240	1.2	0.05	67	189	<0.01
217891.33	150182.12	Killeen	SW-3	Q4 14	11/12/2014	7.3	18	128	1.3	<0.05	71	162	<0.01
218356.54	150695.86	Killeen	SW-4	Q4 14	11/12/2014	7.3	16	164	1	<0.05	79	158	<0.01
219213.04	150618.27	Killeen	SW-5	Q4 14	11/12/2014	7.4	23	216	1.9	<0.05	91	227	<0.01

Oil Interceptor Results				
Licence No:	P0499			
YEAR: 2014				
LOCATION	FA YARD	TR FUEL	TT YARD	TT FUEL
Month	SWE 1 COD mg/l	SWE 2 COD mg/l	SWE 3 COD mg/l	SWE 4 COD mg/l
Jan	47	268		
Feb	87	no flow	164	56
Mar	74	no flow		
Apr	42	no flow		
May	24	no flow	no flow	no flow
June	34	no flow		
July	no flow	no flow		
Aug	no flow	no flow	no flow	no flow
Sep	no flow	no flow		
Oct	39	no flow		
Nov	64	no flow	no flow	no flow
Dec	88	no flow		

Head mm	M3 / Hour	Litres / Sec
0	0	0
100	16	4.4
105	18	5.0
110	20	5.6
115	22	6.1
120	25	6.9
125	28	7.8
130	30	8.3
135	33	9.2
140	37	10.3
145	40	11.1
150	43	11.9
155	47	13.1
160	51	14.2
165	55	15.3
170	59	16.4
175	64	17.8
180	68	18.9
185	73	20.3
190	78	21.7
195	84	23.3
100	16	4.4
105	18	5.0
110	20	5.6
115	22	6.1
120	25	6.9
125	28	7.8
130	30	8.3
135	33	9.2
140	37	10.3
145	40	11.1
150	43	11.9
155	47	13.1
160	51	14.2
165	55	15.3
170	59	16.4
175	64	17.8
180	68	18.9
185	73	20.3
190	78	21.7
195	84	23.3
200	90	25.0
205	96	26.7
210	100	27.8
215	107	29.7
220	113	31.4
225	119	33.1
230	126	35.0
235	133	36.9
240	140	38.9
245	148	41.1
250	155	43.1
255	163	45.3
260	171	47.5
265	180	50.0
270	188	52.2
275	197	54.7
280	206	57.2
285	216	60.0
290	225	62.5
295	235	65.3
300	249	69.2

Weekly Emissions to Water PW - 102. 2014

Works: Littleton

IPPC: 499

Date	Ph (Ph Units)	COD (mg/l)	SS (mg/l)	Flow l/sec	Head mm
08/01/2014	7.9	64	29	14.2	160
15/01/2014	7.6	93	38	16.4	170
22/01/2014	7.6	62	19	2.2	50
29/01/2014	8.4	78	36	11.9	150
05/02/2014	7.8	117	64	38.9	240
12/02/2014	8.7	84	46	25.0	195
19/02/2014	8.6	82	26	11.9	150
26/02/2014	8.5	62	28	11.9	150
05/03/2014	8.8	38	22	11.9	150
12/03/2014	8.1	66	27	10.3	140
19/03/2014	8	60	22	16.4	170
26/03/2014	7.9	71	38	17.8	175
02/04/2014	7.5	59	28	14.2	160
09/04/2014	7.8	67	32	11.9	150
16/04/2014	7.6	73	39	11.1	145
23/04/2014	8.6	53	18	16.4	170
30/04/2014	7.9	41	26	15.3	165
07/05/2014	8	58	22	15.3	165
14/05/2014	7.8	75	34	23.3	195
21/05/2014				20.3	185
28/05/2014	7.8	70	38	15.3	165
04/06/2014	7.5	19	<5	3.0	60
11/06/2014	7.6	48	39	3.8	95
18/06/2014	7.7	40	15	1.7	37
25/06/2014	7.7	34	6	2.0	45
02/07/2014	7.9	60	17	1.4	23
09/07/2014	7.8	45	8	0.6	5
16/07/2014	no flow				
23/07/2014	no flow				
30/07/2014	no flow				
06/08/2014	no flow				
13/08/2014	no flow				
20/08/2014	no flow				
27/08/2014	no flow				
03/09/2014	no flow				
10/09/2014	no flow				
17/09/2014	no flow				
24/09/2014	8	59	38	17.8	175
01/10/2014	7.4	80	40	16.4	170
08/10/2014	8.1	66	40	16.4	170
15/10/2014	7.7	107	40	18.9	180
22/10/2014	7.8	75	21	25.0	200
29/10/2014	7.7	134	69	23.3	195
05/11/2014	7.7	66	14	3.0	60
12/11/2014	7.8	105	42	20.3	185
19/11/2014	7.9	168	97	16.4	170
26/11/2014	7.7	75	30	18.9	180
03/12/2014	8.9	65	21	18.9	180
10/12/2014	8.5	55	18	29.7	215
17/12/2014	9	62	27	31.4	220
24/12/2014	factory down				
31/12/2014	factory down				

Quarterly Emissions to Water PW - 102 2014

Works: Littleton

IPPC: 499

Quarter	Total Phosperous	Ammonia	Oil,Fats &Grease
Feb	0.41	0.35	8
May	0.6	0.24	2
October	0.64	1.1	<1

Littleton
Decommissioning and Rehabilitation
AER Overview 2014.

Within the Littleton licensed area (P0409-01) there were no bog areas available for rehabilitation in 2014. Ongoing monitoring of cutaway within the Littleton licensing area included the areaof the Bruckana Windfarm development.
Draft rehabilitation plans for the Littleton bogs licensed area, including more detailed draft plans for each component bog unit were submitted to the EPA in 2013. The BNM Ecology Team (who plan and manage rehabilitation) met with the EPA inspectorate in 2013 to outline the general content of the rehab plans and a review process was agreed. This will involve a biannual review and update of plans as well as more detail and finalisation of plans for sites that have been taken out of production. The plans are currently under review (March-April 2015).
The annual Biodiversity Action Plan review day was held in February 2015 and this included an update on progress of this plan, bog restoration and cutaway rehabilitation for a wide range on statutory and non-statutory consultees including members of the EPA, NPWS, BWI, Bord na Mona, Coillte, Inland Fisheries Ireland, An Taisce, IPCC, Irish Red Grouse Association, Irish Wildlife Trust, NARGC, local game councils, Midland Regional Planning Authority as well as a range of local community groups and Heritage Officers from counties Laois, Offaly, Kildare, Roscommon, Longford, Meath, Galway, Westmeath and Dublin.
A copy of our Biodiversity Action Plan is available to view and download at http://www.bordnamona.ie/our-company/biodiversity/

Environmental Protection Agency

Guidance to completing the PRTR workbook

AER Returns Workbook

Version 1.1.18

REFERENCE YEAR	2014

1. FACILITY IDENTIFICATION

Parent Company Name	Bord na Mona Fuels Limited
Facility Name	Bord na Mona Fuels Limited (Littleton)
PRTR Identification Number	P0499
Licence Number	P0499-01

Classes of Activity

No.	**class_name**
-	Refer to PRTR class activities below

Address 1	Littleton Group
Address 2	c/o Littleton Briquette Factory
Address 3	Thurles
Address 4	
	Tipperary
Country	Ireland
Coordinates of Location	-7.69986 52.6123
River Basin District	IESE
NACE Code	0892
Main Economic Activity	Extraction of peat
AER Returns Contact Name	Enda McDonagh
AER Returns Contact Email Address	enda.mcdonagh@bnm.ie
AER Returns Contact Position	Head of Environment
AER Returns Contact Telephone Number	057 9345911
AER Returns Contact Mobile Phone Number	086 2370816
AER Returns Contact Fax Number	057 9345160
Production Volume	289327.0
Production Volume Units	Tonnes
Number of Installations	3
Number of Operating Hours in Year	5174
Number of Employees	148
User Feedback/Comments	In accordance with licence condition 6.2 of Technical Amendment A, quarterly sampling is now rotated every quarter and therefore suspended solids results are not factored into loading. Monitoring of pollutant 351 Total Organic Carbon is no longer a requirement as the Firelighter Plant is currently closed.
Web Address	www.bnm.ie

2. PRTR CLASS ACTIVITIES

Activity Number	**Activity Name**
50.1	General

3. SOLVENTS REGULATIONS (S.I. No. 543 of 2002)

Is it applicable?	No
Have you been granted an exemption ?	
If applicable which activity class applies (as per Schedule 2 of the regulations) ?	
Is the reduction scheme compliance route being used ?	

4. WASTE IMPORTED/ACCEPTED ONTO SITE Guidance on waste imported/accepted onto site

Do you import/accept waste onto your site for on-site treatment (either recovery or disposal activities) ?	No

This question is only applicable if you are an IPPC or Quarry site

4.1 RELEASES TO AIR Link to previous years emissions data | PRTR# : P0499 | Facility Name : Bord na Mona Fuels Limited (Littleton) | Filename : P0499_2014.xls | Return Year : 2014 | 05/05/2015 09:52

SECTION A : SECTOR SPECIFIC PRTR POLLUTANTS

RELEASES TO AIR					Please enter all quantities in this section in KGs			
POLLUTANT		METHOD			QUANTITY			
			Method Used					
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
					0.0	0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

SECTION B : REMAINING PRTR POLLUTANTS

RELEASES TO AIR					Please enter all quantities in this section in KGs			
POLLUTANT		METHOD			QUANTITY			
			Method Used		B101			
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
08	Nitrogen oxides (NOx/NO2)	M	ISO 10849:1996		81543.0	81543.0	0.0	0.0
11	Sulphur oxides (SOx/SO2)	M	ISO 7935: 1992		15744.0	15744.0	0.0	0.0
02	Carbon monoxide (CO)	M	ISO 12039:2001		142185.0	142185.0	0.0	0.0
03	Carbon dioxide (CO2)	C	ETS		47610930.0	47610930.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

SECTION C : REMAINING POLLUTANT EMISSIONS (As required in your Licence)

RELEASES TO AIR					Please enter all quantities in this section in KGs										
POLLUTANT		METHOD											QUANTITY		
			Method Used		B101	A101	A102	A103	A104	A105	A106	DM-01 - DM04		A	
Pollutant No.	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	Emission Point 2	Emission Point 3	Emission Point 4	Emission Point 5	Emission Point 6	Emission Point 7	Emission Point 8	T (Total) KG/Year	(Accidental) KG/Year	F (Fugitive) KG/Year
210	**Dust**	E	OTH	VDI 2119 Blatt 2/Part 2	233664.0	34637.0	71554.0	5755.0	23670.0	434.0	109.0	0.18	369823.18	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

Additional Data Requested from Landfill operators

For the purposes of the National Inventory on Greenhouse Gases, landfill operators are requested to provide summary data on landfill gas (Methane) flared or utilised on their facilities to accompany the figures for total methane generated. Operators should only report their Net methane (CH4) emission to the environment under T(total) KG/yr for Section A: Sector specific PRTR pollutants above. Please complete the table below:

Landfill: Bord na Mona Fuels Limited (Littleton)

Please enter summary data on the quantities of methane flared and / or utilised	**T (Total) kg/Year**	**M/C/E**	**Method Used: Method Code**	**Method Used: Designation or Description**	**Facility Total Capacity m3 per hour**	
Total estimated methane generation (as per site model)	0.0				N/A	
Methane flared	0.0				0.0	(Total Flaring Capacity)
Methane utilised in engine/s	0.0				0.0	(Total Utilising Capacity)
Net methane emission (as reported in Section A above)	0.0				N/A	

4.2 RELEASES TO WATERS

Link to previous years emissions data

SECTION A : SECTOR SPECIFIC PRTR POLLUTANTS

Data on ambient monitoring of storm/surface water or groundwater, conducted as part of your licence requirements, should NOT be submitted under AER / PRTR Reporting as this only co

RELEASES TO WATERS					Please enter all quantities in this section in KGs			
POLLUTANT					QUANTITY			
			Method Used					
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
					0.0	0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

SECTION B : REMAINING PRTR POLLUTANTS

RELEASES TO WATERS					Please enter all quantities in this section in KGs			
POLLUTANT					QUANTITY			
			Method Used					
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
					0.0	0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

SECTION C : REMAINING POLLUTANT EMISSIONS (as required in your Licence)

RELEASES TO WATERS					Please enter all quantities in this section in KGs			
POLLUTANT					QUANTITY			
			Method Used		SW-18			
Pollutant No.	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
240	**Suspended Solids**	E	OTH	G/19 Based on ALPHA,1998,20th Edition, Method 2540D	52712.0	52712.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

4.3 RELEASES TO WASTEWATER OR SEWER

Link to previous years emissions data

SECTION A : PRTR POLLUTANTS

OFFSITE TRANSFER OF POLLUTANTS DESTINED FOR WASTE-WATER TREATMENT OR SEWER					Please enter all quantities in this section in KGs			
POLLUTANT		METHOD			QUANTITY			
			Method Used					
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
					0.0	0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

SECTION B : REMAINING POLLUTANT EMISSIONS (as required in your Licence)

OFFSITE TRANSFER OF POLLUTANTS DESTINED FOR WASTE-WATER TREATMENT OR SEWER					Please enter all quantities in this section in KGs			
POLLUTANT		METHOD			QUANTITY			
			Method Used					
Pollutant No.	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
					0.0	0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

4.4 RELEASES TO LAND

Link to previous years emissions data

SECTION A : PRTR POLLUTANTS

RELEASES TO LAND					Please enter all quantities in this section in KGs		
POLLUTANT		METHOD			QUANTITY		
			Method Used				
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year
					0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

SECTION B : REMAINING POLLUTANT EMISSIONS (as required in your Licence)

RELEASES TO LAND					Please enter all quantities in this section in KGs		
POLLUTANT		METHOD			QUANTITY		
			Method Used				
Pollutant No.	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year
					0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

5. ONSITE TREATMENT & OFFSITE TRANSFERS OF WASTE

| PRTR# : P0499 | Facility Name : Bord na Mona Fuels Limited (Littleton) | Filename : P0499_2014.xls | Return Year : 2014 | 05/05/2015 09:55

Please enter all quantities on this sheet in Tonnes 0

Transfer Destination	European Waste Code	Hazardous	Quantity (Tonnes per Year)	Description of Waste	Waste Treatment Operation	Method Used		Location of Treatment	Haz Waste : Name and Licence/Permit No of Next Destination Facility Non Haz Waste: Name and Licence/Permit No of Recover/Disposer	Haz Waste : Address of Next Destination Facility Non Haz Waste: Address of Recover/Disposer	Name and License / Permit No. and Address of Final Recoverer / Disposer (HAZARDOUS WASTE ONLY)	Actual Address of Final Destination i.e. Final Recovery / Disposal Site (HAZARDOUS WASTE ONLY)
						M/C/E	Method Used					
Within the Country	01 01 02	No	1167.0	wastes from mineral non-metalliferous excavation	D1	E	Volume Calculation	Onsite of generatic	Bord na Mona Fuels Ltd,P0499-01	Littleton,Thurles,Co Tipperary,.,Ireland		
Within the Country	01 01 02	No	598.0	wastes from mineral non-metalliferous excavation	D1	E	Volume Calculation	Onsite of generatic	Bord na Mona Fuels Ltd,P0499-01	Littleton,Thurles,Co Tipperary,.,Ireland		
Within the Country	02 01 04	No	177.82	waste plastics (except packaging)	R3	M	Weighed	Offsite in Ireland	Leinster Environmentals,WP 2008/06	Haggardstown,Dundalk ,Co Louth,.,Ireland		
To Other Countries	11 01 13	Yes	2.34	degreasing wastes containing dangerous substances	R2	C	Volume Calculation	Abroad	Safety Kleen Ltd,W0099-01	Tallaght,Dublin,.,.,Ireland	Solvent Recovery Management,PP33345F,Wheeland Rd,Knottingly,West Yorks,WF118DZ,United Kingdom	Wheeland Rd,Knottingly,West Yorks,WF118DZ,United Kingdom
Within the Country	13 02 05	Yes	1.2	mineral-based non-chlorinated engine, gear and lubricating oils	R1	C	Volume Calculation	Offsite in Ireland	Enva Ireland Ltd,W0184-1	Clonminam Ind Estate,Portlaoise,Co Laois,.,Ireland	Enva Ireland Ltd,W0184-1,Clonminam Ind Estate,Portlaoise,Co Laois,.,Ireland	Clonminam Ind Estate,Portlaoise,Co Laois,.,Ireland
To Other Countries	13 08 99	Yes	0.6	wastes not otherwise specified	R1	E	Volume Calculation	Abroad	Enva Ireland Ltd,W0184-1	Clonminam Ind Estate,Portlaoise,Co Laois,.,Ireland	KWA,E17012100,Lintfort,.,.,., Germany	Lintfort,.,.,.,Germany
Within the Country	15 01 03	No	27.08	wooden packaging	R1	M	Weighed	Offsite in Ireland	Kiawa Ltd,WP/TN/24	Tipperary,.,.,.,Ireland		
To Other Countries	15 02 02	Yes	0.75	absorbents, filter materials (including oil filters not otherwise specified), wiping cloths, protective clothing contaminated by dangerous substances	D10	E	Volume Calculation	Abroad	Enva Ireland Ltd,W0184-1	Clonminam Ind Estate,Portlaoise,Co Laois,.,Ireland	KWA,E17012100,Lintfort,.,.,., Germany	Lintfort,.,.,.,Germany
To Other Countries	16 01 07	Yes	0.84	oil filters	R4	C	Volume Calculation	Abroad	Enva Ireland Ltd,W0184-1	Clonminam Ind Estate,Portlaoise,Co Laois,.,Ireland	R. D Recycling,51727/1/KD,Houthalen,.,.,.,Belgium	Houthalen,.,.,.,Belgium
Within the Country	17 04 07	No	66.06	mixed metals	R4	M	Weighed	Offsite in Ireland	Hammond Lane Ltd,WP4620033	Athlone,Co Westmeath,.,.,Ireland		
Within the Country	20 01 21	Yes	0.3	fluorescent tubes and other mercury-containing waste	R13	M	Weighed	Offsite in Ireland	Irish Lamp Recycling,WFP-KE-08-0348-01	Athy,.,.,.,Ireland	Irish Lamp Recycling,WFP-KE-08-0348-01,Athy,Co Kildare,.,.,Ireland	Athy,Co Kildare,.,.,Ireland
Within the Country	20 03 01	No	38.62	mixed municipal waste	D1	M	Weighed	Offsite in Ireland	AES,WP-OY-08-601-01	Nenagh,Tipperary,.,.,Ireland		
Within the Country	20 03 01	No	89.4	mixed municipal waste	D1	E	Volume Calculation	Offsite in Ireland	AES,WP-OY-08-601-01	Nenagh,Tipperary,.,.,Ireland		
Within the Country	13 05 03	Yes	3.6	interceptor sludges	R1	M	Volume Calculation	Offsite in Ireland	Enva Ireland Ltd,W0184-1	Clonminam Ind Estate,Portlaoise,Co Laois,.,Ireland	Enva Ireland Ltd,W0184-1,Clonminam Ind Estate,Portlaoise,Co Laois,.,Ireland	Clonminam Ind Estate,Portlaoise,Co Laois,.,Ireland

* Select a row by double-clicking the Description of Waste then click the delete button

Annual Environmental Report (AER)

2022

Company Name: Bord na Mona Fuels Ltd (Littleton Group)

Licence Number: P0499-01

Address: Bord na Mona Fuels Ltd, C/O Newbridge, Co Kildare

Class of Activity[1]: 1.4

[1] See Appendix I

Bord na Móna - Data Classification - Business Use

Purpose of this Report

One of the functions of the Environmental Protection Agency (EPA) is to licence and regulate the activities[2] of large scale industrial (e.g. chemical, food processors, power plants) and waste facilities. Submitting an Annual Environmental Report (AER) is a requirement of all EPA licences.

An AER is a public document. To this end, this format has been developed for industrial and waste licence holders (other than the intensive agriculture sector) to use as a template. This is to assist any member of the public to interpret and understand the environmental performance of the licensed facility.

The AER is a **summary** of environmental information for a given year. It includes:

- Details of the licence holder's environmental goals achieved, goals to maintain compliance and/or improve their environmental performance;
- Answers to questions regarding their facility's activities;
- Tables of results from monitoring emissions such as air, water, noise, and odour; and
- Details of waste generated, accepted and treated.

An AER does **not** provide detailed technical data. Such information is available in three ways:

1) Contacting the licence holder directly. The Contact Us section of this template enables the licence holder to provide details of where a member of the public can obtain further information on topics reported in this document.

[2] See Appendix I

Bord na Móna - Data Classification - Business Use

2) Some documents[3] are available on the EPA website via the licence details page for each individual licence. This can be found by browsing either the http://www.epa.ie/licensing/ or http://www.epa.ie/enforcement/ pages of the EPA website.

3) All formal enforcement correspondence exchanged between the EPA and a licence holder during the regulatory process is available for public viewing by appointment at any EPA Office.

If you have a question or query about an AER or an individual EPA licensed facility see the EPA's website or contact the relevant EPA office. See http://www.epa.ie/about/contactus/ for contact details.

[3] This includes EPA site inspection and compliance monitoring reports, licence holders' self-monitoring reports, AERs and special reports

Bord na Móna - Data Classification - Business Use

Contents

Glossary 5
Declaration 8
1) Introduction 9
Contact Us 9
2) How we Manage our Facility 10
3) Energy & Water 12
Energy 12
Water 14
4) Environmental Complaints 15
5) Environmental Incidents 17
6) Our Environmental Emissions 20
Storm Water 21
Waste Water 23
Air 25
Fugitive Solvent Emissions 27
Groundwater 28
Noise 30
7) Waste 31
Waste Generated 31
Waste Accepted 32
8) Financial Provision 33

Bord na Móna - Data Classification - Business Use

Glossary

Abatement Equipment	Technology used to reduce pollution
AER	Annual Environmental Report.
CRAMP	Closure, Restoration and Aftercare Management Plan.
ELRA	Environmental Liability Risk Assessment.
Emission Limit Value	Limits set for specified emissions, typically outlined in Schedule B of an EPA licence.
EMS	Environmental Management System.
Environmental Goal	An objective or target set by a licensee as part of an environmental management system (EMS).
Environmental Pollutant	Substance or material that due to its quantity and/or nature has a negative impact on the environment.
Facility	Any site or premises that holds an EPA industrial or waste licence.
FP	Financial Provision.
GJ	Giga joules, an international unit of energy measurement.
Groundwater	All water which is below the surface of the ground in the saturation zone and in direct contact with the ground or subsoil.
Incident	As defined by an EPA industrial or waste licence.

Bord na Móna - Data Classification - Business Use

Inert Waste	Is waste that will not undergo physical, chemical or biological change thereby, is unlikely to cause environmental pollution or harm human health.
List of Wastes (LoW)	A list of wastes drawn up by the European Commission and published as Commission Decision 2014/955/EU.
Noise Sensitive Location	Any dwelling house, hotel or hostel, health building, educational establishment, place of worship or entertainment, or any other installation or area of high amenity which for its proper enjoyment requires the absence of noise at nuisance levels.
Non-Renewable Resource	A resource of economic value that cannot be replaced at the same rate it is being consumed e.g. coal, peat, oil and natural gas.
Oil Separator	Separator system for light liquids (e.g. oil and petrol).
PRTR	Pollutant Release and Transfer Register.
Renewable Resource	Wind, solar, aerothermal, geothermal, hydrothermal and ocean energy, hydropower, biomass, landfill gas, sewage treatment plant gas and biogases.
Sanitary Waste	Waste water from toilet, washroom and canteen facilities.
Storm Water	Rain water run-off from roof and non-process areas.

Surface Water	Lakes, rivers, streams, estuaries and coastal waters.
Trigger Level	A value set for a specific parameter, the achievement or exceedance of which requires certain actions to be taken by the licence holder.
Volatile Organic Compounds	Gases produced from solids or liquids that evaporate readily in ambient conditions.
Waste	Any substance or object which the holder discards or intends or is required to discard.

Disclaimer

These are **not** legal definitions. Legal definitions can be found in the corresponding legislation.

Declaration

I, Ray Lenihan, confirm that by ticking the box below, all information in this report is truthful and accurate to the best of my knowledge and belief.

In addition, I confirm that all monitoring and performance reporting required by our EPA licence and summarised herein is available for inspection by the EPA.

Tick here [X]

Bord na Móna - Data Classification - Business Use

1) Introduction

See below a brief description of our facility and a summary of our environmental performance this year.

- The Littleton bogs peat extraction activity ceased in 2017 with the briquette factory operations ceasing in March 2018.
- In the period there were no complaints of an environmental nature.
- In the period, there were no incidents of an environmental nature relating to suspended solids exceedances, dust, fires and exceedances in COD trigger levels.
- During the period, there were notifications submitted to the Agency regarding a scope for the Independent Closure Audit for the Lanespark Workshop boundary amendments and a notification regarding the Midlands Native Woodland Project.
- During the period, waste generated was from the ongoing decommissioning activity and the maintenance of the silt pond network
- The main activity undertaken was completion of the rehabilitation of the remaining peatlands as required by condition 10 and associated decommissioning and waste removal

Contact Us

If you have any questions or would like further information on any aspect of this report, please contact us directly.

See below details:

Enda McDonagh,
Bord na Mona Energy Ltd
Leabeg
Tullamore

Bord na Móna - Data Classification - Business Use

Co Offaly
www.bnm.ie

2) How we Manage our Facility

Bord na Mona have an Environmental Compliance Department with a team of five who manage the day to day IPC Licence requirements. This licence governs the extraction of peat and associated activities and manages emission to air, water and land.

The information below sets out the environmental goals for our facility to help us prevent environmental pollution and reduce our impact on the environment. Target dates for completing each goal and progress towards achieving the goal are outlined in Table 1.

Table 1 Environmental Goals

Environmental Goal	Target Date	Progress
Maintain compliance with existing licence conditions while the peatlands have been rehabilitated	Dec 2022	Ongoing
Waste Management – Removal of all waste that are deemed a risk the environment in bogs scheduled to be decommissioned in 2022	Dec 2022	Ongoing
Maintain surface water quality compliance with emission limit values for Suspended Solids.	Dec 2022	Ongoing
Decommissioning of remainder of scheduled bogs in accordance with condition 10.	Dec 2022	Ongoing

Bord na Móna - Data Classification - Business Use

Comment

The remaining peatlands are being rehabilitated in accordance with Condition 10 of the IPC Licence. Monitoring of water quality is ongoing to verify the expected improvements as a result of rehabilitation.

Bord na Móna - Data Classification - Business Use

3) Energy & Water

Energy

Explanation
Fossil fuels such as coal, gas and oil are non-renewable resources. As a result, our EPA licence requires that we measure our energy use and set targets to improve the energy efficiency of our activities and reduce our overall use, where possible. Where we have the means and technology on-site to generate energy, this is also captured in this report.

The information below summarises the energy used this year compared to the previous year and includes renewable and non-renewable energy types.

Table 2 Energy Used

Energy Used (GJ)	Quantity	% Increase/ decrease on previous year
Electricity	459	8.1% increase
Heavy Fuel Oil	-	
Light Fuel Oil	427	0%
Natural Gas	-	
Coal / Solid Fuel	-	
Peat	-	
Renewable Biomass	-	
Renewable Energy Generated On-site	-	
Total Energy Used	886	4.2% increase

Comment

All activity has ceased at Littleton Bog and Factory.

Bord na Móna - Data Classification - Business Use

The information below summarises the energy we generated on our site this year with specific focus on renewable energy generation.

Table 3 Energy Generated

Energy Generated (GJ)	**Quantity**	**% Increase/ decrease on previous year**
Renewable Energy	NA	
Total Energy Generated		

Comment

There are no renewable energy assets on this site that feed the facility.

Bord na Móna - Data Classification - Business Use

Water

Explanation
Water is a natural resource and we are required by our EPA licence to identify ways to reduce our use where possible. Water used in industry can be extracted from groundwater, rivers and lakes (surface water), taken from public water supplies (Irish Water), recycled from the facility's processes or harvested from rainwater.

The information below summarises and compares the quantity of water used this year compared to the previous year.

Table 4 Water Used

Source of Water Used	Quantity (m^3/year)	% Increase/ decrease on previous year
Groundwater	0	
Surface Water	0	
Public Supply	0	
Recycled Water	0	
Rainwater	0	
Total Water Used	0	

Comment

Water is not used in any of the peatland rehabilitation or decommissioning processes.

Bord na Móna - Data Classification - Business Use

4) Environmental Complaints

Explanation
Our EPA licence requires that activities do not cause environmental nuisance such as odour, dust or noise. Our licence also requires that we have procedures in place to record, investigate and respond to environmental complaints if or when they arise.
We have an environmental complaints procedure in place where you can contact us[4] directly. You can also contact the EPA[5] if you wish to make an environmental complaint, confidentially or not.

See the information below for a summary of **all** the environmental complaints relating to our activities made directly to us and to the EPA this year.

Table 5 Summary of All Environmental Complaints Received in

Type of Complaint	Number of Complaints Received	Number Closed
Odour / Smells	N/A	
Noise	N/A	
Dust	0	
Water Quality	0	
Air Quality	0	
Waste	N/A	
Litter	N/A	
Vermin/Flies/Birds	N/A	
Soil Contamination	N/A	
Vibration	N/A	
Other	N/A	

[4] See Section 1, Introduction – Contact Us

[5] If you wish to contact the EPA to make an environmental complaint about an EPA licenced facility, please go to https://lema.epa.ie/complaints

Bord na Móna - Data Classification - Business Use

Comment

As required environmental complaints are reportable to the EPA and as such must be investigated. In the 2022 reporting period, this licence did not receive any complaints of an environmental nature.

Bord na Móna - Data Classification - Business Use

5) Environmental Incidents

Explanation
It is our responsibility as an EPA licensed facility to ensure we have systems in place to prevent incidents that have the potential to cause environmental pollution. If an incident occurs, we are required to report it to the EPA, investigate the cause and fix the problem.
The EPA classify environmental incidents into 5 categories based on the potential impact on the environment:

- Minor
- Limited
- Serious
- Very Serious
- Catastrophic

See Table 6 for the number of the environmental incidents we reported to the EPA this year.

Bord na Móna - Data Classification - Business Use

Table 6 Number of Environmental Incidents

Incident Category	Minor	Limited	Serious	Very Serious	Catastrophic
Abatement Equipment Offline	0	0	0	0	0
Breach of Ambient ELV	0	0	0	0	0
Breach of Emission Limit	0	0	0	0	0
Explosion	0	0	0	0	0
Fire	0	0	0	0	0
Monitoring Equipment Failure	0	0	0	0	0
Odour	0	0	0	0	0
Spillage	0	0	0	0	0
Breach of trigger Level	0	0	0	0	0
Uncontrolled Release	0	0	0	0	0

Bord na Móna - Data Classification - Business Use

Incident Category	Minor	Limited	Serious	Very Serious	Catastrophic
Other	0	0	0	0	0

Comment

As required, incidents of an environmental nature are reportable to the EPA and as such must be investigated. In the 2022 reporting period, there were no incidents of an environmental nature requiring reporting.

Bord na Móna - Data Classification - Business Use

6) Our Environmental Emissions

Explanation

We are required to ensure the emissions from our activities do not cause environmental pollution.

We are required to monitor any of the following emissions that we make:

- Storm water
- Waste water
- Air
- Groundwater
- Noise

We regularly test any such emissions for specific pollutants and materials to ensure they do not contain levels of pollution that exceed emission limit values (ELVs) or cause environmental pollution. If monitoring of an emission indicates an ELV is exceeded, we are required to report this to the EPA[6].

The next sub-sections of this report summarise our compliance with any ELVs set in our EPA licence. Some emissions monitored do not have specific ELVs, but we still carry out monitoring and report all incidents that may give rise to environmental pollution.

[6] See section 5, Incidents

Bord na Móna - Data Classification - Business Use

Storm Water

Explanation
Storm water is rain water run-off from roof and non-process areas of a facility, e.g. carparks, and generally shall not contain any pollution.
Storm water is usually released into a local water body after a basic form of treatment. Our EPA licence requires that we manage storm water to ensure no polluting substances or materials are released into the environment.

The information below summarises how the storm water from our facility is treated, where it is released and the results of monitoring this year.

1. **Storm water from our facility is managed prior to release by;**

Either direct to drain where it is roof water only, or via petrol/oil interceptor.

2. **Storm water from our facility is released into the following water bodies:**

The Breaghagh (Tipperary), the Drish and the Black (Two Mile Borris) Rivers

Bord na Móna - Data Classification - Business Use

Table 7 Summary of Storm Water Monitoring

Parameter measured	No. of Samples	% Compliant[7]	Comment
COD	0	N/A	No monitoring required

Add rows as necessary

Comment

As required by the licence, stormwater is required to be separated where possible from process/non-process areas. Where it is possible, stormwater is managed via oil-interceptors which are inspected on a weekly basis and sampled for associated discharges each month. All activities have ceased on yards associated with the Littleton IPC Licence with some workshops and yards having been decommissioned and removed from the Licence.

[7] % compliant = [(number of samples compliant) / (number of samples taken)] x 100. Compliance could refer to emission limit values or trigger levels. The EPA commonly use trigger levels on stormwater discharges.

Bord na Móna - Data Classification - Business Use

Waste Water

Explanation
There are two types of waste water that can be produced:

- Process waste water produced from the activities and;
- Sanitary waste water from toilets, washrooms and canteens.

Our EPA licence requires us to manage our waste water on or off-site and ensure that it does not cause environmental pollution when discharged into the environment.

The information below summarises how we treat the waste water produced from our activities, where it is released and the results of monitoring this year.

1. **Waste water produced by our activities is treated as follows before discharge to a receiving waterbody**;

All production area runoff is treated via an associated silt pond designed, inspected and maintained in accordance with condition 6 of the IPC Licence

2. **Treated waste water from our facility is released into the following water bodies:**

Errill River, Clonmore Stream, River Suir, Aughall Beg River, Rossestown River, Drich River, Gaul River, Clover River, Black (Two Mile Borris), Breagagh (Tipperary) and Clashawley River.

Bord na Móna - Data Classification - Business Use

Table 8 Summary of Waste Water Monitoring

Parameter measured	No. of Samples	% Compliant	Comment
Suspended Solids	33	100%	Emission Limit Value
Ammonia	33	100%	Trigger Level
Total Solids	33	NA	NA
Total Phosphorus	33	NA	NA
pH	33	NA	NA
Colour	33	NA	NA
COD	33	100%	Trigger Level

Add rows as necessary

Comment

Licence requirements are quarterly grab samples on a selected number of silt pond outlets as per condition 6.2 The emission limit value is 35mg/l suspended solids, with Trigger levels of 4mg/l total ammonia and 100mg/l COD.

Bord na Móna - Data Classification - Business Use

Air

Explanation
Generally, three types of air emissions are monitored from industry in Ireland: gases, dust (particulates) and odour. Our EPA licence requires us to ensure that any air emissions from our activities do not cause air pollution or create an odour nuisance.

The information below details the number of air emission points we monitor, the results from testing the air emissions and any odour assessments carried out by us and the EPA this year.

1. **We monitor air emissions from the following number of emission points at our facility.**

As peat production has ceased. No dust monitoring took place during 2022

Table 9 Summary of Air Emissions Monitoring

Parameter measured	No. of Samples	% Compliant	Comment
Fugitive Dust			

Add rows as necessary

Comment

Due to the permanent cessation of peat production in 2017, it is no longer necessary to monitor for dust.

Bord na Móna - Data Classification - Business Use

Table 10 Summary of Odour Assessments Carried Out

Assessment Conducted By	No. of Odour Assessments	% Compliant[8]	Comment
Licence Holder	NA		Not required
EPA	NA		Not required

Add rows where necessary

Comment

There are no odour emissions of note from the activity, no requirements to monitor and no associated complaints.

[8] A compliant odour assessment is based on EPA Odour Impact Assessment Guidance available at http://www.epa.ie/pubs/advice/air/emissions/ag5-odourassessment.html

Bord na Móna - Data Classification - Business Use

Fugitive Solvent Emissions

Are you are required to monitor fugitive solvent air emissions from your facility?

Yes [ ] No [X]

Explanation
The use of solvents is regulated under Irish and European Union (EU) Regulations[9]. Solvents are chemicals that, by their nature, are volatile (evaporate readily under ambient conditions). Solvents can be found in many inks, glues and cleaning agents. Due to the volatility of solvents some emissions may be released into the atmosphere during our activities before being captured in our air treatment system. This type of emission is called a **fugitive solvent emission**.

The information below summarises the quantity of solvents used this year, the percentage of fugitive solvent emissions (% of total quantity used) and whether the percentage complied with the targets set in the EU Regulations.

Table 11 Summary of Fugitive Solvent Emissions

Quantity of Solvents Used (Kg)	% Fugitive Solvent Emissions	Compliant
NA		

Comment

NA

[9] See Annex VII of the Industrial Emissions Directive
https://ec.europa.eu/environment/industry/stationary/ied/legislation.htm

Bord na Móna - Data Classification - Business Use

Groundwater

Explanation
Groundwater is an important and sensitive resource in Ireland. Our EPA licence requires that we monitor groundwater to ensure our activities do not cause groundwater pollution.
Understanding how groundwater flows through soil and rock layers and eventually into surface and coastal waters is a complex science. Sometimes groundwater pollution that occurred in the past can take years and even decades to disappear. Therefore, it is important that experts help us monitor and interpret results from groundwater monitoring and testing.

The information below is a basic summary of the condition of the groundwater this year.

1. **Do you have a groundwater monitoring programme in place?**

Yes [ ] No [X]

2. **Have the groundwater monitoring results over the last 5 years indicated the presence of groundwater pollution?**

Yes [ ] No [ ]

Table 12 List of Groundwater Pollutants Identified

Pollutants
NA

Add rows as necessary

Bord na Móna - Data Classification - Business Use

3. Give details of the investigations and subsequent actions taken, where applicable, to manage the groundwater pollution.

NA

Comment

There are no licence requirements to monitor groundwater from the activity.

Bord na Móna - Data Classification - Business Use

Noise

Explanation
Our EPA licence requires that we monitor noise emissions from our facility. Noise monitoring can be conducted at the boundary of our facility and/or at locations beyond the boundary referred to as “noise sensitive locations”. Noise monitoring requires the use of special noise monitoring equipment. Our EPA licence requires that noise produced by our facility shall not exceed the noise limit values and/or give rise to nuisance.

The information below gives a summary of when and where we conducted noise monitoring this year and if results complied with our EPA licence limits.

1. **We conducted noise monitoring on the following dates this year:**

NA

2. **Was the noise monitoring carried out at:**
   - i. **the boundary of our facility,**
   - ii. **noise sensitive locations off-site, or**
   - iii. **both?**

NA

3. **Were measured noise levels compliant with your EPA licence limits?**

Yes ☐ No ☐

If No, we took the following actions to address the noise level exceedances?

NA

Comment

There are no licence requirements to monitor noise from the activity, nor any complaints regarding noise impact.

Bord na Móna - Data Classification - Business Use

7) Waste

Waste Generated

Explanation
Our EPA licence requires us to manage the waste we generate in a manner that does not cause environmental pollution.
We manage, store and record hazardous, non-hazardous and inert waste we generate in accordance with our licence. We ensure that this waste is subsequently treated or disposed of in accordance with the relevant waste Regulations.

The information in table 13 is a summary of waste we generated this year and the percentage increase or decrease on the previous year. The percentage recovery is the amount of total waste generated that was reused, recycled or recovered.

Table 13 Waste Generated

Type	Quantity (Tonnes)	% Increase/ decrease on previous year	% Recovery
Hazardous	22.42	24% Reduction	
Non-Hazardous	488.84	82% Reduction	
Inert			
Total Tonnes	511.26	82% reduction	95%

Comment

The main wastes generated from this activity are Waste Oil, Interceptor Waste, Asbestos contaminated soils, Oil Filters, Parts Wash Polythene, scrap metal, Silt Pond Waste and Peat Screenings all of which are recycled. The waste generated for landfill was from General Waste skips and Wheelie Bins.

Bord na Móna - Data Classification - Business Use

Waste Accepted

Did you accept waste onto your facility for storage, treatment, recovery or disposal this year?

Yes [ ] No [X]

Explanation
Our EPA licence requires us to manage the waste we accept in a manner that does not cause environmental pollution.
We manage, store and record all incoming and outgoing hazardous, non-hazardous and inert waste. The waste we accept may be treated, recovered, disposed or stored at our facility depending on our licence requirements.

The information in Table 14 provides a summary of waste we accepted this year and the percentage increase or decrease on the previous year. The percentage recovery is the amount of total waste accepted that was reused, recycled or recovered.

Table 14 Waste Accepted

Type	Quantity (Tonnes)	% Increase/ decrease on previous year	% Recovery
Hazardous			
Non-Hazardous			
Inert			
Total Tonnes			

Comment

NA

Bord na Móna - Data Classification - Business Use

8) Financial Provision

Explanation
Our EPA licence requires us to assess the risk our activities pose to the environment if we cease our activities or if an incident occurred. If we are identified as a high risk facility[10] by the EPA, we are required to put provision in place such as a financial bond or insurance to cover the cost of restoring our site to a satisfactory condition. This financial provision can then be used to cover the cost of managing the restoration or clean up should such an event occur.

1. Are you required to have an agreed financial provision in place?

Yes [ ] No [X]

2. What year was your Closure, Restoration and Aftercare Management Plan (CRAMP) last agreed by the Agency?

[ ]

3. What year was your Environmental Liability Assessment Report (ELRA) agreed by the Agency?

Not required under the Licence.

4. Has there been any significant changes on your site since the last agreements?

Yes [ ] No [X]

If yes, have you submitted details to the EPA?

Yes [ ] No [ ] N/A [ ]

[10] See Appendix II

Bord na Móna - Data Classification - Business Use

Appendix I

Class of Activity

Industrial and waste facilities are classed into different sectors depending on the nature of their activity and its potential impact on the environment. The EPA Act 1992 as amended, outlines these as follows:

Class 1	Minerals and other materials
Class 2	Energy
Class 3	Metals
Class 4	Mineral fibres and glass
Class 5	Chemicals
Class 6	Intensive Agriculture[11]
Class 7	Food and drink
Class 8	Wood, paper, textiles and leather
Class 9	Fossil fuels
Class 10	Cement, lime and magnesium oxide
Class 11	Waste
Class 12	Surface Coatings
Class 13	Other Activities

[11] This reporting template is not applicable to the **intensive agriculture sector**. Their annual environmental reporting structure is different and can be found at http://www.epa.ie/pubs/advice/aerprtr/aerguid/

Bord na Móna - Data Classification - Business Use

Appendix II

High Environmental Risk Categories

If an industrial or waste licence falls into one of these categories it is deemed, by the EPA, as a high environmental risk. As a result, the licence holder is required to have financial provision in place. See section 8, Financial Provision.

1. Landfills
2. Non-Hazardous Waste Transfer Station
3. Incineration and Co-Incineration Waste Facilities
4. Category A – Extractive Waste Facilities
5. Upper and Lower Tier Seveso Facilities
6. Hazardous Waste Transfer Stations
7. High Risk Contaminated Land
8. Exceptional Circumstances

NOTE:

This list is subject to change.

See the link below for further information.

http://www.epa.ie/pubs/advice/licensee/fp/epaapproachtoenvironmentalliabilitiesandfinancialprovision.html

Bord na Móna - Data Classification - Business Use

Annual Environmental Report (AER)

2023

Company Name: Bord na Mona Fuels Ltd

Licence Number: P0499-01

Address: C/O Bord na Móna, Leabeg, Tullamore, Co Offaly

Class of Activity[1]:1.4

[1] See Appendix I

Bord na Móna - Data Classification - Public

Purpose of this Report

One of the functions of the Environmental Protection Agency (EPA) is to licence and regulate the activities[2] of large scale industrial (e.g. chemical, food processors, power plants) and waste facilities. Submitting an Annual Environmental Report (AER) is a requirement of all EPA licences.

An AER is a public document. To this end, this format has been developed for industrial and waste licence holders (other than the intensive agriculture sector) to use as a template. This is to assist any member of the public to interpret and understand the environmental performance of the licensed facility.

The AER is a **summary** of environmental information for a given year. It includes:

- Details of the licence holder's environmental goals achieved, goals to maintain compliance and/or improve their environmental performance;
- Answers to questions regarding their facility's activities;
- Tables of results from monitoring emissions such as air, water, noise, and odour; and
- Details of waste generated, accepted and treated.

An AER does **not** provide detailed technical data. Such information is available in three ways:

1) Contacting the licence holder directly. The Contact Us section of this template enables the licence holder to provide details of where a member of the public can obtain further information on topics reported in this document.

[2] See Appendix I

Bord na Móna - Data Classification - Public

2) Some documents[3] are available on the EPA website via the licence details page for each individual licence. This can be found by browsing either the http://www.epa.ie/licensing/ or http://www.epa.ie/enforcement/ pages of the EPA website.

3) All formal enforcement correspondence exchanged between the EPA and a licence holder during the regulatory process is available for public viewing by appointment at any EPA Office.

If you have a question or query about an AER or an individual EPA licensed facility see the EPA's website or contact the relevant EPA office. See http://www.epa.ie/about/contactus/ for contact details.

[3] This includes EPA site inspection and compliance monitoring reports, licence holders' self-monitoring reports, AERs and special reports

Bord na Móna - Data Classification - Public

Contents

Glossary 5
Declaration 8
1) Introduction 9
Contact Us 9
2) How we Manage our Facility 10
Environmental Management System 10
Beyond Compliance 11
3) Energy & Water 12
Energy 12
Water 14
4) Environmental Complaints 15
5) Environmental Incidents 17
6) Our Environmental Emissions 20
Storm Water 21
Waste Water 23
Air 25
Fugitive Solvent Emissions 27
Groundwater 28
Noise 30
7) Waste 31
Waste Generated 31
Waste Accepted 32
8) Financial Provision 33

Bord na Móna - Data Classification - Public

Glossary

Abatement Equipment	Technology used to reduce pollution
AER	Annual Environmental Report.
Beyond Compliance	Beyond compliance is concept to help deliver greater organisational performance and long-term value for the environment, society and the economy.
CRAMP	Closure, Restoration and Aftercare Management Plan.
ELRA	Environmental Liability Risk Assessment.
Emission Limit Value	Limits set for specified emissions, typically outlined in Schedule B of an EPA licence.
EMS	Environmental Management System.
Environmental Goal	An objective or target set by a licensee as part of an environmental management system (EMS).
Environmental Pollutant	Substance or material that due to its quantity and/or nature has a negative impact on the environment.
Facility	Any site or premises that holds an EPA industrial or waste licence.
FP	Financial Provision.
GJ	Giga joules, an international unit of energy measurement.

Bord na Móna - Data Classification - Public

Groundwater	All water which is below the surface of the ground in the saturation zone and in direct contact with the ground or subsoil.
Incident	As defined by an EPA industrial or waste licence.
Inert Waste	Is waste that will not undergo physical, chemical or biological change thereby, is unlikely to cause environmental pollution or harm human health.
List of Wastes (LoW)	A list of wastes drawn up by the European Commission and published as Commission Decision 2014/955/EU.
Noise Sensitive Location	Any dwelling house, hotel or hostel, health building, educational establishment, place of worship or entertainment, or any other installation or area of high amenity which for its proper enjoyment requires the absence of noise at nuisance levels.
Non-Renewable Resource	A resource of economic value that cannot be replaced at the same rate it is being consumed e.g. coal, peat, oil and natural gas.
Oil Separator	Separator system for light liquids (e.g. oil and petrol).
PRTR	Pollutant Release and Transfer Register.
Renewable Resource	Wind, solar, aerothermal, geothermal, hydrothermal and ocean energy, hydropower, biomass, landfill gas, sewage treatment plant gas and biogases.
Sanitary Waste	Waste water from toilet, washroom and canteen facilities.

Bord na Móna - Data Classification - Public

Storm Water	Rain water run-off from roof and non-process areas.
Surface Water	Lakes, rivers, streams, estuaries and coastal waters.
Trigger Level	A value set for a specific parameter, the achievement or exceedance of which requires certain actions to be taken by the licence holder.
Volatile Organic Compounds	Gases produced from solids or liquids that evaporate readily in ambient conditions.
Waste	Any substance or object which the holder discards or intends or is required to discard.

Disclaimer

These are **not** legal definitions. Legal definitions can be found in the corresponding legislation.

Bord na Móna - Data Classification - Public

Declaration

I, *Ray Lenihan,* confirm that by ticking the box below, all information in this report is truthful and accurate to the best of my knowledge and belief.

In addition, I confirm that all monitoring and performance reporting required by our EPA licence and summarised herein is available for inspection by the EPA.

Tick here ☑

Bord na Móna - Data Classification - Public

1) Introduction

See below a brief description of our facility and a summary of our environmental performance this year.

- During the reporting period the main activity was ongoing decommissioning of rail line and the construction of the Littleton Labrinth trailway across decommissioned rail routes.
- During the period, there was no complaints received of an environmental nature.
- In the period, 10% of water quality sampling reported exceedances in the COD trigger levels related to emissions from peatlands, exceeding the 100mg/l trigger level by on average 10%. This was of minor significance and was closed out during the period as they are not linked to any ongoing activity. All other parameters, Suspended Solids and Ammonia were under the Emission Limit Values and Trigger Levels respectively.
- During the period, there were various submissions to the Agency including mapping clarifications and the Environmental Performance Report 2023.

Contact Us

If you have any questions or would like further information on any aspect of our licensed activity, please contact us directly.

See below details:

Enda McDonagh,
Bord na Mona Energy Ltd.,
Leabeg,
Tullamore,
Co. Offaly.

Bord na Móna - Data Classification - Public

2) How we Manage our Facility

Environmental Management System

Explanation
To ensure our facility's activities do not cause environmental pollution we are required to have detailed documentation systems in place to help us manage and track our environmental performance. These systems are referred to as Environmental Management Systems (EMS). We review our EMS every year and set up-to-date **environmental goals** to continually improve our environmental performance.

The information below sets out the environmental goals for our facility to help us prevent environmental pollution and reduce our impact on the environment. Target dates for completing each goal and progress towards achieving the goal are outlined in Table 1.

Table 1 Environmental Goals

Environmental Goal	Target Date	Progress
Waste Management – Removal of all waste that are deemed a risk the environment in bogs scheduled to be decommissioned in 2024	Dec 2024	Underway
Maintain surface water quality compliance with emission limit values for Suspended Solids.	Dec 2024	Underway
Decommissioning of remainder of scheduled bogs in accordance with condition 10.	December 2024	Underway

Add rows as necessary

Comment

As peat extraction on all bogs in this licence ceased in 2017, all environmental goals for 2024 are linked to the remaining activity which is the final decommissioning scheduled for 2024 and the preparation of a licence surrender application to the Agency.

Bord na Móna - Data Classification - Public

Beyond Compliance

Explanation
We are legally required to comply with our environmental licence. However, the EPA realise that some sites go further than just complying with their environmental licence requirements. Some projects carried out at facilities can have long term positive impacts on the environment and local communities.
The EPA's beyond compliance initiative is encouraging us to identify and report on these environmental and sustainability projects. For example, the project could involve renewable energy, biodiversity, water conservation or exemplar community engagement.

Did any project completed on your site in the reporting year go beyond your licence requirements?

Yes ☐ No ☑

If yes, provide details of one case study in Appendix III that demonstrates how the project went beyond compliance of your licence.

Bord na Móna - Data Classification - Public

3) Energy & Water

Energy

Explanation
Fossil fuels such as coal, gas and oil are non-renewable resources. As a result, our EPA licence requires that we measure our energy use and set targets to improve the energy efficiency of our activities and reduce our overall use, where possible. Where we have the means and technology on-site to generate energy, this is also captured in this report.

The information below summarises the energy used this year compared to the previous year and includes renewable and non-renewable energy types.

Table 3 Energy Used

Energy Used	Quantity (GJ)	% Increase/ decrease on previous year
Electricity	609.35	25% Increase
Heavy Fuel Oil	0	
Light Fuel Oil	427	0% Decrease
Natural Gas	0	
Coal / Solid Fuel	0	
Peat	0	
Renewable Biomass	0	
Renewable Energy Generated On-site	0	
Total Energy Used	1036	14.47% Decrease

Comment

Both electricity and fuel usage decreased in 2023, primarily to reduced workshop activities and bog pumps being decommissioned.

Bord na Móna - Data Classification - Public

The information below summarises the energy we generated on our site this year with specific focus on renewable energy generation.

Table 4 Energy Generated

Energy Generated	**Quantity (GJ)**	**% Increase/ decrease on previous year**
Renewable Energy		
Total Energy Generated	n/a	

Comment

N/A

Bord na Móna - Data Classification - Public

Water

Explanation
Water is a natural resource and we are required by our EPA licence to identify ways to reduce our use where possible. Water used in industry can be extracted from groundwater, rivers and lakes (surface water), taken from public water supplies (Irish Water), recycled from the facility's processes or harvested from rainwater.

The information below summarises and compares the quantity of water used this year compared to the previous year.

Table 5 Water Used

Source of Water Used	Quantity (m^3/year)	% Increase/ decrease on previous year
Groundwater	0	
Surface Water	0	
Public Supply	0	
Recycled Water	0	
Rainwater	0	
Total Water Used	0	

Comment

Water is not used in any of the peatland rehabilitation or decommissioning processes.

Bord na Móna - Data Classification - Public

4) Environmental Complaints

Explanation
Our EPA licence requires that activities do not cause environmental nuisance such as odour, dust or noise. Our licence also requires that we have procedures in place to record, investigate and respond to environmental complaints if or when they arise.
We have an environmental complaints procedure in place where you can contact us[4] directly. You can also contact the EPA[5] if you wish to make an environmental complaint, confidentially or not.

See the information below for a summary of **all** the environmental complaints relating to our activities made directly to us and to the EPA this year.

Table 6 Summary of All Environmental Complaints Received in

Type of Complaint	Number of Complaints	Number Closed
Odour / Smells	0	
Noise	0	
Dust	0	
Water Quality	0	
Air Quality	0	
Waste	0	
Litter	0	
Vermin/Flies/Birds	0	
Soil Contamination	0	
Vibration	0	
Other	0	

[4] See Section 1, Introduction – Contact Us

[5] If you wish to contact the EPA to make an environmental complaint about an EPA licenced facility, please go to https://lema.epa.ie/complaints

Bord na Móna - Data Classification - Public

Comment

There were no complaints of an environmental nature received in 2023.

Bord na Móna - Data Classification - Public

5) Environmental Incidents

Explanation
It is our responsibility as an EPA licensed facility to ensure we have systems in place to prevent incidents that have the potential to cause environmental pollution. If an incident occurs, we are required to report it to the EPA, investigate the cause and fix the problem.
The EPA classify environmental incidents into 5 categories based on the potential impact on the environment:

- Minor
- Limited
- Serious
- Very Serious
- Catastrophic

See Table 7 for the number of the environmental incidents we reported to the EPA this year.

Bord na Móna - Data Classification - Public

Table 7 Number of Environmental Incidents

Incident Category	Minor	Limited	Serious	Very Serious	Catastrophic
Abatement Equipment Offline	N/A				
Breach of Ambient ELV	0				
Breach of Emission Limit	N/A				
Explosion	N/A				
Fire	N/A				
Monitoring Equipment Failure	N/A				
Odour	N/A				
Spillage	N/A				
Breach of trigger Level	7				
Uncontrolled Release	N/A				

Bord na Móna - Data Classification - Public

Incident Category	Minor	Limited	Serious	Very Serious	Catastrophic
Other	N/A				

Comment

There were no incidents in the Emission Limit Values during the reporting period. Elevated COD results, all in the minor category, were investigated. These 7 were minor exceedances in the 100mg/l COD and not linked to any activity on the bog.

Bord na Móna - Data Classification - Public

6) Our Environmental Emissions

Explanation

We are required to ensure the emissions from our activities do not cause environmental pollution.

We are required to monitor any of the following emissions that we make:

- Storm water
- Waste water
- Air
- Groundwater
- Noise

We regularly test any such emissions for specific pollutants and materials to ensure they do not contain levels of pollution that exceed emission limit values (ELVs) or cause environmental pollution. If monitoring of an emission indicates an ELV is exceeded, we are required to report this to the EPA[6].

The next sub-sections of this report summarise our compliance with any ELVs set in our EPA licence. Some emissions monitored do not have specific ELVs, but we still carry out monitoring and report all incidents that may give rise to environmental pollution.

[6] See section 5, Incidents

Bord na Móna - Data Classification - Public

Storm Water

Explanation
Storm water is rain water run-off from roof and non-process areas of a facility, e.g. carparks, and generally shall not contain any pollution.
Storm water is usually released into a local water body after a basic form of treatment. Our EPA licence requires that we manage storm water to ensure no polluting substances or materials are released into the environment.

The information below summarises how the storm water from our facility is treated, where it is released and the results of monitoring this year.

1. **Storm water from our facility is managed prior to release by;**

Either direct to drain where it is roof water only, or via the petrol/oil interceptor

2. **Storm water from our facility is released into the following water bodies:**

The Breaghagh (Tipperary), the Drish and the Black (Two Mile Borris) Rivers

Bord na Móna - Data Classification - Public

Table 8 Summary of Storm Water Monitoring

Parameter measured	No. of Samples	% Compliant[7]	Comment
COD	0	100%	All workshop activities have ceased with all interceptors degassed and cleaned.

Add rows as necessary

Comment

As required by the licence, stormwater is required to be separated where possible from process/non-process areas. Where it is possible, stormwater is managed via oil-interceptors which are inspected on a weekly basis and sampled for associated discharges each month. All activities have ceased on yards associated with the Littleton IPC Licence with some workshops and yards having been decommissioned and removed from the Licence.

[7] % compliant = [(number of samples compliant) / (number of samples taken)] x 100. Compliance could refer to emission limit values or trigger levels. The EPA commonly use trigger levels on stormwater discharges.

Bord na Móna - Data Classification - Public

Waste Water

Explanation
There are two types of waste water that can be produced:

- Process waste water produced from the activities and;
- Sanitary waste water from toilets, washrooms and canteens.

Our EPA licence requires us to manage our waste water on or off-site and ensure that it does not cause environmental pollution when discharged into the environment.

The information below summarises how we treat the waste water produced from our activities, where it is released and the results of monitoring this year.

1. **Waste water produced by our activities is treated as follows before discharge to a receiving waterbody**;

All bog area runoff is treated via an associated silt pond designed, inspected, and maintained in accordance with condition 6 of the IPC Licence.

2. **Treated waste water from our facility is released into the following water bodies:**

Errill River, Clonmore Stream, River Suir, Aughall Beg River, Rossestown River, Drich River, Gaul River, Clover River, Black (Two Mile Borris), Breagagh (Tipperary) and Clashawley River.

Bord na Móna - Data Classification - Public

Table 9 Summary of Waste Water Monitoring

Parameter measured	No. of Samples	% Compliant	Comment
Suspended Solids	66	100%	
Total Solids	66	100%	
Ammonia	66	100%	
Total Phosphorous	66	100%	
pH	66	100%	
Colour	66	100%	
COD	66	90%	7 samples were over the trigger level of 100mg/l for COD during the reporting period. No evidence of any contamination was found at any of these events.

Add rows as necessary

Comment

Licence requirements are quarterly grab samples on a selected number of silt pond outlets as per condition 6.2 The emission limit value is 35mg/l suspended solids, with Trigger levels of 4mg/l total ammonia and 100mg/l COD.

Bord na Móna - Data Classification - Public

Air

Explanation
Generally, three types of air emissions are monitored from industry in Ireland: gases, dust (particulates) and odour. Our EPA licence requires us to ensure that any air emissions from our activities do not cause air pollution or create an odour nuisance.

The information below details the number of air emission points we monitor, the results from testing the air emissions and any odour assessments carried out by us and the EPA this year.

1. We monitor air emissions from the following number of emission points at our facility.

As peat production has ceased. No dust monitoring took place during 2023

Table 10 Summary of Air Emissions Monitoring

Parameter measured	No. of Samples	% Compliant	Comment
N/A			

Add rows as necessary

Comment

Due to the permanent cessation of peat production in 2017, it is no longer necessary to monitor for dust.

Bord na Móna - Data Classification - Public

Table 11 Summary of Odour Assessments Carried Out

Assessment Conducted By	No. of Odour Assessments	% Compliant[8]	Comment
Licence Holder	N/A		
EPA	N/A		

Add rows where necessary

Comment

There are no odour emissions of note from our activities and no requirements to monitor with no associated complaints.

[8] A compliant odour assessment is based on EPA Odour Impact Assessment Guidance available at Air Enforcement | Environmental Protection Agency (epa.ie)

Bord na Móna - Data Classification - Public

Fugitive Solvent Emissions

Are you required to monitor fugitive solvent air emissions from your facility?

Yes ☐ No ☑

Explanation
The use of solvents is regulated under Irish and European Union (EU) Regulations[9]. Solvents are chemicals that, by their nature, are volatile (evaporate readily under ambient conditions). Solvents can be found in many inks, glues and cleaning agents. Due to the volatility of solvents some emissions may be released into the atmosphere during our activities before being captured in our air treatment system. This type of emission is called a **fugitive solvent emission**.

The information below summarises the quantity of solvents used this year, the percentage of fugitive solvent emissions (% of total quantity used) and whether the percentage complied with the targets set in the EU Regulations.

Table 12 Summary of Fugitive Solvent Emissions

Quantity of Solvents Used (Kg)	% Fugitive Solvent Emissions	Compliant
N/A		

Comment

N/A

[9] See Annex VII of the Industrial Emissions Directive
https://ec.europa.eu/environment/industry/stationary/ied/legislation.htm

Bord na Móna - Data Classification - Public

Groundwater

Explanation
Groundwater is an important and sensitive resource in Ireland. Our EPA licence requires that we monitor groundwater to ensure our activities do not cause groundwater pollution.
Understanding how groundwater flows through soil and rock layers and eventually into surface and coastal waters is a complex science. Sometimes groundwater pollution that occurred in the past can take years and even decades to disappear. Therefore, it is important that experts help us monitor and interpret results from groundwater monitoring and testing.

The information below is a basic summary of the condition of the groundwater this year.

1. **Do you have a groundwater monitoring programme in place?**

Yes ☐ No ☑

2. **Have the groundwater monitoring results over the last 5 years indicated the presence of groundwater pollution?**

Yes ☐ No ☑

Table 13 List of Groundwater Pollutants Identified

Pollutants
N/A

Add rows as necessary

Bord na Móna - Data Classification - Public

3. Give details of the investigations and subsequent actions taken, where applicable, to manage the groundwater pollution.

N/A

Comment

N/A

Bord na Móna - Data Classification - Public

Noise

Explanation
Our EPA licence requires that we monitor noise emissions from our facility. Noise monitoring can be conducted at the boundary of our facility and/or at locations beyond the boundary referred to as “noise sensitive locations”. Noise monitoring requires the use of special noise monitoring equipment. Our EPA licence requires that noise produced by our facility shall not exceed the noise limit values and/or give rise to nuisance.

The information below gives a summary of when and where we conducted noise monitoring this year and if results complied with our EPA licence limits.

1. **We conducted noise monitoring on the following dates this year:**

N/A

2. **Where was the noise monitoring carried out?**
   - i. **the boundary of our facility;**
   - ii. **noise sensitive locations off-site; or**
   - iii. **both.**

N/A

3. **Were measured noise levels compliant with your EPA licence limits?**

Yes ☐ No ☐

If No, we took the following actions to address the noise level exceedances?

N/A

Comment

Noise monitoring not required.

Bord na Móna - Data Classification - Public

7) Waste

Waste Generated

Explanation
Our EPA licence requires us to manage the waste we generate in a manner that does not cause environmental pollution.
We manage, store and record hazardous, non-hazardous and inert waste we generate in accordance with our licence. We ensure that this waste is subsequently treated or disposed of in accordance with the relevant waste Regulations.

The information in Table 14 is a summary of waste we generated this year and the percentage increase or decrease on the previous year. The percentage recovery is the amount of total waste generated that was reused, recycled or recovered.

Table 14 Waste Generated

Type	Quantity (Tonnes)	% Increase/ decrease on previous year	% Recovery
Hazardous	0	0% Increase	0
Non-Hazardous	693	693% Increase	100%
Inert	83.85	55% Decrease	0
Total Tonnes	776.83	517% Increase	89%

Comment

The increase in waste generated in 2023 of over 500% was from the lifting of 15 kms of rail and associated scrap metal. The 55% decrease in inert waste was due to ongoing stabilisation of the peatlands and associated reduction in the cleaning requirements of the silt pond network.

Bord na Móna - Data Classification - Public

Waste Accepted

Did you accept waste onto your facility for storage, treatment, recovery or disposal this year?

Yes ☐ No ☑

Explanation
Our EPA licence requires us to manage the waste we accept in a manner that does not cause environmental pollution.
We manage, store and record all incoming and outgoing hazardous, non-hazardous and inert waste. The waste we accept may be treated, recovered, disposed or stored at our facility depending on our licence requirements.

The information in Table 15 provides a summary of waste we accepted this year and the percentage increase or decrease on the previous year. The percentage recovery is the amount of total waste accepted that was reused, recycled or recovered.

Table 15 Waste Accepted

Type	Quantity (Tonnes)	% Increase/ decrease on previous year	% Recovery
Hazardous	N/A		
Non-Hazardous	N/A		
Inert	N/A		
Total Tonnes	N/A		

Comment

No wastes accepted

Bord na Móna - Data Classification - Public

8) Financial Provision

Explanation
Our EPA licence requires us to assess the risk our activities pose to the environment if we cease our activities or if an incident occurred. If we are identified as a high risk facility[10] by the EPA, we are required to put provision in place such as a financial bond or insurance to cover the cost of restoring our site to a satisfactory condition. This financial provision can then be used to cover the cost of managing the restoration or clean up should such an event occur.

1. Are you required to have an agreed financial provision in place?

Yes ☐ No ☑

2. What year was your Closure, Restoration and Aftercare Management Plan (CRAMP) last agreed by the Agency?

N/A

3. What year was your Environmental Liability Assessment Report (ELRA) agreed by the Agency?

4. Has there been any significant changes on your site since the last agreements?

Yes ☐ No ☐

If yes, have you submitted details to the EPA?

Yes ☐ No ☐ N/A ☑

[10] See Appendix II

Bord na Móna - Data Classification - Public

Appendix I

Class of Activity

Industrial and waste facilities are classed into different sectors depending on the nature of their activity and its potential impact on the environment. The EPA Act 1992 as amended, outlines these as follows:

Class 1	Minerals and other materials
Class 2	Energy
Class 3	Metals
Class 4	Mineral fibres and glass
Class 5	Chemicals
Class 6	Intensive Agriculture[11]
Class 7	Food and drink
Class 8	Wood, paper, textiles and leather
Class 9	Fossil fuels
Class 10	Cement, lime and magnesium oxide
Class 11	Waste
Class 12	Surface Coatings
Class 13	Other Activities

[11] This reporting template is not applicable to the **intensive agriculture sector**. Their annual environmental reporting structure is different and can be found at Compliance & Enforcement: Licensees: Reporting Publications | Environmental Protection Agency (epa.ie)

Bord na Móna - Data Classification - Public

Appendix II

High Environmental Risk Categories

If an industrial or waste licence falls into one of these categories it is deemed, by the EPA, as a high environmental risk. As a result, the licence holder is required to have financial provision in place. See section 8, Financial Provision.

1. Landfills
2. Non-Hazardous Waste Transfer Station
3. Incineration and Co-Incineration Waste Facilities
4. Category A – Extractive Waste Facilities
5. Upper and Lower Tier Seveso Facilities
6. Hazardous Waste Transfer Stations
7. High Risk Contaminated Land
8. Exceptional Circumstances

NOTE:

This list is subject to change.

See the link below for further information.

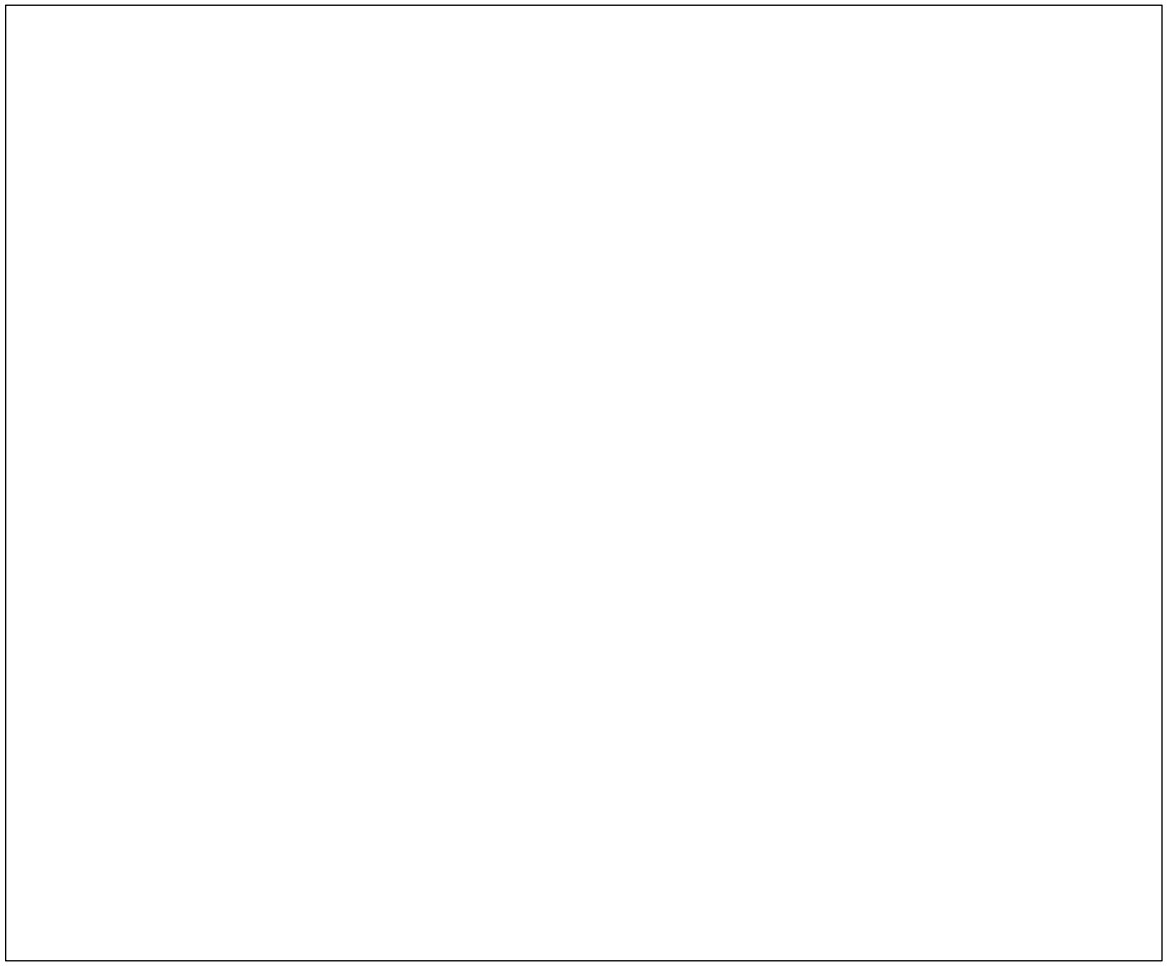
Compliance & Enforcement: Financial Provisions Publications | Environmental Protection Agency (epa.ie)

Bord na Móna - Data Classification - Public

Appendix III

Beyond Compliance

The case study below shows how we went beyond the requirements of our licence in the reporting year.



Bord na Móna - Data Classification - Public

Annual Environmental Report (AER)

2024

Company Name: Bord na Mona Fuels Ltd

Licence Number: P0499-01

Address: C/O Bord na Móna, Leabeg, Tullamore, Co Offaly

Class of Activity[1]:1.4

[1] See Appendix I

Bord na Móna - Data Classification - Public

Purpose of this Report

One of the functions of the Environmental Protection Agency (EPA) is to licence and regulate the activities[2] of large scale industrial (e.g. chemical, food processors, power plants) and waste facilities. Submitting an Annual Environmental Report (AER) is a requirement of all EPA licences.

An AER is a public document. To this end, this format has been developed for industrial and waste licence holders (other than the intensive agriculture sector) to use as a template. This is to assist any member of the public to interpret and understand the environmental performance of the licensed facility.

The AER is a **summary** of environmental information for a given year. It includes:

- Details of the licence holder's environmental goals achieved, goals to maintain compliance and/or improve their environmental performance;
- Answers to questions regarding their facility's activities;
- Tables of results from monitoring emissions such as air, water, noise, and odour; and
- Details of waste generated, accepted and treated.

An AER does **not** provide detailed technical data. Such information is available in three ways:

1) Contacting the licence holder directly. The Contact Us section of this template enables the licence holder to provide details of where a member of the public can obtain further information on topics reported in this document.

[2] See Appendix I

Bord na Móna - Data Classification - Public

2) Some documents[3] are available on the EPA website via the licence details page for each individual licence. This can be found by browsing either the http://www.epa.ie/licensing/ or http://www.epa.ie/enforcement/ pages of the EPA website.

3) All formal enforcement correspondence exchanged between the EPA and a licence holder during the regulatory process is available for public viewing by appointment at any EPA Office.

If you have a question or query about an AER or an individual EPA licensed facility see the EPA's website or contact the relevant EPA office. See http://www.epa.ie/about/contactus/ for contact details.

[3] This includes EPA site inspection and compliance monitoring reports, licence holders' self-monitoring reports, AERs and special reports

Bord na Móna - Data Classification - Public

Contents

Glossary 5

Declaration 8

1) Introduction 9

Contact Us 9

2) How we Manage our Facility 10

Environmental Management System 10

Beyond Compliance 11

3) Energy & Water 12

Energy 12

Water 14

4) Environmental Complaints 15

5) Environmental Incidents 16

6) Our Environmental Emissions 19

Storm Water 20

Waste Water 22

Air 24

Fugitive Solvent Emissions 26

Groundwater 27

Noise 29

7) Waste 30

Waste Generated 30

Waste Accepted 31

8) Financial Provision 32

Bord na Móna - Data Classification - Public

Glossary

Abatement Equipment	Technology used to reduce pollution
AER	Annual Environmental Report.
Beyond Compliance	Beyond compliance is concept to help deliver greater organisational performance and long-term value for the environment, society and the economy.
CRAMP	Closure, Restoration and Aftercare Management Plan.
ELRA	Environmental Liability Risk Assessment.
Emission Limit Value	Limits set for specified emissions, typically outlined in Schedule B of an EPA licence.
EMS	Environmental Management System.
Environmental Goal	An objective or target set by a licensee as part of an environmental management system (EMS).
Environmental Pollutant	Substance or material that due to its quantity and/or nature has a negative impact on the environment.
Facility	Any site or premises that holds an EPA industrial or waste licence.
FP	Financial Provision.
GJ	Giga joules, an international unit of energy measurement.

Bord na Móna - Data Classification - Public

Groundwater	All water which is below the surface of the ground in the saturation zone and in direct contact with the ground or subsoil.
Incident	As defined by an EPA industrial or waste licence.
Inert Waste	Is waste that will not undergo physical, chemical or biological change thereby, is unlikely to cause environmental pollution or harm human health.
List of Wastes (LoW)	A list of wastes drawn up by the European Commission and published as Commission Decision 2014/955/EU.
Noise Sensitive Location	Any dwelling house, hotel or hostel, health building, educational establishment, place of worship or entertainment, or any other installation or area of high amenity which for its proper enjoyment requires the absence of noise at nuisance levels.
Non-Renewable Resource	A resource of economic value that cannot be replaced at the same rate it is being consumed e.g. coal, peat, oil and natural gas.
Oil Separator	Separator system for light liquids (e.g. oil and petrol).
PRTR	Pollutant Release and Transfer Register.
Renewable Resource	Wind, solar, aerothermal, geothermal, hydrothermal and ocean energy, hydropower, biomass, landfill gas, sewage treatment plant gas and biogases.
Sanitary Waste	Waste water from toilet, washroom and canteen facilities.

Bord na Móna - Data Classification - Public

Storm Water	Rain water run-off from roof and non-process areas.
Surface Water	Lakes, rivers, streams, estuaries and coastal waters.
Trigger Level	A value set for a specific parameter, the achievement or exceedance of which requires certain actions to be taken by the licence holder.
Volatile Organic Compounds	Gases produced from solids or liquids that evaporate readily in ambient conditions.
Waste	Any substance or object which the holder discards or intends or is required to discard.

Disclaimer

These are **not** legal definitions. Legal definitions can be found in the corresponding legislation.

Declaration

I, *Ray Lenihan,* confirm that by ticking the box below, all information in this report is truthful and accurate to the best of my knowledge and belief.

In addition, I confirm that all monitoring and performance reporting required by our EPA licence and summarised herein is available for inspection by the EPA.

Tick here ☑

Bord na Móna - Data Classification - Public

1) Introduction

See below a brief description of our facility and a summary of our environmental performance this year.

- During the reporting period the main activity was ongoing decommissioning of rail line and the construction of the Littleton Labrinth trailway across decommissioned rail routes along with ongoing silt control.
- During the period, there was no complaints received of an environmental nature.
- In the period, 2% of water quality sampling reported exceedances in the COD trigger levels related to emissions from peatlands, exceeding the 100mg/l trigger level by on average 16%. This was of minor significance and was closed out during the period as they are not linked to any ongoing activity. All other parameters, Suspended Solids and Ammonia were under the Emission Limit Values and Trigger Levels respectively.
- During the period, there were various submissions to the Agency including the Environmental Performance Report 2023 and notification about Fy26 Rehabilitation Plans.

Contact Us

If you have any questions or would like further information on any aspect of our licensed activity, please contact us directly.

See below details:

Enda McDonagh,
Bord na Mona Energy Ltd.,
Leabeg,
Tullamore,
Co. Offaly.

Bord na Móna - Data Classification - Public

2) How we Manage our Facility

Environmental Management System

Explanation
To ensure our facility's activities do not cause environmental pollution we are required to have detailed documentation systems in place to help us manage and track our environmental performance. These systems are referred to as Environmental Management Systems (EMS). We review our EMS every year and set up-to-date **environmental goals** to continually improve our environmental performance.

The information below sets out the environmental goals for our facility to help us prevent environmental pollution and reduce our impact on the environment. Target dates for completing each goal and progress towards achieving the goal are outlined in Table 1.

Table 1 Environmental Goals

Environmental Goal	Target Date	Progress
Waste Management – Removal of any residual waste that are deemed a risk the environment in bogs scheduled to be rehabilitated in 2025.	Dec 2025	Underway
Maintain surface water quality compliance with emission limit values for Suspended Solids, and Trigger levels for Ammonia and COD.	Dec 2025	Underway
Ensuring Licence compliance regarding the rehabilitation of the proposed Littleton bogs in 2025.	Dec 2025	Underway

Add rows as necessary

Comment

As peat extraction on all bogs in this licence ceased in 2017, all environmental goals for 2025 are linked to the remaining activity which is the proposed rehabilitation planned for 2025.

Bord na Móna - Data Classification - Public

Beyond Compliance

Explanation
We are legally required to comply with our environmental licence. However, the EPA realise that some sites go further than just complying with their environmental licence requirements. Some projects carried out at facilities can have long term positive impacts on the environment and local communities.
The EPA's beyond compliance initiative is encouraging us to identify and report on these environmental and sustainability projects. For example, the project could involve renewable energy, biodiversity, water conservation or exemplar community engagement.

Did any project completed on your site in the reporting year go beyond your licence requirements?

Yes ☐ No ☑

If yes, provide details of one case study in Appendix III that demonstrates how the project went beyond compliance of your licence.

Bord na Móna - Data Classification - Public

3) Energy & Water

Energy

Explanation
Fossil fuels such as coal, gas and oil are non-renewable resources. As a result, our EPA licence requires that we measure our energy use and set targets to improve the energy efficiency of our activities and reduce our overall use, where possible. Where we have the means and technology on-site to generate energy, this is also captured in this report.

The information below summarises the energy used this year compared to the previous year and includes renewable and non-renewable energy types.

Table 3 Energy Used

Energy Used	Quantity (GJ)	% Increase/ decrease on previous year
Electricity	299.34	50% reduction
Heavy Fuel Oil	0	
Light Fuel Oil	183	57% decrease
Natural Gas	0	
Coal / Solid Fuel	0	
Peat	0	
Renewable Biomass	0	
Renewable Energy Generated On-site	0	
Total Energy Used	482.34	53% Decrease

Comment

Both electricity and fuel usage decreased in 2024, primarily to reduced workshop activities and bog pumps being decommissioned.

Bord na Móna - Data Classification - Public

The information below summarises the energy we generated on our site this year with specific focus on renewable energy generation.

Table 4 Energy Generated

Energy Generated	**Quantity (GJ)**	**% Increase/ decrease on previous year**
Renewable Energy		
Total Energy Generated	n/a	

Comment

N/A

Bord na Móna - Data Classification - Public

Water

Explanation
Water is a natural resource and we are required by our EPA licence to identify ways to reduce our use where possible. Water used in industry can be extracted from groundwater, rivers and lakes (surface water), taken from public water supplies (Irish Water), recycled from the facility's processes or harvested from rainwater.

The information below summarises and compares the quantity of water used this year compared to the previous year.

Table 5 Water Used

Source of Water Used	Quantity (m^3/year)	% Increase/ decrease on previous year
Groundwater	0	
Surface Water	0	
Public Supply	0	
Recycled Water	0	
Rainwater	0	
Total Water Used	0	

Comment

Water is not used in any of the peatland rehabilitation or decommissioning processes.

Bord na Móna - Data Classification - Public

4) Environmental Complaints

Explanation
Our EPA licence requires that activities do not cause environmental nuisance such as odour, dust or noise. Our licence also requires that we have procedures in place to record, investigate and respond to environmental complaints if or when they arise.
We have an environmental complaints procedure in place where you can contact us[4] directly. You can also contact the EPA[5] if you wish to make an environmental complaint, confidentially or not.

See the information below for a summary of **all** the environmental complaints relating to our activities made directly to us and to the EPA this year.

Table 6 Summary of All Environmental Complaints Received in

Type of Complaint	Number of Complaints	Number Closed
Odour / Smells	0	
Noise	0	
Dust	0	
Water Quality	0	
Air Quality	0	
Waste	0	
Litter	0	
Vermin/Flies/Birds	0	
Soil Contamination	0	
Vibration	0	
Other	0	

Comment

There were no complaints of an environmental nature received in 2024.

[4] See Section 1, Introduction – Contact Us

[5] If you wish to contact the EPA to make an environmental complaint about an EPA licenced facility, please go to https://lema.epa.ie/complaints

Bord na Móna - Data Classification - Public

5) Environmental Incidents

Explanation
It is our responsibility as an EPA licensed facility to ensure we have systems in place to prevent incidents that have the potential to cause environmental pollution. If an incident occurs, we are required to report it to the EPA, investigate the cause and fix the problem.
The EPA classify environmental incidents into 5 categories based on the potential impact on the environment:

- Minor
- Limited
- Serious
- Very Serious
- Catastrophic

See Table 7 for the number of the environmental incidents we reported to the EPA this year.

Bord na Móna - Data Classification - Public

Table 7 Number of Environmental Incidents

Incident Category	Minor	Limited	Serious	Very Serious	Catastrophic
Abatement Equipment Offline	N/A				
Breach of Ambient ELV	0				
Breach of Emission Limit	N/A				
Explosion	N/A				
Fire	N/A				
Monitoring Equipment Failure	N/A				
Odour	N/A				
Spillage	N/A				
Breach of trigger Level	2				
Uncontrolled Release	N/A				

Bord na Móna - Data Classification - Public

Incident Category	Minor	Limited	Serious	Very Serious	Catastrophic
Other	N/A				

Comment

There were no incidents in the Emission Limit Values during the reporting period. 2 x elevated COD results, all in the minor category, were investigated.

Bord na Móna - Data Classification - Public

6) Our Environmental Emissions

Explanation

We are required to ensure the emissions from our activities do not cause environmental pollution.

We are required to monitor any of the following emissions that we make:

- Storm water
- Waste water
- Air
- Groundwater
- Noise

We regularly test any such emissions for specific pollutants and materials to ensure they do not contain levels of pollution that exceed emission limit values (ELVs) or cause environmental pollution. If monitoring of an emission indicates an ELV is exceeded, we are required to report this to the EPA[6].

The next sub-sections of this report summarise our compliance with any ELVs set in our EPA licence. Some emissions monitored do not have specific ELVs, but we still carry out monitoring and report all incidents that may give rise to environmental pollution.

[6] See section 5, Incidents

Bord na Móna - Data Classification - Public

Storm Water

Explanation
Storm water is rain water run-off from roof and non-process areas of a facility, e.g. carparks, and generally shall not contain any pollution.
Storm water is usually released into a local water body after a basic form of treatment. Our EPA licence requires that we manage storm water to ensure no polluting substances or materials are released into the environment.

The information below summarises how the storm water from our facility is treated, where it is released and the results of monitoring this year.

1. **Storm water from our facility is managed prior to release by;**

Either direct to drain where it is roof water only, or via the petrol/oil interceptor

2. **Storm water from our facility is released into the following water bodies:**

The Breaghagh (Tipperary), the Drish and the Black (Two Mile Borris) Rivers

Bord na Móna - Data Classification - Public

Table 8 Summary of Storm Water Monitoring

Parameter measured	No. of Samples	% Compliant[7]	Comment
COD	0	100%	All workshop activities have ceased with all interceptors degassed and cleaned.

Add rows as necessary

Comment

As required by the licence, stormwater is required to be separated where possible from process/non-process areas. Where it is possible, stormwater is managed via oil-interceptors which are inspected on a weekly basis and sampled for associated discharges each month. All activities have ceased on yards associated with the Littleton IPC Licence with some workshops and yards having been decommissioned and removed from the Licence.

[7] % compliant = [(number of samples compliant) / (number of samples taken)] x 100. Compliance could refer to emission limit values or trigger levels. The EPA commonly use trigger levels on stormwater discharges.

Bord na Móna - Data Classification - Public

Waste Water

Explanation
There are two types of waste water that can be produced:

- Process waste water produced from the activities and;
- Sanitary waste water from toilets, washrooms and canteens.

Our EPA licence requires us to manage our waste water on or off-site and ensure that it does not cause environmental pollution when discharged into the environment.

The information below summarises how we treat the waste water produced from our activities, where it is released and the results of monitoring this year.

1. **Waste water produced by our activities is treated as follows before discharge to a receiving waterbody**;

All bog area runoff is treated via an associated silt pond designed, inspected, and maintained in accordance with condition 6 of the IPC Licence.

2. **Treated waste water from our facility is released into the following water bodies:**

Errill River, Clonmore Stream, River Suir, Aughall Beg River, Rossestown River, Drich River, Gaul River, Clover River, Black (Two Mile Borris), Breagagh (Tipperary) and Clashawley River.

Bord na Móna - Data Classification - Public

Table 9 Summary of Waste Water Monitoring

Parameter measured	No. of Samples	% Compliant	Comment
Suspended Solids	89	100%	
Total Solids	89	100%	
Ammonia	89	100%	
Total Phosphorous	89	100%	
pH	89	100%	
Colour	89	100%	
COD	89	98%	2 samples were over the trigger level of 100mg/l for COD during the reporting period. No evidence of any contamination was found at any of these events.

Add rows as necessary

Comment

Licence requirements are quarterly grab samples on a selected number of silt pond outlets as per condition 6.2
The emission limit value is 35mg/l suspended solids, with Trigger levels of 4mg/l total ammonia and 100mg/l COD. In advance of the proposed rehabilitation of a number of bogs in Littleton as part for the Peatlands Climate Action Scheme in 2025, sampling frequency of applicable emission points has increased to bi-monthly.

Bord na Móna - Data Classification - Public

Air

Explanation
Generally, three types of air emissions are monitored from industry in Ireland: gases, dust (particulates) and odour. Our EPA licence requires us to ensure that any air emissions from our activities do not cause air pollution or create an odour nuisance.

The information below details the number of air emission points we monitor, the results from testing the air emissions and any odour assessments carried out by us and the EPA this year.

1. **We monitor air emissions from the following number of emission points at our facility.**

As peat production has ceased. No dust monitoring took place during 2024

Table 10 Summary of Air Emissions Monitoring

Parameter measured	No. of Samples	% Compliant	Comment
N/A			

Add rows as necessary

Comment

Due to the permanent cessation of peat production in 2017, it is no longer necessary to monitor for dust.

Bord na Móna - Data Classification - Public

Table 11 Summary of Odour Assessments Carried Out

Assessment Conducted By	No. of Odour Assessments	% Compliant[8]	Comment
Licence Holder	N/A		
EPA	N/A		

Add rows where necessary

Comment

There are no odour emissions of note from our activities and no requirements to monitor with no associated complaints.

[8] A compliant odour assessment is based on EPA Odour Impact Assessment Guidance available at Air Enforcement | Environmental Protection Agency (epa.ie)

Bord na Móna - Data Classification - Public

Fugitive Solvent Emissions

Are you required to monitor fugitive solvent air emissions from your facility?

Yes ☐ No ☑

Explanation

The use of solvents is regulated under Irish and European Union (EU) Regulations[9]. Solvents are chemicals that, by their nature, are volatile (evaporate readily under ambient conditions). Solvents can be found in many inks, glues and cleaning agents. Due to the volatility of solvents some emissions may be released into the atmosphere during our activities before being captured in our air treatment system. This type of emission is called a **fugitive solvent emission**.

The information below summarises the quantity of solvents used this year, the percentage of fugitive solvent emissions (% of total quantity used) and whether the percentage complied with the targets set in the EU Regulations.

Table 12 Summary of Fugitive Solvent Emissions

Quantity of Solvents Used (Kg)	% Fugitive Solvent Emissions	Compliant
N/A		

Comment

N/A

[9] See Annex VII of the Industrial Emissions Directive https://ec.europa.eu/environment/industry/stationary/ied/legislation.htm

Bord na Móna - Data Classification - Public

Groundwater

Explanation
Groundwater is an important and sensitive resource in Ireland. Our EPA licence requires that we monitor groundwater to ensure our activities do not cause groundwater pollution.
Understanding how groundwater flows through soil and rock layers and eventually into surface and coastal waters is a complex science. Sometimes groundwater pollution that occurred in the past can take years and even decades to disappear. Therefore, it is important that experts help us monitor and interpret results from groundwater monitoring and testing.

The information below is a basic summary of the condition of the groundwater this year.

1. **Do you have a groundwater monitoring programme in place?**

Yes ☐ No ☑

2. **Have the groundwater monitoring results over the last 5 years indicated the presence of groundwater pollution?**

Yes ☐ No ☑

Table 13 List of Groundwater Pollutants Identified

Pollutants
N/A

Add rows as necessary

Bord na Móna - Data Classification - Public

3. Give details of the investigations and subsequent actions taken, where applicable, to manage the groundwater pollution.

N/A

Comment

N/A

Bord na Móna - Data Classification - Public

Noise

Explanation
Our EPA licence does not require that we monitor noise emissions from our facility. Noise monitoring can be conducted at the boundary of our facility and/or at locations beyond the boundary referred to as “noise sensitive locations”. Noise monitoring requires the use of special noise monitoring equipment. Our EPA licence requires that noise produced by our facility shall not exceed the noise limit values and/or give rise to nuisance.

The information below gives a summary of when and where we conducted noise monitoring this year and if results complied with our EPA licence limits.

1. **We conducted noise monitoring on the following dates this year:**

N/A

2. **Where was the noise monitoring carried out?**
   - i. **the boundary of our facility;**
   - ii. **noise sensitive locations off-site; or**
   - iii. **both.**

N/A

3. **Were measured noise levels compliant with your EPA licence limits?**

Yes ☐ No ☐

If No, we took the following actions to address the noise level exceedances?

N/A

Comment

Noise monitoring not required.

Bord na Móna - Data Classification - Public

7) Waste

Waste Generated

Explanation
Our EPA licence requires us to manage the waste we generate in a manner that does not cause environmental pollution.
We manage, store and record hazardous, non-hazardous and inert waste we generate in accordance with our licence. We ensure that this waste is subsequently treated or disposed of in accordance with the relevant waste Regulations.

The information in Table 14 is a summary of waste we generated this year and the percentage increase or decrease on the previous year. The percentage recovery is the amount of total waste generated that was reused, recycled or recovered.

Table 14 Waste Generated

Type	Quantity (Tonnes)	% Increase/ decrease on previous year	% Recovery
Hazardous	0	0% Increase	0
Non-Hazardous	126.95	82% Decrease	100%
Inert	8.54	89% Decrease	0
Total Tonnes	135.49	82% Decrease	93%

Comment

The decrease in waste generated in 2024 of over 82% was peatlands and workshop decommissioning requirements declining. The 82% decrease in inert waste was due to ongoing stabilisation of the peatlands and associated reduction in the cleaning requirements of the silt pond network.

Bord na Móna - Data Classification - Public

Waste Accepted

Did you accept waste onto your facility for storage, treatment, recovery or disposal this year?

Yes ☐ No ☑

Explanation
Our EPA licence requires us to manage the waste we accept in a manner that does not cause environmental pollution.
We manage, store and record all incoming and outgoing hazardous, non-hazardous and inert waste. The waste we accept may be treated, recovered, disposed or stored at our facility depending on our licence requirements.

The information in Table 15 provides a summary of waste we accepted this year and the percentage increase or decrease on the previous year. The percentage recovery is the amount of total waste accepted that was reused, recycled or recovered.

Table 15 Waste Accepted

Type	Quantity (Tonnes)	% Increase/ decrease on previous year	% Recovery
Hazardous	N/A		
Non-Hazardous	N/A		
Inert	N/A		
Total Tonnes	N/A		

Comment

No wastes accepted

Bord na Móna - Data Classification - Public

8) Financial Provision

Explanation
Our EPA licence requires us to assess the risk our activities pose to the environment if we cease our activities or if an incident occurred. If we are identified as a high risk facility[10] by the EPA, we are required to put provision in place such as a financial bond or insurance to cover the cost of restoring our site to a satisfactory condition. This financial provision can then be used to cover the cost of managing the restoration or clean up should such an event occur.

1. Are you required to have an agreed financial provision in place?

Yes ☐ No ☑

2. What year was your Closure, Restoration and Aftercare Management Plan (CRAMP) last agreed by the Agency?

N/A

3. What year was your Environmental Liability Assessment Report (ELRA) agreed by the Agency?

4. Has there been any significant changes on your site since the last agreements?

Yes ☐ No ☐

If yes, have you submitted details to the EPA?

Yes ☐ No ☐ N/A ☑

[10] See Appendix II

Bord na Móna - Data Classification - Public

Appendix I

Class of Activity

Industrial and waste facilities are classed into different sectors depending on the nature of their activity and its potential impact on the environment. The EPA Act 1992 as amended, outlines these as follows:

Class 1	Minerals and other materials
Class 2	Energy
Class 3	Metals
Class 4	Mineral fibres and glass
Class 5	Chemicals
Class 6	Intensive Agriculture[11]
Class 7	Food and drink
Class 8	Wood, paper, textiles and leather
Class 9	Fossil fuels
Class 10	Cement, lime and magnesium oxide
Class 11	Waste
Class 12	Surface Coatings
Class 13	Other Activities

[11] This reporting template is not applicable to the **intensive agriculture sector**. Their annual environmental reporting structure is different and can be found at Compliance & Enforcement: Licensees: Reporting Publications | Environmental Protection Agency (epa.ie)

Bord na Móna - Data Classification - Public

Appendix II

High Environmental Risk Categories

If an industrial or waste licence falls into one of these categories it is deemed, by the EPA, as a high environmental risk. As a result, the licence holder is required to have financial provision in place. See section 8, Financial Provision.

1. Landfills
2. Non-Hazardous Waste Transfer Station
3. Incineration and Co-Incineration Waste Facilities
4. Category A – Extractive Waste Facilities
5. Upper and Lower Tier Seveso Facilities
6. Hazardous Waste Transfer Stations
7. High Risk Contaminated Land
8. Exceptional Circumstances

NOTE:

This list is subject to change.

See the link below for further information.

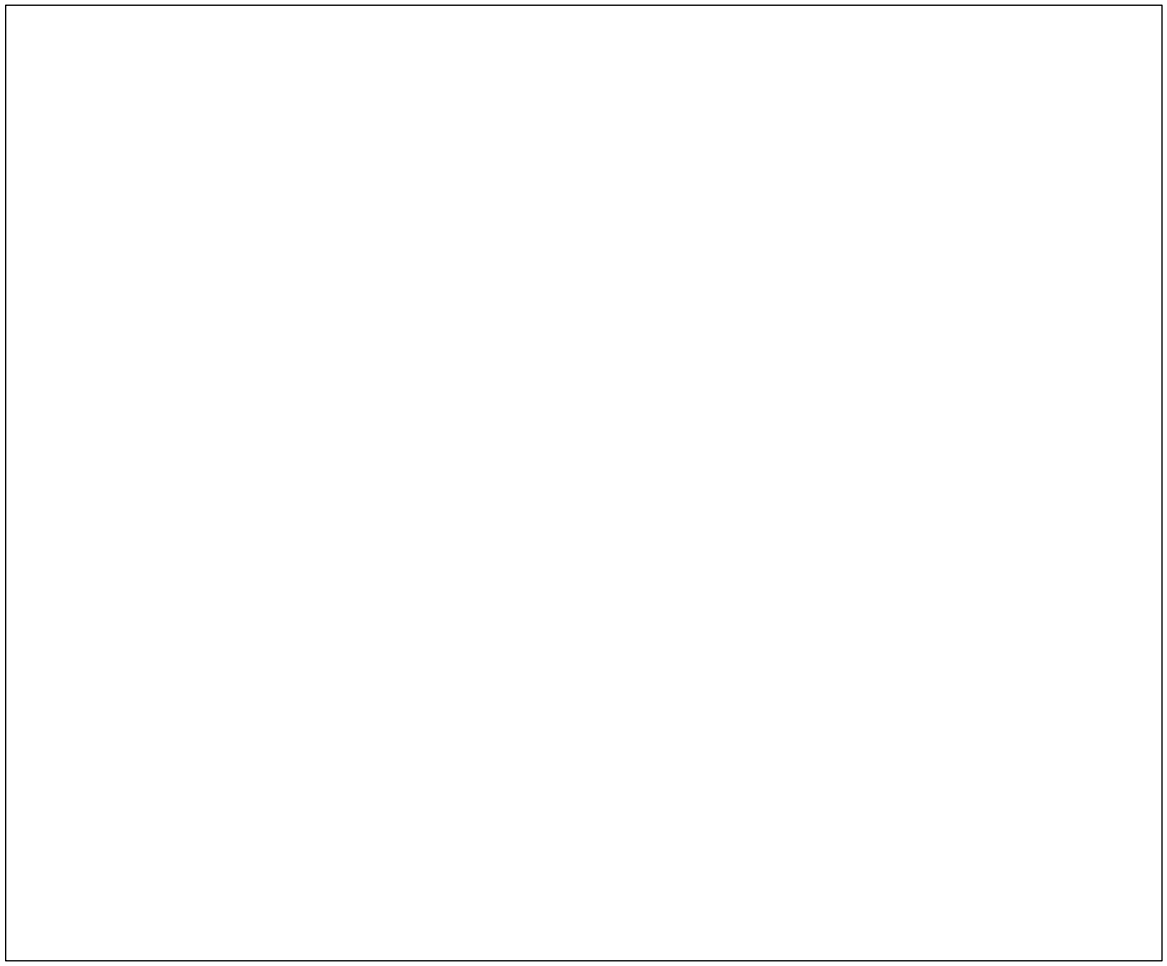
Compliance & Enforcement: Financial Provisions Publications | Environmental Protection Agency (epa.ie)

Bord na Móna - Data Classification - Public

Appendix III

Beyond Compliance

The case study below shows how we went beyond the requirements of our licence in the reporting year.



Bord na Móna - Data Classification - Public

BORD NA MÓNA

BORD NA MÓNA FUELS LIMITED

Annual Environmental Report 2009
IPPC LICENCE P0499-01

March 2010

Bord na Móna today operates 5 main subsidiary companies in more than 20 locations throughout Ireland, the UK and USA. The principal businesses are in the Energy, Resource Recovery, Horticulture, Home Heating and Wastewater Treatment and Air Pollution Abatement markets. The company also engages in an extensive rehabilitation program to develop its peat lands in an environmentally sustainable manner.

Bord na Móna has long recognised the need to diversify its activities in order to secure a sustainable future. In this context we identified the energy and resource recovery sectors as appropriate areas of growth and development, given our assets, strengths and skills.
Significant challenges face Ireland in meeting the country's needs to provide secure sustainable energy and manage waste while minimising the impact on the environment.

Bord na Móna is in a strong position to contribute to dealing with these challenges. We have a unique mixture of assets, experience and innovation which will enable us to cross-link our activities in energy, water and resource recovery to provide products and services which will meet Ireland's needs. We also have the capacity to become an exemplar for others to follow in these fields.

With this background we have scoped out a new vision for the future sustainable development of Bord na Móna.
Following on from our vision, we have developed a new mission for Bord na Móna which the Company is committed to achieving.

In 1934 the Turf Development Board was formed to ‘develop and improve the turf industry.' The experience of fuel shortages during the war re-enforced the Irish State's commitment to developing the country's bogs. In 1944 the TDB was asked to devise and submit a comprehensive programme, the outcome was the transformation in 1946 of the TDB into Bord na Móna. The Board was given a mandate to increase the use of peat as a fuel and in energy production. Markets for the use of moss peat in horticulture were also developed.

In 1990 Bord na Móna implemented a divisionalised and decentralised structure, designed to delegate responsibility downwards ensuring a sharper focus on each profit centre and a greater spirit of enterprise.

Group Vision

The vision statement defines the Company's purpose, in terms of its values.
Values are guiding beliefs about how things should be done.
The vision statement communicates both the purpose and values of Bord na Móna.
For employees, it gives direction about how they are expected to behave and inspires them to give their best. Shared with customers, it shapes the customers' understanding of why they should work with Bord na Móna.
Bord na Móna will seek solutions that optimise the creative energy and potential of the organisation, driven by long term goals and the organisation's vision and mission.
In this context our devolved business units will align their vision and strategic planning with the global direction provided.
Consistent with our vision, innovation will once again return to the core of everything we do. We will capitalise on opportunities to cross fertilise our unique range of skills and technologies that add value and are socially and environmentally sustainable.
Greater focus will be placed on managing and developing our land assets in a responsible and sustainable manner. Our award winning initiatives at Lough Boora (Co. Offaly) and Oweninny (Co Mayo), provide shining examples of what can be achieved

Group Mission

We conduct our affairs with openness, honesty and integrity.
We are Ireland's leading environmentally responsible integrated utility service provider encompassing electricity, heating solutions, resource recovery, water, horticulture and related services.
We capitalise on international opportunities where we have a competitive advantage.
We achieve continuing growth through superior customer service, outstanding quality and innovation delivered through the excellence and commitment of our people.
We engage in sustainable profitable business in the communities we serve, which is rewarding and challenging for employees and other stakeholders.

Contents

1.0 Introduction

1.1 IPC Licence Register No

1.2 Name & Location of Site

1.3 Brief Description of Activities

1.4 Environmental Management of the Company

1.5 Environmental Policy Statement

2.0 Summary Information

2.1 Emissions to Water Summary

2.1.1 Silt Pond Emissions

2.1.2 Factory Processes Discharge @ PW-102

2.1.3 Workshops, Transport & Yard Discharges

2.1.4 Composite Sampler Report

2.1.5 Emissions to Water Non-compliance's

2.2 Emissions to Air Summary

2.2.1 Dust Monitoring Factory.

2.2.2 Dust Monitoring DSL's

2.2.3 Dust Non-compliance's

2.3 Waste Arising

2.3.1 Non-Hazardous Waste

2.3.2 Hazardous Waste

2.4 Energy and Water Consumption

2.4.1 Energy Consumption

2.5 Environmental Incidents and Complaints

2.5.1 Incidents

2.5.2 Complaints

3.0 Management of the Activity

3.1 Environmental Management Programme Report

3.2 Environmental Management Programme Proposal

3.3 Environmental Expenditure

4.0 Licence Specific Reports

4.1 Surface Water Discharge Monitoring Location Programme Review

4.2 Bunding Programme

4.3 Boiler Combustion Efficiency

4.4 Resource Consumption Summary

4.5 Report on de-silting Programme

4.6 Bog Development and Operational Programme

4.7 Bog Rehabilitation Report

4.8 Archaeological Report

5.0 Summary

Appendix 1: Emissions to Water Monitoring Results. (Bogs)

Appendix 2: Emissions to Water Monitoring Results. (Yards)

Appendix 3: Emissions to Water Monitoring Results. (Composite)

Appendix 4: Emissions to Air Monitoring Results.

Appendix 5: De-silting Programme Review

Appendix 6: AER & PRTR Data

1.0 Introduction

Bord na Móna Fuels Limited was granted an Integrated Pollution Control Licence by the E.P.A. on 17th August 2001 for it's operation in the Littleton group of bogs. This report is the ninth A.E.R. for the operations and covers the period from 1st January 2009 to 31st December 2009.

1.1 IPC Licence Number: P0499-01

1.2 Name & Location of Site

The Littleton group of bogs consists of a cluster of bogs approximately ten miles from Thurles in Co. Tipperary.
The main contact and location details of the company are presented in summary form below

Company Name:	Bord na Móna Fuels Limited
Site Address:	Littleton Group Thurles Co. Tipperary.
Telephone No:	0504-44215
Fax No:	0504-44225
Contact Name:	Ray Yates
Position:	General Manager

1.3 Description of Activities

Milled Peat Operations

For milled peat production the bog is laid out in a series of rectangular fields of varying length and 15m wide with drains located between. There are essentially four operations involved in milled peat production:
Milling.
Harrowing.
Ridging.
Harvesting.

Milling.
Special milling machines work there way along the fields, milling approximately 15mm of peat off the top of the bog in a pass.

Harrowing
This is achieved with a machine called a harrow. The milled peat is harrowed until its moisture content is down to approximately 40-50%, which can take up to two to three days, weather depending.

Ridging
The dry peat is then scraped into long ridges running down the centre of each field. This is done with a ridger, a machine consisting of a series of blades in the shape of a v that opens the full width of the field.

Harvesting
During harvesting every eleventh field is used to stockpile the peat, with this field receiving the milled peat from the five fields either side.
Milled Peat is produced on the Littleton group of bogs for transfer to the Briquette Factory for the manufacture of peat solid fuel products. Littleton has a total area of 4,530 hectares. Of this, 1,475 hectares were used for the production of milled peat during the period of the AER.

The production of milled peat is a seasonal activity with production opportunities only possible during the period from late spring to early autumn when drying conditions are suitable. When production operations are underway, they are typically carried out over a seven-day week and for 10 to 15 hours per day. Bog drainage and field conditioning operations are carried out throughout the year, along with peat haulage operations from stockpiles located on the bog to the Briquette Factory. Transport operations are carried out on all days throughout the year that the Briquette Factory is in operation.

Sod Peat was produced on an area of 223 hectares during 2009. Production was from April to August with sales to the public from September to December. Bog preparation and drainage was ongoing throughout the year but was mainly in the period January to March.
The Firelighter Plant operated from January to April and again from September to December.

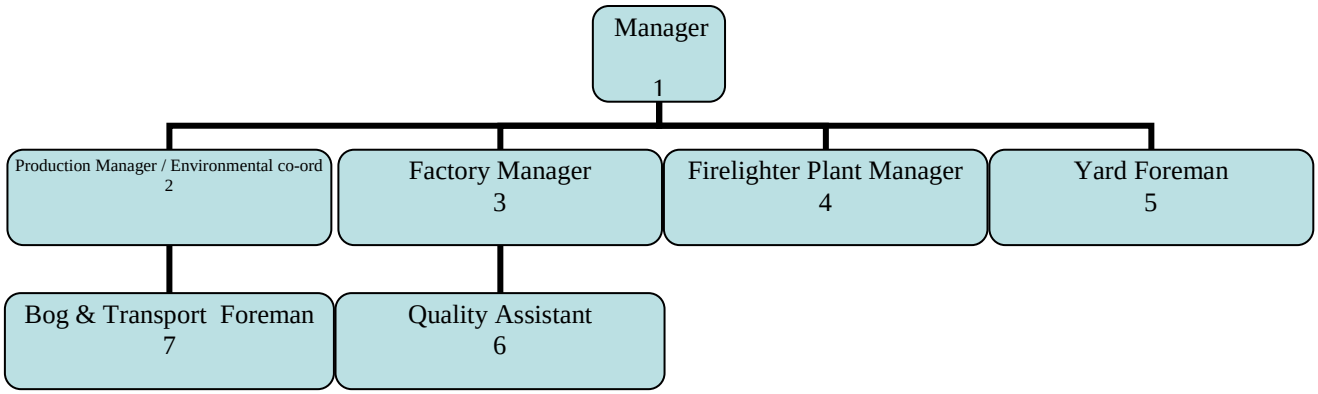
The Group has its own workshop facilities for the maintenance, repair and fabrication of plant used in the operations outlined.

1.4 Environmental Management of the Company

The organisational structure within the Littleton Group is presented in the flow chart below.

Littleton Group

Environmental Responsibilities



(1) Overall environmental responsibilities
(2) Bog production and maintenance including silt ponds and polyethylene: co-ordinating environmental affairs.
(3) Factory process and maintenance including, effluent, settleing ponds and stack emissions.
(4) All firelighter plant environmental issues.
(5) Environmental issues in relation to yard management, storage and sales.
(6) Factory chemicals, effluent readings and environmental sampling.
(7) Silt pond inspections and cleaning

1.5 Environmental Policy

BORD NA MÓNA

BORD NA MÓNA FUELS LIMITED

Bord na Mona Fuels Limited is a commercial semi-state body with responsibility to develop Ireland's peat resources in the national interest.

Bord na Mona Fuels Limited is committed to gather and make available information on all aspects of its environmental impact and to help improve understanding among the public generally of its role and the importance of Irish peatlands.

Bord na Mona Fuels Limited recognises the importance of peatland conservation.

Bord na Mona Fuels Limited will leave behind all areas it owns as either an economically or socially integrated resource of a high environmental value.

Bord na Mona Fuels Limited seeks to conduct all aspects of its business in an environmentally sensitive value.

Bord na Mona Fuels Limited will establish an environmental management system specifically addressing the following impacts.

Discharges to water.
Emissions to atmosphere.
Waste disposal.
Use of natural resources.
Noise, vibration, odour, dust and visual effects.
Natural environment and eco-system.

The environmental management system will be monitored, maintained and continually improved.

A system of regular environmental audits will be put in place.

Bord na Mona Fuels Limited will continue research and development into all aspects of its environmental impact.

This statement is published and is available at all locations within the division and its contents are brought to the attention of all employees.

2.0 Summary Information

2.1 Emissions to water summary

2.1.1 Silt Pond Emissions

Surface Waters

Comment

Surface water monitoring was carried out quarterly during the reporting period. In total analysis was carried out at three different locations. These locations are as follows, Killeens @ SW4, Lanespark @ SW15 and Carrickhill @ SW26. The parameters measured during each sampling event were as follows:
Total Phosphorus, Total Solids, Suspended Solids, pH, Nitrogen, Colour and COD.
In general results were constant across all parameters at each monitoring location.
November was the wettest month with 175.7 mm of rainfall recorded and February the driest with 22.9 mm recorded. The quarterly grab sampling programme proved to be 100% compliant for the year, as was the case in 2005, 2006, 2007 and 2008.

pH values were between 6.4 and 7.7 pH Units, with normal emission limit values being of the range 6 to 9 pH Units.

Suspended solids varied from 4 mg/l to 91 mg/l and would depend on activities such as, piping, ditching etc, in the catchments at the time of sampling. With the exception of the last quarter at SW26 Carrick Hill all results were within the licence limit of 35mg/l.
In fact although above the emission limit value, this result did not constitute a non-compliance as it was only one of four results and was not above 105 mg/l.

Ammonia values ranged from 0.47 mg/l and 3.06 mg/l. The I/PV for A3 waters is 4mg/l. It is however not unusual for surface waters emanating from production peatlands to be slightly elevated.

COD readings ranged from 34 mg/l to 191 mg/l during the reporting period. The I/PV for A3 waters is 40mg/l. Bord na Mona set trigger levels of 100 mg/l, were exceeded on five occasions however, in one case the subsequent result showed a marked reduction in COD. As the others occurred in the last quarter, the first quarter results will be watched closely.

Total Phosphorus results were well below any trigger level in any of the guidance documents.

Flow rates and the non recording of a flow at SW26 Carrickhill and SW15 Lanespark during the last quarter monitoring events is primarily due to the fact that both locations were in flood and therefore the recording of flow was not possible. This would have impacted on the suspended solids as mentioned above.

Sampling will continue at the same locations during 2010.

Surface Water Results are contained in Appendix 1.

2.1.2 PW-102 Factory and Yard Discharge to Ballybeg River.

Monitoring took place at this location on a weekly and quarterly basis. The parameters measured are; COD, Suspended Solids, pH and Flow, on a weekly basis and Total Phosphorus, Ammonia and Oils, Fats and Greases quarterly.
The emission point is located on the factories process water outfall.

Comment:

pH values were within the range 7.2 and 8.6, with a mean value of 7 .
COD values were within the range, 13 to 124 mg/l, with a mean value of 54 mg/l. This mean figure is down on 2007 and 2008 results; also no individual result was above 124 mg/l, which is also down on a peak of 149 mg/l in 2008.
SS results averaged 16.48 mg/l. The range was from 4 mg/l to 43 mg/l. The two results above 35 mg/l did not constitute a non compliance as they represented less than 25% of the overall results; also no individual result was above 105 mg/l. The mean figure was also below the 2007 and 2008 averages.
Quarterly **TP,** ranged from 0.8 mg/l – 0.24 mg/l, with an average of 0.16 mg/l.
Ammonia ranged from 0.19 mg/l – 0.89 mg/l, and averaged 0.44 mg/l.
Oils, Fats & Greases ranged from <1 mg/l – 99 mg/l. The 99 mg/l result, appears to have been a one off, as the subsequent result was 2 mg/l. In addition to this the first quarter result 2010 was 3 mg/l.

2.1.3. Monitoring of workshop/depot surface water run-off.

Comment:

Inspections are undertaken and logged weekly at the following locations: SWE1 Factory / Lanespark Workshop / Firelighter area, SWE2 Factory Transport and Fueling Area, SWE3 Templetuohy Workshop and SWE4 Templetuohy Fueling Area.
Yard runoff monitoring took place at these four different locations on a monthly basis during the reporting period and COD was the parameter requiring analysis. As is evident from the graph, on several occasions no sample was available on the day of sampling. This was due to lack of flow at the emission point as the catchments are so small. In fact, in most instances it would have to be raining quite heavily in order to attain a sample.
Sampling will continue at the same locations during 2010.

Results are attached in Appendix 2.

2.1.4 Composite Sampler Programme

The composite sampling regime at Littleton needs to be reassessed. At present due to the continual dewatering at Lisheen Mine, it has proven difficult to guarantee a continuous flow of water from a number of locations. This is evident from the missing data on the attached appendix tables. A new location was selected but on further inspection, this site also was found to have similar problems, of interrupted flow due to pumped drainage.
One alternative would be to switch the current quarterly grab location of SW15 at Lanespark, which has a constant flow with the composite sampler's present site. Submissions to that effect will be submitted in 2010.

Composite Sampler results are contained in Appendix 3.

2.1.5 Emissions to Water Non-compliance's

The non-compliances associated with agreed sampling of water effluent at Littleton are outlined in table under.

Emissions to Water Non-Compliances 2009		
Licence: P0499-01		
Works: Littleton		
Type	**Non-Compliances**	**Location / SW Nr**
Composite	1	SW22
Quarterly Grab	0	
Monthly Yard	**NA**	
Totals	**1**	

Although two samples exceeded 35mg/l at PW102, this was less than 25% of the total number of samples and no single sample was above 105 mg/l. Ref condition 3.3.1 (ii).
There was one non compliance in relation to composite sampling at SW22, this occurred in January.

2.2 Emissions to Air Summary

2.2.1 Factory Emissions

Emissions from the Boiler stack (B101) have been high due to;

(1) The Grit arrester performing poorly.
(2) The peat fuel condition being very wet at entry to the burner.

We now plan to decommission the present grit arrester due to its poor performance. This will be replaced with a new double filtering arrangement. It will consist of two primary cyclones followed by a new multicyclone filter.

This replacement will be carried out in May of this year.

Attached in Appendix 4 is Emission to Air Results.

2.2.2 Dust Emissions (Dust Sensitive Locations)

Dust monitoring was carried out as per Agency agreed proposals. Monitoring took place at DM01, DM02, DM03 and DM04. The Bergerhoff method of collection was used.
Results were fully compliant with the emission limit value of 350 mg/m2/day.

The results are also displayed in Appendix 4.

2.2.3 Non-compliance's

Dust Non-compliance 2009	
IPPC Licence: P0499-01	
Works: Littleton	
Location / DM Nr	**Non-Compliances**
DM 01	0
DM 02	0
DM 03	0
DM 04	0
Total	**0**

2.3 Waste Management Report

2.3.1 Non Hazardous Waste

Non Hazardous Waste 2009				
IPPC Licence: P0499-01				
Works;Littleton				
Type	**Tonnes**	**EWC Code**	**Contractor**	**Licence Nr**
Skips	57.16	20 03 01	AES	053/OY/39/02
Wheelie Bins	937.63	20 03 01	AES	053/OY/39/02
Polyethlene	240.00	02 01 04	Eco Plastics ltd	WFP-CE-08-0005-01
Scrap Steel	47.42	17 04 07	Hammond Lane	050/OY/162/04
Timber Pallets	208.69	15 01 03	Kiawa Ltd	WP/TN/24
Cardboard	8.62	20 01 01	Smurfit Kappa	WPR021/3
Silt Pond Cleanings	301.14	01 01 02	Bord na Mona	P0499-01
Peat Screenings	585.00	01 01 02	Bord na Mona	P0499-01
Rubber	4.18	16 01 03	Crumb Rubber Irl Ltd	WP2007/01
Totals	**2385.66**			

2.3.2 Hazardous Waste

Hazardous Waste Data 2009				
IPPC Licence: P0499-01				
Works: Littleton				
Type	**Tonnes**	**EWC Code**	**Contractor**	**Licence Nr**
Waste Oil	24.090	13 02 05	Enva Ireland Ltd Portlaoise	184-1
Oil Filters	0.560	16 01 07	Enva Ireland Ltd Portlaoise	184-1
Lead Acid Batt	1.600	16 06 01	Enva Ireland Ltd Portlaoise	184-1
Fluorescent Tubes	0.082	20 01 21	Irish Lamp Recycling Co.Ltd	WCP/DC/08/1115/01
Oily Rags	0.750	15 02 02	Enva Ireland Ltd Portlaoise	184-1
Parts Wash	1.890	11 01 13	Safety Kleen, Tallaght, Dublin	99-1
Total	**28.972**			

2.4 Energy Consumption

The usage of diesel and electricity in the Factory are to supplement the power supplied by Milled Peat. The Bog usage of both is to provide the Milled Peat for Briquetting. Derv is used for road transport service to Milled Peat operations.

Energy Consumption 2009			
IPPC: P0499-01			
Works: Littleton			
1. Factory Units	Diesel (Litres)	Derve (Litres)	Electricity (Units)
Totals	729011	26512	1709297
MW Hours	7138.77	239.67	1709.30
Total MW Hours	**9087.7**		
2. Factory Units	Mill/Peat (Tonnes)	Screens (Tonnes)	Br/Out (Tonnes)
Totals	73421.25	1196.75	24.5
MW Hours	20649.73	5648.66	115.64
Total MW Hours	**26414.0**		
3. Bog Units	Diesel (Litres)	Derve (Litres)	Electricity (Units)
Totals	606722	0	118212
MW Hours	5941.27	0.00	118.21
Total MW Hours	**6059.5**		
1. + 2. + 3.			
Total MW Hours	**41561.2**		

2.5 Environmental Incidents & Complaints

Environmental Incidents 2009	
IPPC Licence: P0499-01	
Works: Littleton	
	Number
Incidents	1
Requiring corrective action	0
Category	
Water	1
Air	0
Procedural	0
Miscellaneous	0
Total	**1**

There was one incident during the reporting period and this pertained to an oil spill that was completely contained within the bunded area. A similar incident occurred in 2008. Following this the issue was raised with the employer of the external delivery driver who was responsible for the incident. Emergency procedures and operating procedures in relation to fuel oils were brought to their attention.

Environmental Complaints 2009	
IPPC Licence: P0499-01	
Works: Littleton	
	Number
Complaints	0
Requiring corrective action	0
Category	
Water	
Air	
Procedural	0
Miscellaneous	0
Total	**0**

3.1 Achievement of Objectives & Targets 2009

Project	Description & Status
Project 1: Reduction of fugitive dust emissions.	**Training.** Continue to train all employees in environmental matters. Training will be by means of the screening of an environmental DVD, followed by a power point presentation. **Status**: 42 staff received Environmental Training during 2009. **Hydraulic Harrows.** There are five new Hydraulic Harrows programmed for delivery over a five year period. These will be used in Dust Sensitive Locations. **Status:** 2 of these Hydraulic Harrows were delivered in 2009 and will be deployed during the coming 2010 season. **Headland Peat Collection.** Continue with the collection of headland peat, particularly at dust sensitive locations. A new mobile Haku Harvestor was delivered in 2008 and is currently being commissioned for use in the 2009 production season. **Status:** Due to the weather conditions which prevailed in 2009 and the resultant wet headlands, no headland peat could be harvested in 2009. The mobile Haku Harvestor delivered in 2008 and commissioned in 2009 was not ready for the 2009 production season, but will be for the coming 2010 season.
Project 2: Waste Management	**Waste Streamlining.** Following the purchase by Bord na Mona of AES Ltd, meetings with that company's management will be ongoing to see how best Bord na Mona's needs can be catered for. Key account managers dedicated to Bord na Mona have been requested and are due to be in place in 2009. **Status:** This is currently being rolled out in Boora and will be installed in Littleton during 2010.

Project 3: Minimisation of Suspended Solids.	**Training.** Continue to train all employees in environmental matters. Training will be by means of the screening of an environmental DVD, followed by a power point presentation. **Status:** 42 staff received Environmental Training during 2009.
Project 4: Effective spill leak management of mobile fuelling units.	**Research and Development.** Continue to introduce rail operated fuel service wagons on a phased basis, with Littleton works budgeted to receive one wagon during 2009. Increased bund provisions where required, will be provided, in 2009. **Status:** A new rail service wagon was delivered in 2009. This tank has a capacity of 5000 litres and is bunded. All workshops also received increased bunding for the storage of fuel and oil barrels.
Project 5: Collection storage and reuse of polyethylene.	**Identify Recyclers.** Continue with the recycling of polyethylene. The sourcing of more recycling contractors will be ongoing. **Status:** 240 tonnes of waste polythene were collected and recycled during 2009
Project 6: PCB Directive	**Survey.** Carry out a comprehensive survey of all PCB suspect appliances. Following this, liaise with EPA in deciding plan of action once a definitive amount of suspect PCB holdings are agreed. **Status:** This was carried out in all other woks in 2009, and has commenced in Littleton in 2009/2010.

3.2 Environmental Management Programme Proposal 2010

Project	Description & Status
Project 1: Reduction of fugitive dust emissions.	**Training.** Continue to train all employees in environmental compliance. Training will be by means of the screening of an environmental DVD, followed by a power point presentation. An addition to this will be a section of compliance with our Archaeological Codes of practice **Hydraulic Harrows.** Two new Hydraulic Harrows were delivered to Littleton and will be used during the 2010 production season. These will be used in Dust Sensitive Locations. **Headland Peat Collection.** Continue with the collection of headland peat, particularly at dust sensitive locations. A new mobile Haku Harvestor was delivered in 2008 and is currently being commissioned for use in the 2010 production season.
Project 2: Waste Management	**Waste Streamlining.** Following the purchase by Bord na Mona of AES Ltd, meetings with that company's management will be ongoing to see how best Bord na Mona's needs can be catered for. Key account managers dedicated to Bord na Mona have been requested and are due to be in place in 2009. This will be rolled out during 2010 in Littleton. This will provide for a more accurate method of recording and reporting waste collected for recycling or disposal. All waste contractors will now be operated through a key account manager in AES.
Project 3: Minimisation of Suspended Solids.	**Training.** Continue to train all employees in environmental compliance. Training will be by means of the screening of an environmental DVD, followed by a power point presentation. An addition to this will be a section of compliance with our Archaeological Codes of practice

Project 4: Effective spill leak management of mobile fuelling units.	**Research and Development.** Littleton is currently carrying out a review of its refuelling operations, so as to improve its bunding arrangements. The results of this will be included in this EMP.
Project 5: Collection storage and reuse of polyethylene.	**Identify Recyclers.** Continue with the recycling of polyethylene. The sourcing of more recycling contractors will be ongoing.
Project 6: PCB Directive	**Survey.** Carry out a comprehensive survey of all PCB suspect appliances. Following this, liaise with EPA in deciding plan of action once a definitive amount of suspect PCB holdings are agreed. **Status:** This was carried out in all other woks in 2009, and has commenced in Littleton in 2009/2010. This involves the quantifying, registering and sampling of all inactive and active transformers in Bord na Mona's ownership. Once these have been tagged, they will be samples and results reported to the EPA.

3.3 Environmental Expenditure

Environmental Expenditure 2009	
Description	**Cost €**
Capital Costs	€146,000
Silt Control	€96,936
Analytical & Consultancy Costs	€38,800
EPA Fees	€11,256
Total	**€292,992**

4.0 Licence Specific Reports

4.1 Surface Water Discharge Monitoring Location Programme Review

The programme has operated satisfactorily. It is proposed to continue at the same locations in 2010. The composite sampler will however be switched with a quarterly grab location as stated above.

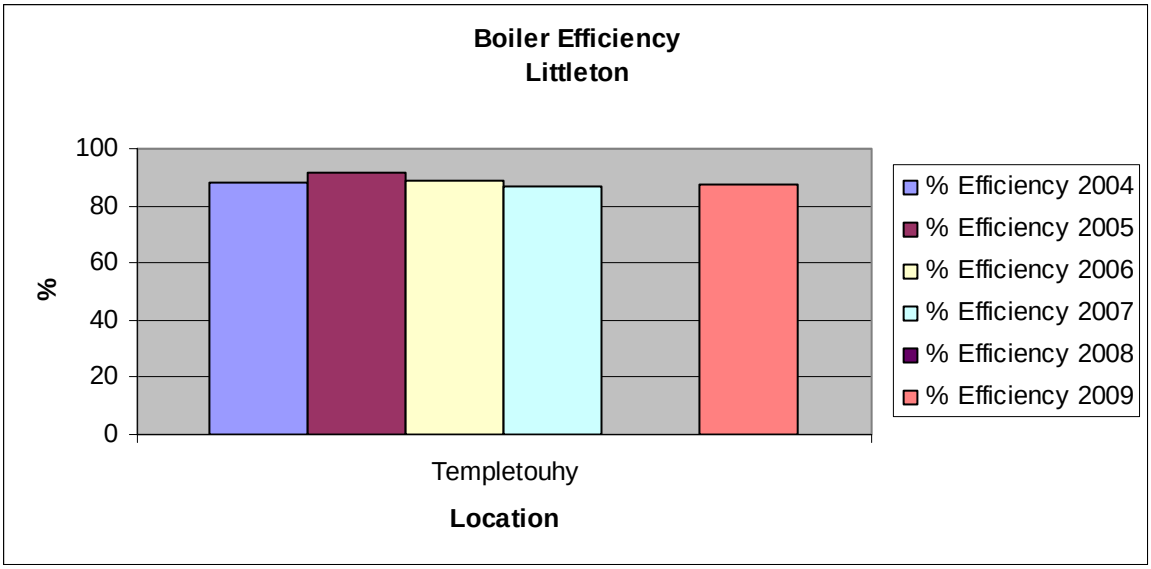
4.2 Bunding Programme

Bund Locations & Numbers Littleton Works					
IPPC Licence: P0499-01					
Location	**Bund Number**	**Last Tested**	**Status Pass/Fail**	**Repair Date**	**Next Test Due**
Lanespark Bund	499-13-01	Dec-09	Pass	N/A	Dec-11
Firelighter Farm Bund	499-13-02	Feb-10	Pass	N/A	Feb-12
Factory Bund	499-13-03	Dec-09	Pass	N/A	Dec-11
Templetouhy Bund	499-13-04	Dec-09	Pass	N/A	Dec-11
Chemical 1	499-13-05	Dec-09	Pass	N/A	Dec-11
Chemical 2	499-13-06	Dec-09	Pass	N/A	Dec-11

All bunds tested in the reporting period passed their integrity test.

4.3 Boiler Combustion Efficiency

Boiler Emissions 2009						
Licence: P0499-01						
Works: Littleton						
Boiler Location	**% Efficiency 2004**	**% Efficiency 2005**	**% Efficiency 2006**	**% Efficiency 2007**	**% Efficiency 2008**	**% Efficiency 2009**
Templetouhy	88.1	91.75	88.65	86.75	0	87.5



4.4 Resource Consumption

Resource Consumption 2009			
Licence: P0499-01			
Works: Littleton			
Product	**Tonnes Produced**	**Tonnes Sold**	**Customer**
Milled Peat	206788	292891	Littleton Briquette Factory
Turf	6234	4045	Public / Domestic
Totals	**213022**	**296936**	

Proposed Production 2010	
Licence: P0499-01	
Works: Littleton	
Product	**Proposed Target**
Milled Peat	275,000
Turf	5800
Totals	**280800**

4.5 De-silting Programme Report

The cleaning roster is based on the fortnightly inspection of ponds. Some ponds were cleaned only once during 2009. Fortnightly inspections dictated that they did not require a second cleaning. The production catchments at some ponds are also declining, due to the bogs being cut away.

The Silt Pond Cleaning Programme Review is contained in Appendix 5.

4.6 Bog development and Operational Programme.

There was no bog development in 2009. It is proposed to carry out some development in 2010 at Templetouhy Sod Bog and at Baunmore Bog. This will extend to an area of approximately 120 hectares.

4.7 Bog Rehabilitation

2008: Following consultation with the National Parks and Wildlife Service, an exercise was carried out, to identify potential areas within the Licence area that may be suitable for management with a biodiversity focus. Following from the initial desktop survey and mapping exercise, key areas of potential biodiversity areas within the Littleton Bogs were identified. These include Derryvella walkway and wetland.

2009: In September 2009, a large-scale baseline ecological survey of all of the Bord na Mona bogs commenced. The survey will target those areas identified during the mapping project in 2008 and will form the basis for development of *Rehabilitation Plans* for all bog areas, while also identifying areas considered as being rich biodiversity. To date, none of the Littleton Bogs have been surveyed but there are selected sites ear-marked for survey in 2010.

Further consultation with the NPWS was carried out in 2009, including a site meeting with Stephen Jones, DCO for that region. The outline long-term rehabilitation plans for the Littleton bogs were discussed and it was agreed to notify the NPWS when potential Biodiversity Areas are identified and more site specific rehabilitation plans drawn up.

4.8 Archaeological Report.

Excavation work was carried out at Baunmore and Templetuohy. In Baunmore there were 6 excavations carried out on a Trackway and Togher and in Templetuohy there were 4 excavations, also on a Trackway and Togher.

5.0 Summary

The Environmental Management Programme has been implemented throughout the group, operating procedures have been put in place, and training has been provided for all personnel involved in compliance with the licence.

There was only one non-compliance from all samples for the year. Littleton continued to improve operations through the purchase of new machinery, to ensure continued reductions in suspended solids.

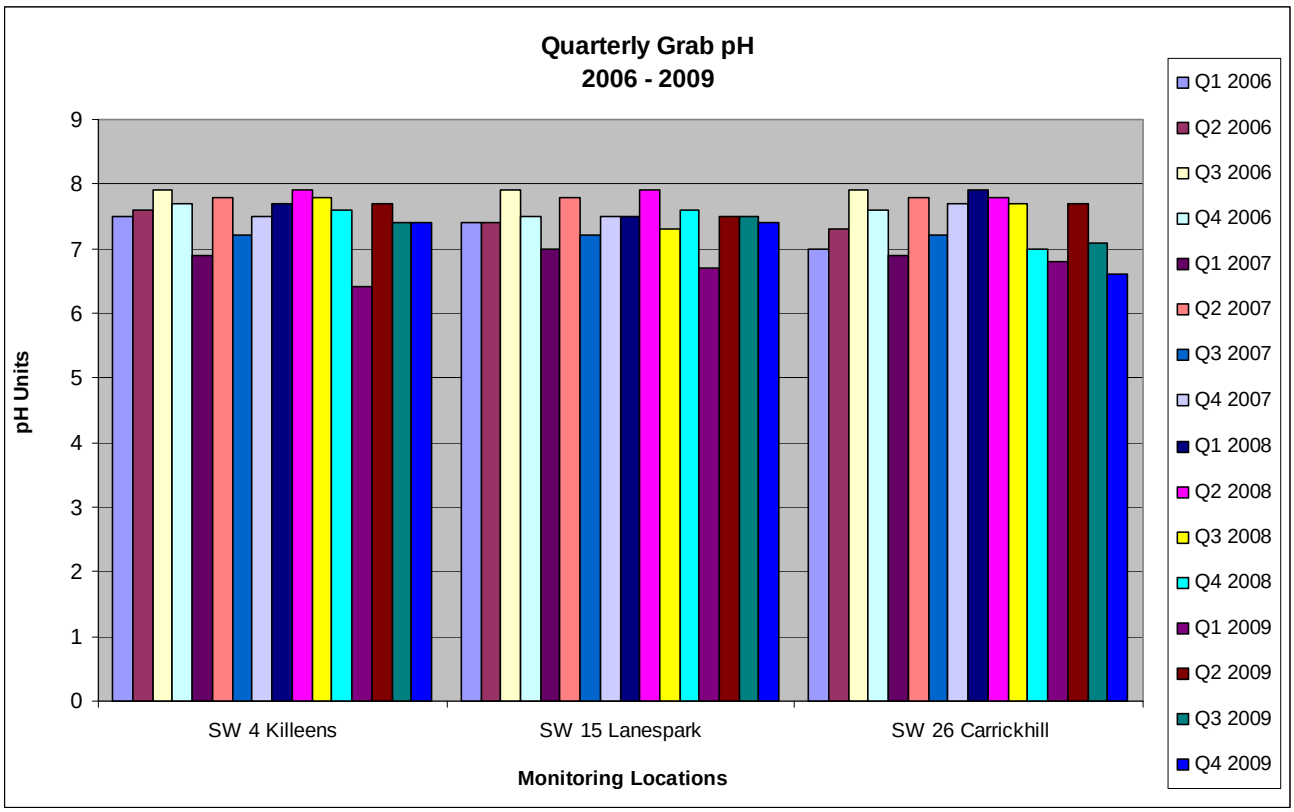
A new project has been initiated for 2010, namely to demonstrate the effective reuse of the peat /ash from the factory settling ponds.

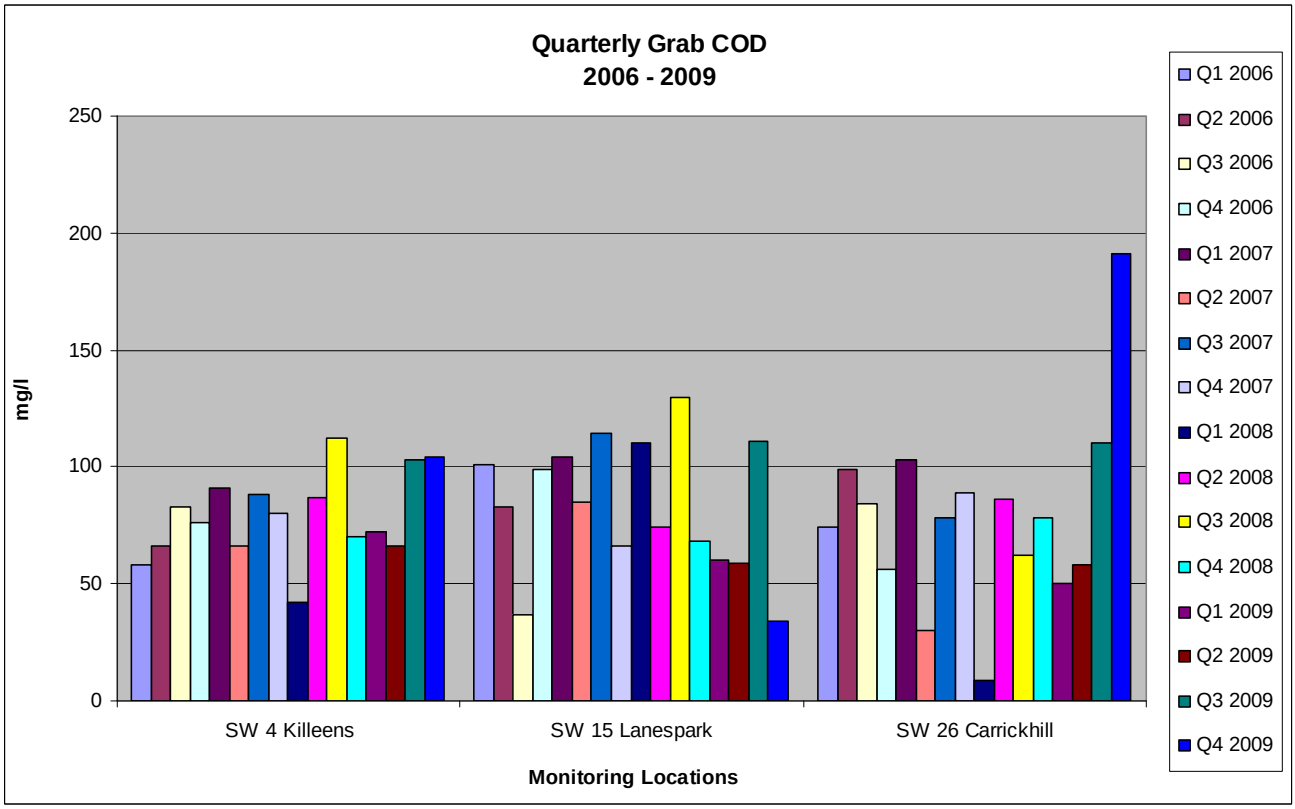
Bord na Mona Energy Ltd are represented on the Management Group of both the Shannon River and Eastern River Basin District Management Systems, set up under the Water Framework Directive, and on the Steering Group of the Catchment Management on the River Barrow.

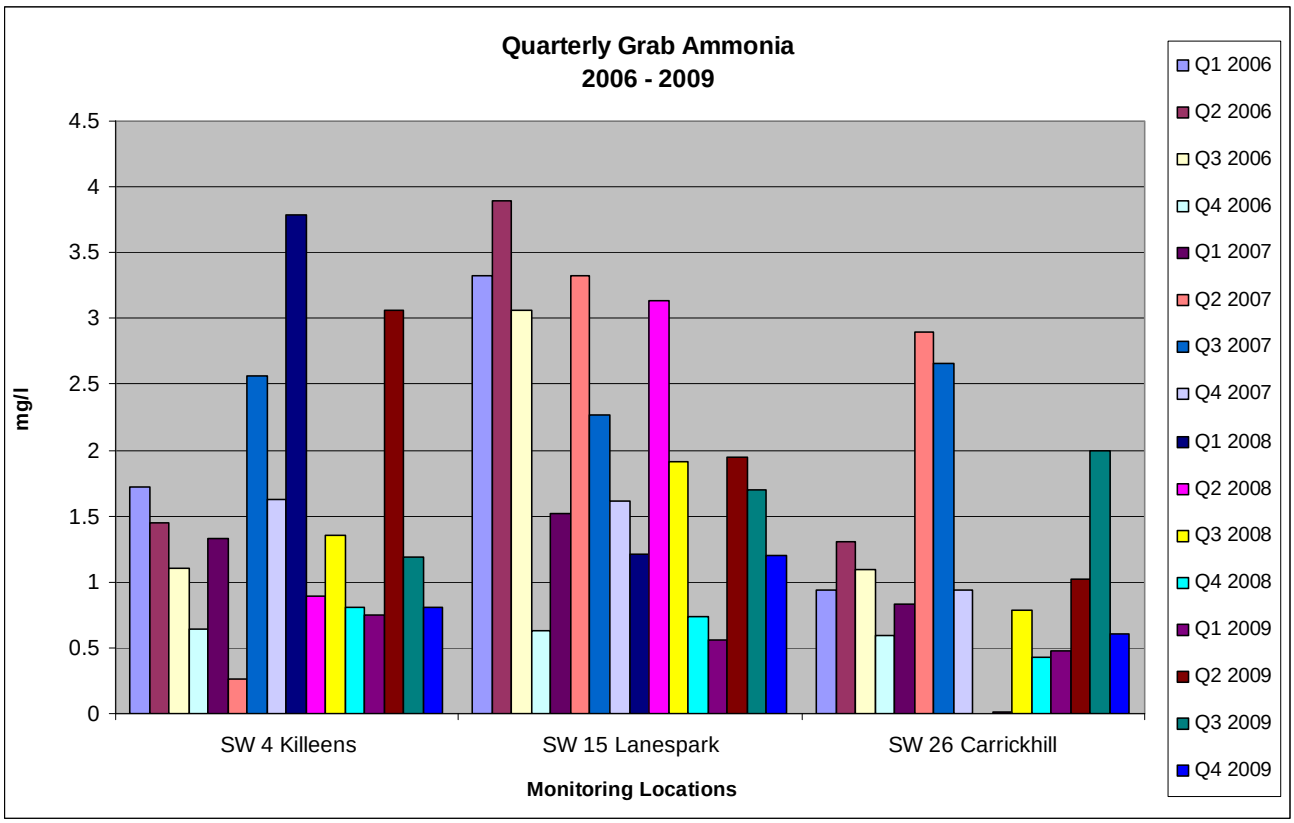
Bord na Mona Fuels Ltd would like to take this opportunity to advise the Environmental Protection Agency of its continued commitment to improving its environmental performance by adopting cleaner production methods and improving its environmental protection measures.

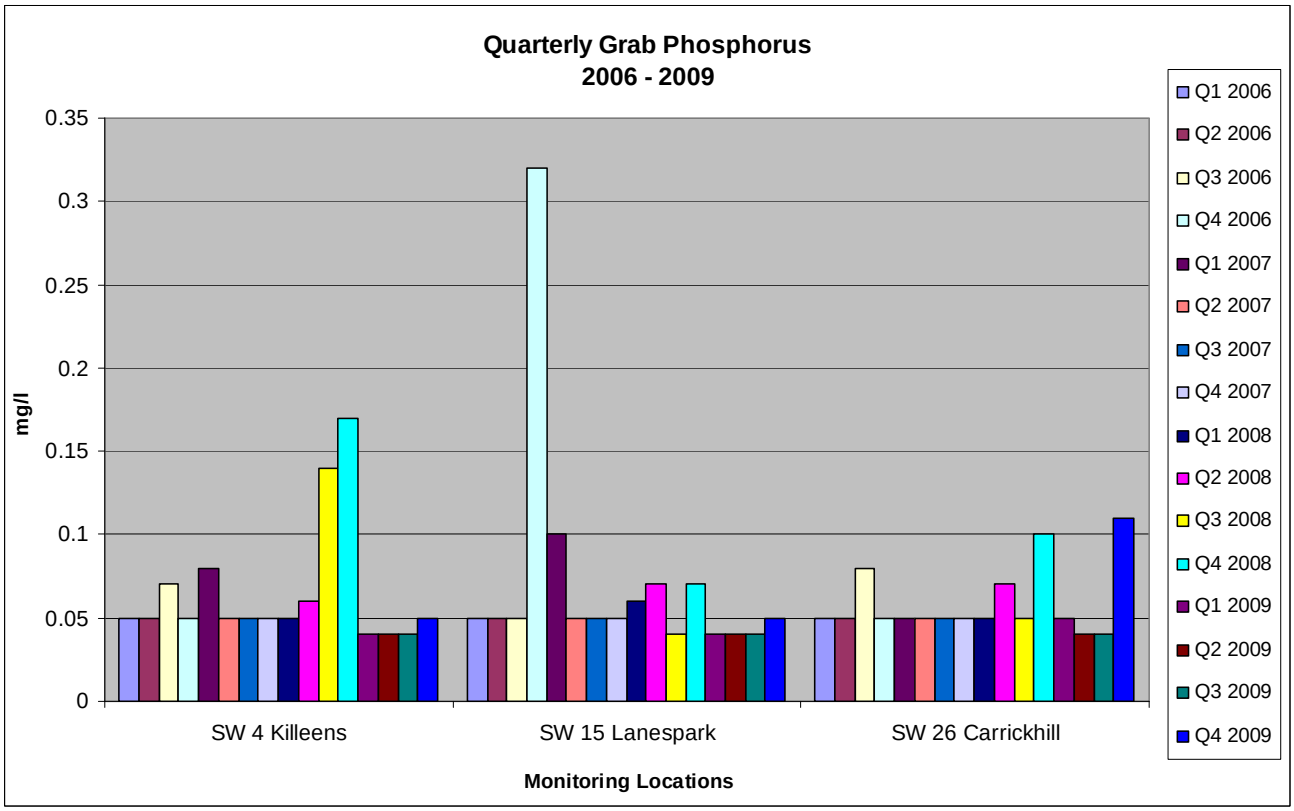
APPENDIX 1

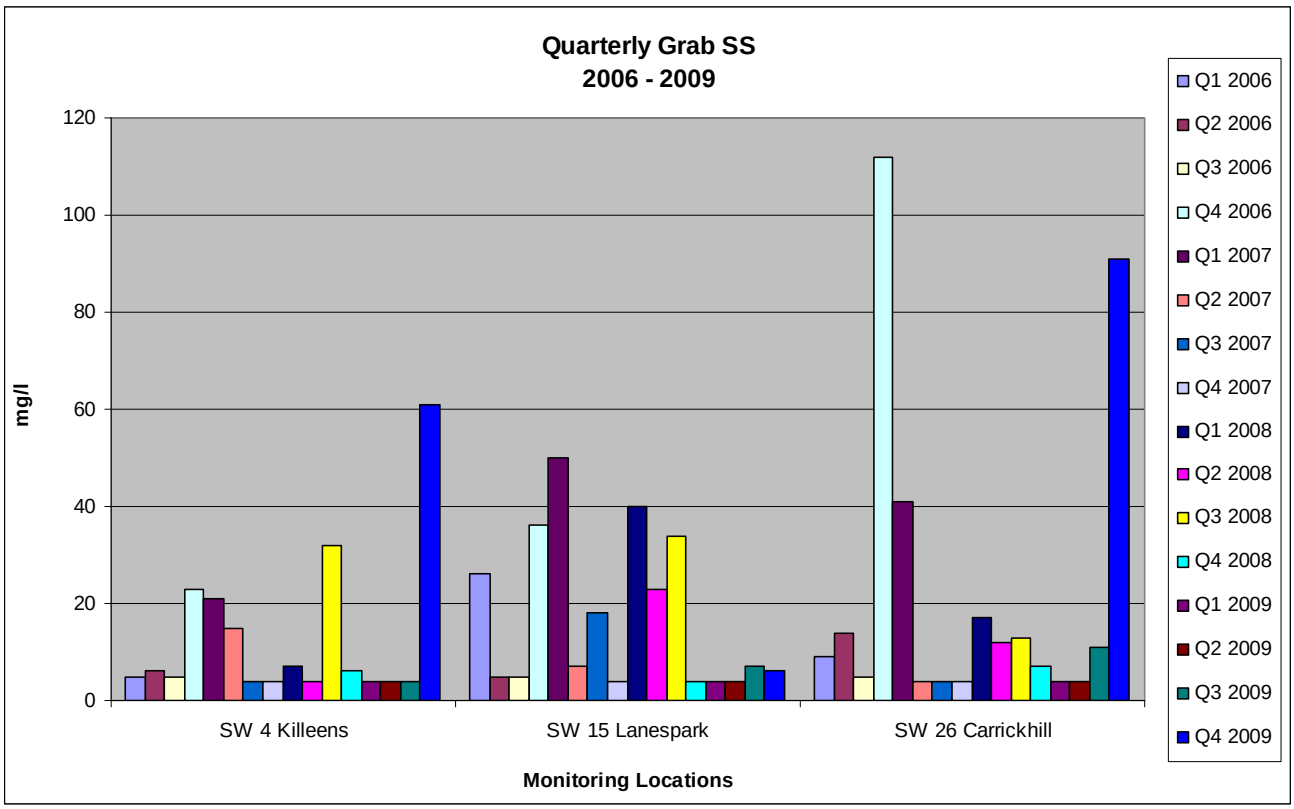
Surface Water Discharge
Monitoring Results
Bogs

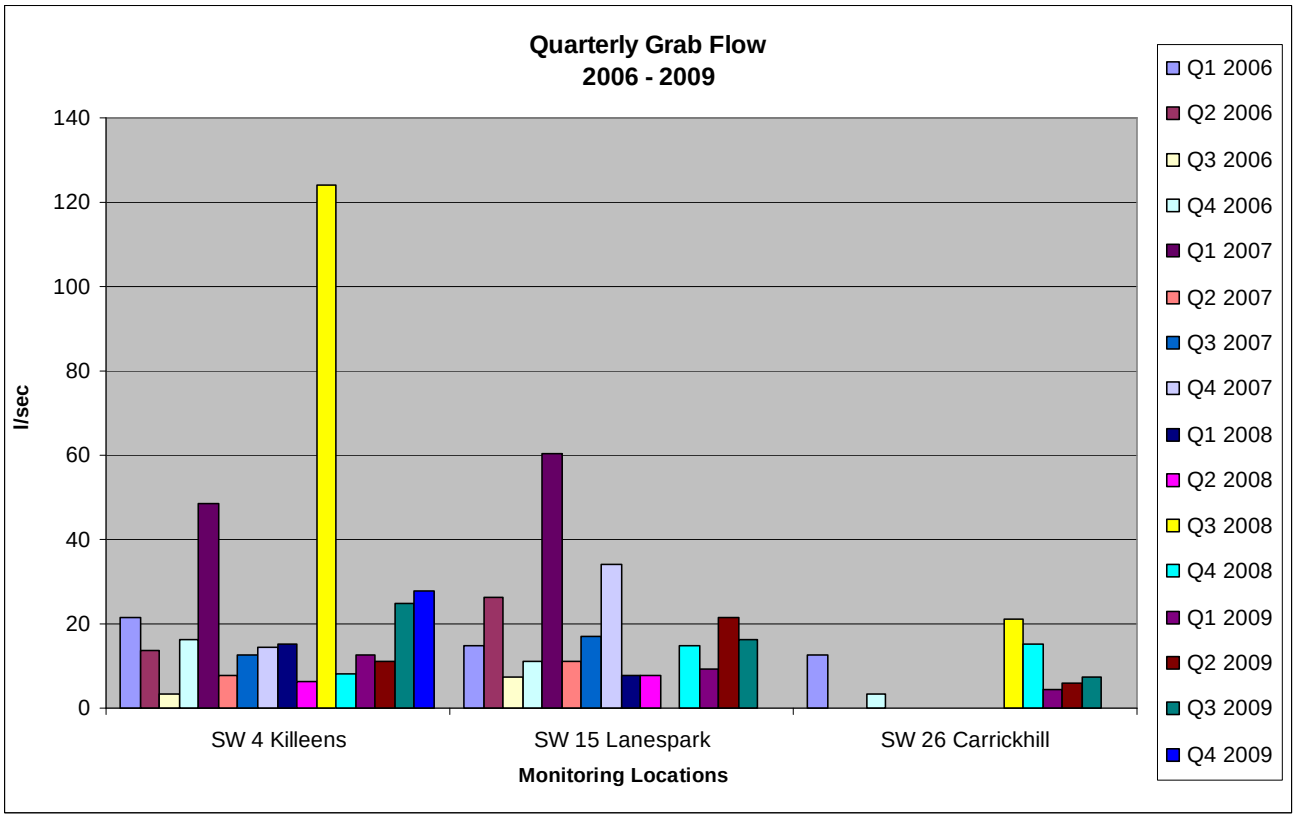

Quarterly Grab pH
2006 - 2009
pH Units
0
1
2
3
4
5
6
7
8
9
SW 4 Killeens
SW 15 Lanespark
SW 26 Carrickhill
Monitoring Locations
Q1 2006
Q2 2006
Q3 2006
Q4 2006
Q1 2007
Q2 2007
Q3 2007
Q4 2007
Q1 2008
Q2 2008
Q3 2008
Q4 2008
Q1 2009
Q2 2009
Q3 2009
Q4 2009


Quarterly Grab COD
2006 - 2009
mg/l
0
50
100
150
200
250
SW 4 Killeens
SW 15 Lanespark
SW 26 Carrickhill
Monitoring Locations
Q1 2006
Q2 2006
Q3 2006
Q4 2006
Q1 2007
Q2 2007
Q3 2007
Q4 2007
Q1 2008
Q2 2008
Q3 2008
Q4 2008
Q1 2009
Q2 2009
Q3 2009
Q4 2009


Quarterly Grab Ammonia
2006 - 2009
mg/l
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
SW 4 Killeens
SW 15 Lanespark
SW 26 Carrickhill
Monitoring Locations
Q1 2006
Q2 2006
Q3 2006
Q4 2006
Q1 2007
Q2 2007
Q3 2007
Q4 2007
Q1 2008
Q2 2008
Q3 2008
Q4 2008
Q1 2009
Q2 2009
Q3 2009
Q4 2009


Quarterly Grab Phosphorus
2006 - 2009
mg/l
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
SW 4 Killeens
SW 15 Lanespark
SW 26 Carrickhill
Monitoring Locations
Q1 2006
Q2 2006
Q3 2006
Q4 2006
Q1 2007
Q2 2007
Q3 2007
Q4 2007
Q1 2008
Q2 2008
Q3 2008
Q4 2008
Q1 2009
Q2 2009
Q3 2009
Q4 2009


Quarterly Grab SS
2006 - 2009
mg/l
120
100
80
60
40
20
0
SW 4 Killeens
SW 15 Lanespark
SW 26 Carrickhill
Monitoring Locations
Q1 2006
Q2 2006
Q3 2006
Q4 2006
Q1 2007
Q2 2007
Q3 2007
Q4 2007
Q1 2008
Q2 2008
Q3 2008
Q4 2008
Q1 2009
Q2 2009
Q3 2009
Q4 2009

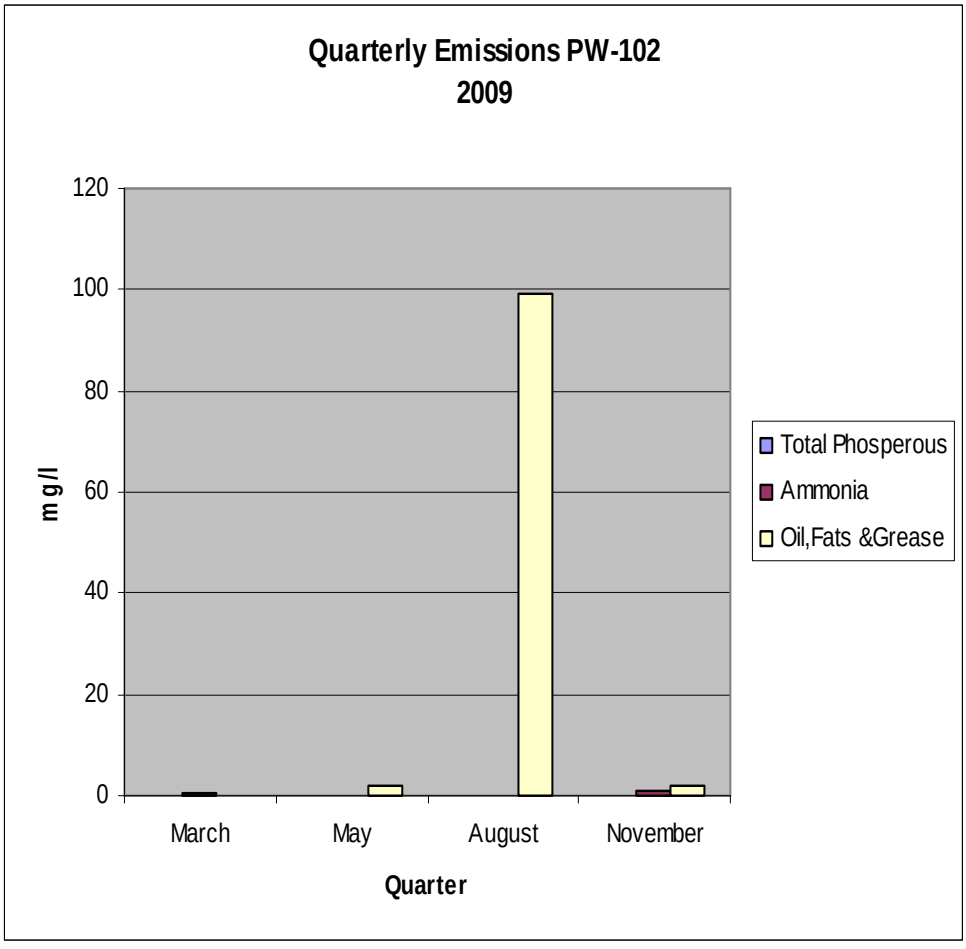

Quarterly Grab Flow
2006 - 2009
l/sec
140
120
100
80
60
40
20
0
SW 4 Killeens
SW 15 Lanespark
SW 26 Carrickhill
Monitoring Locations
Q1 2006
Q2 2006
Q3 2006
Q4 2006
Q1 2007
Q2 2007
Q3 2007
Q4 2007
Q1 2008
Q2 2008
Q3 2008
Q4 2008
Q1 2009
Q2 2009
Q3 2009
Q4 2009

APPENDIX 2

Surface Water Discharge Monitoring Results

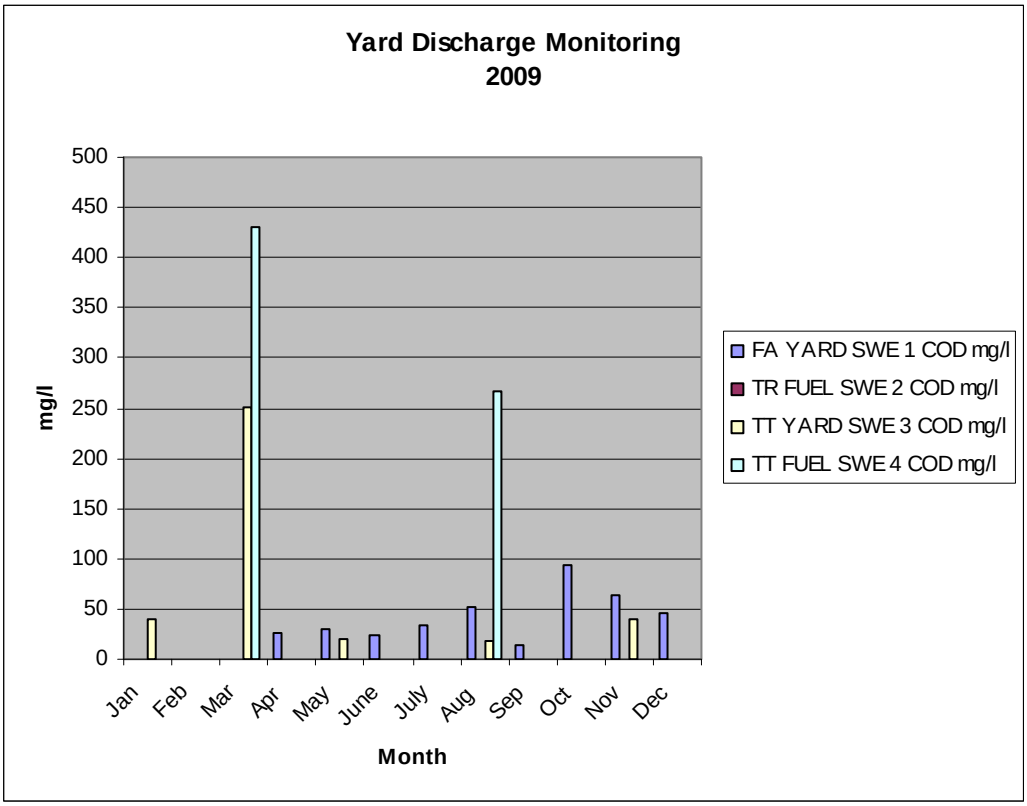
Yards

Quarterly Emissions to Water PW - 102 2009			
Works: Littleton			
IPPC: P0499-01			
Quarter	**Total Phosperous**	**Ammonia**	**Oil,Fats &Grease**
March	0.08	0.45	<1
May	0.24	0.24	2
August	0.2	0.19	99
November	0.13	0.89	2



Note: Due to the elevated Oil, Fats and Greases result in quarter 3, the other parameters are not easily identifiable on the graph but are evident on the table above.

Oil Interceptor Results 2009				
Licence No: PO499-01				
Works: Littleton				
LOCATION	FA YARD	TR FUEL	TT YARD	TT FUEL
Month	SWE 1 COD mg/l	SWE 2 COD mg/l	SWE 3 COD mg/l	SWE 4 COD mg/l
Jan	0	0	39	0
Feb	0	0	0	0
Mar	0	0	251	431
Apr	26	0	0	0
May	30	0	19	0
June	23	0	0	0
July	34	0	0	0
Aug	51	0	17	266
Sep	13	0	0	0
Oct	93	0	0	0
Nov	63	0	40	0
Dec	45	0	0	0



Note: See main body of report in relation to missing data at SWE2 TR Fuel.

APPENDIX 3

Surface Water Discharge
Monitoring Results
Composite

Month				Parameters							Daily Totals		
Jan-08	pH	COD	Ammonia as	Total	Suspended	Total	Colour	Flow	COD	Ammonia as	Total	Suspended	Total
SW22		mg/l	N mg/l	Phosphorus	Solids	Solids	Pt Co	Daily	Kg/Day	Kg/Day	Phosphorus	Solids	Solids
				mg/l	mg/l	mg/l	units	Total (litres)			Kg/Day	Kg/Day	Kg/Day
1					5	506		11315810				56.58	5725.80
2					9	500		11552540				103.97	5776.27
3					5	510		11283840				56.42	5754.76
4					7	510		11085980				77.60	5653.85
5					14	518		11144740				156.03	5772.98
6	8.2	50	0.02	0.05	6	448	107	11659680	582.98	0.23	0.58	69.96	5223.54
7					6	508		11861860				71.17	6025.82
8					84	604		11020320				925.71	6656.27
9					14	460		10137310				141.92	4663.16
10					5	498		9700128				48.50	4830.66
11					6	474		9110016				54.66	4318.15
12					5	392		11115360				55.58	4357.22
13	8	83	0.17	0.05	5	360	138	20186500	1675.48	3.43	1.01	100.93	7267.14
14					5	380		19122050				95.61	7266.38
15					5	324		18250270				91.25	5913.09
16					5	328		23378110				116.89	7668.02
17					5	336		22365500				111.83	7514.81
18					5	316		21999170				110.00	6951.74
19					5	190		22483010				112.42	4271.77
20	7.7	73	0.17	0.05	5	284	187	20246110	1477.97	3.44	1.01	101.23	5749.90
21					5	310		22559910				112.80	6993.57
22					5	332		23505120				117.53	7803.70
23					5	334		22598780				112.99	7547.99
24					5	336		24188550				120.94	8127.35
25					8	367		23245060				185.96	8530.94
26					19	318		23793700				452.08	7566.40
27	8	49	0.02	0.05	25	362	155	23942310	1173.17	0.48	1.20	598.56	8667.12
28					5	310		23942310				119.71	7422.12
29					5	364		22850210				114.25	8317.48
30					5	380		21128260				105.64	8028.74
31					5	288		24320740				121.60	7004.37

Month				Parameters							Daily Totals		
Feb	pH	COD	Ammonia as	Total	Suspended	Total	Colour	Flow	COD	Ammonia as	Total	Suspended	Total
SW22		mg/l	N mg/l	Phosphorus	Solids	Solids	Pt Co	Daily	Kg/Day	Kg/Day	Phosphorus	Solids	Solids
				mg/l	mg/l	mg/l	units	Total (litres)			Kg/Day	Kg/Day	Kg/Day
1					5	298		21260450				106.30	6335.61
2					5	364		20489760				102.45	7458.27
3	7.8	62	0.08	0.05	5	376	147	23973410	1486.35	1.92	1.20	119.87	9014.00
4					5	396		24119420				120.60	9551.29
5					5	376		24838270				124.19	9339.19
6					5	408		24395040				121.98	9953.18
7					5	388		22279970				111.40	8644.63
8					5	368		21246620				106.23	7818.76
9					5	418		20806850				104.03	8697.26
10	8	70	0.09	0.05	11	434	122	21224160	1485.69	1.91	1.06	233.47	9211.29
11					5	346		20867330				104.34	7220.10
12					5	378		21470400				107.35	8115.81
13					5	460		19567870				97.84	9001.22
14					5	170		19176480				95.88	3260.00
15					5	264		23187170				115.94	6121.41
16					5	218		23051520				115.26	5025.23
17	8	24	0.19	0.05	5	316	136	21101470	506.44	4.01	1.06	105.51	6668.06
18					5	444		19447780				97.24	8634.81
19					5	486		16581020				82.91	8058.38
20					5	494		15685060				78.43	7748.42
21					5	455		15679870				78.40	7134.34
22					5	454		15177020				75.89	6890.37
23	8.2	28	0.02	0.05	5	480	56	14992130	419.78	0.30	0.75	74.96	7196.22
24					0	493		14580000				0.00	7187.94
25					0	500		14241310				0.00	7120.66
26					0	458		13864610				0.00	6349.99
27					0	466		13254620				0.00	6176.65
28					0	426		13195870				0.00	5621.44

Month				Parameters							Daily Totals		
Mar	pH	COD	Ammonia as	Total	Suspended	Total	Colour	Flow	COD	Ammonia as	Total	Suspended	Total
SW22		mg/l	N mg/l	Phosphorus	Solids	Solids	Pt Co	Daily	Kg/Day	Kg/Day	Phosphorus	Solids	Solids
				mg/l	mg/l	mg/l	units	Total (litres)			Kg/Day	Kg/Day	Kg/Day
1					5	510		12572930				62.86	6412.19
2					5	464		12787200				63.94	5933.26
3	8.4	28	0.04	0.05	5	476	43	11535260	322.99	0.46	0.58	57.68	5490.78
4					5	496		12424320				62.12	6162.46
5					5	480		14704420				73.52	7058.12
6					5	500		14032230				70.16	7016.12
7					5	512		12611810				63.06	6457.25
8					5	464		11727070				58.64	5441.36
9					5	508		13048130				65.24	6628.45
10	8.4	42	0.18	0.06	5	442	87	14033090	589.39	2.53	0.84	70.17	6202.63
11					5	394		18023900				90.12	7101.42
12					5	396		17258400				86.29	6834.33
13					5	420		15009410				75.05	6303.95
14					5	482		13855100				69.28	6678.16
15					5	494		13634780				68.17	6735.58
16					5	496		12485660				62.43	6192.89
17	8.5	34	0.02	0.05	27	506	117	11635490	395.61	0.23	0.58	314.16	5887.56
18					5	418		11244100				56.22	4700.03
19					5	446		8577706				42.89	3825.66
20					5	446		6948979				34.74	3099.24
21					5	476		6811257				34.06	3242.16
22					5	488		6768317				33.84	3302.94
23					5	444		6668179				33.34	2960.67
24	7.8	25	0.02	0.05	29	500	44	6689865	167.25	0.13	0.33	194.01	3344.93
25					5	506		6605539				33.03	3342.40
26					5	518		6652196				33.26	3445.84
27					5	502		6556983				32.78	3291.61
28					5	516		6415891				32.08	3310.60
29					5	508		6350486				31.75	3226.05
30					5	497		5353257				26.77	2660.57
31	8.8	32	0.03	0.05	7	510	44	5530250				38.71	2820.43

Month				Parameters							Daily Totals		
Apr	pH	COD	Ammonia as	Total	Suspended	Total	Colour	Flow	COD	Ammonia as	Total	Suspended	Total
SW22		mg/l	N mg/l	Phosphorus	Solids	Solids	Pt Co	Daily	Kg/Day	Kg/Day	Phosphorus	Solids	Solids
				mg/l	mg/l	mg/l	units	Total (litres)			Kg/Day	Kg/Day	Kg/Day
1					5	476		5058374				25.29	2407.79
2					5	480		4810752				24.05	2309.16
3					5	454		4809283				24.05	2183.41
4					5	489		5048266				25.24	2468.60
5					5	400		6314803				31.57	2525.92
6					5	444		5114534				25.57	2270.85
7	8.7	25	0.05	0.05	5	474	54	5422205	135.56	0.27	0.27	27.11	2570.13
8					5	412		6328887				31.64	2607.50
9					5	414		6720883				33.60	2782.45
10					5	368		7714656				38.57	2838.99
11					5	362		12420860				62.10	4496.35
12					5	400		10086340				50.43	4034.54
13					5	404		8596368				42.98	3472.93
14	8.5	45	0.03	0.05	5	362	74	8013600	360.61	0.24	0.40	40.07	2900.92
15					10	463		7936531				79.37	3674.61
16					5	456		7510234				37.55	3424.67
17					5	412		7983965				39.92	3289.39
18					5	426		7911302				39.56	3370.21
19					5	450		7377264				36.89	3319.77
20					5	464		7157117				35.79	3320.90
21	8.4	18	0.05	0.05	15	458	65	6924442	124.64	0.35	0.35	103.87	3171.39
22					5	440		6502118				32.51	2860.93
23					5	444		6276701				31.38	2786.86
24					5	318		6253978				31.27	1988.77
25					5	374		6790522				33.95	2539.66
26					5	214		14417570				72.09	3085.36
27					5	100		14571360				72.86	1457.14
28	7.9	54	0.06	0.05	5	350	164	12968640	700.31	0.78	0.65	64.84	4539.02
29					5	332		13314240				66.57	4420.33
30					5	500		13455940				67.28	6727.97

Month				Parameters							Daily Totals		
May	pH	COD	Ammonia as	Total	Suspended	Total	Colour	Flow	COD	Ammonia as	Total	Suspended	Total
SW22		mg/l	N mg/l	Phosphorus	Solids	Solids	Pt Co	Daily	Kg/Day	Kg/Day	Phosphorus	Solids	Solids
				mg/l	mg/l	mg/l	units	Total (litres)			Kg/Day	Kg/Day	Kg/Day
1					6	493		12839040				77.03	6329.65
2					12	384		12794110				153.53	4912.94
3					6	474		9954144				59.72	4718.26
4					5	500		9928224				49.64	4964.11
5	8.3	45	0.09	0.05	13	480	111	9928224	446.77	0.89	0.50	129.07	4765.55
6					5	506		9928224				49.64	5023.68
7					5	488		9510048				47.55	4640.90
8					5	482		9041760				45.21	4358.13
9					5	498		9034848				45.17	4499.35
10					5	438		8715168				43.58	3817.24
11					5	462		8101210				40.51	3742.76
12	8.3	37	0.04	0.05	5	493	59	7329744	271.20	0.29	0.37	36.65	3613.56
13					14	428		7092576				99.30	3035.62
14					5	432		7150810				35.75	3089.15
15					5	440		7192886				35.96	3164.87
16					5	418		8702208				43.51	3637.52
17					5	366		8684064				43.42	3178.37
18					5	408		9029664				45.15	3684.10
19	8.1	35	0.03	0.05	6	392	96	9167040	320.85	0.28	0.46	55.00	3593.48
20					5	306		11488610				57.44	3515.51
21					5	390		12711170				63.56	4957.36
22					5	378		12155620				60.78	4594.82
23					5	386		11604390				58.02	4479.29
24					5	410		10709280				53.55	4390.80
25					5	298		9722592				48.61	2897.33
26	7.8	44	0.04	0.05	5	415	83	8729856	384.11	0.35	0.44	43.65	3622.89
27					5	416		8383824				41.92	3487.67
28					5	394		8391946				41.96	3306.43
29					5	424		8425987				42.13	3572.62
30					5	428		8018266				40.09	3431.82
31					10	420		7436708				74.37	3123.42

Month				Parameters							Daily Totals		
Jun	pH	COD	Ammonia as	Total	Suspended	Total	Colour	Flow	COD	Ammonia as	Total	Suspended	Total
SW22		mg/l	N mg/l	Phosphorus	Solids	Solids	Pt Co	Daily	Kg/Day	Kg/Day	Phosphorus	Solids	Solids
				mg/l	mg/l	mg/l	units	Total (litres)			Kg/Day	Kg/Day	Kg/Day
1					5	418		6607958				33.04	2762.13
2	8.3	26	0.05	0.05	5	438	62	6605625	171.75	0.33	0.33	33.03	2893.26
3					5	476		6672240				33.36	3175.99
4					14	468		6706109				93.89	3138.46
5					12	456		5438102				65.26	2479.77
6					5	444		5132765				25.66	2278.95
7					5	466		4863888				24.32	2266.57
8					5	448		6190387				30.95	2773.29
9	8.3	22	0.04	0.06	5	448	44	4824662	106.14	0.19	0.29	24.12	2161.45
10					8	398		4628275				37.03	1842.05
11					6	354		4055962				24.34	1435.81
12					5	408		4017945				20.09	1639.32
13					5	418		3686083				18.43	1540.78
14					5	416		3686342				18.43	1533.52
15					5	487		3717360				18.59	1810.35
16	8.2	29	0.06	0.05	5	476	40	4182451	121.29	0.25	0.21	20.91	1990.85
17					5	330		3729024				18.65	1230.58
18					5	262		7262525				36.31	1902.78
19					5	367		7274016				36.37	2669.56
20					5	292		6200842				31.00	1810.65
21					5	396		5637341				28.19	2232.39
22					5	436		4815418				24.08	2099.52
23	8.2	48	0.02	0.05	5	434	63	4679683	224.62	0.09	0.23	23.40	2030.98
24					5	386		3678134				18.39	1419.76
25					5	408		3481402				17.41	1420.41
26					5	432		3190579				15.95	1378.33
27					5	462		3348259				16.74	1546.90
28					5	472		3285706				16.43	1550.85
29					8	444		2669760				21.36	1185.37
30	8.2	33	0.02	0.05	10	488	66	2471990	81.58	0.05	0.12	24.72	1206.33

Month				Parameters							Daily Totals		
July	pH	COD	Ammonia as	Total	Suspended	Total	Colour	Flow	COD	Ammonia as	Total	Suspended	Total
SW22		mg/l	N mg/l	Phosphorus	Solids	Solids	Pt Co	Daily	Kg/Day	Kg/Day	Phosphorus	Solids	Solids
				mg/l	mg/l	mg/l	units	Total (litres)			Kg/Day	Kg/Day	Kg/Day
1					6	426		2222813				13.34	946.92
2					9	446		880330				7.92	392.63
3					7	426		2357683				16.50	1004.37
4					5	410		6899731				34.50	2828.89
5					5	426		5752426				28.76	2450.53
6					5	416		6237043				31.19	2594.61
7	8	46	0.04	0.05	5	427	67	6157123	283.23	0.25	0.31	30.79	2629.09
8					6	444		8279798				49.68	3676.23
9					5	404		7196429				35.98	2907.36
10					5	416		5846601				29.23	2432.19
11					5	410		4724957				23.62	1937.23
12					5	426		5795885				28.98	2469.05
13					7	448		8711712				60.98	3902.85
14	7.8	55	0.1	0.05	5	394	119	8824032	485.32	0.88	0.44	44.12	3476.67
15					11	318		11363330				125.00	3613.54
16					9	314		7908624				71.18	2483.31
17					9	320		3168375				28.52	1013.88
18					6	360		2861223				17.17	1030.04
19					8	379		2367792				18.94	897.39
20					9	374		2194906				19.75	820.89
21	7.7	51	0.05	0.05	6	378	121	1895443	96.67	0.09	0.09	11.37	716.48
22					5	408		1875830				9.38	765.34
23					6	390		3234816				19.41	1261.58
24					5	382		3723754				18.62	1422.47
25					6	360		3652819				21.92	1315.01
26					5	412		3209069				16.05	1322.14
27					5	380		3527366				17.64	1340.40
28	8.3	51	0.03	0.05	5	406	108	3824842	195.07	0.11	0.19	19.12	1552.89
29					5	272		3058042				15.29	831.79
30					6	396		2906669				17.44	1151.04
31					5	402		2293834				11.47	922.12

Month				Parameters							Daily Totals		
Aug	pH	COD	Ammonia as	Total	Suspended	Total	Colour	Flow	COD	Ammonia as	Total	Suspended	Total
SW22		mg/l	N mg/l	Phosphorus	Solids	Solids	Pt Co	Daily	Kg/Day	Kg/Day	Phosphorus	Solids	Solids
				mg/l	mg/l	mg/l	units	Total (litres)			Kg/Day	Kg/Day	Kg/Day
1					5	402		1852589				9.26	744.74
2					5	406		2382394				11.91	967.25
3					5	407		2183933				10.92	888.86
4	8.3	47	0.02	0.05	11	418	83	1715990	80.65	0.03	0.09	18.88	717.28
5	no sample due to no flow											0.00	0.00
6	no sample due to no flow											0.00	0.00
7	no sample due to no flow											0.00	0.00
8	no sample due to no flow											0.00	0.00
9	no sample due to no flow											0.00	0.00
10	no sample due to no flow											0.00	0.00
11	no sample due to no flow											0.00	0.00
12	no sample due to no flow											0.00	0.00
13	no sample due to no flow											0.00	0.00
14	no sample due to no flow											0.00	0.00
15	no sample due to no flow											0.00	0.00
16	no sample due to no flow											0.00	0.00
17	no sample due to no flow											0.00	0.00
18	no sample due to no flow											0.00	0.00
19						5	418		2938637				14.69	1228.35
20						5	442		2938637				14.69	1298.88
21						5	414		2938637				14.69	1216.60
22						5	429		2743114				13.72	1176.80
23						5	410		2296080				11.48	941.39
24						5	396		2998253				14.99	1187.31
25	7.8	83	0.37	0.06	5	302	241	7360157	610.89	2.72	0.44	36.80	2222.77
26						5	303		5061053				25.31	1533.50
27						5	364		4428691				22.14	1612.04
28						5	370		4208371				21.04	1557.10
29						5	360		4099766				20.50	1475.92
30						5	378		3753389				18.77	1418.78
31						5	392		3278966				16.39	1285.35

Month				Parameters							Daily Totals		
Sep	pH	COD	Ammonia as	Total	Suspended	Total	Colour	Flow	COD	Ammonia as	Total	Suspended	Total
SW22		mg/l	N mg/l	Phosphorus	Solids	Solids	Pt Co	Daily	Kg/Day	Kg/Day	Phosphorus	Solids	Solids
				mg/l	mg/l	mg/l	units	Total (litres)			Kg/Day	Kg/Day	Kg/Day
1	8.3	53	0.02	0.05	5	340	146	4460918	236.43	0.09	0.22	22.30	1516.71
2					5	332		6037978				30.19	2004.61
3					5	280		5977497				29.89	1673.70
4					5	300		9563616				47.82	2869.08
5					5	328		7482067				37.41	2454.12
6					5	358		5719767				28.60	2047.68
7					5	388		4642445				23.21	1801.27
8	8.1	62	0.02	0.05	5	410	154	5253898	325.74	0.11	0.26	26.27	2154.10
9	no sample due to no flow											0.00	0.00
10	no sample due to no flow											0.00	0.00
11	no sample due to no flow											0.00	0.00
12	no sample due to no flow											0.00	0.00
13	no sample due to no flow											0.00	0.00
14	no sample due to no flow											0.00	0.00
15	no sample due to no flow											0.00	0.00
16					5	452		3815856				19.08	1724.77
17					16	462		3215981				51.46	1485.78
18					5	446		3127939				15.64	1395.06
19					5	481		3032640				15.16	1458.70
20					5	432		3011472				15.06	1300.96
21					5	468		2786832				13.93	1304.24
22	8.3	27	0.05	0.05	5	450	57	2327616	62.85	0.12	0.12	11.64	1047.43
23					8	474		2955398				23.64	1400.86
24					5	460		5134320				25.67	2361.79
25					5	378		3133555				15.67	1184.48
26					5	466		2097706				10.49	977.53
27					5	466		2615587				13.08	1218.86
28					5	222		2583792				12.92	573.60
29	8.2	25	0.02	0.05	8	224	51	1216685	30.42	0.02	0.06	9.73	272.54
30					10	418		1173533				11.74	490.54

Month				Parameters							Daily Totals		
Oct	pH	COD	Ammonia as	Total	Suspended	Total	Colour	Flow	COD	Ammonia as	Total	Suspended	Total
SW22		mg/l	N mg/l	Phosphorus	Solids	Solids	Pt Co	Daily	Kg/Day	Kg/Day	Phosphorus	Solids	Solids
				mg/l	mg/l	mg/l	units	Total (litres)			Kg/Day	Kg/Day	Kg/Day
1					5	428		652778				3.26	279.39
2					17	410		288922				4.91	118.46
3					24	440		232278				5.57	102.20
4					5	417		254051				1.27	105.94
5					7	366		215914				1.51	79.02
6	7.7	70	0.53	0.05	5	308	135	175703	12.30	0.09	0.01	0.88	54.12
7					5	336		639144				3.20	214.75
8					13	308		3197146				41.56	984.72
9					5	364		1225584				6.13	446.11
10					13	308		1332288				17.32	410.34
11					5	312		4237488				21.19	1322.10
12					6	351		2551738				15.31	895.66
13	8	69	0.04	0.05	6	366	155	2050099	141.46	0.08	0.10	12.30	750.34
14					5	338		1390867				6.95	470.11
15					9	382		1118448				10.07	427.25
16					5	379		966816				4.83	366.42
17					6	374		900979				5.41	336.97
18					5	434		793359				3.97	344.32
19					5	442		740474				3.70	327.29
20	8	44	0.03	0.05	5	410	80	743463	32.71	0.02	0.04	3.72	304.82
21					6	380		731264				4.39	277.88
22					11	372		926554				10.19	344.68
23					9	222		3520368				31.68	781.52
24					14	306		2234995				31.29	683.91
25					8	278		1691280				13.53	470.18
26					11	388		2340230				25.74	908.01
27	8.2	48	0.02	0.05	9	362	72	1620864	77.80	0.03	0.08	14.59	586.75
28					6	372		1446336				8.68	538.04
29					5	332		1702080				8.51	565.09
30					8	310		1455494				11.64	451.20
31					21	396		1909526				40.10	756.17

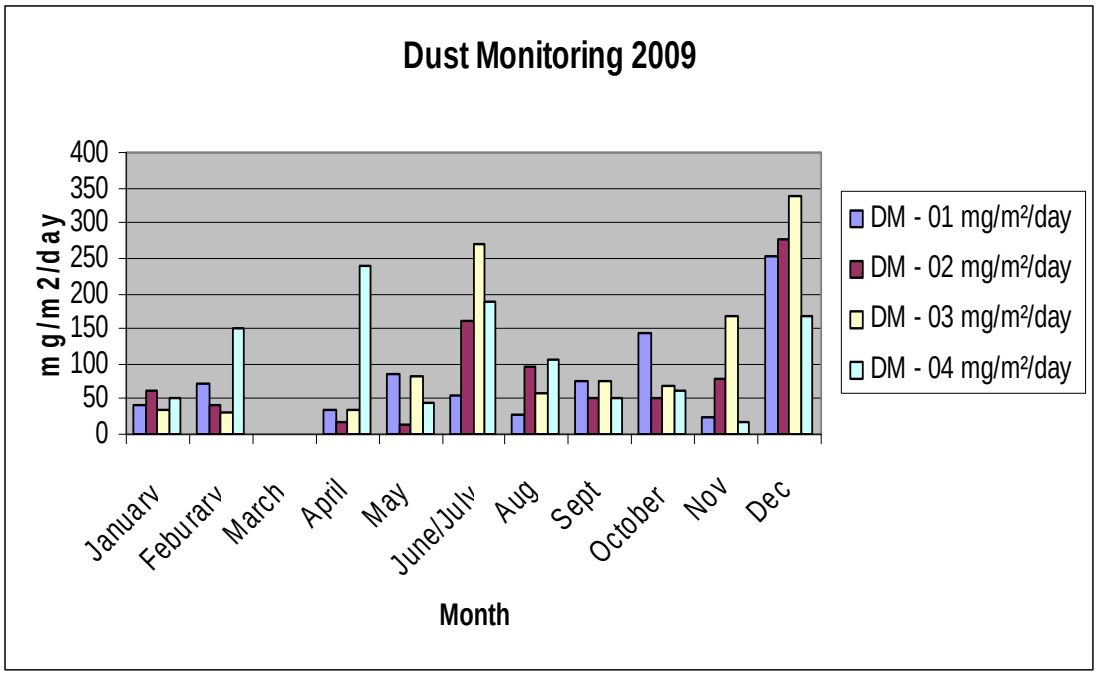
Month				Parameters							Daily Totals		
Nov	pH	COD	Ammonia as	Total	Suspended	Total	Colour	Flow	COD	Ammonia as	Total	Suspended	Total
SW22		mg/l	N mg/l	Phosphorus	Solids	Solids	Pt Co	Daily	Kg/Day	Kg/Day	Phosphorus	Solids	Solids
				mg/l	mg/l	mg/l	units	Total (litres)			Kg/Day	Kg/Day	Kg/Day
1					5	214		4710355				23.55	1008.02
2	7.7	107	0.11	0.05	29	320	232	9021024	965.25	0.99	0.45	261.61	2886.73
3					15	276		8824896				132.37	2435.67
4					26	276		8364557				217.48	2308.62
5					5	244		9405504				47.03	2294.94
6					5	306		8170243				40.85	2500.09
7					5	238		7363440				36.82	1752.50
8					5	270		8600688				43.00	2322.19
9	7.6	78	0.13	0.06	8	186	191	9046080	705.59	1.18	0.54	72.37	1682.57
10	no sample due to no flow											0.00	0.00
11	no sample due to no flow											0.00	0.00
12	no sample due to no flow											0.00	0.00
13	no sample due to no flow											0.00	0.00
14	no sample due to no flow											0.00	0.00
15	no sample due to no flow											0.00	0.00
16	no sample due to no flow											0.00	0.00
17					29	208		8735040				253.32	1816.89
18					28	252		7977485				223.37	2010.33
19					30	242		8465904				253.98	2048.75
20					27	270		9648288				260.50	2605.04
21					25	254		10659170				266.48	2707.43
22					26	292		9450432				245.71	2759.53
23	7.8	86	0.02	0.05	30	298	191	8376739	720.40	0.17	0.42	251.30	2496.27
24					15	282		8618141				129.27	2430.32
25					24	344		8676288				208.23	2984.64
26					24	290		8262951				198.31	2396.26
27					10	182		7888752				78.89	1435.75
28					28	264		7334755				205.37	1936.38
29					28	350		7379164				206.62	2582.71
30	7.7	97	0.09	0.05	34	332	128	7599820	737.18	0.68	0.38	258.39	2523.14

Month				Parameters							Daily Totals		
Dec	pH	COD	Ammonia as	Total	Suspended	Total	Colour	Flow	COD	Ammonia as	Total	Suspended	Total
SW22		mg/l	N mg/l	Phosphorus	Solids	Solids	Pt Co	Daily	Kg/Day	Kg/Day	Phosphorus	Solids	Solids
				mg/l	mg/l	mg/l	units	Total (litres)			Kg/Day	Kg/Day	Kg/Day
1					7	376		6588692				46.12	2477.35
2					15	384		6754061				101.31	2593.56
3					8	382		6574176				52.59	2511.34
4					9	282		6625325				59.63	1868.34
5					29	318		8755776				253.92	2784.34
6					15	252		7947072				119.21	2002.66
7	7.7	73	0.06	0.05	5	220	175	7424352	541.98	0.45	0.37	37.12	1633.36
8					5	364		7080307				35.40	2577.23
9					5	216		6679065				33.40	1442.68
10					5	352		6758554				33.79	2379.01
11					5	356		6767539				33.84	2409.24
12					5	320		4606502				23.03	1474.08
13					6	402		3391891				0.00	1363.54
14	7.9	47	0.04	0.05	5	428	99	4723834	222.02	0.19	0.24	23.62	2021.80
15	ONLY SIX SAMPLES FILLED THIS WEEK FROST ISSUE.							5412787				0.00	0.00
16					5	430		5210525				26.05	2240.53
17					5	458		4935514				24.68	2260.47
18					5	282		4518115				22.59	1274.11
19					5	540		4089053				20.45	2208.09
20					5	466		4504550				22.52	2099.12
21	7.9	49	0.04	0.05	31	408	83	4191696	205.39	0.17	0.21	129.94	1710.21
22					5			3722112				18.61	0.00
23					11	438		3446669				37.91	1509.64
24					5	340		3264365				16.32	1109.88
25					5	68		2915827				14.58	198.28
26					5	162		3202675				16.01	518.83
27					5	248		3605040				18.03	894.05
28					29	476		3342557				96.93	1591.06
29	8	35	0.02	0.05	5	430	74	3489610	122.14	0.07	0.17	17.45	1500.53
30	SAMPLER AND WATER FROZEN.							8623380				0.00	0.00
31	SAMPLER AND WATER FROZEN.							5305054.033				0.00	0.00

APPENDIX 4

Dust Monitoring Results.

Dust Monitoring Results 2009				
IPPC Licence: P0499-01				
Works: Littleton				
Sample Period	**DM - 01 mg/m²/day**	**DM - 02 mg/m²/day**	**DM - 03 mg/m²/day**	**DM - 04 mg/m²/day**
January	40	62	34	51
Feburary	71	41	30	152
March				
April	34	17	34	241
May	86	15	81	46
June/July	55	161	270	189
Aug	28	97	59	105
Sept	75	52	75	52
October	143	52	69	63
Nov	25	80	166	18
Dec	252	277	340	166



Note: The missing data relating to March is due to the dust gauge not being erected for the correct period of time and thus the results were not representative.

Summary Results of Emissions to Atmosphere compliance monitoring from the Bord na Móna Fuels Limited Littleton Briquette Factory at Littleton (January 2009 to December 2009) in accordance with the requirements of integrated pollution control licence register no. P0499-01.

REPORT NO.: ECS3578

ATTENTION: Mr. Sean McCabe
Bord na Móna Fuels Limited
c/o Littleton Briquette Factory
Thurles
Co. Tipperary

PREPARED BY: Mr. Neville Allen
Environmental Scientist

REVIEWED BY: Mr. Paul Crimmins
Environmental Scientist

DATE: March 2010

EXECUTIVE SUMMARY

AS PART OF THE REQUIREMENTS OF INTEGRATED POLLUTION CONTROL LICENCE, REGISTER NO. P0499-01, BORD NA MÓNA FUELS LIMITED ARE REQUIRED TO SUBMIT TO THE AGENCY, AN ANNUAL ENVIRONMENTAL REPORT (AER). BORD NA MÓNA TECHNICAL SERVICES WERE COMMISSIONED TO PREPARE A SUMMARY REPORT OF EMISSIONS TO ATMOSPHERE MONITORED AT THE LITTLETON BRIQUETTE FACTORY FROM THE PERIOD TO JANUARY 2009 TO DECEMBER 2009. DUE TO PRODUCTION DOWNTIME AT THE FACILITY IT WAS NOT POSSIBLE TO CARRY OUT QUARTER TWO MONITORING IN 2009, THIS INCLUDES THE ANNUAL FLUE GAS MONITORING ON EMISSION POINT B101 WHICH WAS SCHEDULED FOR QUARTER 2. FOR THE PURPOSE OF THIS REPORT RESULTS FOR FLUE GASES (NOX (AS NO_2), SO_2 AND CO) ARE TAKEN FROM THE FIRST QUARTERLY MONITORING PERIOD OF 2010 WHICH TOOK PLACE ON 23RD OF FEBRUARY 2010 (REPORT REF: ECS3574).

THIS REPORT IS CERTIFIED AS ACCURATE AND REPRESENTATIVE OF THE SAMPLING AND ASSOCIATED ANALYSIS CARRIED OUT.

RESPECTIVELY SUBMITTED,

MR NEVILLE ALLEN
ENVIRONMENTAL SCIENTIST

MR. PAUL CRIMMINS
ENVIRONMENTAL SCIENTIST

1.0 INTRODUCTION

A summary of IPC Licence Register No. P0499-01 environmental monitoring results from the period January 2009 to December 2009 are presented as follows:

Table 1: Quarterly Compliance Monitoring of Particulate Emissions to Atmosphere

Table 2: Summary of Quarterly Compliance Monitoring of Particulate Mass Emissions to Atmosphere

Table 3: IPC Licence Particulate Emissions to Atmosphere Emission Limit Values (ELV's)

Table 4: Annual Particulate Mass Emissions to Atmosphere

Table 5: Quarterly Compliance Monitoring of TOC (as C) Emissions to Atmosphere from Emission Point A108

Table 6: Annual TOC (as C) Emissions to Atmosphere from Emission Point A108

Appendix 1

Figures 1-6: Particulate Mass Emissions to Atmosphere (kg) (January 2009 to December 2009) vs. Licence ELV from Emissions Reference Points B101, A101-A105 respectively.

Figure 7: Summary of Particulate Mass Emissions to Atmosphere (kg) (January 2009 to December 2009) from Emissions Reference Points B101, A101-A106.

TABLE 1: QUARTERLY COMPLIANCE MONITORING OF PARTICULATE EMISSIONS TO ATMOSPHERE (JANUARY – DECEMBER 2009)

Quarter	Sampling Date	Job No.	Emission Point Ref.	Volumetric Flow (Nm^3/hr)	Particulates (mg/Nm^3)	Particulate Mass Emissions (kg/hr)
1	18/02/09 19/02/09 13/03/09	ECS3263	B101	**36,578**	**1,924**	70.0
			A101	**74,895**	**57.7**	4.32
			A102	**81,516**	**97.1**	7.9
			A103	4,767	2.3	0.01
			A104	**12,174**	273.9	3.3
			A105	**9,158**	2.0	1.8×10^{-2}
			A106	**1,076**	1.2	1.3×10^{-3}
2	Note 1	-	-	-	-	-
			-	-	-	-
			-	-	-	-
			-	-	-	-
			-	-	-	-
			-	-	-	-
			-	-	-	-
3	28/07/09 29/07/09 23/09/09	ECS3403R1	B101	34,393	**1,741.96**	59.91
			A101	**59,513**	46.2	2.75
			A102	**86,297**	**61.0**	5.27
			A103	4,194	92.1	0.39
			A104	10,983	115.0	1.26
			A105	**7,618**	4.5	0.03
			A106	**940**	5.5	5.1×10^{-3}
4	10, 12/11/09	ECS3494	B101	34,355	**8204.9**	281.9
			A101	**65,864**	**450.8**	29.7
			A102	**81,287**	**165.1**	13.4
			A103	3,801	91.1	0.3
			A104	**12,002**	730.2	**8.8**
			A105	**7,319**	1.5	1.1×10^{-2}
			A106	**969**	0.8	7.8×10^{-4}

TABLE 2: SUMMARY OF QUARTERLY COMPLIANCE MONITORING OF PARTICULATE MASS EMISSIONS TO ATMOSPHERE (JANUARY – DECEMBER 2009)				
Emission Point Ref.	**Particulate Mass Emissions during each Quarterly Monitoring Event (kg/hr)**			
	Quarter 1	**Quarter 2** [Note 1:]	**Quarter 3**	**Quarter 4**
B101	70.0	-	59.91	281.9
A101	4.32	-	2.75	29.7
A102	7.9	-	5.27	13.4
A103	0.01	-	0.39	0.3
A104	3.3	-	1.26	8.8
A105	1.8×10^{-2}	-	0.03	1.1×10^{-2}
A106	1.3×10^{-3}	-	5.1×10^{-3}	7.8×10^{-4}

Note 1: Due to production downtime it was not possible to carry out quarter two monitoring in 2009.

TABLE 3: IPC LICENCE PARTICULATE EMISSIONS TO ATMOSPHERE EMISSION LIMIT VALUES (ELV's)				
Emission Point Ref.	**Maximum Volumetric Flow (Nm^3/hr)**	**Particulate ELV (mg/Nm^3 or kg/hr)**	**Particulate ELV (kg/hr)**	***Licensed Annual Particulate Mass Emissions (kg/yr)***
B101	36000	400 mg/Nm^3	14.4	*126144*
A101	34852	50 mg/Nm^3 >0.5kg/hr 150 mg/Nm^3 <0.5kg/hr	5.23max.	*15265* *45815max.*
A102	42400	50 mg/Nm^3 >0.5kg/hr 150 mg/Nm^3 <0.5kg/hr	6.36max.	*18571* *55714max.*
A103	5800	7 kg/hr	7	*61320*
A104	11700	6 kg/hr	6	*52560*
A105	6797	50 mg/Nm^3 >0.5kg/hr 150 mg/Nm^3 <0.5kg/hr	1.02max.	*2977* *8935 max.*
A106	660	50 mg/Nm^3 >0.5kg/hr 150 mg/Nm^3 <0.5kg/hr	0.10max.	*289.1* *876max.*
Maximum Annual Particulates Mass Emissions to Atmosphere Limit			-	*351332*

TABLE 4: ANNUAL PARTICULATE MASS EMISSIONS TO ATMOSPHERE (JANUARY – DECEMBER 2009)				
Location	**Annual Average Mass Emission (kg/hr)**	**Hours Production** (hr/year)	**Annual Particulate Mass Emissions (kg/year)**	***Licensed Annual Particulate Mass Emissions (kg/yr)***
B101	137.3	5200	713,960	*126,144*
A101	12.3	5200	63,960	*45,796 max.*
A102	8.9	5200	46,280	*55,714 max.*
A103	0.2	5200	1,040	*61,320*
A104	4.5	5200	23,400	*52,560*
A105	1.9×10^{-2}	5200	98.8	*8,931 max.*
A106	1.04×10^{-3}	5200	37.3	*867 max.*
Particulate Mass Emissions to Atmosphere			**417,542**	*351332*

Note 1: Due to production downtime it was not possible to carry out quarter two monitoring in 2009.

TABLE 5: QUARTERLY COMPLIANCE MONITORING OF TOC (AS C) EMISSIONS TO ATMOSPHERE FROM EMISSION POINT A108 (JANUARY – DECEMBER 2009)					
Quarter	**Sampling Date**	**Job No.**	**Volumetric Flow (Nm^3/hr)**	**TOC (as C) (mg/Nm^3)**	**TOC (as C) Mass Emissions (kg/hr)**
1	13/03/09	ECS3263	1,808	212	0.37
2	Note 1	-	-	-	-
3	Note 2:	-	-	-	-
4	12/11/09	ECS3494	2935	138	0.41
IPC Licence ELV's			*6,700*	*170*	*1.14*

Note 1: Due to production downtime it was not possible to carry out quarter two monitoring in 2009.

Note 2: Emission point A108 was not operational during quarter 3 monitoring period.

TABLE 6: ANNUAL TOC (as C) MASS EMISSIONS FROM A108 (JANUARY – DECEMBER 2009)			
Annual Average Mass Emission (kg/hr)	**Hours Production (hr/year)** Note 1	**Annual Mass Emissions (kg/year)**	***Annual Mass Emissions IPC Licence ELV (kg/year)***
0.39	5200	2028	*9,986*

Note 1: Operational hours of the Firelighter plant

TABLE 7: ANNUAL COMPLIANCE MONITORING OF NO_x (as NO_2) EMISSIONS TO ATMOSPHERE FROM EMISSION POINT B101					
Annual	**Sampling Date**	**Job No.**	**Volumetric Flow (Nm^3/hr)**	**NO_x (as NO_2) (mg/Nm^3)**	**NO_x (as NO_2) Mass Emissions (kg/hr)**
	23/2/10	ECS3574	30,160	534.7	16.13
IPC Licence ELV's			*36000*	*100*	*3.6*

Note1: Results are referenced to 6% oxygen, temperature 273oK, and pressure 1013.5.

Note 2: Due to production downtime at the facility it was not possible to carry out quarter two monitoring in 2009, this includes the annual flue gas monitoring on emission point B101 which was scheduled for quarter 2. For the purpose of this report results for flue gases (NOx (as NO2), SO2 and CO) are taken from the first quarterly 2010 monitoring period which took place on 23rd of February 2010 (Report Ref: ECS3574)

TABLE 8: ANNUAL NO_x (as NO_2) MASS EMISSIONS FROM B101			
Annual Average Mass Emission (kg/hr) Note 1	**Hours Production** (hr/year)	**Annual Mass Emissions (kg/year)**	***Annual Mass Emissions IPC Licence ELV (kg/year)***
16.13	5,200	**83,876**	*31,536*

Note 1: Based on results from one monitoring event

TABLE 9: ANNUAL COMPLIANCE MONITORING OF SO_2 EMISSIONS TO ATMOSPHERE FROM EMISSION POINT B101					
Annual	**Sampling Date**	**Job No.**	**Volumetric Flow (Nm^3/hr)**	**SO_2 (mg/Nm^3)**	**SO_2 Mass Emissions (kg/hr)**
	23/2/10	ECS3574	30,160	412.6	12.4
IPC Licence ELV's			*36000*	*1000*	*36*

Note1: Results are referenced to 6% oxygen, temperature 273^{o}K, and pressure 1013.5

Note 2: Due to production downtime at the facility it was not possible to carry out quarter two monitoring in 2009, this includes the annual flue gas monitoring on emission point B101 which was scheduled for quarter 2. For the purpose of this report results for flue gases (NOx (as NO2), SO2 and CO) are taken from the first quarterly 2010 monitoring period which took place on 23rd of February 2010 (Report Ref: ECS3574)

TABLE 10: ANNUAL MASS SO_2 EMISSIONS FROM B101			
Annual Average Mass Emission (kg/hr) Note 1	**Hours Production** (hr/year)	**Annual Mass Emissions (kg/year)**	***Annual Mass Emissions IPC Licence ELV (kg/year)***
12.4	5,200	64,480	*315,360*

Note 1: Based on results from one monitoring event

TABLE 11: ANNUAL COMPLIANCE MONITORING OF CO EMISSIONS TO ATMOSPHERE FROM EMISSION POINT B101					
Annual	**Sampling Date**	**Job No.**	**Volumetric Flow (Nm^3/hr)**	**CO (mg/Nm^3)**	**CO Mass Emissions (kg/hr)**
	23/2/10	ECS3574	30,160	324.3	9.8
IPC Licence ELV's			*36000*	*100*	*3.6*

Note1: Results are referenced to 6% oxygen, temperature 273^{o}K, and pressure 1013.5

Note 2: Due to production downtime at the facility it was not possible to carry out quarter two monitoring in 2009, this includes the annual flue gas monitoring on emission point B101 which was scheduled for quarter 2. For the purpose of this report results for flue gases (NOx (as NO2), SO2 and CO) are taken from the first quarterly 2010 monitoring period which took place on 23rd of February 2010 (Report Ref: ECS3574)

TABLE 12: ANNUAL MASS CO EMISSIONS FROM B101			
Annual Average Mass Emission (kg/hr) Note 1	**Hours Production** (hr/year)	**Annual Mass Emissions (kg/year)**	***Annual Mass Emissions IPC Licence ELV (kg/year)***
9.8	5,200	50,960	*31,536*

Note 1: Based on results from one monitoring event

Figure 1: Particulate Mass Emissions to Atmosphere (kg/hr) (January to December 2009) vs. Licence ELV from Emissions Reference Point B101 – Data point 5 is the average yearly emission

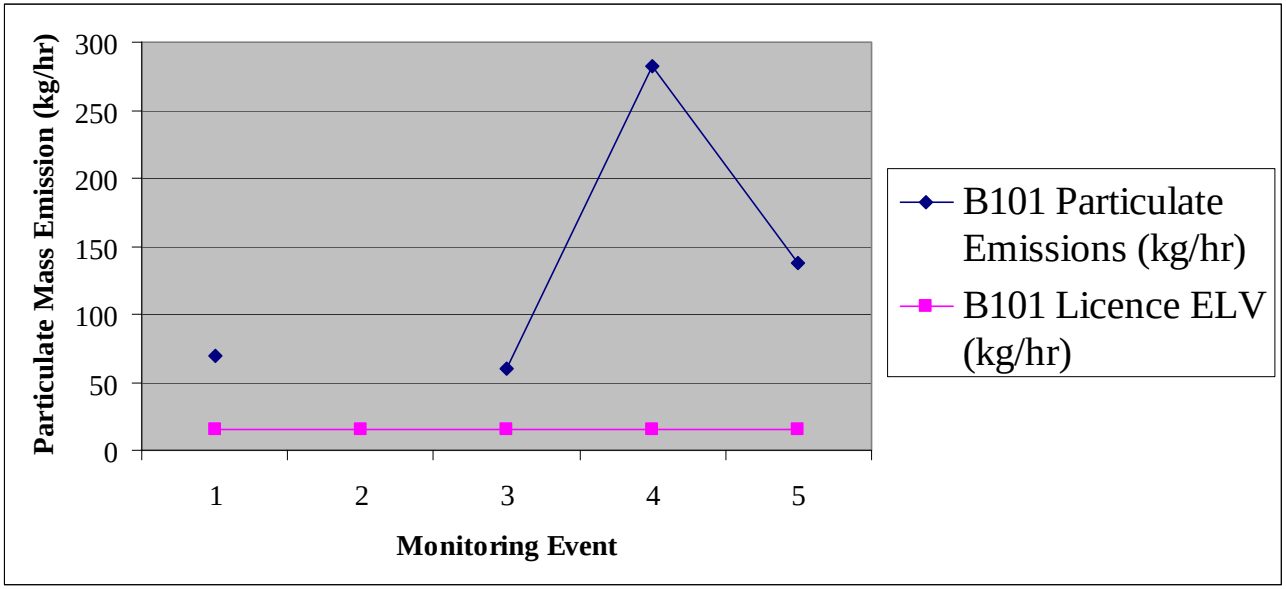


Figure 2: Particulate Mass Emissions to Atmosphere (kg/hr) (January to December 2009) vs. Licence ELV from Emissions Reference Point A101– Data point 5 is the average yearly emission

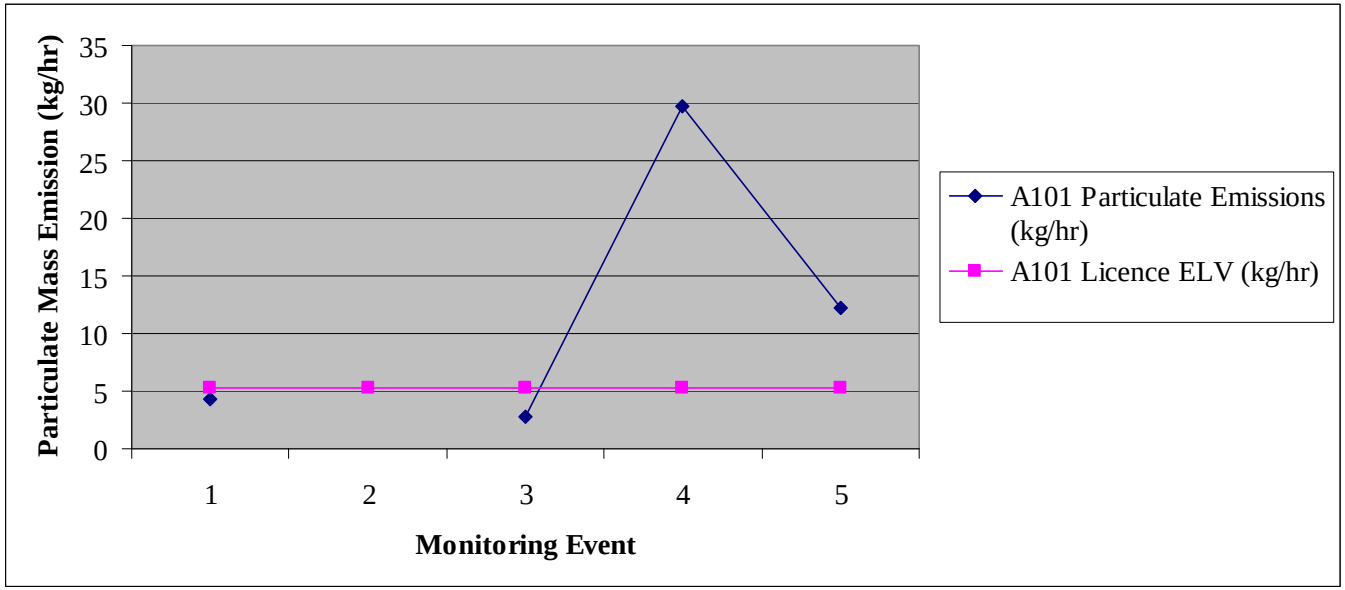


Figure 3: Particulate Mass Emissions to Atmosphere (kg/hr) (January to December 2009) vs. Licence ELV from Emissions Reference Point A102– Data point 5 is the average yearly emission

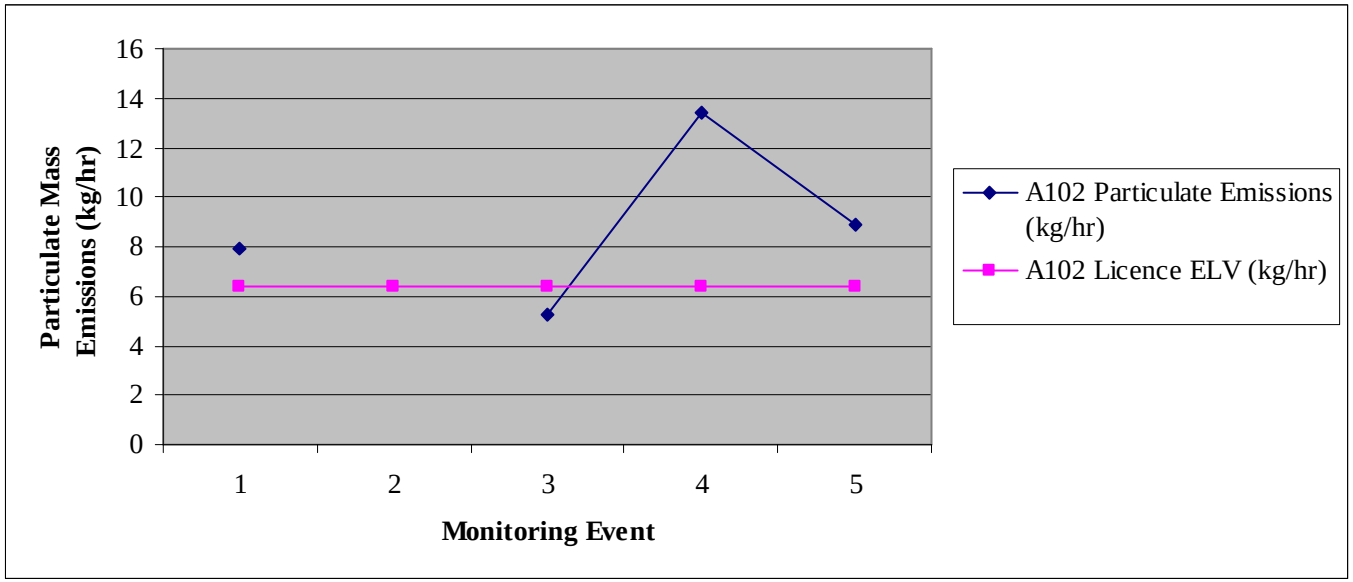


Figure 4: **Particulate Mass Emissions to Atmosphere (kg/hr) (January to December 2009) vs. Licence ELV from Emissions Reference Point A103– Data point 5 is the average yearly emission**

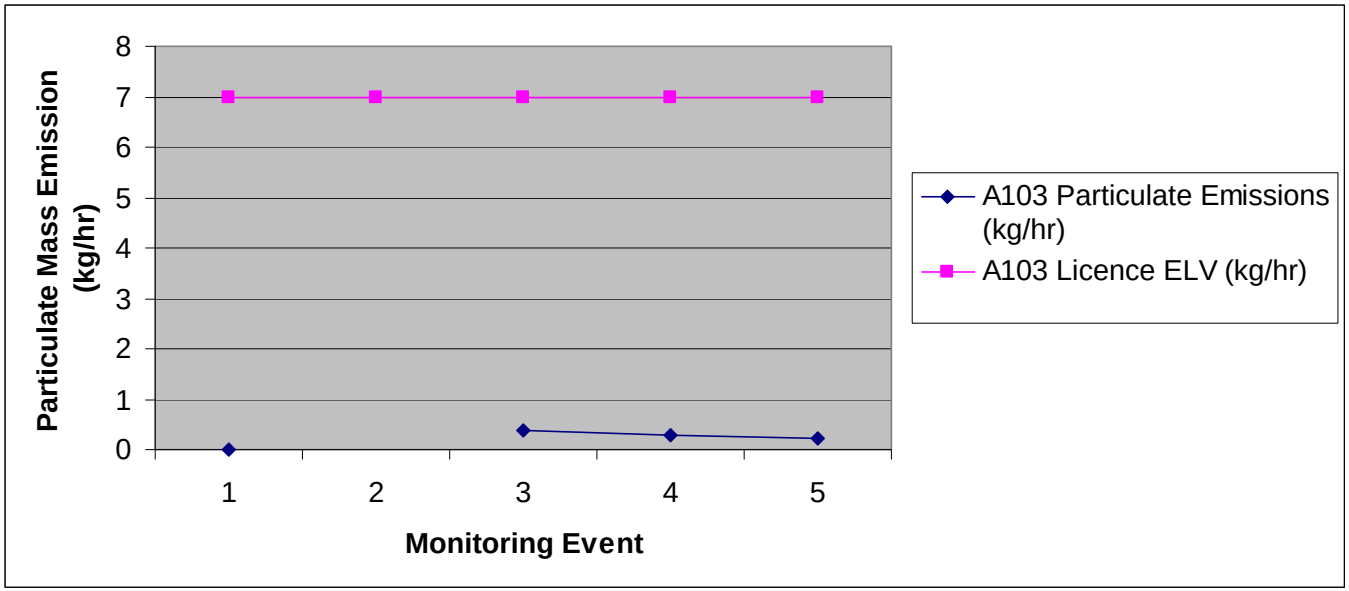


Figure 5: Particulate Mass Emissions to Atmosphere (kg/hr) (January to December 2009) vs. Licence ELV from Emissions Reference Point A104– Data point 5 is the average yearly emission

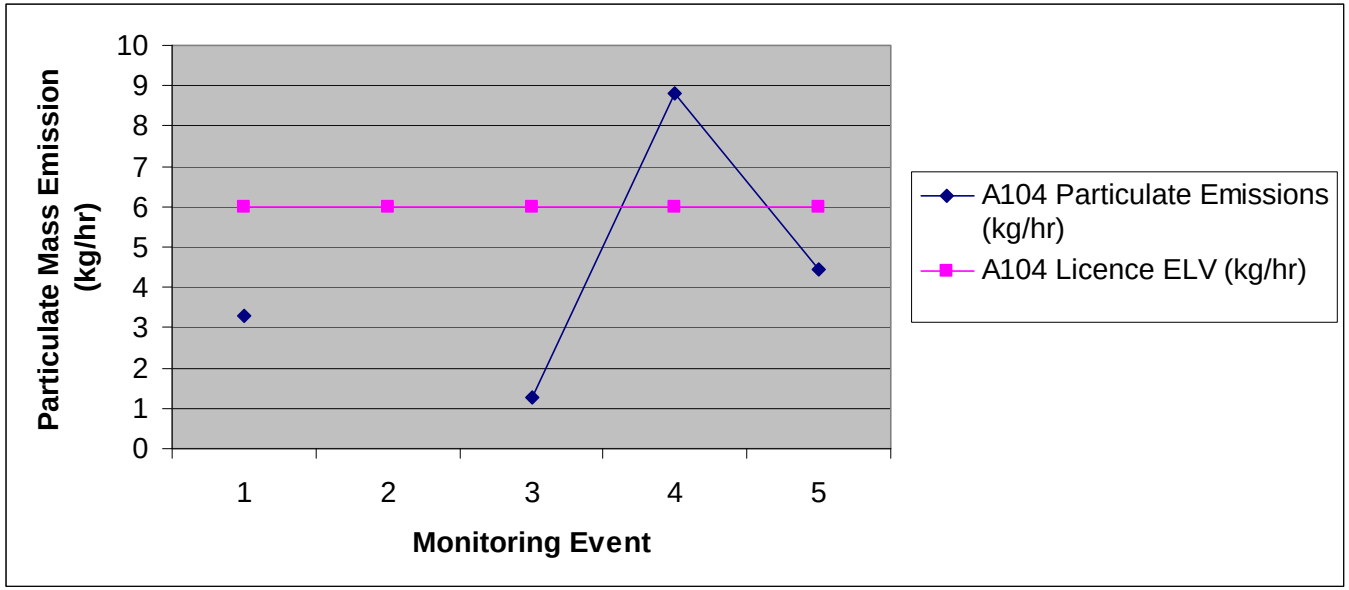


Figure 6: Particulate Mass Emissions to Atmosphere (kg/hr) (January to December 2009) vs. Licence ELV from Emissions Reference Point A105– Data point 5 is the average yearly emission

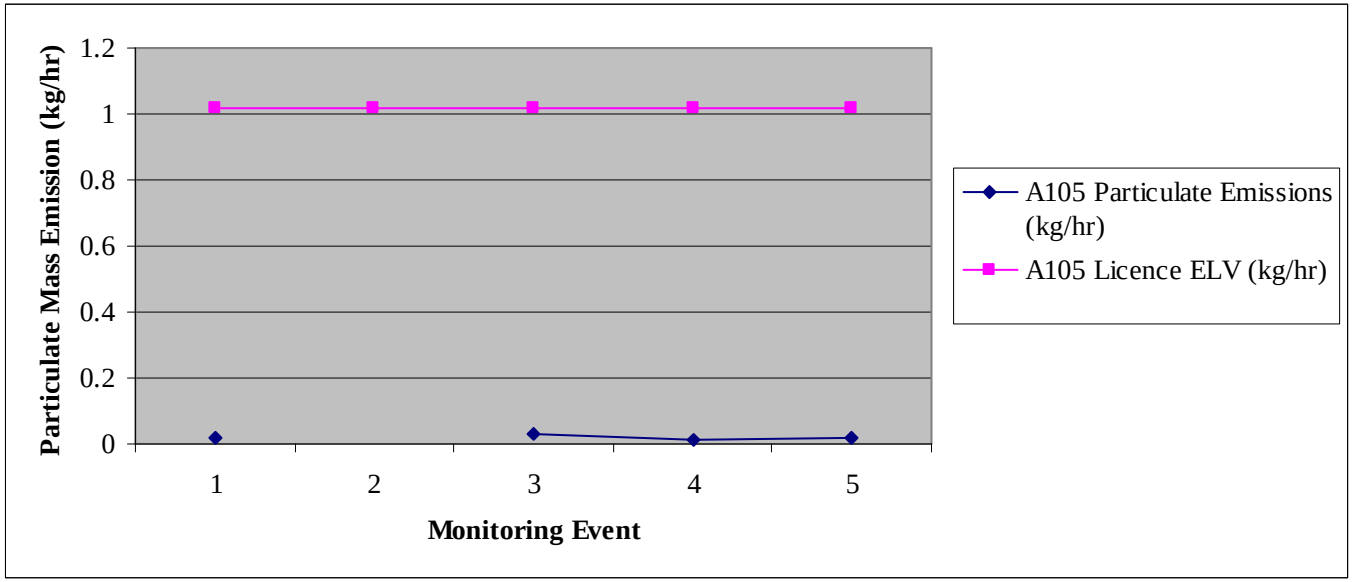


Figure 7: Particulate Mass Emissions to Atmosphere (kg/hr) (January to December 2009) vs. Licence ELV from Emissions Reference Point A106– Data point 5 is the average yearly emission

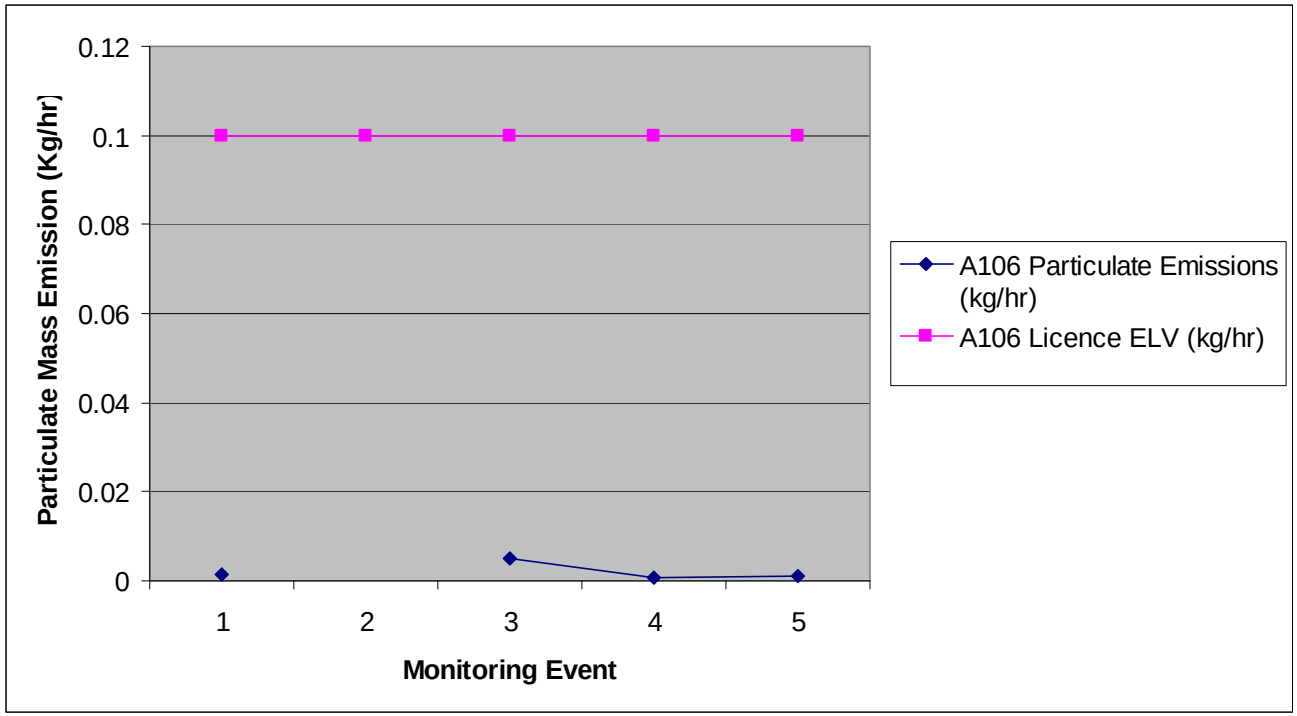
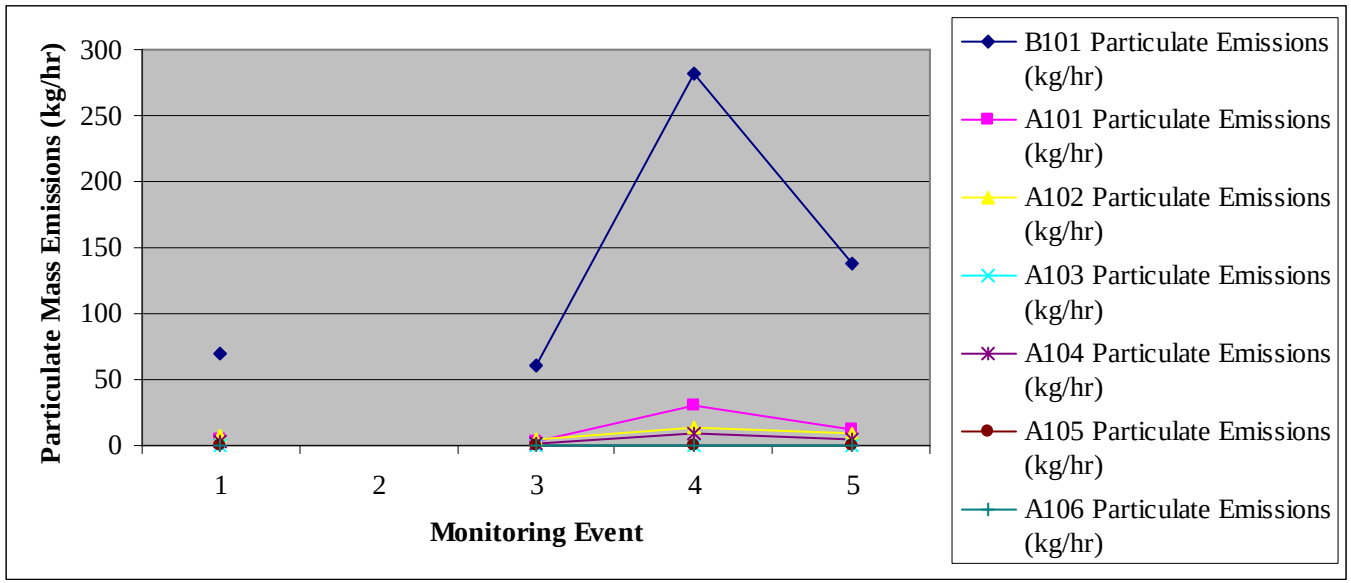


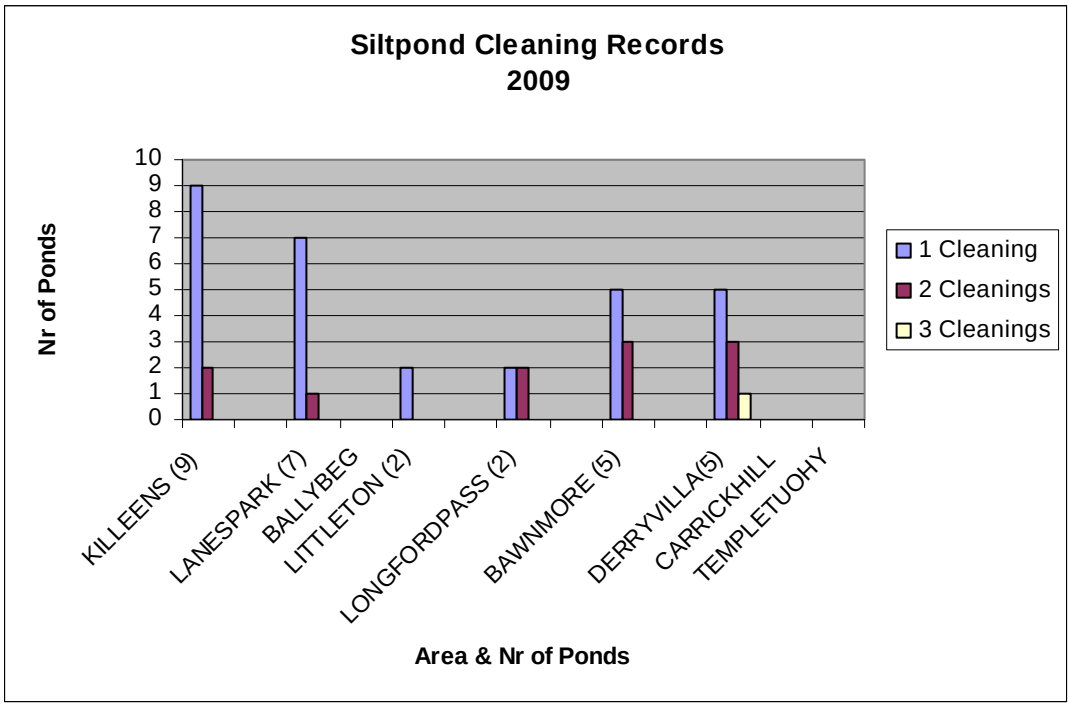
Figure 8: Summary of Particulate Mass Emissions to Atmosphere (kg/hr) (January to December 2009) from Emissions Reference Points B101, A101, A102, A103, A104 and A105



APPENDIX 5

De-silting Programme Review.

Siltpond Cleaning Programme 2009			
IPPC Licence:499			
Bog Area & Nr Ponds	**1 Cleaning**	**2 Cleanings**	**3 Cleanings**
KILLEENS (9)	9	2	
LANESPARK (7)	7	1	
BALLYBEG			
LITTLETON (2)	2		
LONGFORDPASS (2)	2	2	
BAWNMORE (5)	5	3	
DERRYVILLA(5)	5	3	1
CARRICKHILL			
TEMPLETUOHY			



APPENDIX 6

AER & PRTR Data

BORD NA MÓNA

BORD NA MÓNA FUELS LIMITED

Annual Environmental Report 2010
IPPC LICENCE P0499-01

March 2011

Bord na Móna today operates 5 main subsidiary companies in more than 20 locations throughout Ireland, the UK and USA. The principal businesses are in the Energy, Resource Recovery, Horticulture, Home Heating and Wastewater Treatment and Air Pollution Abatement markets. The company also engages in an extensive rehabilitation program to develop its peat lands in an environmentally sustainable manner.

Bord na Móna has long recognised the need to diversify its activities in order to secure a sustainable future. In this context we identified the energy and resource recovery sectors as appropriate areas of growth and development, given our assets, strengths and skills.
Significant challenges face Ireland in meeting the country's needs to provide secure sustainable energy and manage waste while minimising the impact on the environment.

Bord na Móna is in a strong position to contribute to dealing with these challenges. We have a unique mixture of assets, experience and innovation which will enable us to cross-link our activities in energy, water and resource recovery to provide products and services which will meet Ireland's needs. We also have the capacity to become an exemplar for others to follow in these fields.

With this background we have scoped out a new vision for the future sustainable development of Bord na Móna.
Following on from our vision, we have developed a new mission for Bord na Móna which the Company is committed to achieving.

In 1934 the Turf Development Board was formed to ‘develop and improve the turf industry.' The experience of fuel shortages during the war re-enforced the Irish State's commitment to developing the country's bogs. In 1944 the TDB was asked to devise and submit a comprehensive programme, the outcome was the transformation in 1946 of the TDB into Bord na Móna. The Board was given a mandate to increase the use of peat as a fuel and in energy production. Markets for the use of moss peat in horticulture were also developed.

In 1990 Bord na Móna implemented a divisionalised and decentralised structure, designed to delegate responsibility downwards ensuring a sharper focus on each profit centre and a greater spirit of enterprise.

Group Vision

The vision statement defines the Company's purpose, in terms of its values.
Values are guiding beliefs about how things should be done.
The vision statement communicates both the purpose and values of Bord na Móna.
For employees, it gives direction about how they are expected to behave and inspires them to give their best. Shared with customers, it shapes the customers' understanding of why they should work with Bord na Móna.
Bord na Móna will seek solutions that optimise the creative energy and potential of the organisation, driven by long term goals and the organisation's vision and mission.
In this context our devolved business units will align their vision and strategic planning with the global direction provided.
Consistent with our vision, innovation will once again return to the core of everything we do. We will capitalise on opportunities to cross fertilise our unique range of skills and technologies that add value and are socially and environmentally sustainable.
Greater focus will be placed on managing and developing our land assets in a responsible and sustainable manner. Our award winning initiatives at Lough Boora (Co. Offaly) and Oweninny (Co Mayo), provide shining examples of what can be achieved

Group Mission

We conduct our affairs with openness, honesty and integrity.
We are Ireland's leading environmentally responsible integrated utility service provider encompassing electricity, heating solutions, resource recovery, water, horticulture and related services.
We capitalise on international opportunities where we have a competitive advantage.
We achieve continuing growth through superior customer service, outstanding quality and innovation delivered through the excellence and commitment of our people.
We engage in sustainable profitable business in the communities we serve, which is rewarding and challenging for employees and other stakeholders.

Contents

1.0 Introduction

1.1 IPC Licence Register No

1.2 Name & Location of Site

1.3 Brief Description of Activities

1.4 Environmental Management of the Company

1.5 Environmental Policy Statement

2.0 Summary Information

2.1 Emissions to Water Summary

2.1.1 Silt Pond Emissions

2.1.2 Factory Processes Discharge @ PW-102

2.1.3 Workshops, Transport & Yard Discharges

2.1.4 Composite Sampler Report

2.1.5 Emissions to Water Non-compliance's

2.2 Emissions to Air Summary

2.2.1 Dust Monitoring Factory.

2.2.2 Particulate Emissions Minimisation Report

2.2.3 Dust Monitoring DSL's

2.2.4 Dust Non-compliance's

2.3 Waste Arising

2.3.1 Non-Hazardous Waste

2.3.2 Hazardous Waste

2.4 Energy and Water Consumption

2.4.1 Energy Consumption

2.5 Environmental Incidents and Complaints

2.5.1 Incidents

2.5.2 Complaints

3.0 Management of the Activity

3.1 Environmental Management Programme Report

3.2 Environmental Management Programme Proposal

3.3 Environmental Expenditure

4.0 Licence Specific Reports

4.1 Surface Water Discharge Monitoring Location Programme Review

4.2 Bunding Programme

4.3 Boiler Combustion Efficiency

4.4 Resource Consumption Summary

4.5 Report on de-silting Programme

4.6 Bog Development and Operational Programme

4.7 Bog Rehabilitation Report

4.8 Archaeological Report

4.9 Energy Efficiency Audit Report Summary

5.0 Summary

Appendix 1: Emissions to Water Monitoring Results. (Bogs)

Appendix 2: Emissions to Water Monitoring Results. (Yards)

Appendix 3: Emissions to Water Monitoring Results. (Composite)

Appendix 4: Emissions to Air Monitoring Results.

Appendix 5: De-silting Programme Review

1.0 Introduction

Bord na Móna Fuels Limited was granted an Integrated Pollution Control Licence by the E.P.A. on 17th August 2001 for it's operation in the Littleton group of bogs. This report is the tenth A.E.R. for the operations and covers the period from 1st January 2010 to 31st December 2010.

1.1 IPC Licence Number: P0499-01

1.2 Name & Location of Site

The Littleton group of bogs consists of a cluster of bogs approximately ten miles from Thurles in Co. Tipperary.
The main contact and location details of the company are presented in summary form below

Company Name:	Bord na Móna Fuels Limited
Site Address:	Littleton Group Thurles Co. Tipperary.
Telephone No:	0504-44215
Fax No:	0504-44225
Contact Name:	Ray Yates
Position:	General Manager

1.3 Description of Activities

Milled Peat Operations

For milled peat production the bog is laid out in a series of rectangular fields of varying length and 15m wide with drains located between. There are essentially four operations involved in milled peat production:
Milling.
Harrowing.
Ridging.
Harvesting.

Milling.
Special milling machines work there way along the fields, milling approximately 15mm of peat off the top of the bog in a pass.

Harrowing
This is achieved with a machine called a harrow. The milled peat is harrowed until its moisture content is down to approximately 40-50%, which can take up to two to three days, weather depending.

Ridging
The dry peat is then scraped into long ridges running down the centre of each field. This is done with a ridger, a machine consisting of a series of blades in the shape of a v that opens the full width of the field.

Harvesting
During harvesting every eleventh field is used to stockpile the peat, with this field receiving the milled peat from the five fields either side.
Milled Peat is produced on the Littleton group of bogs for transfer to the Briquette Factory for the manufacture of peat solid fuel products. Littleton has a total area of 4,530 hectares. Of this, 1,475 hectares were used for the production of milled peat during the period of the AER.

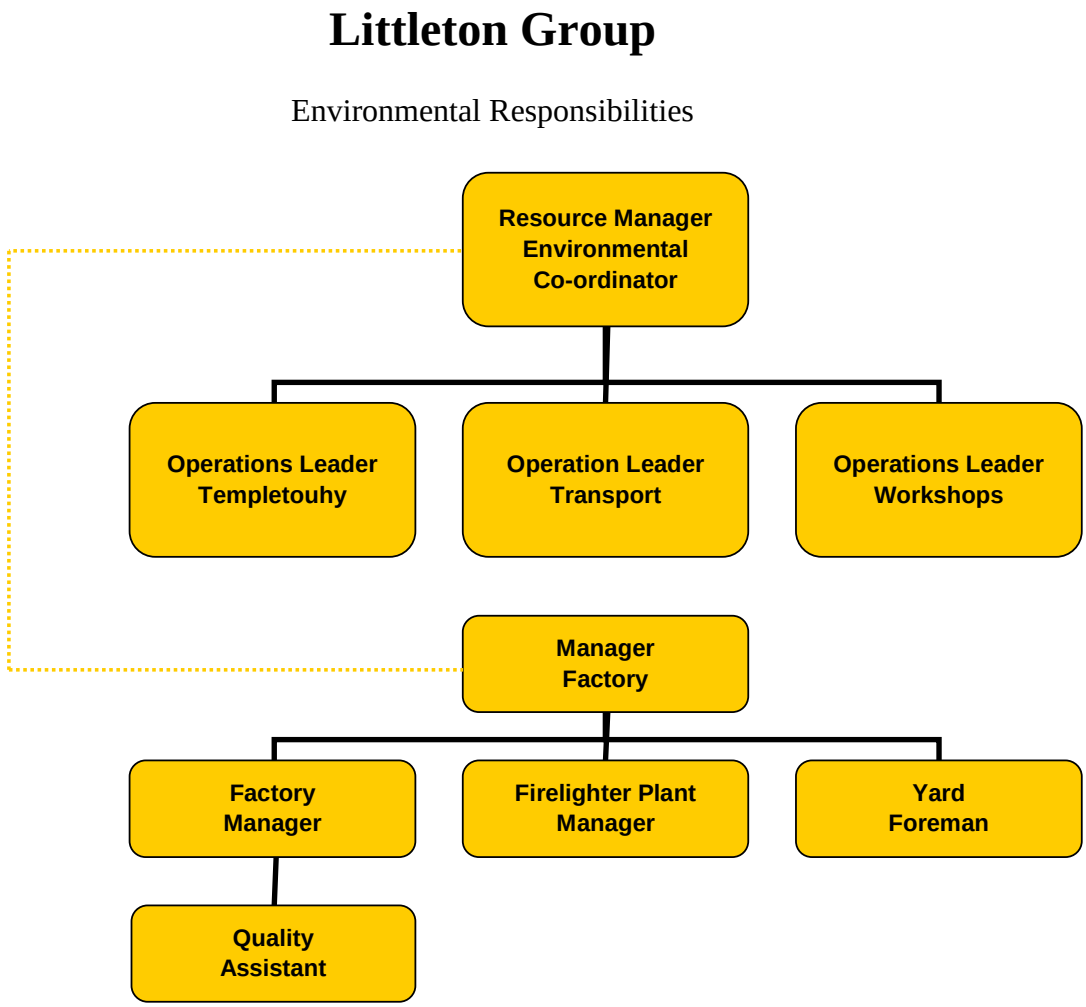
The production of milled peat is a seasonal activity with production opportunities only possible during the period from late spring to early autumn when drying conditions are suitable. When production operations are underway, they are typically carried out over a seven-day week and for 10 to 15 hours per day. Bog drainage and field conditioning operations are carried out throughout the year, along with peat haulage operations from stockpiles located on the bog to the Briquette Factory. Transport operations are carried out on all days throughout the year that the Briquette Factory is in operation.

Sod Peat was produced on an area of 223 hectares during 2010. Production was from April to August with sales to the public from September to December. Bog preparation and drainage was ongoing throughout the year but was mainly in the period January to March.
The Firelighter Plant operated from January to April and again from September to December.

The Group has its own workshop facilities for the maintenance, repair and fabrication of plant used in the operations outlined.

1.4 Environmental Management of the Company

The organisational structure within the Littleton Group is presented in the flow chart below. Although the site operates under a single IPPC Licence, administratively the operations are divided into Factory and Bog.



1.5 Environmental Policy

BORD NA MÓNA

BORD NA MÓNA FUELS LIMITED

Bord na Mona Fuels Limited is a commercial semi-state body with responsibility to develop Ireland's peat resources in the national interest.

Bord na Mona Fuels Limited is committed to gather and make available information on all aspects of its environmental impact and to help improve understanding among the public generally of its role and the importance of Irish peatlands.

Bord na Mona Fuels Limited recognises the importance of peatland conservation.

Bord na Mona Fuels Limited will leave behind all areas it owns as either an economically or socially integrated resource of a high environmental value.

Bord na Mona Fuels Limited seeks to conduct all aspects of its business in an environmentally sensitive value.

Bord na Mona Fuels Limited operate an environmental management system specifically addressing the following impacts.

Discharges to water.
Emissions to atmosphere.
Waste disposal.
Use of natural resources.
Noise, vibration, odour, dust and visual effects.
Natural environment and eco-system.

The environmental management system will be monitored, maintained and continually improved.

A system of regular environmental audits will be put in place.

Bord na Mona Fuels Limited will continue research and development into all aspects of its environmental impact.

This statement is published and is available at all locations within the division and its contents are brought to the attention of all employees.

2.0 Summary Information

2.1 Emissions to water summary

2.1.1 Silt Pond Emissions

Surface Waters

Comment

Surface water monitoring was carried out quarterly during the reporting period. In total analysis was carried out at three different locations. These locations are as follows, Killeens @ SW4, Lanespark @ SW15 and Carrickhill @ SW26. The parameters measured during each sampling event were as follows:
Total Phosphorus, Total Solids, Suspended Solids, pH, Nitrogen, Colour and COD.
In general results were constant across all parameters at each monitoring location.
September was the wettest month with 169.3 mm of rainfall recorded and April the driest with 37.3 mm recorded. The quarterly grab sampling programme proved to be 100% compliant for the year, as was the case in 2007, 2008 and 2009.

pH values were between 6.4 and 8.2 pH Units, with normal emission limit values being of the range 6 to 9 pH Units.

Suspended solids varied from 5 mg/l to 30 mg/l and would depend on activities such as, piping, ditching etc, in the catchments at the time of sampling. Suspended Solids results were on average below the 2009 figures.

Ammonia values ranged from 0.12 mg/l and 3.84 mg/l. The I/PV for A3 waters is 4mg/l. It is however not unusual for surface waters emanating from production peatlands to be slightly elevated.

COD readings ranged from 34 mg/l to 114 mg/l during the reporting period. The I/PV for A3 waters is 40mg/l. Bord na Mona set trigger levels of 100 mg/l was exceeded only once which is a marked improvement on 2009 when trigger levels were breached on five occasions.

Total Phosphorus results remained constant at 0.05 mg/l at all locations, which are well below any trigger level in any of the guidance documents.

Flow rates and the non recording of a flow at all locations during the first quarter monitoring event was primarily due to the fact that the locations were in flood and inaccessible and therefore the recording of flow was not possible.

Sampling will continue at the same locations during 2011.

Surface Water Results are contained in Appendix 1.

2.1.2 PW-102 Factory and Yard Discharge to Ballybeg River.

Monitoring took place at this location on a weekly and quarterly basis. The parameters measured are; COD, Suspended Solids, pH and Flow, on a weekly basis and Total Phosphorus, Ammonia and Oils, Fats and Greases quarterly.
The emission point is located on the factories process water outfall.

Comment:

pH values were within the range 7.2 and 10.76, with a mean value of 8.02 pH units .

COD values were within the range, 17 to 142 mg/l, with a mean value of 59.7 mg/l. This mean figure is marginally higher than the 2009 result (54 mg/l) and down on previous years results.

SS results averaged 26.6 mg/l. The range was from 5 mg/l to 90 mg/l. The nine results above 35 mg/l did not constitute a non compliance as they represented less than 25% of the overall results; also no individual result was above 105 mg/l as per condition 3.3.1 (ii). The mean figure was slightly higher than the 2009 averages.

Quarterly **TP,** ranged from 0.05 mg/l – 0.15 mg/l, with an average of 0.11 mg/l. This represents a reduction on the 2009 figures.

Ammonia ranged from 0.09 mg/l – 0.42 mg/l, and averaged 0.28 mg/l. This represents a reduction on the 2009 figures. The I/PV for A3 waters are of the range 4mg/l.

Oils, Fats & Greases ranged from 1 mg/l – 11 mg/l. The average figure was 4.25 mg/l. This is down on the previous years result.

2.1.3. Monitoring of workshop/depot surface water run-off.

Comment:

Inspections are undertaken and logged weekly at the following locations: SWE1 Factory / Lanespark Workshop / Firelighter area, SWE2 Factory Transport and Fueling Area, SWE3 Templetuohy Workshop and SWE4 Templetuohy Fueling Area.
Yard runoff monitoring took place at these four different locations on a monthly basis during the reporting period and COD was the parameter requiring analysis.
As is evident from the graph, on several occasions no sample was available on the day of sampling. This was due to lack of flow at the emission point as the catchments are so small. In fact, in most instances it would have to be raining quite heavily in order to attain a sample. Where sampling was successful there was a marked reduction in COD levels over the monitoring period.
Sampling will continue at the same locations during 2011.

Results are attached in Appendix 2.

2.1.4 Composite Sampler Programme

The composite sampling regime at Littleton needs to be reassessed. At present due to the continual dewatering at Lisheen Mine, it has proven difficult to guarantee a continuous flow of water from a number of locations. This is evident from the missing data on the attached appendix tables. It should be noted that there was an improvement in flow recording at the site compared with previous years. A new location was selected but on further inspection, this site also was found to have similar problems, of interrupted flow due to pumped drainage.
It was planned to submit a relocation proposal to the Agency in 2010 but this did not materialise.

Composite Sampler results are contained in Appendix 3.

2.1.5 Emissions to Water Non-compliance's

The non-compliances associated with agreed sampling of water effluent at Littleton are outlined in table under.

Emissions to Water Non-Compliances 2010		
IPPC Licence: P0499-01		
Works: Littleton		
Type	**Non-Compliances**	**Location / SW Nr**
Composite	7	DE22
Quarterly Grab	0	
PW 102	0	

Although nine samples exceeded 35mg/l at PW102, this was less than 25% of the total number of samples and no single sample was above 105 mg/l. Ref condition 3.3.1 (ii).
There were seven non compliance in relation to composite sampling at SW22 during 2010. Six of these were associated with one event when the sampler suction head became dislodged and became imbedded in silt at the bottom of the outfall. The other non-compliance was in relation to three consecutive results above 35 mg/l during November. On both occasions the Agency was informed.

2.2 Emissions to Air Summary

2.2.1 Factory Emissions

Emissions from Boiler Stack (B101) improved in the second two quarters (Q3, Q4)

The Grit Arrestor was replaced with phase 1 of modification by a new G.A and an extra 2 primary cyclones during Summer 2010.
Further modification (phase 11) will take place to this circuit during summer 2011.
Incoming boiler fuel was exceptionally wet during period Jan to May 2010.

Attached in Appendix 4 is Emission to Air Results.

2.2.2 Particulate Emissions Minimisation Report

The particulate Emissions Report is also attached in Appendix 4

2.2.3 Dust Emissions (Dust Sensitive Locations)

Dust monitoring was carried out as per Agency agreed proposals. Monitoring took place at DM01, DM02, DM03 and DM04. The Bergerhoff method of collection was used.
On ten occasions the emission limit value of 350 mg/m2/day was exceeded; however there is an issue with the location of the sample bottles, as they are located adjacent to the areas of operation and not at the closest dust sensitive locations. There relocation will be discussed in the coming months. No dust complaints were received on foot of any of the non-compliances. The results are also displayed in Appendix 4.

2.2.4 Non-compliance's

Dust Non-compliance 2010	
IPPC Licence: P0499-01	
Works: Littleton	
Location / DM Nr	**Non-Compliances**
DM 01	3
DM 02	4
DM 03	1
DM 04	2
Total	**10**

As mentioned above no complaints were received in relation to dust during the reporting period, including during times of dust monitoring non-compliance.

2.3 Waste Management Report

2.3.1 Non Hazardous Waste

Non Hazardous Waste Data 2010				
Licence: P0499-01				
Works: Littleton				
Type	**Tonnes**	**EWC Code**	**Contractor**	**Licence Nr**
Skips	3.56	20 03 01	AES	053/OY/39/02
Wheelie Bins	90.85	20 03 01	AES	053/OY/39/02
Polyethlene	89.22	02 01 04	Leinster Environmentals	205/2005
Polyethlene	156.72	02 01 04	Eco Plastics	WFP-CE-08-0005-01
Polyethlene	33.50	02 01 04	AES	053/OY/39/02
Scrap Steel	115.19	17 04 07	AES	053/OY/39/02
Timber Pallets	346.65	15 01 03	AES	053/OY/39/02
Silt Pond Cleanings	1975.00	01 01 02	Bord na Mona	IPPC P0499-01
Peat Screenings	731.25	01 01 02	Bord na Mona	IPPC P0499-01
Totals	**3541.94**			

Note: Skips and wheelie bins are sent to a mixed recycling centre with the residue going to landfill.

2.3.2 Hazardous Waste

Hazardous Waste Data 2010					
Licence: P0499-01					
Works: Littleton					
Type	**Tonnes**	**EWC Code**	**Contractor**	**Licence Nr**	**Destination**
Waste Oil	7.62	13 02 05	Enva Ireland Ltd Portlaoise	184-1	Portlaoise
Oil Filters	0.52	16 01 07	Enva Ireland Ltd Portlaoise	184-1	Portlaoise
Oily Rags	1.35	15 02 02	Enva Ireland Ltd Portlaoise	184-1	Portlaoise
Lead Acid Batt	1.00	16 06 01	Enva Ireland Ltd Portlaoise	184-1	Portlaoise
Parts Wash	2.26	11 01 13	Safety Kleen, Tallaght, Dublin	99-1	Dublin
Total	**12.75**				

2.4 Energy Consumption

The usage of diesel and electricity in the Factory are to supplement the power supplied by Milled Peat. The Bog usage of both is to provide the Milled Peat for Briquetting. Derv is used for road transport service to Milled Peat operations.

Energy Consumption 2010			
IPPC Licence: P0499-01			
Works: Littleton			
1. Factory Units	Diesel (Litres)	Derve (Litres)	Electricity (Units)
Totals	553626	23452	1412717
MW Hours	5421.33	212.01	1412.72
Total MW Hours	**7046.0**		
2. Factory Units	Mill/Peat (Tonnes)	Screens (Tonnes)	Br/Out (Tonnes)
Totals	71538.25	3726	159
MW Hours	20120.13	17586.72	750.48
Total MW Hours	**38457.3**		
3. Bog Units	Diesel (Litres)	Derve (Litres)	Electricity (Units)
Totals	689269	37317	129072
MW Hours	6749.60	337.34	129.07
Total MW Hours	**7216.0**		
1. + 2. + 3.			
Total MW Hours	**52719.4**		

2.5 Environmental Incidents & Complaints

Environmental Incidents 2010	
IPPC Licence: P0499-01	
Works: Littleton	
Incidents	0
Requiring corrective action	0
Category	
Water	
Air	
Procedural	0
Miscellaneous	0
Total	**0**

There were no environmental incidents during the reporting period.

Environmental Complaints 2010	
IPPC Licence: P0499-01	
Works: Littleton	
Complaints	0
Requiring corrective action	0
Category	
Water	
Air	
Procedural	0
Miscellaneous	0
Total	**0**

There were no complaints of an environmental nature during the reporting period.

3.1 Achievement of Objectives & Targets 2010

Project	Description & Status
Project 1: Reduction of fugitive dust emissions.	**Training.** Continue to train all employees in environmental matters. Training will be by means of the screening of an environmental DVD, followed by a power point presentation. **Status**: 4 staff received Environmental Training during 2010. **Hydraulic Harrows.** There were seven new Hydraulic Harrows programmed for delivery over a five year period. These will be used in Dust Sensitive Locations. **Status:** The remaining two of these Hydraulic Harrows were delivered in 2010 and will be deployed during the coming 2011 season. **Headland Peat Collection.** Continue with the collection of headland peat, particularly at dust sensitive locations. A new mobile Haku Harvestor was delivered in 2008 and is currently being commissioned for use in the 2009 production season. **Status:** Headland peat was collected and included in general production figures The mobile Haku Harvestor delivered in 2008 and commissioned in 2009 was not ready for the 2010 production season, but will be for the coming 2011 season.
Project 2: Waste Management	**Waste Streamlining.** Following the purchase by Bord na Mona of AES Ltd, meetings with that company's management will be ongoing to see how best Bord na Mona's needs can be catered for. Key account managers dedicated to Bord na Mona have been requested and are due to be in place in 2009. **Status:** No dedicated key account manager has been appointed to Bord na Mona Littleton to date.
Project 3: Minimisation of Suspended Solids.	**Training.** Continue to train all employees in environmental matters. Training will be by means of the screening of an environmental DVD, followed by a power point presentation. **Status:** 4 staff received Environmental Training during 2010.

Project 4: Effective spill leak management of mobile fuelling units.	**Research and Development.** Continue to introduce rail operated fuel service wagons on a phased basis, with Littleton works budgeted to receive one wagon during 2009. Increased bund provisions where required, will be provided, in 2009. **Status:** A second new rail service wagon was delivered in 2010. This tank has a capacity of 5000 litres and is bunded. All workshops also received increased bunding for the storage of fuel and oil barrels
Project 5: Collection storage and reuse of polyethylene.	**Identify Recyclers.** Continue with the recycling of polyethylene. The sourcing of more recycling contractors will be ongoing. **Status:** 245 tonnes of waste polyethylene was collected and recycled during 2010
Project 6: PCB Directive	**Survey.** Carry out a comprehensive survey of all PCB suspect appliances. Following this, liaise with EPA in deciding plan of action once a definitive amount of suspect PCB holdings are agreed. **Status:** This project was completed in 2010, with all oils sampled proving to be PCB free.

3.2 Environmental Management Programme Proposal 2011

Project	Description & Status
Project 1: Reduction of fugitive dust emissions.	**Training.** Continue to train all employees in environmental compliance. Training will be by means of the screening of an environmental DVD, followed by a power point presentation. The training programme will be revised in 2011. An addition to this will be a section on compliance with our Archaeological Codes of practice **Headland Peat Collection.** Continue with the collection of headland peat, particularly at dust sensitive locations. A new mobile Haku Harvestor was delivered in 2008 and is currently being commissioned for use in the 2011 production season.
Project 2: Waste Management	**Waste Streamlining.** Continue to use AES as a waste management provider. Using their expertise in identifying potential recyclers of waste streams generated. A key account manager from AES Nenagh to be provided for Littleton. The service will include the issuing of quarterly waste quantity reports.

Project 3: Minimisation of Suspended Solids.	**Training.** Continue to train all employees in environmental compliance. Training will be by means of the screening of an environmental DVD, followed by a power point presentation. The training programme will be revised in 2011. An addition to this will be a section on compliance with our Archaeological Codes of practice
Project 4: Effective spill leak management of mobile fuelling units.	**Research and Development.** Littleton is currently carrying out a review of its refuelling operations, so as to improve its bunding arrangements. The results of this will be included in this EMP in 2011.
Project 5: Collection storage and reuse of polyethylene.	**Identify Recyclers.** Continue with the recycling of polyethylene. The sourcing of more recycling contractors will be ongoing.
Project 6: Energy Management.	**Review of Energy Aspects** As part of an energy management process, a review of the factories energy aspects took place. A similar exercise will take place identifying the significant energy users in relation to bog operations.

3.3 Environmental Expenditure

Environmental Expenditure 2010	
Description	**Cost €**
Capital Costs	€551,500
Silt Control	€119,112
Analytical & Consultancy Costs	€38,150
EPA Fees	€11,030
Bog Rehabilitation	€34,970
Total	**€754,762**

4.0 Licence Specific Reports

4.1 Surface Water Discharge Monitoring Location Programme Review

The programme has operated satisfactorily. It is proposed to continue at the same locations in 2011.

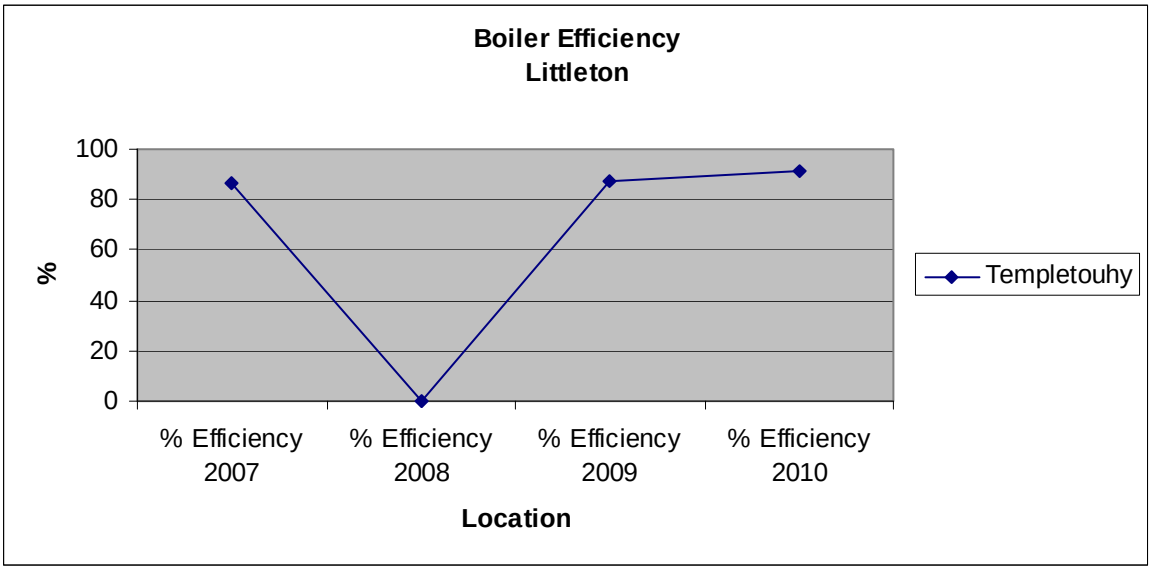
4.2 Bunding Programme

Bund Locations & Numbers Littleton Works					
IPPC Licence: P0499-01					
Location	**Bund Number**	**Last Tested**	**Status Pass/Fail**	**Repair Date**	**Next Test Due**
Lanespark Bund	499-13-01	Dec-09	Pass	N/A	Dec-11
Firelighter Farm Bund	499-13-02	Feb-10	Pass	N/A	Feb-12
Factory Bund	499-13-03	Dec-09	Pass	N/A	Dec-11
Templetouhy Bund	499-13-04	Dec-09	Pass	N/A	Dec-11
Chemical 1	499-13-05	Dec-09	Pass	N/A	Dec-11
Chemical 2	499-13-06	Dec-09	Pass	N/A	Dec-11

All bunds in the licence area were tested and passed in 2009. There was no bund integrity testing in 2010. The next program of testing is due to commence in December 2011 as per the table above.

4.3 Boiler Combustion Efficiency

Boiler Emissions 2010				
Licence: P0499-01				
Works: Littleton				
Boiler Location	**% Efficiency 2007**	**% Efficiency 2008**	**% Efficiency 2009**	**% Efficiency 2010**
Templetouhy	86.75	0	87.5	91



4.4 Resource Consumption

Resource Consumption 2010			
Licence: P0499-01			
Works: Littleton			
Product	**Tonnes Produced**	**Tonnes Sold**	**Customer**
Milled Peat	347846	286153	Littleton Briquette Factory
Turf	5500	3355	Public / Domestic
Totals	**353346**	**289508**	

Proposed Production 2011	
Licence: P0499-01	
Works: Littleton	
Product	**Proposed Target**
Milled Peat	270,000
Turf	4000
Totals	**274000**

4.5 De-silting Programme Report

The cleaning roster is based on the fortnightly inspection of ponds. These inspections dictated which ponds required cleaning.

The Silt Pond Cleaning Programme Review is contained in Appendix 5.

4.6 Bog development and Operational Programme.

Initial drainage works were completed at Templetouhy sod and Bawnmore bogs. Works included outfall excavation and the installation of a new pump and associated pipe work.

4.7 Bog Rehabilitation

With regard to decommissioning, historic polyethylene was removed for recycling from both Popes and Kileens bogs. This was part of the ongoing polyethylene removal.

During 2010, sites surveyed in the Littleton Group included Knockahaw Bog and Doire Bhille wetland. Habitat maps and reports have been outlined for both sites. The site at Doire Bhile is of particular interest due to the presence of a population of Marsh Fritillary. The site will continue to be monitored. The ecology survey will continue for Littleton in 2011. Consultation with local community groups, NPWS and Tipperary Heritage Forum is ongoing.

4.8 Archaeological Report.

Excavations took place in Killeens, Longford Pass and Inchirourke Bogs in 2010, on Toghers, Trackways and a possible animal trap. All excavations were undertaken by Archaeological Development Services under licence from the Department of the Environment

4.9 Energy Efficiency Audit Report Summary.

A comprehensive energy efficiency audit was carried out in 2010 by Capstone Energy Management. The full report is retained on file.

5.0 Summary

The Environmental Management Programme has been implemented throughout the group, operating procedures have been put in place, and training has been provided for all personnel involved in compliance with the licence.

Littleton continued to improve operations through the purchase of new machinery, to ensure continued reductions in suspended solids. The bunding programme was extended by increasing barrel bund capacity and ordering a second self bunded rail bowser cum service wagon.

A new project that was initiated for 2010, namely to demonstrate the effective reuse of the peat /ash from the factory settling ponds, this will be implemented in 2011.

Bord na Mona Energy Ltd are represented on the Management Group of both the Shannon River and Eastern River Basin District Management Systems, set up under the Water Framework Directive, and on the Steering Group of the Catchment Management on the River Barrow.

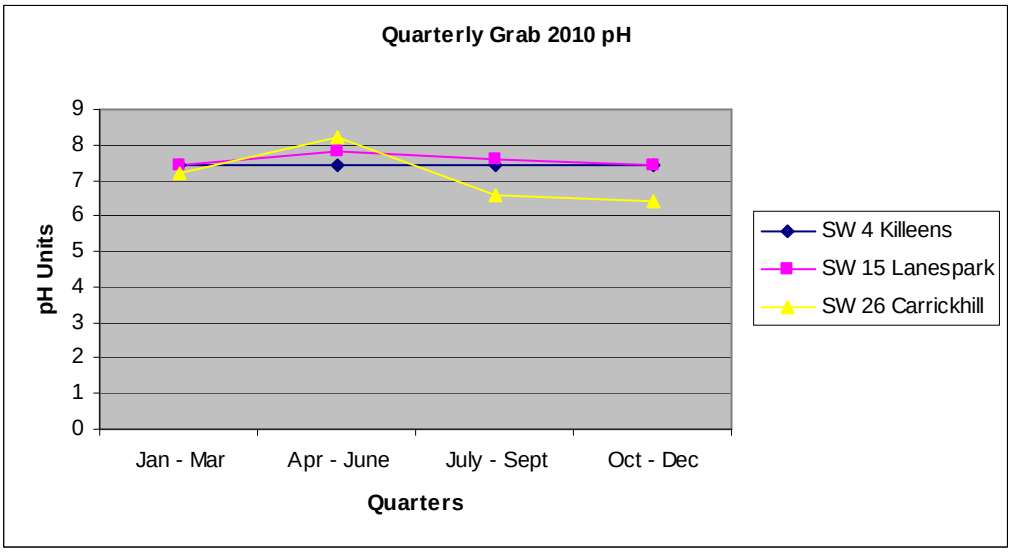
Bord na Mona Fuels Ltd would like to take this opportunity to advise the Environmental Protection Agency of its continued commitment to improving its environmental performance by adopting cleaner production methods and improving its environmental protection measures.

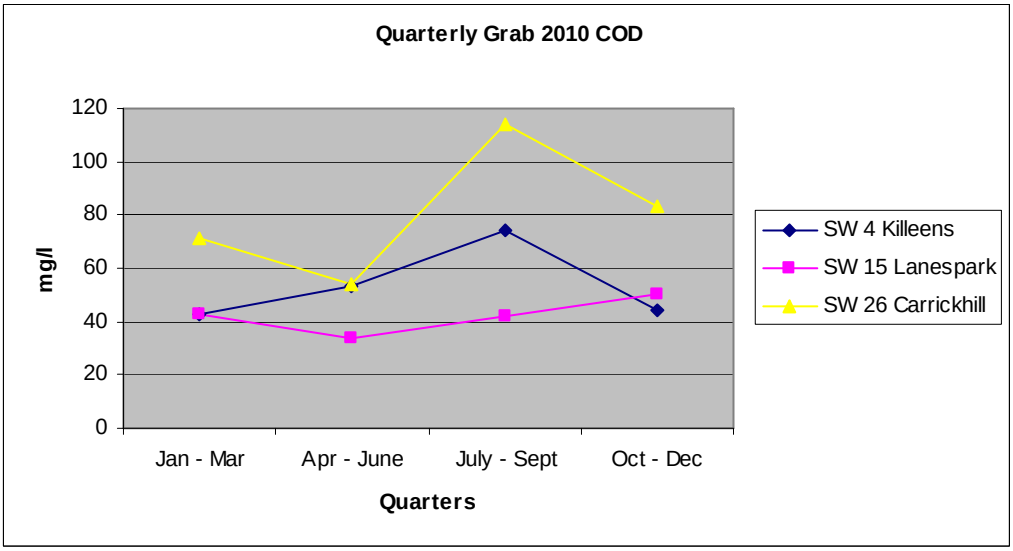
APPENDIX 1

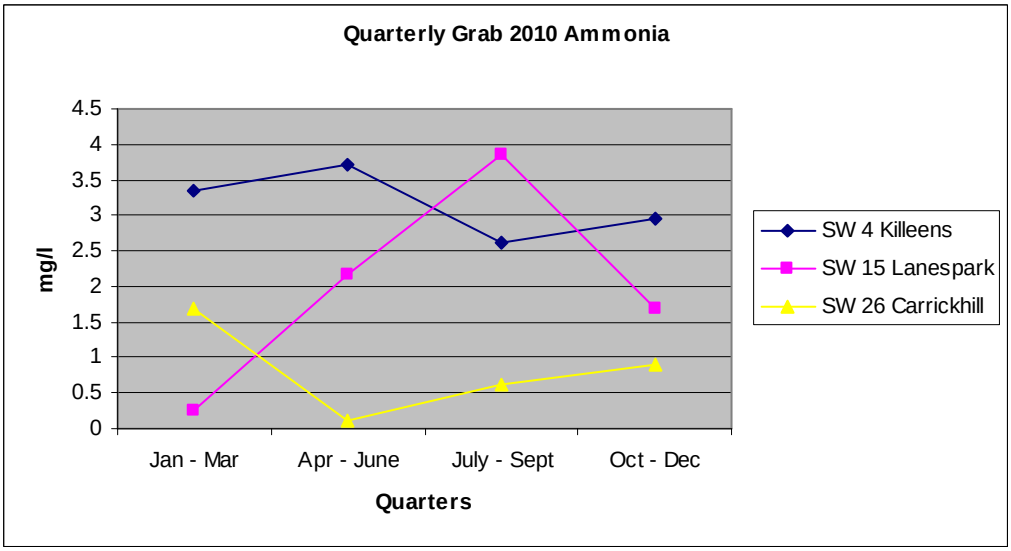
Surface Water Discharge
Monitoring Results
Bogs

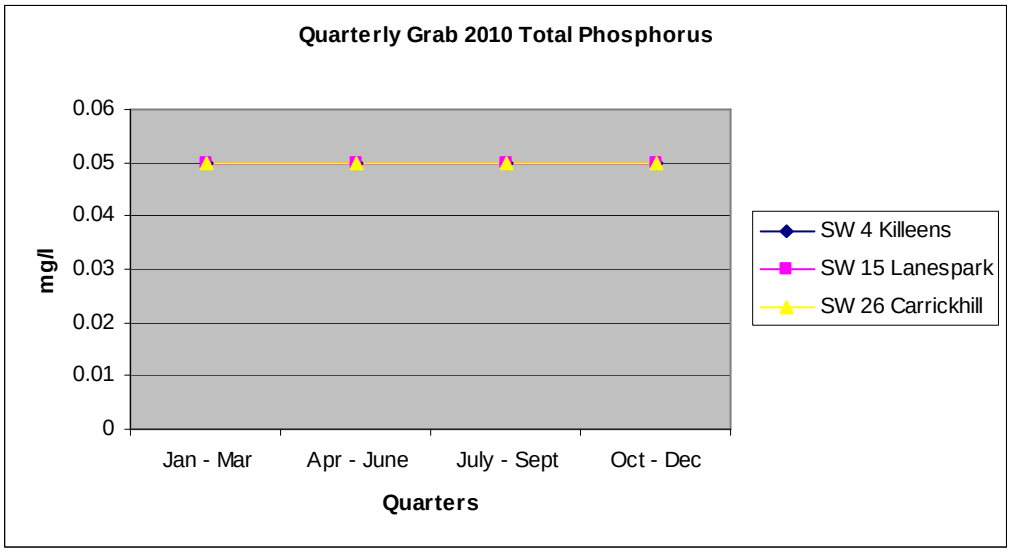
BNM Group:	Littleton		Quarterly Grabs	
IPPC Licence No.	PO499-01		Year	2010
pH (units)				
	Jan - Mar	Apr - June	July - Sept	Oct - Dec
SW 4 Killeens	7.4	7.4	7.4	7.4
SW 15 Lanespark	7.4	7.8	7.6	7.4
SW 26 Carrickhill	7.2	8.2	6.6	6.4
COD (mg/l)				
	Jan - Mar	Apr - June	July - Sept	Oct - Dec
SW 4 Killeens	43	53	74	44
SW 15 Lanespark	43	34	42	50
SW 26 Carrickhill	71	54	114	83
Ammonia as N (mg/l)				
	Jan - Mar	Apr - June	July - Sept	Oct - Dec
SW 4 Killeens	3.36	3.7	2.61	2.96
SW 15 Lanespark	0.24	2.17	3.84	1.68
SW 26 Carrickhill	1.68	0.12	0.61	0.91
Total Phosphorus (mg/l)				
	Jan - Mar	Apr - June	July - Sept	Oct - Dec
SW 4 Killeens	0.05	0.05	0.05	0.05
SW 15 Lanespark	0.05	0.05	0.05	0.05
SW 26 Carrickhill	0.05	0.05	0.05	0.05
Suspended Solids (mg/l)				
	Jan - Mar	Apr - June	July - Sept	Oct - Dec
SW 4 Killeens	5	15	6	5
SW 15 Lanespark	5	30	7	5
SW 26 Carrickhill	11	14	5	23
Total Solids (mg/l)				
	Jan - Mar	Apr - June	July - Sept	Oct - Dec
SW 4 Killeens	134	294	225	184
SW 15 Lanespark	240	496	294	204
SW 26 Carrickhill	134	702	134	146
Colour (pt Co Units)				
	Jan - Mar	Apr - June	July - Sept	Oct - Dec
SW 4 Killeens	153	99	134	169
SW 15 Lanespark	157	71	89	164
SW 26 Carrickhill	256	57	438	216
Flow (l/s)				
	Jan - Mar	Apr - June	July - Sept	Oct - Dec
SW 4 Killeens	0	9.3	7.2	14.2
SW 15 Lanespark	0	13.3	13.3	18.6
SW 26 Carrickhill	0.0	5.1	4.1	5.7

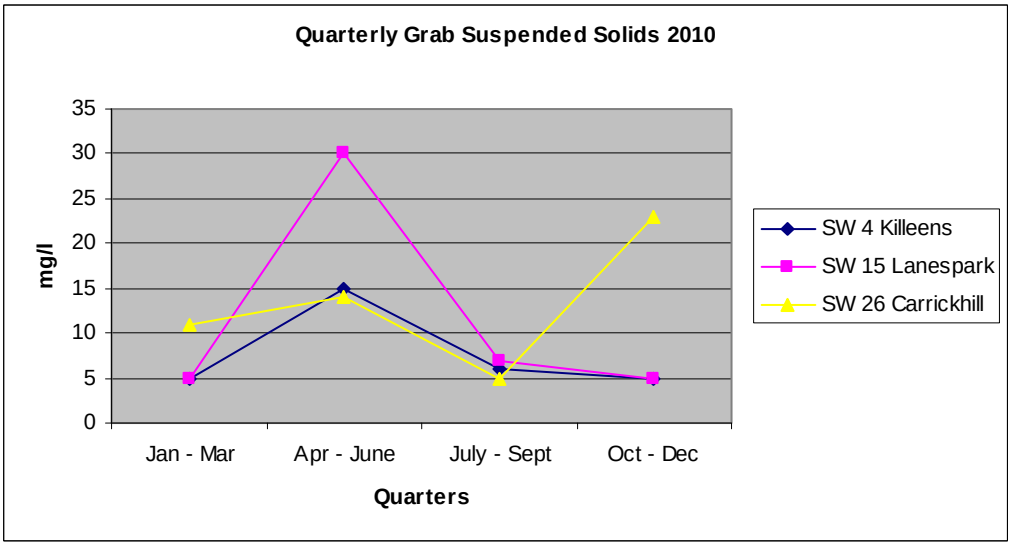
Note: Due to flood conditions access issues prevented the recording of flow during the first quarter monitoring event 2010.

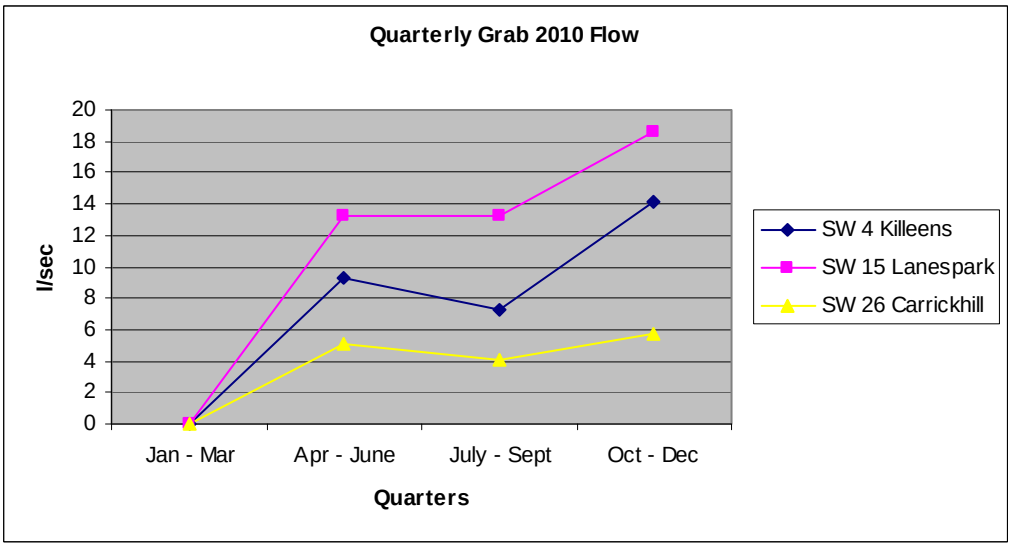

Quarterly Grab 2010 pH
pH Units
9
8
7
6
5
4
3
2
1
0
Jan - Mar
Apr - June
July - Sept
Oct - Dec
Quarters
SW 4 Killeens
SW 15 Lanespark
SW 26 Carrickhill


Quarterly Grab 2010 COD
mg/l
120
100
80
60
40
20
0
Jan - Mar
Apr - June
July - Sept
Oct - Dec
Quarters
SW 4 Killeens
SW 15 Lanespark
SW 26 Carrickhill


Quarterly Grab 2010 Ammonia
mg/l
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
Jan - Mar
Apr - June
July - Sept
Oct - Dec
Quarters
SW 4 Killeens
SW 15 Lanespark
SW 26 Carrickhill


Quarterly Grab 2010 Total Phosphorus
0.06
0.05
0.04
0.03
0.02
0.01
0
mg/l
Jan - Mar
Apr - June
July - Sept
Oct - Dec
Quarters
SW 4 Killeens
SW 15 Lanespark
SW 26 Carrickhill


Quarterly Grab Suspended Solids 2010
35
30
25
20
15
10
5
0
mg/l
Jan - Mar
Apr - June
July - Sept
Oct - Dec
Quarters
SW 4 Killeens
SW 15 Lanespark
SW 26 Carrickhill

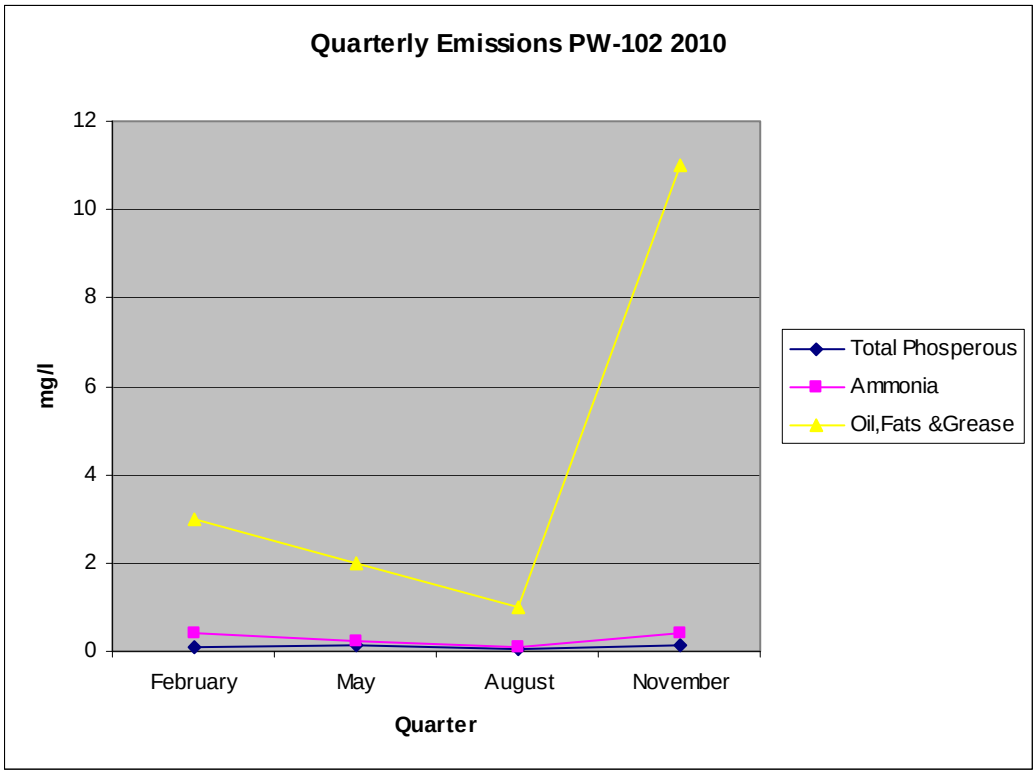

Quarterly Grab 2010 Flow
20
18
16
14
12
10
8
6
4
2
0
l/sec
Jan - Mar
Apr - June
July - Sept
Oct - Dec
Quarters
SW 4 Killeens
SW 15 Lanespark
SW 26 Carrickhill

APPENDIX 2

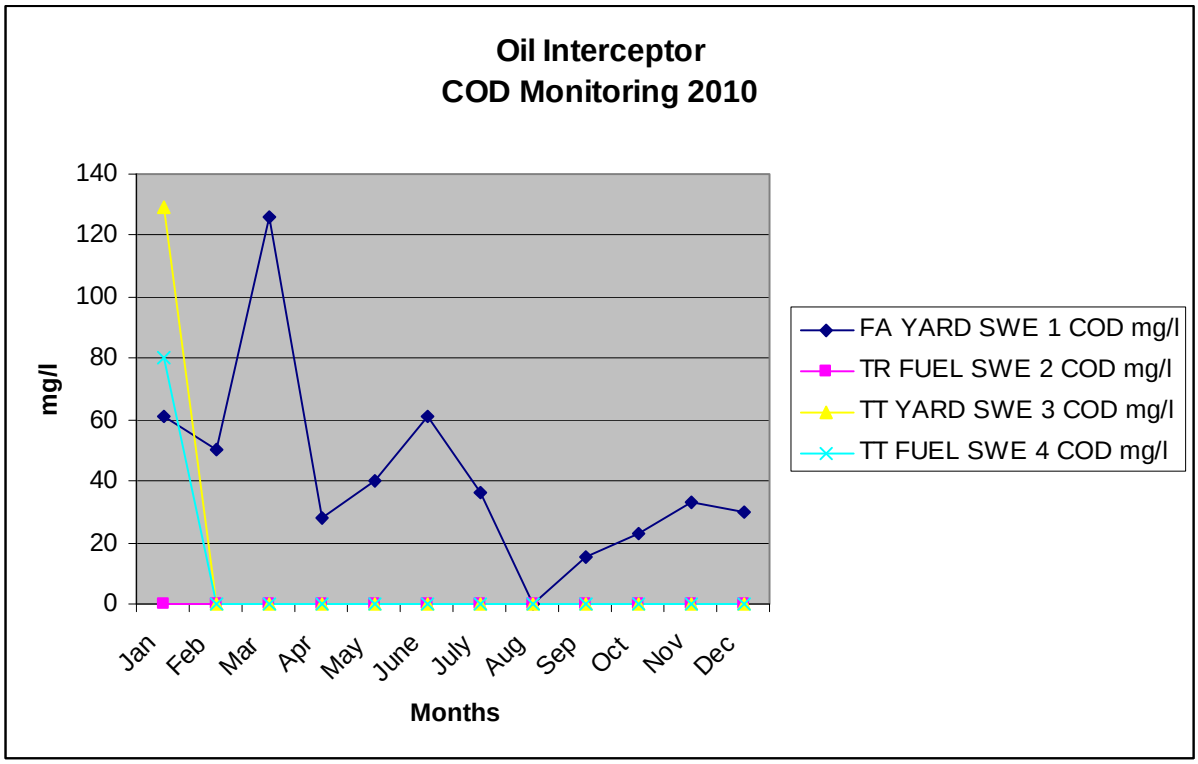
Surface Water Discharge Monitoring Results

Yards

Quarterly Emissions to Water PW - 102 2010			
Works: Littleton			
IPPC: 499			
Quarter	**Total Phosperous**	**Ammonia**	**Oil,Fats &Grease**
February	0.11	0.42	3
May	0.13	0.23	2
August	0.05	0.09	1
November	0.15	0.39	11



Oil Interceptor Results				
Licence No: P0499-01				
YEAR: 2010				
LOCATION	**FA YARD**	**TR FUEL**	**TT YARD**	**TT FUEL**
Month	**SWE 1 COD mg/l**	**SWE 2 COD mg/l**	**SWE 3 COD mg/l**	**SWE 4 COD mg/l**
Jan	61	0	129	80
Feb	50	0	0	0
Mar	126	0	0	0
Apr	28	0	0	0
May	40	0	0	0
June	61	0	0	0
July	36	0	0	0
Aug	0	0	0	0
Sep	15	0	0	0
Oct	23	0	0	0
Nov	33	0	0	0
Dec	30	0	0	0
Note: 0 Denotes no flow on day of sampling				



Note: See main body of report in relation to missing data.

APPENDIX 3

Surface Water Discharge Monitoring Results Composite

Month				Parameters							Daily Totals		
Jan-10	pH	COD	Ammonia as	Total	Suspended	Total	Colour	Flow	COD	Ammonia as	Total	Suspended	Total
SW	22	mg/l	N mg/l	Phosphorus	Solids	Solids	Pt Co	Daily	Kg/Day	Kg/Day	Phosphorus	Solids	Solids
22				mg/l	mg/l	mg/l	units	Total (litres)			Kg/Day	Kg/Day	Kg/Day
1					0	0		8437565				0.00	0.00
2					0	0		8197200				0.00	0.00
3					0	0		5552841				0.00	0.00
4					0	0		4755197				0.00	0.00
5					0	0		4281206				0.00	0.00
6					0	0		4308855				0.00	0.00
7					0	0		5537462				0.00	0.00
8					0	0		0				0.00	0.00
9					0	0		0				0.00	0.00
10					0	0		0				0.00	0.00
11					0	0		0				0.00	0.00
12					0	0		0				0.00	0.00
13					27	256		0				0.00	0.00
14					7	256		5452445				38.17	1395.83
15					29	310		12459				0.36	3.86
16					6	304		-143614				-0.86	-43.66
17					9	208		-1165795				-10.49	-242.49
18					30	344		-1036541				-31.10	-356.57
19	7.6	64	0.26	0.05	10	318	170	-804574	-51.49	-0.21	-0.04	-8.05	-255.85
20					5	194		-8709				-0.04	-1.69
21					5	382		2968186				14.84	1133.85
22					5	260		8197114				40.99	2131.25
23					5	274		10126940				50.63	2774.78
24					5	332		7464787				37.32	2478.31
25					5	358		5595782				27.98	2003.29
26	7.9	51	0.1	0.05	5	361	114	4896288	249.71	0.49	0.24	24.48	1767.56
27					5	434		4306003				21.53	1868.81
28					5	404		4276109				21.38	1727.55
29					6	404		4586890				27.52	1853.10
30					9	346		4645987				41.81	1607.51
31					10	348		4279651				42.80	1489.32

Month				Parameters							Daily Totals		
Feb-10	pH	COD	Ammonia as	Total	Suspended	Total	Colour	Flow	COD	Ammonia as	Total	Suspended	Total
SW	22	mg/l	N mg/l	Phosphorus	Solids	Solids	Pt Co	Daily	Kg/Day	Kg/Day	Phosphorus	Solids	Solids
22				mg/l	mg/l	mg/l	units	Total (litres)			Kg/Day	Kg/Day	Kg/Day
1					6	410		3884717				23.31	1592.73
2	8	43	0.12	0.05	5	436		3620074				18.10	1578.35
3					5	372		3905021				19.53	1452.67
4					5	352		4857408				24.29	1709.81
5					5	264		5648573				28.24	1491.22
6					5	290		10359360				51.80	3004.21
7					5	324		8594553				42.97	2784.64
8					5	325		6192547				30.96	2012.58
9	7.9	56	0.09	0.05	5	392	125	5291309	296.31	0.48	0.26	26.46	2074.19
10					5	414		4246387				21.23	1758.00
11					5	400		3734467				18.67	1493.79
12					5	440		3397507				16.99	1494.90
13					5	427		3167942				15.84	1352.71
14					5	430		3065645				15.33	1318.23
15					5	424		2755901				13.78	1168.50
16	8.1	79	0.04	0.05	5	424	79	2887315	228.10	0.12	0.14	14.44	1224.22
17					14	207		2867616				40.15	593.60
18					10	208		2566771				25.67	533.89
19					24	258		2436826				58.48	628.70
20					6	206		2436566				14.62	501.93
21					10	200		2430864				24.31	486.17
22					15	196		2407190				36.11	471.81
23	8.1	47	0.08	0.05	20	280	71	2396390	112.63	0.19	0.12	47.93	670.99
24					5	418		2323382				11.62	971.17
25					5	410		2682288				13.41	1099.74
26					5	390		3455309				17.28	1347.57
27					10	388		3095107				30.95	1200.90
28					5	415		2647210				13.24	1098.59

Mar-10	pH	COD	Ammonia as	Total	Suspended	Total	Colour	Flow	COD	Ammonia as	Total	Suspended	Total
SW	22	mg/l	N mg/l	Phosphorus	Solids	Solids	Pt Co	Daily	Kg/Day	Kg/Day	Phosphorus	Solids	Solids
22				mg/l	mg/l	mg/l	units	Total (litres)			Kg/Day	Kg/Day	Kg/Day
1					13	414		2521066				32.77	1043.72
2	8	40	1.48	0.05	5	456	68	2507414	100.30	3.71	0.13	12.54	1143.38
3					5	468		2093818				10.47	979.91
4					5	440		2388010				11.94	1050.72
5					8	396		2474842				19.80	980.04
6					5	436		2255558				11.28	983.42
7					5	416		1961194				9.81	815.86
8					16	458		1792800				28.68	821.10
9	8	29		0.05	11	444	60	1726099	50.06	0.00	0.09	18.99	766.39
10					5	400		1642637				8.21	657.05
11					8	448		1554595				12.44	696.46
12					5	428		1602634				8.01	685.93
13					5	438		1549152				7.75	678.53
14					5	446		1560730				7.80	696.09
15					8	442		1511395				12.09	668.04
16	7.9	28	0.04	0.05	13	448	49	1385165	38.78	0.06	0.07	18.01	620.55
17					10	418		1256774				12.57	525.33
18					9	410		1264464				11.38	518.43
19					5	400		1284336				6.42	513.73
20					5	432		1245456				6.23	538.04
21					5	424		1600733				8.00	678.71
22					5	398		1549843				7.75	616.84
23	8.3	34	0.05	0.05	5	424	63	1686528	57.34	0.08	0.08	8.43	715.09
24					7	51		1627862				11.40	83.02
25					5	236		2045952				10.23	482.84
26					5	322		2814653				14.07	906.32
27					5	274		2984774				14.92	817.83
28					40	134		2377987				95.12	318.65
29					22	150		1910131				42.02	286.52
30	7.5	88	0.45	0.07	21	108	244	2718230	239.20	1.22	0.19	57.08	293.57
31					5	56		11807860				59.04	661.24

Apr-10	pH	COD	Ammonia as	Total	Suspended	Total	Colour	Flow	COD	Ammonia as	Total	Suspended	Total
SW	22	mg/l	N mg/l	Phosphorus	Solids	Solids	Pt Co	Daily	Kg/Day	Kg/Day	Phosphorus	Solids	Solids
22				mg/l	mg/l	mg/l	units	Total (litres)			Kg/Day	Kg/Day	Kg/Day
1					5	194		11508480				57.54	2232.65
2					5	240		11658820				58.29	2798.12
3					5	287		10255680				51.28	2943.38
4					5	306		8722080				43.61	2668.96
5					5	366		6868541				34.34	2513.89
6	8	51	0.08	0.05	5	348	150	7076333	360.89	0.57	0.35	35.38	2462.56
7					5	270		11146470				55.73	3009.55
8					5	324		11529220				57.65	3735.47
9					5	354		7257427				36.29	2569.13
10					5	394		6261494				31.31	2467.03
11					5	429		5502211				27.51	2360.45
12					5	450		4754074				23.77	2139.33
13	8	29	0.1	0.05	5	448	81	4016391	116.48	0.40	0.20	20.08	1799.34
14					5	462		3679949				18.40	1700.14
15					5	435		3533587				17.67	1537.11
16					5	446		3464553				17.32	1545.19
17					5	464		3395866				16.98	1575.68
18					5	452		3344544				16.72	1511.73
19					5	440		3396384				16.98	1494.41
20	8.1	21	0.06	0.05	5	448	53	3468701	72.84	0.21	0.17	17.34	1553.98
21					13	448		3522355				45.79	1578.02
22					5	434		3516134				17.58	1526.00
23					8	446		3473626				27.79	1549.24
24					6	450		3412800				20.48	1535.76
25					5	428		3053549				15.27	1306.92
26					5	442		2970173				14.85	1312.82
27	8.2	28	0.04	0.05	5	452	47	2453674	68.70	0.10	0.12	12.27	1109.06
28					8	425		2300832				18.41	977.85
29					5	424		2306707				11.53	978.04
30					8	414		2155853				17.25	892.52

May-10	pH	COD	Ammonia as	Total	Suspended	Total	Colour	Flow	COD	Ammonia as	Total	Suspended	Total
SW	22	mg/l	N mg/l	Phosphorus	Solids	Solids	Pt Co	Daily	Kg/Day	Kg/Day	Phosphorus	Solids	Solids
22				mg/l	mg/l	mg/l	units	Total (litres)			Kg/Day	Kg/Day	Kg/Day
1					9	426		2107469				18.97	897.78
2					5	430		2395958				11.98	1030.26
3					9	426		2478298				22.30	1055.75
4	7.8	24	0.05	0.05	9	412	78	2050618	49.21	0.10	0.10	18.46	844.85
5					5	397		1983571				9.92	787.48
6					5	400		1909094				9.55	763.64
7					5	398		1923869				9.62	765.70
8					5	404		1858723				9.29	750.92
9					5	400		1752019				8.76	700.81
10					5	394		1569974				7.85	618.57
11	8.3	26	0.03	0.05	26	400	89	1386893	36.06	0.04	0.07	36.06	554.76
12					5	411		1247530				6.24	512.73
13					5	408		1260662				6.30	514.35
14					5	408		1193184				5.97	486.82
15					9	412		1229126				11.06	506.40
16					5	412		1044662				5.22	430.40
17					5	416		1018742				5.09	423.80
18	8.2	23	0.03	0.05	17	414	51	931738	21.43	0.03	0.05	15.84	385.74
19					16	380		912557				14.60	346.77
20					24	384		1006387				24.15	386.45
21					21	372		868147				18.23	322.95
22					17	374		763940				12.99	285.71
23					28	434		656882				18.39	285.09
24					27	402		601707				16.25	241.89
25	8.3	41	0.02	0.05	27	376	42	515272	21.13	0.01	0.03	13.91	193.74
26					12	390		383996				4.61	149.76
27					7	294		227042				1.59	66.75
28					7	410		247614				1.73	101.52
29					5	400		294494				1.47	117.80
30					6	460		507289				3.04	233.35
31					16	431		464884				7.44	200.37

Jun-10	pH	COD	Ammonia as	Total	Suspended	Total	Colour	Flow	COD	Ammonia as	Total	Suspended	Total
SW	22	mg/l	N mg/l	Phosphorus	Solids	Solids	Pt Co	Daily	Kg/Day	Kg/Day	Phosphorus	Solids	Solids
22				mg/l	mg/l	mg/l	units	Total (litres)			Kg/Day	Kg/Day	Kg/Day
1	8.3	40	0.06	0.05	6	416	63	331456	13.26	0.02	0.02	1.99	137.89
2					5	243		834538				4.17	202.79
3					18	382		571095				10.28	218.16
4					15	330		346645				5.20	114.39
5					5	368		263909				1.32	97.12
6					5	382		242516				1.21	92.64
7					7	404		382977				2.68	154.72
8	8.4	37	0.02	0.05	9	404	57	385897	14.28	0.01	0.02	3.47	155.90
9					0	0		457574				0.00	0.00
10					0	0		307074				0.00	0.00
11					0	0		224761				0.00	0.00
12					0	0		168540				0.00	0.00
13					0	0		102790				0.00	0.00
14					0	0		73207				0.00	0.00
15					0	0		55849				0.00	0.00
16					0	0		213840				0.00	0.00
17					0	0		187350				0.00	0.00
18					0	0		187350				0.00	0.00
19					0	0		81648				0.00	0.00
20					0	0		5875				0.00	0.00
21					0	0		11854				0.00	0.00
22					0	0		16874				0.00	0.00
23					0	0		10594				0.00	0.00
24					0	0		0				0.00	0.00
25					0	0		0				0.00	0.00
26					0	0		0				0.00	0.00
27					0	0		0				0.00	0.00
28					0	0		0				0.00	0.00
29					0	0		0				0.00	0.00
30					0	0		0				0.00	0.00

Jul-10	pH	COD	Ammonia as	Total	Suspended	Total	Colour	Flow	COD	Ammonia as	Total	Suspended	Total
SW	22	mg/l	N mg/l	Phosphorus	Solids	Solids	Pt Co	Daily	Kg/Day	Kg/Day	Phosphorus	Solids	Solids
22				mg/l	mg/l	mg/l	units	Total (litres)			Kg/Day	Kg/Day	Kg/Day
1					0	0		0				0.00	0.00
2					0	0		0				0.00	0.00
3					0	0		0				0.00	0.00
4					0	0		0				0.00	0.00
5					0	0		0				0.00	0.00
6					0	0		0				0.00	0.00
7					0	0		0				0.00	0.00
8					0	0		0				0.00	0.00
9					0	0		0				0.00	0.00
10					0	0		0				0.00	0.00
11					0	0		0				0.00	0.00
12					0	0		0				0.00	0.00
13					0	0		0				0.00	0.00
14					0	0		0				0.00	0.00
15					0	0		0				0.00	0.00
16					0	0		263036				0.00	0.00
17					0	0		2990131				0.00	0.00
18					0	0		2571955				0.00	0.00
19					0	0		1609546				0.00	0.00
20					0	0		1935014				0.00	0.00
21					5	250		1971562				9.86	492.89
22					5	262		1495843				7.48	391.91
23					5	250		1062547				5.31	265.64
24					6	268		507444				3.04	135.99
25					5	280		229781				1.15	64.34
26					5	250		198798				0.99	49.70
27	7.7	79	0.02	0.05	5	262	268	171590	13.56	0.00	0.01	0.86	44.96
28					31	366		181526				5.63	66.44
29					62	404		93606				5.80	37.82
30					82	422		88525				7.26	37.36
31					115	458		74408				8.56	34.08

Aug-10	pH	COD	Ammonia as	Total	Suspended	Total	Colour	Flow	COD	Ammonia as	Total	Suspended	Total
SW	22	mg/l	N mg/l	Phosphorus	Solids	Solids	Pt Co	Daily	Kg/Day	Kg/Day	Phosphorus	Solids	Solids
22				mg/l	mg/l	mg/l	units	Total (litres)			Kg/Day	Kg/Day	Kg/Day
1					85	436		36737	0.00	0.00	0.00	3.12	16.02
2					96	444		24477	0.00	0.00	0.00	2.35	10.87
3	8	68	0.1	0.08	60	434	104	19760	1.34	0.00	0.00	1.19	8.58
4					0	0		31709	0.00	0.00	0.00	0.00	0.00
5					0	0		651326	0.00	0.00	0.00	0.00	0.00
6					0	0		628543				0.00	0.00
7					0	0		875318				0.00	0.00
8					0	0		495634				0.00	0.00
9					0	0		-16554				0.00	0.00
10					0	0		6304263				0.00	0.00
11					0	0		0				0.00	0.00
12					0	0		0	0.00	0.00	0.00	0.00	0.00
13					0	0		0				0.00	0.00
14					0	0		0				0.00	0.00
15					0	0		0				0.00	0.00
16					0	0		0				0.00	0.00
17					0	0		0				0.00	0.00
18					0	0		0				0.00	0.00
19					0	0		0	0.00	0.00	0.00	0.00	0.00
20					0	0		0				0.00	0.00
21					0	0		0				0.00	0.00
22					0	0		0				0.00	0.00
23					0	0		0				0.00	0.00
24					0	0		0				0.00	0.00
25					0	0		0				0.00	0.00
26					0	0		0	0.00	0.00	0.00	0.00	0.00
27					0	0		0				0.00	0.00
28					0	0		0				0.00	0.00
29					0	0		0				0.00	0.00
30					0	0		0				0.00	0.00
31					0	0		0				0.00	0.00

Sep-10	pH	COD	Ammonia as	Total	Suspended	Total	Colour	Flow	COD	Ammonia as	Total	Suspended	Total
SW	22	mg/l	N mg/l	Phosphorus	Solids	Solids	Pt Co	Daily	Kg/Day	Kg/Day	Phosphorus	Solids	Solids
22				mg/l	mg/l	mg/l	units	Total (litres)			Kg/Day	Kg/Day	Kg/Day
1					0	0		0	0.00	0.00	0.00	0.00	0.00
2					0	0		0	0.00	0.00	0.00	0.00	0.00
3					0	0		0	0.00	0.00	0.00	0.00	0.00
4					0	0		0	0.00	0.00	0.00	0.00	0.00
5					0	0		0	0.00	0.00	0.00	0.00	0.00
6					0	0		0	0.00	0.00	0.00	0.00	0.00
7					0	0		0	0.00	0.00	0.00	0.00	0.00
8					0	0		0	0.00	0.00	0.00	0.00	0.00
9					0	0		0	0.00	0.00	0.00	0.00	0.00
10					0	0		0	0.00	0.00	0.00	0.00	0.00
11					0	0		0	0.00	0.00	0.00	0.00	0.00
12					0	0		0	0.00	0.00	0.00	0.00	0.00
13					0	0		0	0.00	0.00	0.00	0.00	0.00
14					0	0		0	0.00	0.00	0.00	0.00	0.00
15					5	290		18286560	0.00	0.00	0.00	91.43	5303.10
16					5	288		16972420	0.00	0.00	0.00	84.86	4888.06
17					5	314		12200540	0.00	0.00	0.00	61.00	3830.97
18					7	329		9325152	0.00	0.00	0.00	65.28	3067.98
19					9	354		6963408	0.00	0.00	0.00	62.67	2465.05
20					9	378		6329405	0.00	0.00	0.00	56.96	2392.52
21	8	65	0.02	0.05	10	358	171	3913488	254.38	0.08	0.20	39.13	1401.03
22					5	329		1049846	0.00	0.00	0.00	5.25	345.40
23					5	370		1613174	0.00	0.00	0.00	8.07	596.87
24					5	320		4180032	0.00	0.00	0.00	20.90	1337.61
25					5	302		3432672	0.00	0.00	0.00	17.16	1036.67
26					5	304		2534717	0.00	0.00	0.00	12.67	770.55
27					5	374		1672877	0.00	0.00	0.00	8.36	625.66
28	8.2	64	0.04	0.05	5	390	169	1471133	94.15	0.06	0.07	7.36	573.74
29					5	398		1384733	0.00	0.00	0.00	6.92	551.12
30					5	370		1254434	0.00	0.00	0.00	6.27	464.14

Oct-10	pH	COD	Ammonia as	Total	Suspended	Total	Colour	Flow	COD	Ammonia as	Total	Suspended	Total
SW	22	mg/l	N mg/l	Phosphorus	Solids	Solids	Pt Co	Daily	Kg/Day	Kg/Day	Phosphorus	Solids	Solids
22				mg/l	mg/l	mg/l	units	Total (litres)			Kg/Day	Kg/Day	Kg/Day
1					5	412		1031530				5.16	424.99
2					5	411		1212192				6.06	498.21
3					5	424		2479421				12.40	1051.27
4					5	414		2601072				13.01	1076.84
5	8.3	42	0.04	0.05	5	380	114	2169418	91.12	0.09	0.11	10.85	824.38
6					5	420		1561334				7.81	655.76
7					5	444		1447718				7.24	642.79
8					5	424		1373501				6.87	582.36
9					5	424		1372291				6.86	581.85
10					5	453		1102032				5.51	499.22
11					5	380		1085530				5.43	412.50
12	8.3	52	0.26	0.05	5	422	100	1010275	52.53	0.26	0.05	5.05	426.34
13					5	460		918864				4.59	422.68
14					5	454		877219				4.39	398.26
15					5	460		832654				4.16	383.02
16					5	464		759672				3.80	352.49
17					5	468		685610				3.43	320.87
18					5	460		696375				3.48	320.33
19	8.4	42	0.06	0.05	5	468	77	705154	29.62	0.04	0.04	3.53	330.01
20					5	438		613077				3.07	268.53
21					5	446		549945				2.75	245.28
22					5	444		537486				2.69	238.64
23					5	442		710389				3.55	313.99
24					5	444		729363				3.65	323.84
25					5	432		595892				2.98	257.43
26	8.3	24	0.04	0.05	5	404	58	653167	15.68	0.03	0.03	3.27	263.88
27					26	374		858807				22.33	321.19
28					41	338		871430				35.73	294.54
29					17	162		3261946				55.45	528.44
30					76	378		9091872				690.98	3436.73
31					23	218		6349968				146.05	1384.29

Nov-10	pH	COD	Ammonia as	Total	Suspended	Total	Colour	Flow	COD	Ammonia as	Total	Suspended	Total
SW	22	mg/l	N mg/l	Phosphorus	Solids	Solids	Pt Co	Daily	Kg/Day	Kg/Day	Phosphorus	Solids	Solids
22				mg/l	mg/l	mg/l	units	Total (litres)			Kg/Day	Kg/Day	Kg/Day
1					15	194		6818515				102.28	1322.79
2	7.8	69	0.3	0.05	52	348	158	5472490	377.60	1.64	0.27	284.57	1904.43
3					5	316		6772205				33.86	2140.02
4					5	274		7343309				36.72	2012.07
5					5	298		8181562				40.91	2438.11
6					5	272		5732726				28.66	1559.30
7					5	256		4621622				23.11	1183.14
8					5	342		3208118				16.04	1097.18
9	7.9	89	0.12	0.05	10	122	236	3272659	291.27	0.39	0.16	32.73	399.26
10					7	425		1922227				13.46	816.95
11					5	406		2167862				10.84	880.15
12					6	400		1864166				11.18	745.67
13					10	422		1741910				17.42	735.09
14					8	444		1450829				11.61	644.17
15					5	370		80611				0.40	29.83
16	8	66	0.08	0.05	6	298	113	1228867	81.11	0.10	0.06	7.37	366.20
17					5	262		6724512				33.62	1761.82
18					5	304		6486998				32.43	1972.05
19					5	300		5094317				25.47	1528.30
20					5	336		3920141				19.60	1317.17
21					17	360		3380400				57.47	1216.94
22					6	330		3050265				18.30	1006.59
23	8	47	0.04	0.05	5	412	101	4533149	213.06	0.18	0.23	22.67	1867.66
24					5	407		6246115				31.23	2542.17
25					5	270		5526922				27.63	1492.27
26					5	460		5343062				26.72	2457.81
27					5	246		5014569				25.07	1233.58
28					11	476		4807814				52.89	2288.52
29					10	468		4675277				46.75	2188.03
30	8.1	58	0.02	0.05	32	480	102	4541011	263.38	0.09	0.23	145.31	2179.69

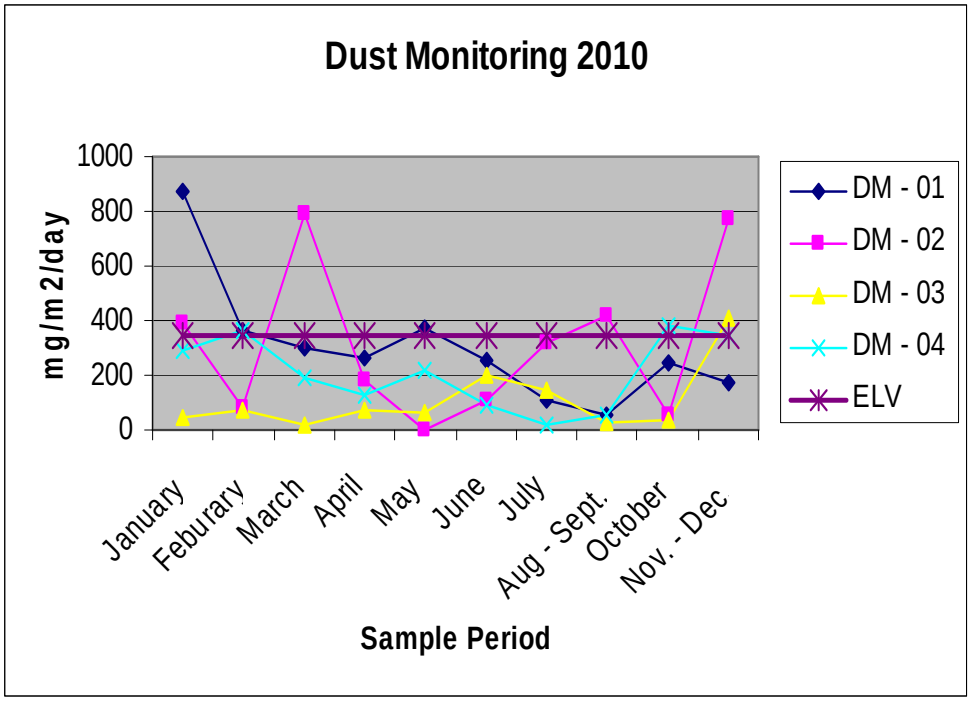
Dec-10	pH	COD	Ammonia as	Total	Suspended	Total	Colour	Flow	COD	Ammonia as	Total	Suspended	Total
SW	22	mg/l	N mg/l	Phosphorus	Solids	Solids	Pt Co	Daily	Kg/Day	Kg/Day	Phosphorus	Solids	Solids
22				mg/l	mg/l	mg/l	units	Total (litres)			Kg/Day	Kg/Day	Kg/Day
1					0	0		0				0.00	0.00
2					0	0		0				0.00	0.00
3					0	0		0				0.00	0.00
4					0	0		0				0.00	0.00
5					0	0		0				0.00	0.00
6					0	0		0				0.00	0.00
7					0	0		0				0.00	0.00
8					5	418		5837616				29.19	2440.12
9					21	302		5837616				122.59	1762.96
10					15	385		5837616				87.56	2247.48
11					5	202		5837616				29.19	1179.20
12					5	334		5837616				29.19	1949.76
13					5	394		5349888				26.749	2107.86
14	7.8	39	0.13	0.05	5	402	69	4944413	192.83	0.64	0.25	24.72	1987.65
15					0	0		4881859				0.00	0.00
16					0	0		4849891				0.00	0.00
17					0	0		5041440				0.00	0.00
18					0	0		4886093				0.00	0.00
19					0	0		4569610				0.00	0.00
20					0	0		4254077				0.00	0.00
21					0	0		3825619				0.00	0.00
22					0	0		3632688				0.00	0.00
23					0	0		3514493				0.00	0.00
24					0	0		3523738				0.00	0.00
25					0	0		3432845				0.00	0.00
26					0	0		3210019				0.00	0.00
27					0	0		5419872				0.00	0.00
28					0	0		3726432				0.00	0.00
29					18	504		6314717				113.66	3182.62
30					9	516		7332249				65.99	3783.44
31					5	398		5902980				29.51	2349.39

APPENDIX 4

Dust Monitoring Results.

Dust Monitoring Results 2010				
IPPC Licence: P0499-01				
Works: Littleton				
Sample Period	**DM - 01**	**DM - 02**	**DM - 03**	**DM - 04**
January	873	387	49	289
Feburary	361	86	69	361
March	300	790	19	191
April	261	184	77	131
May	376	0	64	217
June	252	110	200	90
July	106	318	146	20
Aug - Sept.	53	421	24	53
October	242	51	38	382
Nov. - Dec.	172	775	406	349

Note: 0 Denotes no sample taken during sampling event



Summary Results of Emissions to Atmosphere compliance monitoring from the Bord na Móna Fuels Limited Littleton Briquette Factory at Littleton (January 2010 to December 2010) in accordance with the requirements of integrated pollution control licence register no. P0499-01.

REPORT NO.: ECS3834

ATTENTION: Mr. Ray Yates
Bord na Móna Fuels Limited
c/o Littleton Briquette Factory
Thurles
Co. Tipperary

PREPARED BY: Mr. Neville Allen
Environmental Scientist

REVIEWED BY: Mr. Paul Crimmins
Environmental Scientist

DATE: January 2011

EXECUTIVE SUMMARY

AS PART OF THE REQUIREMENTS OF INTEGRATED POLLUTION CONTROL LICENCE, REGISTER NO. P0499-01, BORD NA MÓNA FUELS LIMITED ARE REQUIRED TO SUBMIT TO THE AGENCY, AN ANNUAL ENVIRONMENTAL REPORT (AER). BORD NA MÓNA TECHNICAL SERVICES WERE COMMISSIONED TO PREPARE A SUMMARY REPORT OF EMISSIONS TO ATMOSPHERE MONITORED AT THE LITTLETON BRIQUETTE FACTORY FROM THE PERIOD TO JANUARY 2010 TO DECEMBER 2010. DUE TO PRODUCTION DOWNTIME OF THE FIRE LIGHTER PLANT IN 2010, IT WAS NOT POSSIBLE TO CARRY OUT QUARTER TWO, THREE OR FOUR TOTAL ORGANIC CARBON MONITORING ON EMISSION POINT A108.

THIS REPORT IS CERTIFIED AS ACCURATE AND REPRESENTATIVE OF THE SAMPLING AND ASSOCIATED ANALYSIS CARRIED OUT.

RESPECTIVELY SUBMITTED,

MR NEVILLE ALLEN
ENVIRONMENTAL SCIENTIST

MR. PAUL CRIMMINS
ENVIRONMENTAL SCIENTIST

1.0 INTRODUCTION

A summary of IPC Licence Register No. P0499-01 environmental monitoring results from the period January 2010 to December 2010 are presented as follows:

Table 1: Quarterly Compliance Monitoring of Particulate Emissions to Atmosphere

Table 2: Summary of Quarterly Compliance Monitoring of Particulate Mass Emissions to Atmosphere

Table 3: IPC Licence Particulate Emissions to Atmosphere Emission Limit Values (ELV's)

Table 4: Annual Particulate Mass Emissions to Atmosphere

Table 5: Quarterly Compliance Monitoring of TOC (as C) Emissions to Atmosphere from Emission Point A108

Table 6: Annual TOC (as C) Emissions to Atmosphere from Emission Point A108

Appendix 1

Figures 1-6: Particulate Mass Emissions to Atmosphere (kg) (January 2010 to December 2010) vs. Licence ELV from Emissions Reference Points B101, A101-A105 respectively.

Figure 7: Summary of Particulate Mass Emissions to Atmosphere (kg) (January 2010 to December 2010) from Emissions Reference Points B101, A101-A106.

TABLE 1: QUARTERLY COMPLIANCE MONITORING OF PARTICULATE EMISSIONS TO ATMOSPHERE (JANUARY – DECEMBER 2010)						
Quarter	**Sampling Date**	**Job No.**	**Emission Point Ref.**	**Volumetric Flow (Nm^3/hr)**	**Particulates (mg/Nm^3)**	**Particulate Mass Emissions (kg/hr)**
1	23/02/10 25/02/10	ECS3574	B101	30,160	**4111.82**	124.01
			A101	**71,432**	**76.09**	5.44
			A102	**86,634**	**57.28**	4.96
			A103	4,371	369.12	1.61
			A104	**11,734**	173.53	2.04
			A105	6,686	**151.03**	1.01
			A106	**1,113**	102.33	0.11
2	26/04/10 17/05/10 18/05/10 25/05/10	ECS3644	B101	34,604	**3008.87**	104.12
			A101	**76,598**	**58.77**	4.50
			A102	**80,404**	**68.01**	5.47
			A103	4,436	207.17	0.92
			A104	11,414	104.28	1.19
			A105	6,353	2.75	0.02
			A106	**1,019**	3.79	3.86×10^{-3}
3	12/08/10 13/08/10 29/09/10	ECS3710	B101	29,062	**893**	25.95
			A101	**70,186**	**169.57**	**11.88**
			A102	**72,306**	**91.66**	**6.63**
			A103	4,657	100.76	0.47
			A104	11,164	293.11	3.27
			A105	**8,547**	19.27	0.16
			A106	**1,095**	**158.40**	0.17
4	09/11/10 10/11/10 12/11/10	ECS3788	B101	29,388	**1970**	57.89
			A101	**78,894**	**80.06**	**6.32**
			A102	**91,803**	**90.74**	**8.33**
			A103	4,320	145.96	0.63
			A104	10,477	392.09	4.11
			A105	**8,417**	2.97	0.03
			A106	**842**	30.01	0.03

TABLE 2: SUMMARY OF QUARTERLY COMPLIANCE MONITORING OF PARTICULATE MASS EMISSIONS TO ATMOSPHERE (JANUARY – DECEMBER 2010)				
Emission Point Ref.	**Particulate Mass Emissions during each Quarterly Monitoring Event (kg/hr)**			
	Quarter 1	**Quarter 2**	**Quarter 3**	**Quarter 4**
B101	124.01	104.12	26.0	57.89
A101	5.44	4.50	**11.90**	**6.32**
A102	4.96	5.47	**6.63**	**8.33**
A103	1.61	0.92	0.47	0.63
A104	2.04	1.19	3.27	4.11
A105	1.01	0.02	0.16	0.03
A106	0.11	3.9×10^{-3}	0.17	0.03

TABLE 3: IPC LICENCE PARTICULATE EMISSIONS TO ATMOSPHERE EMISSION LIMIT VALUES (ELV's)				
Emission Point Ref.	**Maximum Volumetric Flow ELV (Nm^3/hr)**	**Particulate ELV (mg/Nm^3 or kg/hr)**	**Particulate ELV (kg/hr)**	***Licensed Annual Particulate Mass Emissions (kg/yr)***
B101	36000	400 mg/Nm^3	14.4	*126144*
A101	34852	50 mg/Nm^3 >0.5kg/hr 150 mg/Nm^3 <0.5kg/hr	5.23max.	*15265* *45815max.*
A102	42400	50 mg/Nm^3 >0.5kg/hr 150 mg/Nm^3 <0.5kg/hr	6.36max.	*18571* *55714max.*
A103	5800	7 kg/hr	7	*61320*
A104	11700	6 kg/hr	6	*52560*
A105	6797	50 mg/Nm^3 >0.5kg/hr 150 mg/Nm^3 <0.5kg/hr	1.02max.	*2977* *8935 max.*
A106	660	50 mg/Nm^3 >0.5kg/hr 150 mg/Nm^3 <0.5kg/hr	0.10max.	*289.1* *876max.*
Maximum Annual Particulates Mass Emissions to Atmosphere Limit			-	*351332*

TABLE 4: ANNUAL PARTICULATE MASS EMISSIONS TO ATMOSPHERE (JANUARY – DECEMBER 2010)				
Location	**Annual Average Mass Emission (kg/hr)**	**Hours Production** (hr/year)	**Annual Particulate Mass Emissions (kg/year)**	***Licensed Annual Particulate Mass Emissions (kg/yr)***
B101	78.0	5,200	405,600	*126,144*
A101	7.04	5,200	36,608	*45,796 max.*
A102	6.35	5,200	33,020	*55,714 max.*
A103	0.91	5,200	4,732	*61,320*
A104	2.65	5,200	13,780	*52,560*
A105	0.31	5,200	1,312	*8,931 max.*
A106	0.10	5,200	520	*867 max.*
Particulate Mass Emissions to Atmosphere			495,876	*351332*

TABLE 5: QUARTERLY COMPLIANCE MONITORING OF TOC (AS C) EMISSIONS TO ATMOSPHERE FROM EMISSION POINT A108 (JANUARY – DECEMBER 2010)					
Quarter	**Sampling Date**	**Job No.**	**Volumetric Flow (Nm^3/hr)**	**TOC (as C) (mg/Nm^3)**	**TOC (as C) Mass Emissions (kg/hr)**
1	9/02/10	ECS3574	1,658	215	0.36
2	Note 1	-	-	-	-
3	Note 1	-	-	-	-
4	Note 1	-	-	-	-
IPC Licence ELV's			*6,700*	*170*	*1.14*

Note 1: Emission point A108 was not operational during this monitoring period.

TABLE 6: ANNUAL TOC (as C) MASS EMISSIONS FROM A108 (JANUARY – DECEMBER 2010)			
Annual Average Mass Emission (kg/hr)	**Hours Production (hr/year)** Note 1	**Annual Mass Emissions (kg/year)**	***Annual Mass Emissions IPC Licence ELV (kg/year)***
0.36	1,300	468	*9,986*

Note 1: Operational hours of the Firelighter plant

TABLE 7: ANNUAL COMPLIANCE MONITORING OF NO_x (as NO_2) EMISSIONS TO ATMOSPHERE FROM EMISSION POINT B101					
Frequency	**Sampling Date**	**Job No.**	**Volumetric Flow (Nm^3/hr)**	**NO_x (as NO_2) (mg/Nm^3)**	**NO_x (as NO_2) Mass Emissions (kg/hr)**
Annual	23/2/10	ECS3574	30,160	534.7	16.1
Annual	25/05/10	ECS3644	34,604	534.2	18.5
Annual	12/08/10	ECS3710	29,062	639.7	18.6
IPC Licence ELV's			*36000*	*100*	*3.6*

Note1: Results are referenced to 6% oxygen, temperature 273oK, and pressure 1013.5.

TABLE 8: ANNUAL NO_x (as NO_2) MASS EMISSIONS FROM B101			
Annual Average Mass Emission (kg/hr) Note 1	**Hours Production** (hr/year)	**Annual Mass Emissions (kg/year)**	***Annual Mass Emissions IPC Licence ELV (kg/year)***
17.74	5,200	**92,248**	*31,536*

Note 1: Based on results from three monitoring events.

TABLE 9: ANNUAL COMPLIANCE MONITORING OF SO_2 EMISSIONS TO ATMOSPHERE FROM EMISSION POINT B101					
Frequency	**Sampling Date**	**Job No.**	**Volumetric Flow (Nm^3/hr)**	**SO_2 (mg/Nm^3)**	**SO_2 Mass Emissions (kg/hr)**
Annual	23/2/10	ECS3574	30,160	412.6	12.4
Annual	25/05/10	ECS3644	34,604	728.1	25.2
Annual	12/08/10	ECS3710	29,062	196.0	5.7
IPC Licence ELV's			*36000*	*1000*	*36*

Note1: Results are referenced to 6% oxygen, temperature 273^{o}K, and pressure 1013.5

TABLE 10: ANNUAL MASS SO_2 EMISSIONS FROM B101			
Annual Average Mass Emission (kg/hr) Note 1	**Hours Production** (hr/year)	**Annual Mass Emissions (kg/year)**	***Annual Mass Emissions IPC Licence ELV (kg/year)***
43.3	5,200	225,160	*315,360*

Note 1: Based on results from three monitoring events.

TABLE 11: ANNUAL COMPLIANCE MONITORING OF CO EMISSIONS TO ATMOSPHERE FROM EMISSION POINT B101					
Annual	**Sampling Date**	**Job No.**	**Volumetric Flow (Nm^3/hr)**	**CO (mg/Nm^3)**	**CO Mass Emissions (kg/hr)**
Annual	23/2/10	ECS3574	30,160	324.3	9.8
Annual	25/05/10	ECS3644	34,604	413.9	14.3
Annual	12/08/10	ECS3710	29,062	247.3	7.2
IPC Licence ELV's			*36000*	*100*	*3.6*

Note1: Results are referenced to 6% oxygen, temperature 273^{o}K, and pressure 1013.5

TABLE 12: ANNUAL MASS CO EMISSIONS FROM B101			
Annual Average Mass Emission (kg/hr) Note 1	**Hours Production** (hr/year)	**Annual Mass Emissions (kg/year)**	***Annual Mass Emissions IPC Licence ELV (kg/year)***
10.4	5,200	54,080	*31,536*

Note 1: Based on results from three monitoring events.

APPENDIX 1

Figure 1: Particulate Mass Emissions to Atmosphere (kg/hr) (January to December 2010) vs. Licence ELV from Emissions Reference Point B101 – Data point 5 is the average yearly emission

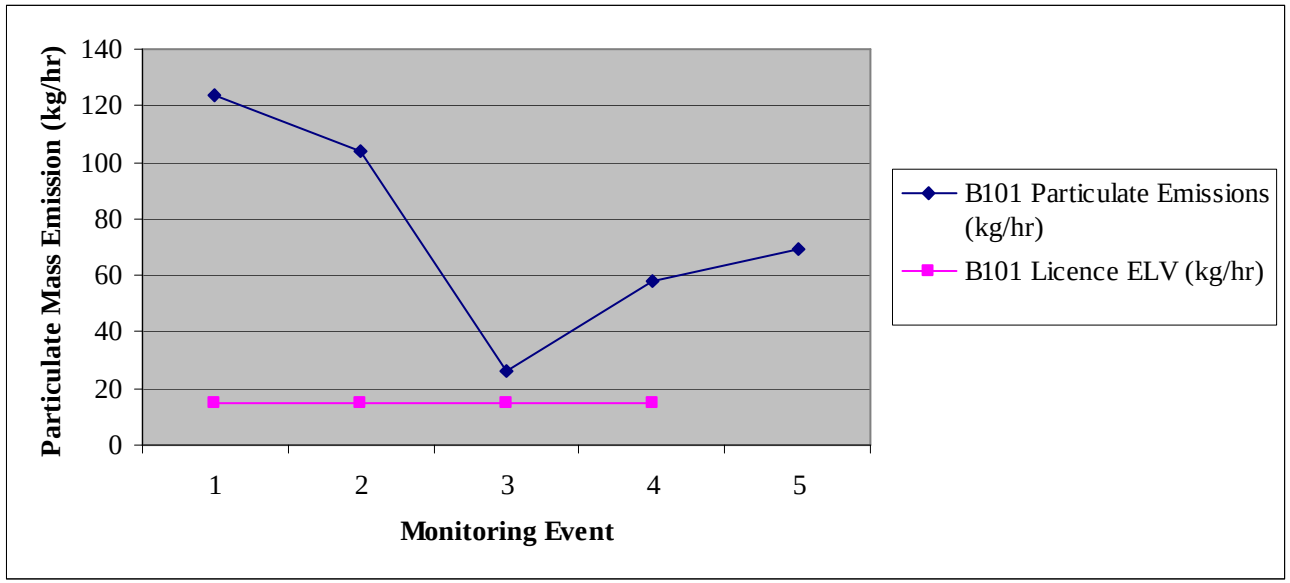


Figure 2: Particulate Mass Emissions to Atmosphere (kg/hr) (January to December 2010) vs. Licence ELV from Emissions Reference Point A101– Data point 5 is the average yearly emission

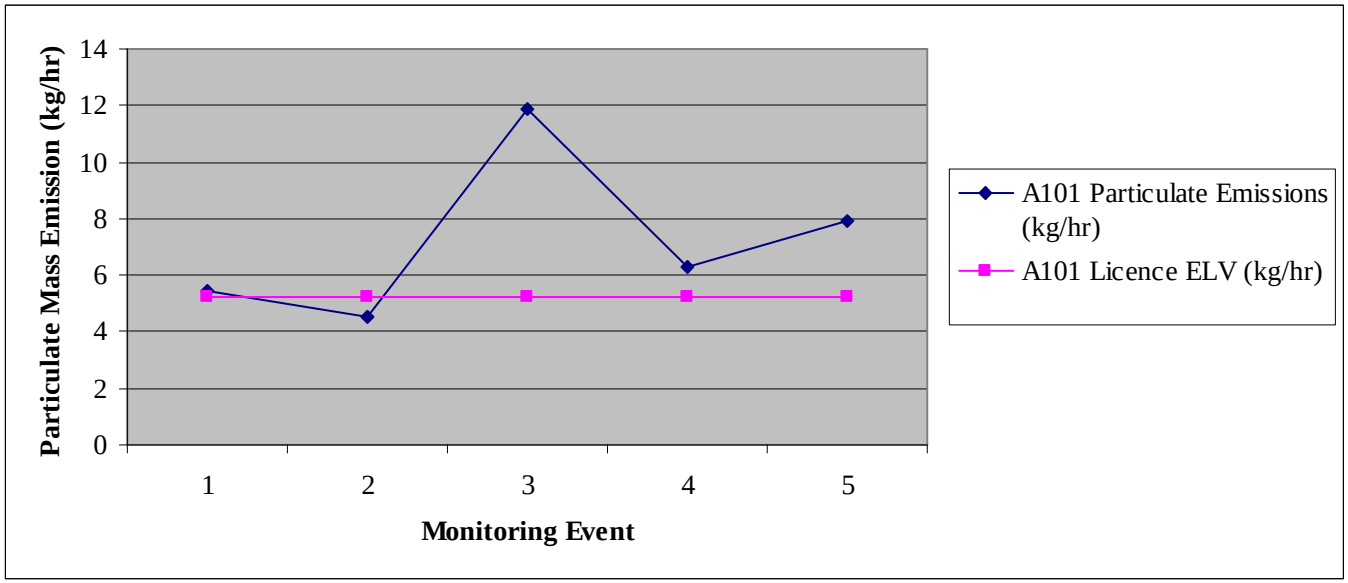


Figure 3: Particulate Mass Emissions to Atmosphere (kg/hr) (January to December 2010) vs. Licence ELV from Emissions Reference Point A102– Data point 5 is the average yearly emission

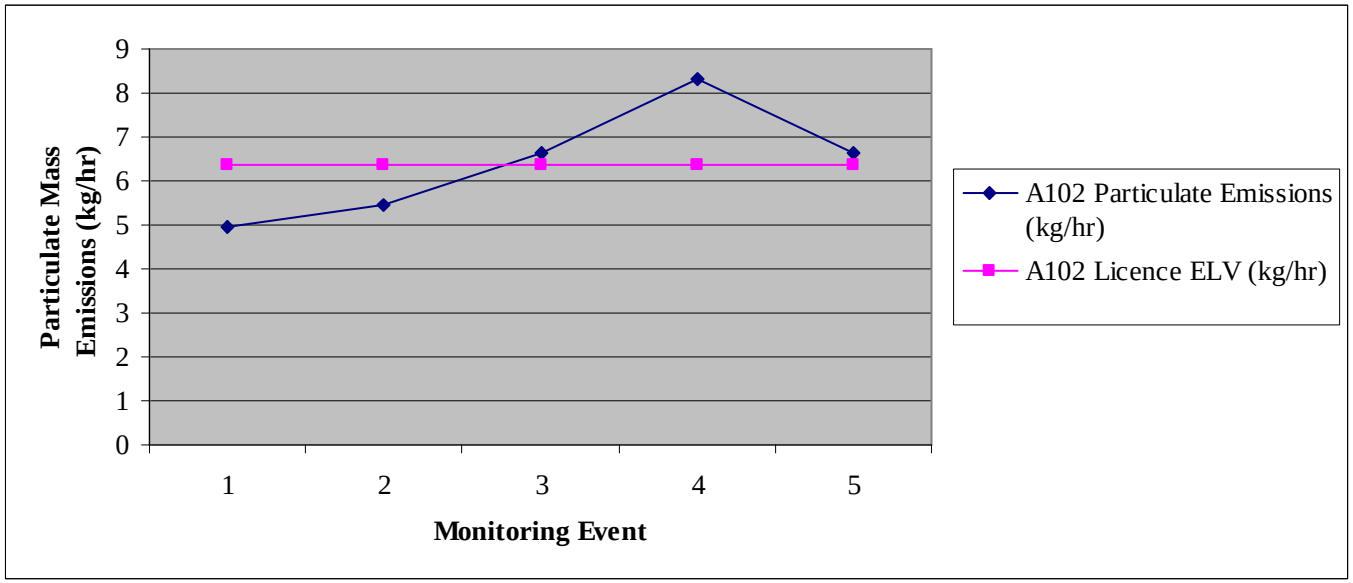


Figure 4: Particulate Mass Emissions to Atmosphere (kg/hr) (January to December 2010) vs. Licence ELV from Emissions Reference Point A103– Data point 5 is the average yearly emission

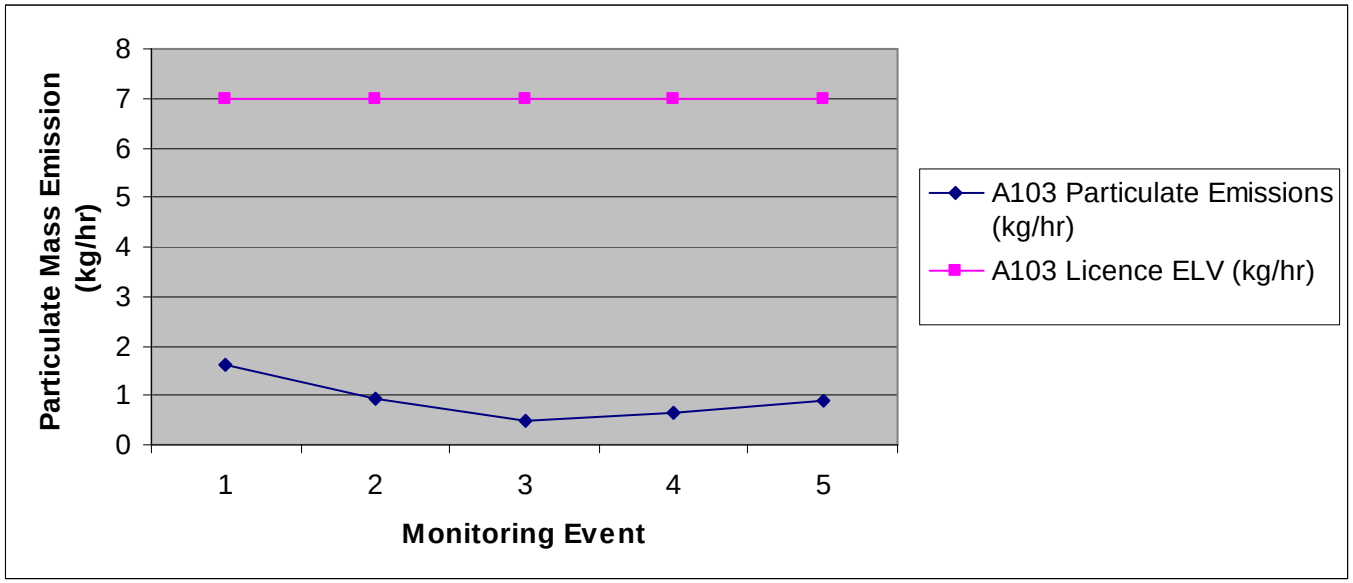


Figure 5: Particulate Mass Emissions to Atmosphere (kg/hr) (January to December 2010) vs. Licence ELV from Emissions Reference Point A104– Data point 5 is the average yearly emission

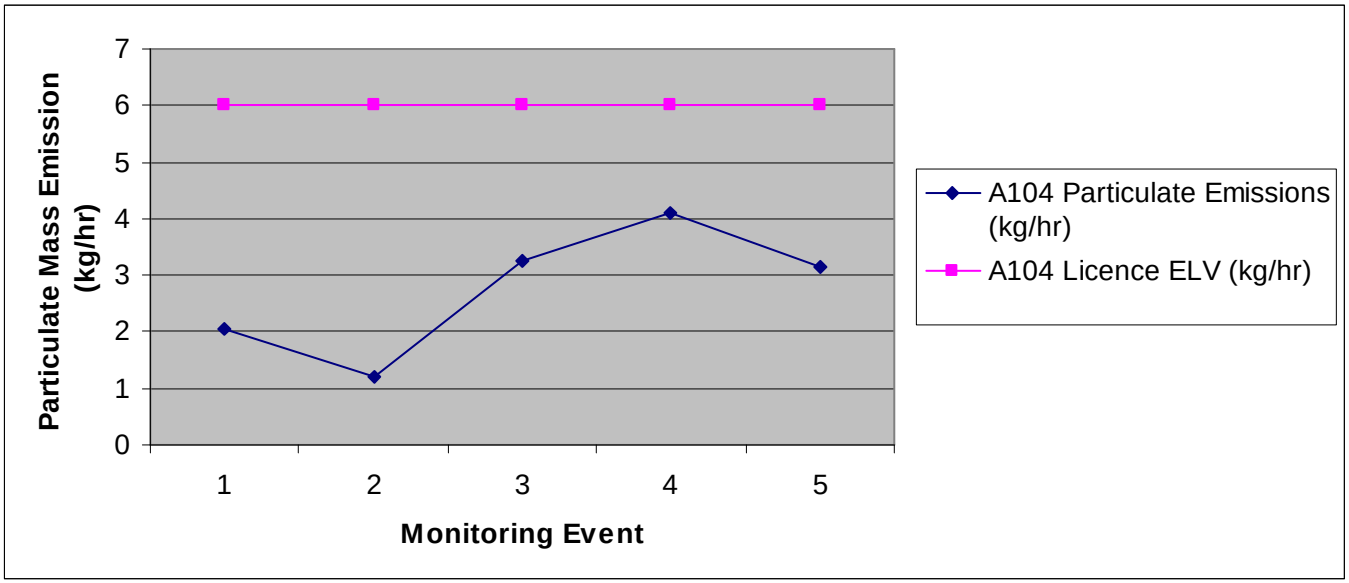


Figure 6: Particulate Mass Emissions to Atmosphere (kg/hr) (January to December 2010) vs. Licence ELV from Emissions Reference Point A105– Data point 5 is the average yearly emission

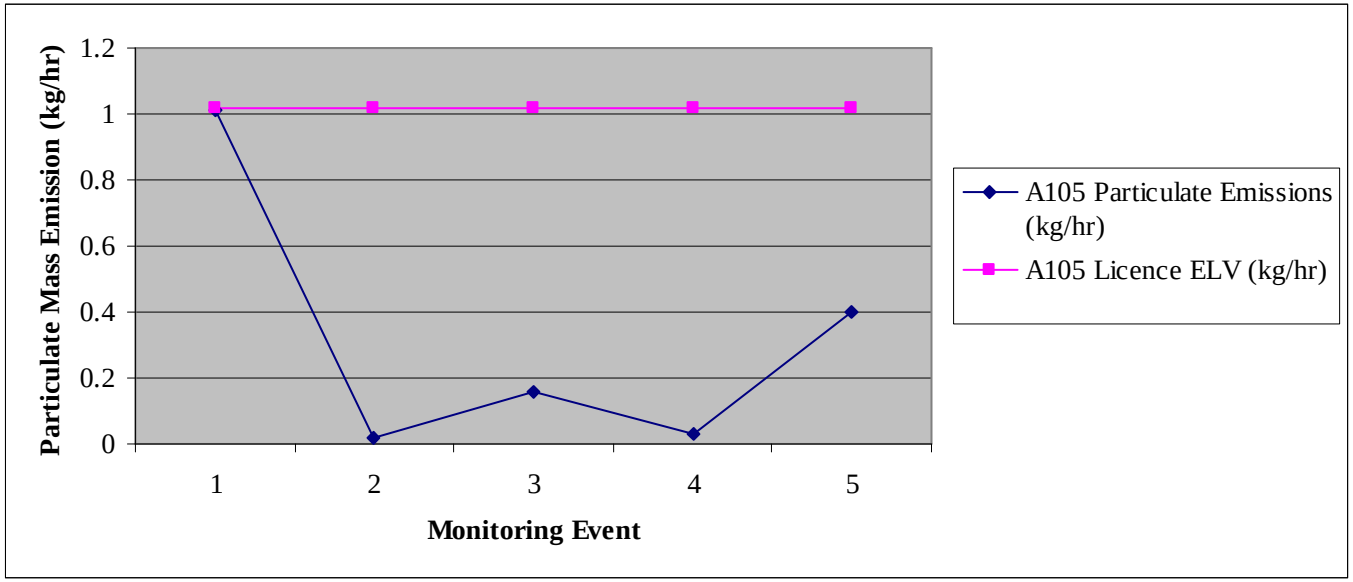


Figure 7: Particulate Mass Emissions to Atmosphere (kg/hr) (January to December 2010) vs. Licence ELV from Emissions Reference Point A106– Data point 5 is the average yearly emission

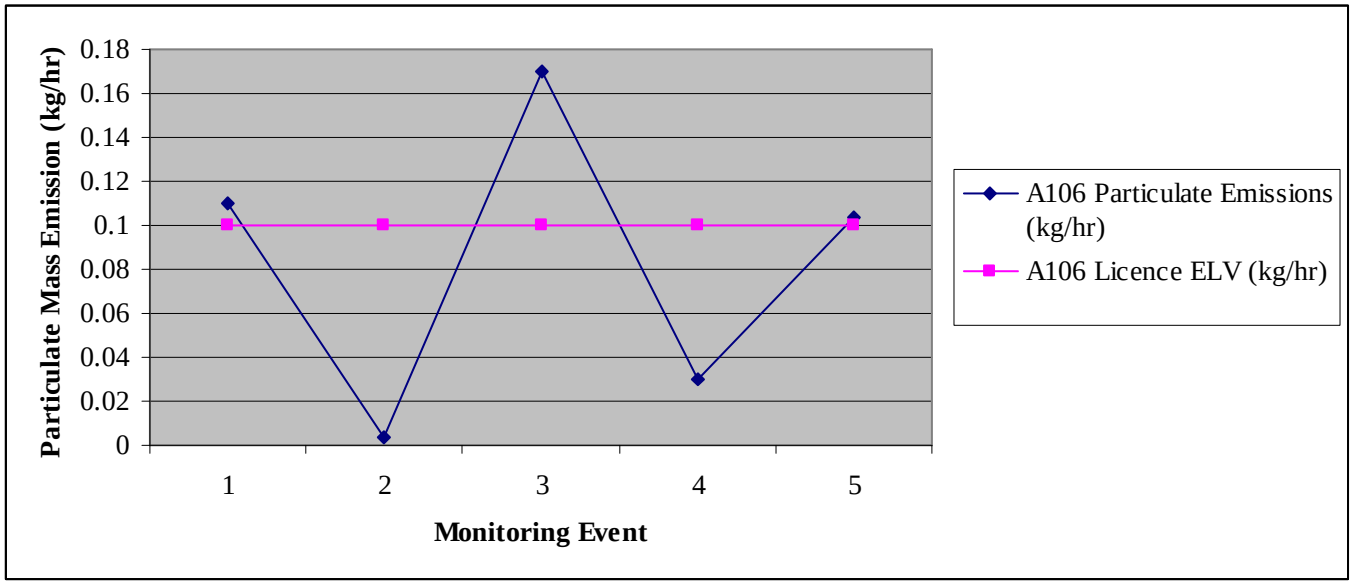
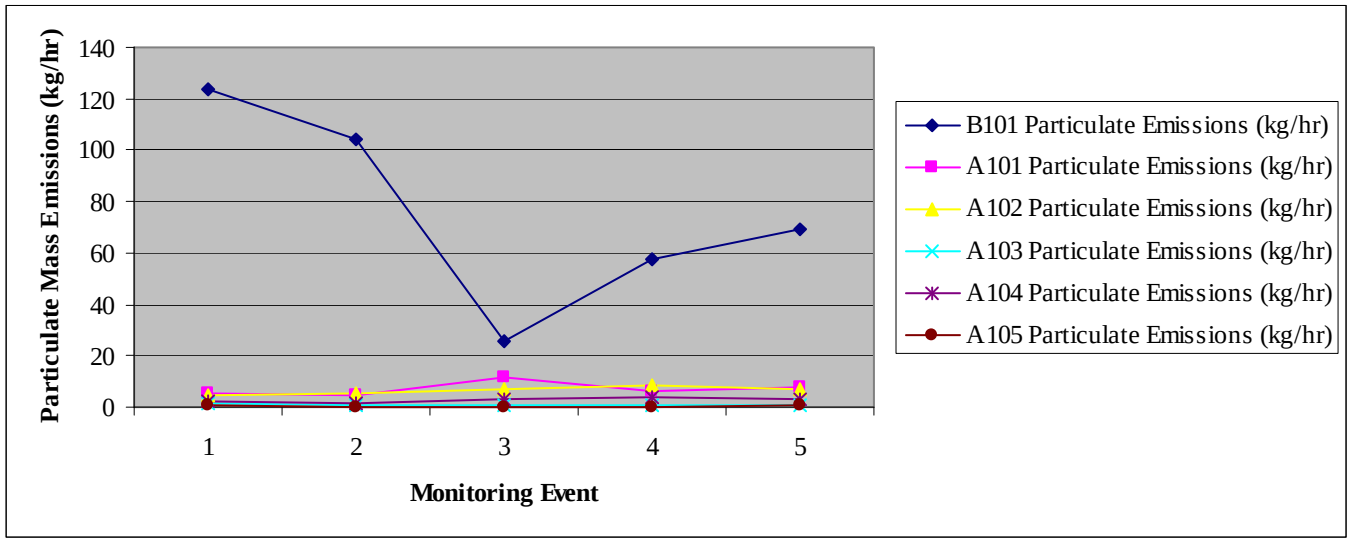


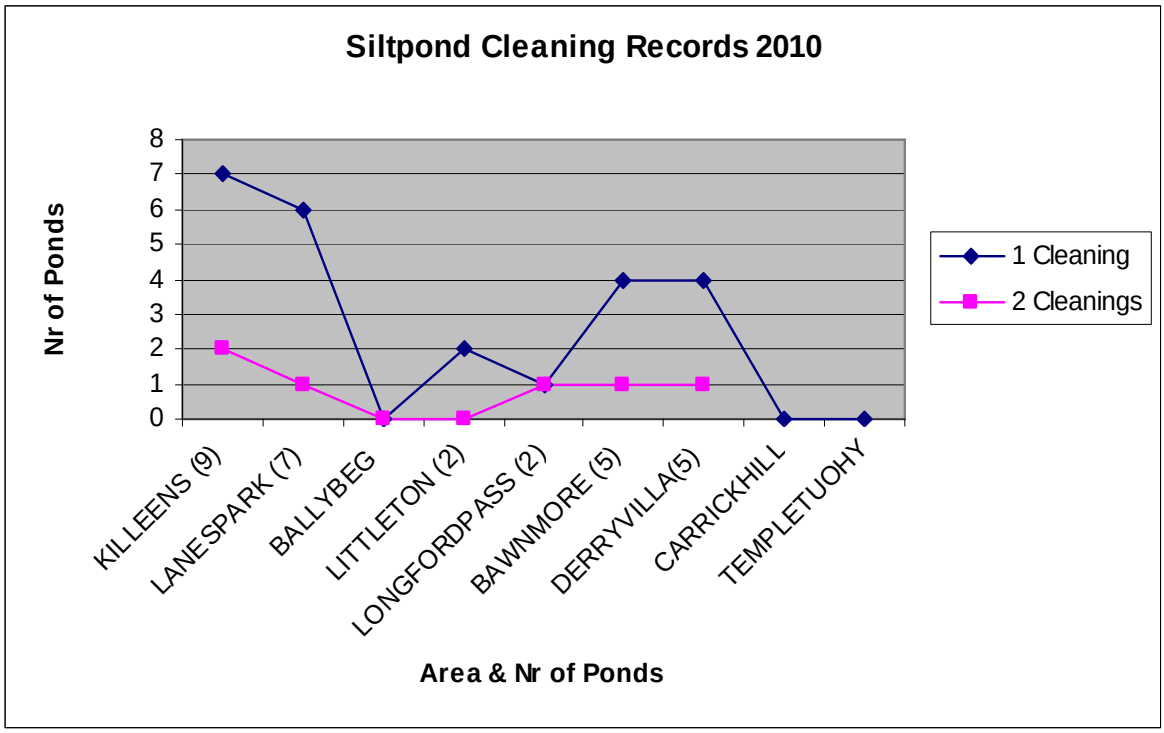
Figure 8: Summary of Particulate Mass Emissions to Atmosphere (kg/hr) (January to December 2010) from Emissions Reference Points B101, A101, A102, A103, A104 and A105



APPENDIX 5

De-silting Programme Review.

Siltpond Cleaning Programme 2010			
IPPC Licence: P0499-01			
Works: Littleton			
Bog Area & Nr Ponds	**1 Cleaning**	**2 Cleanings**	**3 Cleanings**
KILLEENS (9)	9	2	0
LANESPARK (7)	7	1	0
BALLYBEG	0	0	0
LITTLETON (2)	2	0	0
LONGFORDPASS (2)	2	1	0
BAWNMORE (5)	5	1	0
DERRYVILLA(5)	5	1	0
CARRICKHILL	0		
TEMPLETUOHY	0		



BORD NA MÓNA

BORD NA MÓNA FUELS LIMITED

Annual Environmental Report 2011
IPPC LICENCE P0499-01

March 2012

Bord na Móna today operates 5 main subsidiary companies in more than 20 locations throughout Ireland, the UK and USA. The principal businesses are in the Energy, Resource Recovery, Horticulture, Home Heating and Wastewater Treatment and Air Pollution Abatement markets. The company also engages in an extensive rehabilitation program to develop its peat lands in an environmentally sustainable manner.

Bord na Móna has long recognised the need to diversify its activities in order to secure a sustainable future. In this context we identified the energy and resource recovery sectors as appropriate areas of growth and development, given our assets, strengths and skills.
Significant challenges face Ireland in meeting the country's needs to provide secure sustainable energy and manage waste while minimising the impact on the environment.

Bord na Móna is in a strong position to contribute to dealing with these challenges. We have a unique mixture of assets, experience and innovation which will enable us to cross-link our activities in energy, water and resource recovery to provide products and services which will meet Ireland's needs. We also have the capacity to become an exemplar for others to follow in these fields.

With this background we have scoped out a new vision for the future sustainable development of Bord na Móna.
Following on from our vision, we have developed a new mission for Bord na Móna which the Company is committed to achieving.

In 1934 the Turf Development Board was formed to ‘develop and improve the turf industry.' The experience of fuel shortages during the war re-enforced the Irish State's commitment to developing the country's bogs. In 1944 the TDB was asked to devise and submit a comprehensive programme, the outcome was the transformation in 1946 of the TDB into Bord na Móna. The Board was given a mandate to increase the use of peat as a fuel and in energy production. Markets for the use of moss peat in horticulture were also developed.

In 1990 Bord na Móna implemented a divisionalised and decentralised structure, designed to delegate responsibility downwards ensuring a sharper focus on each profit centre and a greater spirit of enterprise.

Group Vision

The vision statement defines the Company's purpose, in terms of its values.
Values are guiding beliefs about how things should be done.
The vision statement communicates both the purpose and values of Bord na Móna.
For employees, it gives direction about how they are expected to behave and inspires them to give their best. Shared with customers, it shapes the customers' understanding of why they should work with Bord na Móna.
Bord na Móna will seek solutions that optimise the creative energy and potential of the organisation, driven by long term goals and the organisation's vision and mission.
In this context our devolved business units will align their vision and strategic planning with the global direction provided.
Consistent with our vision, innovation will once again return to the core of everything we do. We will capitalise on opportunities to cross fertilise our unique range of skills and technologies that add value and are socially and environmentally sustainable.
Greater focus will be placed on managing and developing our land assets in a responsible and sustainable manner. Our award winning initiatives at Lough Boora (Co. Offaly) and Oweninny (Co Mayo), provide shining examples of what can be achieved

Group Mission

We conduct our affairs with openness, honesty and integrity.
We are Ireland's leading environmentally responsible integrated utility service provider encompassing electricity, heating solutions, resource recovery, water, horticulture and related services.
We capitalise on international opportunities where we have a competitive advantage.
We achieve continuing growth through superior customer service, outstanding quality and innovation delivered through the excellence and commitment of our people.
We engage in sustainable profitable business in the communities we serve, which is rewarding and challenging for employees and other stakeholders.

Contents

1.0 Introduction

1.1 IPC Licence Register No

1.2 Name & Location of Site

1.3 Brief Description of Activities

1.4 Environmental Management of the Company

1.5 Environmental Policy Statement

2.0 Summary Information

2.1 Emissions to Water Summary

2.1.1 Silt Pond Emissions

2.1.2 Factory Processes Discharge @ PW-102

2.1.3 Workshops, Transport & Yard Discharges

2.1.4 Composite Sampler Report

2.1.5 Emissions to Water Non-compliance's

2.2 Emissions to Air Summary

2.2.1 Dust Monitoring Factory.

2.2.2 Particulate Emissions Minimisation Report

2.2.3 Dust Monitoring DSL's

2.2.4 Dust Non-compliance's

2.3 Waste Arising

2.3.1 Non-Hazardous Waste

2.3.2 Hazardous Waste

2.4 Energy and Water Consumption

2.4.1 Energy Consumption

2.5 Environmental Incidents and Complaints

2.5.1 Incidents

2.5.2 Complaints

3.0 Management of the Activity

3.1 Environmental Management Programme Report

3.2 Environmental Management Programme Proposal

3.3 Environmental Expenditure

4.0 Licence Specific Reports

4.1 Surface Water Discharge Monitoring Location Programme Review

4.2 Bunding Programme

4.3 Boiler Combustion Efficiency

4.4 Resource Consumption Summary

4.5 Report on de-silting Programme

4.6 Bog Development and Operational Programme

4.7 Bog Rehabilitation Report

4.8 Archaeological Report

4.9 Energy Efficiency Audit Report Summary

5.0 Summary

Appendix 1: Emissions to Water Monitoring Results. (Bogs)

Appendix 2: Emissions to Water Monitoring Results. (Yards)

Appendix 3: Emissions to Water Monitoring Results. (Composite)

Appendix 4: Emissions to Air Monitoring Results.

Appendix 5: De-silting Programme Review

1.0 Introduction

Bord na Móna Fuels Limited was granted an Integrated Pollution Control Licence by the E.P.A. on 17th August 2001 for it's operation in the Littleton group of bogs. This report is the eleventh A.E.R. for the operations and covers the period from 1st January 2011 to 31st December 2011.

1.1 IPC Licence Number: P0499-01

1.2 Name & Location of Site

The Littleton group of bogs consists of a cluster of bogs approximately ten miles from Thurles in Co. Tipperary.
The main contact and location details of the company are presented in summary form below

Company Name:	Bord na Móna Fuels Limited
Site Address:	Littleton Group Thurles Co. Tipperary.
Telephone No:	0504-44215
Fax No:	0504-44225
Contact Name:	Ray Yates
Position:	General Manager

1.3 Description of Activities

Milled Peat Operations

For milled peat production the bog is laid out in a series of rectangular fields of varying length and 15m wide with drains located between. There are essentially four operations involved in milled peat production:
Milling.
Harrowing.
Ridging.
Harvesting.

Milling.
Special milling machines work there way along the fields, milling approximately 15mm of peat off the top of the bog in a pass.

Harrowing
This is achieved with a machine called a harrow. The milled peat is harrowed until its moisture content is down to approximately 40-50%, which can take up to two to three days, weather depending.

Ridging
The dry peat is then scraped into long ridges running down the centre of each field. This is done with a ridger, a machine consisting of a series of blades in the shape of a v that opens the full width of the field.

Harvesting
During harvesting every eleventh field is used to stockpile the peat, with this field receiving the milled peat from the five fields either side.
Milled Peat is produced on the Littleton group of bogs for transfer to the Briquette Factory for the manufacture of peat solid fuel products. Littleton has a total area of 4,530 hectares. Of this, 1,475 hectares were used for the production of milled peat during the period of the AER.

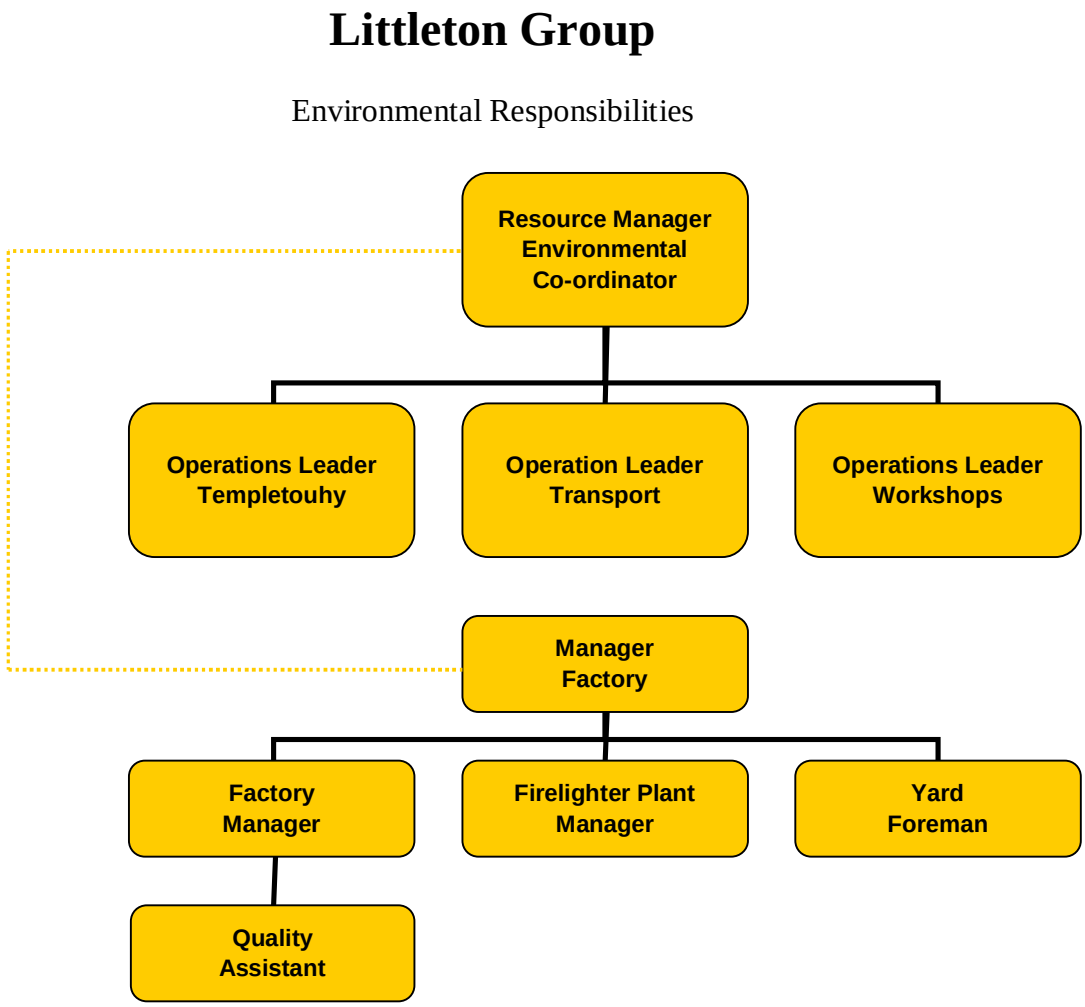
The production of milled peat is a seasonal activity with production opportunities only possible during the period from late spring to early autumn when drying conditions are suitable. When production operations are underway, they are typically carried out over a seven-day week and for 10 to 15 hours per day. Bog drainage and field conditioning operations are carried out throughout the year, along with peat haulage operations from stockpiles located on the bog to the Briquette Factory. Transport operations are carried out on all days throughout the year that the Briquette Factory is in operation.

Sod Peat was produced on an area of 223 hectares during 2011. Production was from April to August with sales to the public from September to December. Bog preparation and drainage was ongoing throughout the year but was mainly in the period January to March.
The Firelighter Plant operated from January to April and again from September to December.

The Group has its own workshop facilities for the maintenance, repair and fabrication of plant used in the operations outlined.

1.4 Environmental Management of the Company

The organisational structure within the Littleton Group is presented in the flow chart below. Although the site operates under a single IPPC Licence, administratively the operations are divided into Factory and Bog.



1.5 Environmental Policy

BORD NA MÓNA

BORD NA MÓNA FUELS LIMITED

Bord na Mona Fuels Limited is a commercial semi-state body with responsibility to develop Ireland's peat resources in the national interest.

Bord na Mona Fuels Limited is committed to gather and make available information on all aspects of its environmental impact and to help improve understanding among the public generally of its role and the importance of Irish peatlands.

Bord na Mona Fuels Limited recognises the importance of peatland conservation.

Bord na Mona Fuels Limited will leave behind all areas it owns as either an economically or socially integrated resource of a high environmental value.

Bord na Mona Fuels Limited seeks to conduct all aspects of its business in an environmentally sensitive value.

Bord na Mona Fuels Limited operate an environmental management system specifically addressing the following impacts.

Discharges to water.
Emissions to atmosphere.
Waste disposal.
Use of natural resources.
Noise, vibration, odour, dust and visual effects.
Natural environment and eco-system.

The environmental management system will be monitored, maintained and continually improved.

A system of regular environmental audits will be put in place.

Bord na Mona Fuels Limited will continue research and development into all aspects of its environmental impact.

This statement is published and is available at all locations within the division and its contents are brought to the attention of all employees.

2.0 Summary Information

2.1 Emissions to water summary

2.1.1 Silt Pond Emissions

Surface Waters

Comment

Surface water monitoring was carried out quarterly during the reporting period. In total analysis was carried out at three different locations. These locations are as follows, Killeens @ SW4, Lanespark @ SW15 and Carrickhill @ SW26. The parameters measured during each sampling event were as follows:
Total Phosphorus, Total Solids, Suspended Solids, pH, Nitrogen, Colour and COD.
In general results were constant across all parameters at each monitoring location.
October was the wettest month with 123.5mm of rainfall recorded and March the driest with 29.4 mm recorded. The quarterly grab sampling programme proved to be 100% compliant for the year, as was the case in 2007, 2008, 2009 and 2010.

pH values were between 7 and 8 pH Units, with normal emission limit values being of the range 6 to 9 pH Units.

Suspended solids varied from 5 mg/l to 48 mg/l and would depend on activities such as, piping, ditching etc, in the catchments at the time of sampling. Although above 35mg/l the 48mg/l result did not constitute a non-compliance under condition 3.2.1 (ii).

Ammonia values ranged from 0.29 mg/l and 3.48 mg/l. The I/PV for A3 waters is 4mg/l. It is however not unusual for surface waters emanating from production peatlands to be slightly elevated.

COD readings ranged from 10 mg/l to 113 mg/l during the reporting period. The I/PV for A3 waters is 40mg/l. Bord na Mona set trigger levels of 100 mg/l was exceeded only once during the fourth quarter monitoring event. The first quarter 2012 results will be watched with interest to see if the elevated trend continues.

Total Phosphorus results ranged from 0.05 mg/l to 0.11mg/l with the average result being 0.059mg/l all of which are well below any trigger level in any of the guidance documents.

Flow rates ranged from 3 l/sec to 23.7 l/sec and would typically depend on rainfall at the time of monitoring.

Sampling will continue at the same locations during 2012.

Surface Water Results are contained in Appendix 1.

2.1.2 PW-102 Factory and Yard Discharge to Ballybeg River.

Monitoring took place at this location on a weekly and quarterly basis. The parameters measured are; COD, Suspended Solids, pH and Flow, on a weekly basis and Total Phosphorus, Ammonia and Oils, Fats and Greases quarterly.
The emission point is located on the factories process water outfall. Due to a an oversight the first quarter monitoring event did not take place.

Comment:

pH values were within the range 7.3 and 8.6, with a mean value of 7.95 pH units .

COD values were within the range, 10 to 178 mg/l, with a mean value of 67.63 mg/l. This mean figure is marginally higher than the 2009 result (54 mg/l) and down on previous years results.

SS results averaged 23.95 mg/l. The range was from 5 mg/l to 48 mg/l. The eight results above 35 mg/l did not constitute a non compliance as they represented less than 25% of the overall results; also no individual result was above 105 mg/l as per condition 3.3.1 (ii). The mean figure was slightly higher than the 2009 averages.

Quarterly **TP,** ranged from 0.08 mg/l – 0.7 mg/l, with an average of 0.49 mg/l. As mentioned above the first quarter monitoring event was accidently omitted.

Ammonia ranged from 0.14 mg/l – 0.68 mg/l, and averaged 0.36 mg/l. This represents an increase on the 2010 figures. The I/PV for A3 waters are of the range 4mg/l.As mentioned above the first quarter monitoring event was accidently omitted.

Oils, Fats & Greases ranged from 5 mg/l – 8 mg/l. The average figure was 6.3 mg/l. This represents a narrowing of the range on 2010, although the average figure is slightly elevated.

2.1.3. Monitoring of workshop/depot surface water run-off.

Comment:

Inspections are undertaken and logged weekly at the following locations: SWE1 Factory / Lanespark Workshop / Firelighter area, SWE2 Factory Transport and Fueling Area, SWE3 Templetuohy Workshop and SWE4 Templetuohy Fueling Area.
Yard runoff monitoring took place at these four different locations on a monthly basis during the reporting period and COD was the parameter requiring analysis.
As is evident from the graph, on several occasions no sample was available on the day of sampling. This was due to lack of flow at the emission point as the catchments are so small. In fact, in most instances it would have to be raining quite heavily in order to attain a sample. Where sampling was successful there was a marked reduction in COD levels over the monitoring period.
Sampling will continue at the same locations during 2012.

Results are attached in Appendix 2.

2.1.4 Composite Sampler Programme

The composite sampler location was changed during the reporting period. This was due to continuing problems with flow or the lack of at its former site. The sampler was relocated to SW18 at Longfordpass bog and became operational at that location during October.

Composite Sampler results are contained in Appendix 3.

2.1.5 Emissions to Water Non-compliance's

The non-compliances associated with agreed sampling of water effluent at Littleton are outlined in table under.

Emissions to Water Non-Compliances 2011		
IPPC Licence: P0499-01		
Works: Littleton		
Type	**Non-Compliances**	**Location / SW Nr**
Composite	2	1 @ DE22 & 1 @ LS18
Quarterly Grab	0	
PW 102	0	
Totals	**2**	

Although eight samples exceeded 35mg/l at PW102, this was less than 25% of the total number of samples and no single sample was above 105 mg/l. Ref condition 3.3.1 (ii).
There were two non compliance's in relation to composite sampling, one at its former location of SW22 and related to the non operation of the sampler. The other non-compliance's was in relation to a result above 105mg/l during November at its new location LS18. On both occasions the Agency was informed.

2.2 Emissions to Air Summary

2.2.1 Factory Emissions

Four Quarterly Monitorings were carried out in 2011 in accordance with
Licence requirements on Emission points in Briquette Factory and Firelighter plant.

Relocation of the Induced Draught Fan on the Boiler has been proposed and agreed to further improve the Boiler Abatement system ie **B101**
This relocation is planned for July 2012 by our equipment supplier, Howden Sirocco UK.

Attached in Appendix 4 is Emission to Air Results.

2.2.2 Particulate Emissions Minimisation Report

The particulate Emissions Report is also attached in Appendix 4

2.2.3 Dust Emissions (Dust Sensitive Locations)

Dust monitoring was carried out as per Agency agreed proposals. Monitoring took place at DM01, DM02, DM03 and DM04. The Bergerhoff method of collection was used.
On five occasions the emission limit value of 350 mg/m2/day was exceeded and the Agency was informed. No dust complaints were received on foot of any of the non-compliances.
The results are also displayed in Appendix 4.

2.2.4 Dust Non-compliance's

As mentioned above no complaints were received in relation to dust during the reporting period, including during times of dust monitoring non-compliance.

2.3 Waste Management Report

2.3.1 Non Hazardous Waste

Non Hazardous Waste 2011				
IPPC Licence: 499				
Works: Littleton				
Type	**Tonnes**	**EWC Code**	**Contractor**	**Licence Nr**
Skips	77.51	20 03 01	AES	WP-OY-08-601-01
Wheelie Bins	1034.96	20 03 01	AES	WP-OY-08-601-01
Polyethlene	216.94	02 01 04	Leinster Environmental	WP 2008/06
Scrap Steel	237.15	17 04 07	Hammond Lane	WP4620033
Timber Pallets	155.32	15 01 03	Kiawa Ltd	WP/TN/24
Cardboard	40.06	20 01 01	Smurfit Kappa	WPR021/3
Silt Pond Cleanings	450.52	01 01 02	Bord na Mona	P0499-01
Peat Screenings	750.00	01 01 02	Bord na Mona	P0499-01

Note: Skips and wheelie bins are sent to a mixed recycling centre with the residue going to landfill.

2.3.2 Hazardous Waste

Hazardous Waste Data 2011				
IPPC Licence: P0499-01				
Works: Littleton				
Type	**Tonnes**	**EWC Code**	**Contractor**	**Licence Nr**
Waste Oil	2.900	13 02 05	Enva Ireland Ltd Portlaoise	184-1
Oil Filters	0.560	16 01 07	Enva Ireland Ltd Portlaoise	184-1
Lead Acid Batt	2.000	16 06 01	Enva Ireland Ltd Portlaoise	184-1
Fluorescent Tubes	0.040	2002 02	Irish Lamp Recycling Co.Ltd	184-1
Oily Rags	0.600	15 02 02	Enva Ireland Ltd Portlaoise	184-1
Parts Wash	2.340	11 01 13	Safety Kleen, Tallaght, Dublin	99-1
Total	**8.440**			

2.4 Energy Consumption

The usage of diesel and electricity in the Factory are to supplement the power supplied by Milled Peat. The Bog usage of both is to provide the Milled Peat for Briquetting. Derv is used for road transport service to Milled Peat operations.

IPPC:	**P0499-01**		
YEAR 2011			
1. Factory Units	Diesel (Litres)	Derve (Litres)	Electricity (Units)
Totals	331189	19487	1308310
MW Hours	3365.21	198.01	1308.31
Total MW Hours	**4871.5**		
2. Factory Units	Mill/Peat (Tonnes)	Screens (Tonnes)	Br/Out (Tonnes)
Totals	43371	5198	266
MW Hours	93768.10	26769.70	1369.90
Total MW Hours	**121907.7**		
3. Bog Units	Diesel (Litres)	Derve (Litres)	Electricity (Units)
Totals	550475	18428	254525
MW Hours	5593.38	187.25	254.53
Total MW Hours	**6035.1**		
1. + 2. + 3.			
Total MW Hours	**132814.4**		

2.5 Environmental Incidents & Complaints

On foot of a direction from the Agency inspector, non-compliances are reported as incidents and are included in the water and emissions to air compliances tables also.
There were no complaints of an environmental nature during the reporting period.

Environmental Incidents 2011	
IPPC Licence: P0499-01	
Works: Littleton 2011	
Incidents	8
Requiring corrective action	2
Category	
Water	3
Air	5
Procedural	0
Miscellaneous	0
Total	**8**

3.1 Achievement of Objectives & Targets 2011

Project	Description & Status
Project 1: Reduction of fugitive dust emissions.	**Training.** Continue to train all employees in environmental matters. Training will be by means of the screening of an environmental DVD, followed by a power point presentation. **Status**: There was no training as no new employees were hired during the reporting period. **Headland Peat Collection.** Continue with the collection of headland peat, particularly at dust sensitive locations. A new mobile Haku Harvestor was delivered in 2008 and is currently being commissioned for use in the 2011 production season. **Status:** Headland peat was harvested and included in the general production returns. The dedicated Haku Harvester was not deployed due to the unavailability of the associated trailers.
Project 2: Waste Management	**Waste Streamlining.** Continue to use AES as a waste management provider. Using their expertise in identifying potential recyclers of waste streams generated. A key account manager from AES Nenagh to be provided for Littleton. The service will include the issuing of quarterly waste quantity reports. **Status:** The service included the co-ordination of all waste streams ensuring the correct waste stream was dealt with by the appropriate waste provider. The service also included the issuing of quarterly reports.
Project 3: Minimisation of Suspended Solids.	**Training.** Continue to train all employees in environmental matters. Training will be by means of the screening of an environmental DVD, followed by a power point presentation. **Status:** There was no training as no new employees were hired during the reporting period. There was a review of silt pond catchment areas with a program of upgrade work put in place where required.
Project 4: Effective spill leak management of mobile fuelling units.	**Research and Development.** Littleton is currently carrying out a review of its refuelling operations, so as to improve its bunding arrangements. The results of this will be included in this EMP in 2011. **Status:** Two double skinned rail operated service trains were in operation in 2011. Also four tractor trailed double skinned fuel service units were also deployed in 2011.

	Additional barrel bunds were also provided.
Project 5: Collection storage and reuse of polyethylene.	**Identify Recyclers.** Continue with the recycling of polyethylene. The sourcing of more recycling contractors will be ongoing. **Status:** 216 tonnes of waste polyethylene was collected and recycled during 2011. Historic polyethylene was also collected in preparation for recycling.
Project 6: Energy Management	**Survey.** As part of an energy management process, a review of the factories energy aspects took place. A similar exercise will take place identifying the significant energy users in relation to bog operations. **Status:** The review of energy aspects is ongoing. The purpose of this is to establish a base line in relation to energy management

3.2 Environmental Management Programme Proposal 2012

Project	Description & Status
Project 1: Reduction of fugitive dust emissions.	**Training.** Continue to train all employees in environmental matters. Training will be by means of a new four module training programme delivered by dedicated Bord na Mona Training Specialists. This new training programme includes Environmental Compliance _ IPPC, Biodiversity, Archaeology and Energy Management. **Headland Peat Collection.** Continue with the collection of headland peat, particularly at dust sensitive locations. A Haku Harvestor will be deployed during the 2012 production season.
Project 2: Waste Management	**Waste Streamlining.** Continue to use AES as a waste management provider. Using their expertise in identifying potential recyclers of waste streams generated. A key account manager from AES Nenagh to be provided for Littleton. The service will include the issuing of quarterly waste quantity reports.
Project 3: Minimisation of Suspended Solids.	**Training.** Continue to train all employees in environmental matters. Training will be by means of a new four module training programme delivered by dedicated Bord na Mona Training Specialists. This new training programme includes Environmental Compliance _ IPPC, Biodiversity, Archaeology and Energy Management.

	Silt Pond Upgrade The above mentioned siltpond upgrade work will be completed during 2012.
Project 4: Effective spill leak management of mobile fuelling units.	**Research and Development.** Increased bund provisions where required, will be provided, in 2012.
Project 5: Collection storage and reuse of polyethylene.	**Identify Recyclers.** Continue with the recycling of polyethylene. The sourcing of more recycling contractors will be ongoing.
Project 6: Energy Management.	**Review of Energy Aspects** As part of an energy management process, a review of energy aspects will continue to take place identifying the significant energy users of the licensee.

3.3 Environmental Expenditure

Environmental Expenditure 2011	
Description	**Cost €**
Capital Costs	€119,300
Silt Control	€92,616
Analytical & Consultancy Costs	€38,150
EPA Fees	€11,030
Bog Rehabilitation	€64,693
Total	**€325,789**

4.0 Licence Specific Reports

4.1 Surface Water Discharge Monitoring Location Programme Review

The programme has operated satisfactorily. It is proposed to continue at the same locations in 2012. The former composite location at DE22 will now be included in the quarterly grab sampling regime, starting the second quarter 2012.

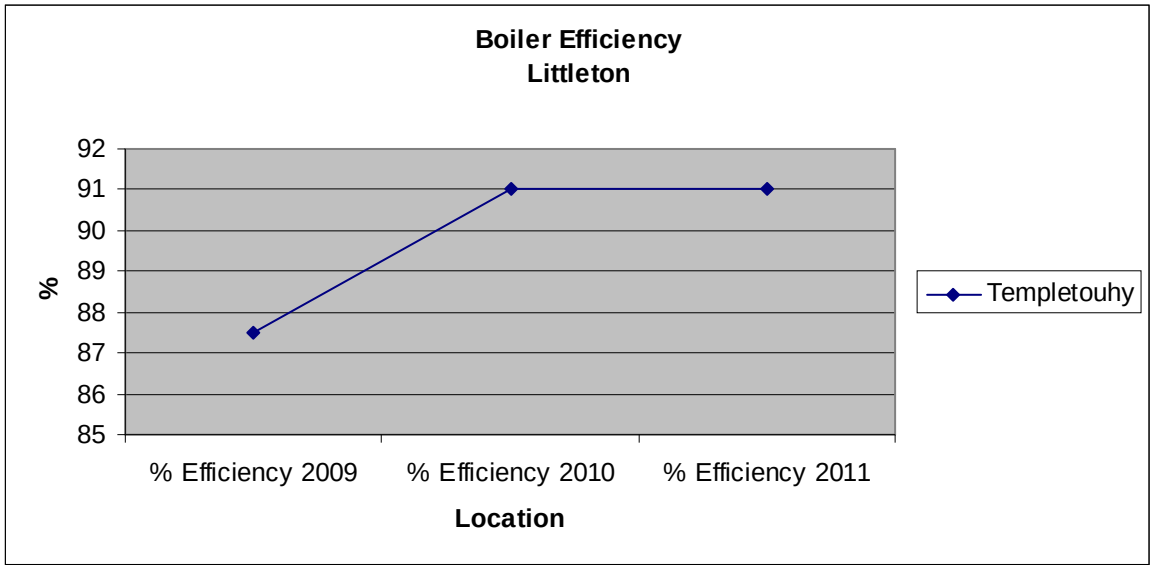
4.2 Bunding Programme

Bund Locations & Numbers Littleton Works					
IPPC Licence: P0499-01					
Location	**Bund Number**	**Last Tested**	**Status Pass/Fail**	**Repair Date**	**Next Test Due**
Lanespark Bund	499-13-01	Sep-11	Pass	N/A	Sep-13
Firelighter Farm Bund	499-13-02	Sep-11	Pass	N/A	Sep-13
Factory Bund	499-13-03	Sep-11	Pass	N/A	Sep-13
Templetouhy Bund	499-13-04	Sep-11	Pass	N/A	Sep-13
Chemical 1	499-13-05	Sep-11	Pass	N/A	Sep-13
Chemical 2	499-13-06	Obsolete			

All bunds in the licence area were tested and passed in 2011. The next program of testing is due to commence in September 2013 as per the table above.

4.3 Boiler Combustion Efficiency

Boiler Emissions 2011					
Licence: P0499-01					
Works: Littleton					
Boiler Location	**% Efficiency 2007**	**% Efficiency 2008**	**% Efficiency 2009**	**% Efficiency 2010**	**% Efficiency 2011**
Templetouhy	86.75	0	87.5	91	91



4.4 Resource Consumption

Resource Consumption 2011			
Licence: P0499-01			
Works: Littleton			
Product	**Tonnes Produced**	**Tonnes Sold**	**Customer**
Milled Peat	274246	252018	Littleton Briquette Factory
Turf	4300	2948	Public / Domestic
Totals	**278546**	**254966**	

Proposed Production 2012	
Licence: P0499-01	
Works: Littleton	
Product	**Proposed Target**
Milled Peat	274,250
Turf	900
Totals	**275150**

4.5 De-silting Programme Report

The cleaning roster is based on the fortnightly inspection of ponds. These inspections dictated which ponds required cleaning.

The Silt Pond Cleaning Programme Review is contained in Appendix 5.

4.6 Bog development and Operational Programme.

Initial drainage works were completed at Templetouhy sod and Bawnmore bogs. Works included outfall excavation and the installation of a new pump and associated pipe work. The drainage work at Templetouhy and Baunmore bogs has progressed to final drainage and it is planned to bring approximately 40 hectares of these areas into production in 2013.

4.7 Bog Rehabilitation

With regard to decommissioning, historic polyethylene was removed for recycling from both Popes and Kileens bogs. Of the total recycled polyethylene approximately 50% was historic material and accounted for 100 tonnes. The removal of historic material is ongoing with further loads due for collection in 2012. The paragraph below outlines rehabilitation at Littleton bogs as compiled by the ecology department.

Littleton 499:

- Small areas of cutaway have emerged such as Loch Doire Bhile amenity area, which is also now recognised as an important area for Marsh Fritillary.
- A wind farm proposal has been developed for Templetuohy bog and this will be constructed within the current peat production area. A draft rehabilitation plan has been developed for the site to account for the wind farm development.
- Only Templetuohy has been surveyed to date as well as the Loch Dhoire amenity area.
- Consultation with Heritage groups, NPWS is ongoing.
- The Littleton bogs will be more extensively surveyed by the ecologists in 2012.

4.8 Archaeological Report.

There was no archaeological survey carried out during 2011.

4.9 Energy Efficiency Audit Report Summary.

A comprehensive energy efficiency audit was carried out in 2010 by Capstone Energy Management. The full report is retained on file.

5.0 Summary

The Environmental Management Programme has been implemented throughout the group, operating procedures have been put in place, and training has been provided for all personnel involved in compliance with the licence.

Littleton continued to improve operations through the purchase of new machinery, to ensure continued reductions in suspended solids. The bunding programme was extended by increasing barrel bund capacity and ordering a second self bunded rail bowser cum service wagon.

A new project that was initiated for 2010, namely to demonstrate the effective reuse of the peat /ash from the factory settling ponds. The selected area was levelled and prepared for production during 2011. It is planned to harvest up to five crops of peat from this area in 2012 after the pond deposits have been levelled.

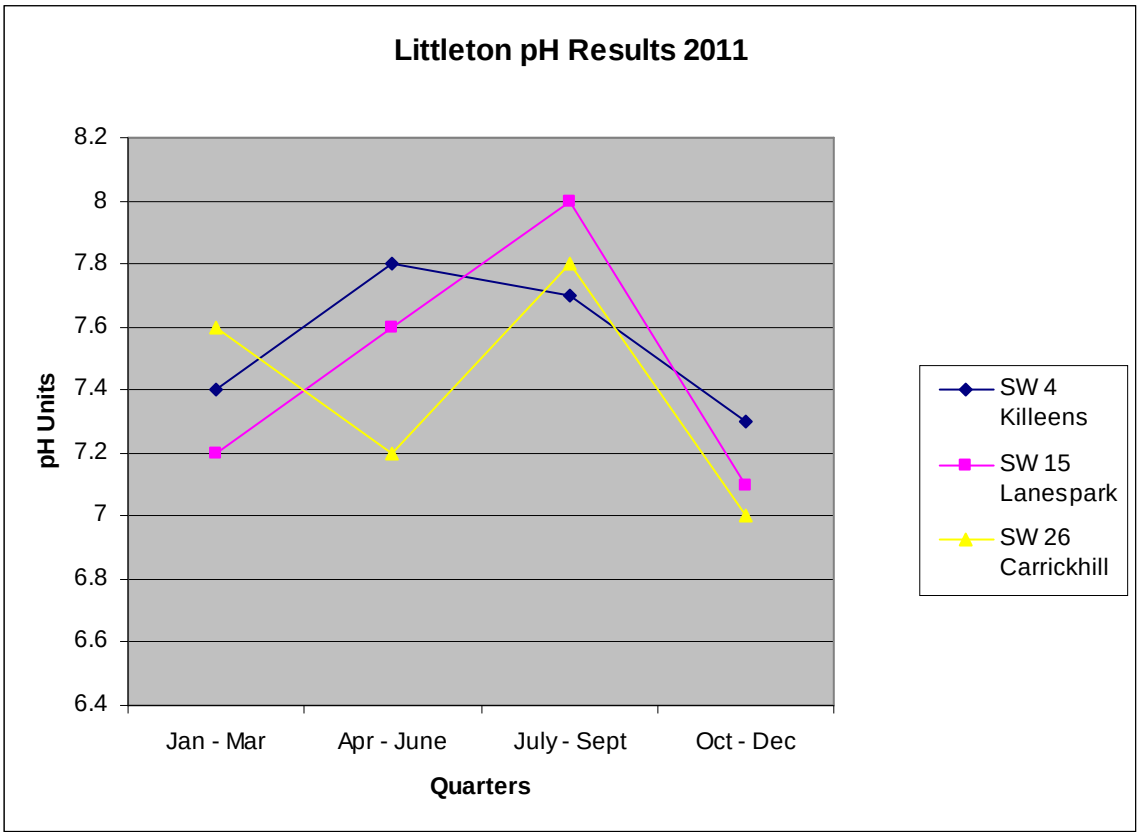
Bord na Mona Energy Ltd are represented on the Management Group of both the Shannon River and Eastern River Basin District Management Systems, set up under the Water Framework Directive, and on the Steering Group of the Catchment Management on the River Barrow.

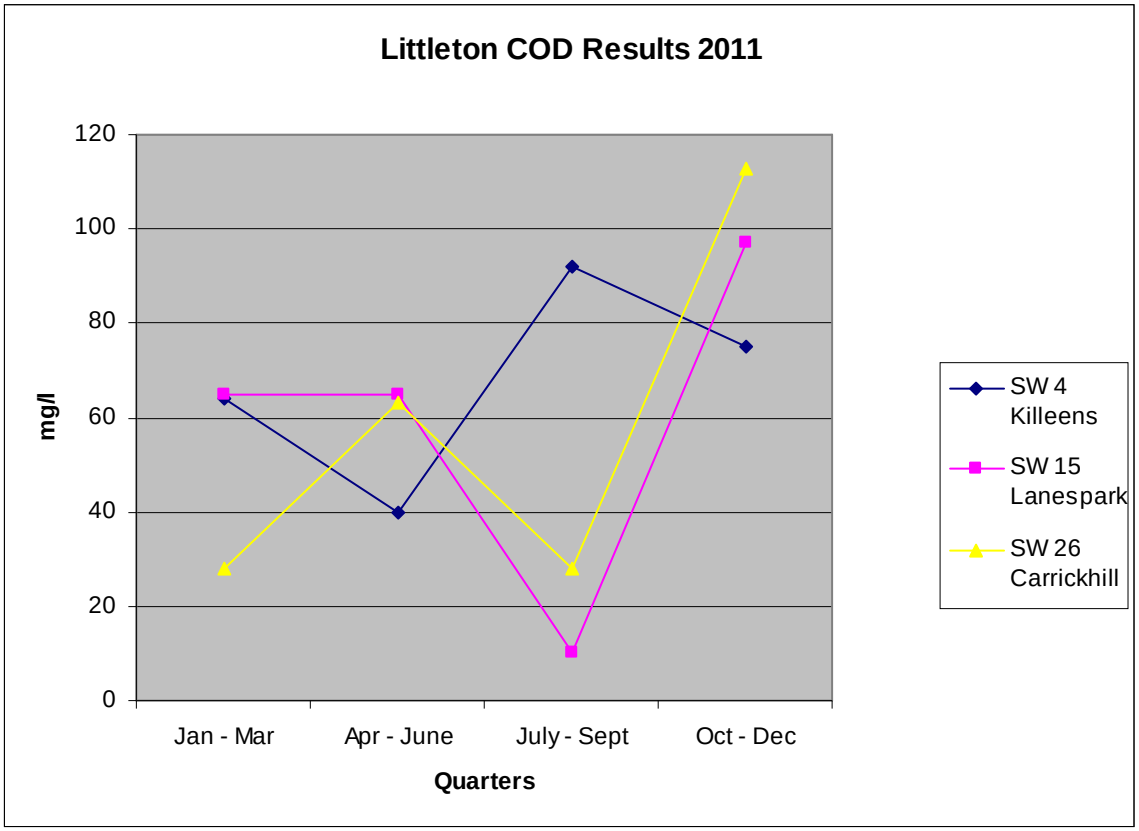
Bord na Mona Fuels Ltd would like to take this opportunity to advise the Environmental Protection Agency of its continued commitment to improving its environmental performance by adopting cleaner production methods and improving its environmental protection measures.

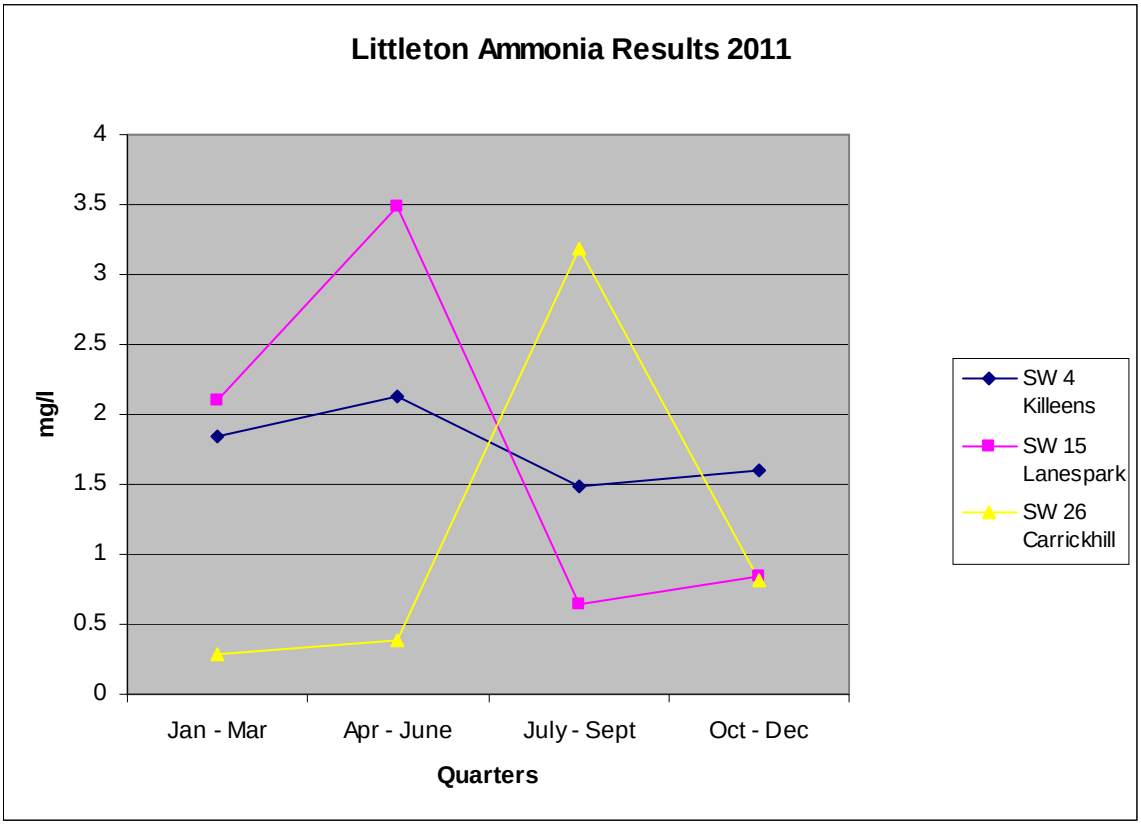
APPENDIX 1

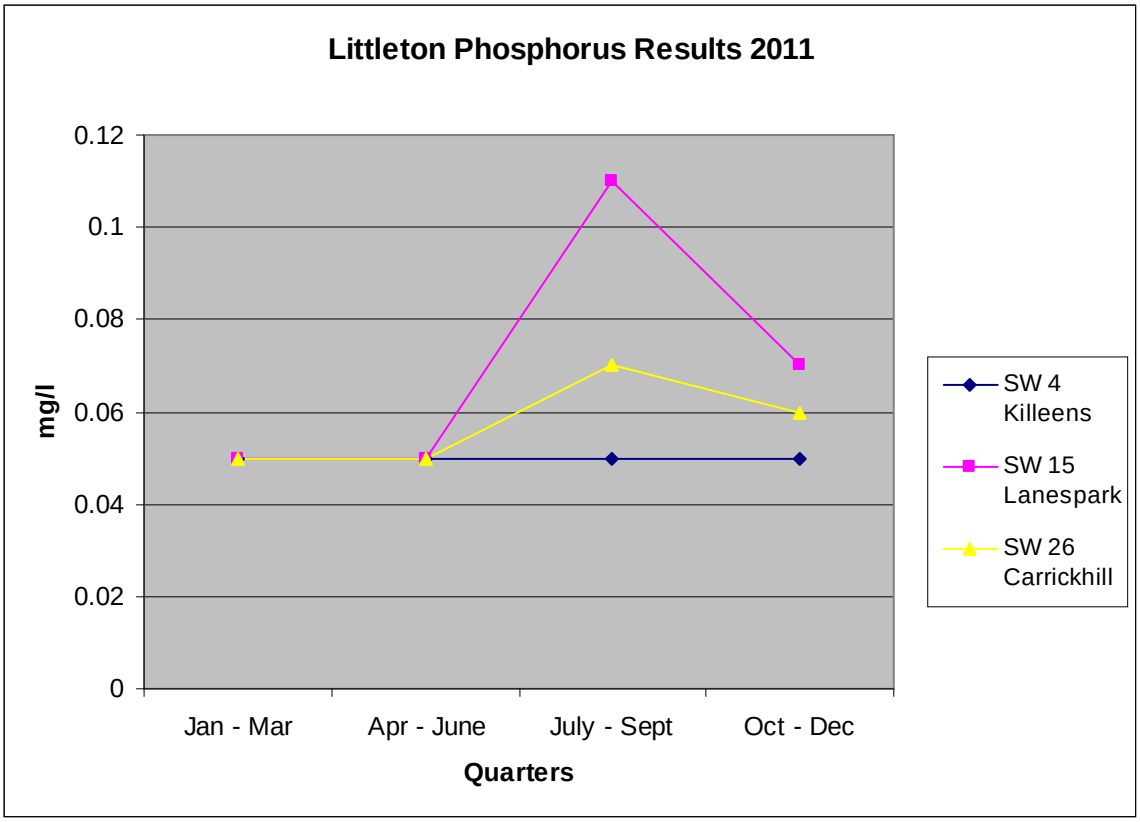
Surface Water Discharge
Monitoring Results
Bogs

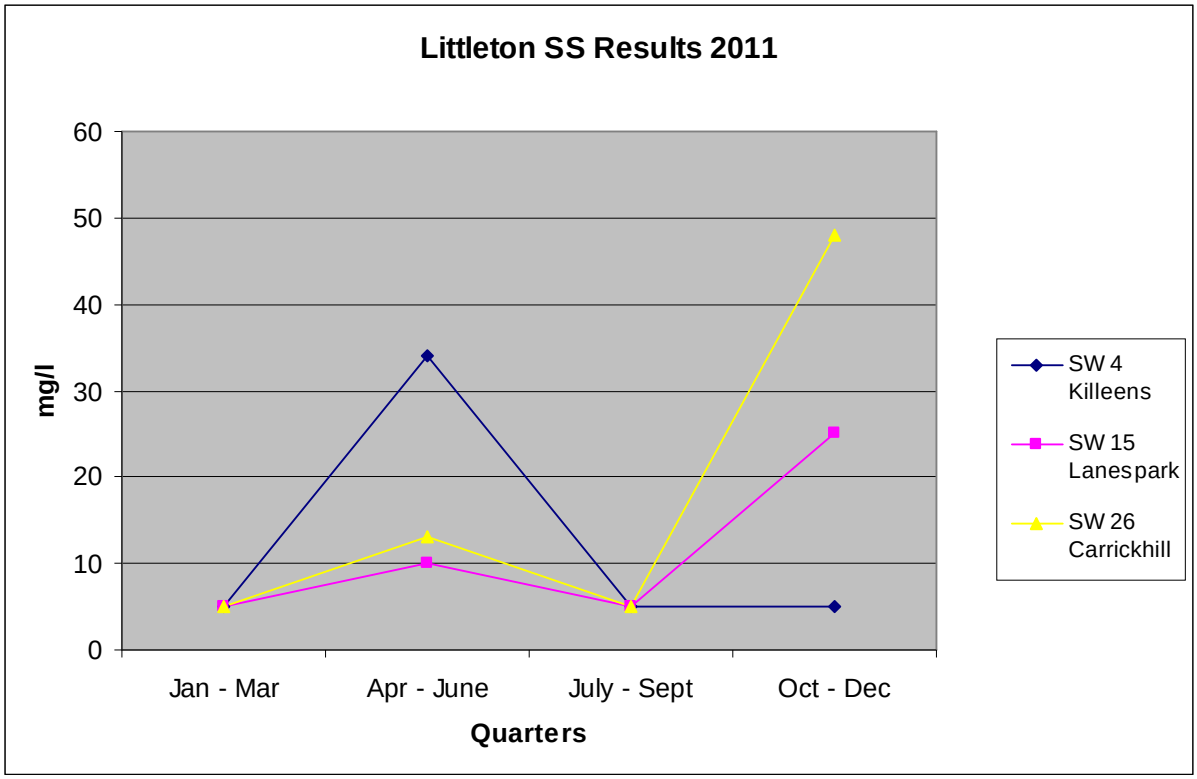
BNM Group:	**Littleton**		**Quarterly Grabs**	
IPPC Licence No.	**PO499-01**	**2011**		
pH (units)				
	Jan - Mar	Apr - June	July - Sept	Oct - Dec
SW 4 Killeens	7.4	7.8	7.7	7.3
SW 15 Lanespark	7.2	7.6	8	7.1
SW 26 Carrickhill	7.6	7.2	7.8	7
COD (mg/l)				
	Jan - Mar	Apr - June	July - Sept	Oct - Dec
SW 4 Killeens	64	40	92	75
SW 15 Lanespark	65	65	10	97
SW 26 Carrickhill	28	63	28	113
Ammonia as N (mg/l)				
	Jan - Mar	Apr - June	July - Sept	Oct - Dec
SW 4 Killeens	1.84	2.13	1.49	1.6
SW 15 Lanespark	2.1	3.48	0.64	0.84
SW 26 Carrickhill	0.29	0.38	3.18	0.82
Total Phosphorus (mg/l)				
	Jan - Mar	Apr - June	July - Sept	Oct - Dec
SW 4 Killeens	0.05	0.05	0.05	0.05
SW 15 Lanespark	0.05	0.05	0.11	0.07
SW 26 Carrickhill	0.05	0.05	0.07	0.06
Suspended Solids (mg/l)				
	Jan - Mar	Apr - June	July - Sept	Oct - Dec
SW 4 Killeens	5	34	5	5
SW 15 Lanespark	5	10	5	25
SW 26 Carrickhill	5	13	5	48
Total Solids (mg/l)				
	Jan - Mar	Apr - June	July - Sept	Oct - Dec
SW 4 Killeens	154	300	240	220
SW 15 Lanespark	164	212	768	132
SW 26 Carrickhill	436	460	312	208
Colour (pt Co Units)				
	Jan - Mar	Apr - June	July - Sept	Oct - Dec
SW 4 Killeens	266	71	107	208
SW 15 Lanespark	285	109	27	192
SW 26 Carrickhill	78	77	73	191
Flow (l/s)				
	Jan - Mar	Apr - June	July - Sept	Oct - Dec
SW 4 Killeens	23.4	3.6	3	11.2
SW 15 Lanespark	16.7	21.4	12	23.7
SW 26 Carrickhill	11.2	8.4	5	7.3

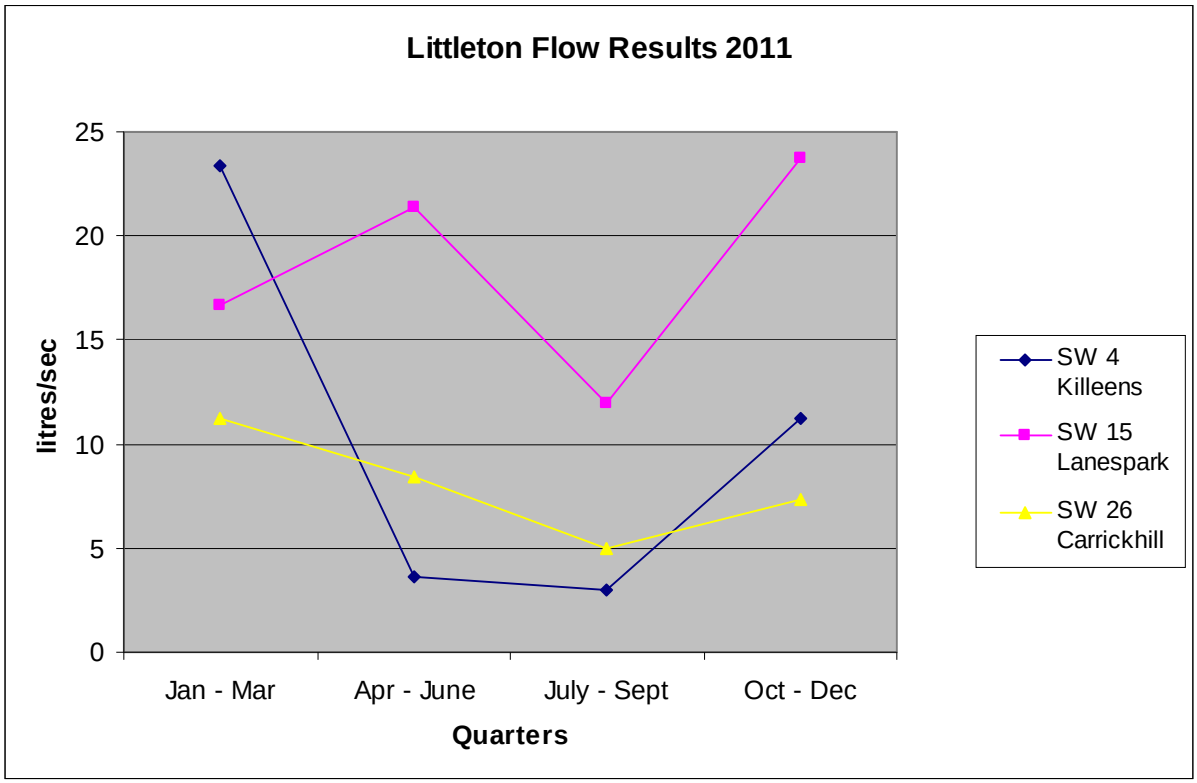

Littleton pH Results 2011
8.2
8
7.8
7.6
7.4
7.2
7
6.8
6.6
6.4
pH Units
Jan - Mar
Apr - June
July - Sept
Oct - Dec
Quarters
SW 4 Killeens
SW 15 Lanespark
SW 26 Carrickhill


Littleton COD Results 2011
120
100
80
60
40
20
0
mg/l
Jan - Mar
Apr - June
July - Sept
Oct - Dec
Quarters
SW 4 Killeens
SW 15 Lanespark
SW 26 Carrickhill


Littleton Ammonia Results 2011
4
3.5
3
2.5
2
1.5
1
0.5
0
mg/l
Jan - Mar
Apr - June
July - Sept
Oct - Dec
Quarters
SW 4 Killeens
SW 15 Lanespark
SW 26 Carrickhill


Littleton Phosphorus Results 2011
0.12
0.1
0.08
0.06
0.04
0.02
0
mg/l
Jan - Mar
Apr - June
July - Sept
Oct - Dec
Quarters
SW 4 Killeens
SW 15 Lanespark
SW 26 Carrickhill


Littleton SS Results 2011
60
50
40
30
20
10
0
mg/l
Jan - Mar
Apr - June
July - Sept
Oct - Dec
Quarters
SW 4 Killeens
SW 15 Lanespark
SW 26 Carrickhill

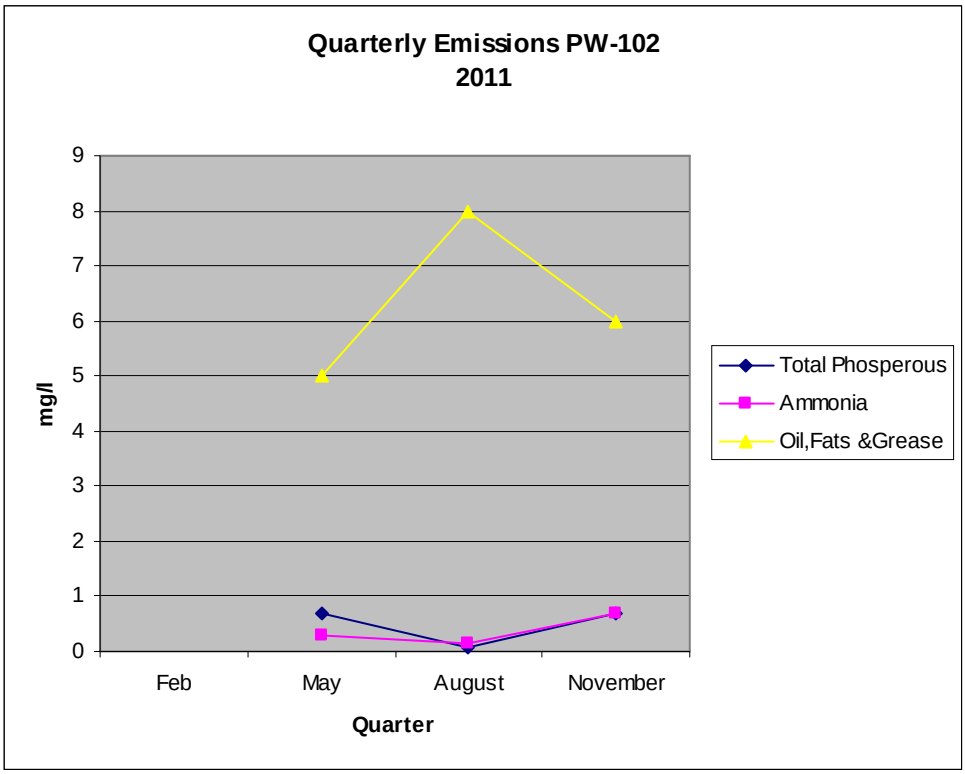

Littleton Flow Results 2011
25
20
15
10
5
0
litres/sec
Jan - Mar
Apr - June
July - Sept
Oct - Dec
Quarters
SW 4 Killeens
SW 15 Lanespark
SW 26 Carrickhill

APPENDIX 2

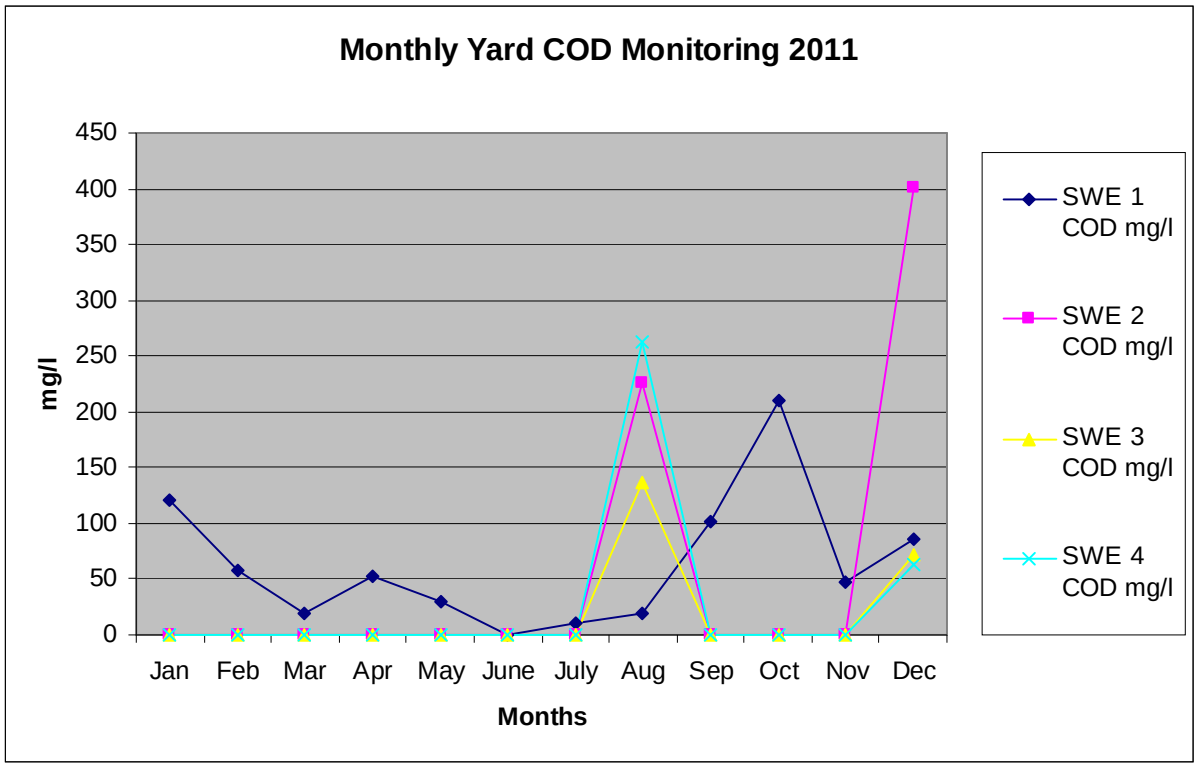
Surface Water Discharge Monitoring Results

Yards

Quarterly Emissions to Water PW - 102 2011			
Works: Littleton			
IPPC: P0499-01			
Quarter	**Total Phosperous**	**Ammonia**	**Oil,Fats &Grease**
Feb			
May	0.7	0.28	5
August	0.08	0.14	8
November	0.7	0.68	6



Oil Interceptor Results				
Licence No:	499			
YEAR: 2011				
LOCATION	FA YARD	TR FUEL	TT YARD	TT FUEL
Month	SWE 1 COD mg/l	SWE 2 COD mg/l	SWE 3 COD mg/l	SWE 4 COD mg/l
Jan	121	0	0	0
Feb	57	0	0	0
Mar	20	0	0	0
Apr	53	0	0	0
May	30	0	0	0
June	0	0	0	0
July	10	0	0	0
Aug	20	226	136	263
Sep	102	0	0	0
Oct	210	0	0	0
Nov	47	0	0	0
Dec	86	401	72	63



APPENDIX 3

Surface Water Discharge Monitoring Results Composite

Month				Parameters							Daily Totals		
Jan	pH	COD	Ammonia as	Total	Suspended	Total	Colour	Flow	COD	Ammonia as	Total	Suspended	Total
SW	22	mg/l	N mg/l	Phosphorus	Solids	Solids	Pt Co	Daily	Kg/Day	Kg/Day	Phosphorus	Solids	Solids
22				mg/l	mg/l	mg/l	units	Total (litres)			Kg/Day	Kg/Day	Kg/Day
1					61	502		5906736				360.31	2965.18
2					5	418		5258045				26.29	2197.86
3					5	256		5128186				25.64	1312.82
4	7.9	34	0.08	0.05	5	252	132	4521830	153.74	0.36	0.23	22.61	1139.50
5					5	410		4201459				21.01	1722.60
6					5	418		4227984				21.14	1767.30
7					5	450		4037213				20.19	1816.75
8					5	454		3768854				18.84	1711.06
9					5	448		4925664				24.63	2206.70
10					5	426		5042909				25.21	2148.28
11	7.8	64	0.27	0.05	5	433	170	6182265	395.66	1.67	0.31	30.91	2676.92
12					5	278		8067168				40.34	2242.67
13					5	282		9792576				48.96	2761.51
14					5	326		10323070				51.62	3365.32
15					5	348		8555673				42.78	2977.37
16					5	288		9749376				48.75	2807.82
17					5	292		12178080				60.89	3556.00
18	8	60	0.03	0.05	8	418	190	9204192	552.25	0.28	0.46	73.63	3847.35
19					5	432		7671802				38.36	3314.22
20					5	440		6181488				30.91	2719.85
21					5	448		5767805				28.84	2583.98
22					5	414		5172681				25.86	2141.49
23					5	424		5125075				25.63	2173.03
24					5	440		5210784				26.05	2292.74
25	8	35	0.05	0.05	5	436	73	5265302	184.29	0.26	0.26	26.33	2295.67
26					5	438		5333990				26.67	2336.29
27					5	395		5336582				26.68	2107.95
28					5	372		5297097				26.49	1970.52
29					11	412		5002387				55.03	2060.98
30					7	420		4513623				31.60	1895.72
31					5	430		4354560				21.77	1872.46

Month				Parameters							Daily Totals		
Feb	pH	COD	Ammonia as	Total	Suspended	Total	Colour	Flow	COD	Ammonia as	Total	Suspended	Total
SW	22	mg/l	N mg/l	Phosphorus	Solids	Solids	Pt Co	Daily	Kg/Day	Kg/Day	Phosphorus	Solids	Solids
22				mg/l	mg/l	mg/l	units	Total (litres)			Kg/Day	Kg/Day	Kg/Day
1	7.9	36	0.09	0.05	5	414	51	4203101	151.31	0.38	0.21	21.02	1740.08
2					5	222		4313174				21.57	957.52
3					5	214		4664304				23.32	998.16
4					5	228		5178903				25.89	1180.79
5					5	214		9901440				49.51	2118.91
6					5	186		13163910				65.82	2448.49
7					5	184		11880000				59.40	2185.92
8	7.6	69	0.18	0.05	5	188	220	10826780	747.05	1.95	0.54	54.13	2035.43
9					5	308		12063170				60.32	3715.46
10					5	254		12737090				63.69	3235.22
11					5	266		11044510				55.22	2937.84
12					5	316		10418110				52.09	3292.12
13					5	346		11580190				57.90	4006.75
14					5	374		12130560				60.65	4536.83
15	7.9	53	0.05	0.05	5	406	133	11107590	588.70	0.56	0.56	55.54	4509.68
16					5	378		9818496				49.09	3711.39
17					5	346		9665568				48.33	3344.29
18					5	388		9372672				46.86	3636.60
19					5	360		8441798				42.21	3039.05
20					5	370		8716896				43.58	3225.25
21					5	376		7732281				38.66	2907.34
22	8.1	43	0.04	0.05	5	374	110	8039952	345.72	0.32	0.40	40.20	3006.94
23					22	396		7636032				167.99	3023.87
24					19	366		7480426				142.13	2737.84
25					17	417		6823354				116.00	2845.34
26					19	428		6302966				119.76	2697.67
27					17	426		6412522				109.01	2731.73
28					19	476		6319987				120.08	3008.31

Mar	pH	COD	Ammonia as	Total	Suspended	Total	Colour	Flow	COD	Ammonia as	Total	Suspended	Total
SW	22	mg/l	N mg/l	Phosphorus	Solids	Solids	Pt Co	Daily	Kg/Day	Kg/Day	Phosphorus	Solids	Solids
22				mg/l	mg/l	mg/l	units	Total (litres)			Kg/Day	Kg/Day	Kg/Day
1	8.1	56	0.22	0.05	19	424	101	5938963	332.58	1.31	0.30	112.84	2518.12
2					5	470		5786467				28.93	2719.64
3					5	472		5323968				26.62	2512.91
4					5	448		5699981				28.50	2553.59
5					5	470		6238253				31.19	2931.98
6					5	400		5944752				29.72	2377.90
7					5	384		5552064				27.76	2131.99
8	8	23	0.05	0.05	5	407	99	4532803	104.25	0.23	0.23	22.66	1844.85
9					5	413		4328381				21.64	1787.62
10					5	472		4287082				21.44	2023.50
11					5	466		4375555				21.88	2039.01
12					5	470		4437850				22.19	2085.79
13					5	464		4444070				22.22	2062.05
14					5	486		4452106				22.26	2163.72
15	8.2	28	0.02	0.05	9	452	71	4508698	126.24	0.09	0.23	40.58	2037.93
16					5	426		4696272				23.48	2000.61
17					5	434		4698778				23.49	2039.27
18					5	426		4712169				23.56	2007.38
19					5	454		4567104				22.84	2073.47
20					5	458		4451933				22.26	2038.99
21					5	450		4573066				22.87	2057.88
22	8.2	31	0.02	0.06	5	444	50	4639075	143.81	0.09	0.28	23.20	2059.75
23					6	430		4707850				28.25	2024.38
24					5	430		4371927				21.86	1879.93
25					5	418		4326739				21.63	1808.58
26					5	438		4338749				21.69	1900.37
27					5	460		4161715				20.81	1914.39
28					5	450		3765830				18.83	1694.62
29	8.2	24	0.05	0.05	5	430	37	3506717	84.16	0.18	0.18	17.53	1507.89
30					7	460		3497558				24.48	1608.88
31					5	426		3636382				18.18	1549.10

Apr	pH	COD	Ammonia as	Total	Suspended	Total	Colour	Flow	COD	Ammonia as	Total	Suspended	Total
SW	22	mg/l	N mg/l	Phosphorus	Solids	Solids	Pt Co	Daily	Kg/Day	Kg/Day	Phosphorus	Solids	Solids
22				mg/l	mg/l	mg/l	units	Total (litres)			Kg/Day	Kg/Day	Kg/Day
1					5	436		3530310				17.65	1539.22
2					5	434		3788520				18.94	1644.22
3					5	404		3694180				18.47	1492.45
4					5	426		3561230				17.81	1517.08
5	8.4	23	0.02	0.05	5	438	47	3403200	78.27	0.07	0.17	17.02	1490.60
6					0	0		3551450				0.00	0.00
7					0	0		3553910				0.00	0.00
8					0	0		3453750				0.00	0.00
9					0	0		3229490				0.00	0.00
10					0	0		2789980				0.00	0.00
11					0	0		2549180				0.00	0.00
12					0	0		2598630				0.00	0.00
13					5	439		2910710				14.55	1277.80
14					5	417		3010720				15.05	1255.47
15					5	410		2468490				12.34	1012.08
16					5	410		2441010				12.21	1000.81
17					5	428		2073050				10.37	887.27
18					5	422		2071910				10.36	874.35
19	8.2	39	0.02	0.05	42	454	40	2168050	84.55	0.04	0.11	91.06	984.29
20					5	432		1989080				9.95	859.28
21					5	412		1772330				8.86	730.20
22					5	416		1754430				8.77	729.84
23					5	433		1641800				8.21	710.90
24					5	416		1557200				7.79	647.80
25					5	418		1526260				7.63	637.98
26	8.3	33	0.02	0.05	5	418	45	1453930	47.98	0.03	0.07	7.27	607.74
27					10	384		1400510				14.01	537.80
28					7	410		1336330				9.35	547.90
29					8	416		1183460				9.47	492.32
30					5	418		1131850				5.66	473.11

May	pH	COD	Ammonia as	Total	Suspended	Total	Colour	Flow	COD	Ammonia as	Total	Suspended	Total
SW	22	mg/l	N mg/l	Phosphorus	Solids	Solids	Pt Co	Daily	Kg/Day	Kg/Day	Phosphorus	Solids	Solids
22				mg/l	mg/l	mg/l	units	Total (litres)			Kg/Day	Kg/Day	Kg/Day
1					5	426		1131410				5.66	481.98
2					5	422		1225670				6.13	517.23
3	8.4	17	0.02	0.05	5	414	41	946853	16.10	0.02	0.05	4.73	392.00
4					8	370		987671				7.90	365.44
5					5	378		1390500				6.95	525.61
6					5	358		1428440				7.14	511.38
7					5	382		1440570				7.20	550.30
8					5	383		1517870				7.59	581.34
9					5	392		1480240				7.40	580.25
10	8.3	24	0.04	0.05	5	360	42	1294380	31.07	0.05	0.06	6.47	465.98
11					5	366		1113060				5.57	407.38
12					5	354		986397				4.93	349.18
13					5	350		840701				4.20	294.25
14					5	282		743857				3.72	209.77
15					5	362		684917				3.42	247.94
16					5	358		633477				3.17	226.78
17	8.2	27	0.03	0.05	19	386	50	574244	15.50	0.02	0.03	10.91	221.66
18					7	368		508226				3.56	187.03
19					9	366		285222				2.57	104.39
20					7	372		226830				1.59	84.38
21					5	380		167642				0.84	63.70
22					5	390		367698				1.84	143.40
23					5	394		363117				1.82	143.07
24	8.3	15	0.02	0.05	5	398	48	295431	4.43	0.01	0.01	1.48	117.58
25					12	324		119982				1.44	38.87
26					5	342		194392				0.97	66.48
27					5	344		205677				1.03	70.75
28					15	318		87998				1.32	27.98
29					14	392		19862				0.28	7.79
30					8	320		28503				0.23	9.12
31	8.2	37	0.06	0.05	18	368	57	22722				0.41	8.36

Jun	pH	COD	Ammonia as	Total	Suspended	Total	Colour	Flow	COD	Ammonia as	Total	Suspended	Total
SW	22	mg/l	N mg/l	Phosphorus	Solids	Solids	Pt Co	Daily	Kg/Day	Kg/Day	Phosphorus	Solids	Solids
22				mg/l	mg/l	mg/l	units	Total (litres)			Kg/Day	Kg/Day	Kg/Day
1								0				0.00	0.00
2								0				0.00	0.00
3								0				0.00	0.00
4								0				0.00	0.00
5								0				0.00	0.00
6								0	0.00	0.00	0.00	0.00	0.00
7								0				0.00	0.00
8								0				0.00	0.00
9								0				0.00	0.00
10								0				0.00	0.00
11								0				0.00	0.00
12								0				0.00	0.00
13								0	0.00	0.00	0.00	0.00	0.00
14								0				0.00	0.00
15								0				0.00	0.00
16								0				0.00	0.00
17								0				0.00	0.00
18								0				0.00	0.00
19								0				0.00	0.00
20								0	0.00	0.00	0.00	0.00	0.00
21								0				0.00	0.00
22								0				0.00	0.00
23								0				0.00	0.00
24								0				0.00	0.00
25								0				0.00	0.00
26								0				0.00	0.00
27								0	0.00	0.00	0.00	0.00	0.00
28								0				0.00	0.00
29								0				0.00	0.00
30								0				0.00	0.00

July	pH	COD	Ammonia as	Total	Suspended	Total	Colour	Flow	COD	Ammonia as	Total	Suspended	Total
SW	22	mg/l	N mg/l	Phosphorus	Solids	Solids	Pt Co	Daily	Kg/Day	Kg/Day	Phosphorus	Solids	Solids
22				mg/l	mg/l	mg/l	units	Total (litres)			Kg/Day	Kg/Day	Kg/Day
1								0	0.00	0.00	0.00	0.00	0.00
2								0				0.00	0.00
3								0				0.00	0.00
4								0				0.00	0.00
5								0				0.00	0.00
6								0				0.00	0.00
7								0				0.00	0.00
8								0	0.00	0.00	0.00	0.00	0.00
9								0				0.00	0.00
10								0				0.00	0.00
11								0				0.00	0.00
12								0				0.00	0.00
13								0				0.00	0.00
14								0				0.00	0.00
15								0	0.00	0.00	0.00	0.00	0.00
16								0				0.00	0.00
17								0				0.00	0.00
18								0				0.00	0.00
19								0				0.00	0.00
20								0				0.00	0.00
21								0				0.00	0.00
22								0	0.00	0.00	0.00	0.00	0.00
23								0				0.00	0.00
24								0				0.00	0.00
25								0				0.00	0.00
26								0				0.00	0.00
27								0				0.00	0.00
28								0				0.00	0.00
29								0	0.00	0.00	0.00	0.00	0.00
30								0				0.00	0.00
31								0				0.00	0.00

Aug	pH	COD	Ammonia as	Total	Suspended	Total	Colour	Flow	COD	Ammonia as	Total	Suspended	Total
SW	22	mg/l	N mg/l	Phosphorus	Solids	Solids	Pt Co	Daily	Kg/Day	Kg/Day	Phosphorus	Solids	Solids
22				mg/l	mg/l	mg/l	units	Total (litres)			Kg/Day	Kg/Day	Kg/Day
1								0	0.00	0.00	0.00	0.00	0.00
2								0				0.00	0.00
3								0				0.00	0.00
4								0				0.00	0.00
5								0				0.00	0.00
6								0				0.00	0.00
7								0				0.00	0.00
8								0	0.00	0.00	0.00	0.00	0.00
9								0				0.00	0.00
10								0				0.00	0.00
11								0				0.00	0.00
12								0				0.00	0.00
13								0				0.00	0.00
14								0				0.00	0.00
15								0	0.00	0.00	0.00	0.00	0.00
16								0				0.00	0.00
17								0				0.00	0.00
18								0				0.00	0.00
19								0				0.00	0.00
20								0				0.00	0.00
21								0				0.00	0.00
22								0	0.00	0.00	0.00	0.00	0.00
23								0				0.00	0.00
24								0				0.00	0.00
25								0				0.00	0.00
26								0				0.00	0.00
27								0				0.00	0.00
28								0				0.00	0.00
29								0	0.00	0.00	0.00	0.00	0.00
30								0				0.00	0.00
31								0				0.00	0.00

Sep	pH	COD	Ammonia as	Total	Suspended	Total	Colour	Flow	COD	Ammonia as	Total	Suspended	Total
SW	22	mg/l	N mg/l	Phosphorus	Solids	Solids	Pt Co	Daily	Kg/Day	Kg/Day	Phosphorus	Solids	Solids
22				mg/l	mg/l	mg/l	units	Total (litres)			Kg/Day	Kg/Day	Kg/Day
1								0	0.00	0.00	0.00	0.00	0.00
2								0				0.00	0.00
3								0				0.00	0.00
4								0				0.00	0.00
5								0				0.00	0.00
6								0				0.00	0.00
7								0				0.00	0.00
8								0	0.00	0.00	0.00	0.00	0.00
9								0				0.00	0.00
10								0				0.00	0.00
11								0				0.00	0.00
12								0				0.00	0.00
13								0				0.00	0.00
14								0				0.00	0.00
15								0	0.00	0.00	0.00	0.00	0.00
16								0				0.00	0.00
17								0				0.00	0.00
18								0				0.00	0.00
19								0				0.00	0.00
20								0				0.00	0.00
21								0				0.00	0.00
22								0	0.00	0.00	0.00	0.00	0.00
23								0				0.00	0.00
24								0				0.00	0.00
25								0				0.00	0.00
26								0				0.00	0.00
27								0				0.00	0.00
28								0				0.00	0.00
29								0	0.00	0.00	0.00	0.00	0.00
30								0				0.00	0.00

Oct	pH	COD	Ammonia as	Total	Suspended	Total	Colour	Flow	COD	Ammonia as	Total	Suspended	Total
SW	22	mg/l	N mg/l	Phosphorus	Solids	Solids	Pt Co	Daily	Kg/Day	Kg/Day	Phosphorus	Solids	Solids
22/18				mg/l	mg/l	mg/l	units	Total (litres)			Kg/Day	Kg/Day	Kg/Day
1								0				0.00	0.00
2								0				0.00	0.00
3								0	0.00	0.00	0.00	0.00	0.00
4								0				0.00	0.00
5								0				0.00	0.00
6								0				0.00	0.00
7								0				0.00	0.00
8								0				0.00	0.00
9								0				0.00	0.00
10								0	0.00	0.00	0.00	0.00	0.00
11								0				0.00	0.00
12								0				0.00	0.00
13								0				0.00	0.00
14								0				0.00	0.00
15								0				0.00	0.00
16								0				0.00	0.00
17								0	0.00	0.00	0.00	0.00	0.00
18								0				0.00	0.00
19								0				0.00	0.00
20								0				0.00	0.00
21								0				0.00	0.00
22								0				0.00	0.00
23								0				0.00	0.00
24								0	0.00	0.00	0.00	0.00	0.00
25					20	128		357955				7.16	45.82
26	7.1	110	2.68	0.05	21	154	423	1606090	176.67	4.30	0.08	33.73	247.34
27					12	118		1193270				14.32	140.81
28					25	146		1195430				29.89	174.53
29					8	106		1192320				9.54	126.39
30					10	106		1779670				17.80	188.65
31					6	134		1193440				7.16	159.92

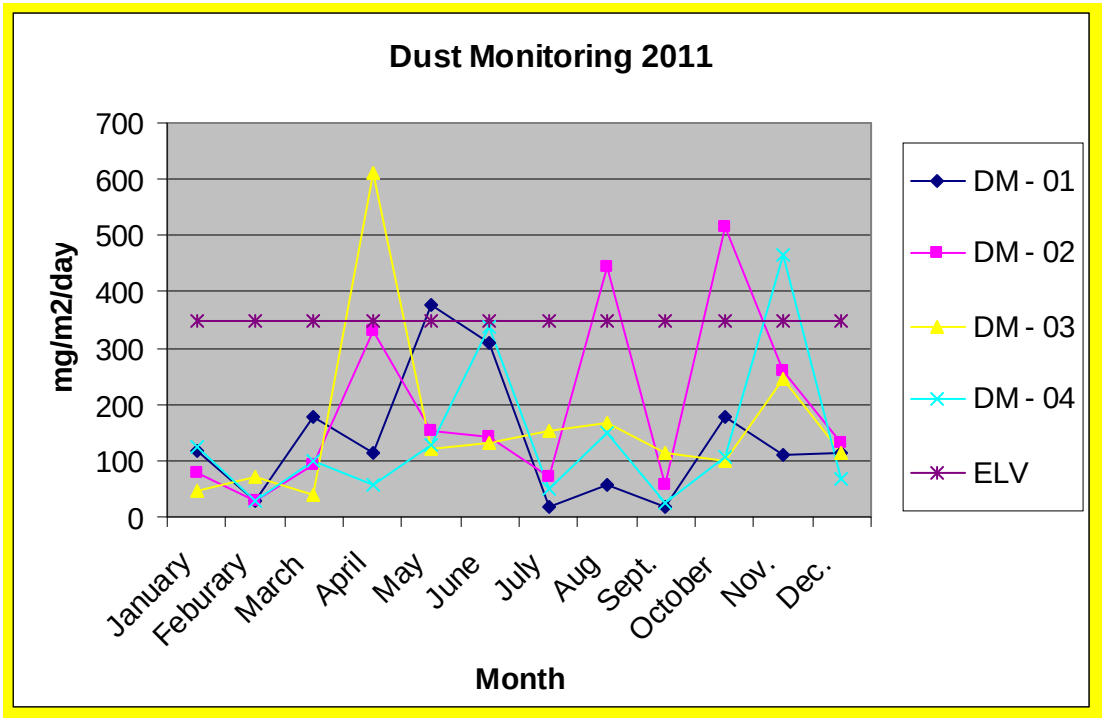
Nov	pH	COD	Ammonia as	Total	Suspended	Total	Colour	Flow	COD	Ammonia as	Total	Suspended	Total
SW	22	mg/l	N mg/l	Phosphorus	Solids	Solids	Pt Co	Daily	Kg/Day	Kg/Day	Phosphorus	Solids	Solids
18				mg/l	mg/l	mg/l	units	Total (litres)			Kg/Day	Kg/Day	Kg/Day
1					11	80		1803690				19.84	144.30
2	7.7	96	2.84	0.05	8	116	351	2047250	196.54	5.81	0.10	16.38	237.48
3					9	144		1241570				11.17	178.79
4					5	126		702173				3.51	88.47
5					8	104		482630				3.86	50.19
6					6	109		449107				2.69	48.95
7					6	122		577670				3.47	70.48
8					5	106		735523				3.68	77.97
9	7.1	220	1.8	0.05	157	276	273	616810	135.70	1.11	0.03	96.84	170.24
10					0	0		1494370				0.00	0.00
11					0	0		965347				0.00	0.00
12					0	0		680314				0.00	0.00
13					0	0		231898				0.00	0.00
14					0	0		333850				0.00	0.00
15					0	0		-98064				0.00	0.00
16					0	0		1120350				0.00	0.00
17					0	0		1793400				0.00	0.00
18					0	0		3058990				0.00	0.00
19					0	0		1644620				0.00	0.00
20					0	0		220838				0.00	0.00
21					0	0		343699				0.00	0.00
22					0	0		1052090				0.00	0.00
23					0	0		1308870				0.00	0.00
24					0	0		1308870				0.00	0.00
25					0	0		1308870				0.00	0.00
26					0	0		1308870				0.00	0.00
27					0	0		1308870				0.00	0.00
28					0	0		1308870				0.00	0.00
29					0	0		1308870				0.00	0.00
30					0	0		1308870				0.00	0.00

Dec	pH	COD	Ammonia as	Total	Suspended	Total	Colour	Flow	COD	Ammonia as	Total	Suspended	Total
SW	22	mg/l	N mg/l	Phosphorus	Solids	Solids	Pt Co	Daily	Kg/Day	Kg/Day	Phosphorus	Solids	Solids
18				mg/l	mg/l	mg/l	units	Total (litres)			Kg/Day	Kg/Day	Kg/Day
1					0	0		1308870				0.00	0.00
2					0	0		1308870				0.00	0.00
3					0	0		1308870				0.00	0.00
4					0	0		1308870				0.00	0.00
5					0	0		1308870				0.00	0.00
6					0	0		1308870				0.00	0.00
7					0	0		1427330				0.00	0.00
8					5	166		1000340				5.00	166.06
9					5	212		733795				3.67	155.56
10					5	230		958608				4.79	220.48
11					5	216		1194570				5.97	258.03
12					27	184		1513560				40.87	278.50
13					11	157		839462				9.23	131.80
14	7.3	85	2.1	0.05	29	170	198	1262130	107.28	2.65	0.06	36.60	214.56
15					5	216		861494				4.31	186.08
16					20	180		815962				16.32	146.87
17					5	194		547862				2.74	106.29
18					5	210		1280020				6.40	268.80
19					8	214		1070150				8.56	229.01
20					7	159		1506470				10.55	239.53
21	7.4	44	2.13	0.05	5	174	175	876183	38.55	1.87	0.04	4.38	152.46
22					0	0		915926				0.00	0.00
23					0	0		1174260				0.00	0.00
24					0	0		862445				0.00	0.00
25					0	0		823478				0.00	0.00
26					0	0		693706				0.00	0.00
27					0	0		701741				0.00	0.00
28					28	130		1444780				40.45	187.82
29					5	145		993427				4.97	144.05
30					5	136		1295400				6.48	176.17
31					5	150		1243730				6.22	186.56

APPENDIX 4

Dust Monitoring Results.

Dust Monitoring Results 2011				
IPPC Licence: P0499-01				
Works: Littleton				
Sample Period	**DM - 01**	**DM - 02**	**DM - 03**	**DM - 04**
January	119	77	47	125
Feburary	30	30	71	30
March	178	94	39	100
April	115	330	610	57
May	376	153	121	127
June	308	141	130	339
July	19	70	153	51
Aug	57	445	167	148
Sept.	19	57	115	25
October	178	516	101	107
Nov.	110	261	245	464
Dec.	113	131	113	68



Summary Results of Emissions to Atmosphere compliance monitoring from the Bord na Móna Fuels Limited Littleton Briquette Factory at Littleton (January 2011 to December 2011) in accordance with the requirements of integrated pollution control licence register no. P0499-01.

REPORT NO.: ECS4164

ATTENTION: Mr. Ray Yates
Bord na Móna Fuels Limited
c/o Littleton Briquette Factory
Thurles
Co. Tipperary

PREPARED BY: Mr. Neville Allen
Environmental Scientist

REVIEWED BY: Mr. Paul Crimmins
Environmental Scientist

DATE: February 2012

This report shall not be reproduced except in full, without the approval of ANUA Environmental. All complaints concerning the report or its contents should be forwarded to the Monitoring Team leader.

EXECUTIVE SUMMARY

AS PART OF THE REQUIREMENTS OF INTEGRATED POLLUTION CONTROL LICENCE, REGISTER NO. P0499-01, BORD NA MÓNA FUELS LIMITED ARE REQUIRED TO SUBMIT TO THE AGENCY, AN ANNUAL ENVIRONMENTAL REPORT (AER). ANUA ENVIRONMENTAL WERE COMMISSIONED TO PREPARE A SUMMARY REPORT OF EMISSIONS TO ATMOSPHERE MONITORED AT THE LITTLETON BRIQUETTE FACTORY DURING THE PERIOD FROM JANUARY 2011 TO DECEMBER 2011. DUE TO PRODUCTION DOWNTIME OF THE FIRE LIGHTER PLANT IN 2011, IT WAS NOT POSSIBLE TO CARRY OUT QUARTER TWO TOTAL ORGANIC CARBON MONITORING ON EMISSION POINT A108.

THIS REPORT IS CERTIFIED AS ACCURATE AND REPRESENTATIVE OF THE SAMPLING AND ASSOCIATED ANALYSIS CARRIED OUT.

RESPECTIVELY SUBMITTED,

MR NEVILLE ALLEN
ENVIRONMENTAL SCIENTIST

MR. PAUL CRIMMINS
ENVIRONMENTAL SCIENTIST

1.0 INTRODUCTION

A summary of IPC Licence Register No. P0499-01 environmental monitoring results from the period January 2011 to December 2011 are presented as follows:

Table 1: Quarterly Compliance Monitoring of Particulate Emissions to Atmosphere

Table 2: Summary of Quarterly Compliance Monitoring of Particulate Mass Emissions to Atmosphere

Table 3: IPC Licence Particulate Emissions to Atmosphere Emission Limit Values (ELV's)

Table 4: Annual Particulate Mass Emissions to Atmosphere

Table 5: Quarterly Compliance Monitoring of TOC (as C) Emissions to Atmosphere from Emission Point A108

Table 6: Annual TOC (as C) Emissions to Atmosphere from Emission Point A108

Appendix 1

Figures 1-6: Particulate Mass Emissions to Atmosphere (kg) (January 2011 to December 2011) vs. Licence ELV from Emissions Reference Points B101, A101-A106 respectively.

Figure 7: Summary of Particulate Mass Emissions to Atmosphere (kg) (January 2011 to December 2011) from Emissions Reference Points B101, A101-A106.

TABLE 1: QUARTERLY COMPLIANCE MONITORING OF PARTICULATE EMISSIONS TO ATMOSPHERE (JANUARY – DECEMBER 2011)						
Quarter	**Sampling Dates**	**Job No.**	**Emission Point Ref.**	**Volumetric Flow (Nm^3/hr)**	**Particulates Concentration (mg/Nm^3)**	**Particulate Mass Emissions (kg/hr)**
1	8/2/12 8/3/12 9/3/12	ECS3888	B101	32,143	**939.22**	30.19
			A101	**63,511**	32.79	2.08
			A102	**83,658**	**144.78**	12.11
			A103	5,020	240.58	1.21
			A104	11,023	216.98	2.39
			A105	6,427	0.81	5.2×10^{-3}
			A106	560	103.30	5.8×10^{-2}
2	24/5/11	ECS3939	B101	31,363	**1109.00**	34.77
			A101	**81,418**	**113.66**	9.25
			A102	**87,509**	**59.05**	5.17
			A103	3,631	34.00	0.12
			A104	11,251	1218.26	**13.71**
			A105	**6,884**	14.31	0.10
			A106	**924**	75.40	0.07
3	28/9/11 29/9/11	ECS4051	B101	33,341	889.19	29.65
			A101	**77,455**	779.43	60.37
			A102	**85,785**	287.57	24.67
			A103	4,673	86.37	0.40
			A104	7,259	1219.15	8.85
			A105	4,338	22.83	0.10
			A106	**668**	47.14	0.03
4	16/11/2011 17/11/2011	ECS4079	B101	27,843	1490.92	41.51
			A101	**52,952**	75.51	4.00
			A102	77,389	119.11	9.22
			A103	4,330	35.79	0.15
			A104	11,584	2686.82	31.12
			A105	5,209	13.61	0.07
			A106	**989**	158.01	0.16

TABLE 2: SUMMARY OF QUARTERLY COMPLIANCE MONITORING OF PARTICULATE MASS EMISSIONS TO ATMOSPHERE (JANUARY – DECEMBER 2011)				
Emission Point Ref.	**Particulate Mass Emissions during each Quarterly Monitoring Event (kg/hr)**			
	Quarter 1	**Quarter 2**	**Quarter 3**	**Quarter 4**
B101	30.19	34.77	29.65	41.51
A101	2.08	9.25	60.37	4.00
A102	12.11	5.17	24.67	9.22
A103	1.21	0.12	0.40	0.15
A104	2.39	13.71	8.85	31.12
A105	5.2×10^{-3}	0.10	0.10	0.07
A106	5.8×10^{-2}	0.07	0.03	0.16

TABLE 3: IPC LICENCE PARTICULATE EMISSIONS TO ATMOSPHERE EMISSION LIMIT VALUES (ELV's)				
Emission Point Ref.	**Maximum Volumetric Flow ELV (Nm^3/hr)**	**Particulate ELV (mg/Nm^3 or kg/hr)**	**Particulate ELV (kg/hr)**	***Licensed Annual Particulate Mass Emissions (kg/yr)***
B101	36000	400 mg/Nm^3	14.4	*126144*
A101	34852	50 mg/Nm^3 >0.5kg/hr 150 mg/Nm^3 <0.5kg/hr	5.23max.	*15265* *45815max.*
A102	42400	50 mg/Nm^3 >0.5kg/hr 150 mg/Nm^3 <0.5kg/hr	6.36max.	*18571* *55714max.*
A103	5800	7 kg/hr	7	*61320*
A104	11700	6 kg/hr	6	*52560*
A105	6797	50 mg/Nm^3 >0.5kg/hr 150 mg/Nm^3 <0.5kg/hr	1.02max.	*2977* *8935 max.*
A106	660	50 mg/Nm^3 >0.5kg/hr 150 mg/Nm^3 <0.5kg/hr	0.10max.	*289.1* *876max.*
Maximum Annual Particulates Mass Emissions to Atmosphere Limit			-	*351332*

TABLE 4: ANNUAL PARTICULATE MASS EMISSIONS TO ATMOSPHERE (JANUARY – DECEMBER 2011)				
Location	**Annual Average Mass Emission (kg/hr)**	**Hours Production** (hr/year)	**Annual Particulate Mass Emissions (kg/year)**	***Licensed Annual Particulate Mass Emissions (kg/yr)***
B101	34.03	5,200	176,956	*126,144*
A101	18.93	5,200	98,410	*45,796 max.*
A102	12.79	5,200	66,521	*55,714 max.*
A103	0.47	5,200	2,444	*61,320*
A104	14.02	5,200	72,891	*52,560*
A105	0.09	5,200	468	*8,931 max.*
A106	0.09	5,200	451	*867 max.*
Particulate Mass Emissions to Atmosphere			418,141	*351332*

TABLE 5: QUARTERLY COMPLIANCE MONITORING OF TOC (AS C) EMISSIONS TO ATMOSPHERE FROM EMISSION POINT A108 (JANUARY – DECEMBER 2011)					
Quarter	**Sampling Date**	**Job No.**	**Volumetric Flow (Nm^3/hr)**	**TOC (as C) (mg/Nm^3)**	**TOC (as C) Mass Emissions (kg/hr)**
1	29/3/11	ECS3888	1,805	115	0.21
2	Note 1	Note 1	Note 1	Note 1	Note 1
3	29/9/11	ECS4051	1,774	154	0.27
4	16/11/11	ECS4079	1,690	135	0.23
IPC Licence ELV's			*6,700*	*170*	*1.14*

Note 1: Emission point A108 was not operational during this monitoring period.

TABLE 6: ANNUAL TOC (as C) MASS EMISSIONS FROM A108 (JANUARY – DECEMBER 2011)			
Annual Average Mass Emission (kg/hr)	**Hours Production (hr/year)** Note 1	**Annual Mass Emissions (kg/year)**	***Annual Mass Emissions IPC Licence ELV (kg/year)***
0.24	3,800	912	*9,986*

Note 1: Operational hours of the Firelighter plant

TABLE 7: ANNUAL COMPLIANCE MONITORING OF NOx (as NO_2) EMISSIONS TO ATMOSPHERE FROM EMISSION POINT B101					
Frequency	**Sampling Date**	**Job No.**	**Volumetric Flow (Nm^3/hr)**	**NOx (as NO_2) (mg/Nm^3)**	**NOx (as NO_2) Mass Emissions (kg/hr)**
Annual	24/5/11	ECS3939	31,363	397	12.5
IPC Licence ELV's			*36000*	*100*	*3.6*

Note 1: *Results are referenced to 6% oxygen, temperature 273K, and pressure 1013.5hPa.*

TABLE 8: ANNUAL NOx (as NO_2) MASS EMISSIONS FROM B101			
Annual Average Mass Emission (kg/hr)	**Hours Production** (hr/year)	**Annual Mass Emissions (kg/year)**	***Annual Mass Emissions IPC Licence ELV (kg/year)***
12.45	5,200	64,740	*31,536*

TABLE 9: ANNUAL COMPLIANCE MONITORING OF SO_2 EMISSIONS TO ATMOSPHERE FROM EMISSION POINT B101					
Frequency	**Sampling Date**	**Job No.**	**Volumetric Flow (Nm^3/hr)**	**SO_2 (mg/Nm^3)**	**SO_2 Mass Emissions (kg/hr)**
Annual	24/5/11	ECS3939	31,363	688	21.6
IPC Licence ELV's			*36000*	*1000*	*36*

Note 1: *Results are referenced to 6% oxygen, temperature 273K, and pressure 1013.5*

TABLE 10: ANNUAL MASS SO_2 EMISSIONS FROM B101			
Annual Average Mass Emission (kg/hr)	**Hours Production** (hr/year)	**Annual Mass Emissions (kg/year)**	***Annual Mass Emissions IPC Licence ELV (kg/year)***
21.6	5,200	112,320	*315,360*

TABLE 11: ANNUAL COMPLIANCE MONITORING OF CO EMISSIONS TO ATMOSPHERE FROM EMISSION POINT B101					
Annual	**Sampling Date**	**Job No.**	**Volumetric Flow (Nm^3/hr)**	**CO (mg/Nm^3)**	**CO Mass Emissions (kg/hr)**
Annual	24/5/11	ECS3939	31,363	1,251	39.2
IPC Licence ELV's			*36000*	*100*	*3.6*

Note1: Results are referenced to 6% oxygen, temperature 273K, and pressure 1013.5hPa

TABLE 12: ANNUAL MASS CO EMISSIONS FROM B101			
Annual Average Mass Emission (kg/hr) Note 1	**Hours Production** (hr/year)	**Annual Mass Emissions (kg/year)**	***Annual Mass Emissions IPC Licence ELV (kg/year)***
39.23	5,200	203,996	-

APPENDIX 1

Figure 1: Particulate Mass Emissions to Atmosphere (kg/hr) (January to December 2011) vs. Licence ELV from Emissions Reference Point B101 – Data point 5 is the average yearly emission

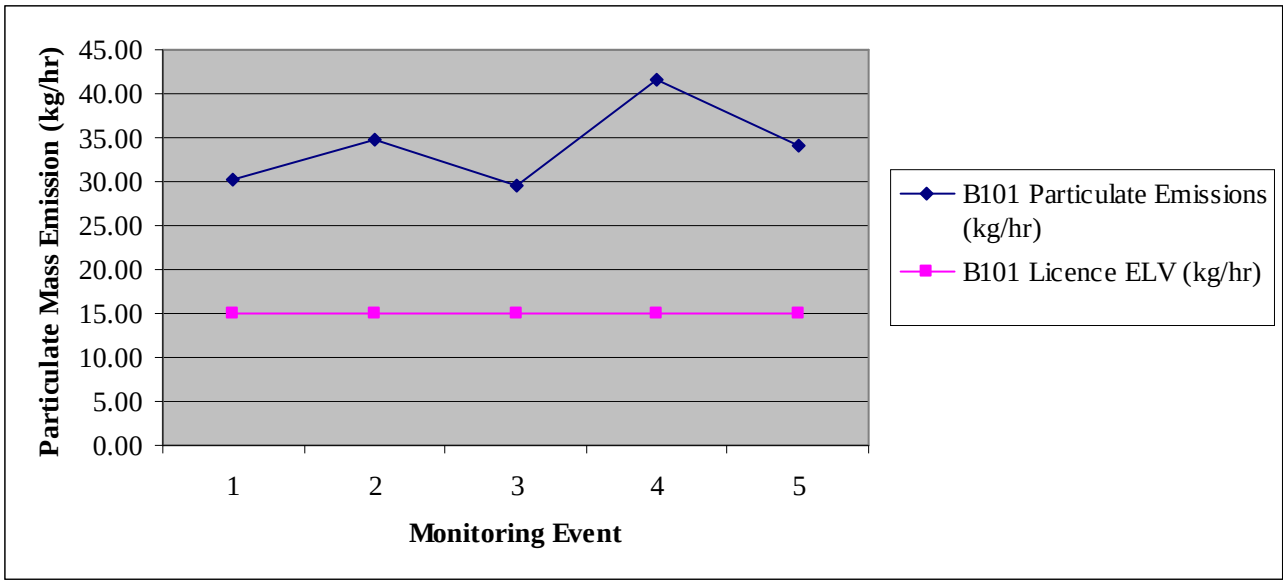


Figure 2: Particulate Mass Emissions to Atmosphere (kg/hr) (January to December 2011) vs. Licence ELV from Emissions Reference Point A101– Data point 5 is the average yearly emission

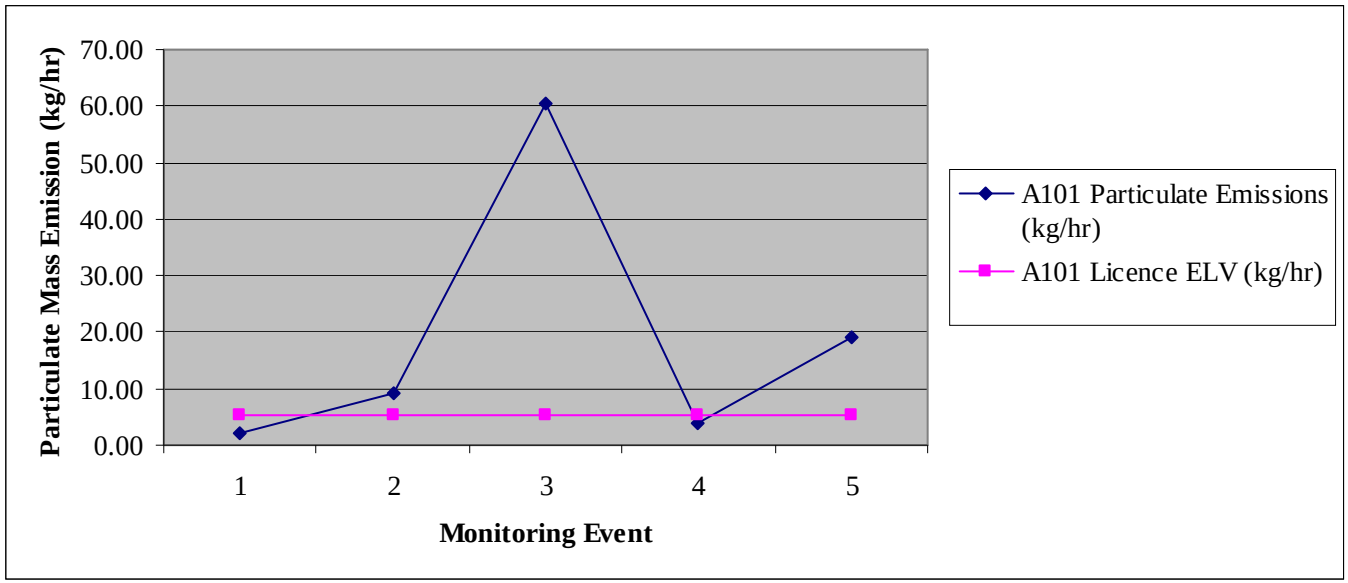


Figure 3: Particulate Mass Emissions to Atmosphere (kg/hr) (January to December 2011) vs. Licence ELV from Emissions Reference Point A102– Data point 5 is the average yearly emission

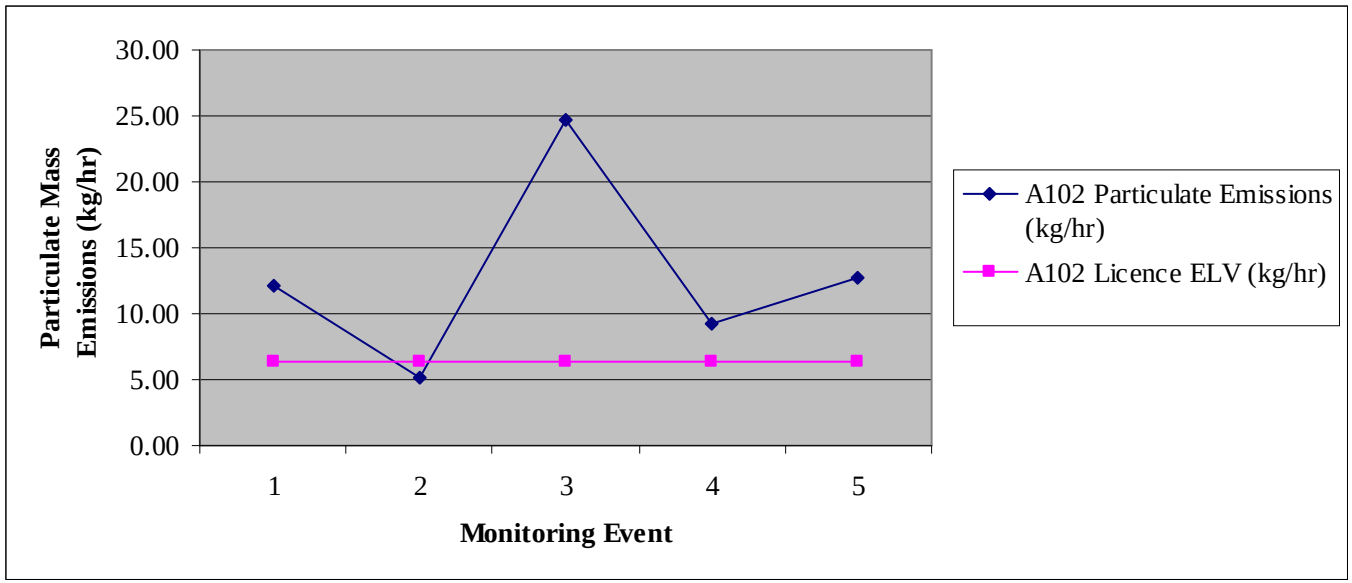


Figure 4: Particulate Mass Emissions to Atmosphere (kg/hr) (January to December 2011) vs. Licence ELV from Emissions Reference Point A103– Data point 5 is the average yearly emission

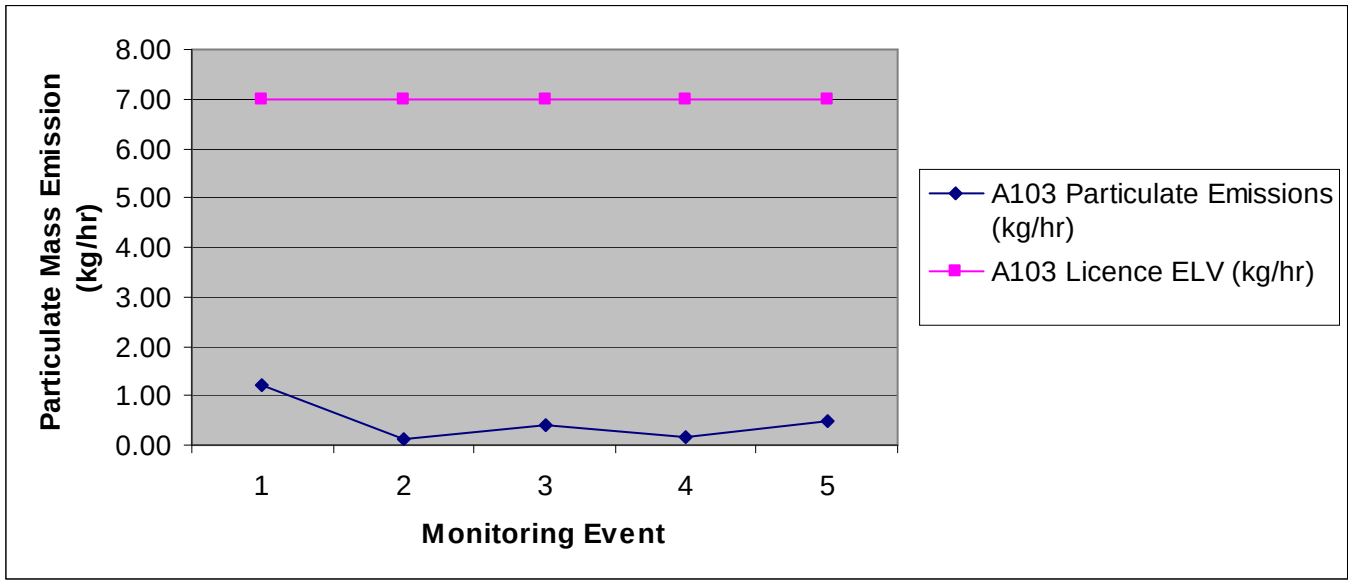


Figure 5: Particulate Mass Emissions to Atmosphere (kg/hr) (January to December 2011) vs. Licence ELV from Emissions Reference Point A104– Data point 5 is the average yearly emission

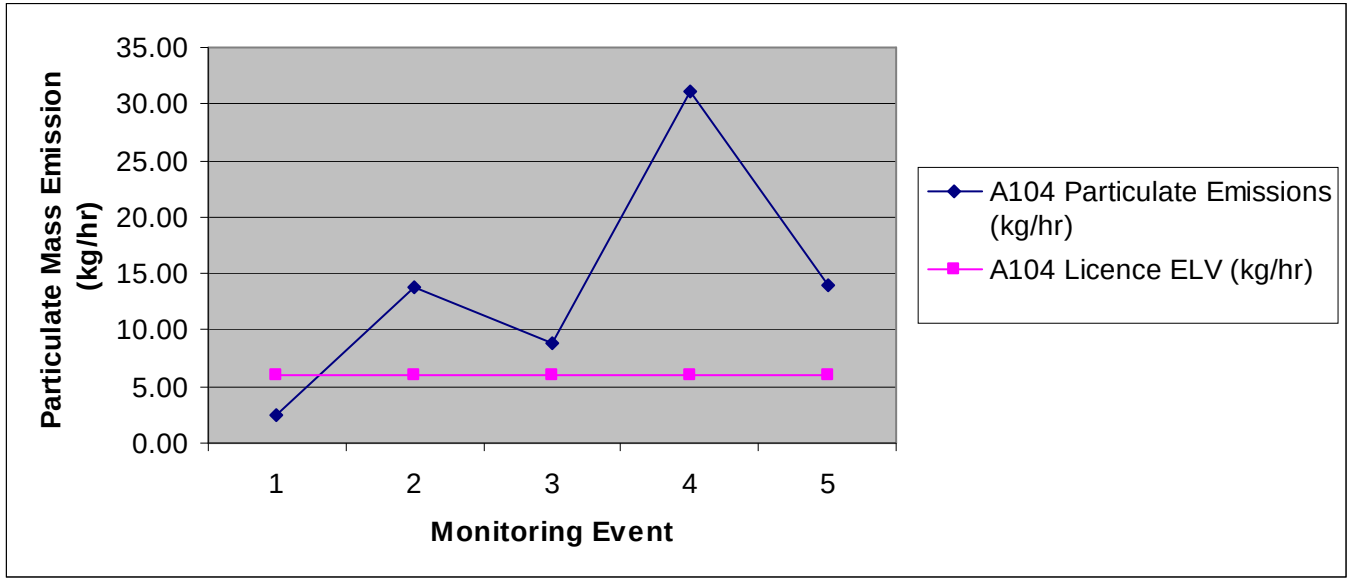
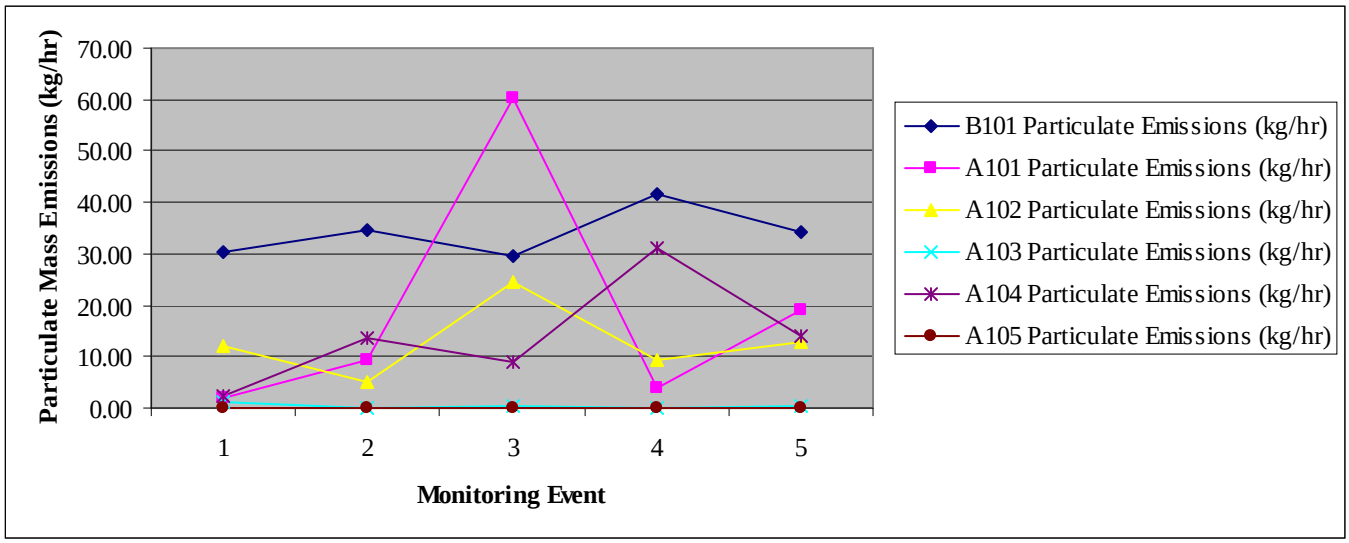


Figure 6: Particulate Mass Emissions to Atmosphere (kg/hr) (January to December 2011) vs. Licence ELV from Emissions Reference Point A105– Data point 5 is the average yearly emission

Figure 7: Particulate Mass Emissions to Atmosphere (kg/hr) (January to December 2011) vs. Licence ELV from Emissions Reference Point A106– Data point 5 is the average yearly emission

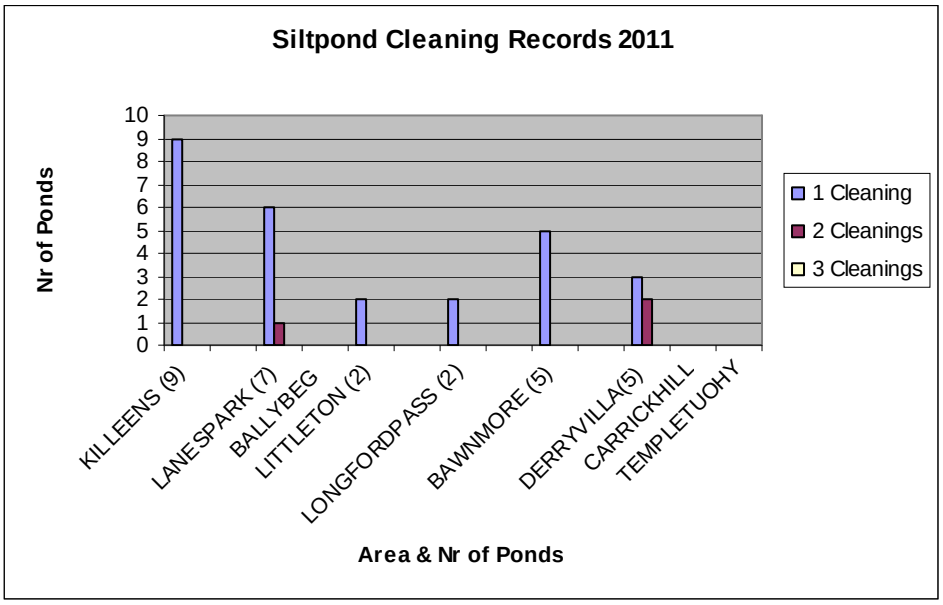
Figure 8: Summary of Particulate Mass Emissions to Atmosphere (kg/hr) (January to December 2011) from Emissions Reference Points B101, A101, A102, A103, A104 and A105



APPENDIX 5

De-silting Programme Review.

Siltpond Cleaning Programme 2011			
IPPC Licence:499			
Year 2011			
Bog Area & Nr Ponds	**1 Cleaning**	**2 Cleanings**	**3 Cleanings**
KILLEENS (9)	9	0	0
LANESPARK (7)	6	1	0
BALLYBEG			
LITTLETON (2)	2	0	0
LONGFORDPASS (2)	2	0	0
BAWNMORE (5)	5	0	0
DERRYVILLA(5)	3	2	0
CARRICKHILL			
TEMPLETUOHY			



Littleton AER 2002

Contents

1.0 Introduction

Bord na Móna Fuels Limited was granted an Integrated Pollution Control Licence by the E.P.A. on 17th August 2001 for it's operation in the Littleton group of bogs. This report is the first A.E.R. for the operations and covers the period from 1st January 2002 to 31st December 2002.

1.1 Company Details

The Littleton group of bogs consists of a cluster of bogs approximately ten miles from Thurles in Co. Tipperary.
The main contact and location details of the company are presented in summary form below

Company Name:	Bord na Móna Fuels Limited
Site Address:	Littleton Group Thurles Co. Tipperary.
IPC Licence Number:	499
Telephone No:	0504-44215
Fax No:	0504-44225
Contact Name:	Ray Yates
Position:	General Manager

The Environmental Protection Agency
31 MAR 2003
IPC ENFORCEMENT

1.2 Activities

Milled Peat is produced on the Littleton group of bogs for transfer to the Briquette Factory for the manufacture of peat solid fuel products. Littleton has a total area of 4,530 hectares. Of this, 1,475 hectares were used for the production of milled peat during the period of the AER.

The production of milled peat is a seasonal activity with production opportunities only possible during the period from late spring to early autumn when drying conditions are suitable. When production operations are underway, they are typically carried out over a seven-day week and for 12 to 15 hours per day. Bog drainage and field conditioning operations are carried out throughout the year, along with peat haulage operations from stockpiles located on the bog to the Briquette Factory. Transport operations are carried out on all days throughout the year that the Briquette Factory is in operation.

Sod Peat was produced on an area of 243 hectares during 2002. Production was from April to August with sales to the public from September to December. Bog preparation and drainage was ongoing throughout the year but was mainly in the period January to March.

The Firelighter Plant operated from January to April and again from September to December.

The Group has it's own workshop facilities for the maintenance, repair and fabrication of plant used in the operations outlined.

In total 128 permanent workers and 34 seasonal workers at peak were employed during 2002.

1.3 Environmental Policy Statement

The Environmental Policy Statement of the company is shown in Appendix 1

1.4 Environmental Management of the Company

The management structure illustrating environmental responsibilities within Bord na Móna Fuels Limited in 2002 is shown in Appendix 2.
The General Manager, Mr. Ray Yates has overall responsibility for the Littleton Group.

2.0 Summary Information

2.1 Emissions to water summary

2.1.1 Silt Pond Emissions

Monitoring and sampling from agreed discharge points are carried out quarterly in the form of grab samples. Samples were taken each quarter from each of the agreed outlets in accordance with the regular sampling programme. The results of the analyses of these samples are presented below in Tables 1A , 1B, 1C.

Table 1A.	Emission Point Reference Number: SW 4.				
	Reporting Period: January – December 2002				
Parameter	Monitoring Period				Licensed ELV
	Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec	
pH (pH units)	8	7.9	7.7	7.0	N/A
COD (mg/l)	271	70	78	64	N/A
Total Phosphorus (mg/l)	0.03	<0.05	<0.05	<0.05	N/A
Ammonia as N (mg/l)	2.1	2.2	1.6	1.7	N/A
Suspended Solids (mg/l)	[redacted]	6	<5	<5	35 mg/l
Colour (Pt Co units)	80	207	214	195	N/A
Flow (l/s)	*	*	5.2	18.9	N/A

Table 1B.	Emission Point Reference Number: SW 15				
	Reporting Period: January – December 2002				
Parameter	Monitoring Period				Licensed ELV
	Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec	
pH (pH units)	8	7.8	7.8	7.3	N/A
COD (mg/l)	46	52	32	372	N/A
Total Phosphorus (mg/l)	<0.05	<0.05	<0.05	0.28	N/A
Ammonia as N (mg/l)	3.3	1.5	3.4	1.8	N/A
Suspended Solids (mg/l)	7	<5	<5	[redacted]	35 mg/l
Colour (Pt Co units)	142	136	69	115	N/A
Flow (l/s)	*	*	4.9	55.5	N/A

Table 1C.	Emission Point Reference Number: SW 26				
	Reporting Period: January – December 2002				
Parameter	Monitoring Period				Licensed ELV
	Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec	
pH (pH units)	7.3	7.4	7.8	6.8	N/A
COD (mg/l)	84	107	130	81	N/A
Total Phosphorus (mg/l)	0.05	<0.05	<0.05	0.07	N/A
Ammonia as N (mg/l)	1.5	1.6	.3	1.1	N/A
Suspended Solids (mg/l)	7	<5	<5	<5	35 mg/l
Colour (Pt Co units)	226	324	413	191	N/A
Flow (l/s)	*	*	1.5	7.85	N/A

2.1.2 PW-102 Factory and Yard Discharge to Ballybeg river.

The sampling and analysis at this location was the subject of a proposal because of lack of access to the original location. This proposal was dated 6th of February 2002 and was further discussed at a site visit in July 2002. During the relevent year the proposal was not agreed and in its absence Littleton continued to sample the factory and yard effluent seperately. The results of our sampling have been included as Appendix 3. No samples are taken during the factory stop period because of the absence of factory effluent. This is the period during which the ponds are cleaned.

2.1.3. Monitoring of workshop/depot surface water run-off.

Inspections are undertaken and logged weekly in the following areas: factory, lanespark workshop, templetuohy workshop and the firelighter area. This is linked to 2.12 as the lanespark workshop, factory yard and oil storage, and the firelighter area all discharge through the factory yard pond and oil-trap. There is an additional trap for lanespark, which is inspected and maintained.
The bunding and fill area progress for the bog will give the up to date position.
The templetuohy workshop and yard area is under development at present. The civil works for a new bunding area and fill area have been completed with associated oil-trap. The yard run-off has not as yet been separated from the storm water and this complete with link to oil-trap is planned for May – June 2003.
The civil works for new bund area at Lanespark is complete however the upgrade of the transport fueling area complete with oil-trap cannot be completed until factory stop in June/July. Tender received and accepted for this final stage. This will complete the groundwater protection programme and with agreement a full sampling programme can commence. The license has a completion deadline of August 2003 on this work. At present the only samples taken are those shown in Appendix 3. Which cover all areas except templetuohy.

2.1.4 Composite Sampler Programme

The Littleton Composite Sampler Proposal was accepted on 25th February 2002. The sampler was in position and sampling after some commissioning difficulties on 10th July 2002. The sampler worked continuously to the end of the year except for:

Power problems from17th to 30th of July.
No flow from the 21st August to 10th October. (The major cause of this was the dewatering undertaken by Minorca Mining. First time outfall dry.)
Battery failure at Christmas.

The results for the composite sampler operating at location SW22 are included as Appendix 4.

2.1.5 Non-compliance

The non- compliances associated with agreed sampling of water effluent at littleton are outlined in table under.

Date	Non-compliance	Cause	Corrective Action
23/10/02	Two consecutive samples of 202 and 408. At composite sampler SW 22.	Not known non-compliance not noticed until A.E.R.	Pond cleaned on 12/8/02. Results of next week averaged 12.7 max. 24. Inspections indicate clear.
13/11/02	Grab sample for Oct. – Dec. 2002 taken on 13/11/02 was 282mg/l. Results on 9/12/02.	Sampler did not notice high s.s. Bypass cleaned at this time. Pond was cleaned on 22/11/02 Before results sent.	Pond cleaned before results and inspection . No further action. Ref: CA LT02/03.
4/12/02	5 Samples > 35mg/l max. = 53mg/l sampled on 4/12/02 results on 17/1/03	Rainfall for week Previous @ 53mm Was 200% normal. For month.	Inspected pond –clear . Samples for next 2 weeks averaged : 13 & 7, with a max. of 24. Ref : CA LT 02/02
27/3/02	SS from SW4. Grab Sample. Emission Limit Value was exceeded ie. (196mg.l Vs 35mg/l)	Take from letter to E.P.A. of 1St May 2002.	Corrective Action Outlined in letter of 19th June to the EPA.

2.2 Emissions to Air Summary (see Appendix 5)

Dispersion modelling of Air Emissions carried out early in the year indicated that Air Quality Standards would be threatened more by emissions of dust from stack B101, A103 and A104.

The Boiler Stack (B101) was improved substantially during the course of the year by a complete replacement of the internal parts of its grit arrestor as well as fitting a new model airlock. The emissions were reduced to well within the limit value for the second part of the year.

Conveyor Exhaust Stack (A103) had the most severe impact on Air Quality in the vicinity and a new scrubber arrangement was fitted on this outlet. This again reduced the emission to within the ELV and enabled the modelling to demonstrate that no breach of Air Quality Standard would occur by operating the plant for the full year.

The Stemple Suction Stack A104 has been improved in the latter part of the year and was operating below its ELV. This was achieved by attention to the maintenance of the existing Cyclone and Airlock. We do still intend to replace this unit in the coming summer with a new Multicyclone to further improve the performance.

Annual monitoring of CO. NOx and SOx at the Boiler B101 was planned at the final monitoring for the year but could not be carried out due to a temporary failure of the measuring equipment. These will be carried out and reported in the first quarterly monitoring for the coming year.

2.2.2 Dust Emissions (Dust Sensitive Locations)

The Dust Emissions are being monitored monthly as per proposal of 18th February 2002 on D.S.L.'s.

The following table contains the monthly readings. In general, readings are below the emission limit value of 350 mg/m^2 /day.

Month	DSL 1	DSL 2	DSL 3
Jan 02	251	205	99
Feb 02			
Mar 02			
Apr 02			
May 02	148	287	105
Jun 02	67	252	6
Jul 02	24	76	124
Aug 02	135	172	166
Sep 02	152	1812	71
Oct 02	142	101	166
Nov 02	69	126	7.5
Dec 02	202	813	42

2.2.3 Non-compliance's

This covers non-compliance's resulting from the dust emissions.

Date	Non-compliance	Cause	Corrective Action
Sep 02	1812 vs 350	Suspect that interference took place as sample contained large chunk of raw peat	Security of site was implemented.
Dec 02	813 vs 350	This sample point was extremely close to area where excavator was carrying out rehabilitation work. Windy conditions during Dec 02.	Relocated to nearby area in Jan 03

2.3 Waste Management Report

2.3.1 Hazardous Waste

BORD NA MÓNA

BORD NA MÓNA FUEL'S LIMITED

Waste Management Record (Hazardous)

Group : Littleton. IPC Licence No.: 499

WASTE DESCRIPTION	*EWC CODE*	*TONNES*	*NAME OF CONTRACTOR*	*NAME OF PERSON ULTIMATELY RESPONSIBLE*	*DESTINATION*	*DATE*
Waste Oil	13 01 01		Bord na Mona	Bord na Mona	Re-use Factory	
Oil/Fuel Filters	16 01 07	3 cub. m	Atlas	Atlas		
Lead Acid Batteries	16 06 01	24 no.	ReturnBatt Ltd.	ReturnBatt Ltd.	Unit 3, Kildare Enterprise Centre	

DETAILS OF ANY REJECTED CONSIGNMENTS						
No rejected consignments						

2.3.2 Non-hazardous Waste

BORD NA MÓNA

BORD NA MÓNA FUELS LIMITED

Waste Management Record (Non-Hazardous)
Group : Littleton IPC Licence No.: 499

WASTE DESCRIPTION	EWC CODE	TONNES	NAME OF CONTRACTOR	NAME OF PERSON ULTIMATELY RESPONSIBLE	DESTINATION	DATE
Silt	01 01 02	15884	0N SITE	BORD NA MONA		ANNUAL
Peat Screenings	01 01 02	300	ON SITE	BORD NA MONA		ANNUAL
Polythene	02 01 04	15.73	. RYAN BROS	. RYAN BROS	THURLES	ANNUAL
Peat Ash/Silt Factory.	10 01 03	4600	ON SITE	BORD NA MONA		ANNUAL
Surface Shaping Waste	12 01 01 12 01 02 12 01 03 12 01 04 12 01 05					
Welding Wastes	12 01 13		HAMMOND LANE	HAMMOND LANE	ATHLONE	
Scrap Metal	17 04 07	74.55	METAL CO. LTD.	METAL CO. LTD.		ANNUAL
Packaging	15 01 01	1.88	RYAN BROS	RYAN BROS	THURLES	ANNUAL
Wooden Pallets/Timber	15 01 02	15.2	MID CORK PLTS.	MID CORK PLTS.	MACROOM	ANNUAL
		49.8	CLARE WASTE.	CLARE WASTE.	SCARIFF	ANNUAL
Wiping Cloths	15 01 03					
General Office &	15 02 01					
Domestic Waste	20 01 00	416 cub.m	RYAN BROS.	RYAN BROS.	THURLES	ANNUAL

2.4 Noise Emissions

No measuring or reporting of noise was required.

2.5 Energy and Water Consumption

The usage of diesel and electricity in the Factory are to supplement the power supplied by Milled Peat. The Bog usage of both is to provide the Milled Peat for Briquetting. Derve is used for road transport service to Milled Peat operations.

Energy Source	MW Hours Consumed
Diesel - Factory	1,987,829
Diesel - Bog Machinery	5,615,683
Derv.	15,213
Electricity – Factory	1,592,152
Milled Peat	141,100
Total	

2.7 Environmental Incidents & Complaints

There were no environmental complaints received during the year.

Environmental Complaint	Number of Complaints
Complaints	0
Complaints requiring corrective action	0
Categories of Complaint	
Odour	0
Noise	0
Water	0
Air	0
Procedural	0
Miscellaneous	0

3.0 Management of the Activity

3.1 Environmental Management Programme Proposal/Report

Project 1 & 3

These two projects were undertaken together as the training and procedures development which form the main part of the projects were completed together.

Training on Maintenance of an I.P.C. Licence was given to all management and foremen by I.B.E.C. during January 2001. All permanent bog employees received training on the Littleton I.P.C. Licence and it's relevance and their role in compliance. This was carried out during February / March 2002 by Enda McDonagh (Environmental Engineer). Because of the late production season, the training planned for seasonal employees was not achieved. This is now planned for April 2003.

The procedures outlining the operations necessary to ensure compliance with the licence were completed between January and June 2002. These procedures are available to all relevant personnel.

The monitoring and inspection of both dust and silt emissions is ongoing as outlined in report.

Project 2

The training of Factory personnel was not achieved during 2002 as planned. This is now planned for May / June 2003 and will be carried out by Enda McDonagh.

Two dispersion models have been run to check the improvements in emissions as a result of work carried out. The test and the ongoing improvement work, which during 2002 had a capital cost of €103,000, form an ongoing feasibility study. Ref: 4.3

Project 4 & 6

These projects were completed using the same techniques:
1. A map review of catchments of production acreage
2. A walking survey of the bog areas during May & June 2002.

The catchment study showed that the area of production bog versus the original catchment area had reduced significantly. This had the follow on effect of reducing the silt-pond upgrade programme.

The walking study confirmed that, through the years, the most efficient drainage system had been developed eliminated, where possible, outside water.

Project 5

This project has been completed, and a report examining the potential for using reed-bed systems for the final polishing of silt pond discharges has been completed, and a copy is held on records. The report has come to the conclusion that it would not be suitable for BNM's silt pond treatment systems.

Project 7

The fueling of bog machinery was assessed in the Autumn of 2002. A list of all fueling locations was made. This led to the following decisions and actions:

1. Two new bunding areas
   Action: Ref 4.2

2. Fueling by mobile tanks
   Action: One tank purchased, three more by June

3. Training of those involved
   Action: March 2002, again April 2003

4. Operating procedures
   Action: completed by May 2002

5. Emergency Response Procedure
   Action: comprehensive Safety Statement in place – being reviewed at present.

Project 8

Ref: 4.2

Project 9

A silt pond has been constructed, on the headland at Gilltown Bog in the Kilberry Group of Bogs, where trials will be carried out to examine the potential for re-using the silt waste from the silt pond as the main product, or as a by-product. This project was due to commence in 2002, but failed to do so, due to the weather conditions during the 2002 production season.

Project 10

Polythene is being collected and stored for recycling. The polythene is either baled on site by an outside contractor, or transported loose to their depot for baling off-site. A new mechanical method of removing polythene from stockpiles has been developed and put into operation at some bog locations. This will remove the polythene, wrap it and tie it, leaving it in a bale suitable for recycling. The volumes recycled are recorded in the waste section of the AER.

Project 11

This project has been completed and a report compiled by the Polymer Development Centre, Athlone Business & Technology Park, on a comparison between biodegradable films and polythene is held on file.

Project 12

This project has been completed, and a report on its findings is on file. Wind power pumping is not suitable for Bord na Móna's pumping requirements.

3.2 Pollution Emission Register

3.3 Environmental Expenditure

Description	Cost (€)
Capital Costs (Plant & Equipment)	234,100
Labour & Supervision	143,250
Materials & External Environmental Consultancy	[redacted]
Overheads (ESB, Phones, Consumables)	[redacted]
EPA Fees	[redacted]
Total	409,920

4.0 Licence Specific Reports

4.1 Surface Water Discharge Monitoring Location Programme Review

The programme has operated satisfactorily and as only six months of sampling have been completed for the composite sampler it is proposed to continue at the same locations for 2003.

4.2 Bunding Programme

Condition 9.1.4. Two new bunding areas were completed in November. The piping and pumping arrangements for the two areas are decided costed and tender accepted with a completion date of May 2003 likely. The bunds are ready for testing. The bunds include capacity for storage of barrels. It is proposed to transfer all oil storage and issuing to the new bunded areas on completion of pipe work. It is further proposed to de-commission the two old oil storage facilities at this stage. Three new diesel storage tanks have been positioned in the bunds.

4.3 Particulate Emission Minimisation Report

Dispersion modelling of Air Emissions carried out early in the year indicated that Air Quality Standards would be threatened more by emissions of dust from stack B101, A103 and A104.

The Boiler Stack (B101) was improved substantially during the course of the year by a complete replacement of the internal parts of its grit arrestor as well as fitting a new model airlock. The emissions were reduced to well within the limit value for the second part of the year.

Conveyor Exhaust Stack (A103) had the most severe impact on Air Quality in the vicinity and a new scrubber arrangement was fitted on this outlet. This again reduced the emission to within the ELV and enabled the modelling to demonstrate that no breach of Air Quality Standard would occur by operating the plant for the full year.

The Stemple Suction Stack A104 has been improved in the latter part of the year and was operating below its ELV. This was achieved by attention to the maintenance of the existing Cyclone and Airlock. We do still intend to replace this unit in the coming summer with a new Multicyclone to further improve the performance.

Annual monitoring of CO. NOx and SOx at the Boiler B101 was planned at the final monitoring for the year but could not be carried out due to a temporary failure of the measuring equipment. These will be carried out and reported in the first quarterly monitoring for the coming year.

4.4 Boiler Combustion Efficiency AB1

An efficiency test was carried out on Templetuohy Oil Fired Boiler on 16th October 2002.

The efficiencies recorded were 89.1% on low fire and 88.4% on high fire and copy of test report is in Appendix 6

4.5 Energy Audit

The proposed plan on an Energy Audit for Littleton dated 18th March 2003.

The audit of Peat Fuel use has been completed and analyses the various areas that peat is used in the process. This report is in Appendix 7

4.6 Resource Consumption Summary

The Briquette Factory consumed 351,170 tonnes of milled peat and 4,946 of re-cycled product to produce 131,861 tonnes of briquettes, 11,174 tonnes of loose briquettes and 2,628 tonnes of bagged product.

4.7 Report on de-silting Programme

The upgrade programme for silt ponds for 2002 was 85% completed. This included the completion of 3 new silt ponds and the completion of silt treatment on all outlets. This, combined with Projects 4 & 6, results in 50% of operating silt ponds meeting the full design criteria. The programme is on-going.

The table below summarises the de-silting completed at Littleton in 2002.

Bog Area	No. of Ponds	Number of Cleanings		Notes
		One	Two	
Ballysorrel	2			Not in production.**
Templetuohy	1	1		Excavated in Sept.*
Carrickhill	2		2	
Derryvilla	2	2		
Bawnmore	4	2	2	1catchment non/prod.**
Littleton	3	2		1 Pond not excavated.*
Longfordpass	1	2		
Lanespark	3	2		1 Pond not excavated.*
Ballybeg	3	2		1catchment non/prod.**
Killeens 1	5	3	2	
Killeens 2	1	1		
Killeens 3	3	2	1	Excavated in Sept.*
NO.PONDS NOT REQUIRED **	4			
Total	26	19	112	
Percentage Cleaning		73%	27%	

(b) Notes: ** The catchments of these ponds are not in production.(4no.)

- See silt pond upgrade programme update.

4.8 Bog development and operational programme

No new bog has been developed for 2003. The production target has increased but, as discussed above, the effective catchments have reduced.

4.9 Bog rehabilitation progress report

As Littleton is a relatively "young" bog area, there are not many areas requiring rehabilitation presently.

The current areas rehabilitated include:

Forestry:	Planted by Coillte and continuing to develop long-term	*Approx. 800 acres*
Lakeland:	Constructed in 1999 and continuing to mature with planted area and fish-life development.	*60 acres*
Wetland:	Also developed in 1999/2000 to promote habitat for wildlife	*100 acres*

A group-wide project team are currently assessing the whole of Bord na Móna Land Estate with a view to establishing the future use of all Bord na Móna owned peatlands.
Consideration is being given to production requirements, environmental requirements and after use. This is an extensive programme.

5.0 Summary

The attached Environmental Management Programme has been implemented throughout the group, operating procedures have been put in place, and training has been provided for all personnel involved in compliance with the licence.

Bord na Mona Fuels Ltd would like to take this opportunity to advise the Environmental Protection Agency of its continued commitment to improving its environmental performance by adopting cleaner production methods and improving its environmental protection measures.

Appendix 1

ENVIRONMENTAL

POLICY

STATEMENT

Littleton AER 2002

Chief Executive

BORD NA MÓNA

BORD NA MÓNA FUELS LIMITED

Document:	Q 1.4
Page:	1 of 1
Rev.:	0
Issued:	14/November 2000

ENVIRONMENTAL POLICY STATEMENT

Bord na Mona Fuels Limited operates in line with Bord na Mona plc group environmental policies. It is a registered member of Repak and promotes the efficient use of energy in its briqueting processes and operates under an Integrated Pollution Control (I.P.C.) licence at its Littleton works.

Bord na Mona plc is a commercial semi-state body with responsibility to develop Irelands peat resources in the national interest.

Bord na Mona Fuels Limited is committed to gather and make available information on all aspects of its environmental impact and to help improve understanding among the public generally of its role and of the importance of Irish peatlands.

Bord na Mona Fuels Limited recognises the importance of peatland conservation and has a conservation policy statement.

Bord na Mona Fuels Limited will leave behind all areas it owns as either an economically or socially integrated resource of high environmental value.

Bord na Mona Fuels Limited seeks to conduct all aspects of its business in an environmentally sensitive manner.

Bord na Mona Fuels Limited will establish an environmental management system specifically addressing the following impacts:

- Discharges to water
- Emissions to atmosphere
- Waste disposal
- Use of natural resources
- Noise, vibration, odour, dust and visual effects
- Natural environmental and Eco-system

The environmental management system will be monitored, maintained and continually improved. A system of regular environmental audits will be put in place.

Bord na Mona Fuels Limited as part of the group, will continue research and development (R&D) into all aspects of its environmental impact.

This statement is published and is available at all locations within the company and its contents are brought to the attention of all employees.

Appendix 2

ENVIRONMENTAL

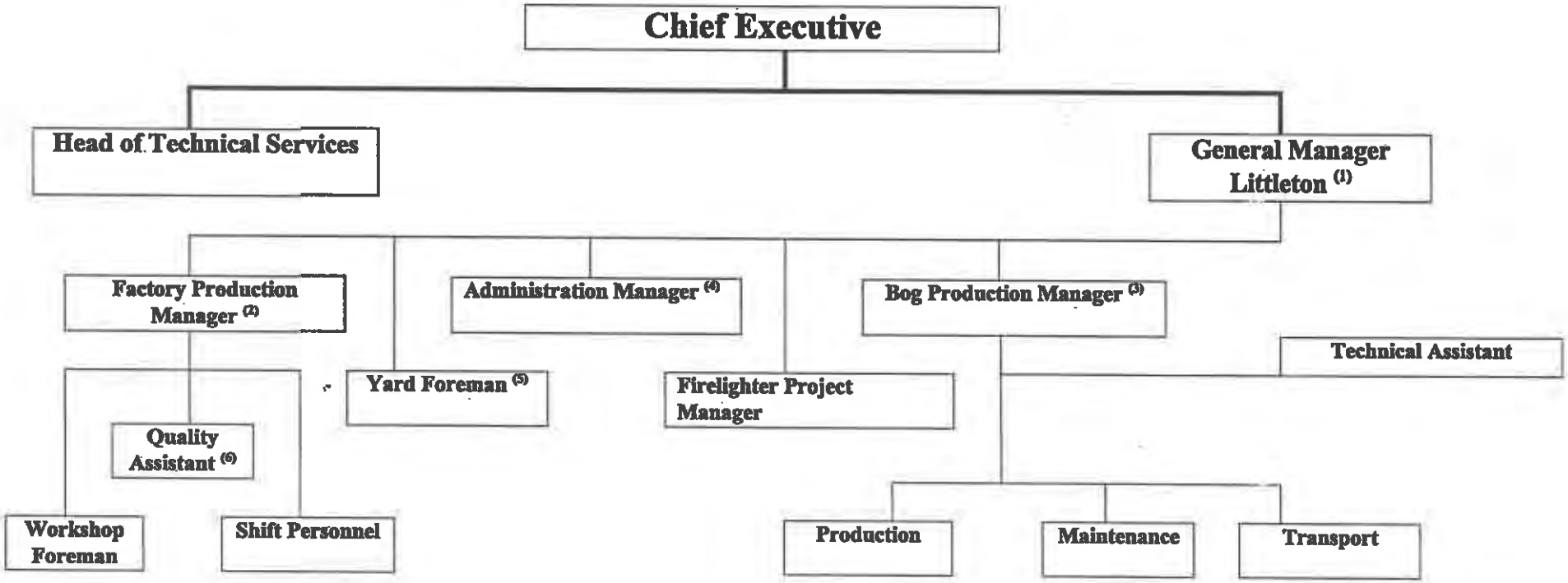
MANAGEMENT

STRUCTURE

Littleton AER 2002

Bord na Móna Fuels Limited

Environmental Responsibilities



(1) - Overall Environmental Responsibility
(2) - Factory Process production and maintenance include. settling ponds, effluent, emissions
(3) - Bog production, maintenance and transport activities, include silt ponds, tea centres, polythene etc.
(4) - Administration include sales, payroll, stores
(5) - Yard sales, include cleaning, recycling, disposal
(6) - Factory chemicals, effluent readings, water readings, process checks

Appendix 3

FACTORY & YARD

DISCHARGE

Littleton AER 2002

WEEK NO.	SURFACE DRAINS POND. P.H.	FLOW C.M./HR	S.S P.P.M.	COLOUR	FACTORY EFFLUENT POND. P.H.	FLOW C.M./HR	S.S P.P.M.	COLOUR
1	7.2	29	**68**	<70	6.5	59	**44**	<70
2	6.8	45	**42**	<70	6.5	25	**64**	<70
3	7.3	40	**36**	<70	6.9	30	**44**	<70
4	6.7	57	**36**	<70	7.5	59	**92**	<70
5	7.2	65	24	<70	6.7	51	**88**	<70
6	7.3	29	16	<70	7.5	16	**96**	<70
7	7.3	40	20	<70	6.8	55	**260**	<70
8	7.2	47	20	<70	6.9	25	**196**	<70
9	7.4	52	16	<70	6.5	33	**72**	<70
10	7.1	45	20	<70	6.4	16	**104**	<70
11	7.1	33	20	<70	6.7	30	28	<70
12	7	29	16	<70	6.5	37	**84**	<70
13		0			6	25	**252**	<70
14		0			6.7	33	**116**	<70
15	7.2	162	**40**	<70	7.4	43	**88**	<70
16	7.1	110	28	<70	8.5	33	**1284**	<70
17	7.3	29	16	<70	7.6	28	**316**	<70
18	6.8	25	12	<70	6.9	30	24	<70
19	DURING FACTORY OVERHAUL NO SAMPLES TAKEN.							
20	DURING FACTORY OVERHAUL NO SAMPLES TAKEN.							
21	DURING FACTORY OVERHAUL NO SAMPLES TAKEN.							
22	DURING FACTORY OVERHAUL NO SAMPLES TAKEN.							
23	DURING FACTORY OVERHAUL NO SAMPLES TAKEN.							
24	DURING FACTORY OVERHAUL NO SAMPLES TAKEN.							
25	DURING FACTORY OVERHAUL NO SAMPLES TAKEN.							
26	DURING FACTORY OVERHAUL NO SAMPLES TAKEN.							
27	DURING FACTORY OVERHAUL NO SAMPLES TAKEN.							
28	DURING FACTORY OVERHAUL NO SAMPLES TAKEN.							
29	DURING FACTORY OVERHAUL NO SAMPLES TAKEN.							
30	DURING FACTORY OVERHAUL NO SAMPLES TAKEN.							
31	DURING FACTORY OVERHAUL NO SAMPLES TAKEN.							
32	DURING FACTORY OVERHAUL NO SAMPLES TAKEN.							
33	DURING FACTORY OVERHAUL NO SAMPLES TAKEN.							
34	DURING FACTORY OVERHAUL NO SAMPLES TAKEN.							
35	7.2	29	20	<70	7.2	55	16	<70
36	7.2	79	**44**	<70	7.4	40	12	<70
37	6.9	14	16	<70	7	51	8	<70
38	7.2	14	12	<70	7.6	78	16	<70
39	7.2	11	10	<70	7.5	78	28	<70
40	6.8	11	16	<70	7.5	30	28	<70
41	6.9	21	**60**	<70	7.4	51	28	<70
42	6.9	14	20	<70	7.8	47	32	<70
43	7.2	40	25	<70	8.9	68	**40**	<70
44	7.1	36	32	<70	8.8	59	**36**	<70
45	6.9	33	**56**	<70	9	59	**36**	<70
46	7.1	162	28	<70	8.6	43	32	<70
47	6.7	65	26	<70	7.9	55	**38**	<70
48	6.9	48	32	<70	7.4	51	**42**	<70
49	6.9	40	20	<70	7.1	37	**56**	<70
50	6.8	42	28	<70	7.1	37	**36**	<70
51	6.9	40	24	<70	7.3	51	**40**	<70
52	6.8	52	16	<70	7.2	47	**48**	<70

Appendix 4

COMPOSITE

SAMPLER

Littleton AER 2002

Bord Na Mona Energy Ltd, Littleton Group, Thurles, Co Tipperary

Composite Sampler Results

Month				Parameters							Daily Totals		
July	pH	COD	Ammonia as	Total	Suspended	Total	Colour	Flow	COD	Ammonia as	Total	Suspended	Total
2002		mg/l	N mg/l	Phosphorus	Solids	Solids	Pt Co	Daily	Kg/Day	Kg/Day	Phosphorus	Solids	Solids
				mg/l	mg/l	mg/l	units	Total (litres)			Kg/Day	Kg/Day	Kg/Day
1								1333066	0.00	0.00	0.00	0.00	0.00
2								1333066	0.00	0.00	0.00	0.00	0.00
3								1333066	0.00	0.00	0.00	0.00	0.00
4								1333066	0.00	0.00	0.00	0.00	0.00
5								1333066	0.00	0.00	0.00	0.00	0.00
6								1333066	0.00	0.00	0.00	0.00	0.00
7								1333066	0.00	0.00	0.00	0.00	0.00
8								1333066	0.00	0.00	0.00	0.00	0.00
9								1320784	0.00	0.00	0.00	0.00	0.00
10	-	-	-	-	5	396	-	904671	#VALUE!	#VALUE!	#VALUE!	4.52	358.25
11	-	-	-	-	12	404	-	803050	#VALUE!	#VALUE!	#VALUE!	9.64	324.43
12	-	-	-	-	6	408	-	717825	#VALUE!	#VALUE!	#VALUE!	4.31	292.87
13	-	-	-	-	8	411	-	949651	#VALUE!	#VALUE!	#VALUE!	7.60	390.31
14	-	-	-	-	12	438	-	799714	#VALUE!	#VALUE!	#VALUE!	9.60	350.27
15	-	-	-	-	9	442	-	525179	#VALUE!	#VALUE!	#VALUE!	4.73	232.13
16	8.5	48	0.2	0.13	18	451	89	687896	33.02	0.14	0.09	12.38	310.24
17								618576	0.00	0.00	0.00	0.00	0.00
18								486664	0.00	0.00	0.00	0.00	0.00
19								551522	0.00	0.00	0.00	0.00	0.00
20								628199	0.00	0.00	0.00	0.00	0.00
21								446172	0.00	0.00	0.00	0.00	0.00
22								213544	0.00	0.00	0.00	0.00	0.00
23								207217	0.00	0.00	0.00	0.00	0.00
24								79470	0.00	0.00	0.00	0.00	0.00
25								283854	0.00	0.00	0.00	0.00	0.00
26								232564	0.00	0.00	0.00	0.00	0.00
27								137912	0.00	0.00	0.00	0.00	0.00
28								191704	0.00	0.00	0.00	0.00	0.00
29								381648	0.00	0.00	0.00	0.00	0.00
30								449989	0.00	0.00	0.00	0.00	0.00
31	-	-	-	-	14	429	-	269046	#REF!	#REF!	#REF!	#REF!	#REF!

Bord Na Mona Energy Ltd, Littleton Group, Thurles, Co Tipperary

Composite Sampler Results

Month				Parameters								Daily Totals		
August	pH	COD	Ammonia as	Total	Suspended	Total	Colour	Flow	COD	Ammonia as	Total	Suspended	Total
2002		mg/l	N mg/l	Phosphorus	Solids	Solids	Pt Co	Daily	Kg/Day	Kg/Day	Phosphorus	Solids	Solids
				mg/l	mg/l	mg/l	units	Total (litres)			Kg/Day	Kg/Day	Kg/Day
1	-	-	-	-	5	418	-	326719	#VALUE!	#VALUE!	#VALUE!	4.57	140.16
2	-	-	-	-	5	428	-	1284056	#VALUE!	#VALUE!	#VALUE!	6.42	536.74
3	-	-	-	-	32	IS	-	955054	#VALUE!	#VALUE!	#VALUE!	4.78	408.76
4	-	-	-	-	22	434	-	785687	#VALUE!	#VALUE!	#VALUE!	25.14	#VALUE!
5	-	-	-	-	7	464	-	785687	#VALUE!	#VALUE!	#VALUE!	17.29	340.99
6	8.6	45	0.2	0.05	17	IS	60	785687	#VALUE!	#VALUE!	#VALUE!	5.50	364.56
7	-	-	-	-	5	422	-	518348	23.33	0.10	0.03	8.81	#VALUE!
8	-	-	-	-	9	328	-	1040714	#VALUE!	#VALUE!	#VALUE!	9.37	341.35
9	-	-	-	-	16	298	-	2540502	#VALUE!	#VALUE!	#VALUE!	40.65	757.07
10	-	-	-	-	5	312	-	1240144	#VALUE!	#VALUE!	#VALUE!	6.20	386.92
11	-	-	-	-	5	324	-	1095660	#VALUE!	#VALUE!	#VALUE!	5.48	354.99
12	-	-	-	-	5	370	-	883046	#VALUE!	#VALUE!	#VALUE!	4.42	326.73
13	8.4	55	0.3	0.05	9	384	130	838983	46.14	0.25	0.04	7.55	322.17
14	-	-	-	-	5	353	-	1175731	#VALUE!	#VALUE!	#VALUE!	5.88	415.03
15	-	-	-	-	5	352	-	806673	#VALUE!	#VALUE!	#VALUE!	4.03	283.95
16	-	-	-	-	5	358	-	397225	#VALUE!	#VALUE!	#VALUE!	1.99	142.21
17	-	-	-	-	9	378	-	287981	#VALUE!	#VALUE!	#VALUE!	2.59	108.86
18	-	-	-	-	8	328	-	282806	#VALUE!	#VALUE!	#VALUE!	2.26	92.76
19	-	-	-	-	7	362	-	213163	#VALUE!	#VALUE!	#VALUE!	1.49	77.17
20	8.3	42	0.2	0.05	8	350	102	496051	20.83	0.10	0.02	3.97	173.62
21								191504	0.00	0.00	0.00	0.00	0.00
22								20495	0.00	0.00	0.00	0.00	0.00
23								3944	0.00	0.00	0.00	0.00	0.00
24								977	0.00	0.00	0.00	0.00	0.00
25								132	0.00	0.00	0.00	0.00	0.00
26								7	0.00	0.00	0.00	0.00	0.00
27								0	0.00	0.00	0.00	0.00	0.00
28								6	0.00	0.00	0.00	0.00	0.00
29								0	0.00	0.00	0.00	0.00	0.00
30								106	0.00	0.00	0.00	0.00	0.00
31								192	0.00	0.00	0.00	0.00	0.00

Bord Na Mona Energy Ltd, Littleton Group, Thurles, Co Tipperary

Composite Sampler Results

Month				Parameters							Daily Totals		
September	pH	COD	Ammonia as	Total	Suspended	Total	Colour	Flow	COD	Ammonia as	Total	Suspended	Total
2002		mg/l	N mg/l	Phosphorus	Solids	Solids	Pt Co	Daily	Kg/Day	Kg/Day	Phosphorus	Solids	Solids
				mg/l	mg/l	mg/l	units	Total (litres)			Kg/Day	Kg/Day	Kg/Day
1								245	0.00	0.00	0.00	0.00	0.00
2								271	0.00	0.00	0.00	0.00	0.00
3								288	0.00	0.00	0.00	0.00	0.00
4								320	0.00	0.00	0.00	0.00	0.00
5								153	0.00	0.00	0.00	0.00	0.00
6								69	0.00	0.00	0.00	0.00	0.00
7								40	0.00	0.00	0.00	0.00	0.00
8								22	0.00	0.00	0.00	0.00	0.00
9								78	0.00	0.00	0.00	0.00	0.00
10								195	0.00	0.00	0.00	0.00	0.00
11								760	0.00	0.00	0.00	0.00	0.00
12								385	0.00	0.00	0.00	0.00	0.00
13								521	0.00	0.00	0.00	0.00	0.00
14								262	0.00	0.00	0.00	0.00	0.00
15								214	0.00	0.00	0.00	0.00	0.00
16								95	0.00	0.00	0.00	0.00	0.00
17								93	0.00	0.00	0.00	0.00	0.00
18								293	0.00	0.00	0.00	0.00	0.00
19								1946	0.00	0.00	0.00	0.00	0.00
20								3897	0.00	0.00	0.00	0.00	0.00
21								3897	0.00	0.00	0.00	0.00	0.00
22								3897	0.00	0.00	0.00	0.00	0.00
23								3897	0.00	0.00	0.00	0.00	0.00
24								3897	0.00	0.00	0.00	0.00	0.00
25								3897	0.00	0.00	0.00	0.00	0.00
26								3897	0.00	0.00	0.00	0.00	0.00
27								3897	0.00	0.00	0.00	0.00	0.00
28								3897	0.00	0.00	0.00	0.00	0.00
29								3897	0.00	0.00	0.00	0.00	0.00
30								3897	0.00	0.00	0.00	0.00	0.00
31									0.00	0.00	0.00	0.00	0.00

Bord Na Mona Energy Ltd, Littleton Group, Thurles, Co Tipperary

Composite Sampler Results

Month				Parameters								Daily Totals		
October	pH	COD	Ammonia as	Total	Suspended	Total	Colour	Flow	COD	Ammonia a	Total	Suspended	Total
2002		mg/l	N mg/l	Phosphorus	Solids	Solids	Pt Co	Daily	Kg/Day	Kg/Day	Phosphorus	Solids	Solids
				mg/l	mg/l	mg/l	units	Total (litres)			Kg/Day	Kg/Day	Kg/Day
1								3897	0.00	0.00	0.00	0.00	0.00
2								3897	0.00	0.00	0.00	0.00	0.00
3								3897	0.00	0.00	0.00	0.00	0.00
4								3897	0.00	0.00	0.00	0.00	0.00
5								3897	0.00	0.00	0.00	0.00	0.00
6								3897	0.00	0.00	0.00	0.00	0.00
7								3897	0.00	0.00	0.00	0.00	0.00
8								3897	0.00	0.00	0.00	0.00	0.00
9								255982	0.00	0.00	0.00	0.00	0.00
10	-	-	-	-	9	216	-	642070	#VALUE!	#VALUE!	#VALUE!	5.78	138.69
11	-	-	-	-	35	252	-	677141	#VALUE!	#VALUE!	#VALUE!	23.70	170.64
12	-	-	-	-	5	178	-	2592038	#VALUE!	#VALUE!	#VALUE!	12.96	461.38
13	-	-	-	-	7	212	-	1345369	#VALUE!	#VALUE!	#VALUE!	9.42	285.22
14	-	-	-	-	5	74	-	1842038	#VALUE!	#VALUE!	#VALUE!	9.21	136.31
15	8.1	83	1	0.05	7	254	200	1686009	139.94	1.69	0.08	11.80	428.25
16	-	-	-	-	5	206	-	1326216	#VALUE!	#VALUE!	#VALUE!	6.63	273.20
17	-	-	-	-	5	237	-	876184	#VALUE!	#VALUE!	#VALUE!	4.38	207.66
18	-	-	-	-	5	280	-	1003745	#VALUE!	#VALUE!	#VALUE!	5.02	281.05
19	-	-	-	-	13	274	-	899127	#VALUE!	#VALUE!	#VALUE!	11.69	246.36
20	-	-	-	-	202	370	-	1363454	#VALUE!	#VALUE!	#VALUE!	275.42	504.48
21	-	-	-	-	408	452	-	4903038	#VALUE!	#VALUE!	#VALUE!	2000.44	2216.17
22	7.6	112	0.2	0.09	45	314	214	6964702	780.05	1.39	0.63	313.41	2186.92
23	-	-	-	-	9	240	-	4138253	#VALUE!	#VALUE!	#VALUE!	37.24	993.18
24	-	-	-	-	24	232	-	3218725	#VALUE!	#VALUE!	#VALUE!	77.25	746.74
25	-	-	-	-	11	264	-	3403527	#VALUE!	#VALUE!	#VALUE!	37.44	898.53
26	-	-	-	-	10	274	-	2770185	#VALUE!	#VALUE!	#VALUE!	27.70	759.03
27	-	-	-	-	8	278	-	4965341	#VALUE!	#VALUE!	#VALUE!	39.72	1380.36
28	-	-	-	-	9	216	-	3121251	#VALUE!	#VALUE!	#VALUE!	28.09	674.19
29	7.7	107	0.5	0.05	18	276	225	5744871	614.70	2.87	0.29	103.41	1585.58
30	-	-	-	-	6	258	-	5338652	#VALUE!	#VALUE!	#VALUE!	32.03	1377.37
31	-	-	-	-	14	66	-	3517201	#VALUE!	#VALUE!	#VALUE!	49.24	232.14

Bord Na Mona Energy Ltd, Littleton Group, Thurles, Co Tipperary

Composite Sampler Results

Month				Parameters							Daily Totals		
November	pH	COD	Ammonia as	Total	Suspended	Total	Colour	Flow	COD	Ammonia as	Total	Suspended	Total
2002		mg/l	N mg/l	Phosphorus	Solids	Solids	Pt Co	Daily	Kg/Day	Kg/Day	Phosphorus	Solids	Solids
				mg/l	mg/l	mg/l	units	Total (litres)			Kg/Day	Kg/Day	Kg/Day
1								3149532	0.00	0.00	0.00	0.00	0.00
2								4055772	0.00	0.00	0.00	0.00	0.00
3								7597779	0.00	0.00	0.00	0.00	0.00
4								6171461	0.00	0.00	0.00	0.00	0.00
5	7.8	76	0.8	0.09	20	272	211	4253383	323.26	3.40	0.38	85.07	1156.92
6	-	-	-	-	12	258	-	4196434	#VALUE!	#VALUE!	#VALUE!	50.36	1082.68
7	-	-	-	-	18	228	-	3745180	#VALUE!	#VALUE!	#VALUE!	67.41	853.90
8	-	-	-	-	12	230	-	6246495	#VALUE!	#VALUE!	#VALUE!	74.96	1436.69
9	-	-	-	-	5	262	-	5785998	#VALUE!	#VALUE!	#VALUE!	28.93	1515.93
10	-	-	-	-	24	214	-	9741026	#VALUE!	#VALUE!	#VALUE!	233.78	2084.58
11	-	-	-	-	6	208	-	5882770	#VALUE!	#VALUE!	#VALUE!	35.30	1223.62
12	7.8	72	0.5	0.05	5	304	204	4181916	301.10	2.09	0.21	20.91	1271.30
13	-	-	-	-	5	194	-	3911607	#VALUE!	#VALUE!	#VALUE!	19.56	758.85
14	-	-	-	-	14	232	-	7140012	#VALUE!	#VALUE!	#VALUE!	99.96	1656.48
15	-	-	-	-	27	234	-	12378090	#VALUE!	#VALUE!	#VALUE!	334.21	2896.47
16	-	-	-	-	14	306	-	12342130	#VALUE!	#VALUE!	#VALUE!	172.79	3776.69
17	-	-	-	-	12	222	-	7984116	#VALUE!	#VALUE!	#VALUE!	95.81	1772.47
18	-	-	-	-	10	226	-	7212297	#VALUE!	#VALUE!	#VALUE!	72.12	1629.98
19	7.8	83	0.2	0.09	13	124	216	13037990	1082.15	2.61	1.17	169.49	1616.71
20	-	-	-	-	7	218	-	12421150	#VALUE!	#VALUE!	#VALUE!	86.95	2707.81
21	-	-	-	-	20	230	-	13125100	#VALUE!	#VALUE!	#VALUE!	262.50	3018.77
22	-	-	-	-	20	302	-	12741990	#VALUE!	#VALUE!	#VALUE!	254.84	3848.08
23	-	-	-	-	14	238	-	9504134	#VALUE!	#VALUE!	#VALUE!	133.06	2261.98
24	-	-	-	-	36	288	-	9748169	#VALUE!	#VALUE!	#VALUE!	350.93	2807.47
25	-	-	-	-	22	226	-	11075700	#VALUE!	#VALUE!	#VALUE!	243.67	2503.11
26	7.6	82	0.3	0.14	20	242	218	10764170	882.66	3.23	1.51	215.28	2604.93
27	-	-	-	-	37	288	-	10615920	#VALUE!	#VALUE!	#VALUE!	392.79	3057.38
28	-	-	-	-	53	316	-	12139640	#VALUE!	#VALUE!	#VALUE!	643.40	3836.13
29	-	-	-	-	40	250	-	11835870	#VALUE!	#VALUE!	#VALUE!	473.43	2958.97
30	-	-	-	-	32	152	-	11764230	#VALUE!	#VALUE!	#VALUE!	376.46	1788.16
31									0.00	0.00	0.00	0.00	0.00

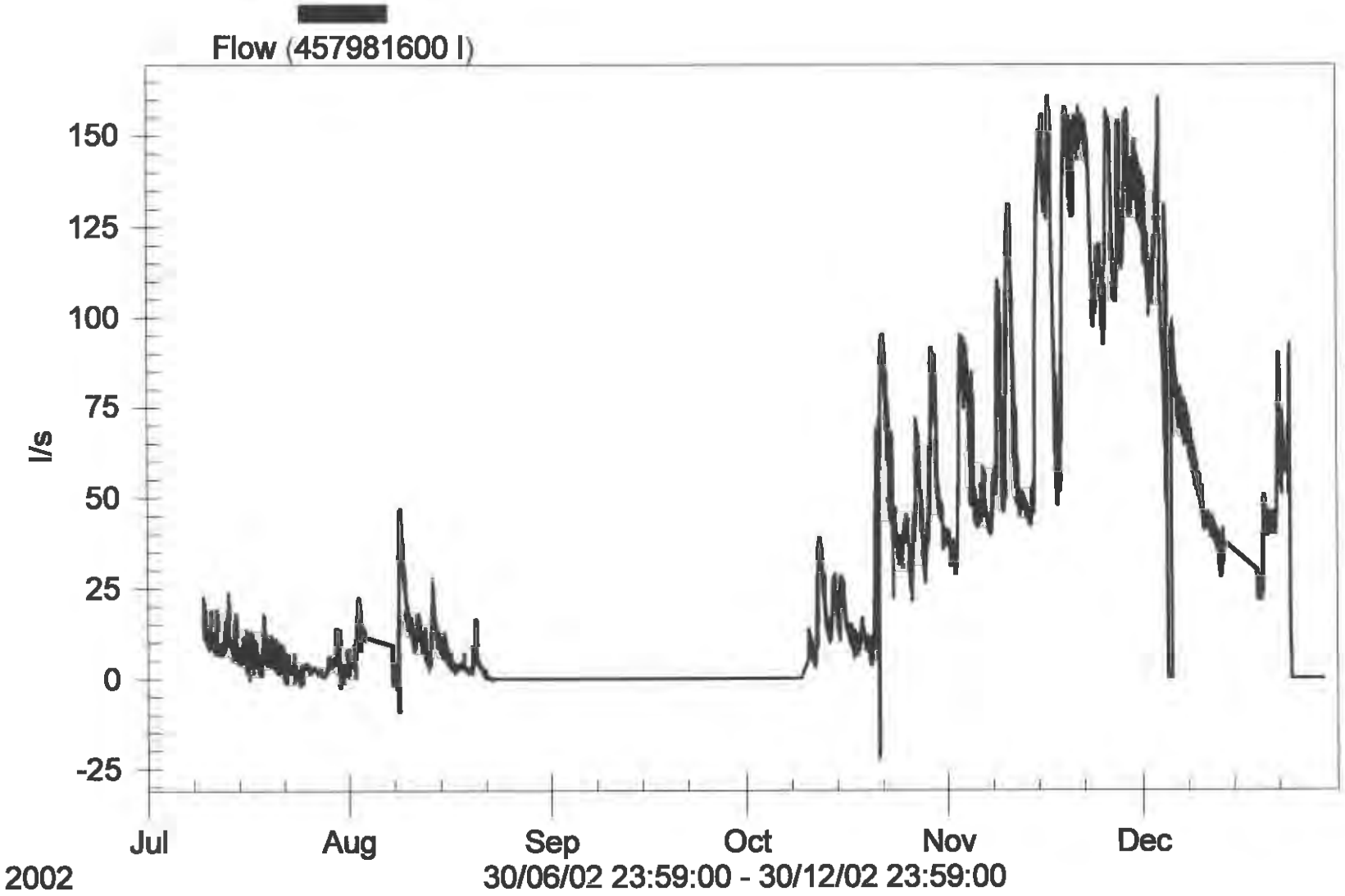
Bord Na Mona Energy Ltd, Littleton Group, Thurles, Co Tipperary

Composite Sampler Results

Month				Parameters							Daily Totals		
December	pH	COD	Ammonia as	Total	Suspended	Total	Colour	Flow	COD	Ammonia as	Total	Suspended	Total
2002		mg/l	N mg/l	Phosphorus	Solids	Solids	Pt Co	Daily	Kg/Day	Kg/Day	Phosphorus	Solids	Solids
				mg/l	mg/l	mg/l	units	Total (litres)			Kg/Day	Kg/Day	Kg/Day
1	-	-	-	-	28	270	-	10843050	#VALUE!	#VALUE!	#VALUE!	303.61	2927.62
2	-	-	-	-	36	392	-	9537055	#VALUE!	#VALUE!	#VALUE!	343.33	3738.53
3	7.6	101	0.3	0.05	46	324	156	11290560	1140.35	3.39	0.56	519.37	3658.14
4	-	-	-	-	10	336	-	7130467	#VALUE!	#VALUE!	#VALUE!	71.30	2395.84
5	-	-	-	-	13	322	-	3626632	#VALUE!	#VALUE!	#VALUE!	47.15	1167.78
6	-	-	-	-	19	390	-	6698077	#VALUE!	#VALUE!	#VALUE!	127.26	2612.25
7	-	-	-	-	10	358	-	6115937	#VALUE!	#VALUE!	#VALUE!	61.16	2189.51
8	-	-	-	-	8	384	-	5505951	#VALUE!	#VALUE!	#VALUE!	44.05	2114.29
9	-	-	-	-	8	442	-	4745064	#VALUE!	#VALUE!	#VALUE!	37.96	2097.32
10	7.6	94	0.5	0.1	24	296	166	3893329	365.97	1.95	0.39	93.44	1152.43
11	-	-	-	-	6	236	-	3669435	#VALUE!	#VALUE!	#VALUE!	22.02	865.99
12	-	-	-	-	6	218	-	3319688	#VALUE!	#VALUE!	#VALUE!	19.92	723.69
13	-	-	-	-	8	273	-	2752120	#VALUE!	#VALUE!	#VALUE!	22.02	751.33
14	-	-	-	-	6	398	-	2568672	#VALUE!	#VALUE!	#VALUE!	15.41	1022.33
15	-	-	-	-	12	238	-	2568672	#VALUE!	#VALUE!	#VALUE!	30.82	611.34
16	-	-	-	-	6	196	-	2568672	#VALUE!	#VALUE!	#VALUE!	15.41	503.46
17	8.2	35	0.4	0.05	6	294	65	2568672	89.90	1.03	0.13	15.41	755.19
18								2431302	0.00	0.00	0.00	0.00	0.00
19								2844842	0.00	0.00	0.00	0.00	0.00
20								3731653	0.00	0.00	0.00	0.00	0.00
21								4132959	0.00	0.00	0.00	0.00	0.00
22								5480115	0.00	0.00	0.00	0.00	0.00
23								4398236	0.00	0.00	0.00	0.00	0.00
24								0	0.00	0.00	0.00	0.00	0.00
25					5			0	0.00	0.00	0.00	0.00	0.00
26					5			0	0.00	0.00	0.00	0.00	0.00
27					5			0	0.00	0.00	0.00	0.00	0.00
28					8			0	0.00	0.00	0.00	0.00	0.00
29					10				0.00	0.00	0.00	0.00	0.00
30					45				0.00	0.00	0.00	0.00	0.00
31	7.6	79	0.2	0.08	20	448	145		0.00	0.00	0.00	0.00	0.00

Littleton Composite Sampler

July - Dec 02



Appendix 5

EMMISSIONS

TO

AIR

Littleton AER 2002

SUMMARY RESULTS OF EMISSIONS TO ATMOSPHERE COMPLIANCE MONITORING FROM THE BORD NA MÓNA FUELS LIMITED LITTLETON BRIQUETTE FACTORY AT LITTLETON (DECEMBER 2001 TO DECEMBER 2002) IN ACCORDANCE WITH THE REQUIREMENTS OF INTEGRATED POLLUTION CONTROL LICENCE REGISTER NO. 499.

REPORT NO.: ECS0077

ATTENTION: Mr. Ray Yeats
Production Manager
Bord na Móna Fuels Limited
c/o Littleton Briquette Factory
Thurles
Co. Tipperary

PREPARED BY: Ms. Catherine Grimes
Environmental Consultant

REVIEWED BY: Mr. John Conway
Air Quality Section Head

DATE: 18th March 2003

Executive Summary

As part of the requirements of Integrated Pollution Control Licence, Register No. 499, Bord na Móna Fuels Limited are required to submit to the Agency, an Annual Environmental Report (AER). Bord na Móna Environmental Limited were commissioned to prepare a summary report of emissions to atmosphere monitored at the Littleton Briquette Factory from the period December 2001 to December 2002.

This report is certified as accurate and representative of the sampling and associated analysis carried out.

Respectively submitted,

Ms. Catherine Grimes
Environmental Consultant

Mr. John Conway
Air Quality Section Head

1.0 INTRODUCTION

A summary of IPC Licence Register No. 499 monitoring of environmental monitoring results from the period December 2001 to December 2002 are presented as follows:

Table 1: Quarterly Compliance Monitoring of Particulate Emissions to Atmosphere

Table 2: Summary of Quarterly Compliance Monitoring of Particulate Mass Emissions to Atmosphere

Table 3: IPC Licence Particulate Emissions to Atmosphere Emission Limit Values (ELV's)

Table 4: Annual Particulate Mass Emissions to Atmosphere

Table 5: Quarterly Compliance Monitoring of TOC (as C) Emissions to Atmosphere from Emission Point A108

Table 6: Annual TOC (as C) Emissions to Atmosphere from Emission Point A108

Appendix 1

Figures 1-7: Particulate Mass Emissions to Atmosphere (kg) (December 2001 to December 2002) vs. Licence ELV from Emissions Reference Points B101, A101-A106 respectively.

Figure 8: Summary of Particulate Mass Emissions to Atmosphere (kg) (December 2001 to December 2002) from Emissions Reference Points B101, A101-A106.

Figure 9: Annual TOC (as C) Mass Emissions to Atmosphere from Emission Reference Point A108 (mg/Nm^3) vs. Licence ELV.

Note

Figures in bold represent sample results for specific parameters that exceed IPC Licence Emission Limit Values (ELV's).

TABLE 1: QUARTERLY COMPLIANCE MONITORING OF PARTICULATE EMISSIONS TO ATMOSPHERE (DECEMBER 2001 – DECEMBER 2002)

Quarter	Sampling Date	Job No.	Emission Point Ref.	Volumetric Flow (Nm^3/hr)	Particulates Note 1 (mg/Nm^3)	Particulate Mass Emissions (kg/hr)
1 (2001)	13+14/12/01	T431	B101	**40221**	**631.0**	**25.4**
			A101	**76831**	**129.6**	**10.0**
			A102	**93875**	**266.0**	**25.0**
			A103	5742	**1849.0**	**10.6**
			A104	**12665**	**1178.0**	**14.9**
			A105	**7927**	1.4	0.01
			A106	Note 1	Note 1	Note 1
1 (2002)	14/02/02	T469	A101	**90297**	51.1 Note 2	4.6 Note 2
			A102	**87758**	87.7 Note 2	**7.7** Note 2
2	23+29/05/02	T658	B101	31951	**548.0**	**17.5**
			A101	**98554**	**150.0**	**14.8**
			A102	**73813**	**297.0**	**21.9**
			A103	5520	**2149.0**	**11.9**
			A104	**12935**	**835.5**	**10.8**
			A105	**8662**	**247.2**	**2.1**
			A106	**1145**	17.0	0.02
3	26+27/09/02	T842	B101	27711	98.3	2.7
			A101	**95059**	**77.4**	**7.4**
			A102	**111984**	**117.7**	**13.2**
			A103	5274	250.6	1.3
			A104	**12287**	**1802**	**22.1**
			A105	**10530**	12.8	0.1
			A106	Note 1	Note 1	Note 1
4	09+10/01/03	B004	B101	34197	164.5	5.6
			A101	**84171**	30.3	2.6
			A102	**112650**	**64.9**	**7.3**
			A103	4843	792.6	3.8
			A104	**12460**	271.2	3.4
			A105	**7665**	7.4	0.06
			A106	Note 1	Note 1	Note 1

Note 1 Process servicing emission reference point was not operational during monitoring events.

Note 2 Average of three monitoring results undertaken at the client's request.

TABLE 2: SUMMARY OF QUARTERLY COMPLIANCE MONITORING OF PARTICULATE MASS EMISSIONS TO ATMOSPHERE (DECEMBER 2001 – DECEMBER 2002)					
Emission Point Ref.	**Particulate Mass Emissions during each Quarterly Monitoring Event (kg/hr)**				
	4 (2001)	**1 (2002)**	**2 (2002)**	**3 (2002)**	**4 (2002)**
B101	**25.4**	Note 1	**17.5**	2.7	5.6
A101	**10.0**	4.6	**14.8**	**7.4**	2.6
A102	**25.0**	**7.7**	**21.9**	**13.2**	**7.3**
A103	**10.6**	Note 1	**11.9**	1.3	3.8
A104	**14.9**	Note 1	**10.8**	**22.1**	3.4
A105	0.01	Note 1	**2.10**	0.1	0.06
A106	Note 1	0.02	Note 1	Note 1	Note 1

Note 1 Process serving emission reference point was not operational during monitoring events.

TABLE 3: IPC LICENCE PARTICULATE EMISSIONS TO ATMOSPHERE EMISSION LIMIT VALUES (ELV's)				
Emission Point Ref.	**Maximum Volumetric Flow (Nm^3/hr)**	**Particulate ELV (mg/Nm^3 or kg/hr)**	**Particulate ELV (kg/hr)**	***Licensed Annual Particulate Mass Emissions (kg/yr)*** *Note 1*
B101	36000	400 mg/Nm^3	14.4	*126144*
A101	34852	50 mg/Nm^3 >0.5kg/hr 150 mg/Nm^3 <0.5kg/hr	5.23 max.	*15265* *45796 max.*
A102	42400	50 mg/Nm^3 >0.5kg/hr 150 mg/Nm^3 <0.5kg/hr	6.36 max.	*18571* *55714 max.*
A103	5800	7 kg/hr	7	*61320*
A104	11700	6 kg/hr	6	*52560*
A105	6797	50 mg/Nm^3 >0.5kg/hr 150 mg/Nm^3 <0.5kg/hr	1.02 max.	*2977* *8931 max.*
A106	660	50 mg/Nm^3 >0.5kg/hr 150 mg/Nm^3 <0.5kg/hr	0.099 max.	*289.1* *867 max.*
Annual Particulates Mass Emissions to Atmosphere Limit			-	*351332*

Note 1 Following the installation of appropriate abatement equipment and demonstration that operations at the Plant during the last two weeks of May and from June to August will not result in any breach of Air Quality Standards (Refer to Bord na Móna Environmental Consultancy Services Report No. T560, dated March 2002), the licensed annual mass

emissions for particulates are calculated on the basis of possible emissions to atmosphere (volumetric flow x concentration) from each emission point for 24 hrs/day 365 days/year.

TABLE 4: ANNUAL PARTICULATE MASS EMISSIONS TO ATMOSPHERE (DECEMBER 2001 – DECEMBER 2002)

Location	Annual Average Mass Emission (kg/hr)	Hours Production	Annual Particulate Mass Emissions (kg/year)	*Licensed Annual Particulate Mass Emissions (kg/yr)*
B101	12.8	7200	92160	*126144*
A101	7.9	7200	**56880**	*45796 max.*
A102	15.0	7200	**108000**	*55714 max.*
A103	6.9	7200	49680	*61320*
A104	12.8	7200	**92160**	*52560*
A105	0.57	7200	4104	*8931 max.*
A106	0.02 Note 1	7200	144	*867 max.*
Particulate Mass Emissions to Atmosphere			**403128**	*351332*

Note 1 Based on results from one monitoring event.

TABLE 5: QUARTERLY COMPLIANCE MONITORING OF TOC (AS C) EMISSIONS TO ATMOSPHERE FROM EMISSION POINT A108 (DECEMBER 2001 – DECEMBER 2002)

Quarter	Sampling Date	Job No.	Volumetric Flow (Nm^3/hr)	TOC (as C) Note 1 (mg/Nm^3)	TOC (as C) Mass Emissions (kg/hr)
4 (2001)	13+14/12/01	T431	Note 1	Note 1	Note 1
1 (2002)	14/02/02	T469	2695	134	0.36
2	29/05/02	T658	Note 1	Note 1	Note 1
3	27/09/02	T842	2898	5.6	0.02
4	09+10/01/03	B004	Note 1	Note 1	Note 1
IPC Licence ELV's			*6700*	*170*	*Note 2*

Note 1 Process servicing emission reference point was not operational during monitoring events.

Note 2 Annual TOC (as C) Mass Emissions to Atmosphere Limit Value is calculated as 1.14 kg/hr x 7200 production hours = 8201 kg/year.

TABLE 6: ANNUAL TOC (as C) MASS EMISSIONS FROM A108 (DECEMBER 2001 – DECEMBER 2002)

Annual Average Mass Emission (kg/hr) Note 1	Hours Production Note 2	Annual Mass Emissions (kg/year)	*Annual Mass Emissions IPC Licence ELV (kg/year)*
0.19	2000	380	*8201*

Note 1 Average of two monitoring results.

Note 2 Average number of production hours per year for Firelighter Production Plant

APPENDIX 1

Figure 1: Particulate Mass Emissions to Atmosphere (kg) (December 2001 to December 2002) vs. Licence ELV from Emissions Reference Point B101

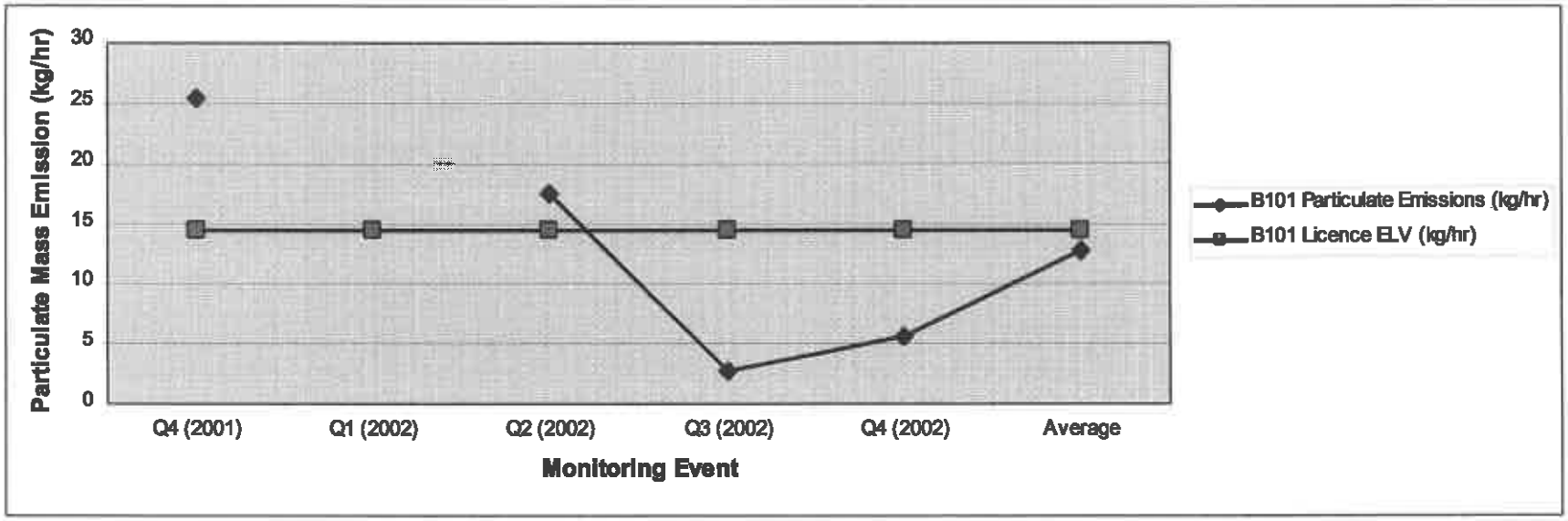


Figure 2: Particulate Mass Emissions to Atmosphere (kg) (December 2001 to December 2002) vs. Licence ELV from Emissions Reference Point A101

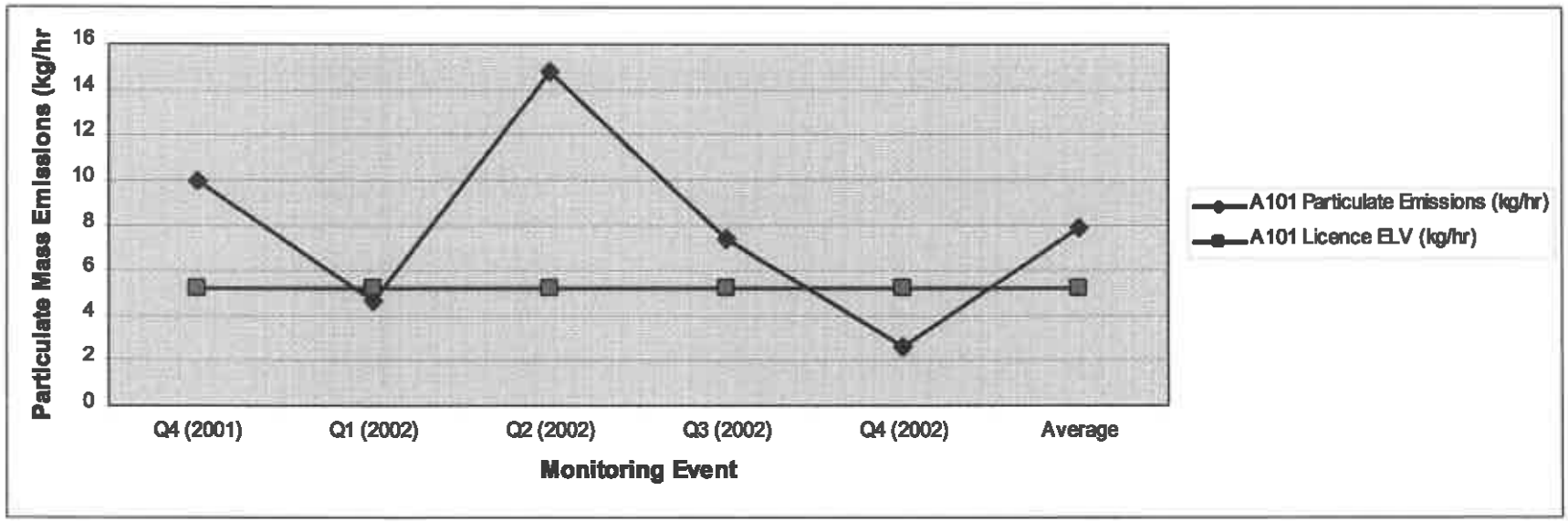


Figure 3: Particulate Mass Emissions to Atmosphere (kg) (December 2001 to December 2002) vs. Licence ELV from Emissions Reference Point A102

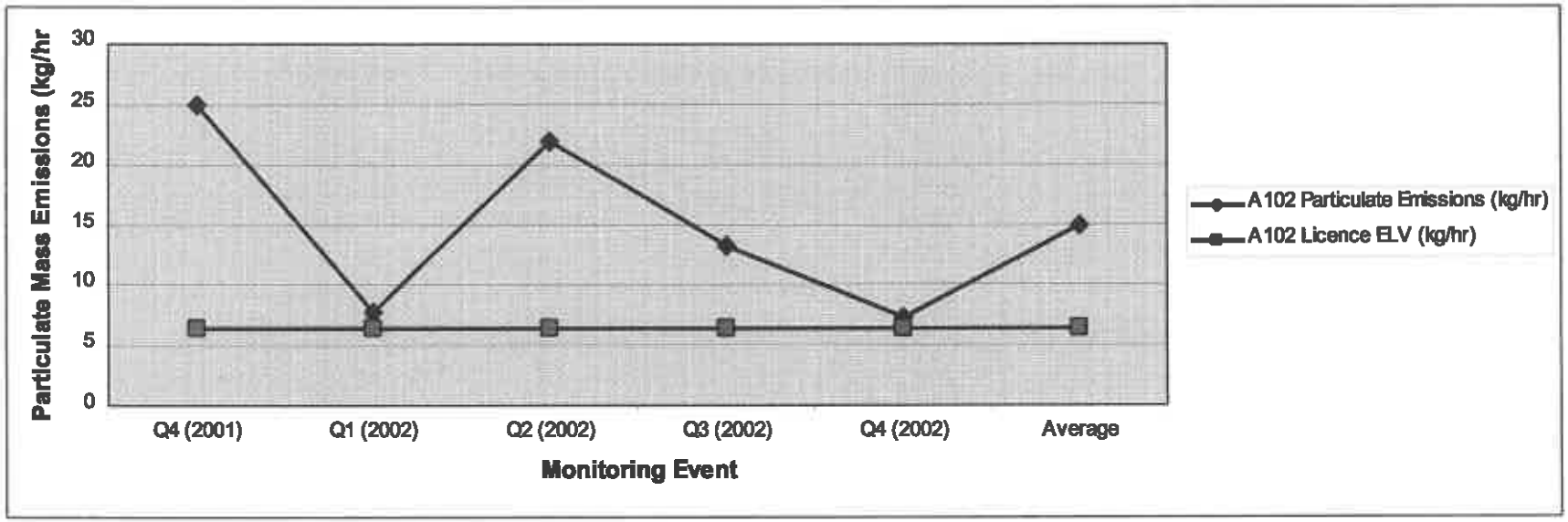


Figure 4: Particulate Mass Emissions to Atmosphere (kg) (December 2001 to December 2002) vs. Licence ELV from Emissions Reference Point A103

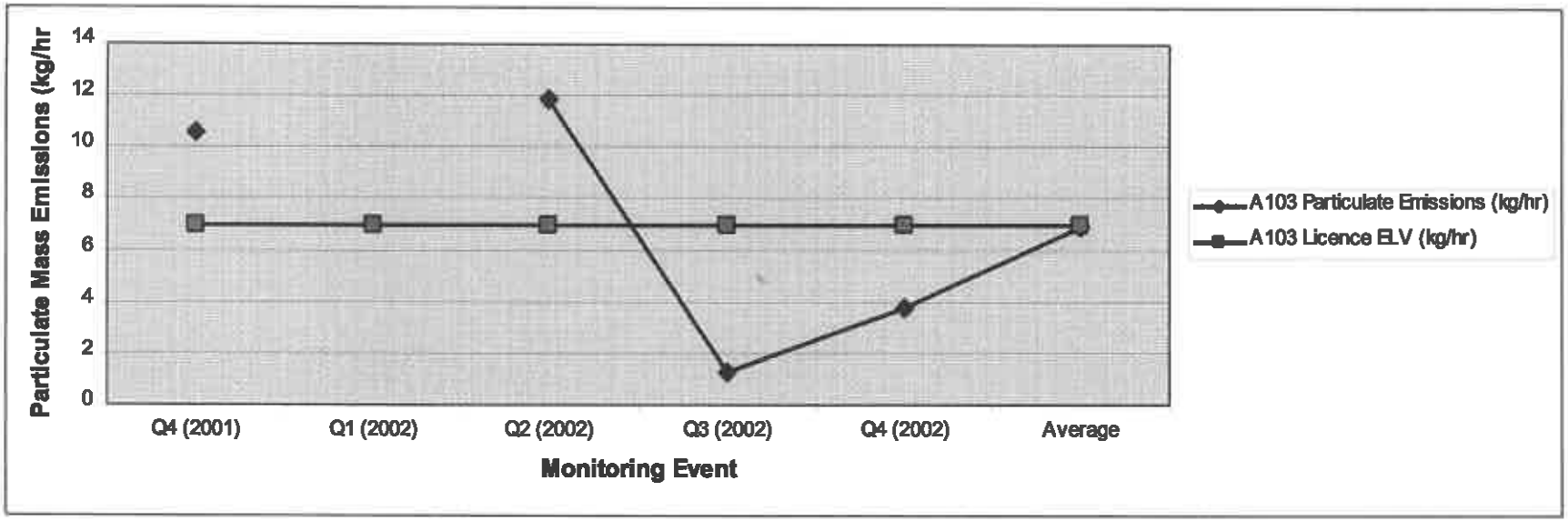


Figure 5: Particulate Mass Emissions to Atmosphere (kg) (December 2001 to December 2002) vs. Licence ELV from Emissions Reference Point A104

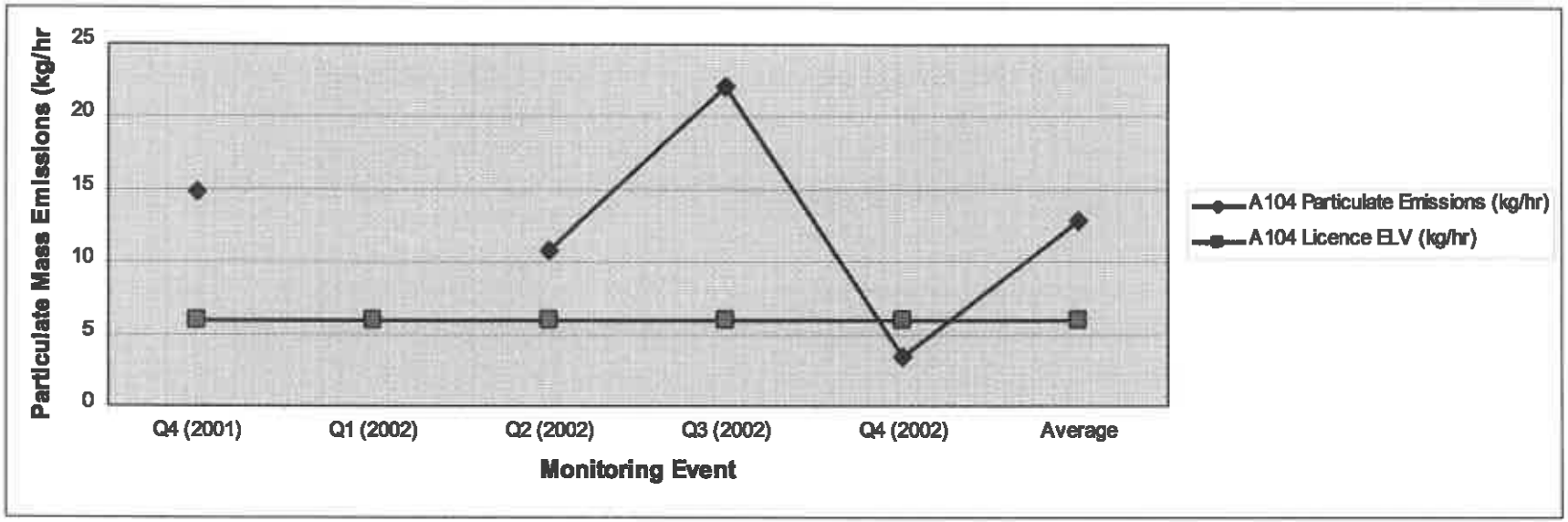


Figure 6: Particulate Mass Emissions to Atmosphere (kg) (December 2001 to December 2002) vs. Licence ELV from Emissions Reference Point A105

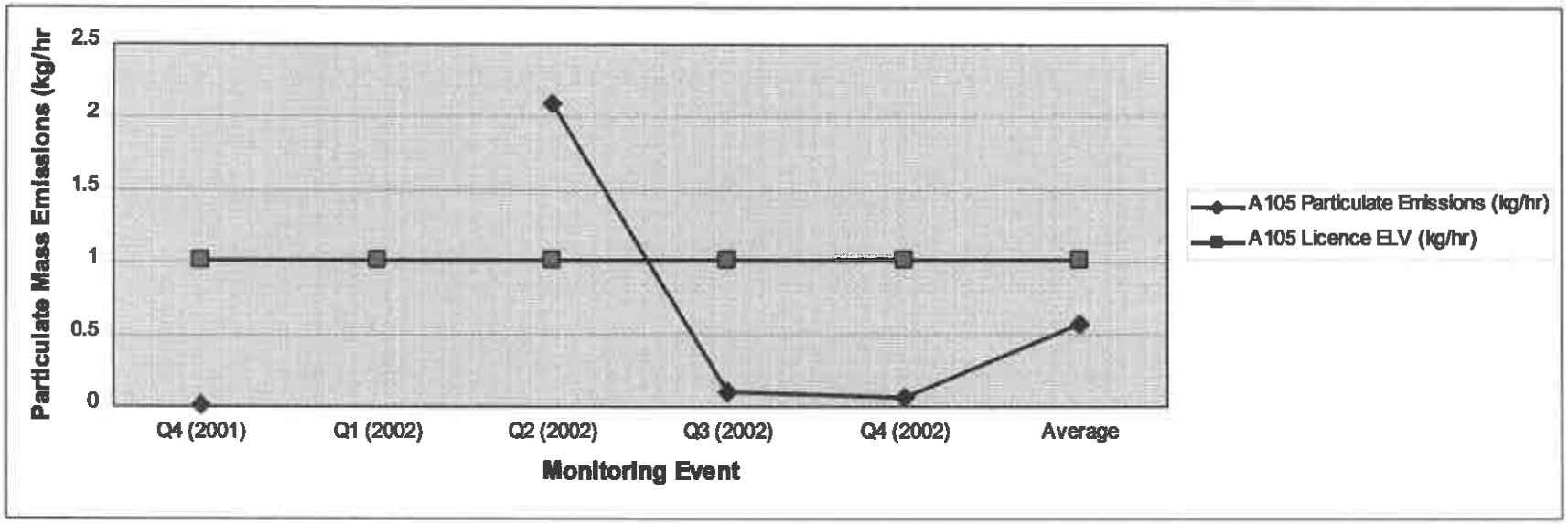


Figure 7: Particulate Mass Emissions to Atmosphere (kg) (December 2001 to December 2002) vs. Licence ELV from Emissions Reference Point A106

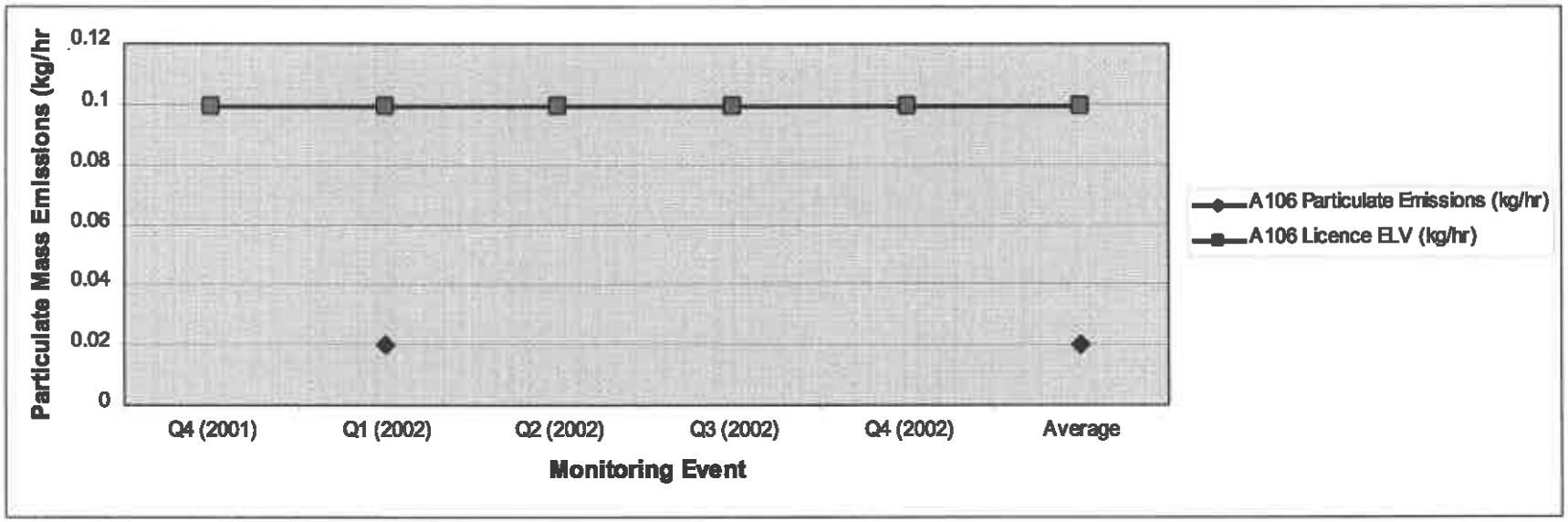


Figure 8: Summary of Particulate Mass Emissions to Atmosphere (kg) (December 2001 to December 2002) from Emissions Reference Points B101, A101-A106

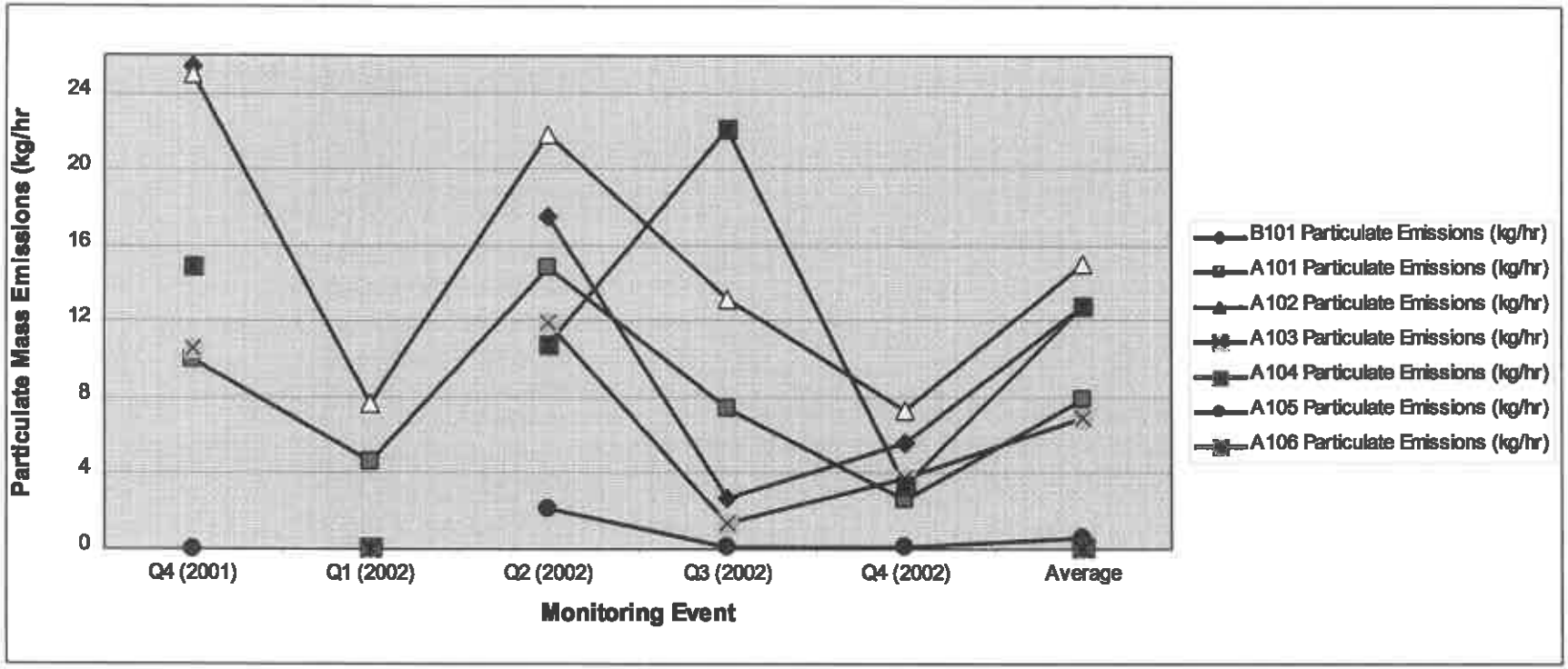
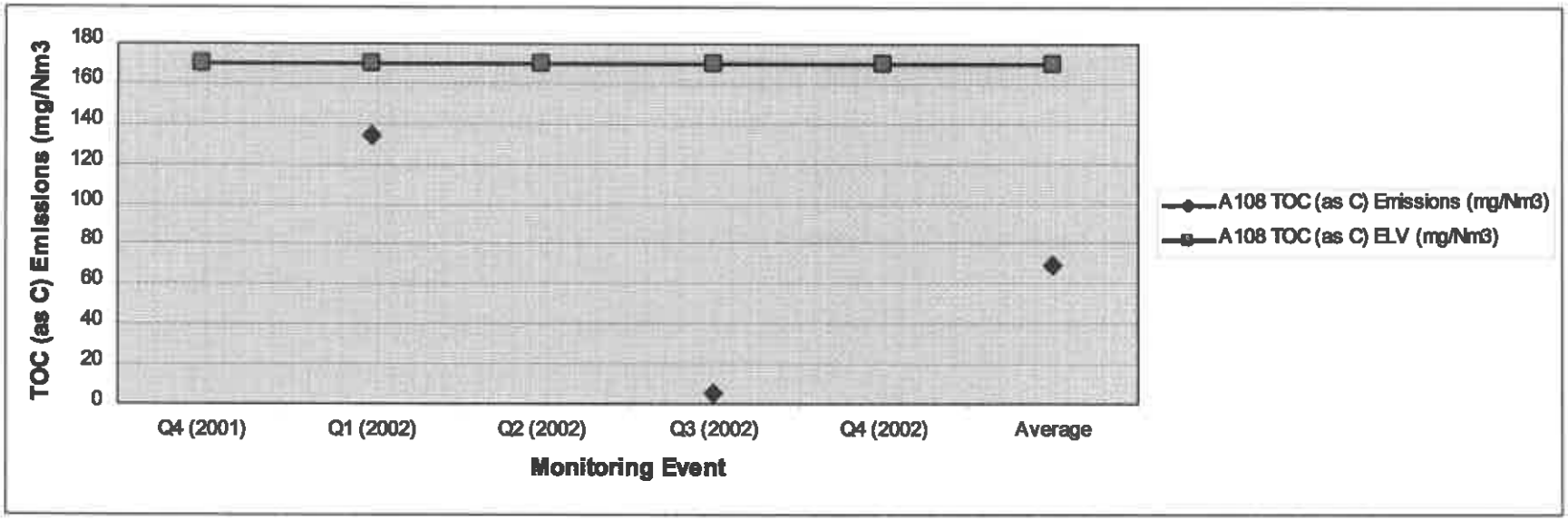


Figure 9: Annual TOC (as C) Mass Emissions to Atmosphere from Emission Reference Point A108 (mg/Nm^3) vs. Licence ELV.



Appendix 6

BOILER

COMBUSTION

EFFICIENCY

Littleton AER 2002

Boiler Services

SERVICE/~~COMMISSION~~

REPORT No. 4037

Allenstown, Broadway, Co. Wexford.
Tel.: 053 - 31308 • Mobile: 087 - 2604276
Industrial • Commercial & Domestic • Service & Repairs
• Oil & Gas • Free Estimates • 23 hour Call Out • V.A.T. No. IE 3505423T

City & Guilds of London

CUSTOMER: Co M DELANEY

SITE ADDRESS
RG BORD NA MONA
TEMPLETOUHY WORKS
TEMPLETOUHY
CO. TIPPERARY

ENGINEER SIGNATURE Co Mhoin

DATE 16/10/2002

CUSTOMER TEL-CONTACT

O No/JOB No

WORKING TIME

MILEAGE

MATERIALS USED
2 No 4.50/60°B OIL NOZZLES

SITE TELEPHONE No & CONTACT

BOILER No	No1	~~No2~~	~~No3~~
BOILER TYPE & MAKE	BUDERUS GE575		
C[illegible]PUT			
SERIAL No			
BURNER	RIELLO RL 50		
SERIAL No	02464900019		
GAS TRAIN SIZE REF	N/A		
FUEL	GAS OIL		

BOILER No	No1		No2		No3	
BURNER STATUS	LOW FIRE	HIGH FIRE	LOW FIRE	HIGH FIRE	LOW FIRE	HIGH FIRE
CO2	11.1	11.5				
CO	0	0				
O2	6.1	6.6				
NOX	—	—				
FLUE TEMP GROSS	180	190				
AMBIENT TEMP	10	10				
[illegible]E TEMP NETT	170	180				
EFFICIENCY	89.1	88.4				
FLUE DRAUGHT MB	0	.5				
BOILER TEMP °C	50	50				
GAS INLET PRESS (STATIC)	—	—				
GAS INLET PRESS (RUNNING)	—	—				
IONIZATION CURRENT UA	—	—				
GAS HEAD PRESS	—	—				
GAS RATE Pr3/M3h	—	—				
NOZZLE SIZE & TYPE	4.50	4.50				
SMOKE No	0	0				
OIL PUMP PRESS BAR	12	12				
COMBUSTION CHAMBER PRESS	0	.5				
FAN STATIC PRESS	—	—				
AIR SETTING	30	50.				
HEAD SETTING	3	3				

COMMENTS

CLEANED & CHECKED BOILER.
CLEANED & CHECKED BURNER
CLEANED OIL FILTERS
REPLACED OIL NOZZLES
SET COMBUSTION HEAD.
CALIBRATED BURNER FOR GAS OIL

CARRIED OUT FLUE GAS ANALYSIS

AIR REQUIREMENTS BS6644

TOTAL KW INPUT

AIR REQUIREMENTS HIGH CM²

LEVEL LOW CM²

AIR AVAILABLE HIGH CM²

LEVEL LOW CM²

CUSTOMER SIGNATURE

SIGN:

PRINT:

White: INVOICE Yellow: FILE Pink: SITE

Appendix 7

ENERGY AUDIT

PEAT FUEL USE

Littleton AER 2002

Peat Usage at Littleton Briquette Factory

EPA Energy Audit - Part I

By
Barry-John Hooper, M.Eng.Sc, B.E.
Mechanical Engineer

March 21, 2003

1 INTRODUCTION

The Littleton Factory produces approximately 150,000 tonnes of briquettes each year. These are made from milled peat harvested from the surrounding bogs. The milled peat enters the factory with and moisture content of 50-60% and is dried to 10-12% moisture content before briquetting. Both the drying and briquetting processes require large amounts of energy.

At Littleton Factory a combined heat and power plant (C.H.P) is used. This means, that under normal operating conditions, the plant provides its own electrical power requirement needed to run the various machinery as well as the heat necessary to dry the peat for briquetting. A C.H.P is the most energy efficient system possible where both large amounts of lower grade heat energy and electrical power are required.

Peat is central to all activities at Littleton and intimately inter-linked with energy flow in the factory because it:

- Is the raw material for the final product (which is itself an energy product).
- Provides the Energy for Electrical Generation.
- Provides the Energy for the Drying Plant.

As peat is both the raw material and energy source opportunity for energy savings is most likely to come from peat usage control.

2 OUTLINE OF AUDIT

Peat comes into the factory from the bog where it is blended in the blending bunker. Each blend can be up to ~1500 tonnes of milled peat. For peat auditing purposes it is more practical to look at peat usage over a number of blends rather than over a fixed time frame. For this audit four consecutive blend weeks, running from 2:15pm on January 1st 2003 to 7:00am January 30th 2003, were examined. This was a total of 688 hours running time.

The flow of peat through the process is shown in Figure 1. The raw peat from the blending bunker is milled and then sorted in the screening machines. Peat particles too coarse for drying are passed to the boiler for power and steam generation. The rest continues to the drying plant. In the drying plant the heated peat releases moisture in the form of water vapour. Some of the finer peat particles are trapped in this vapour. The

multi-cyclones separate out ~98% of the peat particles which are then returned to the process. Some peat will however escape to atmosphere. Vapour released during the briquetting process is dealt with in a similar way. Emissions are monitored in accordance with the IPC licence.

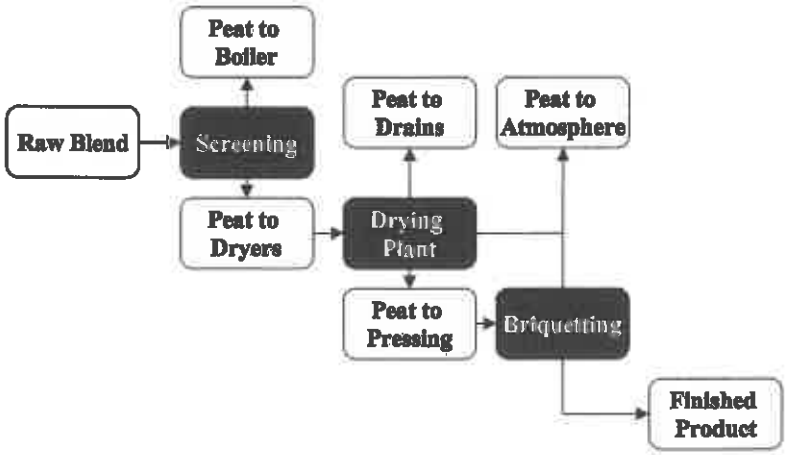


Figure 1 Peat Usage throughout Briquette Factory

During the First Effects (Steam) Drying the vapour released is condensed in a heat exchanger adding to the energy efficiency of the plant. The condensed vapour is drained to the silt ponds. This is also a source of peat loss.

During the audit, certain figures were known from factory data [1] and environmental services monitoring [2] while others had to be either estimated or arrived at from historical data. The tonnage of raw peat entering was known as was the finished product leaving the plant. From the emissions data the quantity of peat escaping to atmosphere was estimated. A study done on the heat exchanger allowed the quantity of peat escaping to drain to be estimated [3]. Adding the peat in finished product to the sum of peat escaping to atmosphere and drains gave the total peat dried. Subtracting this from the raw peat entering allowed the peat burned in the boiler to be estimated.

Given the average steam load and a previous report on boiler efficiency [4], a theoretical figure for boiler peat consumption could be derived [5,6]. This was compared with the audit estimates. Conclusions and recommendations to improve the auditing accuracy were then drawn.

3 RESULTS

The results of the audit are listed below. As peat of varying moisture content is involved, to aid comparison all final figures are converted to 55% moisture content. The difference between the incoming raw peat and the outgoing finished product was found to be 7,667 tonnes (Table 1). This is the amount of peat to be accounted for between boiler usage, venting to atmosphere and flow into the drain.

	Tonnage	Average Moisture Content	Tonnage @ 55%
Raw Peat	32,689	57.44%	30,917
Finished Product	11,801	11.35%	23,250
		Difference	7,667

Table 1 Incoming versus Outgoing Peat [1]

Using the air emissions monitoring data [2] an estimate was made for the amount of peat leaving the process through venting to atmosphere (Table 2). This was found to be 11.81 tonnes over the test period. This corresponds to 18.09 tonnes at 55% moisture content or 0.03% of total raw peat input.

Stack Name	Code	Conc. (mg/Nm^3)	Flow Rate (Nm^3/hr)	Mass Flow Rate (kg/hr)	Moisture %	Emmision (Tonnes)	Peat Emmision @ 55%
Drier 2B	A101	30.30	84,171	2.55	48.80	1.76	2.00
Drier 2A	A102	64.90	112,650	7.31	44.65	5.03	6.19
Press Conveyor	A103	793.00	4,843	3.84	11.35	2.64	5.21
Stemple Suction	A104	273.00	12,460	3.40	11.35	2.34	4.61
Press Suction	A105	7.40	7,665	0.06	11.35	0.04	0.08
						TOTAL	18.09

Table 2 Peat Vented to Atmosphere [2]

Similarly, using the data from a previous study at the plant [3], the amount of peat exiting through the drain could be estimated. This was found to be 163 tonnes or 0.53% of raw peat input (Table 3).

	Concentration (mg/Nm^3)	Flow Rate (Nm^3/hr)	Mass Flow Rate (kg/hr)	Peat Emmision @ 55%
Drain	2,588	46,453	120.22	163
			Total	163

Table 3 Peat Drained to Silt Pond [3]

The remaining peat it was assumed went to the boiler for heat and power generation. This was found to be 7,486 tonnes or 10.87 tonnes per hour.

4 Theoretical Boiler Peat Usage

Previous examinations of the Littleton boiler showed it had a thermal efficiency of 77.56%. Thermal efficiency is the fraction of the energy transferred to the steam from the energy released in burning of the peat fuel. Knowing the efficiency, calorific value of the fuel, the average steam load, temperature and pressure it was possible to derive the mass flow rate of the fuel. This was found to be 9.94 tonnes per hour. This compares favorably with the audit value of 10.87 tonnes per hour. This meant 639 tonnes were not accounted for.

5 CONCLUSIONS

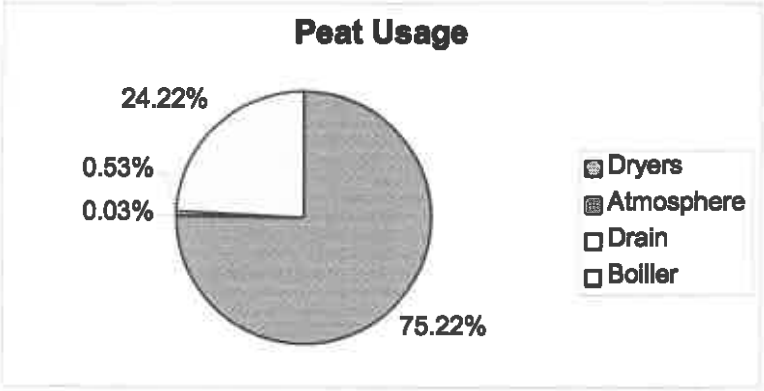


Figure 2 Peat Usage Distribution

- Given the data available a successful Peat Usage Audit was completed.
- The distribution of peat usage is shown above (Figure 2).
- The difference between the theoretical and apparent actual peat burned in the boiler is 639 tonnes or 2.1% of the raw peat inputed.
- The percentage of peat being used in the boiler by the audit figures is high.
- More peat is probably therefore going to drain.
- The short fall is either due to inaccuracies in the estimates of the boiler and/or the drain

6 RECOMMENDATIONS

- Before the next audit a weighing system should be installed to determine the fuel usage in the boiler.
- As part of the next audit an up to date figure for the thermal efficiency of the boiler should be determined.
- Fresh work is needed to determine more accurately the quantity of peat escaping through the drain.

7 REFERENCES

[1] Littleton Factory Weekly Reports, January 2003.

[2] Monitoring of Air Emissions at the Littleton Briquette Factory, Report No. B004-A, January 2003.

[3] Institute of Industrial Research and Standards, Report Ref: R6/43, 1982

[4] Boiler Efficiency Test at Littleton Briquette Factory, May 1986

[5] Energy Efficiency Audit of Littleton Briquette Factory, Micheal Gillen, October 1991

[6] Energy Utilisation in a Peat Briquette Factory, M.Eng.Sc Thesis, Paul Doyle, Department of Mechanical Engineering, University College Dublin, 1995

[7] Littleton Factory Daily Boiler Logs, January 1st-30th 2003.

BORD NA MÓNA

Littleton Works

A.E.R. 2003

Environmental Protection Agency
Office of Environmental Enforcement
Rec... 3 1 MAR 2004

I.P.C. Licence No: 499

Littleton AER 2003

Contents

1.0 Introduction

Bord na Móna Fuels Limited was granted an Integrated Pollution Control Licence by the E.P.A. on 17th August 2001 for it's operation in the Littleton group of bogs. This report is the second A.E.R. for the operations and covers the period from 1st January 2003 to 31st December 2003.

1.1 Company Details

The Littleton group of bogs consists of a cluster of bogs approximately ten miles from Thurles in Co. Tipperary.
The main contact and location details of the company are presented in summary form below

Company Name:	Bord na Móna Fuels Limited
Site Address:	Littleton Group Thurles Co. Tipperary.
IPC Licence Number:	499
Telephone No:	0504-44215
Fax No:	0504-44225
Contact Name:	Ray Yates
Position:	General Manager

1.2 Activities

Milled Peat is produced on the Littleton group of bogs for transfer to the Briquette Factory for the manufacture of peat solid fuel products. Littleton has a total area of 4,530 hectares. Of this, 1,475 hectares were used for the production of milled peat during the period of the AER.

The production of milled peat is a seasonal activity with production opportunities only possible during the period from late spring to early autumn when drying conditions are suitable. When production operations are underway, they are typically carried out over a seven-day week and for 12 to 15 hours per day. Bog drainage and field conditioning operations are carried out throughout the year, along with peat haulage operations from stockpiles located on the bog to the Briquette Factory. Transport operations are carried out on all days throughout the year that the Briquette Factory is in operation.

Sod Peat was produced on an area of 243 hectares during 2003. Production was from April to August with sales to the public from September to December. Bog preparation and drainage was ongoing throughout the year but was mainly in the period January to March.

The Firelighter Plant operated from January to April and again from September to December.

The Group has its own workshop facilities for the maintenance, repair and fabrication of plant used in the operations outlined.

In total 127 permanent workers and 41 seasonal workers at peak were employed during 2003.

1.3 Environmental Policy Statement

The Environmental Policy Statement of the company is shown in Appendix 1

1.4 Environmental Management of the Company

The management structure illustrating environmental responsibilities within Bord na Móna Fuels Limited in 2003 is shown in Appendix 2.
The General Manager, Mr. Ray Yates has overall responsibility for the Littleton Group.

2.0 Summary Information

2.1 Emissions to water summary

2.1.1 Silt Pond Emissions

Monitoring and sampling from agreed discharge points are carried out quarterly in the form of grab samples. Samples were taken each quarter from each of the agreed outlets in accordance with the regular sampling programme. The results of the analyses of these samples are presented below in Tables 1A , 1B, 1C.

Table 1A. Emission Point Reference Number: SW 4. Reporting Period: January – December 2003					
Parameter	Monitoring Period				Licensed ELV
	Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec	
pH (pH units)	7.8	7.5	7.4	7.6	N/A
COD (mg/l)	39	57	102	53	N/A
Total Phosphorus (mg/l)	<0.05	<0.05	<0.05	<0.05	N/A
Ammonia as N (mg/l)	2.1	1.8	1.53	1.5	N/A
Suspended Solids (mg/l)	<5	<5	64	<5	35 mg/l
Colour (Pt Co units)	138	154	184	154	N/A
Flow (l/s)	*	3.7	3.5	14.85	N/A

Table 1B. Emission Point Reference Number: SW 15 Reporting Period: January – December 2003					
Parameter	Monitoring Period				Licensed ELV
	Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec	
pH (pH units)	7.8	7.4	7.8	7.5	N/A
COD (mg/l)	28	102	14	83	N/A
Total Phosphorus (mg/l)	<0.05	<0.05	<0.05	<0.05	N/A
Ammonia as N (mg/l)	3.1	1.3	3.98	2.44	N/A
Suspended Solids (mg/l)	<5	<5	<5	<5	35 mg/l
Colour (Pt Co units)	133	381	70	233	N/A
Flow (l/s)	*	4.2	7.6	61.2	N/A

Table 1C. Emission Point Reference Number: SW 26					
Reporting Period: January – December 2003					
Parameter	Monitoring Period				Licensed ELV
	Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec	
pH (pH units)	7.2	7.6	8.0	7.7	N/A
COD (mg/l)	72	35	17	75	N/A
Total Phosphorus (mg/l)	1.1	<0.05	<0.05	<0.05	N/A
Ammonia as N (mg/l)	.08	3.6	.04	.76	N/A
Suspended Solids (mg/l)	7	<5	<5	<5	35 mg/l
Colour (Pt Co units)	247	116	52	211	N/A
Flow (l/s)	*	2.5	0.5	3.46	N/A

* Flow meter not operating

2.1.2 PW-102 Factory and Yard Discharge to Ballybeg river.

The sampling and analysis at this location was the subject of a proposal because of lack of access to the original location. This proposal was dated 6th of February 2002 and was further discussed at a site visit in July 2002. During the relevent year the proposal was not agreed and in its absence Littleton continued to sample the factory and yard effluent seperately. The results of our sampling have been included as Appendix 3. No samples are taken during the factory stop period because of the absence of factory effluent. This is the period during which the ponds are cleaned.

2.1.3. Monitoring of workshop/depot surface water run-off.

Inspections are undertaken and logged weekly in the following areas: Factory, Lanespark Workshop, Templetuohy Workshop and the Firelighter area. This is linked to 2.12 as the Lanespark Workshop, Factory Yard and oil storage and the Firelighter area all discharge through the Factory Yard pond and oil-trap. There is an additional trap for Lanespark which is inspected and maintained. Templetuohy yard discharge separation and oil trap installation are planned for 2004

The Transport fuelling area has been completed with oil-trap during 2003. The Templetuohy yard will complete the groundwater protection programme and with agreement a full sampling programme can commence. At present the only samples taken are those shown in Appendix 3 which covers all areas except Templetuohy.

2.1.4 Composite Sampler Programme

The Littleton Composite Sampler worked continuously to the end of the year except for:

No flow from the 20th August – 29th October (The major cause of this was the dewatering undertaken by Minorca Mining. First time outfall dry.)

The results for the composite sampler operating at location SW22 are included as Appendix 4.

2.1.5 Non-compliance

The non-compliances associated with agreed sampling of water effluent at Littleton are outlined in table under.

Date	Non-compliance	Cause	Corrective Action
03/03/03	Sample from Composite Sampler @ SW22 on 03/03/03 97mg/l..	Some loose sods in pond.	Corrective Action LT/03/01 – Sods removed, next samples o.k..
21/04/03	Sample from Composite Sampler @ SW22 on 27/03/03 80mg/l	May be same as above – no evident cause	Corrective Action LT/03/02. Next 5 samples all <5mg/l No action necessary.
20/08/03	Sample from Composite Sampler @ SW22 week ending 20/08/03 Sample 1 - 39mg/l Sample 4 – 123mg/l	Not evident	Corrective Action LT/03/03. Pond clean when samples taken on 20/08/03. Flow very low. I.S. next week
16/09/03	Grab sample from SW4 on 16/09/03 64mg/l	Pond ¾ full at inspection	Corrective Action LT/03/04. Pond by-passed. Cleaned on 16/10/03

2.2 Emissions to Air Summary (see Appendix 5)

Earlier dispersion modelling of Air Emissions indicated that Air Quality Standards would be threatened more by emission of dust from stacks B101, A103 and A104.

As noted in last years report, the Boiler Stack (B101) was improved substantially by complete renewal of the Grit Arrester codes and installation of an improved Model Airlock. This had brought emissions well within the licenced limit value.

Surprisingly, the first two quarterly readings on this stack were outside the limit values. We have concluded that this resulted from burning wetter than normal peat fuel in the early part of the year. This has been improved in the latter half of the year and the emission values have been brought back well within the limit values.

With regard to the Conveyor Exhaust Stack (A103), the scrubber which was installed in the previous year continued to operate well with emission measures well below limit values.

Emissions from the Stemple Suction Stack (A104) were targeted for reduction in the year under review. A new multicyclone was designed and installed in place of the old single cell cyclone. Also the airlock was re specified and replaced. The result has been a reduction in emissions of dust at this point to well within the limit value since the new unit has been put in place.

2.2.2 Dust Emissions (Dust Sensitive Locations)

The Dust Emissions are being monitored monthly as per proposal of 18th February 2002 on D.S.L.'s.

The following table contains the monthly readings. In general, readings are below the emission limit value of 350 mg/m^2/day.

Month	DSL 1	DSL 2	DSL 3
Jan 03	86	96.8	37.6
Feb 03	39	35	20
Mar 03	46	40	79
Apr 03	231	235	20
May 03	35	71	40
Jun 03	42	712	89
Jul 03	231	255	101
Aug 03	66	391	478
Sep 03			
Oct 03	30	49	44
Nov 03	43	< 36	<36
Dec 03	86	< 26	52

2.2.3 Non-compliance's

This covers non-compliance's resulting from the dust emissions.

Date	Non-compliance	Cause	Corrective Action
Jun 03	712 vs 350	Disturbance of settling pond spread material by machinery	Replanned work for Autumn 03
Aug 03 Sep 03	391 vs 350 478 vs 350	Very dry conditions in August / September. Bog Production.	

2.3 Waste Management Report

2.3.1 Hazardous Waste

BORD NA MÓNA
BORD NA MÓNA FUEL'S LIMITED

Waste Management Record (Hazardous)

Group : Littleton. IPC Licence No.: 499

WASTE DESCRIPTION	EWC CODE	TONNES	NAME OF CONTRACTOR	NAME OF PERSON ULTIMATELY RESPONSIBLE	DESTINATION	DATE
Waste Oil	13 01 01		Bord na Mona	Bord na Mona	Re-use Factory	
Oil/Fuel Filters	16 01 07	480l	Atlas	Atlas		04/06/03
Lead Acid Batteries	16 06 01	3170kg	ReturnBatt Ltd.	ReturnBatt Ltd.	Unit 3, Kildare Enterprise Centre	Apr 03 Oct 03

DETAILS OF ANY REJECTED CONSIGNMENTS						
No rejected consignments						

2.3.2 Non-hazardous Waste

BORD NA MÓNA
BORD NA MÓNA FUELS LIMITED

Waste Management Record (Non-Hazardous)
Group : Littleton IPC Licence No.: 499

WASTE DESCRIPTION	EWC CODE	TONNES	NAME OF CONTRACTOR	NAME OF PERSON ULTIMATELY RESPONSIBLE	DESTINATION	DATE
Silt	01 01 02	1401	0N SITE	BORD NA MONA		ANNUAL
Peat Screenings	01 01 02	300	ON SITE	BORD NA MONA		ANNUAL
Polythene	02 01 04	0	. RYAN BROS	. RYAN BROS	THURLES	ANNUAL
Peat Ash/Silt Factory.	10 01 03	4600	ON SITE	BORD NA MONA		ANNUAL
Surface Shaping Waste	12 01 01 12 01 02 12 01 03 12 01 04 12 01 05					
Welding Wastes	12 01 13		HAMMOND LANE	HAMMOND LANE	ATHLONE	
Scrap Metal	17 04 07	50.06	METAL CO. LTD.	METAL CO. LTD.		ANNUAL
Packaging	15 01 01	28.27	RYAN BROS	RYAN BROS	THURLES	ANNUAL
Wooden Pallets/Timber	15 01 02	67.18	O'NEILLS	O'NEILLS .	CASTLECONNELL	ANNUAL
		76.87	MICHAEL FAHY	MICHAEL FAHY	LITTLETON	ANNUAL
Wiping Cloths	15 01 03					
General Office &	15 02 01					
Domestic Waste	20 01 00	416 cub.m	RYAN BROS.	RYAN BROS.	THURLES	ANNUAL

2.4 Noise Emissions

No measuring or reporting of noise was required.

2.5 Energy and Water Consumption

The usage of diesel and electricity in the Factory are to supplement the power supplied by Milled Peat. The Bog usage of both is to provide the Milled Peat for Briquetting. Derve is used for road transport service to Milled Peat operations.

Energy Source	MW Hours Consumed
Diesel - Factory Diesel - Bog Machinery	1,351 6,141
Derv.	531
Electricity – Factory	157
Milled Peat	135,538
Total	143,718

2.7 Environmental Incidents & Complaints

There was one environmental complaint received during the year.

Environmental Complaint	Number of Complaints
Complaints	1
Complaints requiring corrective action	0
Categories of Complaint	
Odour	0
Noise	0
Water	1
Air	0
Procedural	0
Miscellaneous	0

The complaint was from North Tipperary County Council and referred to evidence of silt in the Black River and the Clover River. On investigation, the complaint received in November 2003 referred to a walking survey completed during 2002. Therefore, no action was possible. (Ref: letter of 29th January 2004)

3.0 Management of the Activity

3.1 Environmental Management Programme Proposal/Report

Project 1 & 3

These two projects have been completed.

Training and machine development is ongoing.

Training
Training was provided for all personnel during 2002, and will be repeated in 2004. This will be in the form of a Cleaner Production Video, which is currently in production. This video deals with all dust related production issues and identifies good practice and codes of practice for peat production in Dust Sensitive Locations (DSL's).

Headland Peat
Headland peat is another potential source of dust generation from bog production traffic. This was address by the introduction of a pilot production unit, involving a dedicated unit for the collection of headland peat in the Boora Group of Bogs (IPC 500). This unit, made up of one same field harvester and 4/5 tractor and haku trailers units was in operation in the Boora group during 2003. Its main function was to gather all headland peat from the different units as often as possible, so as to reduce the volumes of loose peat dry peat that can cause dust problems. It has proved successful, and it is proposed to extend this programme in 2004.

Hydraulic harrows
Plans for the fabrication of hydraulically operated harrows were completed in 2003, and an order was placed for 8 harrows for the 2004 production season.

A two day internal audit will be conducted on site and will include an assessment of dust protection measures in place at Dust Sensitive Locations

Project works for 2004 includes:

Hydraulic Harrows
Eight Hydraulic Harrows have been fabricated in 2004, specifically for Dust Sensitive Locations. These hydraulic harrows will allow the spoons to be lifted when not on the production fields. This will assist in reducing dust generation by the following:

1. Less harrowing of headlands and passways, will reduce the suspension of dust particles
2. The headland peat will not be broken down and dried as much from harrowing, which will reduce the volumes that may become suspended.
3. It will also leave it a better condition for subsequent collection by the proposed headland peat units.

It is proposed to have these 8 new hydraulic harrows in operation by the 2004 production season.

There is a 5 year policy in BNM to fabricate an additional 40 hydraulic harrows, which will include some for the 2005 production season. The total cost of this proposed work is circa €650,000 over the 5 years and will represent 15% of the total no. of harrows in operation.

Headland Peat Collection
Following the success of the headland collection trials in Boora in 2003, a machine design for mass manufacture was agreed and tendered outside BNM for manufacture. These units are planed for mid production season in Derrygreenagh, Mountdillon, Boora, Blackwater, Derryfadda & Littleton. In addition to these machines, 26 Tractor and Haku trailer units will be employed to transport the peat from the headland to the Haku piles, at an overall cost of €1.7 million.

All of the above modifications/new methods of production will be assessed, throughout the production year, to measure their performance and identify any potential improvements. The EMP will be updated on a regular basis to reflect these assessments.

Project 2

This project is completed (Ref: 4.3)

Project 4 & 6

These projects were completed.

Project 5

This project has been completed.

Project 7

This project has been completed during 2003 with the purchase of two double skinned mobile fuelling units and the completion of the Transport fuelling area.

Project 8

Two new bunded storage areas were completed in 2002. One area is in use at present and the other is planned for May 2004. Tenders have been received for the de-commissioning of the two old storage areas. (Ref: 4.2)

Project 9

No work has been carried out on this project to-date. It was proposed to monitor a silt pond constructed on the headland at Gilltown, in the Kilberry group of Bogs. Its close proximity to the production fields and stockpiles made it suitable for potentially reusing the waste peat excavated from the silt pond. This project will be examined again in 2004.

Project 10

Polythene for recycling has been collected from around the production areas and stockpiled at a hard surface for baling/collection. A new mechanical method of stripping piles and rolling the polythene on a spool was developed and contracts for fabrication of 20 units externally was agreed. This will produce a more compact and cleaner method of removing and transporting the polythene to a storage area. Polythene baled and loose was sent for recycling to various contractors and records of these are kept on file at the associated works. (see 2.3 Waste Arising). In total, approximately 1500 tonnes have been baled & collected, 700-800 tonnes of this recycled into pellets.

Collection of polythene is on-going. This is mainly the back-log of polythene. There are currently 20 of the new polythene strippers being manufactured and are currently being delivered. All of the strippers will be delivered by the end of April, and will be assigned to the different locations within BNM. An additional 3 – 4 will also be fabricated by the late 04, early 05. This will bring to 25 the number in operation.

There are currently three potential contractors that could take the waste polythene for recycling. All involve shredding, washing and either baling or pelletising the polythene and BNM are currently assessing each contractor to assess their suitability, environmental compliance etc.

Once the back-log has been recycled, and BNM have all of the strippers in place, the day to day recycling of the polythene removed each year will be more efficient.

3.2 Pollution Emission Register

3.3 Environmental Expenditure

Description	Cost (€)
Capital Costs (Plant & Equipment)	145,000
Labour & Supervision	154,000
Materials & External Environmental Consultancy	21,420
Overheads (ESB, Phones, Consumables)	1,600
EPA Fees	12,007
Total	334,027

4.0 Licence Specific Reports

4.1 Surface Water Discharge Monitoring Location Programme Review

The programme has operated satisfactorily and, as only eighteen months of sampling have been completed for the composite sampler, it is proposed to continue at the same locations for 2004.

4.2 Bunding Programme

Condition 9.1.4. Two new bunding areas were completed in November. The piping and pumping arrangements for the Lanespark area are completed and the area is in operation. The tanks are in position in the Templetuohy area and the piping and pumps are planned for completion in May 2004. Tenders have been received for the de-commissioning of the two old storage areas.

4.3 Particulate Emissions Minimisation Report

Condition 5.2 of the licence calls for a feasibility study to investigate the reduction of particulate emissions from Stack A103, A104 and B101. Modifications and new installations have now been completed at all three stacks and we are presently preparing the report as required.

4.4 Boiler Combustion Efficiency AB1

An efficiency test was carried out on Templetuohy Oil Fired Boiler in November 2003. Copy of test report is in Appendix 6

4.5 Energy Report

The proposed plan for an energy audit for Littleton was submitted on 18th March 2003 and the report on the audit of fuel peat was submitted in the AER for last year.

The second part of that audit programme which is an investigation into heat use at Littleton is being prepared now and will be submitted by June 2004.

4.6 Resource Consumption Summary

The Briquette Factory consumed 338,845 tonnes of milled peat and 4,789 of re-cycled product to produce 126,760 tonnes of briquettes.

4.7 Report on de-silting Programme

The upgrade programme for silt ponds was reviewed in February 2003. The design capacity of the silt ponds in the upgrade programme was incorrect. The revised upgrade programme giving the correct design capacities and also the position at 31st December 2003 is attached as Appendix 7. Seven ponds require significant development and this is planned to be completed before August 2004. Six further ponds are to be by-passed as outlined on the reviewed programme.

The silt pond cleaning programme is outlined in the spreadsheet attached as Appendix 8. The ponds were all cleaned as required by the inspections. The fact that two thirds of the ponds were cleaned only once is explained by their capacity being above the design capacity and pre-cleaning of open outfalls leading into the ponds.

4.8 Bog development and operational programme

No new bog has been developed for 2004. The production target has remained the same.

4.9 Bog rehabilitation progress report

No bog rehabilitation has taken place at Littleton during 2003.

5.0 Summary

The Environmental Management Programme has been implemented throughout the group, operating procedures have been put in place, and training has been provided for all personnel involved in compliance with the licence.

Bord na Mona Energy Ltd are represented on the Management Group of both the Shannon River and Eastern River Basin District Management Systems, set up under the Water Framework Directive, and on the Steering Group of the Catchment Management on the River Barrow.

Bord na Mona Fuels Ltd would like to take this opportunity to advise the Environmental Protection Agency of its continued commitment to improving its environmental performance by adopting cleaner production methods and improving its environmental protection measures.

Appendix 1

ENVIRONMENTAL

POLICY

STATEMENT

Littleton AER 2003

Colm Ó Jógáin
Chief Executive

BORD NA MÓNA

BORD NA MÓNA FUELS LIMITED

Document:	Q 1.4
Page:	1 of 1
Rev.:	0
Issued:	14/November 2000

ENVIRONMENTAL POLICY STATEMENT

Bord na Mona Fuels Limited operates in line with Bord na Mona plc group environmental policies. It is a registered member of Repak and promotes the efficient use of energy in its briqueting processes and operates under an Integrated Pollution Control (I.P.C.) licence at its Littleton works.

Bord na Mona plc is a commercial semi-state body with responsibility to develop Irelands peat resources in the national interest.

Bord na Mona Fuels Limited is committed to gather and make available formation on all aspects of its environmental impact and to help prove understanding among the public generally of its role and of the importance of Irish peatlands.

Bord na Mona Fuels Limited recognises the importance of peatland conservation and has a conservation policy statement.

Bord na Mona Fuels Limited will leave behind all areas it owns as either an economically or socially integrated resource of high environmental value.

Bord na Mona Fuels Limited seeks to conduct all aspects of its business in an environmentally sensitive manner.

Bord na Mona Fuels Limited will establish an environmental management system specifically addressing the following impacts:

- Discharges to water
- Emissions to atmosphere
- Waste disposal
- Use of natural resources
- Noise, vibration, odour, dust and visual effects
- Natural environmental and Eco-system

The environmental management system will be monitored, maintained and continually improved. A system of regular environmental audits will be put in place.

Bord na Mona Fuels Limited as part of the group, will continue research and development (R&D) into all aspects of its environmental impact.

This statement is published and is available at all locations within the company and its contents are brought to the attention of all employees.

Appendix 2

ENVIRONMENTAL

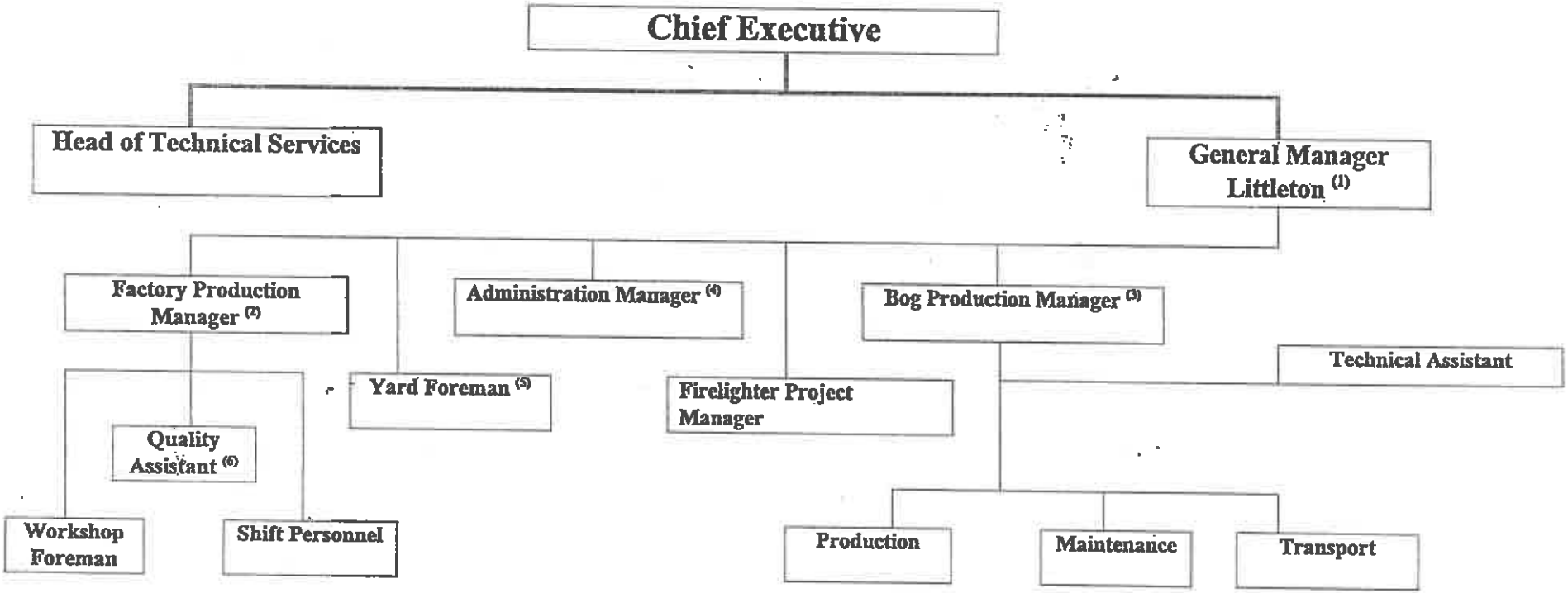
MANAGEMENT

STRUCTURE

Littleton AER 2003

Bord na Móna Fuels Limited

Environmental Responsibilities



(1) - Overall Environmental Responsibility
(2) - Factory Process production and maintenance include. settling ponds, effluent, emissions
(3) - Bog production, maintenance and transport activities, include silt ponds, tea centres, polythene etc.
(4) - Administration include sales, payroll, stores
(5) - Yard sales, include cleaning, recycling, disposal
(6) - Factory chemicals, effluent readings, water readings, process checks

Appendix 3

FACTORY & YARD

DISCHARGE

Littleton AER 2003

SURFACE DRAINS POND. 2003 FACTORY EFFLUENT POND.

WEEK NO.	P.H.	FLOW C.M./HR	S.S P.P.M.	COLOUR	P.H.	FLOW C.M./HR	S.S P.P.M.	COLOUR
1	6.8	52	68	<70	7.0	20	52	<70
2	7.0	40	256	<70	7.1	37	56	<70
3	6.9	40	56	<70	6.8	64	104	<70
4	7.0	38	80	<70	7.4	59	72	<70
5	7.0	42	28	<70	8.0	37	68	<70
6	6.8	40	20	<70	8.2	37	56	<70
7	6.9	42	8	<70	8.6	33	76	<70
8	7.0	40	10	<70	8.4	43	70	<70
9	7.1	48	20	<70	8.5	55	68	<70
10	7.2	57	72	<70	8.3	126	112	<70
11	6.9	40	24	<70	7.6	40	48	<70
12	7.1	40	20	<70	7.4	25	24	<70
13	7.2	42	28	<70	8.9	30	24	<70
14	7.1	29	15	<70	8.3	28	56	<70
15								
16	7.3	29	16	<70	7.1	51	84	<70
17	7.1	29	52	<70	7.1	78	68	<70
18	7.2	29	16	<70	7.3	68	60	<70
19	6.7	27	28	<70	7.1	40	92	<70
20	7.0	48	28	<70	7.2	40	32	<70
21	7.2	29	16	<70	7.1	18	36	<70
22	6.9	31	20	<70	7.5	40	20	<70
23	7.0	65	16	<70	7.4	43	40	<70
24	6.8	29	20	<70	7.2	33	28	<70
25	DURING FACTORY OVERHAUL NO SAMPLES TAKEN.				DURING FACTORY OVERHAUL NO SAMPLES TAKEN.			
26	DURING FACTORY OVERHAUL NO SAMPLES TAKEN.				DURING FACTORY OVERHAUL NO SAMPLES TAKEN.			
27	DURING FACTORY OVERHAUL NO SAMPLES TAKEN.				DURING FACTORY OVERHAUL NO SAMPLES TAKEN.			
28	DURING FACTORY OVERHAUL NO SAMPLES TAKEN.				DURING FACTORY OVERHAUL NO SAMPLES TAKEN.			
29	DURING FACTORY OVERHAUL NO SAMPLES TAKEN.				DURING FACTORY OVERHAUL NO SAMPLES TAKEN.			
30	DURING FACTORY OVERHAUL NO SAMPLES TAKEN.				DURING FACTORY OVERHAUL NO SAMPLES TAKEN.			
31	DURING FACTORY OVERHAUL NO SAMPLES TAKEN.				DURING FACTORY OVERHAUL NO SAMPLES TAKEN.			
32	DURING FACTORY OVERHAUL NO SAMPLES TAKEN.				DURING FACTORY OVERHAUL NO SAMPLES TAKEN.			
33	DURING FACTORY OVERHAUL NO SAMPLES TAKEN.				DURING FACTORY OVERHAUL NO SAMPLES TAKEN.			
34	DURING FACTORY OVERHAUL NO SAMPLES TAKEN.				DURING FACTORY OVERHAUL NO SAMPLES TAKEN.			
35	DURING FACTORY OVERHAUL NO SAMPLES TAKEN.				DURING FACTORY OVERHAUL NO SAMPLES TAKEN.			
36	6.7	29	40	<70	7.0	51	8	<70
37	7.2	26	24	<70	7.1	37	8	<70
38	6.9	26	18	<70	6.9	51	18	<70
39	7.2	27	18	<70	7.9	68	28	<70
40	7.2	25	12	<70	7.4	68	32	<70
41	7.2	26	15	<70	7.4	43	16	<70
42	7.2	24	10	<70	8.7	47	20	<70
43	7.1	25	13	<70	7.3	22	16	<70
44	7.2	25	12	<70	7.5	22	17	<70
45	7.1	26	15	<70	7.2	30	25	<70
46	7.1	27	17	<70	7.1	43	36	<70
47	7.0	26	15	<70	7.2	47	56	<70
48	7.0	27	18	<70	7.2	37	44	<70
49	7.0	52	30	<70	8.7	55	28	<70
50								
51	7.0	65	35	<70	7.2	33	26	<70
52	6.9	29	20	<70	7.0	43	28	<70

Appendix 4

COMPOSITE

SAMPLER

Littleton AER 2003

Bord Na Mona Energy Ltd, Littleton Group, Thurles, Co Tipperary

Composite Sampler Results

Month				Parameters							Daily Totals		
January	pH	COD	Ammonia as	Total	Suspended	Total	Colour	Flow	COD	Ammonia as	Total	Suspended	Total
2003		mg/l	N mg/l	Phosphorus	Solids	Solids	Pt Co	Daily	Kg/Day	Kg/Day	Phosphorus	Solids	Solids
				mg/l	mg/l	mg/l	units	Total (litres)			Kg/Day	Kg/Day	Kg/Day
1	-	-	-	-	13	418	-	5363885	-	-	-	69.73	2242.10
2	-	-	-	-	14	IS	-	3215433	-	-	-	45.02	-
3	-	-	-	-	4	IS	-	-8889819	-	-	-	-35.56	-
4	-	-	-	-	4	IS	-	-5024834	-	-	-	-20.10	-
5	-	-	-	-	4	294	-	-2815724	-	-	-	-11.26	-827.82
6	-	-	-	-	21	-	-	2194435	-	-	-	46.08	-
7	7.7	45	0.3	0.07	10	406	98	9668496	435.08	2.90	0.68	96.68	3925.41
8	-	-	-	-	-	-	-	8387931	-	-	-	-	-
9	-	-	-	-	-	-	-	7590107	-	-	-	-	-
10	-	-	-	-	-	-	-	7637431	-	-	-	-	-
11	-	-	-	-	-	-	-	7061940	-	-	-	-	-
12	-	-	-	-	-	-	-	6737134	-	-	-	-	-
13	-	-	-	-	-	-	-	8270422	-	-	-	-	-
14	7.9	31	0.2	0.05	4	206	93	8072484	250.25	1.61	0.40	32.29	1662.93
15	-	-	-	-	6	358	-	8001503	-	-	-	48.01	2864.54
16	-	-	-	-	5	316	-	7206933	-	-	-	36.03	2277.39
17	-	-	-	-	27	338	-	12819160	-	-	-	346.12	4332.88
18	-	-	-	-	12	216	-	14392810	-	-	-	172.71	3108.85
19	-	-	-	-	14	244	-	-6134394	-	-	-	-85.88	-1496.79
20	-	-	-	-	23	338	-	-7505203	-	-	-	-172.62	-2536.76
21	7.6	52	0.5	0.05	12	334	180	-17664510	-918.55	-8.83	-0.88	-211.97	-5899.95
22	-	-	-	-	4	150	-	-1735372	-	-	-	-6.94	-260.31
23	-	-	-	-	5	710	-	11200070	-	-	-	56.00	7952.05
24	-	-	-	-	5	150	-	11631570	-	-	-	58.16	1744.74
25	-	-	-	-	5	344	-	14891290	-	-	-	74.46	5122.60
26	-	-	-	-	5	210	-	12377330	-	-	-	61.89	2599.24
27	-	-	-	-	5	360	-	11826160	-	-	-	59.13	4257.42
28	-	-	-	-	9	350	-	11171060	-	-	-	100.54	3909.87
29	8.3	85	0.5	0.06	5	354	138	14050050	1194.25	7.03	0.84	70.25	4973.72
30	-	-	-	-	4	336	-	14382600	-	-	-	57.53	4832.55
31	-	-	-	-	4	353	-	10723090	-	-	-	42.89	3785.25

Bord Na Mona Energy Ltd, Littleton Group, Thurles, Co Tipperary

Composite Sampler Results

Month				Parameters					Daily Totals				
February	pH	COD	Ammonia as	Total	Suspended	Total	Colour	Flow	COD	Ammonia as	Total	Suspended	Total
2003		mg/l	N mg/l	Phosphorus	Solids	Solids	Pt Co	Daily	Kg/Day	Kg/Day	Phosphorus	Solids	Solids
				mg/l	mg/l	mg/l	units	Total (litres)			Kg/Day	Kg/Day	Kg/Day
1	-	-	-	-	4	366	-	11169220	-	-	-	44.68	4087.93
2	-	-	-	-	4	302	-	11557520	-	-	-	46.23	3490.37
3	-	-	-	-	4	276	-	13364930	-	-	-	53.46	3688.72
4	7.7	42	0.8	0.06	4	396	94	10568790	443.89	8.46	0.63	42.28	4185.24
5	-	-	-	-	6	330	-	9965147	-	-	-	59.79	3288.50
6	-	-	-	-	14	315	-	9925564	-	-	-	138.96	3126.55
7	-	-	-	-	6	256	-	9923090	-	-	-	59.54	2540.31
8	-	-	-	-	7	258	-	9452736	-	-	-	66.17	2438.81
9	-	-	-	-	10	316	-	10732620	-	-	-	107.33	3391.51
10	-	-	-	-	10	350	-	11224040	-	-	-	112.24	3928.41
11	8	48	0.2	0.05	8	276	103	9590069	460.32	1.92	0.48	76.72	2646.86
12	-	-	-	-	5	354	-	7189498	-	-	-	35.95	2545.08
13	-	-	-	-	6	316	-	6688563	-	-	-	40.13	2113.59
14	-	-	-	-	6	294	-	6609097	-	-	-	39.65	1943.07
15	-	-	-	-	5	266	-	6098919	-	-	-	30.49	1622.31
16	-	-	-	-	6	258	-	6296674	-	-	-	37.78	1624.54
17	-	-	-	-	5	316	-	5993967	-	-	-	29.97	1894.09
18	8.3	34	0.4	0.05	6	304	77	5786634	196.75	2.31	0.29	34.72	1759.14
19	-	-	-	-	5	348	-	6076320	-	-	-	30.38	2114.56
20	-	-	-	-	5	380	-	7542551	-	-	-	37.71	2866.17
21	-	-	-	-	6	376	-	6830776	-	-	-	40.98	2568.37
22	-	-	-	-	8	358	-	6339460	-	-	-	50.72	2269.53
23	-	-	-	-	6	368	-	6545428	-	-	-	39.27	2408.72
24	-	-	-	-	11	386	-	6060989	-	-	-	66.67	2339.54
25	8.2	33	0.5	0.05	9	390	58	5696176	187.97	2.85	0.28	51.27	2221.51
26	-	-	-	-	28	388	-	5132659	-	-	-	143.71	1991.47
27	-	-	-	-	5	394	-	4659348	-	-	-	23.30	1835.78
28	-	-	-	-	5	342	-	7441419	-	-	-	37.21	2544.97
	-	-	-	-	-	-	-		-	-	-	-	-
	-	-	-	-	-	-	-		-	-	-	-	-
	-	-	-	-	-	-	-		-	-	-	-	-

Bord Na Mona Energy Ltd, Littleton Group, Thurles, Co Tipperary
Composite Sampler Results

Month				Parameters							Daily Totals		
March 2002	pH	COD mg/l	Ammonia as N mg/l	Total Phosphorus mg/l	Suspended Solids mg/l	Total Solids mg/l	Colour Pt Co units	Flow Daily Total (litres)	COD Kg/Day	Ammonia as Kg/Day	Total Phosphorus Kg/Day	Suspended Solids Kg/Day	Total Solids Kg/Day
1	-	-	-	-	20	258	-	11314680	-	-	-	226.29	2919.19
2	-	-	-	-	7	290	-	10883400	-	-	-	76.18	3156.19
3	-	-	-	-	97	330	-	9485802	-	-	-	920.12	3130.31
4	8.2	38	0.3	0.05	26	331	148	11103840	421.95	3.33	0.56	288.70	3675.37
5	-	-	-	-	5	208	-	8946865	-	-	-	44.73	1860.95
6	-	-	-	-	5	208	-	6946372	-	-	-	34.73	1444.85
7	-	-	-	-	5	156	-	7508078	-	-	-	37.54	1171.26
8	-	-	-	-	5	198	-	13342300	-	-	-	66.71	2641.78
9	-	-	-	-	5	174	-	15040310	-	-	-	75.20	2617.01
10	-	-	-	-	9	166	-	14890020	-	-	-	134.01	2471.74
11	7.7	51	0.7	0.05	10	214	179	3575438	182.35	2.50	0.18	35.75	765.14
12	-	-	-	-	17	266	-	2377961	-	-	-	40.43	632.54
13	-	-	-	-	16	209	-	6836611	-	-	-	109.39	1428.85
14	-	-	-	-	22	212	-	7152660	-	-	-	157.36	1516.36
15	-	-	-	-	20	232	-	4365761	-	-	-	87.32	1012.86
16	-	-	-	-	10	236	-	4345843	-	-	-	43.46	1025.62
17	-	-	-	-	7	240	-	4165486	-	-	-	29.16	999.72
18	8.2	49	0.3	0.05	10	246	84	4066397	199.25	1.22	0.20	40.66	1000.33
19	-	-	-	-	5	390	-	3740446	-	-	-	18.70	1458.77
20	-	-	-	-	6	384	-	3381664	-	-	-	20.29	1298.56
21	-	-	-	-	5	390	-	2655912	-	-	-	13.28	1035.81
22	-	-	-	-	5	364	-	2726217	-	-	-	13.63	992.34
23	-	-	-	-	5	372	-	2312738	-	-	-	11.56	860.34
24	-	-	-	-	5	412	-	1928484	-	-	-	9.64	794.54
25	8.1	51	0.2	0.05	6	IS	63	1762375	89.88	0.35	0.09	10.57	-
26	-	-	-	-	7	268	-	1822881	-	-	-	12.76	488.53
27	-	-	-	-	80	274	-	2356539	-	-	-	188.52	645.69
28	-	-	-	-	5	264	-	2076158	-	-	-	10.38	548.11
29	-	-	-	-	5	282	-	1738784	-	-	-	8.69	490.34
30	-	-	-	-	5	256	-	1251157	-	-	-	6.26	320.30
31	-	-	-	-	5	278	-	720711	-	-	-	3.60	200.36

Bord Na Mona Energy Ltd, Littleton Group, Thurles, Co Tipperary

Composite Sampler Results

Month				Parameters							Daily Totals		
April	pH	COD	Ammonia as	Total	Suspended	Total	Colour	Flow	COD	Ammonia as	Total	Suspended	Total
2002		mg/l	N mg/l	Phosphorus	Solids	Solids	Pt Co	Daily	Kg/Day	Kg/Day	Phosphorus	Solids	Solids
				mg/l	mg/l	mg/l	units	Total (litres)			Kg/Day	Kg/Day	Kg/Day
1	8.3	28	0.5	0.05	5	270	33	2131085	59.67	1.07	0.11	10.66	575.39
2	-	-	-	-	5	442	-	1743567	-	-	-	8.72	770.66
3	-	-	-	-	5	384	-	964251	-	-	-	4.82	370.27
4	-	-	-	-	5	425	-	991023	-	-	-	4.96	421.18
5	-	-	-	-	9	IS	-	208330	-	-	-	1.87	-
6	-	-	-	-	5	IS	-	-443940	-	-	-	-2.22	-
7	-	-	-	-	6	IS	-	-623915	-	-	-	-3.74	-
8	8.6	49	0.2	0.05	IS	IS	60	-197124	-9.66	-0.04	-0.01	-	-
9	-	-	-	-	5	392	-	-242204	-	-	-	-1.21	-94.94
10	-	-	-	-	IS	264	-	497055	-	-	-	-	131.22
11	-	-	-	-	IS	306	-	461627	-	-	-	-	141.26
12	-	-	-	-	5	386	-	483787	-	-	-	2.42	186.74
13	-	-	-	-	5	396	-	623230	-	-	-	3.12	246.80
14	-	-	-	-	5	356	-	1090333	-	-	-	5.45	388.16
15	8.2	31	0.5	0.05	5	292	57	547275	16.97	0.27	0.03	2.74	159.80
16	-	-	-	-	5	522	-	677815	-	-	-	3.39	353.82
17	-	-	-	-	5	373	-	871346	-	-	-	4.36	325.01
18	-	-	-	-	5	358	-	682620	-	-	-	3.41	244.38
19	-	-	-	-	IS	338	-	247693	-	-	-	-	83.72
20	-	-	-	-	IS	270	-	63219	-	-	-	-	17.07
21	-	-	-	-	IS	473	-	121895	-	-	-	-	57.66
22	8.4	67	0.2	IS	IS	IS	48	250152	16.76	0.05	-	-	-
23	-	-	-	-	15	386	-	183093	-	-	-	2.75	70.67
24	-	-	-	-	5	395	-	700478	-	-	-	3.50	276.69
25	-	-	-	-	5	380	-	3265685	-	-	-	16.33	1240.96
26	-	-	-	-	5	252	-	4062680	-	-	-	20.31	1023.80
27	-	-	-	-	5	318	-	3511818	-	-	-	17.56	1116.76
28	-	-	-	-	5	334	-	5026788	-	-	-	25.13	1678.95
29	8.2	56	0.3	0.05	5	318	111	3686924	206.47	1.11	0.18	18.43	1172.44
30	-	-	-	-	5	308	-	3078586	-	-	-	15.39	948.20
	-	-	-	-	-	-	-		-	-	-	-	-

Bord Na Mona Energy Ltd, Littleton Group, Thurles, Co Tipperary

Composite Sampler Results

Month				Parameters							Daily Totals		
May	pH	COD	Ammonia as	Total	Suspended	Total	Colour	Flow	COD	Ammonia as	Total	Suspended	Total
2002		mg/l	N mg/l	Phosphorus	Solids	Solids	Pt Co	Daily	Kg/Day	Kg/Day	Phosphorus	Solids	Solids
				mg/l	mg/l	mg/l	units	Total (litres)			Kg/Day	Kg/Day	Kg/Day
1	-	-	-	-	5	312	-	2983079	-	-	-	14.92	930.72
2	-	-	-	-	8	294	-	6446874	-	-	-	51.57	1895.38
3	-	-	-	-	5	314	-	3806793	-	-	-	19.03	1195.33
4	-	-	-	-	5	342	-	14391920	-	-	-	71.96	4922.04
5	-	-	-	-	34	264	-	33965530	-	-	-	1154.83	8966.90
6	7.7	55	0.6	0.06	12	342	197	17283230	950.58	10.37	1.04	207.40	5910.86
7	-	-	-	-	4	330	-	8110233	-	-	-	32.44	2676.38
8	-	-	-	-	4	374	-	5535351	-	-	-	22.14	2070.22
9	-	-	-	-	4	388	-	5095609	-	-	-	20.38	1977.10
10	-	-	-	-	7	384	-	4186919	-	-	-	29.31	1607.78
11	-	-	-	-	4	IS	-	4189739	-	-	-	16.76	-
12	-	-	-	-	-	-	-	3977917	-	-	-	-	-
13	-	-	-	-	-	-	-	3617240	-	-	-	-	-
14	-	-	-	-	5	400	-	3120974	-	-	-	15.60	1248.39
15	-	-	-	-	5	446	-	2708349	-	-	-	13.54	1207.92
16	-	-	-	-	5	432	-	4356667	-	-	-	21.78	1882.08
17	-	-	-	-	5	362	-	5479711	-	-	-	27.40	1983.66
18	-	-	-	-	5	348	-	6109786	-	-	-	30.55	2126.21
19	-	-	-	-	5	388	-	6059584	-	-	-	30.30	2351.12
20	8.2	57	0.2	0.05	5	354	146	5812546	331.32	1.16	0.29	29.06	2057.64
21	-	-	-	-	5	334	-	5333497	-	-	-	26.67	1781.39
22	-	-	-	-	5	424	-	5669491	-	-	-	28.35	2403.86
23	-	-	-	-	5	352	-	4712098	-	-	-	23.56	1658.66
24	-	-	-	-	5	366	-	4317412	-	-	-	21.59	1580.17
25	-	-	-	-	5	384	-	3197648	-	-	-	15.99	1227.90
26	-	-	-	-	6	416	-	2747834	-	-	-	16.49	1143.10
27	8.2	43	0.2	0.05	5	338	92	3017982	129.77	0.60	0.15	15.09	1020.08
28	-	-	-	-	5	398	-	2704074	-	-	-	13.52	1076.22
29	-	-	-	-	7	438	-	2540286	-	-	-	17.78	1112.65
30	-	-	-	-	5	372	-	3005815	-	-	-	15.03	1118.16
31	-	-	-	-	5	366	-	2350427	-	-	-	11.75	860.26

Bord Na Mona Energy Ltd, Littleton Group, Thurles, Co Tipperary

Composite Sampler Results

Month				Parameters							Daily Totals		
June	pH	COD	Ammonia as	Total	Suspended	Total	Colour	Flow	COD	Ammonia as	Total	Suspended	Total
2002		mg/l	N mg/l	Phosphorus	Solids	Solids	Pt Co	Daily	Kg/Day	Kg/Day	Phosphorus	Solids	Solids
				mg/l	mg/l	mg/l	units	Total (litres)			Kg/Day	Kg/Day	Kg/Day
1	-	-	-	-	5	412	-	2382601	-	-	-	11.91	981.63
2	-	-	-	-	5	414	-	2010747	-	-	-	10.05	832.45
3	8.3	40	0.2	0.05	5	424	79	2675976	107.04	0.54	0.13	13.38	1134.61
4	-	-	-	-	12	320	-	3785798	-	-	-	45.43	1211.46
5	-	-	-	-	5	298	-	2560358	-	-	-	12.80	762.99
6	-	-	-	-	5	330	-	2279268	-	-	-	11.40	752.16
7	-	-	-	-	5	358	-	1904318	-	-	-	9.52	681.75
8	-	-	-	-	5	350	-	1839665	-	-	-	9.20	643.88
9	-	-	-	-	7	384	-	1795635	-	-	-	12.57	689.52
10	7.7	73	0.4	0.23	10	411	80	6018339	439.34	2.41	1.38	60.18	2473.54
11	-	-	-	-	6	310	-	5141692	-	-	-	30.85	1593.92
12	-	-	-	-	5	316	-	3298912	-	-	-	16.49	1042.46
13	-	-	-	-	5	344	-	2341357	-	-	-	11.71	805.43
14	-	-	-	-	5	314	-	2113704	-	-	-	10.57	663.70
15	-	-	-	-	16	380	-	1927872	-	-	-	30.85	732.59
16	-	-	-	-	6	388	-	1937418	-	-	-	11.62	751.72
17	8.2	60	0.3	0.1	5	364	83	1994309	119.66	0.60	0.20	9.97	725.93
18	-	-	-	-	12	484	-	1676247	-	-	-	20.11	811.30
19	-	-	-	-	9	382	-	1978118	-	-	-	17.80	755.64
20	-	-	-	-	27	420	-	1442160	-	-	-	38.94	605.71
21	-	-	-	-	7	374	-	1213434	-	-	-	8.49	453.82
22	-	-	-	-	15	388	-	1331157	-	-	-	19.97	516.49
23	-	-	-	-	7	379	-	1221484	-	-	-	8.55	462.94
24	8.6	64	0.2	0.12	IS	328	84	420672	26.92	0.08	0.05	-	137.98
25	-	-	-	-	11	274	-	8872	-	-	-	0.10	2.43
26	-	-	-	-	13	274	-	*	-	-	-	-	-
27	-	-	-	-	10	280	-	*	-	-	-	-	-
28	-	-	-	-	7	288	-	*	-	-	-	-	-
29	-	-	-	-	11	292	-	*	-	-	-	-	-
30	-	-	-	-	12	232	-	*	-	-	-	-	-
	-	-	-	-	-	-	-	*	-	-	-	-	-

* Battery Powered down

Bord Na Mona Energy Ltd, Littleton Group, Thurles, Co Tipperary

Composite Sampler Results

Month				Parameters							Daily Totals		
July	pH	COD	Ammonia as	Total	Suspended	Total	Colour	Flow	COD	Ammonia as	Total	Suspended	Total
2002		mg/l	N mg/l	Phosphorus	Solids	Solids	Pt/Co	Daily	Kg/Day	Kg/Day	Phosphorus	Solids	Solids
				mg/l	mg/l	mg/l	units	Total (litres)			Kg/Day	Kg/Day	Kg/Day
1	7.4	64	0.5	0.19	29	340	176	4440848	284.21	2.22	0.84	128.78	1509.89
2	-	-	-	-	5	266	-	2712062	-	-	-	13.56	721.41
3	-	-	-	-	5	336	-	1970522	-	-	-	9.85	662.10
4	-	-	-	-	5	422	-	1626956	-	-	-	8.13	686.58
5	-	-	-	-	5	399	-	1198139	-	-	-	5.99	478.06
6	-	-	-	-	5	398	-	1026187	-	-	-	5.13	408.42
7	-	-	-	-	5	376	-	919683	-	-	-	4.60	345.80
8	8.2	55	0.4	0.08	5	380	69	1054802	58.01	0.42	0.08	5.27	400.82
9	-	-	-	-	11	406	-	1392237	-	-	-	15.31	565.25
10	-	-	-	-	8	442	-	1275890	-	-	-	10.21	563.94
11	-	-	-	-	18	392	-	746062	-	-	-	13.43	292.46
12	-	-	-	-	27	360	-	513515	-	-	-	13.86	184.87
13	-	-	-	-	32	334	-	382131	-	-	-	12.23	127.63
14	-	-	-	-	9	330	-	378040	-	-	-	3.40	124.75
15	8.5	32	0.24	0.06	5	345	70	1438876	46.04	0.35	0.09	7.19	496.41
16	-	-	-	-	5	433	-	1683961	-	-	-	8.42	729.16
17	-	-	-	-	5	472	-	2151395	-	-	-	10.76	1015.46
18	-	-	-	-	5	502	-	2487515	-	-	-	12.44	1248.73
19	-	-	-	-	5	482	-	1740809	-	-	-	8.70	839.07
20	-	-	-	-	6	492	-	1452899	-	-	-	8.72	714.83
21	-	-	-	-	5	528	-	1192923	-	-	-	5.96	629.86
22	8.2	45	0.07	0.09	6	446	80	941660	42.37	0.07	0.08	5.65	419.98
23	-	-	-	-	5	398	-	970140	-	-	-	4.85	386.12
24	-	-	-	-	5	496	-	915144	-	-	-	4.58	453.91
25	-	-	-	-	5	458	-	1151813	-	-	-	5.76	527.53
26	-	-	-	-	5	452	-	904505	-	-	-	4.52	408.84
27	-	-	-	-	5	440	-	670277	-	-	-	3.35	294.92
28	-	-	-	-	5	444	-	876268	-	-	-	4.38	389.06
29	7	31	0.06	0.05	5	448	67	1918325	59.47	0.12	0.10	9.59	859.41
30	-	-	-	-	12	374	-	3763127	-	-	-	45.16	1407.41
31	-	-	-	-	7	384	-	5129883	-	-	-	35.91	1969.88

Bord Na Mona Energy Ltd, Littleton Group, Thurles, Co Tipperary

Composite Sampler Results

Month				Parameters							Daily Totals		
August	pH	COD	Ammonia as	Total	Suspended	Total	Colour	Flow	COD	Ammonia as	Total	Suspended	Total
2002		mg/l	N mg/l	Phosphorus	Solids	Solids	Pt Co	Daily	Kg/Day	Kg/Day	Phosphorus	Solids	Solids
				mg/l	mg/l	mg/l	units	Total (litres)			Kg/Day	Kg/Day	Kg/Day
1	-	-	-	-	7	354	-	4478230	-	-	-	31.35	1585.29
2	-	-	-	-	13	372	-	2952264	-	-	-	38.38	1098.24
3	-	-	-	-	11	396	-	2227304	-	-	-	24.50	882.01
4	-	-	-	-	8	378	-	1846838	-	-	-	14.77	698.10
5	8	54	0.03	0.05	7	373	122	1417948	76.57	0.04	0.07	9.93	528.89
6	-	-	-	-	5	404	-	1180788	-	-	-	5.90	477.04
7	-	-	-	-	5	372	-	997380	-	-	-	4.99	371.03
8	-	-	-	-	5	420	-	696537	-	-	-	3.48	292.55
9	-	-	-	-	5	364	-	636762	-	-	-	3.18	231.78
10	-	-	-	-	5	414	-	569013	-	-	-	2.85	235.57
11	-	-	-	-	6	406	-	392880	-	-	-	2.36	159.51
12	8.5	87	0.41	IS	11	406	98	250150	21.76	0.10	#VALUE!	2.75	101.56
13	-	-	-	-	39	490	-	141555	-	-	-	5.52	69.36
14	-	-	-	-	11	498	-	68298	-	-	-	0.75	34.01
15	-	-	-	-	14	492	-	49008	-	-	-	0.69	24.11
16	-	-	-	-	123	542	-	201325	-	-	-	24.76	109.12
17	-	-	-	-	5	490	-	100846	-	-	-	0.50	49.41
18	-	-	-	-	26	474	-	74757	-	-	-	1.94	35.43
19	8.4	58	0.09	0.05	IS	470	76	59404	3.45	0.01	0.00	-	27.92
20	-	-	-	-	IS	-	-	42882	-	-	-	-	-
21	-	-	-	-	IS	-	-	14387	-	-	-	-	-
22	-	-	-	-	IS	-	-	1368	-	-	-	-	-
23	-	-	-	-	IS	-	-	1532	-	-	-	-	-
24	-	-	-	-	IS	-	-	2820	-	-	-	-	-
25	-	-	-	-	IS	-	-	5220	-	-	-	-	-
26	-	-	-	-	IS	-	-	4466	-	-	-	-	-
27	-	-	-	-	IS	-	-	290969	-	-	-	-	-
28	-	-	-	-	IS	-	-	578768	-	-	-	-	-
29	-	-	-	-	IS	-	-	578768	-	-	-	-	-
30	-	-	-	-	IS	-	-	578768	-	-	-	-	-
31	-	-	-	-	IS	-	-	578768	-	-	-	-	-

Bord Na Mona Energy Ltd, Littleton Group, Thurles, Co Tipperary

Composite Sampler Results

Month				Parameters							Daily Totals		
September	pH	COD	Ammonia as	Total	Suspended	Total	Colour	Flow	COD	Ammonia as	Total	Suspended	Total
2002		mg/l	N mg/l	Phosphorus	Solids	Solids	Pt Co	Daily	Kg/Day	Kg/Day	Phosphorus	Solids	Solids
				mg/l	mg/l	mg/l	units	Total (litres)			Kg/Day	Kg/Day	Kg/Day
1								578768	0.00	0.00	0.00	0.00	0.00
2								578768	0.00	0.00	0.00	0.00	0.00
3								578768	0.00	0.00	0.00	0.00	0.00
4								578768	0.00	0.00	0.00	0.00	0.00
5								578768	0.00	0.00	0.00	0.00	0.00
6								578768	0.00	0.00	0.00	0.00	0.00
7								578768	0.00	0.00	0.00	0.00	0.00
8								578768	0.00	0.00	0.00	0.00	0.00
9								578768	0.00	0.00	0.00	0.00	0.00
10								578768	0.00	0.00	0.00	0.00	0.00
11								578768	0.00	0.00	0.00	0.00	0.00
12								578768	0.00	0.00	0.00	0.00	0.00
13								578768	0.00	0.00	0.00	0.00	0.00
14								578768	0.00	0.00	0.00	0.00	0.00
15								578768	0.00	0.00	0.00	0.00	0.00
16								578768	0.00	0.00	0.00	0.00	0.00
17								578768	0.00	0.00	0.00	0.00	0.00
18								578768	0.00	0.00	0.00	0.00	0.00
19								578768	0.00	0.00	0.00	0.00	0.00
20								578768	0.00	0.00	0.00	0.00	0.00
21								578768	0.00	0.00	0.00	0.00	0.00
22								578768	0.00	0.00	0.00	0.00	0.00
23								578768	0.00	0.00	0.00	0.00	0.00
24								578768	0.00	0.00	0.00	0.00	0.00
25								578768	0.00	0.00	0.00	0.00	0.00
26								578768	0.00	0.00	0.00	0.00	0.00
27								578768	0.00	0.00	0.00	0.00	0.00
28								578768	0.00	0.00	0.00	0.00	0.00
29								578768	0.00	0.00	0.00	0.00	0.00
30								578768	0.00	0.00	0.00	0.00	0.00
31									0.00	0.00	0.00	0.00	0.00

Bord Na Mona Energy Ltd, Littleton Group, Thurles, Co Tipperary

Composite Sampler Results

Month				Parameters								Daily Totals		
October	pH	COD	Ammonia as	Total	Suspended	Total	Colour	Flow	COD	Ammonia as	Total	Suspended	Total
2002		mg/l	N mg/l	Phosphorus	Solids	Solids	Pt Co	Daily	Kg/Day	Kg/Day	Phosphorus	Solids	Solids
				mg/l	mg/l	mg/l	units	Total (litres)			Kg/Day	Kg/Day	Kg/Day
1								578768	0.00	0.00	0.00	0.00	0.00
2								578768	0.00	0.00	0.00	0.00	0.00
3								578768	0.00	0.00	0.00	0.00	0.00
4								578768	0.00	0.00	0.00	0.00	0.00
5								578768	0.00	0.00	0.00	0.00	0.00
6								578768	0.00	0.00	0.00	0.00	0.00
7								578768	0.00	0.00	0.00	0.00	0.00
8								578768	0.00	0.00	0.00	0.00	0.00
9								578768	0.00	0.00	0.00	0.00	0.00
10								578768	0.00	0.00	0.00	0.00	0.00
11								578768	0.00	0.00	0.00	0.00	0.00
12								578768	0.00	0.00	0.00	0.00	0.00
13								578768	0.00	0.00	0.00	0.00	0.00
14								578768	0.00	0.00	0.00	0.00	0.00
15								578768	0.00	0.00	0.00	0.00	0.00
16								578768	0.00	0.00	0.00	0.00	0.00
17								578768	0.00	0.00	0.00	0.00	0.00
18								578768	0.00	0.00	0.00	0.00	0.00
19								578768	0.00	0.00	0.00	0.00	0.00
20								578768	0.00	0.00	0.00	0.00	0.00
21								578768	0.00	0.00	0.00	0.00	0.00
22								578768	0.00	0.00	0.00	0.00	0.00
23								578768	0.00	0.00	0.00	0.00	0.00
24								578768	0.00	0.00	0.00	0.00	0.00
25								578768	0.00	0.00	0.00	0.00	0.00
26								578768	0.00	0.00	0.00	0.00	0.00
27								578768	0.00	0.00	0.00	0.00	0.00
28								578768	0.00	0.00	0.00	0.00	0.00
29	-	-	-	-	-	-	-	578768	-	-	-		
30	-	-	-	-	4	258	-	578768	-	-	-	2.32	149.32
31	-	-	-	-	4	230	-	578768	-	-	-	2.32	133.12

Bord Na Mona Energy Ltd, Littleton Group, Thurles, Co Tipperary

Composite Sampler Results

Month				Parameters							Daily Totals		
November	pH	COD	Ammonia as	Total	Suspended	Total	Colour	Flow	COD	Ammonia as	Total	Suspended	Total
2002		mg/l	N mg/l	Phosphorus	Solids	Solids	Pt Co	Daily	Kg/Day	Kg/Day	Phosphorus	Solids	Solids
				mg/l	mg/l	mg/l	units	Total (litres)			Kg/Day	Kg/Day	Kg/Day
1	-	-	-	-	4	252	-	578768	-	-	-	2.32	145.85
2	-	-	-	-	6	236	-	578768	-	-	-	3.47	136.59
3	-	-	-	-	4	226	-	1060196	-	-	-	4.24	239.60
4	7.5	87	1.09	0.04	4	210	182	1495706	130.13	1.63	0.06	5.98	314.10
5	-	-	-	-	4	244	-	1130168	-	-	-	4.52	275.76
6	-	-	-	-	4	222	-	1224113	-	-	-	4.90	271.75
7	-	-	-	-	8	208	-	1284500	-	-	-	10.28	267.18
8	-	-	-	-	4	222	-	1348913	-	-	-	5.40	299.46
9	-	-	-	-	4	204	-	924961	-	-	-	3.70	188.69
10	-	-	-	-	4	232	-	787512	-	-	-	3.15	182.70
11	8	21	0.37	0.04	11	102	141	839943	17.64	0.31	0.03	9.24	85.67
12	-	-	-	-	4	228	-	2315593	-	-	-	9.26	527.96
13	-	-	-	-	4	248	-	1595994	-	-	-	6.38	395.81
14	-	-	-	-	28	194	-	1093838	-	-	-	30.63	212.20
15	-	-	-	-	4	214	-	-473542	-	-	-	-1.89	-101.34
16	-	-	-	-	13	248	-	-313421	-	-	-	-4.07	-77.73
17	-	-	-	-	4	230	-	-421513	-	-	-	-1.69	-96.95
18	7.6	61	0.5	0.04	4	250	164	-594087	-36.24	-0.30	-0.02	-2.38	-148.52
19	-	-	-	-	4	264	-	107073	-	-	-	0.43	28.27
20	-	-	-	-	6	264	-	6598651	-	-	-	39.59	1742.04
21	-	-	-	-	4	208	-	5363323	-	-	-	21.45	1115.57
22	-	-	-	-	4	336	-	2912033	-	-	-	11.65	978.44
23	-	-	-	-	9	292	-	2620843	-	-	-	23.59	765.29
24	-	-	-	-	4	320	-	2340528	-	-	-	9.36	748.97
25	7.7	36	0.66	0.04	4	290	205	2162844	77.86	1.43	0.09	8.65	627.22
26	-	-	-	-	4	330	-	2968139	-	-	-	11.87	979.49
27	-	-	-	-	4	262	-	2808566	-	-	-	11.23	735.84
28	-	-	-	-	4	258	-	2362007	-	-	-	9.45	609.40
29	-	-	-	-	4	270	-	4737837	-	-	-	18.95	1279.22
30	-	-	-	-	5	278	-	6314516	-	-	-	31.57	1755.44
	-	-	-	-	-	-	-		-	-	-	-	-

Bord Na Mona Energy Ltd, Littleton Group, Thurles, Co Tipperary

Composite Sampler Results

Month				Parameters							Daily Totals		
December	pH	COD	Ammonia as	Total	Suspended	Total	Colour	Flow	COD	Ammonia as	Total	Suspended	Total
2003		mg/l	N mg/l	Phosphorus	Solids	Solids	Pt.Co	Daily	Kg/Day	Kg/Day	Phosphorus	Solids	Solids
				mg/l	mg/l	mg/l	units	Total (litres)			Kg/Day	Kg/Day	Kg/Day
1	-	-	-	-	12	280	-	3105383	-	-	-	37.26	869.51
2	8.1	68	0.54	0.04	4	316	175	3748308	254.88	2.02	0.15	14.99	1184.47
3	-	-	-	-	4	186	-	4064733	-	-	-	16.26	756.04
4	-	-	-	-	4	206	-	3056071	-	-	-	12.22	629.55
5	-	-	-	-	4	268	-	2792376	-	-	-	11.17	748.36
6	-	-	-	-	4	316	-	2643164	-	-	-	10.57	835.24
7	-	-	-	-	4	278	-	2384215	-	-	-	9.54	662.81
8	-	-	-	-	4	238	-	1972845	-	-	-	7.89	469.54
9	8	57	0.41	0.04	4	311	130	2667442	152.04	1.09	0.11	10.67	829.57
10	-	-	-	-	4	268	-	3255297	-	-	-	13.02	872.42
11	-	-	-	-	4	274	-	6144040	-	-	-	24.58	1683.47
12	-	-	-	-	4	208	-	7705360	-	-	-	30.82	1602.71
13	-	-	-	-	7	202	-	8421790	-	-	-	58.95	1701.20
14	-	-	-	-	4	264	-	4874802	-	-	-	19.50	1286.95
15	-	-	-	-	4	284	-	3287198	-	-	-	13.15	933.56
16	7.8	64	0.42	0.04	4	326	186	2804232	179.47	1.18	0.11	11.22	914.18
17	-	-	-	-	4	254	-	2887533	-	-	-	11.55	733.43
18	-	-	-	-	4	302	-	2855082	-	-	-	11.42	862.23
19	-	-	-	-	4	260	-	2559092	-	-	-	10.24	665.36
20	-	-	-	-	25	178	-	2955002	-	-	-	73.88	525.99
21	-	-	-	-	4	250	-	3919524	-	-	-	15.68	979.88
22	-	-	-	-	4	282	-	1786882	-	-	-	7.15	503.90
23	-	-	0.39	0.04	4	225	152	1416319	-	0.55	0.06	5.67	318.67
24	-	-	-	-	4	280	-	2383498	-	-	-	9.53	667.38
25	-	-	-	-	4	146	-	2208355	-	-	-	8.83	322.42
26	-	-	-	-	4	268	-	8030487	-	-	-	32.12	2152.17
27	-	-	-	-	9	228	-	11631680	-	-	-	104.69	2652.02
28	-	-	-	-	4	202	-	6751780	-	-	-	27.01	1363.86
29	-	-	-	-	4	296	-	5578227	-	-	-	22.31	1651.16
30	-	-	0.3	0.04	7	236	180	3746424	-	1.12	0.15	26.22	884.16
31	-	-	-	-	4	278	-	4808615	-	-	-	19.23	1336.79

Appendix 5

EMMISSIONS

TO

AIR

Littleton AER 2003

Summary Results of Emissions to Atmosphere compliance monitoring from the Bord na Móna Fuels Limited Littleton Briquette Factory at Littleton (January 2003 to December 2003) in accordance with the requirements of Integrated Pollution Control Licence Register No. 499.

Report No.: ECS0742

Attention: Mr. Ray Yates
Production Manager
Bord na Móna Fuels Limited
c/o Littleton Briquette Factory
Thurles
Co. Tipperary

Prepared by: Mr John Conway
Air Quality Section Head

Reviewed by: Mr Sean Creedon
Environmental Consultant

Date: February 2004

Executive Summary

As part of the requirements of Integrated Pollution Control Licence, Register No. 499, Bord na Móna Fuels Limited are required to submit to the Agency, an Annual Environmental Report (AER). Bord na Móna Environmental Limited were commissioned to prepare a summary report of emissions to atmosphere monitored at the Littleton Briquette Factory from the period to January 2003 to December 2003.

This report is certified as accurate and representative of the sampling and associated analysis carried out.

Respectively submitted,

Mr John Conway
Air Quality Section Head

Mr. Sean Creedon
Environmental Consultant

1.0 INTRODUCTION

A summary of IPC Licence Register No. 499 environmental monitoring results from the period January 2003 to December 2003 are presented as follows:

Table 1: Quarterly Compliance Monitoring of Particulate Emissions to Atmosphere

Table 2: Summary of Quarterly Compliance Monitoring of Particulate Mass Emissions to Atmosphere

Table 3: IPC Licence Particulate Emissions to Atmosphere Emission Limit Values (ELV's)

Table 4: Annual Particulate Mass Emissions to Atmosphere

Table 5: Quarterly Compliance Monitoring of TOC (as C) Emissions to Atmosphere from Emission Point A108

Table 6: Annual TOC (as C) Emissions to Atmosphere from Emission Point A108

Table 7: Annual Compliance Monitoring of NOx (as NO_2) Emissions to Atmosphere from Emission Point B101

Table 8: Annual NOx (as NO_2) Emissions to Atmosphere from Emission Point B101

Table 9: Annual Compliance Monitoring of SO_2 Emissions to Atmosphere from Emission Point B101

Table 10 Annual SO_2 Emissions to Atmosphere from Emission Point B101

Appendix 1

Figures 1-6: Particulate Mass Emissions to Atmosphere (kg) (December 2001 to December 2002) vs. Licence ELV from Emissions Reference Points B101, A101-A105 respectively.

Figure 7: Summary of Particulate Mass Emissions to Atmosphere (kg) (December 2001 to December 2002) from Emissions Reference Points B101, A101-A106.

Note

Figures in bold represent sample results for specific parameters that exceed IPC Licence Emission Limit Values (ELV's).

TABLE 1: QUARTERLY COMPLIANCE MONITORING OF PARTICULATE EMISSIONS TO ATMOSPHERE (JANUARY – DECEMBER 2003)

Quarter	Sampling Date	Job No.	Emission Point Ref.	Volumetric Flow (Nm^3/hr)	Particulates (mg/Nm^3)	Particulate Mass Emissions (kg/hr)
1 (2003)	26+27/03	ECS0159	B101	35,529	**750**	**26.6**
			A101	**85,207**	**57.1**	**4.9**
			A102	**79,604**	**173.2**	**13.8**
			A103	4,243	55.3	0.23
			A104	**12,225**	**1,946**	**23.8**
			A105	**9,124**	11.4	0.10
			A106	Note 1	Note 1	Note 1
2	19+20/06	ECS0328	B101	**39,344**	**1,200**	**47.2**
			A101	**78,129**	**58.5**	**4.57**
			A102	**88,077**	**143.0**	**12.6**
			A103	4,713	281.0	1.33
			A104	11,134	**2,894**	**32.2**
			A105	**9,457**	5.55	0.05
			A106	Note 1	Note 1	Note 1
3	24/9 + 6/10	ECS0515	B101	31,261	186.9	5.84
			A101	**78,268**	**58.4**	**4.57**
			A102	**77,051**	**117.0**	**9.01**
			A103	4,807	118.9	0.60
			A104	9,726	159.5	1.60
			A105	6,777	7.10	0.05
			A106	Note 1	Note 1	Note 1
4	25 + 26/11	ECS0630	B101	31,642	155.4	4.92
			A101	**83,712**	**59.3**	**5.00**
			A102	**76,756**	**163.1**	**12.5**
			A103	**6,383**	87.1	0.56
			A104	**13,484**	288.5	3.89
			A105	6,058	18.2	0.11
			A106	Note 1	Note 1	Note 1

Note 1 Process servicing emission reference point was not operational during monitoring events.

TABLE 2: SUMMARY OF QUARTERLY COMPLIANCE MONITORING OF PARTICULATE MASS EMISSIONS TO ATMOSPHERE (JANUARY – DECEMBER 2003)				
Emission Point Ref.	**Particulate Mass Emissions during each Quarterly Monitoring Event (kg/hr)**			
	1	**2**	**3**	**4**
B101	**26.6**	**47.2**	5.84	4.92
A101	**4.9**	**4.57**	**4.57**	**5.00**
A102	**13.8**	**12.6**	**9.01**	**12.5**
A103	0.23	1.33	0.60	0.56
A104	**23.8**	**32.2**	1.60	3.89
A105	0.10	0.05	0.05	0.11
A106	Note 1	Note 1	Note 1	Note 1

Note 1 Process serving emission reference point was not operational during monitoring events.

TABLE 3: IPC LICENCE PARTICULATE EMISSIONS TO ATMOSPHERE EMISSION LIMIT VALUES (ELV's)				
Emission Point Ref.	**Maximum Volumetric Flow (Nm^3/hr)**	**Particulate ELV (mg/Nm^3 or kg/hr)**	**Particulate ELV (kg/hr)**	***Licensed Annual Particulate Mass Emissions (kg/yr)***
B101	36000	400 mg/Nm^3	14.4	*126144*
A101	34852	50 mg/Nm^3 >0.5kg/hr 150 mg/Nm^3 <0.5kg/hr	5.23 max.	*15265* *45796 max.*
A102	42400	50 mg/Nm^3 >0.5kg/hr 150 mg/Nm^3 <0.5kg/hr	6.36 max.	*18571* *55714 max.*
A103	5800	7 kg/hr	7	*61320*
A104	11700	6 kg/hr	6	*52560*
A105	6797	50 mg/Nm^3 >0.5kg/hr 150 mg/Nm^3 <0.5kg/hr	1.02 max.	*2977* *8931 max.*
A106	660	50 mg/Nm^3 >0.5kg/hr 150 mg/Nm^3 <0.5kg/hr	0.10 max.	*289.1* *867 max.*
Maximum Annual Particulates Mass Emissions to Atmosphere Limit			-	*351332*

TABLE 4: ANNUAL PARTICULATE MASS EMISSIONS TO ATMOSPHERE (JANUARY – DECEMBER 2003)

Location	Annual Average Mass Emission (kg/hr)	Hours Production	Annual Particulate Mass Emissions (kg/year)	*Licensed Annual Particulate Mass Emissions (kg/yr)*
B101	21.1	7438	156942	*126144*
A101	4.76	7438	35405	*45796 max.*
A102	12.0	7438	89256	*55714 max.*
A103	0.68	7438	5058	*61320*
A104	15.4	7438	114545	*52560*
A105	0.08	7438	595	*8931 max.*
A106	Note 1	7438	Note 1	*867 max.*
Particulate Mass Emissions to Atmosphere			401950	*351332*

Note 1 Process serving emission reference point was not operational during monitoring events.

TABLE 5: QUARTERLY COMPLIANCE MONITORING OF TOC (AS C) EMISSIONS TO ATMOSPHERE FROM EMISSION POINT A108 (JANUARY – DECEMBER 2003)

Quarter	Sampling Date	Job No.	Volumetric Flow (Nm^3/hr)	TOC (as C) Note 1 (mg/Nm^3)	TOC (as C) Mass Emissions (kg/hr)
1	26& 27 March	ECS0159	Note 1	Note 1	Note 1
2	19 & 20 June	ECS0328	Note 1	Note 1	Note 1
3	24 Sept. + 6 Oct.	ECS0515	2,583	130	0.34
4	25 & 26 Nov.	ECS0630	Note 1	Note 1	Note 1
IPC Licence ELV's			*6700*	*170*	*1.14*

Note 1 Process servicing emission reference point was not operational during monitoring events.

TABLE 6: ANNUAL TOC (as C) MASS EMISSIONS FROM A108 (JANUARY – DECEMBER 2003)

Annual Average Mass Emission (kg/hr) Note 1	Hours Production Note 2	Annual Mass Emissions (kg/year)	*Annual Mass Emissions IPC Licence ELV (kg/year)*
0.34	1417.25	482	*9978*

Note 1 Based on results from one monitoring event

Note 2 Average number of production hours per year for Firelighter Production Plant

TABLE 7: ANNUAL COMPLIANCE MONITORING OF NO_x (as NO_2) EMISSIONS TO ATMOSPHERE FROM EMISSION POINT B101 (JANUARY – DECEMBER 2003)					
Annual	**Sampling Date**	**Job No.**	**Volumetric Flow (Nm^3/hr)**	**NO_x (as NO_2) (mg/Nm^3)**	**NO_x (as NO_2) Mass Emissions (kg/hr)**
	26& 27 March	ECS0159	35529	572	20.3
IPC Licence ELV's			*36000*	*100*	*3.6*

TABLE 8: ANNUAL NO_x (as NO_2) MASS EMISSIONS FROM B101 (JANUARY – DECEMBER 2003)			
Annual Average Mass Emission (kg/hr) Note 1	**Hours Production**	**Annual Mass Emissions (kg/year)**	***Annual Mass Emissions IPC Licence ELV (kg/year)***
20.3	7438	150991	*31536*

Note 1 Based on results from one monitoring event

TABLE 9: ANNUAL COMPLIANCE MONITORING OF SO_2 EMISSIONS TO ATMOSPHERE FROM EMISSION POINT B101 (JANUARY – DECEMBER 2003)					
Annual	**Sampling Date**	**Job No.**	**Volumetric Flow (Nm^3/hr)**	**SO_2 (mg/Nm^3)**	**SO_2 Mass Emissions (kg/hr)**
	26& 27 March	ECS0159	35529	565	20.1
IPC Licence ELV's			*36000*	*1000*	*36*

TABLE 10: ANNUAL NO_x (as NO_2) MASS EMISSIONS FROM B101 (JANUARY – DECEMBER 2003)			
Annual Average Mass Emission (kg/hr) Note 1	**Hours Production**	**Annual Mass Emissions (kg/year)**	***Annual Mass Emissions IPC Licence ELV (kg/year)***
20.1	7438	149504	*315360*

Note 1 Based on results from one monitoring event

APPENDIX 1

Figure 1: Particulate Mass Emissions to Atmosphere (kg/hr) (January to December 2003) vs. Licence ELV from Emissions Reference Point B101

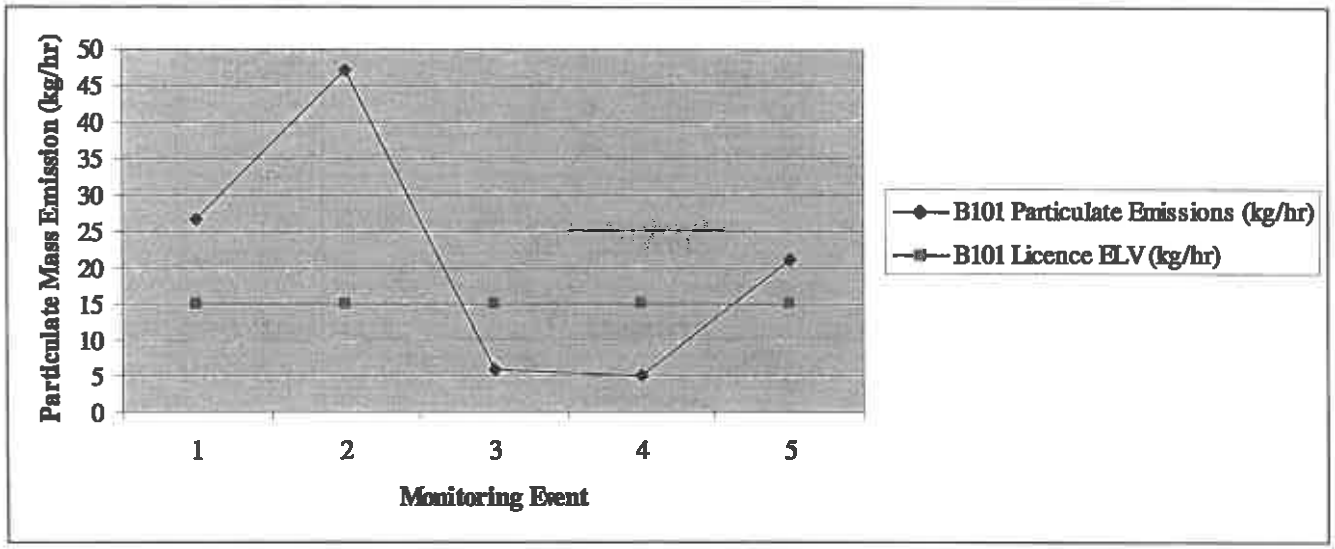


Figure 2: Particulate Mass Emissions to Atmosphere (kg/hr) (to December 2003) vs. Licence ELV from Emissions Reference Point A101

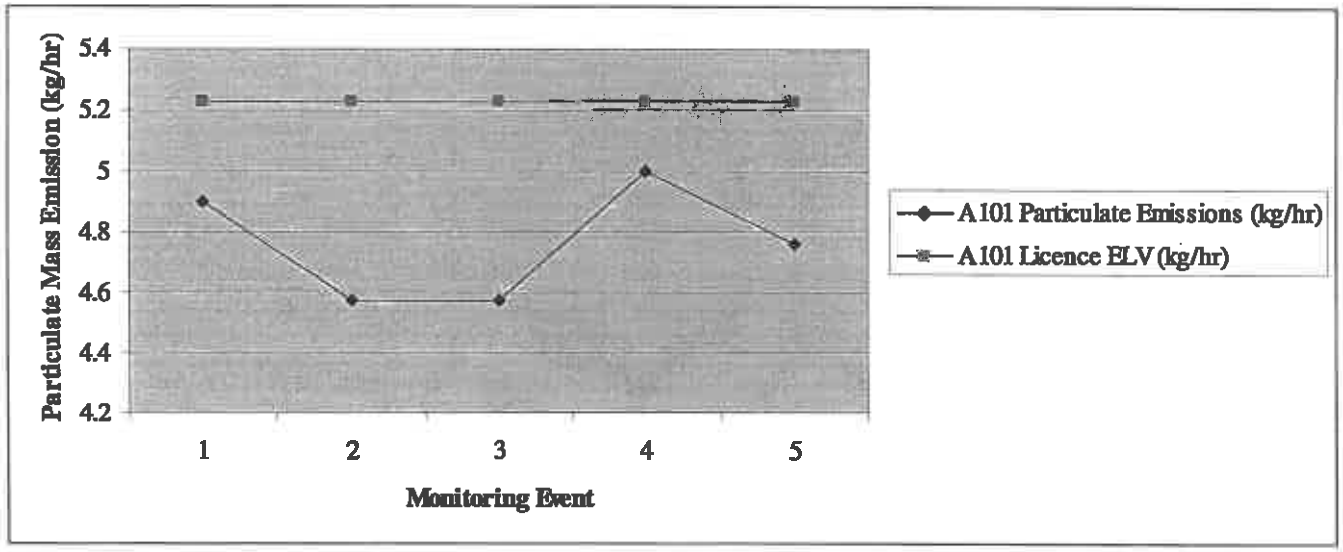


Figure 3: Particulate Mass Emissions to Atmosphere (kg/hr) (January to December 2003) vs. Licence ELV from Emissions Reference Point A102

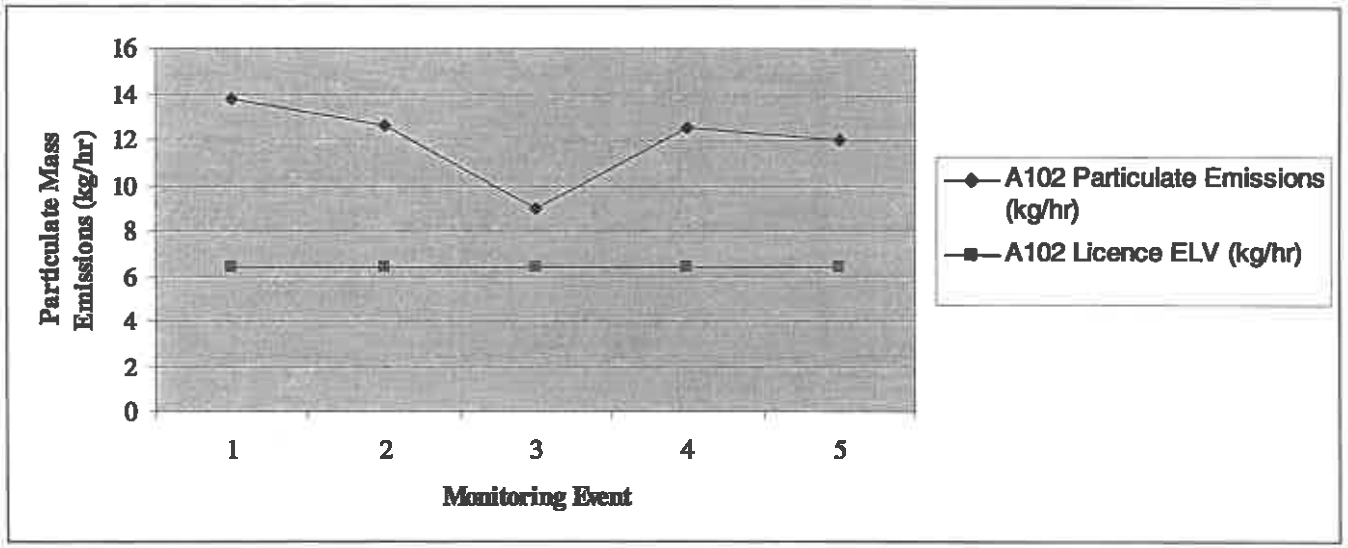


Figure 4: Particulate Mass Emissions to Atmosphere (kg/hr) (January to December 2003) vs. Licence ELV from Emissions Reference Point A103

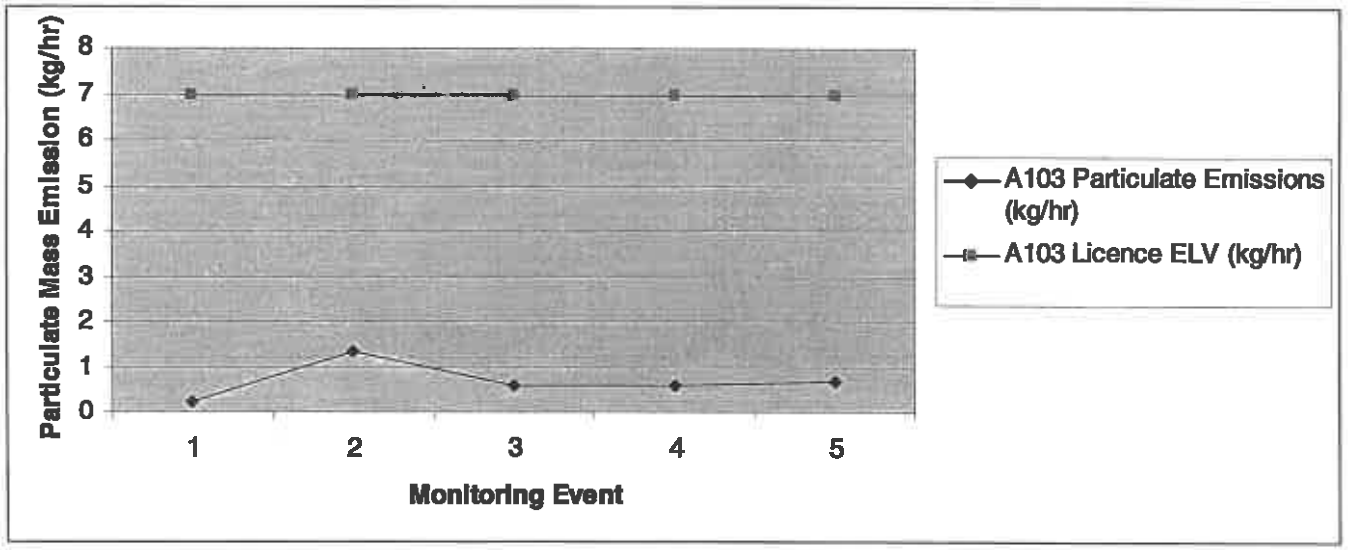


Figure 5: Particulate Mass Emissions to Atmosphere (kg/hr) (January to December 2003) vs. Licence ELV from Emissions Reference Point A104

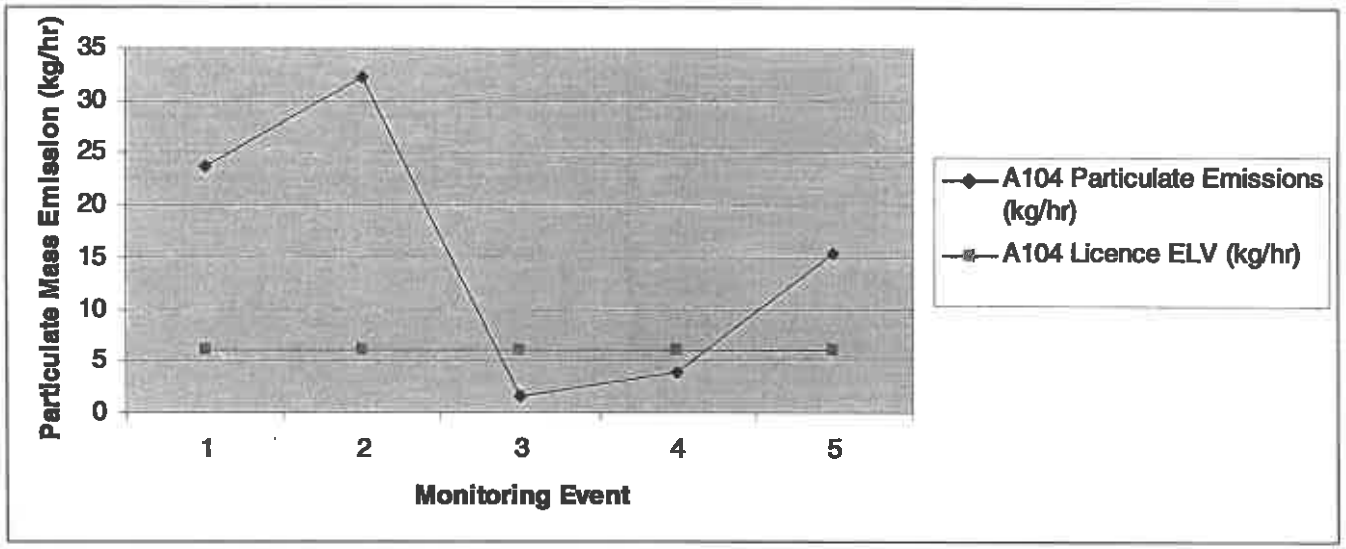


Figure 6: Particulate Mass Emissions to Atmosphere (kg/hr) (January to December 2003) vs. Licence ELV from Emissions Reference Point A105

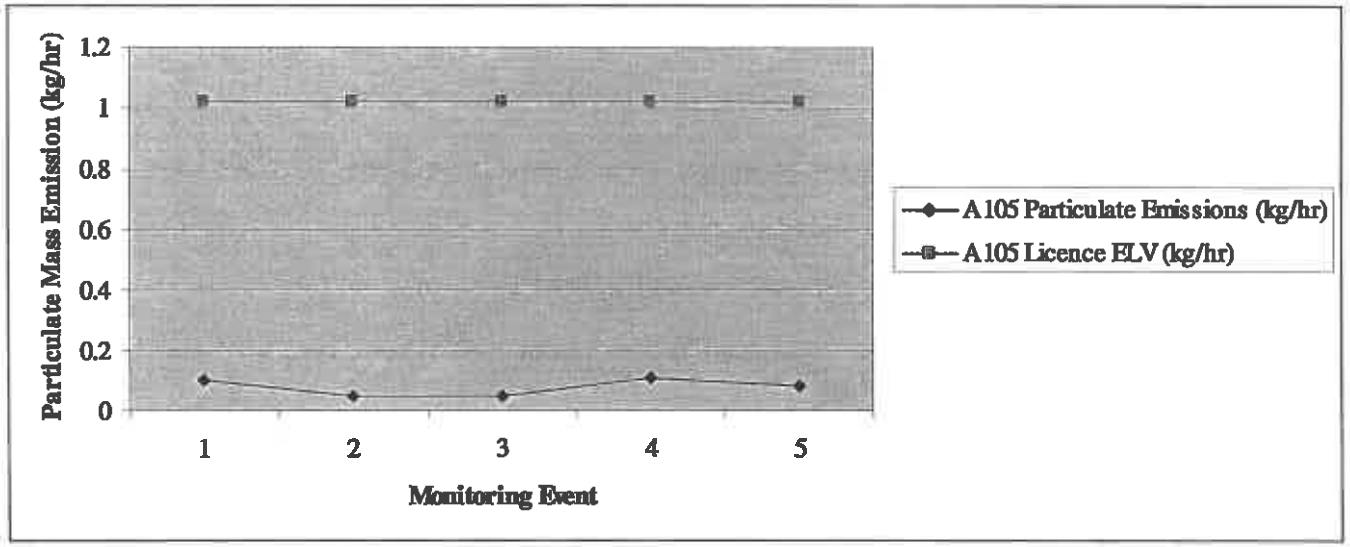
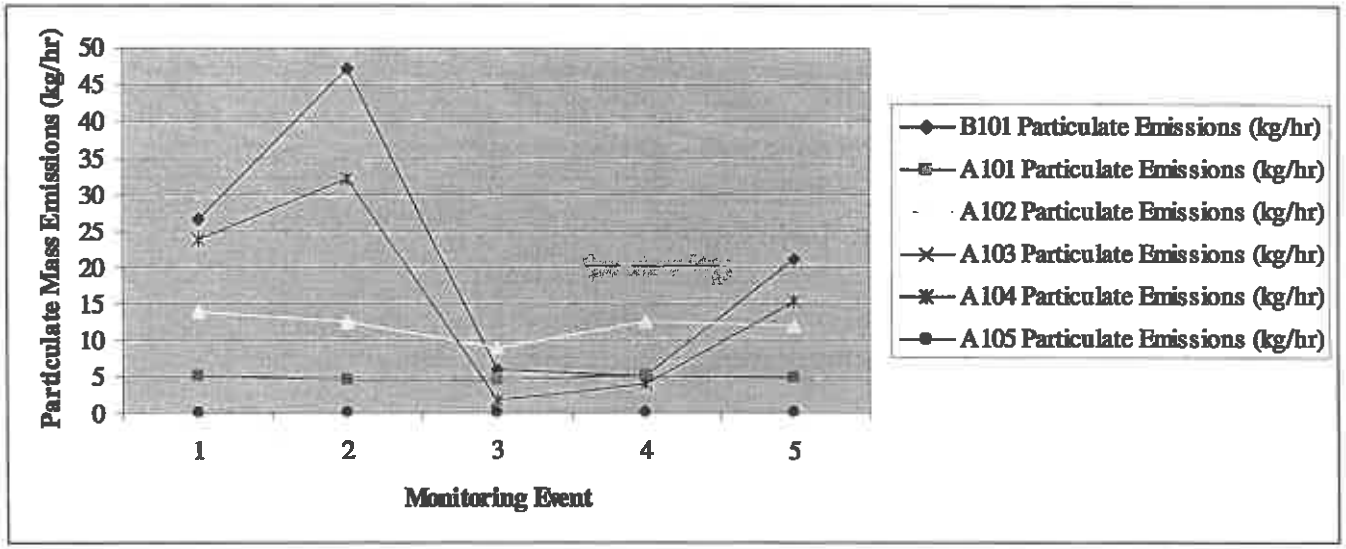


Figure 7: Summary of Particulate Mass Emissions to Atmosphere (kg/hr) (January to December 2003) from Emissions Reference Points B101, A101-A105



Appendix 6

BOILER

COMBUSTION

EFFICIENCY

Littleton AER 2003

Boiler Services

SERVICE/COMMISSION

REPORT No. 4202.

Allenstown, Broadway, Co. Wexford.
Tel.: 053 - 31308 • Mobile: 087 - 2604276
Industrial • Commercial & Domestic • Service & Repairs
• Oil & Gas • Free Estimates • 23 hour Call Out • V.A.T. No. IE 3503423T

CUSTOMER: Ed M Delaney SITE ADDRESS Bord na Mona, Templetuohy Works	ENGINEER SIGNATURE Pat Morris	DATE 4/11/2003
	CUSTOMER TEL-CONTACT	Q No/JOB No
	WORKING TIME	MILEAGE
	MATERIALS USED 2. oil nozzles.	

SITE TELEPHONE No & CONTACT

BOILER No	No1		No2		No3	
BURNER TYPE & MAKE	Büderus G 515					
OUTPUT						
SERIAL No						
BURNER	Riello RL 50					
SERIAL No	3244900009					
GAS TRAIN SIZE REF	N18					
FUEL	Gas oil					
BOILER No	No1		No2		No3	
BURNER STATUS	LOW FIRE	HIGH FIRE	LOW FIRE	HIGH FIRE	LOW FIRE	HIGH FIRE
CO2	11·2	11·6				
CO	0	0				
O2	6·3	6·6				
NOX	—	—				
FLUE TEMP GROSS	185	190				
AMBIENT TEMP	10	10				
FLUE TEMP NETT	175	180				
EFFICIENCY	88·6	88·0				
FLUE DRAUGHT mB	·0	·5				
BOILER TEMP °C	70	90				
GAS INLET PRESS (STATIC)	—	—				
GAS INLET PRESS (RUNNING)	—	—				
IONIZATION CURRENT UA	—	—				
GAS HEAD PRESS	—	—				
GAS RATE Pa/M3h	—	—				
NOZZLE SIZE & TYPE	6·0.	3·0				
SMOKE No	0	0				
OIL PUMP PRESS	12	12				
COMBUSTION CHAMBER PRESS	·5	·1				
FAN STATIC PRESS	—	—				
AIR SETTING	32	48				
HEAD SETTING	3	3				

COMMENTS

Cleaned & checked Boiler
Cleaned & checked Burner.
Cleaned oil filters
Replaced oil nozzles
Calibrated Burner for Gas oil
Tested Boiler Emmissions with analyser.

AIR REQUIREMENTS BS6644	
TOTAL KW INPUT	
AIR REQUIREMENTS HIGH CM²	
LEVEL LOW CM²	
AIR AVAILABLE HIGH CM²	
LEVEL LOW CM²	
CUSTOMER SIGNATURE	
SIGN:	
PRINT:	

White: INVOICE Yellow: FILE Pink: SITE

Appendix 7

SILT POND

UPGRADE

PROGRAMME REVIEW

Littleton AER 2003

REVISED SILT POND UPGRADE PROGRAMME LITTLETON GROUP.

STAGE 1.

DATE : 27/09/2003

POND NO.	CATCH. HECT.s	DESIGN CAP.(m^3)	PRESENT CAP.(m^3)	PLANNED UPGRADE WORK	PLAN CAP.(m^3)	PLAN SCHEDULE	ACTUAL COMPL.	POSITION 31/12/'03
KN9	36	875	1080	NEW POND 240*3*1.5m.	1080	OCT. '02	OCT. '02	205
LN34	120	3000	750	1. TWO NO. PONDS REQ.		JULY '02		-2250
LN35	120	3000	750	2. DEVELOP 2 TRENCHES AS PONDS.	6240	AUG. '04		-2250
				3. PIPE INLETS AND OUTLETS.		AUG. '04		0
				TOTAL = 1600*3*1.3m.				0
LS29	125	3125	3204.5	EXTRA CATCH-NEW POND 290*8.5*1.3m.	3204.5	NOV. '02	JAN '04	79.5
DE22	138	3450	4320	2ND POND 300*7*1.2m.	4320	JUNE '02	JUNE '02	870
TY30	75	1875	2000	DEVELOP TRENCH - 500*4*1m.	2000	SEPT. '02	SEPT. '02	125

STAGE 2.

LK15	160	4000	3168	DEEPEN BY 0.3M	4032	JUN. '04		-832
BE20	167	4175	3375	2ND POND 350*5*1.1m.	5300	MAY '04		-800
BE19	67	1675	1248	EXTEND TO 160*8*1.3m.	1728	MAY '04		-427
DE26	110	2750	3042	DEEPEN BY 0.3M	3120	NOV. '03	FEB '03	292
KN2	60	1500	1080	INCREASE POND TO - 150*10*1.2m.	1800	MAY '04		-420
KN3	90	2250	2210	DEEPEN BY 0.3M	2380	SEPT.'03	DEC '03	-40
LS17	28	700	280	DEVELOPE TO 140*5*1.1	770	MAY '04		-420

STAGE 3.

KN1	40	1000	1296	TO DESIGN. BY-PASS REQ.	1296	JUL. '04		296
KN5	120	3000	3072	TO DESIGN	3072	FEB. '03	JUL '03	72
KN4	38	950	1120	TO DESIGN.	1120	DEC. '02	DEC. '02	170
BE21	67	1675	1680	TO DESIGN. BY-PASS REQ.	1680	OCT. '03		5
KN6	86	2150	2499	TO DESIGN	2499	MAR. '03	DEC. '02	349
KN7	40	1000	1440	TO DESIGN	1440	APR. '03	DEC. '02	440
KN8	22	550	672	TO DESIGN. BY-PASS REQ.	672	JUL. '04		122
BG11	40	1000	1800	TO DESIGN. BY-PASS REQ.	1800	JUL. '04		800
BG12	18	450	665	TO DESIGN. BY-PASS REQ.	665	JUL. '04		215
BG13	15	375	700	TO DESIGN	700	NOV. '03	DEC. '03	325
LK10	44	1100	2000	TO DESIGN	2000	DEC. '03	DEC. '03	900
LK14	9	225	264	TO DESIGN	264	FEB. '04	DEC. '03	39
LK16	35	875	1200	TO DESIGN	1200	MAR. '04	DEC. '02	325
LS18	70	1750	1760	TO DESIGN	1760	JU[illegible]	JUL. '03	10
BE23	71	1775	2240	TO DESIGN	2240	AU[illegible]	DEC. '02	465
DE24	53	1325	2405	TO DESIGN.	2405	DEC. '02	JUL. '03	1080

Appendix 8

SILT POND

CLEANING RECORD

Littleton AER 2003

I.P.C. LICENSE 499, LITTLETON GROUP, SILT - POND FORTNIGHTLY INSPECTION ANNUAL LOG. 2003

SILT POND	EMISSION PT. REF.	LAST '02 CLEANED	JAN 1	JAN 2	FEB 3	FEB 4	MAR. 5	MAR. 6	APR. 7	APR. 8	MAY 9	MAY 10	JUN. 11	JUN. 12	JUL. 13	JUL. 14	AUG. 15	AUG. 16	SEP. 17	SEP. 18	OCT. 19	OCT. 20	NOV. 21	NOV. 22	DEC. 23	DEC. 24
KN1	SW1	FT 20	1/4	1/4	1/4	1/4	1/2	1/2	1/2	3/4	3/4	3/4	[illegible]	0	1/4	1/4	1/4	1/2	1/2	1/2	3/4	[illegible]	0	1/4	1/4	1/4
KN2	SW2	FT 21	1/4	3/4	[illegible]	0	0	1/4	1/4	1/2	1/2	3/4	[illegible]	0	1/4	1/4	1/4	1/2	1/2	3/4	[illegible]	0	1/4	1/4	1/4	1/4
KN3	SW3	FT 21	0	1/4	1/4	1/4	1/2	1/2	1/2	1/2	1/2	3/4	3/4	[illegible]	0	0	1/4	1/4	1/4	1/2	1/2	1/2	1/2	1/2	[illegible]	0
KN4	SW4	FT 22	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	3/4	3/4	3/4	[illegible]	0	0	0	0	0
KN5	SW5	FT 2	1/2	3/4	3/4	3/4	0	0	0	1/4	1/4	1/2	1/2	3/4	[illegible]	1/4	1/4	1/2	3/4	3/4	[illegible]	0	0	0	0	0
KN6	SW6	FT 2	3/4	3/4	[illegible]	0	0	1/4	1/4	1/4	1/4	1/2	1/2	1/2	1/2	1/2	1/2	1/2	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4
KN7	SW7	FT 19	1/4	1/4	[illegible]	0	1/4	1/4	1/4	1/2	1/2	1/2	1/2	3/4	[illegible]	0	0	0	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4
KN8	SW8	FT 8	1/4	1/2	[illegible]	0	0	0	0	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/2	1/2	1/2	1/2	3/4	[illegible]	0
KN9	SW9	FT 22	0	1/2	[illegible]	0	1/4	1/4	1/4	1/4	1/4	1/2	1/2	3/4	[illegible]	0	0	1/4	1/4	1/4	1/2	1/2	3/4	3/4	3/4	3/4
LK10	SW10	FT 1	1/4	1/4	1/4	1/4	1/4	1/4	1/2	1/2	1/2	1/2	3/4	3/4	[illegible]	0	0	0	0	1/4	1/4	1/4	1/4	1/4	1/4	1/4
BG11	SW11	FT 19	1/4	1/4	1/4	1/4	1/4	1/4	1/2	1/2	1/2	1/2	1/2	[illegible]	0	0	0	0	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4
BG12	SW12	FT 1	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/2	1/2	1/2	[illegible]	0	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4
BG13	SW13	FT 24	1/4	1/4	1/4	1/4	1/2	1/2	1/2	1/2	1/2	1/2	[illegible]	0	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4
LK14	SW14		***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
LK15	SW15	FT 23	0	0	0	0	1/4	1/4	1/2	1/2	1/2	1/2	3/4	3/4	[illegible]	0	1/4	1/4	1/2	3/4	[illegible]	0	0	0	1/4	1/4
LK16	SW16	FT 2	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	3/4	3/4	[illegible]	0	1/4	1/4
LT34	TRENCH 6	**				[illegible]																				[illegible]
LT35	TRENCH 1	**			[illegible]																				[illegible]	
LS29			*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
LS17	SW17		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
LS18	SW18	FT 1	0	0	[illegible]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1/4	1/4	1/4
IE19	SW19	FT 21	0	0	0	0	0	0	0	0	0	1/4	1/4	[illegible]	0	0	0	0	0	0	0	0	0	1/4	1/4	1/4
BE20	SW20	FT 15	1/4	1/4	1/4	1/4	1/4	1/4	1/2	1/2	[illegible]	0	0	0	0	0	0	0	0	0	0	0	0	1/4	1/4	1/4
BE21	SW21	FT 15	0	0	0	0	0	0	0	0	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	[illegible]
DE22	SW22	FT 17	0	0	0	0	0	0	0	0	[illegible]	0	0	0	0	0	0	0	0	0	0	0	0	1/4	1/4	1/4
BE23	SW23	FT 17	1/4	1/4	1/4	1/4	1/4	[illegible]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1/4	1/4	1/4
DE24	SW24	FT 17	1/4	1/4	1/4	1/4	[illegible]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CL25	SW25	FT 18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1/4	1/4	[illegible]
CL26	SW26	FT 18	1/2	1/2	[illegible]	0	0	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4
BL27	SW27		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
BL28	SW28		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
TY29			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

* bog not in production

** cleaned as part of A.E.G. drainage plan.

*** drain to be developed into pond.

Environmental Protection Agency
Office of Environmental Enforcement
Received 01 APR 2005

BORD NA MÓNA

Littleton Works

A.E.R. 2004

I.P.C. Licence No: 499

Littleton AER 2004

1.0 Introduction

Bord na Móna Fuels Limited was granted an Integrated Pollution Control Licence by the E.P.A. on 17th August 2001 for it's operation in the Littleton group of bogs. This report is the second A.E.R. for the operations and covers the period from 1st January 2004 to 31st December 2004.

1.1 Company Details

The Littleton group of bogs consists of a cluster of bogs approximately ten miles from Thurles in Co. Tipperary.
The main contact and location details of the company are presented in summary form below

Company Name:	Bord na Móna Fuels Limited
Site Address:	Littleton Group Thurles Co. Tipperary.
IPC Licence Number:	499
Telephone No:	0504-44215
Fax No:	0504-44225
Contact Name:	Ray Yates
Position:	General Manager

1.2 Activities

Milled Peat is produced on the Littleton group of bogs for transfer to the Briquette Factory for the manufacture of peat solid fuel products. Littleton has a total area of 4,530 hectares. Of this, 1,475 hectares were used for the production of milled peat during the period of the AER.

The production of milled peat is a seasonal activity with production opportunities only possible during the period from late spring to early autumn when drying conditions are suitable. When production operations are underway, they are typically carried out over a seven-day week and for 12 to 15 hours per day. Bog drainage and field conditioning operations are carried out throughout the year, along with peat haulage operations from stockpiles located on the bog to the Briquette Factory. Transport operations are carried out on all days throughout the year that the Briquette Factory is in operation.

Sod Peat was produced on an area of 243 hectares during 2004. Production was from April to August with sales to the public from September to December. Bog preparation and drainage was ongoing throughout the year but was mainly in the period January to March.

The Firelighter Plant operated from January to April and again from September to December.

The Group has its own workshop facilities for the maintenance, repair and fabrication of plant used in the operations outlined.

In total 135 permanent workers and 22 seasonal workers at peak were employed during 2004.

1.3 Environmental Policy Statement

The Environmental Policy Statement of the company is shown in Appendix 1

1.4 Environmental Management of the Company

The management structure illustrating environmental responsibilities within Bord na Móna Fuels Limited in 2004 is shown in Appendix 2.
The General Manager, Mr. Ray Yates has overall responsibility for the Littleton Group.

2.0 Summary Information

2.1 Emissions to water summary

2.1.1 Silt Pond Emissions

Monitoring and sampling from agreed discharge points are carried out quarterly in the form of grab samples. Samples were taken each quarter from each of the agreed outlets in accordance with the regular sampling programme. The results of the analyses of these samples are presented in Appendix 3. A proposal to change the sampling locations will be submitted for approval.

2.1.2 PW-102 Factory and Yard Discharge to Ballybeg river.

The sampling and analysis at this location was the subject of a proposal because of lack of access to the original location. This proposal was dated 6th of February 2002 and was further discussed at a site visit in July 2002. During the relevent year the proposal was not agreed and in its absence Littleton continued to sample the factory and yard effluent separately. The results of our sampling have been included as Appendix 4. No samples are taken during the factory stop period because of the absence of factory effluent. This is the period during which the ponds are cleaned. The Factory sample points were agreed during an EPA audit in August 2004. This has been put in operation from January 2005.

2.1.3. Monitoring of workshop/depot surface water run-off.

Inspections are undertaken and logged weekly in the following areas: Factory, Lanespark Workshop, Templetuohy Workshop and the Firelighter area. This is linked to 2.12 as the Lanespark Workshop, Factory Yard and oil storage and the Firelighter area all discharge through the Factory Yard pond and oil-trap. There is an additional trap for Lanespark which is inspected and maintained. Templetuohy yard discharge separation and oil trap installation were completed in December 2004. There will be a complete sampling programme for all five yard and fueling interceptors from January 2005.

2.1.4 Composite Sampler Programme

The Littleton Composite Sampler worked continuously to the end of the year except for:

No flow from the June – August (The major cause of this was the dewatering undertaken by Minorca Mining. First time outfall dry.)

There was also a two week period in November for overhaul.

The result graphs for the composite sampler operating at location SW22 are included as Appendix 5.

It is proposed to change the location of the Composite Sampler because of the extended periods of no flow at present location. Proposal to follow.

2.1.5 Non-compliance

The non-compliances associated with agreed sampling of water effluent at Littleton are outlined in table under.

Date	Non-compliance	Cause	Corrective Action
29/03/04	Sample from Composite Sampler @ SW22 on 26/02/04 46mg/l.	Not evident	Corrective Action LT/04/01
06/12/04	Sample from Composite Sampler @ SW22 on 12 – 15/11/04 54 - 174mg/l	No apparent reason – all samples in following three weeks < 5	Corrective Action LT/04/05. Requesting re-test, not forwarded yet

2.2 Emissions to Air Summary (see Appendix 6)

Boiler (B101) Emissions of particulates were above the Emission Limit Value on one of the test results. The cells in the multicyclone grit arrester were all replaced and the unit has performed well since.

In the driers stacks, A101 and A102, the volume flows are consistently above their limit values. We will trim the flow rates using the dampers and this should reduce the emissions.

The press conveyor emissions from A103 have been consistently good since the scrubber was installed.

The stemple dust emissions at A104 have been above the limit on two occasions. This unit should be capable of a more consistent performance and we will investigate this.

Emissions from the press mouth suction at A105 have been consistently within limits.

Emissions levels for NO_x and SO_2 have been carried out for the first time during the year at B101, while the SO_2 levels have been within the limit value the NO_x is above the limit. We will investigate this.

Emissions of TOC (ac C) at point A108 have been satisfactory throughout the year.

We are recommending that a Dispersion Modelling of Air Emissions from the factory be carried out during the coming year to check particle concentration and deposition in the factory vicinity.

2.2.2 Dust Emissions (Dust Sensitive Locations)

The Dust Emissions are being monitored monthly as per proposal of 18th February 2002 on D.S.L.'s.

The following table contains the monthly readings. In general, readings are below the emission limit value of 350 mg/m^2 /day.

Month	DSL 1 (Lawn)	DSL 2 (Ponds)	DSL 3 (Bog)
Jan 04	165	75	60
Feb 04	128	98	66
Mar 04			
Apr 04	41	34	21
May 04	95	65	629
Jun 04	300	1649	78
Jul 04	234	349	25
Aug 04			
Sep 04	<24	262	41
Oct 04	<20	<20	<20
Nov 04	57	48	38
Dec 04	53	179	40

As a result of Audit in August 2004, a review document was forwarded with two incident reports (LT 04/03 and LT 04/04) and also proposal on a further DSL 4 as requested.

2.2.3 Non-compliance's

This covers non-compliance's resulting from the dust emissions.

Date	Non-compliance	Cause	Corrective Action
10/5/04 – 8/6/04	629 vs 350	Monitor position very close to production headland	Move monitor position by 200m
8/6/04 – 9/7/04	1649 vs 350	Dumper activity close to monitor removing factory silt pond waste	None required

2.3 Waste Management Report

2.3.1 Hazardous Waste

BORD NA MÓNA
BORD NA MÓNA FUEL'S LIMITED

Waste Management Record (Hazardous)

Group : Littleton. IPC Licence No.: 499

WASTE DESCRIPTION	EWC CODE	AMOUNT	NAME OF CONTRACTOR	NAME OF PERSON ULTIMATELY RESPONSIBLE	DESTINATION	DATE
Waste Oil	13 01 01	4,000L	Atlas Oil	Atlas Oil		2004
Fuel Filters	16 01 07	1,440L	Atlas Oil	Atlas Oil		2004
Lead Acid Batteries	16 06 01	2,000L	ReturnBatt Ltd.	ReturnBatt Ltd.	Unit 3, Kildare Enterprise Centre	2004
Gas Lamps		50kg	Irish Lamp Recycling	Irish Lamp Recycling		2004

DETAILS OF ANY REJECTED CONSIGNMENTS						
No rejected consignments						

2.3.2 Non-hazardous Waste

BORD NA MÓNA
BORD NA MÓNA FUELS LIMITED

Waste Management Record (Non-Hazardous)
Group : Littleton IPC Licence No.: 499

WASTE DESCRIPTION	EWC CODE	TONNES	NAME OF CONTRACTOR	NAME OF PERSON ULTIMATELY RESPONSIBLE	DESTINATION	DATE
Silt	01 01 02	1504	0N SITE	BORD NA MONA		ANNUAL
Peat Screenings	01 01 02	300	ON SITE	BORD NA MONA		ANNUAL
Polythene	02 01 04	15.9	. RYAN BROS	. RYAN BROS	THURLES	ANNUAL
		82.24	KILDARE PLASTICS LTD	KILDARE PLASTICS LTD	KILDARE	ANNUAL
Peat Ash/Silt Factory.	10 01 03	4600	ON SITE	BORD NA MONA		ANNUAL
Surface Shaping Waste Welding Wastes Scrap Metal	12 01 01 12 01 02 12 01 03 12 01 04 12 01 05 12 01 13 17 04 07	86.30	HAMMOND LANE METAL CO. LTD.	HAMMOND LANE METAL CO. LTD.	ATHLONE	ANNUAL
Packaging	15 01 01	4.60	RYAN BROS	RYAN BROS	THURLES	ANNUAL
		2.54	SMURFITT	SMURFITT	DUBLIN	ANNUAL
		0.36	MARCHMOUNT	MARCHMOUNT	DUBLIN	ANNUAL
Wooden Pallets/Timber	15 01 02	89.44	MICHAEL FAHY	MICHAEL FAHY	LITTLETON	ANNUAL
Wiping Cloths General Office & Domestic Waste	15 01 03 15 02 01 20 01 00	416 cub.m	RYAN BROS.	RYAN BROS.	THURLES	ANNUAL

2.4 Noise Emissions

No measuring or reporting of noise was required.

2.5 Energy and Water Consumption

The usage of diesel and electricity in the Factory are to supplement the power supplied by Milled Peat. The Bog usage of both is to provide the Milled Peat for Briquetting. Derve is used for road transport service to Milled Peat operations.

Energy Source	MW Hours Consumed
Diesel - Factory Diesel - Bog Machinery	1,805 5,975
Derv.	520
Electricity – Factory	136
Milled Peat	105,910
Screenings, Breakout	4,370
Total	118,716

2.7 Environmental Incidents & Complaints

There was one environmental complaint received during the year.

Environmental Complaint	Number of Complaints
Complaints	1
Complaints requiring corrective action	0
Categories of Complaint	
Odour	0
Noise	0
Water	1
Air	0
Procedural	0
Miscellaneous	0

The complaint was from North Tipperary County Council and referred to evidence of silt in the Drish River. This was fully investigated including the taking of samples and all subsequent reports were sent to the E.P.A. (Ref: Complaint LT/04/02)

3.0 Management of the Activity

3.1 Environmental Management Programme Report 2004

Environmental Management Report for 2004	
Project	
Project 1. Reduction of fugitive dust emissions.	**Training** The Cleaner Production Video was completed in May 2004. The video covers all aspects of the IPC Licence, and in particular, cleaner production methods, good & bad practice, pollution prevention and codes of practice. A quiz on the contents of the video and items relating to the target audience, accompanies the 1 hour training session. During 2004, training with the video occurred at 4 of the IPC licensed sites and targeted management and production personnel. An internal audit of all IPC licensed sites also occurred during May and June of 2004. This included an assessment of the dust prevention measures in-place or planned during 2004. A copy of the audit findings is on file at each works. Based on these audits, various projects were put in-place regarding training for personnel at these dust sensitive locations and new machines for targeting dust problems from headland peat. Project works for 2004 includes: **Hydraulic Harrows** As was proposed for 2004, 8 newly fabricated hydraulic harrows were purchased and distributed to Dust Sensitive Locations within the 9 IPC licensed sites. These have proved successful in reducing dust generation at DSL sites. **Headland Peat Collection** BNM recently took delivery of 4 new mechanical bin harvesters. These were manufactured in Finland, and are currently being modified in Ireland. These types of harvesters are specifically for use in lifting dry peat from headlands at DSL's and will be engaged alone in tackling dust sensitive areas in each licence, for the 2005 production season. In addition two Headland Harvester units will be in operation. These units operated in Boora and Mountdillon in 2004, and will continue to operate in these areas. In total, these 6 units will operate specifically at DSL' in Peco bogs, and will be assessed during the 2005 season, as to their effectiveness at reducing headland peat and reducing incidents of dust generation. The total expenditure on the additional bin harvesters, hydraulic harrows, and the polyrollers (project 5) for the 2004 season is €670,600, which is €400,000 above what was budgeted.

Project 2. Minimisation of Suspended Solids	This project is on-going and is primarily one of training for all production personnel, and is covered in the Cleaner Production Video, as in Project 1 (Training).
Project 3. Effective spill/leak management of mobile fuelling tanks	All of BNM's production bogs now have locations highlighted as being suitable for re-fuelling on the bog, and this is being brought to the attention of all personnel. These locations have been chosen having due regard to location of water courses and drains.
Project 4. Re-use of silt pond waste	There are over 850 silt ponds in operation in the 9 IPC Licensed BNM bogs. These are located in low areas on the bog perimeters, due to drainage requirements. All of these ponds are excavated into the mineral layer, and as a result of this, all silt removed from the ponds have high levels of grit, stones etc. All of these make the peat unsuitable for combustion purposes. In addition, over 95% of the silt excavated is water, which would require it to be spread out on the bog to be allowed to dry to the required moisture content. Given the small volumes of silt excavated, it is therefore not feasible to reuse this silt pond waste.
Project 5. Collection, storage and re-use of polythene.	Polythene collection is ongoing in BNM, and volumes collected and recycled are recorded in the Non-hazardous Waste records in the AER. The 25 new polystrippers proposed in last years EMP, were delivered in 04' and are currently being used to strip polythene from stockpiles. This new system now produces a roll of polythene which is cleaner, easier to handle, and consequently more attractive for recycling. All bogs now have a hard standing area, where the rolls of polythene are stored for collection and subsequent recycling. In addition to this, procedures have been put in-place, and are highlighted during training, about best practice for stripping, collection and storage. There are currently three potential contractors that could take the waste polythene for recycling. All involve shredding, washing and either baling or pelletising the polythene and BNM are currently assessing each contractor to assess their suitability, environmental compliance etc. Once the back-log has been recycled, and BNM have all of the strippers in place, the day to day recycling of the polythene removed each year will be more efficient.
Project 6. Condition 2.2.2 (v) *Provision of measures to protect dust sensitive areas.*	There are no identified D.S.L.'s in the Littleton Group. However, this project will be kept open.

3.1 Environmental Management Programme Prop al for 2005

Environmental Management Programme Proposal for 2005	
Project	
Project 1. Reduction of fugitive dust emissions.	**Training** Continue with the training programme for 2005. 15 Training sessions have already taken place at 6 of the IPC Licensed works, since January 05' This has targeted management and production personnel (teamleaders) and will be extended to include all seasonal staff to be engaged this year. It is targeted to have all production personnel trained by the commencement of production for 2005. **Headland Peat** The 6 new headland peat harvester units will be deployed for the 2005 production season. These units are a mixture of the bin harvester system (4 units) and the same field harvester (2 units), and will be operated in dust sensitive locations. The bin harvester units, while having been experimented with previously in BNM, are a relatively new technology in BNM's modern day operations, and so will be monitored closely over the coming season to asses their performance. All trials, observations and tests will be monitored and recorded by the EMP system as to their effectiveness and suitability. **Hydraulic harrows** 14 new hydraulic harrows have been made over 04/05 and will be in operation between now and the end of 2005. In line with BNM's policy to fabricate 40 hydraulic harrows over 5 years, this current no. brings the total to-date to 22 in operation by the end of 05' This is well ahead of what was planned in the 2004 EMP proposal. In addition, 3 new units are budgeted for fabrication by the end of 05. When completed, all DSL's will be equipped with a hydraulic harrow.
Project 2. Minimisation of Suspended Solids	This project is on-going and is primarily one of training for all production personnel, and is covered in the Cleaner Production Video, as in Project 1 (Training). It will also include inspections at a number of production units during the 05 production season, to assess compliance with the good practice and codes of practice developed by BNM and communicated through the training programmes and the video.

Project 3. Effective spill/leak management of mobile fuelling tanks	As reported in the 2004 EMP report, all areas have designated areas for re-fuelling. This project is therefore completed. Compliance with the original requirements of this project will however be checked through the inspections as highlighted in project 2 above. Specific training has also been provided for oil spill management and clean-up, as part of the management of oil spill kits and procedures etc. and will continue to be facilitated during 2005.
Project 4. Re-use of silt pond waste	This project is also not feasible, as highlighted in the 2004 report, but will be reviewed where necessary, if a use (other than fuel use) emerges.
Project 5. Collection, storage and re-use of polythene.	Banner recycling are currently taking BNM's rolled and loose polythene, for recycling to their permitted yards in Co.Clare. Two additional interested parties are also being investigated, one locally in Co Kildare and a potential recycler in Belgium who may be in a position to reuse the polythene to process pellets to be used in the manufacture of new polythene to be used by BNM. An additional order for 22 polyrollers have been placed, to be delivered by the end of March, so that all bog units will have a roller for stripping piles. This will put an end to loose polythene gathering around the bog.
Project 6. Condition 2.2.2 (v) *Provision of measures to protect dust sensitive areas.*	This project is on-going. It is proposed to seed tough grass on headlands close to two roads.

3.1 Pollution Emission Register

Not applicable

3.2 Environmental Expenditure

Description	Cost (€)
Capital Costs (Plant & Equipment)	150,678
Labour & Supervision	76,600
Materials & External Environmental Consultancy	49,960
Overheads (ESB, Phones, Consumables)	1,600
EPA Fees	13,500
Total	292,338

4.0 Licence Specific Reports

4.1 Surface Water Discharge Monitoring Location Programme Review

The programme has operated satisfactorily. As already outlined, the proposed changes will be forwarded to the E.P.A. for approval.

4.2 Bunding Programme

The bunding programme has been completed. Tenders have been received for the de-commissioning of the two old oil storage areas and this will proceed during 2005.

4.3 Particulate Emissions Minimisation Report

This report was submitted during 2004.

4.4 Boiler Combustion Efficiency AB1

An efficiency test was carried out on Templetuohy Oil Fired Boiler in November 2004.

4.5 Energy Report

The Energy Report has been completed and is included as Appendix 7.

4.6 Resource Consumption Summary

The Briquette Factory consumed 248,085 tonnes of milled peat and 4,630 of re-cycled product to produce 103,369 tonnes of briquettes.

4.7 Report on de-silting Programme

The upgrade programme for silt ponds was completed during 2004 except for proposal to develop trenches in old Littleton agreed during audit in August 2004 (see attached Appendix 8)

The silt pond cleaning programme is outlined in the spreadsheet attached as Appendix 9. The ponds were all cleaned as required by the inspections. The fact that one third of the ponds were cleaned only once is explained by their capacity being above the design capacity and pre-cleaning of open outfalls leading into the ponds.

4.8 Bog development and operational programme

No new bog has been developed for 2004. The production target has remained the same.

4.9 Bog rehabilitation progress report

No bog rehabilitation has taken place at Littleton during 2004.

5.0 Summary

The Environmental Management Programme has been implemented throughout the group, operating procedures have been put in place, and training has been provided for all personnel involved in compliance with the licence.

Bord na Mona Energy Ltd are represented on the Management Group of both the Shannon River and Eastern River Basin District Management Systems, set up under the Water Framework Directive, and on the Steering Group of the Catchment Management on the River Barrow.

Bord na Mona Fuels Ltd would like to take this opportunity to advise the Environmental Protection Agency of its continued commitment to improving its environmental performance by adopting cleaner production methods and improving its environmental protection measures.

Appendix 1

ENVIRONMENTAL

POLICY

STATEMENT

Littleton AER 2004

Chief Executive

BORD NA MÓNA

BORD NA MÓNA FUELS LIMITED

Document:	Q 1.4
Page:	1 of 1
Rev.:	0
Issued:	14/November 2000

ENVIRONMENTAL POLICY STATEMENT

Bord na Mona Fuels Limited operates in line with Bord na Mona plc group environmental policies. It is a registered member of Repak and promotes the efficient use of energy in its briqueting processes and operates under an Integrated Pollution Control (I.P.C.) licence at its Littleton works.

Bord na Mona plc is a commercial semi-state body with responsibility to develop Irelands peat resources in the national interest.

Bord na Mona Fuels Limited is committed to gather and make available information on all aspects of its environmental impact and to help improve understanding among the public generally of its role and of the importance of Irish peatlands.

Bord na Mona Fuels Limited recognises the importance of peatland conservation and has a conservation policy statement.

Bord na Mona Fuels Limited will leave behind all areas it owns as either an economically or socially integrated resource of high environmental value.

Bord na Mona Fuels Limited seeks to conduct all aspects of its business in an environmentally sensitive manner.

Bord na Mona Fuels Limited will establish an environmental management system specifically addressing the following impacts:

- Discharges to water
- Emissions to atmosphere
- Waste disposal
- Use of natural resources
- Noise, vibration, odour, dust and visual effects
- Natural environmental and Eco-system

The environmental management system will be monitored, maintained and continually improved. A system of regular environmental audits will be put in place.

Bord na Mona Fuels Limited as part of the group, will continue research and development (R&D) into all aspects of its environmental impact.

This statement is published and is available at all locations within the company and its contents are brought to the attention of all employees.

Appendix 2

ENVIRONMENTAL

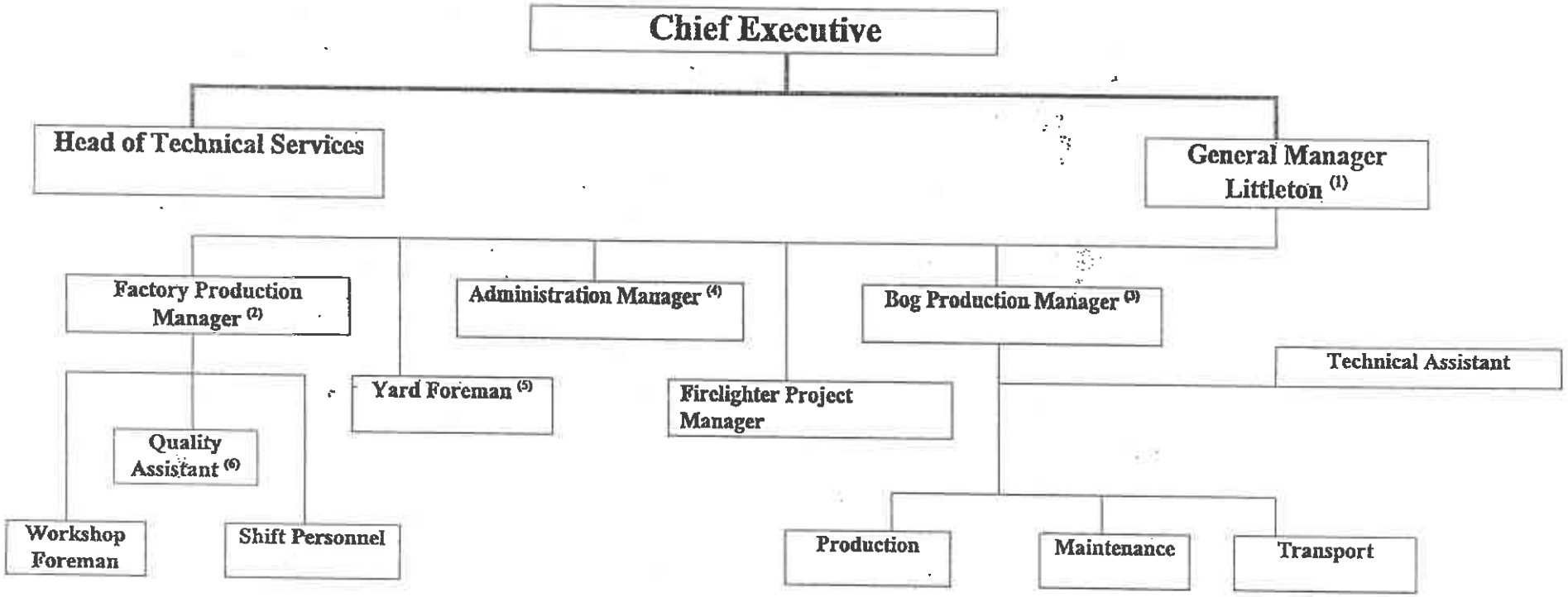
MANAGEMENT

STRUCTURE

Littleton AER 2004

Bord na Móna Fuels Limited

Environmental Responsibilities



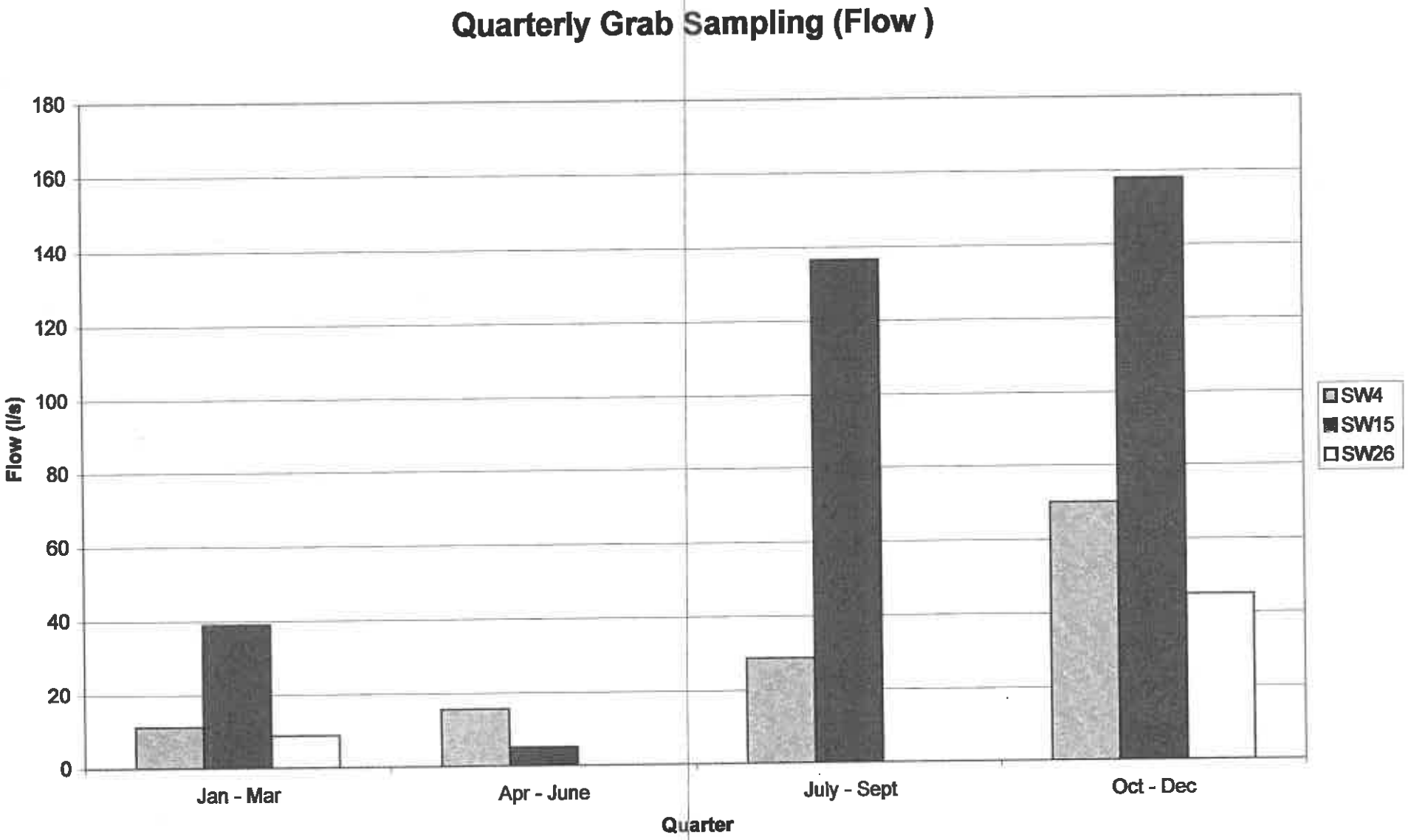
(1) - Overall Environmental Responsibility
(2) - Factory Process production and maintenance include. settling ponds, effluent, emissions
(3) - Bog production, maintenance and transport activities, include silt ponds, tea centres, polythene etc.
(4) - Administration include sales, payroll, stores
(5) - Yard sales, include cleaning, recycling, disposal
(6) - Factory chemicals, effluent readings, water readings, process checks

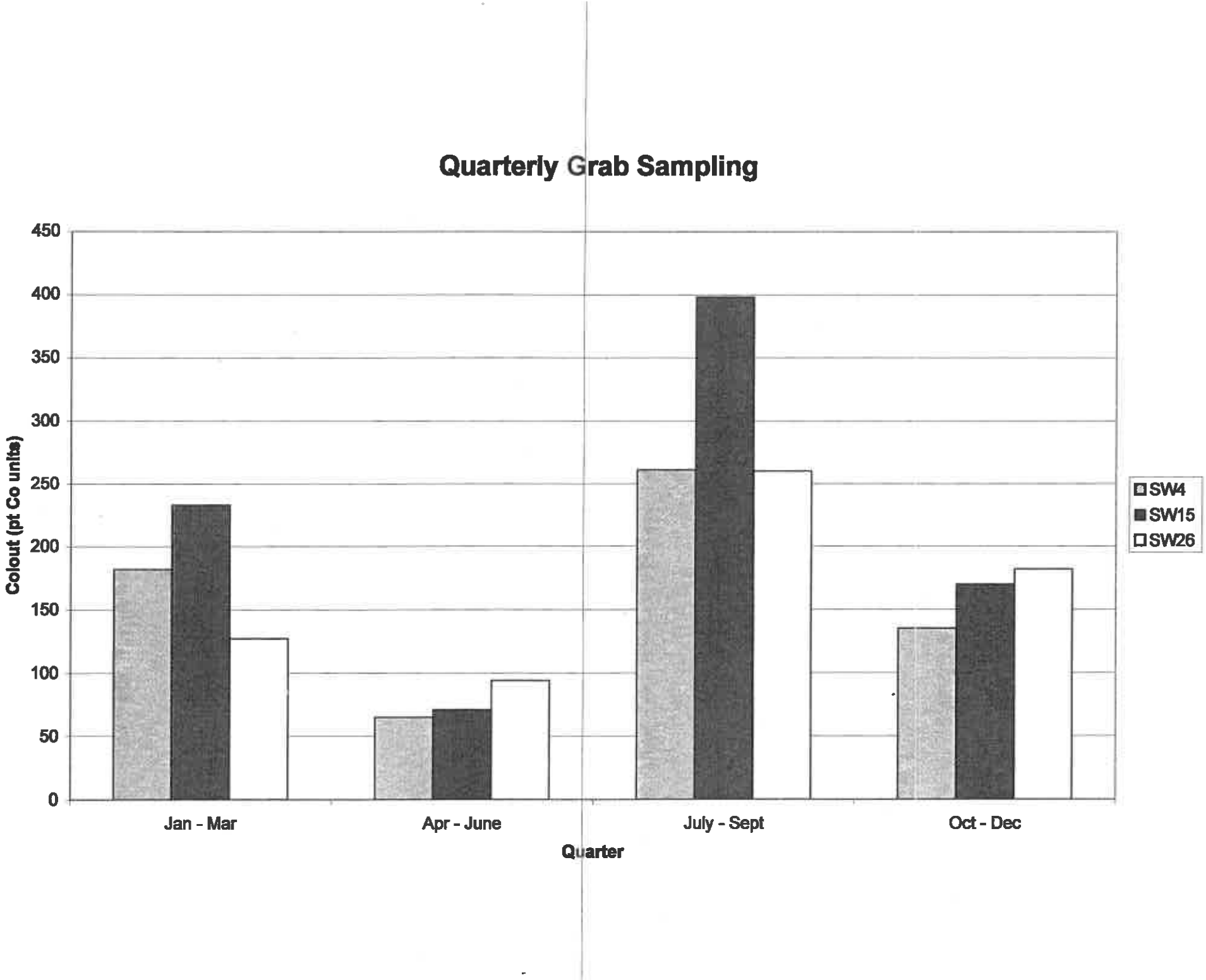
Appendix 3

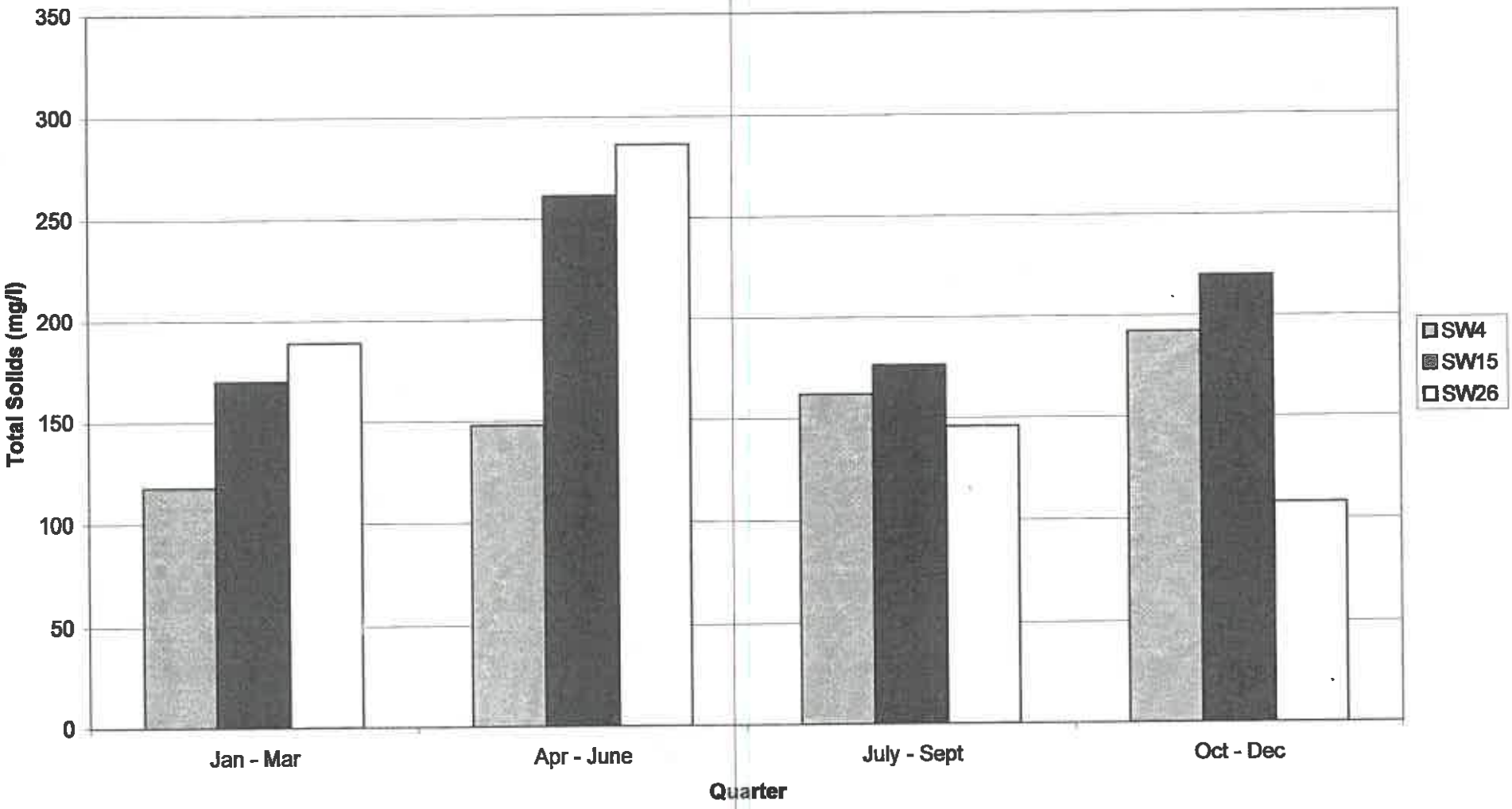
GRAB SAMPLES

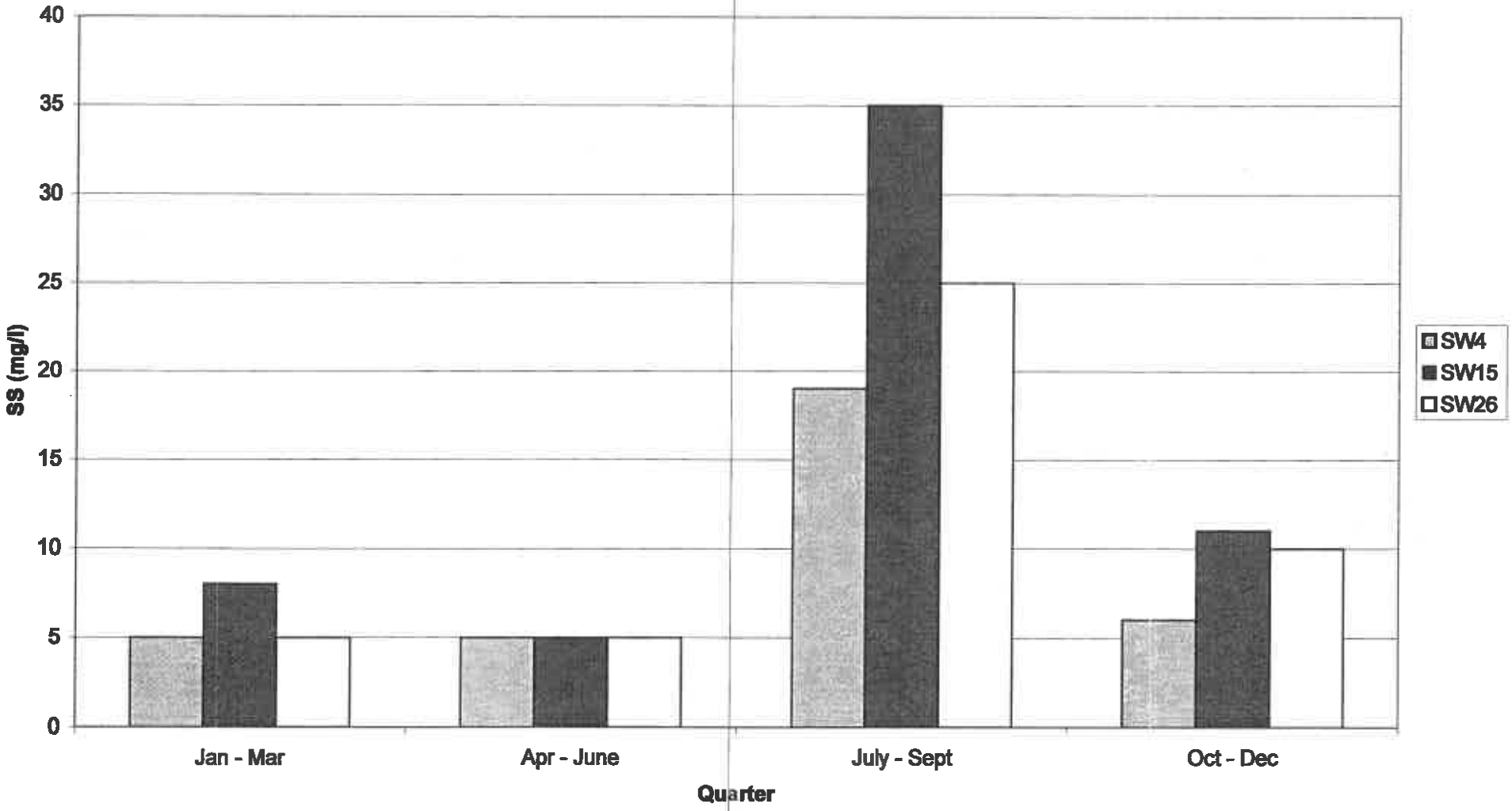
DISCHARGE

RESULTS

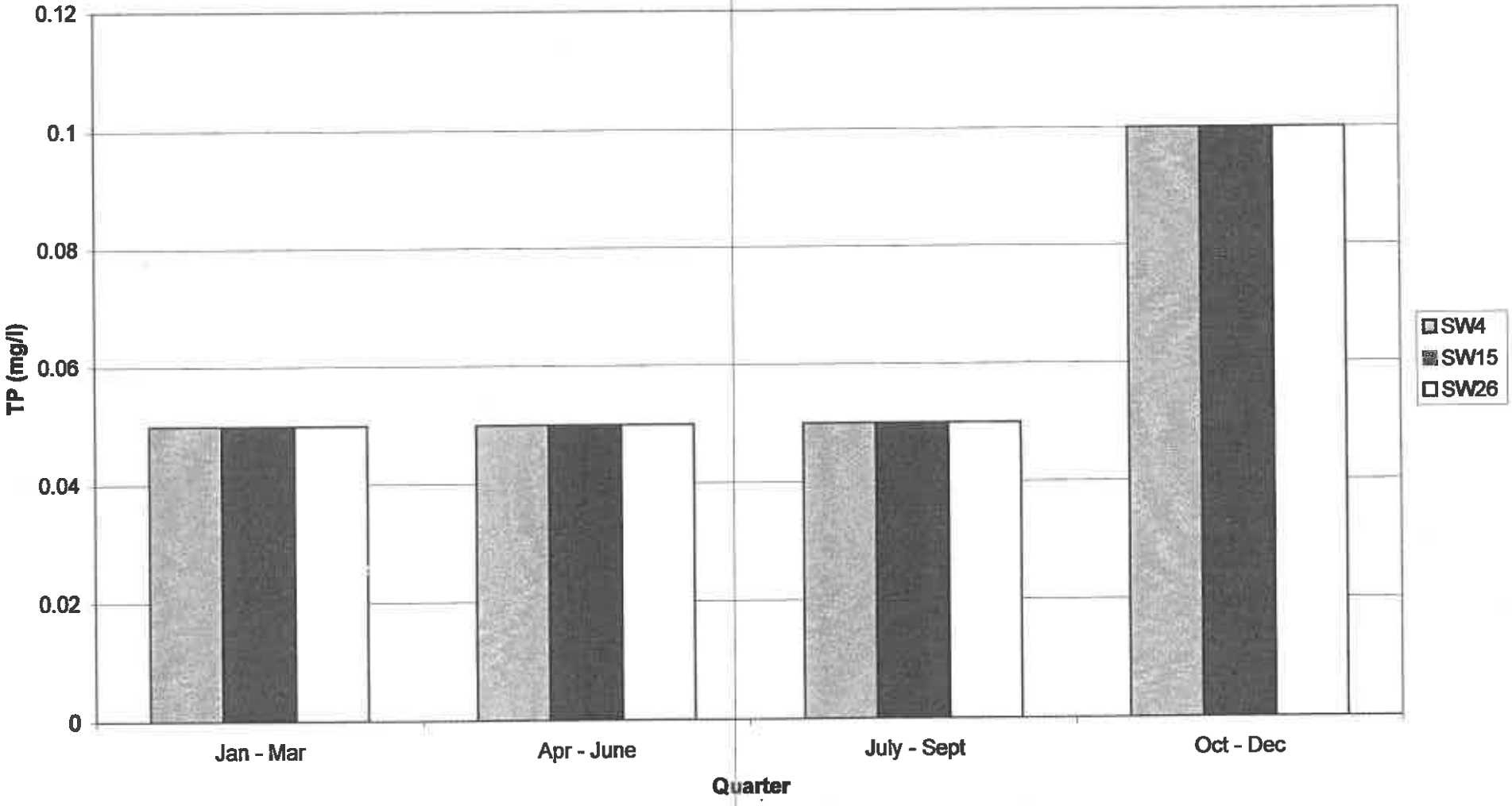

Quarterly Grab Sampling (Flow)
180
160
140
120
100
80
60
40
20
0
Flow (l/s)
Jan - Mar
Apr - June
July - Sept
Oct - Dec
Quarter
SW4
SW15
SW26


Quarterly Grab Sampling
Colout (pt Co units)
450
400
350
300
250
200
150
100
50
0
Jan - Mar
Apr - June
July - Sept
Oct - Dec
Quarter
SW4
SW15
SW26

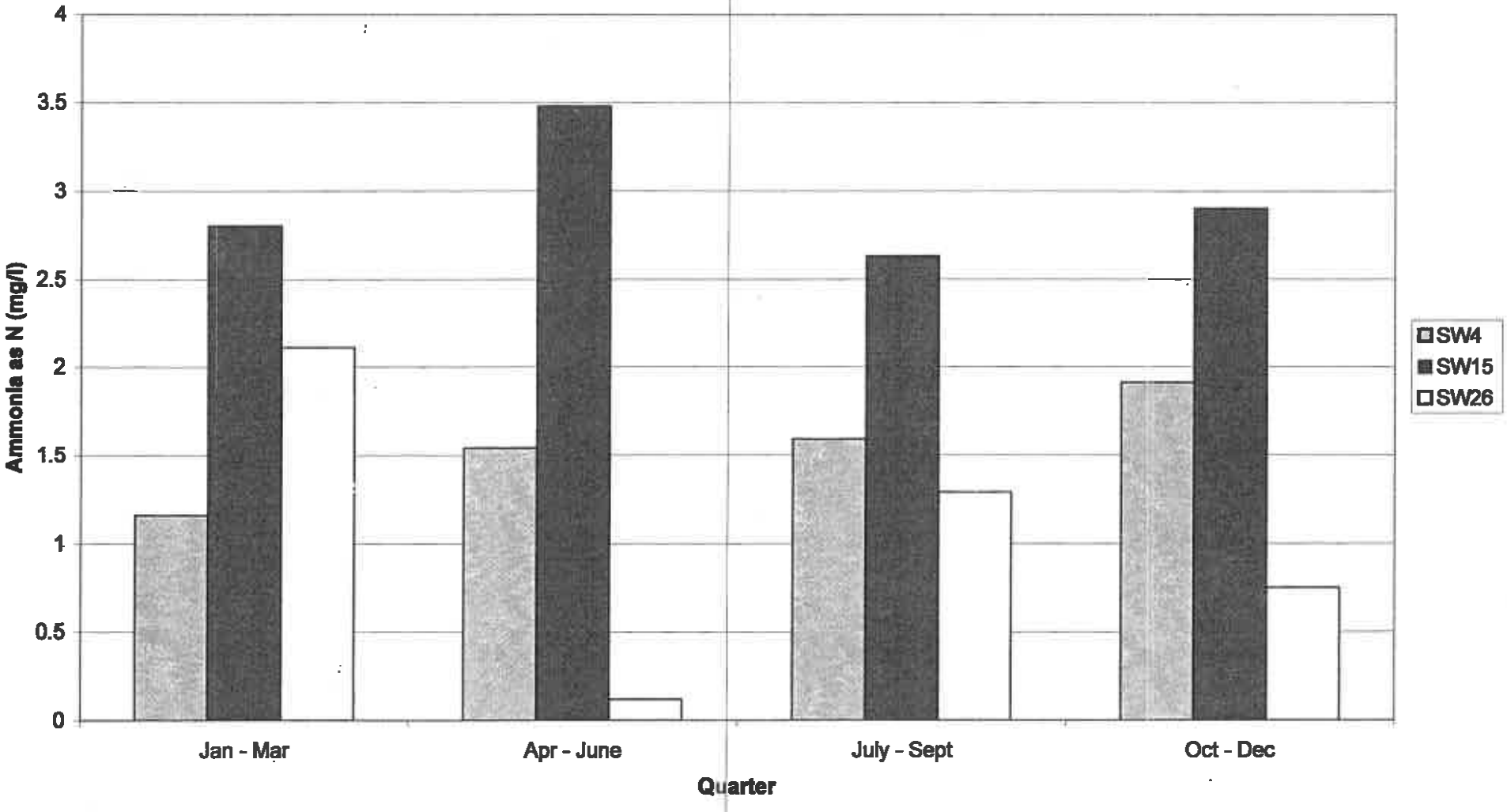

Quarterly Grab Sampling (Total Solids)
Total Solids (mg/l)
350
300
250
200
150
100
50
0
Jan - Mar
Apr - June
July - Sept
Oct - Dec
Quarter
SW4
SW15
SW26

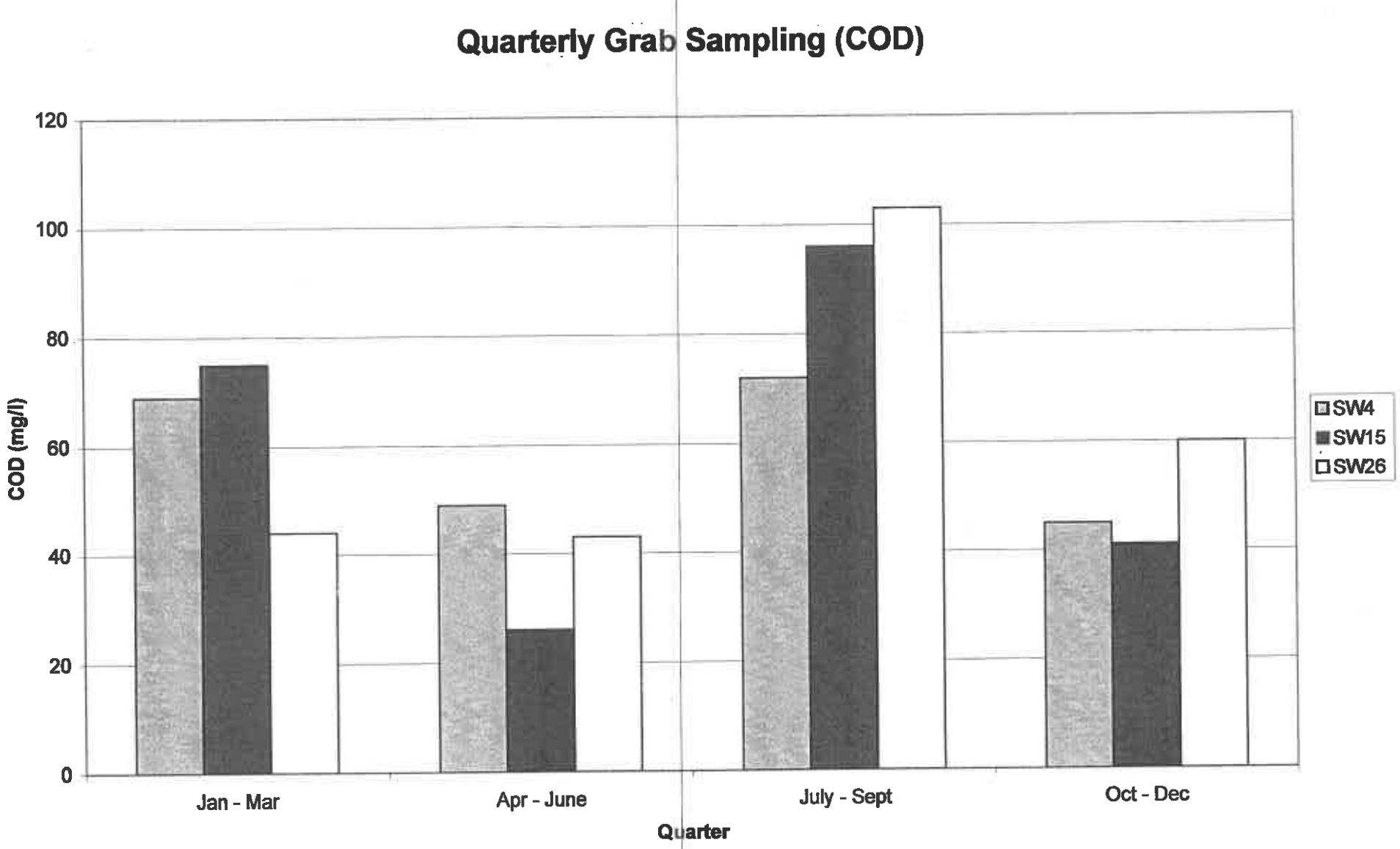

Quarterly Grab Sampling (Suspended Solids)
SS (mg/l)
40
35
30
25
20
15
10
5
0
Jan - Mar
Apr - June
July - Sept
Oct - Dec
Quarter
SW4
SW15
SW26

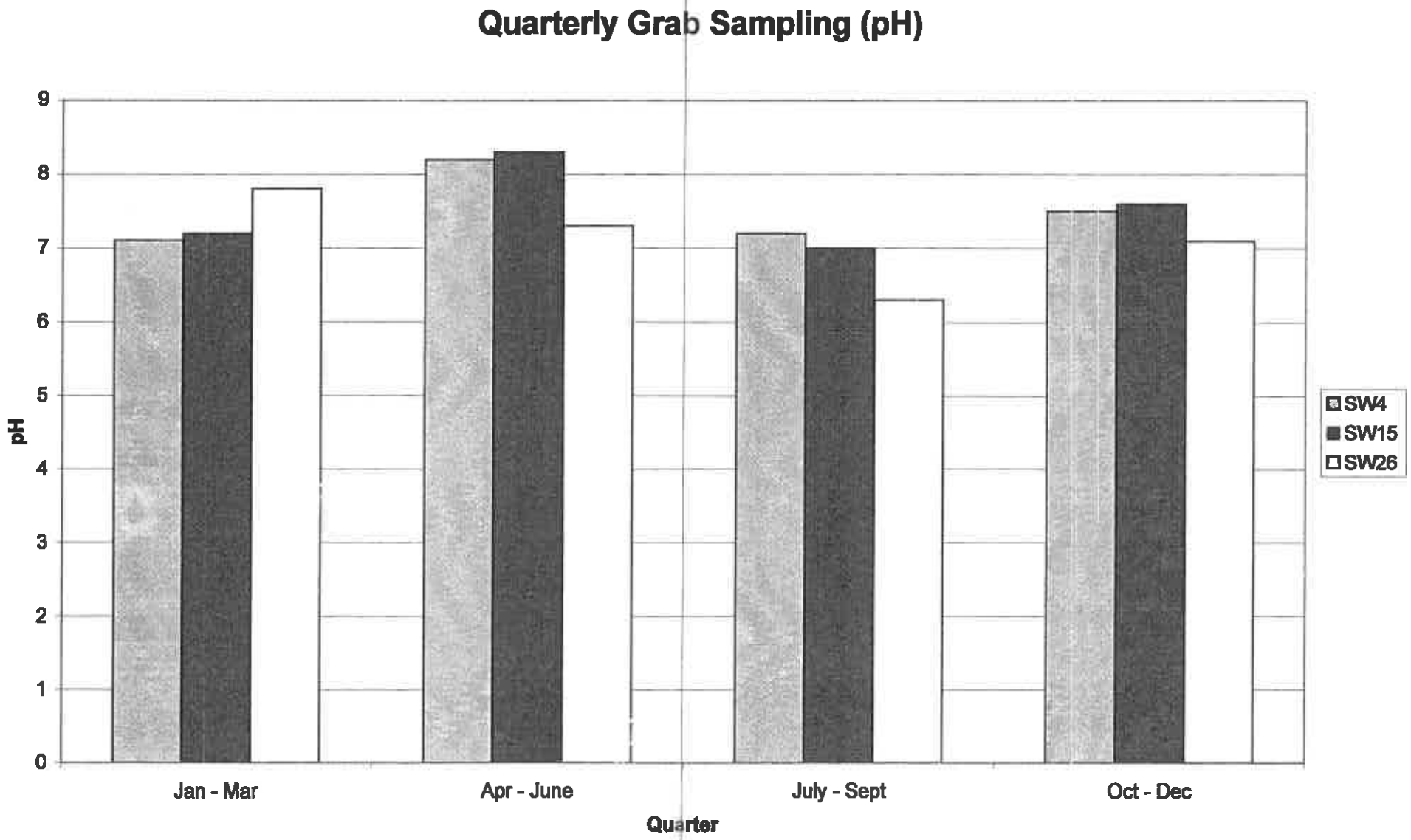
Quarterly Grab Sampling (Total Phosphorus)



Quarterly Grab Sampling (Ammonia)




Quarterly Grab Sampling (COD)
120
100
80
60
40
20
0
COD (mg/l)
Jan - Mar
Apr - June
July - Sept
Oct - Dec
Quarter
SW4
SW15
SW26


Quarterly Grab Sampling (pH)
9
8
7
6
5
4
3
2
1
0
pH
Jan - Mar
Apr - June
July - Sept
Oct - Dec
Quarter
SW4
SW15
SW26

Appendix 4

FACTORY & YARD

DISCHARGE

Littleton AER 2004

WEEK NO.	SURFACE DRAINS POND. P.H.	FLOW C.M./HR	S.S P.P.M.	COLOUR	FACTORY EFFLUENT POND. P.H.	FLOW C.M./HR	S.S P.P.M.	COLOUR
1	6.8	27	20	<70	6.5	37	24	<70
2	6.9	48	8	<70	7.1	55	24	<70
3	7.0	33	14	<70	7.1	51	26	<70
4	6.9	29	20	<70	7.0	51	32	<70
5	7.0	26	16	<70	7.1	47	24	<70
6	7.1	27	12	<70	7.4	43	20	<70
7	7.0	27	12	<70	7.2	59	20	<70
8	7.2	26	15	<70	7.8	51	22	<70
9	7.1	25	12	<70	7.6	55	20	<70
10	6.9	26	16	<70	7.4	51	24	<70
11	7.0	27	12	<70	7.6	43	24	<70
12	6.9	25	20	<70	7.8	47	28	<70
13	6.6	25	16	<70	7.6	55	28	<70
14	7.2	24	12	<70	7.7	64	36	<70
15	7.2	29	12	<70	7.2	47	28	<70
16	7.0	25	14	<70	6.7	68	32	<70
17	7.0	25	16	<70	6.9	55	36	<70
18	DURING FACTORY OVERHAUL NO SAMPLES TAKEN.				DURING FACTORY OVERHAUL NO SAMPLES TAKEN.			
19	DURING FACTORY OVERHAUL NO SAMPLES TAKEN.				DURING FACTORY OVERHAUL NO SAMPLES TAKEN.			
20	DURING FACTORY OVERHAUL NO SAMPLES TAKEN.				DURING FACTORY OVERHAUL NO SAMPLES TAKEN.			
21	DURING FACTORY OVERHAUL NO SAMPLES TAKEN.				DURING FACTORY OVERHAUL NO SAMPLES TAKEN.			
22	DURING FACTORY OVERHAUL NO SAMPLES TAKEN.				DURING FACTORY OVERHAUL NO SAMPLES TAKEN.			
23	DURING FACTORY OVERHAUL NO SAMPLES TAKEN.				DURING FACTORY OVERHAUL NO SAMPLES TAKEN.			
24	DURING FACTORY OVERHAUL NO SAMPLES TAKEN.				DURING FACTORY OVERHAUL NO SAMPLES TAKEN.			
25	DURING FACTORY OVERHAUL NO SAMPLES TAKEN.				DURING FACTORY OVERHAUL NO SAMPLES TAKEN.			
26	DURING FACTORY OVERHAUL NO SAMPLES TAKEN.				DURING FACTORY OVERHAUL NO SAMPLES TAKEN.			
27	DURING FACTORY OVERHAUL NO SAMPLES TAKEN.				DURING FACTORY OVERHAUL NO SAMPLES TAKEN.			
28	DURING FACTORY OVERHAUL NO SAMPLES TAKEN.				DURING FACTORY OVERHAUL NO SAMPLES TAKEN.			
29	DURING FACTORY OVERHAUL NO SAMPLES TAKEN.				DURING FACTORY OVERHAUL NO SAMPLES TAKEN.			
30	DURING FACTORY OVERHAUL NO SAMPLES TAKEN.				DURING FACTORY OVERHAUL NO SAMPLES TAKEN.			
31	DURING FACTORY OVERHAUL NO SAMPLES TAKEN.				DURING FACTORY OVERHAUL NO SAMPLES TAKEN.			
32	DURING FACTORY OVERHAUL NO SAMPLES TAKEN.				DURING FACTORY OVERHAUL NO SAMPLES TAKEN.			
33	DURING FACTORY OVERHAUL NO SAMPLES TAKEN.				DURING FACTORY OVERHAUL NO SAMPLES TAKEN.			
34	DURING FACTORY OVERHAUL NO SAMPLES TAKEN.				DURING FACTORY OVERHAUL NO SAMPLES TAKEN.			
35	DURING FACTORY OVERHAUL NO SAMPLES TAKEN.				DURING FACTORY OVERHAUL NO SAMPLES TAKEN.			
36	NO FLOW THROUGH PONDS AFTER CLEANING.							
37	NO FLOW THROUGH PONDS AFTER CLEANING.							
38	7.0	25	4	<70	7.5	78	12	<70
39	7.1	26	8	<70	7.3	68	18	<70
40	7.2	26	8	<70	7.2	59	28	<70
41	6.6	26	10	<70	7.0	55	32	<70
42	6.8	26	12	<70	7.1	73	44	<70
43	6.5	26	16	<70	6.8	90	36	<70
44	6.8	26	16	<70	6.9	78	32	<70
45	6.9	27	20	<70	6.8	73	32	<70
46	7.0	26	16	<70	6.9	78	40	<70
47	7.1	35	16	<70	6.9	133	40	<70
48								<70
49	7.0	26	18	<70	6.8	107	36	<70
50	7.1	29	20	<70	8.9	78	56	
51	6.8	127	24	<70	8.9	55	32	<70
52								<70

Appendix 5

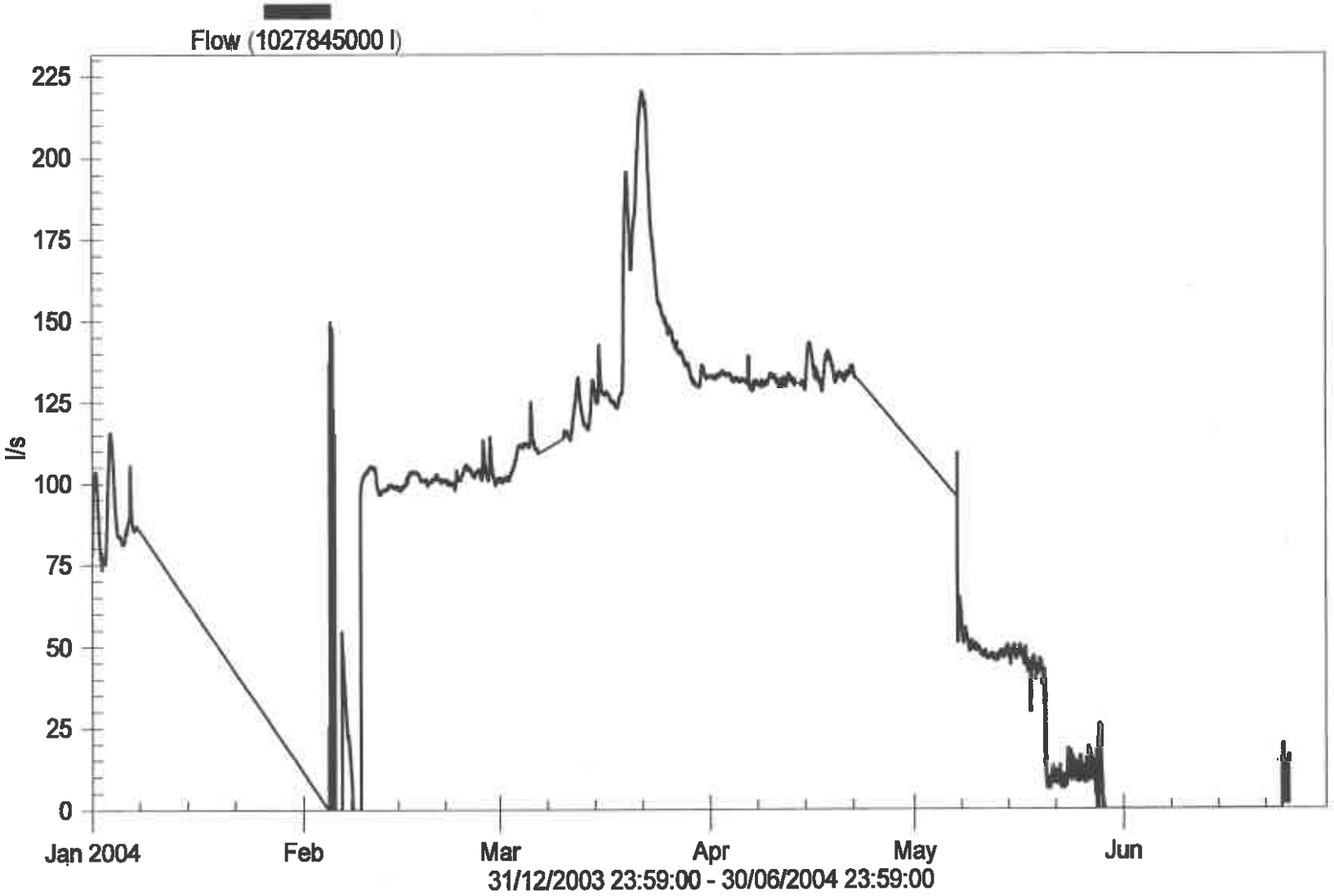
COMPOSITE

SAMPLER

Littleton AER 2004

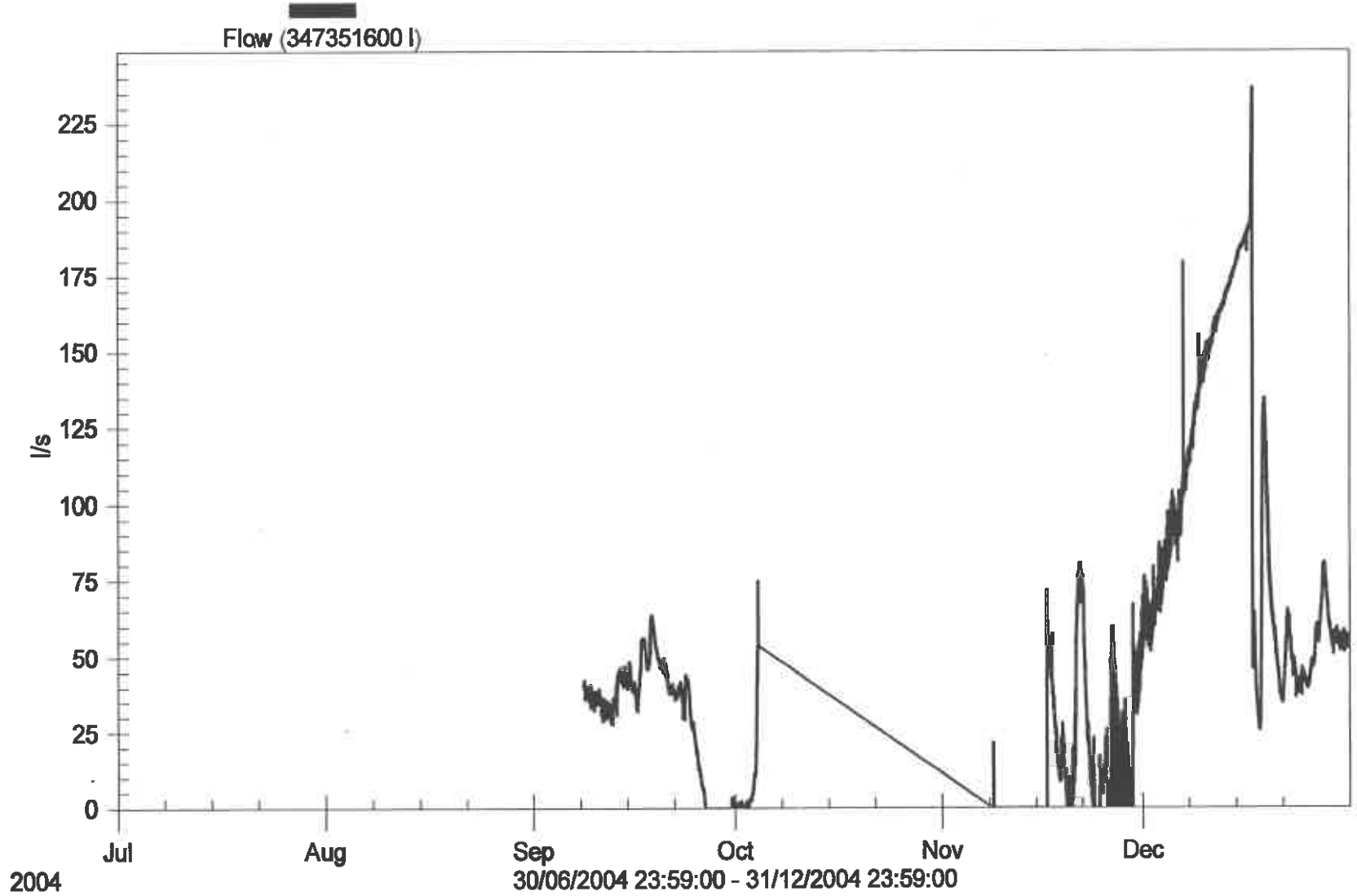
Littleton Composite Sampler

Jan - June



Littleton Composite Sampler

July to December



Appendix 6

EMMISSIONS

TO

AIR

Littleton AER 2004

Summary Results of Emissions to Atmosphere compliance monitoring from the Bord na Móna Fuels Limited Littleton Briquette Factory at Littleton (January 2004 to December 2004) in accordance with the requirements of Integrated Pollution Control Licence Register No. 499.

Report No.: ECS1379

Attention:
Mr. Ray Yates
Production Manager
Bord na Móna Fuels Limited
c/o Littleton Briquette Factory
Thurles
Co. Tipperary

Prepared by:
Mr Sean Creedon
Environmental Consultant

Reviewed by:
Ms Lisa Blyth
Technical Services Manager

Date: March 2005

Executive Summary

As part of the requirements of Integrated Pollution Control Licence, Register No. 499, Bord na Móna Fuels Limited are required to submit to the Agency, an Annual Environmental Report (AER). Bord na Móna Environmental Limited were commissioned to prepare a summary report of emissions to atmosphere monitored at the Littleton Briquette Factory from the period to January 2004 to December 2004.

This report is certified as accurate and representative of the sampling and associated analysis carried out.

Respectively submitted,

Mr Sean Creedon	***Ms Lisa Blyth***
Environmental Consultant	***Technical Services Manager***

1.0 INTRODUCTION

A summary of IPC Licence Register No. 499 environmental monitoring results from the period January 2004 to December 2004 are presented as follows:

Table 1: Quarterly Compliance Monitoring of Particulate Emissions to Atmosphere

Table 2: Summary of Quarterly Compliance Monitoring of Particulate Mass Emissions to Atmosphere

Table 3: IPC Licence Particulate Emissions to Atmosphere Emission Limit Values (ELV's)

Table 4: Annual Particulate Mass Emissions to Atmosphere

Table 5: Quarterly Compliance Monitoring of TOC (as C) Emissions to Atmosphere from Emission Point A108

Table 6: Annual TOC (as C) Emissions to Atmosphere from Emission Point A108

Table 7: Annual Compliance Monitoring of NOx (as NO_2) Emissions to Atmosphere from Emission Point B101

Table 8: Annual NOx (as NO_2) Emissions to Atmosphere from Emission Point B101

Table 9: Annual Compliance Monitoring of SO_2 Emissions to Atmosphere from Emission Point B101

Table 10 Annual SO_2 Emissions to Atmosphere from Emission Point B101

Appendix 1

Figures 1-6: Particulate Mass Emissions to Atmosphere (kg) (January 2004 to December 2004) vs. Licence ELV from Emissions Reference Points B101, A101-A105 respectively.

Figure 7: Summary of Particulate Mass Emissions to Atmosphere (kg) (January 2004 to December 2004) from Emissions Reference Points B101, A101-A106.

Note

Figures in bold represent sample results for specific parameters that exceed IPC Licence Emission Limit Values (ELV's).

TABLE 1: QUARTERLY COMPLIANCE MONITORING OF PARTICULATE EMISSIONS TO ATMOSPHERE (JANUARY – DECEMBER 2004)

Quarter	Sampling Date	Job No.	Emission Point Ref.	Volumetric Flow (Nm^3/hr)	Particulates (mg/Nm^3)	Particulate Mass Emissions (kg/hr)
1 (2004)	9 to 10/02	ECS0726-A	B101	31,147	122	3.8
			A101	**80,228**	**71**	**5.7**
			A102	**7,339**	**164**	**12.7**
			A103	**6,836**	89	0.61
			A104	**16,891**	**1,946**	**23.8**
			A105	4,916	25.4	0.13
			A106	Note 1	Note 1	Note 1
2	6+7/05	ECS0874-A	B101	32,567	121.4	3.95
			A101	**99,058**	**103.9**	**10.3**
			A102	**105,609**	**208.8**	**22.1**
			A103	Note 2	Note 2	Note 2
			A104	5,862	508.9	3.68
			A105	4,366	106.9	0.47
			A106	Note 1	Note 1	Note 1
3	20 + 21/09	ECS1098-A	B101	**38,398**	**615**	**23.6**
			A101	**86,363**	**116**	**10.0**
			A102	**113,018**	**229**	**25.9**
			A103	Note 3	Note 3	Note 3
			A104	**12,920**	946	**12.2**
			A105	**8,899**	<0.4	3.6×10^{-3}
			A106	Note 1	Note 1	Note 1
4	15/12	ECS1234-A	B101	Note 4	Note 4	Note 4
			A101	**85,582**	40.1	3.43
			A102	**80,252**	**67.9**	5.45
			A103	**7,894**	69.2	0.55
			A104	**12,014**	223.6	2.69
			A105	**7,030**	8.0	0.06
			A106	Note 1	Note 1	Note 1

Note 1 Process servicing emission reference point was not operational during monitoring events.

Note 2 Not possible to monitor due to excessively high moisture and particulate matter

Note 3 Not possible to monitor due to blockage of sampling probe by particulate matter emission

Note 4 Sampling carried over to the following year

TABLE 2: SUMMARY OF QUARTERLY COMPLIANCE MONITORING OF PARTICULATE MASS EMISSIONS TO ATMOSPHERE (JANUARY – DECEMBER 2004)				
Emission Point Ref.	**Particulate Mass Emissions during each Quarterly Monitoring Event (kg/hr)**			
	1	**2**	**3**	**4**
B101	**3.8**	**3.95**	**23.6**	Note 4
A101	**5.7**	**10.3**	**10.0**	3.43
A102	**12.7**	**22.1**	**25.9**	5.45
A103	0.61	Note 2	Note 3	0.55
A104	**23.8**	3.68	**12.2**	2.69
A105	0.13	0.47	3.6×10^{-3}	0.06
A106	Note 1	Note 1	Note 1	Note 1

Note 1 Process serving emission reference point was not operational during monitoring events.

Note 2 Not possible to monitor due to excessively high moisture and particulate matter

Note 3 Not possible to monitor due to blockage of sampling probe by particulate matter emission

Note 4 Sampling carried over to the following year

TABLE 3: IPC LICENCE PARTICULATE EMISSIONS TO ATMOSPHERE EMISSION LIMIT VALUES (ELV's)				
Emission Point Ref.	**Maximum Volumetric Flow (Nm^3/hr)**	**Particulate ELV (mg/Nm^3 or kg/hr)**	**Particulate ELV (kg/hr)**	***Licensed Annual Particulate Mass Emissions (kg/yr)***
B101	36000	400 mg/Nm^3	14.4	*126144*
A101	34852	50 mg/Nm^3 >0.5kg/hr 150 mg/Nm^3 <0.5kg/hr	5.23 max.	*15265* *45796 max.*
A102	42400	50 mg/Nm^3 >0.5kg/hr 150 mg/Nm^3 <0.5kg/hr	6.36 max.	*18571* *55714 max.*
A103	5800	7 kg/hr	7	*61320*
A104	11700	6 kg/hr	6	*52560*
A105	6797	50 mg/Nm^3 >0.5kg/hr 150 mg/Nm^3 <0.5kg/hr	1.02 max.	*2977* *8931 max.*
A106	660	50 mg/Nm^3 >0.5kg/hr 150 mg/Nm^3 <0.5kg/hr	0.10 max.	*289.1* *867 max.*
Maximum Annual Particulates Mass Emissions to Atmosphere Limit			-	*351332*

TABLE 4: ANNUAL PARTICULATE MASS EMISSIONS TO ATMOSPHERE (JANUARY – DECEMBER 2004)				
Location	**Annual Average Mass Emission (kg/hr)**	**Hours Production**	**Annual Particulate Mass Emissions (kg/year)**	***Licensed Annual Particulate Mass Emissions (kg/yr)***
B101	10.45	5374	56158.3	*126144*
A101	7.36	5374	39552.64	*45796 max.*
A102	16.5	5374	88671	*55714 max.*
A103	0.58	5374	3116.92	*61320*
A104	10.6	5374	56964.4	*52560*
A105	0.17	5374	913.58	*8931 max.*
A106	Note 1	5374	Note 1	*867 max.*
Particulate Mass Emissions to Atmosphere			245376.8	*351332*

Note 1 Process serving emission reference point was not operational during monitoring events.

TABLE 5: QUARTERLY COMPLIANCE MONITORING OF TOC (AS C) EMISSIONS TO ATMOSPHERE FROM EMISSION POINT A108 (JANUARY – DECEMBER 2004)					
Quarter	**Sampling Date**	**Job No.**	**Volumetric Flow (Nm^3/hr)**	**TOC (as C) Note 1 (mg/Nm^3)**	**TOC (as C) Mass Emissions (kg/hr)**
1	9 to 10/2/04	ECS0726-A	1,306	31	0.04
2	6 to 7/5/04	ECS0874-A	1,150	177.5	0.20
3	20 to 21/9/04	ECS1098-A	1,174	68	0.08
4	15/12/04	ECS1234 -A	1,778	11	0.2
IPC Licence ELV's			*6700*	*170*	*1.14*

TABLE 6: ANNUAL TOC (as C) MASS EMISSIONS FROM A108 (JANUARY – DECEMBER 2004)			
Annual Average Mass Emission (kg/hr)	**Hours Production** Note 1	**Annual Mass Emissions (kg/year)**	***Annual Mass Emissions IPC Licence ELV (kg/year)***
0.13	1327	172.5	*9978*

Note 1 Operational hours of the Firelighter plant

TABLE 7: ANNUAL COMPLIANCE MONITORING OF NO_x (as NO_2) EMISSIONS TO ATMOSPHERE FROM EMISSION POINT B101 (JANUARY – DECEMBER 2004)					
Annual	**Sampling Date**	**Job No.**	**Volumetric Flow (Nm^3/hr)**	**NO_x (as NO_2) (mg/Nm^3)**	**NO_x (as NO_2) Mass Emissions (kg/hr)**
	21/09/04	ECS1098	38,398	781	29.9
IPC Licence ELV's			*36000*	*100*	*3.6*

TABLE 8: ANNUAL NO_x (as NO_2) MASS EMISSIONS FROM B101 (JANUARY – DECEMBER 2003)			
Annual Average Mass Emission (kg/hr) Note 1	**Hours Production**	**Annual Mass Emissions (kg/year)**	***Annual Mass Emissions IPC Licence ELV (kg/year)***
29.9	5374	160,682	*31,536*

Note 1 Based on results from one monitoring event

TABLE 9: ANNUAL COMPLIANCE MONITORING OF SO_2 EMISSIONS TO ATMOSPHERE FROM EMISSION POINT B101 (JANUARY – DECEMBER 2003)					
Annual	**Sampling Date**	**Job No.**	**Volumetric Flow (Nm^3/hr)**	**SO_2 (mg/Nm^3)**	**SO_2 Mass Emissions (kg/hr)**
	21/09/04	ECS1098	38,398	487	18.7
IPC Licence ELV's			*36000*	*1000*	*36*

TABLE 10: ANNUAL MASS SO_2 EMISSIONS FROM B101 (JANUARY – DECEMBER 2004)			
Annual Average Mass Emission (kg/hr) Note 1	**Hours Production**	**Annual Mass Emissions (kg/year)**	***Annual Mass Emissions IPC Licence ELV (kg/year)***
18.7	5374	100,494	*315,360*

Note 1 Based on results from one monitoring event

APPENDIX 1

Figure 1: Particulate Mass Emissions to Atmosphere (kg/hr) (January to December 2004) vs. Licence ELV from Emissions Reference Point B101 – Data point 5 is the average yearly emission

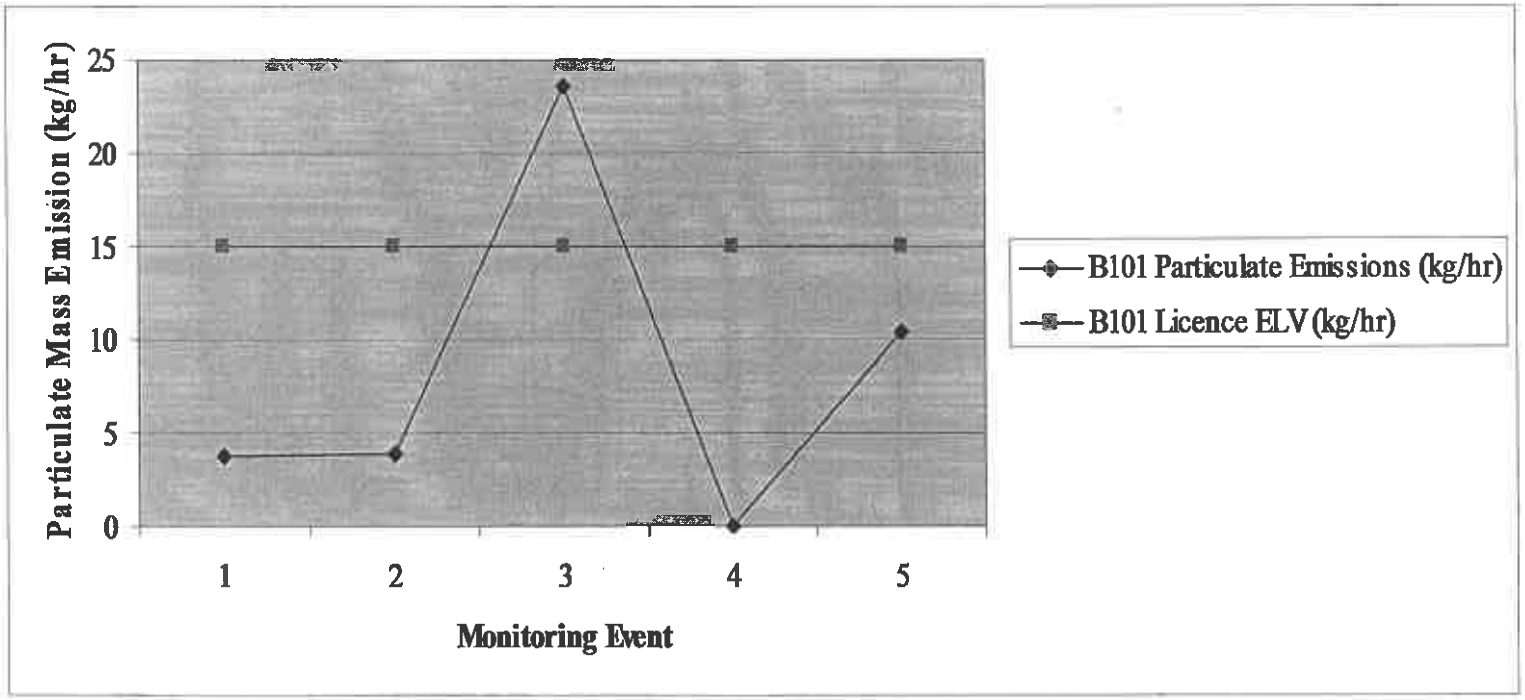


Figure 2: Particulate Mass Emissions to Atmosphere (kg/hr) (to December 2004) vs. Licence ELV from Emissions Reference Point A101– Data point 5 is the average yearly emission

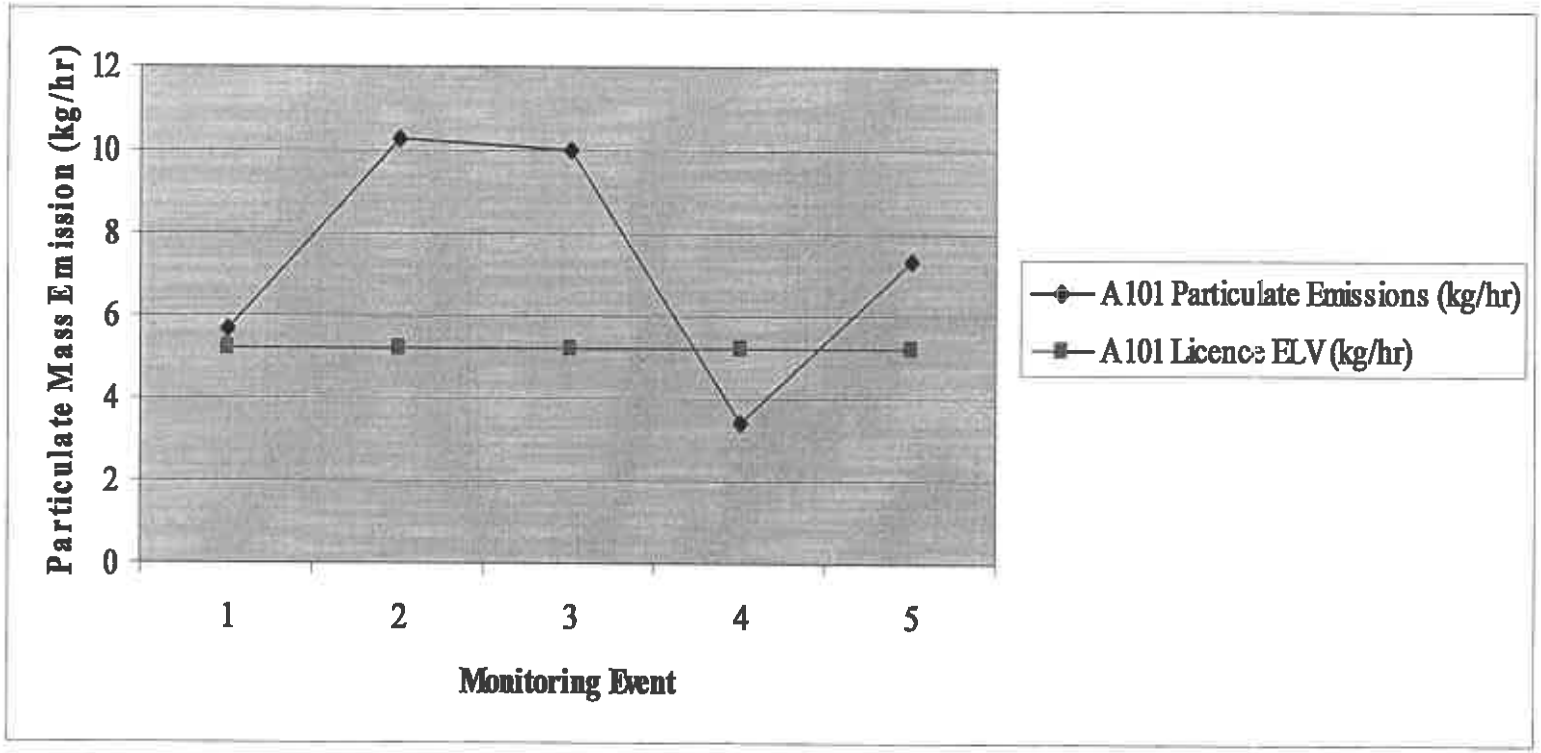


Figure 3: Particulate Mass Emissions to Atmosphere (kg/hr) (January to December 2004) vs. Licence ELV from Emissions Reference Point A102– Data point 5 is the average yearly emission

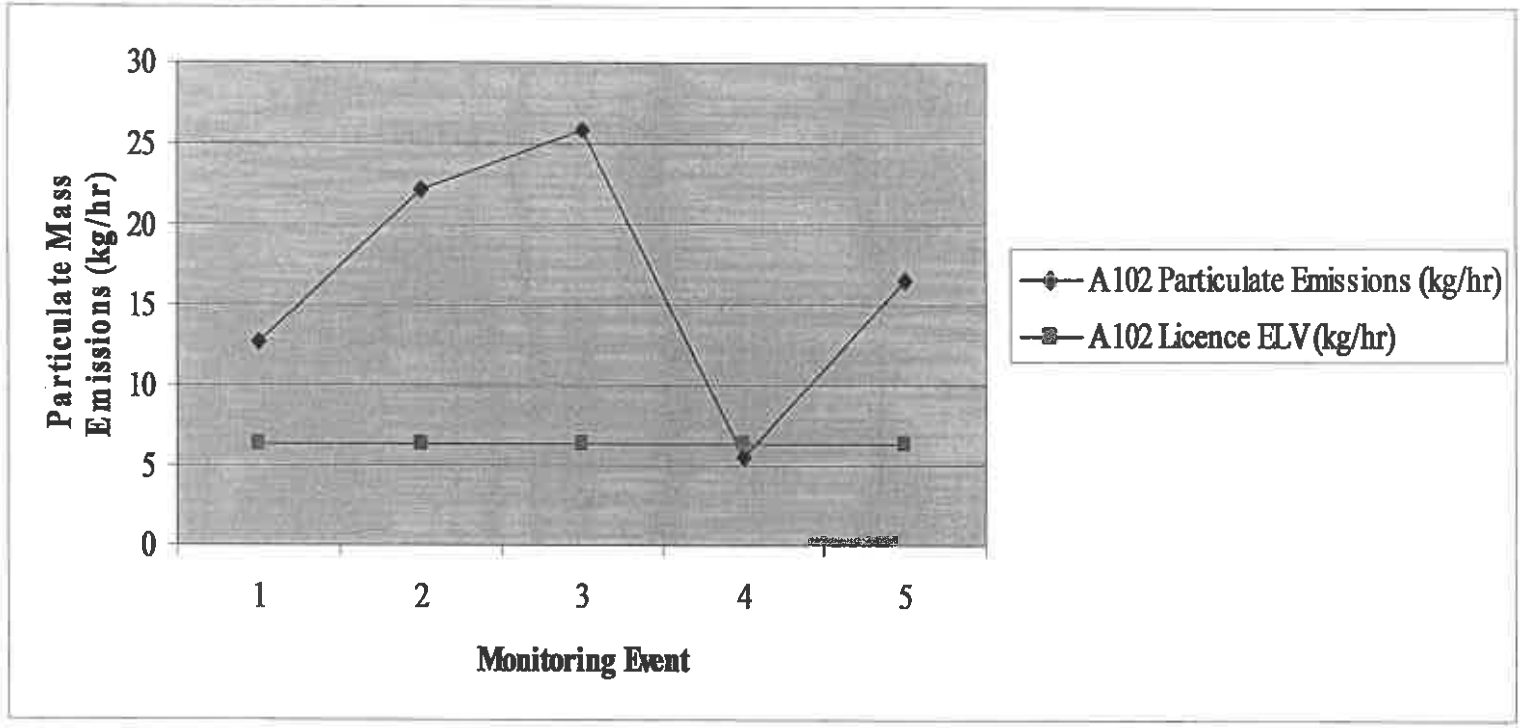


Figure 4: Particulate Mass Emissions to Atmosphere (kg/hr) (January to December 2004) vs. Licence ELV from Emissions Reference Point A103– Data point 5 is the average yearly emission

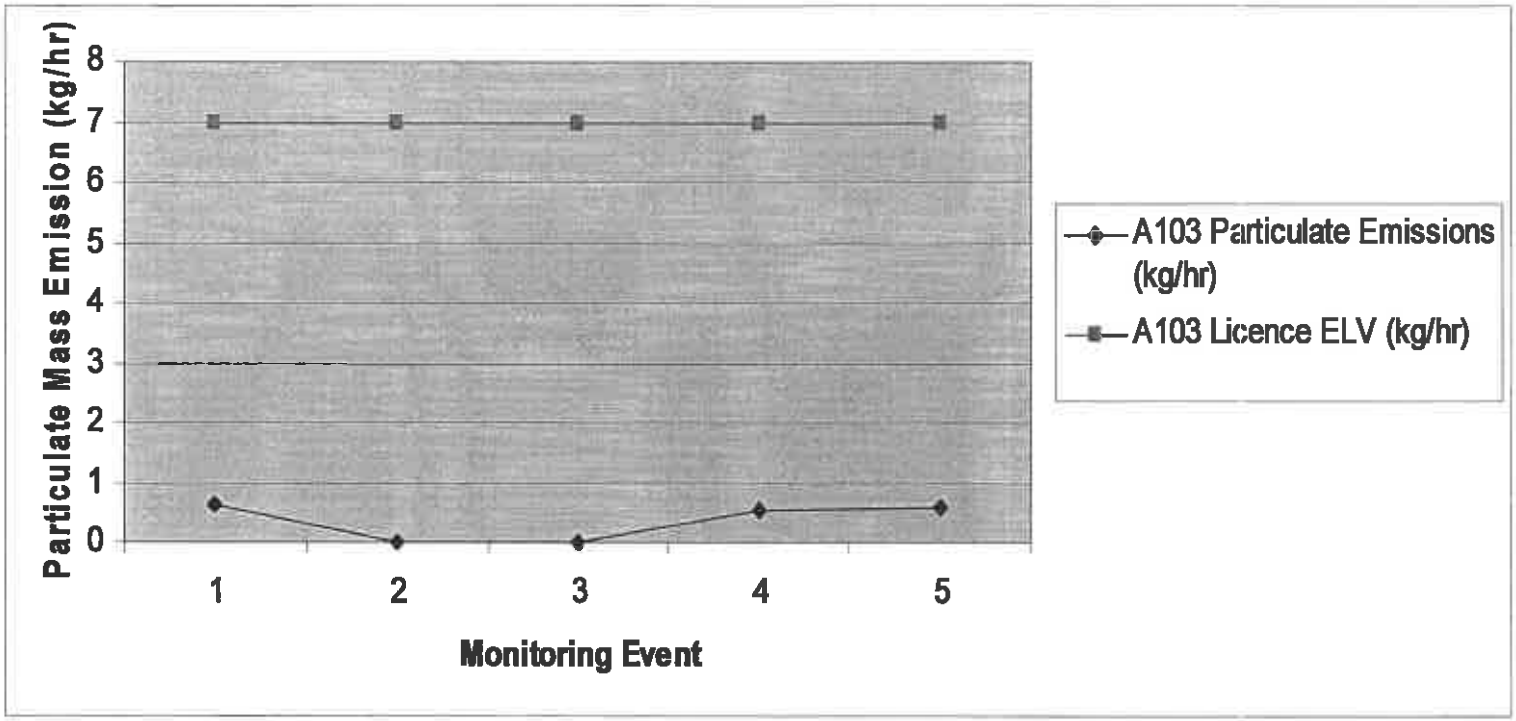


Figure 5: Particulate Mass Emissions to Atmosphere (kg/hr) (January to December 2004) vs. Licence ELV from Emissions Reference Point A104– Data point 5 is the average yearly emission

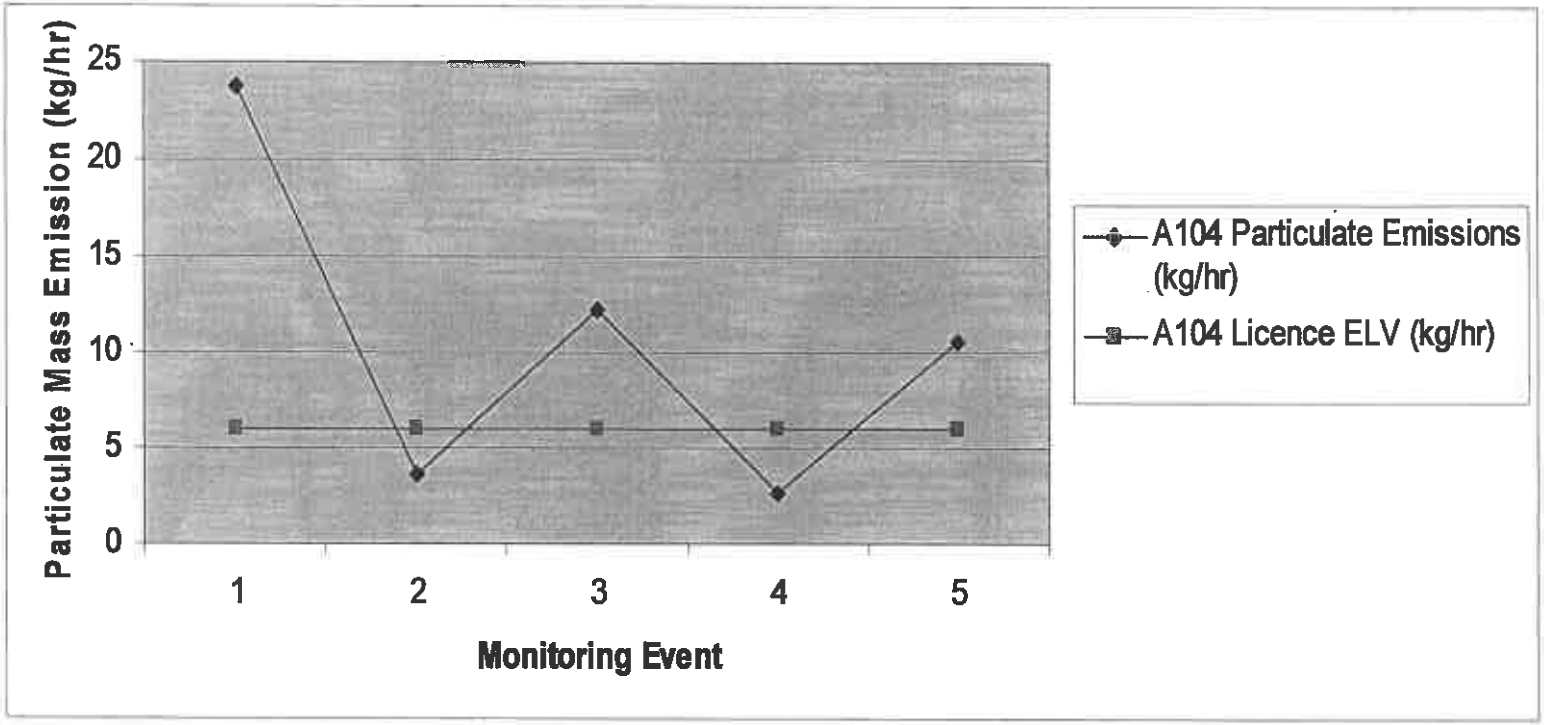


Figure 6: Particulate Mass Emissions to Atmosphere (kg/hr) (January to December 2004) vs. Licence ELV from Emissions Reference Point A105– Data point 5 is the average yearly emission

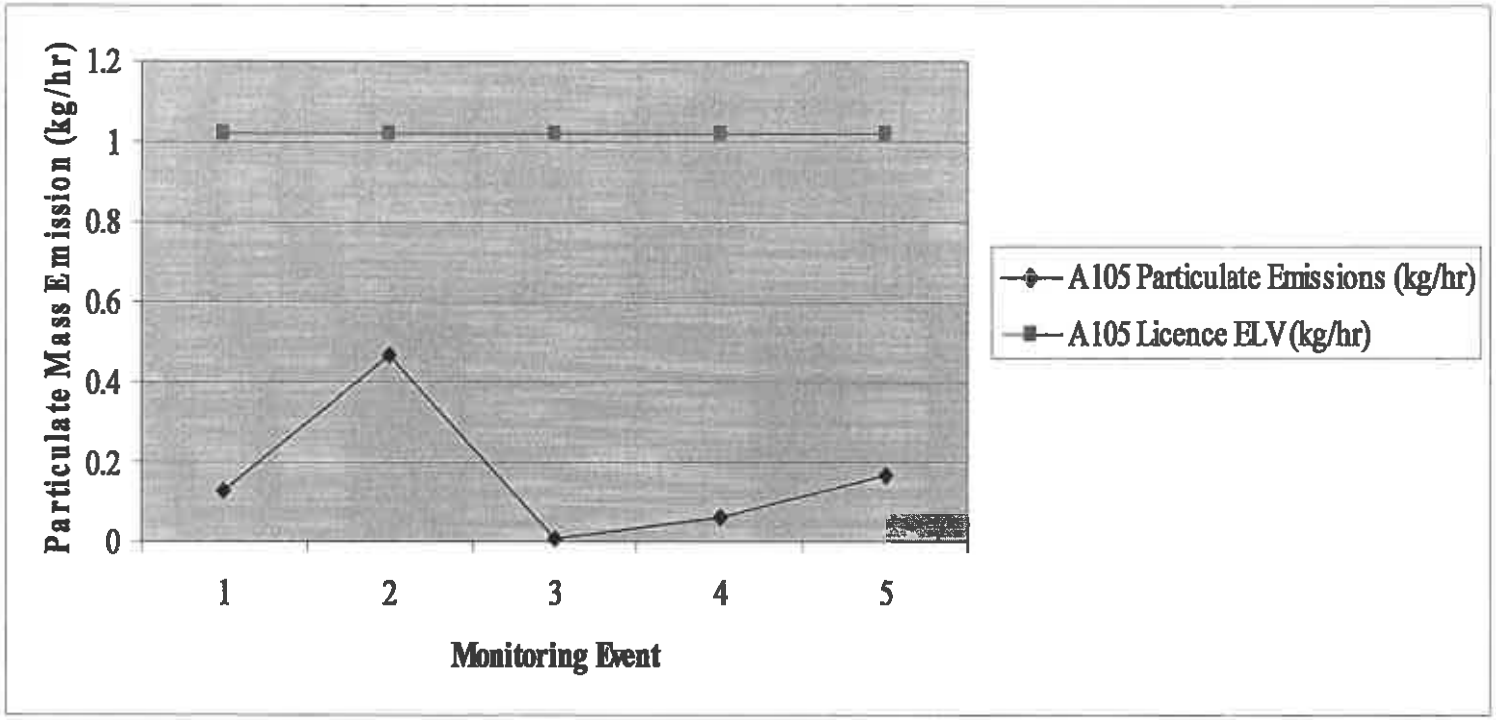
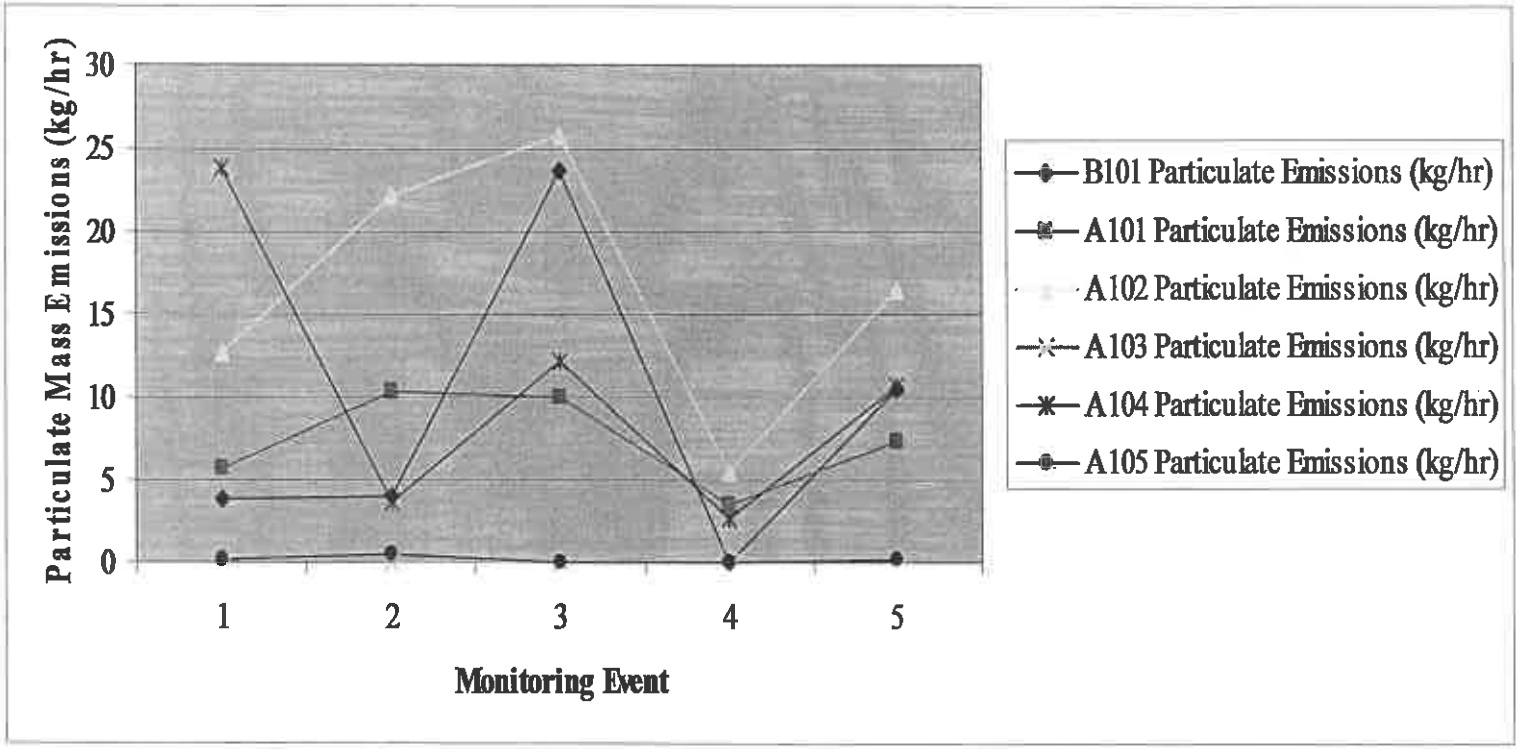


Figure 7: Summary of Particulate Mass Emissions to Atmosphere (kg/hr) (January to December 2004) from Emissions Reference Points B101, A101-A105– Data point 5 is the average yearly emission



Appendix 7

ENERGY

REPORT

Littleton AER 2004

Heat, Electricity and Oil Usage at Littleton Briquette Factory

ERA Energy Audit - Part II

By
Barry-John Hooper, M.Eng.Sc, B.E., M.I.E.I
Mechanical Engineer

March 23, 2005

1 INTRODUCTION

The combined heat and power plant (CHP) is central to operations at Littleton. The heat generated from the peat-fired boiler is used to produce high pressure steam. This steam turns the turbine to generate power. The turbine exhaust steam provides the thermal energy required to dry the peat for briquetting. Were it not for CHP briquette production would be uneconomical.

Heat generation and usage is essential in briquette manufacture. Heat losses affect production in two ways. Firstly, less heat is available to dry the peat reducing the throughput in the drying plant. Secondly, to counter this more peat, that could have been used to manufacture briquettes, is burnt in the boiler. This unnecessarily increases CO_2 emmisions.

While 2.5 MWe of power is generated at Littleton, the factory is a net importer of power from the ESB. Correct management of electrical power on both the generation and usage side make both financial and environmental sense.

Oil is used in Littleton to power the boiler during start up, to run bog machinery such as train locomotives, tractors and to power mobile yard machinery such as loading shovels and forklifts. This area will be analysed with a view to identifying areas for improvement.

2 HEAT AUDIT

Heat or thermal energy is generated in the boiler through burning peat and/or oil. A percentage of this heat is transferred to the water to generate high pressure steam. This percentage is known as the thermal efficiency. The turbine harnesses some of this thermal energy from the steam and converts it into electrical power. The turbine exhaust steam contains the remaining thermal energy. This is sent to the dryers and other heat exchangers where as much as possible of the heat is used. This audit looks at the boilers thermal efficiency as it has a knock-on effect to the overall efficiency of the plant

2.1 Boiler Thermal Efficiency

Boiler thermal efficiency can be calculated by one of two methods, the direct method and the indirect method.

2.1.1 Direct Method

In the direct method, the amount of fuel burned is directly measured (i.e. weighed). The thermal input can therefore be calculated from the calorific value of the fuel. The heat transferred to the steam can be calculated from boiler readings. The thermal efficiency can be calculated from *Equation 1*.

$$Thermal\ Efficiency_{DIRECT} = \frac{Heat\ given\ to\ Steam\ (MJ)}{Heat\ of\ Combustion\ of\ Fuel(MJ)}$$

Equation 1

The peat burned in the boiler can only be calculated by the mass balance from the difference of the peat input and the production output. The previous audit of peat usage found that 75.2% of peat went into making briquettes, 24.2% to the boiler with the remainder going to drain or atmosphere, and this is supported by a recent study [1]. This data is measured over too long time frame (i.e. weeks, months) to be compared with the boiler readings taken in such a test (e.g. every 15 mins for 3 hrs).

One recommendation of the previous audit was the installation of a belt weigher to directly meter the peat going to the boiler [1]. This will be installed in Summer '05 and will allow the direct method for boiler efficiency determination to be used.

2.1.2 Indirect Method

In the indirect method the maximum theoretical heat deliverable is known from the Gross Calorific Value of the fuel and equates to 100%. All other sources of loss are then calculated on a percentage basis and subtracted (*Equation 2*).

$$Thermal\ Efficiency_{INDIRECT} = 100\% - Losses\ (\%)$$

Equation 2

In this method the ultimate composition of the fuel is assumed and the flue gas temperature and fuel moisture content must be known. The following losses are calculated from efficiency charts derived for peat:

- Dry Flue Gas Loss
- Wet Flue Gas Loss
- Loss due to Humidity in the Air
- Unburned Carbon
- Radiation Losses

2.2 Results

Data from the factory daily boiler log was used to calculate boiler efficiency using the indirect method. The results showed that the average boiler efficiency was 79.8%. This figure is in line with figures for boilers of its type and class and high considering the age of the boiler (23 years old). This has been achieved due to annual boiler maintenance and retro-fitting of more modern technical innovations (e.g. automatic soot-blowing)

Boiler Log Date	Moisture Content of Fuel (%)	Final Flue Gas Temperature (°C)	O_2 In Stack (%)	Excess Air (%)	Boiler Efficiency (%)
06/03/2005	50.19	238	5.4	35	79.6
03/03/2005	48.9	234	6.25	43	80.2
28/02/2005	50.6	236	5.4	35	79.5

Table 1 Results of Boiler Efficiency Tests

2.3 Previous Boiler Efficiency Audits

Boiler Efficiency tests where first carried out in Littleton during commissioning by the manufacturer StandardKessel in 1982 and again in 1986 by Bord na Móna R&D Group. The efficiency was found to be 85% and 77.5% respectively [2][3]. Here a different version of the indirect method was used involving analyses of the composition of the flue gases.

3 Electricity Audit

3.1 Electricity Generation and Usage

The power usage was examined over three days and the results averaged. It was found that the turbine generated 92% of the plants power requirement, with the remainder being imported from the ESB. The power usages of the larger plant items are monitored and recorded. The briquette factory consists of three main areas, the dryers, the boiler and the press house. The breakdown of power usage was derived from factory logs and estimated values and is shown (Figure 1).

3.2 Turbine Output

The turbine blading is overhauled every 60,000 operating hours to ensure optimum output. This was carried out during last year's summer overhaul 2004.

3.3 Speed Controllers

In Littleton Factory most of the large motors are powered by 3.3 kW and not standard 400V 3-phase power. Speed controllers at this frequency present a technical difficulty, are not readily available and therefore would not be economical.

One large motor on the 400V line is the boiler feed pump. Previous studies carried out at Derrinlough factory showed that a significant power saving could be made in this area [5]. Initial investigations for this audit show that possible power savings could be made. A full technical investigation into the feasibility of a speed controller should be carried out.

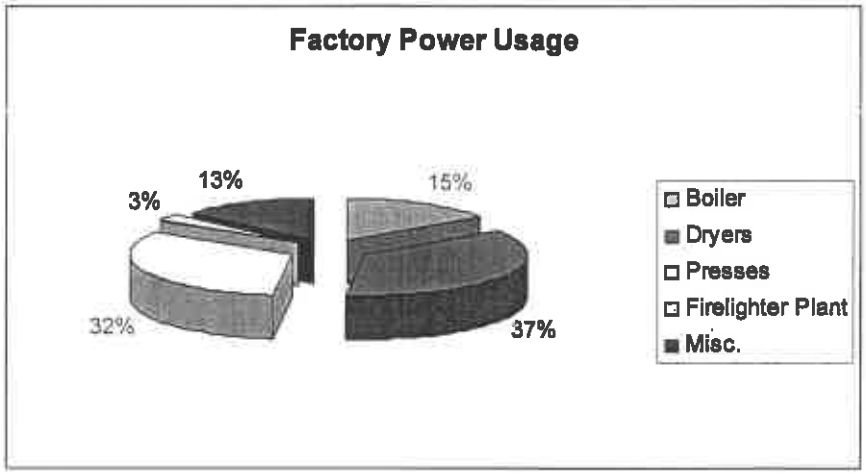


Figure 1 **Factory Power Usage**

3.4 Maximum Demand

High peak demand by industry can have a big effect on the environment. Power generation and the distribution network have to be upgraded to stay ahead of the usage. For this reason installations agree a Maximum Import Capacity (MIC) and if maximum demand goes above this level heavy tariffs are applied.

Maximum demand and electrical usage is carefully managed on site and by Bord na Móna technical services. Littleton factory has agreed an MIC of 650kVA (~580kW) with the ESB. The graph shows that in the past two years maximum demand has exceeded MIC on only two occasions.

To avoid high maximum demand a 720eW stand-by generator was installed at Derrinlough. This has proved very effective. A feasibility study for such a system at Littleton could be carried out.

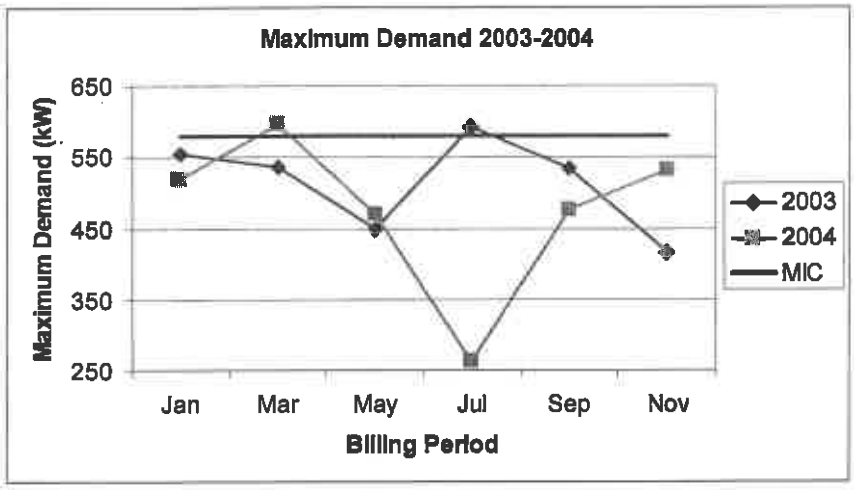


Figure 2 **Maximum Demand at Littleton (2003-2004)**

4 OIL AUDIT

Many different oils are used for various applications on the Littleton site. These can be classed into three main groups:

- Kerosene :- Raw material in Firelighter Manufacture
- Diesel Gas Oil :- Boiler Secondary Fuel, Bog Machinery, Road Transport
- Others :- Hydraulic oils, Lubrication oils

The usage from March '01 to March '04 (three Bord na Móna years) together with the breakdown for the last financial year is shown (Table 2 & Figure 3).

	03/'04	02/'03	01/'02	Average
Kerosene	2,871,105	2,482,015	1,566,674	2,306,598
Diesel Gas Oil	794,486	820,862	776,345	797,231
Others	21,724	11,131	14,689	15,848

Table 2 **Oil Usage at Littleton '01-'04**

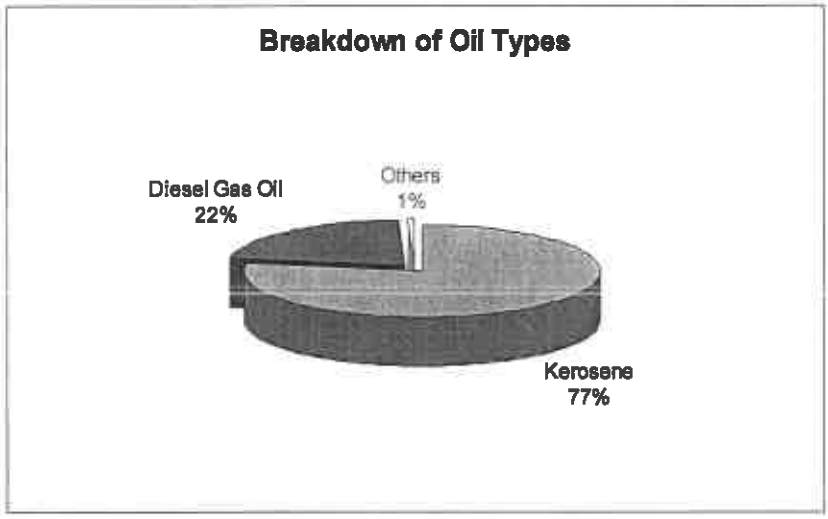


Figure 3 Percentage Usage of Oil Types

Firelighters are manufactured at Littleton for sale to the domestic home heating market. Kerosene is a raw material used in firelighter manufacture. Finished firelighters can be made of up to 70% kerosene by weight. Kerosene usage during firelighter manufacture is strictly monitored and controlled for cost reasons. While kerosene is not consumed on site it accounts for three quarters of all oil delivered. Increases usage can be accounted for due to the winning of a new contract ('02/'03) and increased sales ('03/'04). Currently work is under way to reduce kerosene usage by increasing the peat chip content of firelighters.

Diesel Gas Oil is used widely in a number of different applications (Figure 4). Diesel is used widely in bog operations to power the rail locomotives transporting peat and to power the bog machinery itself. In the factory, diesel is used in the boiler at startup and as a secondary fuel when burning wet peat. Yard machinery and road transport are also fuelled by diesel.

Diesel is strictly controlled and usage is monitored by meters. Usage remains relatively constant and varies from year to year depending on the length of bog harvest and moisture content of peat burned in the boiler.

Other oils represent small quantities and issue is controlled by stores.

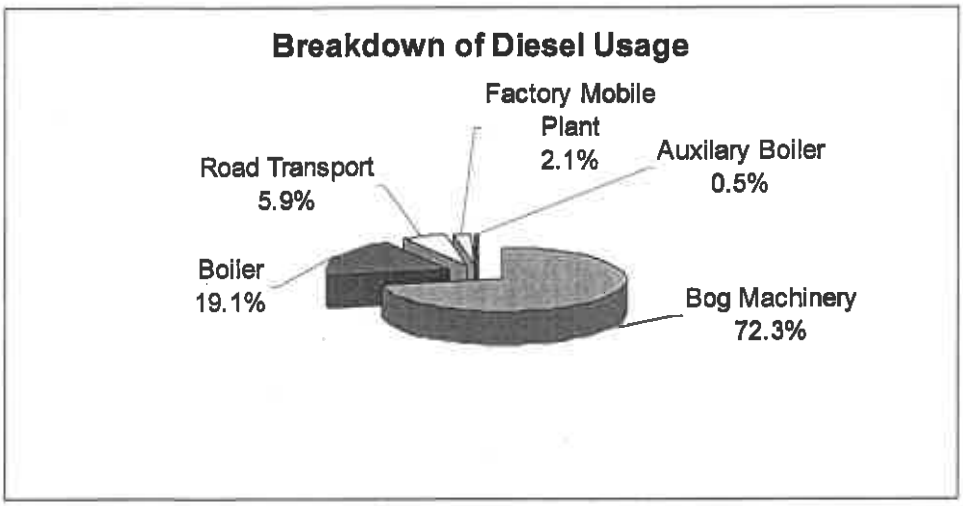


Figure 4 Breakdown of Diesel Usage

5 RECOMMENDATIONS

HEAT AUDIT

- Installation of boiler belt weigher
- Thorough investigation into thermal efficiency of the boiler

ELECTRICITY AUDIT

- Feasibility of speed control on boiler feed pump
- Feasibility of stand-by generator.

OIL USAGE

- Increased usage of peat chip in firelighter manufacture
- Investigation into fuel consumption of bog machinery

6 REFERENCES

[1] Peat Usage at Littleton Briquette Factory, ERA Energy Audit - Part I, March 2003

[2] Estimation of CO_2 Emissions 2004, Bord na Móna Internal Study, March 2005.

[3] Boiler Acceptance Test, StandardKessel (manufacturer), July 1982.

[4] Boiler Efficiency Test at Littleton Briquette Factory, Bord na Móna Internal Study, May 1986.

[5] Energy Utilisation in a Peat Briquette Factory, M.Eng.Sc Thesis, Paul Doyle, Department of Mechanical Engineering, University College Dublin, 1995

Appendix 8

SILT POND

UPGRADE

PROGRAMME

Littleton AER 2004

REVISED SILT POND UPGRADE PROGRAMME LITTLETON GROUP

STAGE 1

DATE : 27/09/2003

POND NO.	CATCH. HECT.s	DESIGN CAP.(m^3)	PRESENT CAP.(m^3)	PLANNED UPGRADE WORK	PLAN CAP.(m^3)	PLAN SCHEDULE	ACTUAL COMPL.	POSITION 31/12/'03
KN9	35	875	1080	NEW POND 240*3*1.5m.	1080	OCT. '02	OCT. '02	
LN34	120	3000	3465	1. TWO NO. PONDS REQ.	3120	JULY '02	OCT.'04	
LN35	120	3000	750	2. DEVELOP 2 TRENCHES AS PONDS.	6240	AUG. '04		
				3. PIPE INLETS AND OUTLETS.		AUG. '04		0
				TOTAL = 1600*3*1.3m.				0
LS29	125	3125	3204.5	EXTRA CATCH-NEW POND 280*8.5*1.3m	3206.5	NOV. '02	JAN '04	
DE22	138	3450	4320	2ND POND 300*7*1.2m.	4320	JUNE '02	JUNE '02	
TY30	75	1875	2000	DEVELOP TRENCH - 500*4*1m.	2000	SEPT. '02	SEPT. '02	

STAGE 2

LK15	160	4000	4032	DEEPEN BY 0.3M	4032	JUN. '04	JUL. '04	
BE20	167	4175	5300	2ND POND 350*5*1.1m.	5300	MAY '04	JUN. '04	
BE19	67	1675	1684.8	EXTEND TO 160*6*1.3m.	1725	MAY '04	JUL. '04	
DE26	110	2750	3042	DEEPEN BY 0.3M	3120	NOV. '03	FEB '03	
KN2	60	1500	1579.5	INCREASE POND TO - 150*10*1.2m.	1800	MAY '04	JUN. '04	
KN3	90	2250	2210	DEEPEN BY 0.3M	2360	SEPT.'03	DEC '03	
LS17	28	700	770	DEVELOPE TO 140*5*1.1	770	MAY '04		

STAGE 3

KN1	40	1000	1296		1296	JUL. '04	JUN. '04	
KN5	120	3000	3072	TO DESIGN	3072	FEB. '03	JUL '03	
KN4	36	950	1120	TO DESIGN.	1120	DEC. '02	DEC. '02	
BE21	67	1675	1680	TO DESIGN. BY-PASS REQ.	1680	OCT. '03	JUN. '04	
KN6	86	2150	2499	TO DESIGN	2499	MAR. '03	DEC. '02	
KN7	40	1000	1440	TO DESIGN	1440	APR. '03	DEC. '02	
KN8	22	550	672		672	JUL. '04	JUN. '04	
BG11	40	1000	1800		1800	JUL. '04	JUL. '04	
BG12	18	450	665		665	JUL. '04	JUL. '04	
BG13	15	375	700	TO DESIGN	700	NOV. '03	DEC. '03	
LK10	44	1100	2000	TO DESIGN	2000	DEC. '03	DEC. '03	
LK14	9	225	264	TO DESIGN	264	FEB. '04	DEC. '03	
LK16	36	875	1200	TO DESIGN	1200	MAR. '04	DEC. '02	
LS18	70	1750	1760	TO DESIGN	1760	JUL. '04	JUL '03	
BE23	71	1775	2240	TO DESIGN	2240	AUG. '04	DEC. '02	
DE24	53	1325	2405	TO DESIGN.	2405	DEC. '02	JUL '03	
DE25	47	1175	2112	TO DESIGN. BY-PASS REQ.	2112	JUN '04		937

Appendix 9

SILT POND

CLEANING RECORD

Littleton AER 2004

I.P.C. LICENSE 499, LITTLETON GROUP, SILT - POND FORTNIGHTLY INSPECTION ANNUAL LOG. 2004

SILT	EMISSION	LAST '02	JAN		FEB		MAR.		APR.		MAY		JUN.		JUL.		AUG.		SEP.		OCT.		NOV.		DEC.	
POND	PT. REF.	CLEANED	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
KN1	SW1	FT 20	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	[illegible]	0	0	0	0	0	0	0	0	0	0	0	0	0
KN2	SW2	FT 19	1/4	1/4	1/2	1/2	1/2	1/2	1/2	1/2	1/2	3/4	[illegible]	0	0	0	0	0	0	0	0	0	0	0	0	0
KN3	SW3	FT 23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
KN4	SW4	FT 19	1/4	1/4	1/4	1/4	1/4	1/4	1/2	1/2	1/2	1/2	1/2	[illegible]	0	0	0	0	0	1/4	1/4	1/4	1/4	1/4	1/4	1/4
KN5	SW5	FT 19	1/4	1/4	1/4	1/4	1/4	1/4	1/2	1/2	1/2	1/2	[illegible]	3/4	0	0	0	0	0	0	0	0	0	0	0	0
KN6	SW6	FT 3	[illegible]	0	0	0	1/4	1/4	1/4	1/4	1/4	1/4	[illegible]	1/2	0	0	0	0	0	0	0	0	0	0	0	0
KN7	SW7	FT 13	1/4	1/4	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	[illegible]	0	0	0	0	0	0	0	0	0	0	0	0
KN8	SW8	FT 23	0	0	0	0	1/4	1/4	1/4	1/4	1/4	1/4	[illegible]	1/4	0	0	0	0	0	0	0	0	0	0	0	0
KN9	SW9	FT 13	3/4	[illegible]	0	0	1/4	1/4	1/4	1/4	1/4	1/2	[illegible]	0	0	0	0	0	0	0	0	0	0	0	0	0
LK10	SW10	FT 13	1/4	1/4	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	[illegible]	0	0	0	0	0	0	0	0	0	0	0
BG11	SW11	FT 12	1/4	1/4	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	3/4	[illegible]	0	0	0	0	0	0	0	0	0	0	0
BG12	SW12	FT 11	1/4	1/4	1/4	1/4	1/4	1/4	1/2	1/2	1/2	1/2	1/2	1/2	[illegible]	0	0	0	0	0	0	0	0	0	0	0
BG13	SW13	FT 11	1/4	1/4	1/4	1/4	1/4	1/4	1/2	1/2	1/2	1/2	1/2	3/4	[illegible]	0	0	0	0	0	1/4	1/4	1/4	1/4	1/4	1/4
LK14	SW14		***	***	***	***	***	***	***	***	***	***	***	[illegible]	0	0	0	0	0	0	0	0	0	0	0	0
LK15	SW15	FT 19	3/4	[illegible]	0	0	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/2	[illegible]	0	0	0	0	0	0	0	0	0	0	0
LK16	SW16	FT 21	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	[illegible]	0	0	0	0	0	1/4	1/4	1/4	1/4	1/4	1/4	1/4
LT34	TRENCH 6	FT 24																		[illegible]	[illegible]					
LT35	TRENCH 1	FT 23			[illegible]																		[illegible]			
LS29			*	[illegible]	[illegible]	0	0	0	0	0	0	0	0	0	0	0	[illegible]	0	0	0	0	0	0	0	0	0	0
LS17	SW17		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
LS18	SW18	FT 3	1/4	1/4	1/4	1/4	1/4	[illegible]	0	0	0	0	[illegible]	0	0	0	0	0	0	0	0	0	0	0	0	0
IE19	SW19	FT 12	1/4	1/4	1/4	[illegible]	0	0	0	0	0	0	1/4	1/4	[illegible]	0	0	0	0	0	0	0	0	0	0	0
BE20	SW20	FT 8	1/4	1/4	1/4	1/4	[illegible]	0	0	1/4	[illegible]	0	[illegible]	0	0	0	0	0	0	0	0	0	0	0	0	0
BE21	SW21	FT 24	0	0	0	0	1/4	[illegible]	0	0	0	0	[illegible]	[illegible]	0	0	0	0	0	0	0	0	0	0	0	0
DE22	SW22	FT 9	1/4	1/4	[illegible]	0	0	0	0	0	0	0	1/4	1/4	[illegible]	0	0	0	0	0	0	0	0	0	0	0
BE23	SW23	FT 6	1/4	1/4	1/4	1/4	[illegible]	0	0	1/4	[illegible]	0	[illegible]	1/4	[illegible]	0	0	0	0	0	0	0	0	0	[illegible]	0	0
DE24	SW24	FT 5	1/4	[illegible]	0	0	0	0	0	0	0	0	1/4	1/4	0	0	0	[illegible]	0	0	0	0	0	0	0	0
CL25	SW25	FT 24	0	0	0	1/4	1/4	[illegible]	0	1/4	1/4	1/4	1/4	1/4	0	0	[illegible]	0	0	0	0	0	0	0	0	0
CL26	SW26	FT 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BL27	SW27		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	[illegible]	0	0	0	0	0	0
BL28	SW28		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	[illegible]	0	0	0	0	0	0
TY29		FT24	0	0	0	0	1/4	[illegible]	0	0	0	0	1/4	1/4	[illegible]	0	0	0	0	0	0	0	0	0	0	0
BE24	proposed												[illegible]	[illegible]	0	0	0	0	0	0	0	0	0	0	0	0

BORD NA MÓNA

Littleton Works

ENVIRONMENTAL PROTECTION AGENCY
12 APR 2006

A.E.R. 2005

I.P.C. Licence No: 499

Littleton AER 2005

Contents

1.0 Introduction

Bord na Móna Fuels Limited was granted an Integrated Pollution Control Licence by the E.P.A. on 17th August 2001 for it's operation in the Littleton group of bogs. This report is the third A.E.R. for the operations and covers the period from 1st January 2005 to 31st December 2005.

1.1 Company Details

The Littleton group of bogs consists of a cluster of bogs approximately ten miles from Thurles in Co. Tipperary.
The main contact and location details of the company are presented in summary form below

Company Name:	Bord na Móna Fuels Limited
Site Address:	Littleton Group Thurles Co. Tipperary.
IPC Licence Number:	499
Telephone No:	0504-44215
Fax No:	0504-44225
Contact Name:	Ray Yates
Position:	General Manager

1.2 Activities

Milled Peat is produced on the Littleton group of bogs for transfer to the Briquette Factory for the manufacture of peat solid fuel products. Littleton has a total area of 4,530 hectares. Of this, 1,475 hectares were used for the production of milled peat during the period of the AER.

The production of milled peat is a seasonal activity with production opportunities only possible during the period from late spring to early autumn when drying conditions are suitable. When production operations are underway, they are typically carried out over a seven-day week and for 10 to 15 hours per day. Bog drainage and field conditioning operations are carried out throughout the year, along with peat haulage operations from stockpiles located on the bog to the Briquette Factory. Transport operations are carried out on all days throughout the year that the Briquette Factory is in operation.

Sod Peat was produced on an area of 223 hectares during 2005. Production was from April to August with sales to the public from September to December. Bog preparation and drainage was ongoing throughout the year but was mainly in the period January to March.

The Firelighter Plant operated from January to April and again from September to December.

The Group has its own workshop facilities for the maintenance, repair and fabrication of plant used in the operations outlined.

In total 135 permanent workers and 26 seasonal workers at peak were employed during 2005.

1.3 Environmental Policy Statement

The Environmental Policy Statement of the company is shown in Appendix 1

1.4 Environmental Management of the Company

The management structure illustrating environmental responsibilities within Bord na Móna Fuels Limited in 2005 is shown in Appendix 2.
The General Manager, Mr. Ray Yates has overall responsibility for the Littleton Group.

2.0 Summary Information

2.1 Emissions to water summary

2.1.1 Silt Pond Emissions

Monitoring and sampling from agreed discharge points are carried out quarterly in the form of grab samples. Samples were taken each quarter from each of the agreed outlets in accordance with the regular sampling programme. The results of the analyses of these samples are presented below in Appendix 3. There were no non compliances with no sample greater than three times the standard and more than 75% to date below the standard.

2.1.2 PW-102 Factory and Yard Discharge to Ballybeg river.

The sampling and analysis at this location was the subject of a proposal because of lack of access to the original location. This proposal was put into operation during 2005. Samples were taken and analysed as per license except for the period of factory overhaul from June to September, during which there was no effluent.. The results of the sampling was that no sample exceeded three times the standard and eight of thirty three samples were greater than the standard. Therefore there were no non compliances. The samples for COD analysis for the yard were taken during the same period.

2.1.3. Monitoring of workshop/depot surface water run-off.

Inspections are undertaken and logged weekly in the following areas: Factory, Lanespark Workshop and Fueling Area, Templetuohy Workshop and Fueling Area, and the Firelighter area. This is linked to 2.12 as the Lanespark Workshop, Factory Yard and oil storage and the Firelighter area all discharge through the Factory Yard pond and oil-trap.
Templetuohy yard discharge separation and oil trap installation were completed in December 2004. However there were problems organising the inspection and sampling of Templetuohy and Lanespark due to personnel issues. This resulted in inspections not being continuous during the year.
The COD samples for the factory, factory yard and Lanespark fuel area were taken during the year, however the sampling of the two Templetuohy locations did not start until January 2006. There will be a complete sampling programme for all five yard and fueling area interceptors from January 2006.This has been in place for the past three months.

2.1.4 Composite Sampler Programme

The Littleton Composite Sampler worked continuously to the end of the year except for:
No flow from the 13th July – 23rd July. And from 20th August – 5th October.
Due to low rainfall and the dewatering of local zinc mine.
The result graphs for the composite sampler operating at location SW22 are included as Appendix 4. The flow data was only available for part of Nov. and Dec.
The proposed change in location of the Composite Sampler was not undertaken.
There were in total 308 samples analysed of which 8 were greater than the standard and 3 of the eight were greater than 1.5 times the standard.
No non compliance reports were sent because the grab sample standard of 105mg/l was applied in error. The non compliances are outlined under.

2.1.5 Non-compliance

The non-compliances associated with agreed sampling of water effluent at Littleton are outlined in table under.

Date	Non-compliance	Cause	Corrective Action
10/02/05	Sample from Composite Sampler @ SW22 wk. end 01/02/05.	Not known 30/1/05 @ 99mg/l 3*samples > 35mg/l	Highest of next 7 = 6mg/l
10/03/05	Sample from Composite Sampler @ SW22 on 01/03/05 92mg/l	Not known	Highest of next 7 = 6mg/l
25/06/05	Sample from Composite Sampler @ SW22 on 9/06/05 – 56mg/l	Not known	Highest of next 7 = 8mg/l
16/12/05	Sample from Composite Sampler @ SW22 on 11/12/05 – 59mg/l	Not known	Highest of next 7 = 8mg/l

2.2 Emissions to Air Summary (see Appendix 5)

The boiler (B101) emissions of particulates were above the Emissions Limit Value on each of the two occasions when measures units were taken. This was disappointing especially after replacement of the grit arrester cells. Some alterations have now been carried out on the peat fuel feeding arrangement to the burners. This was done to even out the fuel flow and prevent puffing in the combustion. Some further alterations may be required later and we are studying the possibility of further milling the peat fuel supply.

Flow rates in the drier stacks (A101) and (A102) are again considerably higher then the limit values. We are now of the view that the limit value originally set may require to be reviewed.

We are now arranging to carry out dispersion modelling of air emissions from the factory to check particle concentration and deposition in the factory vicinity.

2.2.2 Dust Emissions (Dust Sensitive Locations)

The Dust Emissions are being monitored monthly as per proposal of 18th February 2002 on D.S.L.'s. The additional DSL agreed as a result of your audit was installed and sampled for the year.
The following table contains the monthly readings. In general, readings are below the emission limit value of 350 mg/m^2 /day.

Month	DSL 1	DSL 2	DSL 3	DSL 4
Jan 03	44	3	<3	28
Feb 03	45	45	36	136
Mar 03	50	17	666	67
Apr 03	258	90	69	39
May 03	99	40	73	79
Jun 03	46	20	364	166
Jul 03	178	997	77	184
Aug 03	34	103	62	28
Sep 03				
Oct 03	50	172	78	81
Nov 03	104	113	140	140
Dec 03	43	461	37	68

2.2.3 Non-compliance's

This covers non-compliance's resulting from the dust emissions.

Date	Non-compliance	Cause	Corrective Action
Mar 05	666 vs 350 @ DSL 3.	Pile loading 950m away bog wet. Factory in production but 1400m away.	No apparent cause. Potential sources a large distance away.
Jun 05	364 vs 350 @ DSL 3.	Very dry conditions for Bog Production. 40% target achieved.	At present very close to production fields. Move closer to boundary.
Jul 05	997 vs 350 @ DSL 2.	Factory on overhaul. Too close to machine Passway.	Move closer to boundary with closest houses.
Dec 05	461 vs 350 @ DSL 2.	Not known	

It is proposed to move DSL 2. and DSL 3. for the May test as outlined in our Proposal sent on 12/1/'05.

2.3 Waste Management Report

2.3.1 Hazardous Waste

BORD NA MÓNA
BORD NA MÓNA FUEL'S LIMITED

Waste Management Record (Hazardous)

Group : Littleton. IPC Licence No.: 499

WASTE DESCRIPTION	EWC CODE	TONNES	NAME OF CONTRACTOR	NAME OF PERSON ULTIMATELY RESPONSIBLE	DESTINATION	DATE
Waste Oil	13 01 01	6050l	Bord na Mona Atlas	Bord na Mona Atlas	Re-use Factory Clonminam, Ind.Est.,Portlaoise.	
Oil/Fuel Filters	16 01 07	960l	Atlas	Atlas		04/06/03
Lead Acid Batteries Nicad batteries	16 06 01	500kg 33kg	ReturnBatt Ltd.	ReturnBatt Ltd.	Unit 3, Kildare Enterprise Centre	25/2/05

DETAILS OF ANY REJECTED CONSIGNMENTS						
No rejected consignments						

2.3.2 Non-hazardous Waste

BORD NA MÓNA
BORD NA MÓNA FUELS LIMITED

Waste Management Record (Non-Hazardous)
Group : Littleton IPC Licence No.: 499

WASTE DESCRIPTION	EWC CODE	TONNES	NAME OF CONTRACTOR	NAME OF PERSON ULTIMATELY RESPONSIBLE	DESTINATION	DATE
Silt	01 01 02	1196	0N SITE	BORD NA MONA		ANNUAL
Peat Screenings	01 01 02	300	ON SITE	BORD NA MONA		ANNUAL
Polythene	02 01 04	26.52	RYAN BROS	. RYAN BROS	THURLES	ANNUAL
Peat Ash/Silt Factory.	10 01 03	945	ON SITE	BORD NA MONA		ANNUAL
Surface Shaping Waste	12 01 01 12 01 02 12 01 03 12 01 04 12 01 05	419.00	HEGARTY METAL RECYCLING, LIMERICK.	HEGARTY METAL	LIMERICK.	
Welding Wastes Scrap Metal	12 01 13 17 04 07	87.99	HAMMOND LANE METAL CO. LTD.	HAMMOND LANE METAL CO. LTD.	ATHLONE	ANNUAL
Packaging	15 01 01	4.28	SMURFIT KAPPA	SMURFIT KAPPA	DUBLIN.	ANNUAL
Wooden Pallets/Timber	15 01 02	87.99	MICHAEL FAHY	MICHAEL FAHY	LITTLETON	ANNUAL ANNUAL
Wiping Cloths	15 01 03					
General Office & Domestic Waste	15 02 01 20 01 00	416 cub.m	RYAN BROS.	RYAN BROS.	THURLES	ANNUAL

2.4 Noise Emissions

No measuring or reporting of noise was required.

2.5 Energy and Water Consumption

The usage of diesel and electricity in the Factory are to supplement the power supplied by Milled Peat. The Bog usage of both is to provide the Milled Peat for Briquetting. Derv is used for road transport service to Milled Peat operations.

Energy Source	MW Hours Consumed
Diesel - Factory	3,308
Diesel - Bog Machinery	6,841
Derv.	515
Electricity – Factory	146
Milled Peat	12,541
Total	23,351

2.7 Environmental Incidents & Complaints

There were two environmental complaint received during the year. Non- compliances are outlined separately.

Environmental Complaint	Number of Complaints
Complaints	2
Complaints requiring corrective action	0
Categories of Complaint	
Odour	0
Noise	0
Water	1
Air	1
Procedural	0
Miscellaneous	0

The water complaint was from silt pond outlet which became overgrown due mainly to nitrates. The silt pond and outlet were cleaned, pond less than 20% full.
The second complaint was due to fire smoke from a stock pile of milled peat which was dealt with immediately.

3.0 Management of the Activity Manageme of the Activity

3.1 Environmental Management Programme Report 2005

Environmental Management Report for 2005	
Project	
Project 1. Reduction of fugitive dust emissions.	**Training** Training took place with the front line production Team Leaders during 2004. Environmental dust issues were discussed at pre production meetings with Team Leaders.. **Hydraulic Harrows** Two hydraulic harrows were put into operation during 2005, for harrowing close to areas of potential dust sensitivity. **Headland Peat Collection** An Headland Harvester was delivered at end of season for the 2006 season. The ridgeing and collection of headland peat was operated at regular intervals during the season.
Project 2. Minimisation of Suspended Solids	Drainage and ditching operations continued as per procedures in order to minimise suspended solids. Pre silt pond drains were cleaned regularly.
Project 3. Effective spill/leak management of mobile fuelling tanks	Designated areas for fueling were nominated in each area having due regard to potential environmental hazards. Spill/leak management issues were discussed at pre production meetings with Team Leaders.
Project 4. Re-use of silt pond waste	This Project will be kept active should any opportunities for re-using silt pond waste arise.
Project 5. Collection, storage and re-use of polythene.	All polythene collected is stored on free draining gravel hills ready for transportation.
Project 6. Condition 2.2.2 (v) *Provision of measures to protect dust sensitive areas.*	There were no complaints due to dust at Littleton during 2005. Two hydraulic harrows were employed. The production procedures were followed at all times. Environmental dust issues were discussed at pre production meetings with Team Leaders.

3.1 Environmental Management Programme Proposal for 2006

Environmental Management Programme Proposal for 2006	
Project	
Project 1. Reduction of fugitive dust emissions.	**Training** Training plans for 2006 include showing the Cleaner Production video to all production operators. To emphasise its importance it will be introduced by our Environmental Engineer. The production procedures will be posted at Tea centres. **Headland Peat** Headlands will be ridged and collected at regular intervals to minimise dust blow. The Littleton headland harvester has been transferred to Mountdillon. To be replaced in 2007. **Hydraulic harrows** Two further hydraulic harrows are planned for Littleton during 2006.
Project 2. Minimisation of Suspended Solids	Inspections during 2005 primarily targeted teacentres, oil stores, workshops etc. It is proposed to carry out inspections at a number of production locations during 2006, looking at cleaner production, dust sensitive areas, pond maintenance etc. The results of these inspections will be reported to the General Manager and any corrective actions will be maintained on file.
Project 3. Effective spill/leak management of mobile fuelling tanks	These areas will also be inspected as part of the proposed inspections under Project 6 above. Compliance with Conditions 9.1.1 to 9.1.14 will be checked and any improvements and corrective actions will be documented and maintained on file. A 2000l bunded mobile bowser is planned for 2006.
Project 4. Re-use of silt pond waste	This Project will be kept active should any opportunities for re-using silt pond waste arise.
Project 5. Collection, storage and re-use of polythene.	An invitation to tender for the recycling of BNM's polythene was sent to a number of interested companies in 2005. Six companies expressed in interest, and are currently being assessed as to environmental compliance with permitting regulations, collection methods, waste records transfer etc. It is proposed to select one or two of these companies to contract the recycling of the BNM Polythene in 2006. The Polyrollers developed in BNM will be removing and wrapping the 2006 polythene in the coming months. This year will have a renewed emphasis on the reduction of peat and water contamination in the rolls.
Project 6. Condition 2.2.2 (v) *Provision of measures to protect dust sensitive areas.*	Two water tankers are planned to water down machine passes not suited for collection.

3.1 Pollution Emission Register

3.2 Environmental Expenditure

Description	Cost (€)
Capital Costs (Plant & Equipment)	17,496
Labour & Supervision	98,925
Materials & External Environmental Consultancy	54,455
Overheads (ESB, Phones, Consumables)	1,600
EPA Fees	11,495
Total	247,646

4.0 Licence Specific Reports

4.1 Surface Water Discharge Monitoring Location Programme Review

The programme has operated satisfactorily; it is proposed to continue at the same locations for 2006.

4.2 Bunding Programme

Condition 9.1.4. Two new bunding areas were completed in November 2004.

4.3 Particulate Emissions Minimisation Report

Report submitted in 2004.

4.4 Boiler Combustion Efficiency AB1

An efficiency test was carried out on Templetuohy Oil Fired Boiler 2005. Copy of test report is in Appendix 7.

4.5 Energy Report

The Energy Report was included in last AER.

4.6 Resource Consumption Summary

The Briquette Factory consumed 222,944 tonnes of milled peat and 2,371 of re-cycled product to produce 95,293 tonnes of briquettes.

4.7 Report on de-silting Programme

The upgrade programme for silt ponds was completed with the development of two trenches as ponds in Littleton area..
The silt pond cleaning programme is outlined in the spreadsheet attached as Appendix 6. The ponds were all cleaned as required by the inspections. The fact that 60 % of the ponds were cleaned only once is explained by their capacity being above the design capacity and pre-cleaning of open outfalls leading into the ponds.

4.8 Bog development and operational programme

No new bog has been developed for 2005. The production target has remained the same. Development work is in progress in Littleton to replace cutaway areas, this will not be complete until 2008.

4.9 Bog rehabilitation progress report

Approximately 90% of old sod bog and obsolete milled peat machinery was cut up and sent for recycling. This represented 419 tonnes. This work will continue during 2006 and in addition it is planned to collect old 30lbs line from old sod areas and either refurbish or recycle same.

5.0 Summary

The Environmental Management Programme has been implemented throughout the group, operating procedures have been put in place, and training has been provided for all personnel involved in compliance with the licence.

Bord na Mona Energy Ltd are represented on the Management Group of both the Shannon River and Eastern River Basin District Management Systems, set up under the Water Framework Directive, and on the Steering Group of the Catchment Management on the River Barrow.

Bord na Mona Fuels Ltd would like to take this opportunity to advise the Environmental Protection Agency of its continued commitment to improving its environmental performance by adopting cleaner production methods and improving its environmental protection measures.

Appendix 1

ENVIRONMENTAL

POLICY

STATEMENT

Littleton AER 2005

Chief Executive

BORD NA MÓNA

BORD NA MÓNA FUELS LIMITED

Document:	Q 1.4
Page:	1 of 1
Rev.:	0
Issued:	14/November 2000

ENVIRONMENTAL POLICY STATEMENT

Bord na Mona Fuels Limited operates in line with Bord na Mona plc group environmental policies. It is a registered member of Repak and promotes the efficient use of energy in its briqueting processes and operates under an Integrated Pollution Control (I.P.C.) licence at its Littleton works.

Bord na Mona plc is a commercial semi-state body with responsibility to develop Irelands peat resources in the national interest.

Bord na Mona Fuels Limited is committed to gather and make available information on all aspects of its environmental impact and to help improve understanding among the public generally of its role and of the importance of Irish peatlands.

Bord na Mona Fuels Limited recognises the importance of peatland conservation and has a conservation policy statement.

Bord na Mona Fuels Limited will leave behind all areas it owns as either an economically or socially integrated resource of high environmental value.

Bord na Mona Fuels Limited seeks to conduct all aspects of its business in an environmentally sensitive manner.

Bord na Mona Fuels Limited will establish an environmental management system specifically addressing the following impacts:

- Discharges to water
- Emissions to atmosphere
- Waste disposal
- Use of natural resources
- Noise, vibration, odour, dust and visual effects
- Natural environmental and Eco-system

The environmental management system will be monitored, maintained and continually improved. A system of regular environmental audits will be put in place.

Bord na Mona Fuels Limited as part of the group, will continue research and development (R&D) into all aspects of its environmental impact.

This statement is published and is available at all locations within the company and its contents are brought to the attention of all employees.

Appendix 2

ENVIRONMENTAL

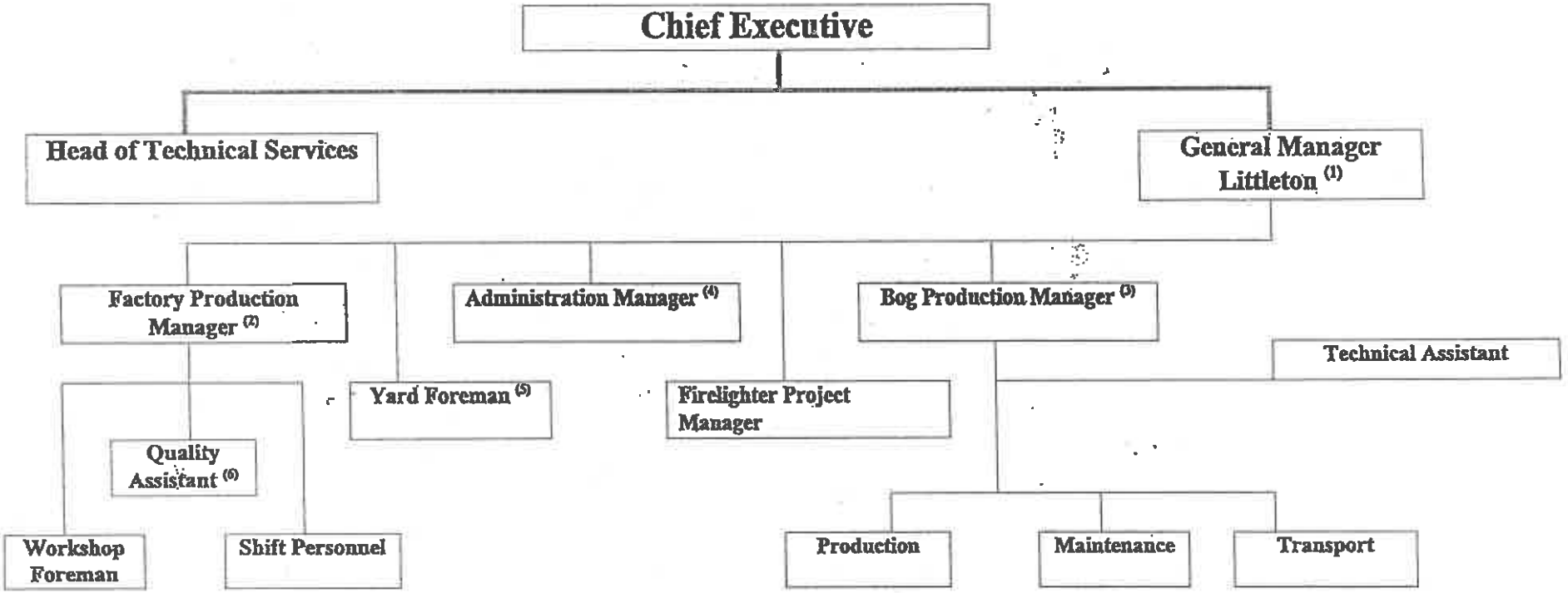
MANAGEMENT

STRUCTURE

Littleton AER 2005

Bord na Móna Fuels Limited

Environmental Responsibilities



(1) - Overall Environmental Responsibility
(2) - Factory Process production and maintenance include. settling ponds, effluent, emissions
(3) - Bog production, maintenance and transport activities, include silt ponds, tea centres, polythene etc.
(4) - Administration include sales, payroll, stores
(5) - Yard sales, include cleaning, recycling, disposal
(6) - Factory chemicals, effluent readings, water readings, process checks

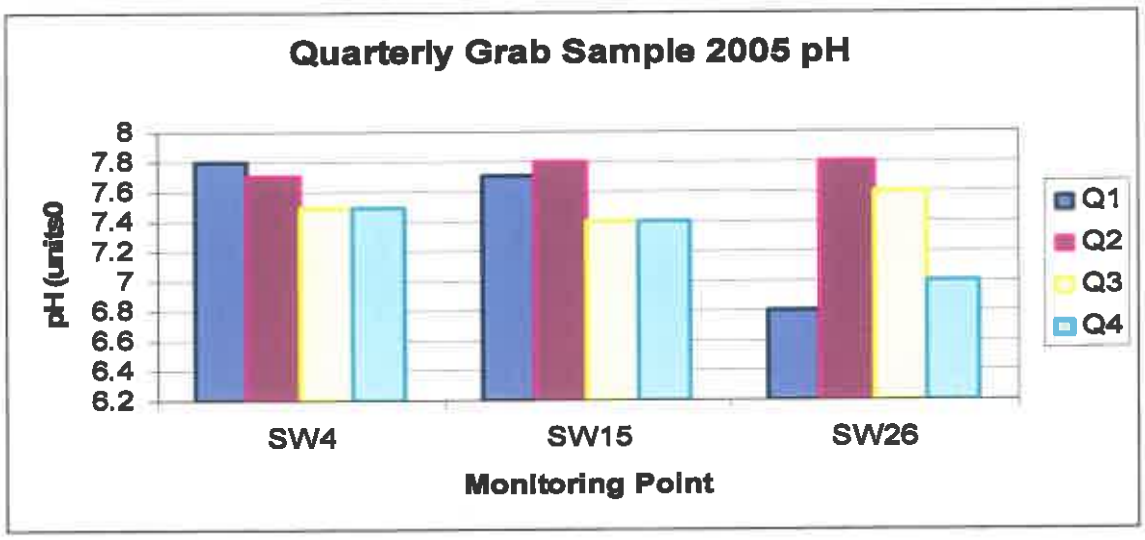
Appendix 3

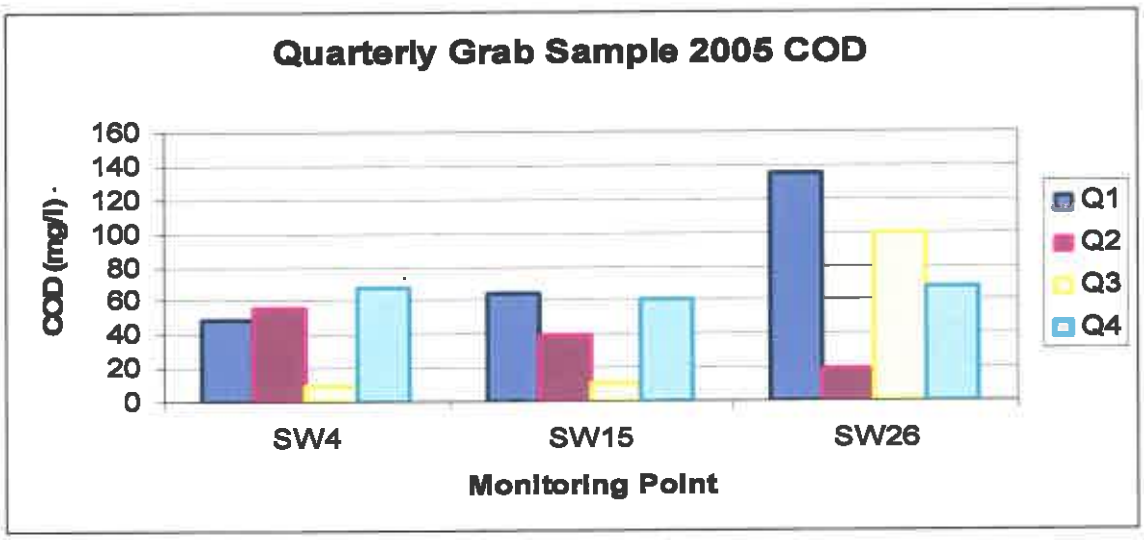
GRAB SAMPLES

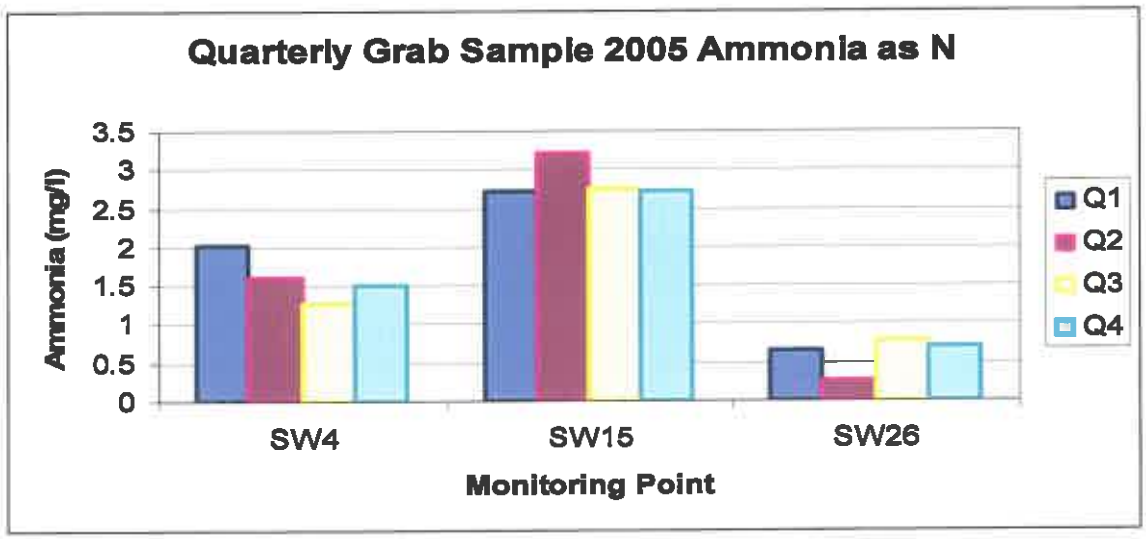
DISCHARGE

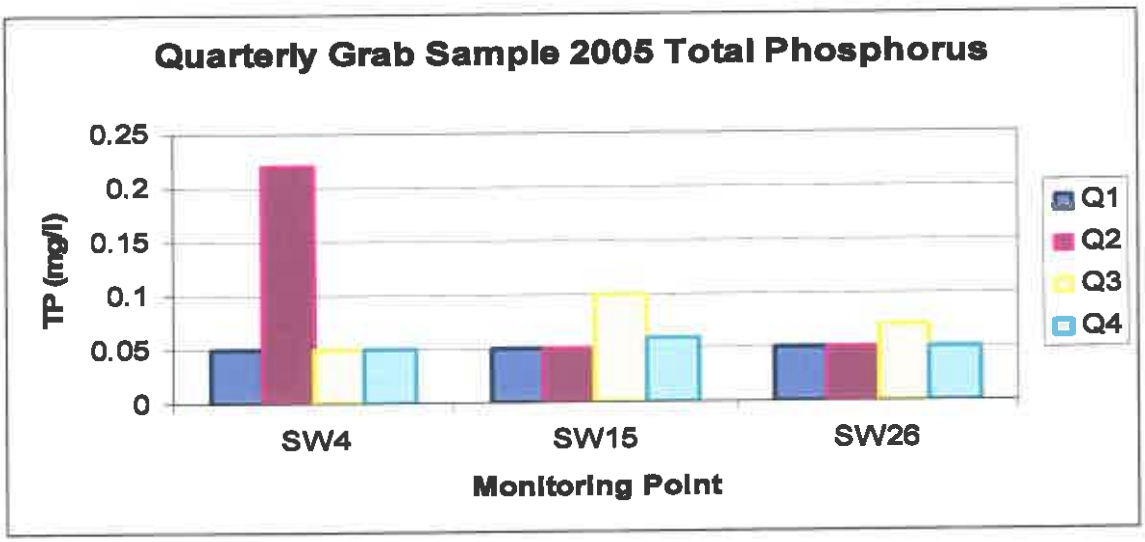
RESULTS

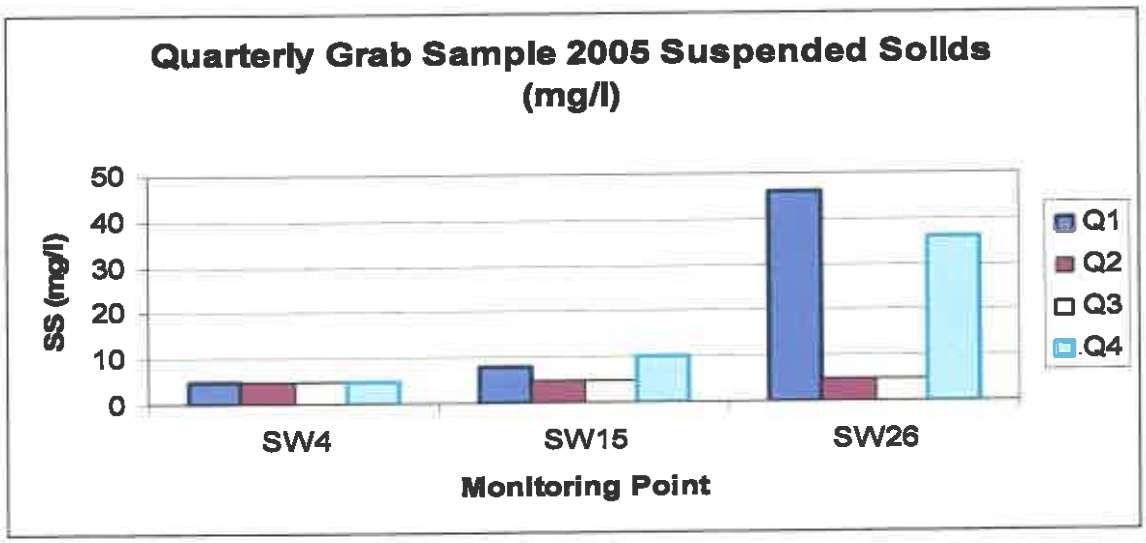
Littleton AER 2005

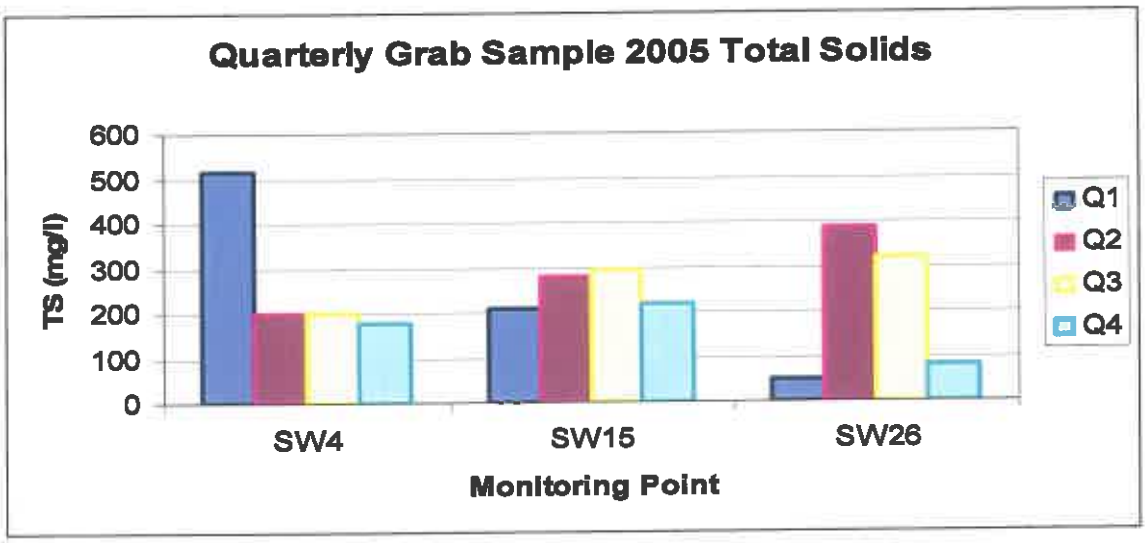

Quarterly Grab Sample 2005 pH
pH (units0
8
7.8
7.6
7.4
7.2
7
6.8
6.6
6.4
6.2
SW4
SW15
SW26
Monitoring Point
Q1
Q2
Q3
Q4

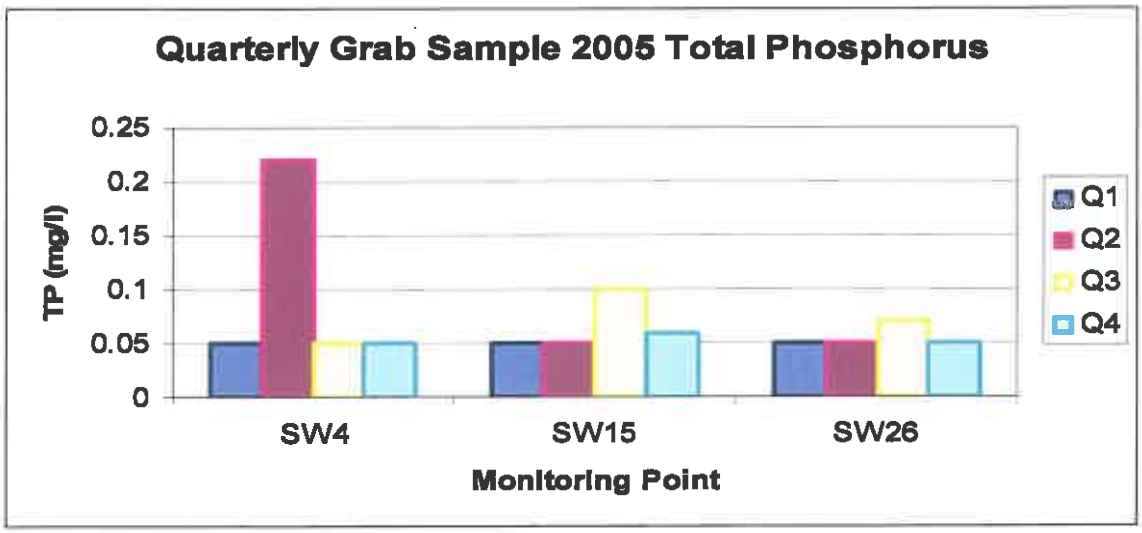

Quarterly Grab Sample 2005 COD
COD (mg/l)
160
140
120
100
80
60
40
20
0
SW4
SW15
SW26
Monitoring Point
Q1
Q2
Q3
Q4

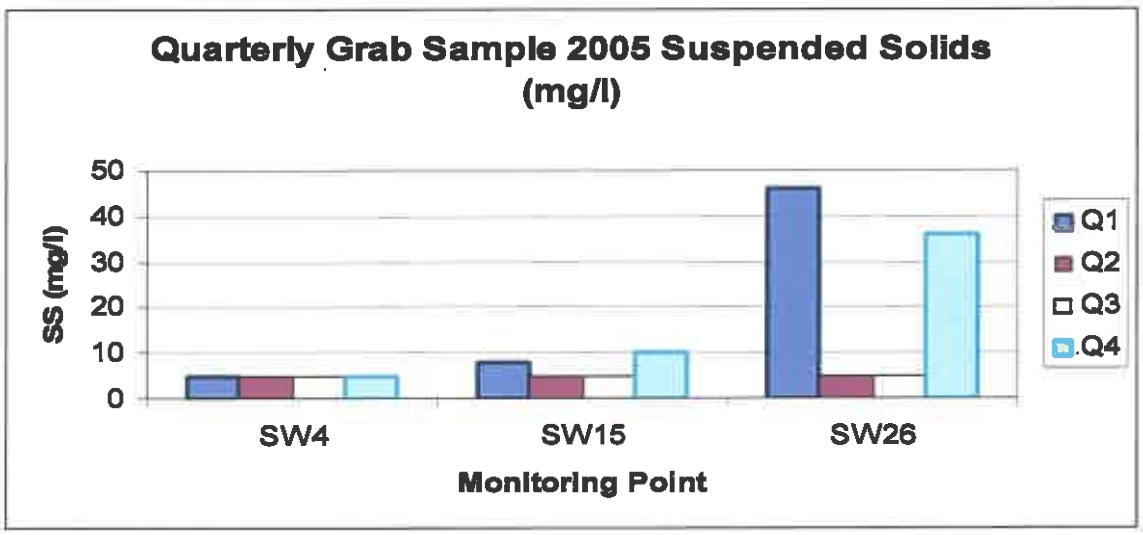

Quarterly Grab Sample 2005 Ammonia as N
Ammonia (mg/l)
3.5
3
2.5
2
1.5
1
0.5
0
SW4
SW15
SW26
Monitoring Point
Q1
Q2
Q3
Q4

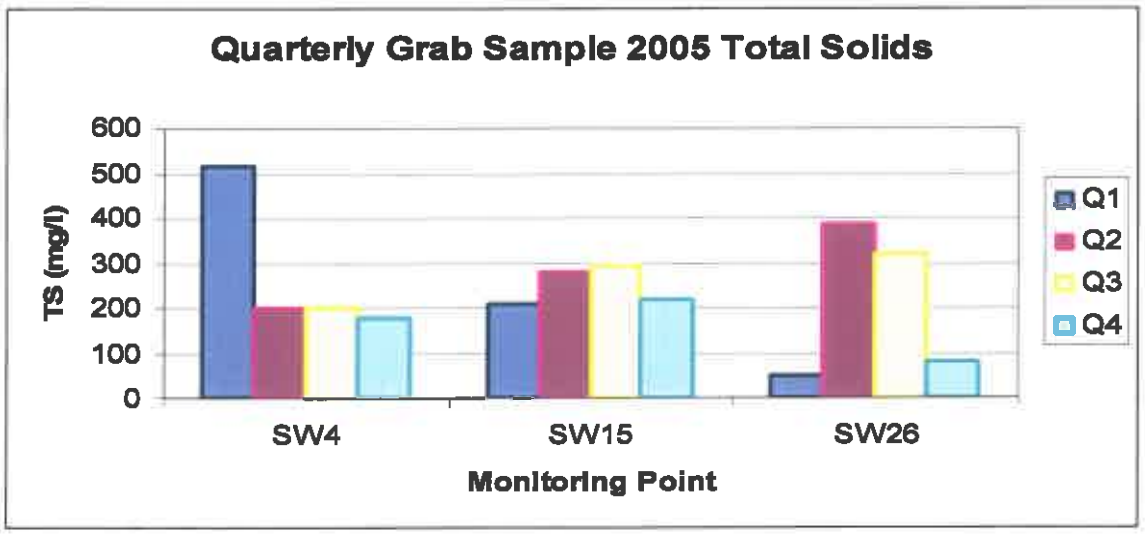

Quarterly Grab Sample 2005 Total Phosphorus
TP (mg/l)
0.25
0.2
0.15
0.1
0.05
0
SW4
SW15
SW26
Monitoring Point
Q1
Q2
Q3
Q4

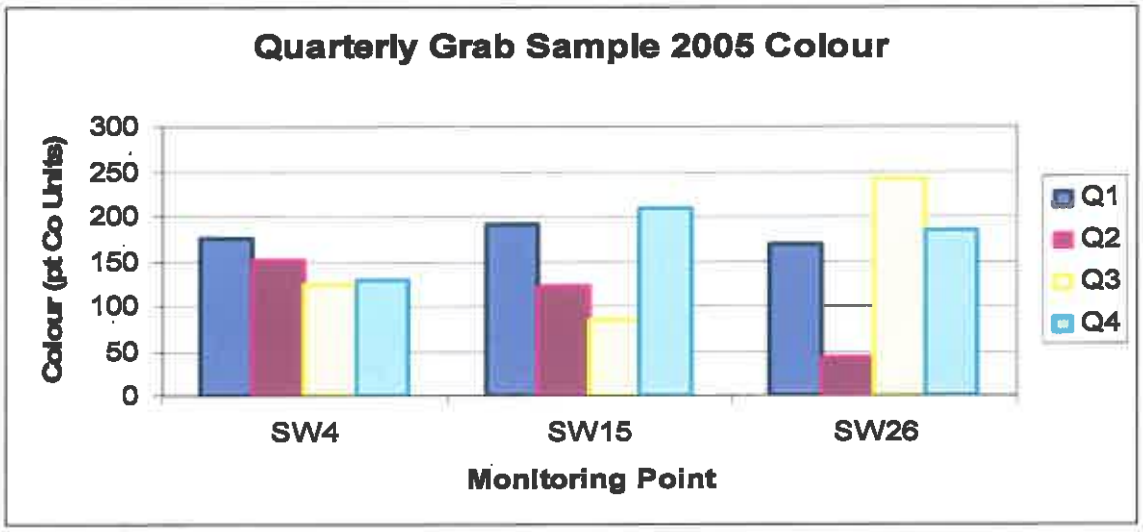

Quarterly Grab Sample 2005 Suspended Solids (mg/l)
SS (mg/l)
50
40
30
20
10
0
SW4
SW15
SW26
Monitoring Point
Q1
Q2
Q3
Q4

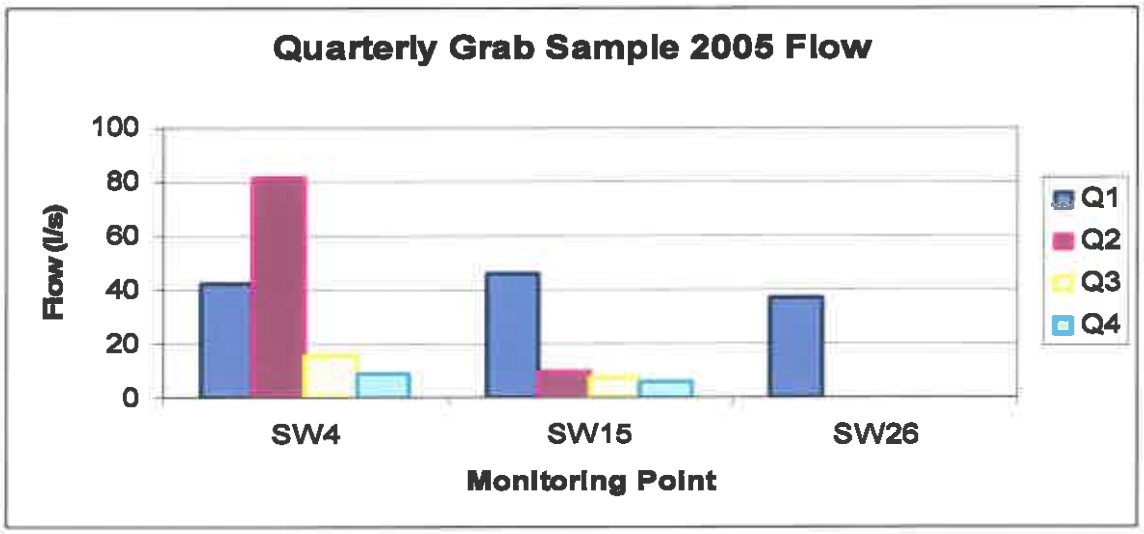

Quarterly Grab Sample 2005 Total Solids
TS (mg/l)
600
500
400
300
200
100
0
SW4
SW15
SW26
Monitoring Point
Q1
Q2
Q3
Q4


Quarterly Grab Sample 2005 Total Phosphorus
TP (mg/l)
0.25
0.2
0.15
0.1
0.05
0
SW4
SW15
SW26
Monitoring Point
Q1
Q2
Q3
Q4


Quarterly Grab Sample 2005 Suspended Solids (mg/l)
SS (mg/l)
50
40
30
20
10
0
SW4
SW15
SW26
Monitoring Point
Q1
Q2
Q3
Q4


Quarterly Grab Sample 2005 Total Solids
TS (mg/l)
600
500
400
300
200
100
0
SW4
SW15
SW26
Monitoring Point
Q1
Q2
Q3
Q4


Quarterly Grab Sample 2005 Colour
Colour (pt Co Units)
300
250
200
150
100
50
0
SW4
SW15
SW26
Monitoring Point
Q1
Q2
Q3
Q4


Quarterly Grab Sample 2005 Flow
Flow (l/s)
100
80
60
40
20
0
SW4
SW15
SW26
Monitoring Point
Q1
Q2
Q3
Q4

Appendix 4

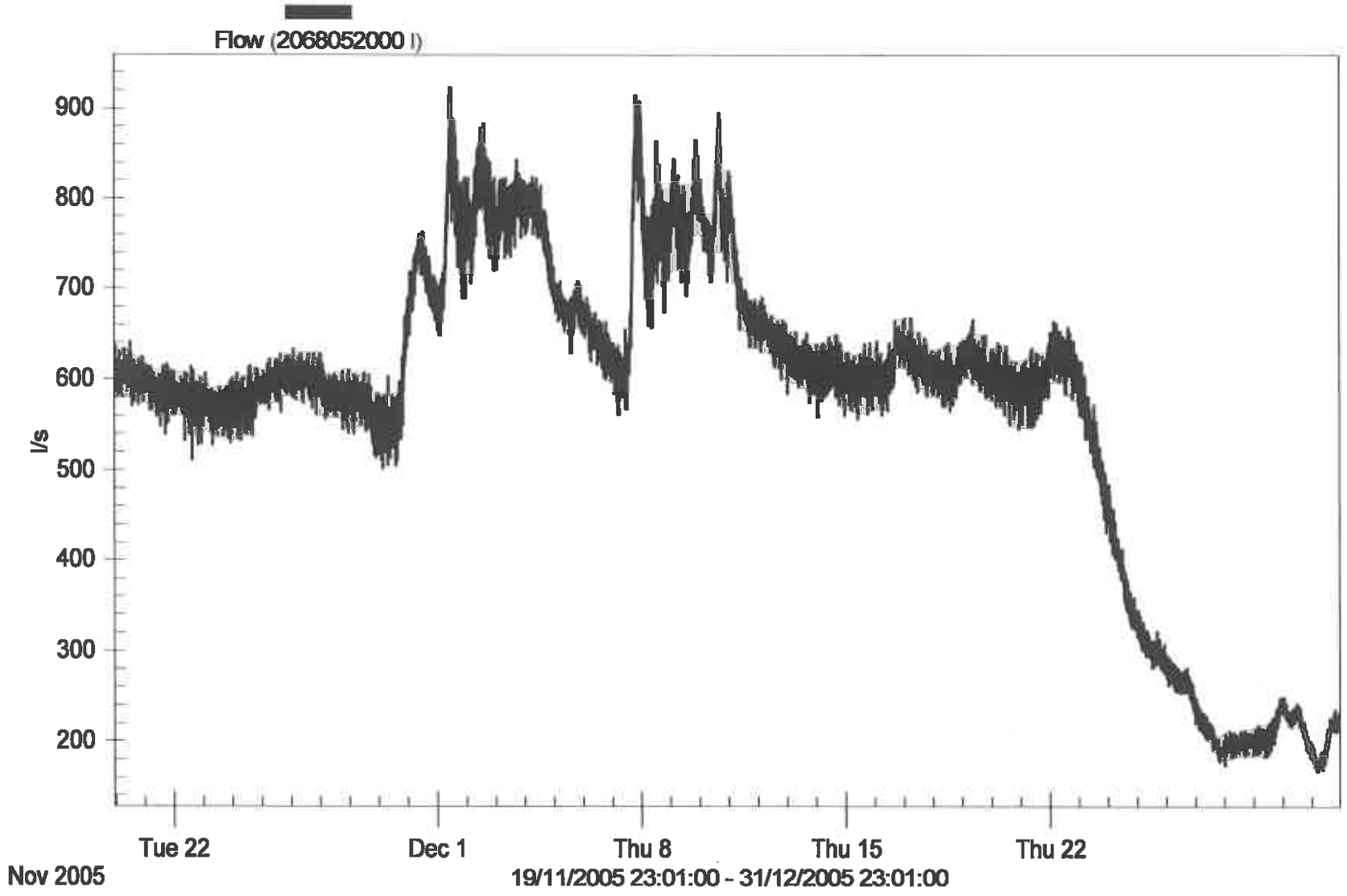
COMPOSITE

SAMPLER

Littleton AER 2005

Littleton Composite Flow Rates 2005

Flowlink 4 for Windows



Appendix 5

EMMISSIONS

TO

AIR

Littleton AER 2005

Summary Results of Emissions to Atmosphere compliance monitoring from the Bord na Móna Fuels Limited Littleton Briquette Factory at Littleton (January 2004 to December 2004) in accordance with the requirements of Integrated Pollution Control Licence Register No. 499.

Report No.: ECS1936

Attention: Mr. Ray Yates
Production Manager
Bord na Móna Fuels Limited
c/o Littleton Briquette Factory
Thurles
Co. Tipperary

Prepared by: Mr. Bryan Tobin
Environmental Scientist

Reviewed by: Mr. Sean Creedon
Environmental Consultant

Date: April 2006

Executive Summary

As part of the requirements of Integrated Pollution Control Licence, Register No. 499, Bord na Móna Fuels Limited are required to submit to the Agency, an Annual Environmental Report (AER). Bord na Móna Environmental Limited were commissioned to prepare a summary report of emissions to atmosphere monitored at the Littleton Briquette Factory from the period to January 2005 to December 2005.

This report is certified as accurate and representative of the sampling and associated analysis carried out.

Respectively submitted,

Mr Bryan Tobin
Environmental Scientist

Mr Sean Creedon
Environmental Consultant

1.0 INTRODUCTION

A summary of IPC Licence Register No. 499 environmental monitoring results from the period January 2005 to December 2005 are presented as follows:

Table 1: Quarterly Compliance Monitoring of Particulate Emissions to Atmosphere

Table 2: Summary of Quarterly Compliance Monitoring of Particulate Mass Emissions to Atmosphere

Table 3: IPC Licence Particulate Emissions to Atmosphere Emission Limit Values (ELV's)

Table 4: Annual Particulate Mass Emissions to Atmosphere

Table 5: Quarterly Compliance Monitoring of TOC (as C) Emissions to Atmosphere from Emission Point A108

Table 6: Annual TOC (as C) Emissions to Atmosphere from Emission Point A108

Table 7: Annual Compliance Monitoring of NOx (as NO_2) Emissions to Atmosphere from Emission Point B101

Table 8: Annual NOx (as NO_2) Emissions to Atmosphere from Emission Point B101

Table 9: Annual Compliance Monitoring of SO_2 Emissions to Atmosphere from Emission Point B101

Table 10 Annual SO_2 Emissions to Atmosphere from Emission Point B101

Appendix 1

Figures 1-6: Particulate Mass Emissions to Atmosphere (kg) (January 2005 to December 2005) vs. Licence ELV from Emissions Reference Points B101, A101-A105 respectively.

Figure 7: Summary of Particulate Mass Emissions to Atmosphere (kg) (January 2005 to December 2005) from Emissions Reference Points B101, A101-A106.

Note

Figures in bold represent sample results for specific parameters that exceed IPC Licence Emission Limit Values (ELV's).

TABLE 1: QUARTERLY COMPLIANCE MONITORING OF PARTICULATE EMISSIONS TO ATMOSPHERE (JANUARY – DECEMBER 2005)						
Quarter	**Sampling Date**	**Job No.**	**Emission Point Ref.**	**Volumetric Flow (Nm^3/hr)**	**Particulates (mg/Nm^3)**	**Particulate Mass Emissions (kg/hr)**
1	15+29 Mar	ECS1415-A	B101	**40,581**	**1,669**	68
			A101	**88,050**	3.3	0.5
			A102	**51,765**	**140**	7.2
			A103	4,816	1,830	**8.8**
			A104	**11,940**	579	**6.9**
			A105	**8,912**	41	0.4
			A106	Note 1	Note 1	Note 1
2	-	-	Note 5	Note 5	Note 5	Note 5
3	27+28 Sept	ECS1648-A	B101	**41,368**	**1086**	44.9
			A101	**87,649**	**70**	6.1
			A102	**113,018**	**146**	13.3
			A103	**7,058**	176	1.2
			A104	**12,110**	1,062	**13.9**
			A105	**10,209**	2.2	0.02
			A106	Note 1	Note 1	Note 1
4	30 Nov	ECS1774-A	B101	Note 6	Note 6	Note 6
			A101	Note 6	Note 6	Note 6
			A102	**93,774**	**194**	18.2
			A103	**6,132**	175	1.1
			A104	**13,931**	998	**13.9**
			A105	**10,726**	29.7	0.3
			A106	Note 1	Note 1	Note 1

Note 1 Process servicing emission reference point was not operational during monitoring events.

Note 2 Not possible to monitor due to excessively high moisture and particulate matter

Note 3 Not possible to monitor due to blockage of sampling probe by particulate matter emission

Note 4 Sampling carried over to the following year

Note 5 The plant was non operation during the second quarter.

Note 6 Plant was non operational during the time of monitoring

TABLE 2: SUMMARY OF QUARTERLY COMPLIANCE MONITORING OF PARTICULATE MASS EMISSIONS TO ATMOSPHERE (JANUARY – DECEMBER 2005)				
Emission Point Ref.	**Particulate Mass Emissions during each Quarterly Monitoring Event (kg/hr)**			
	1	**2**	**3**	**4**
B101	68	Note 5	44.9	Note 6
A101	0.5	Note 5	6.1	Note 6
A102	7.2	Note 5	13.3	18.2
A103	**8.8**	Note 5	1.2	1.1
A104	**6.9**	Note 5	**13.9**	**13.9**
A105	0.4	Note 5	0.02	0.3
A106	Note 1	Note 5	Note 1	Note 1

Note 1 Process serving emission reference point was not operational during monitoring events.

Note 2 Not possible to monitor due to excessively high moisture and particulate matter

Note 3 Not possible to monitor due to blockage of sampling probe by particulate matter emission

Note 4 Sampling carried over to the following year

Note 5 The plant was non operation during the second quarter of monitoring.

Note 6 Plant was non operational during the time of monitoring

TABLE 3: IPC LICENCE PARTICULATE EMISSIONS TO ATMOSPHERE EMISSION LIMIT VALUES (ELV's)				
Emission Point Ref.	**Maximum Volumetric Flow (Nm^3/hr)**	**Particulate ELV (mg/Nm^3 or kg/hr)**	**Particulate ELV (kg/hr)**	***Licensed Annual Particulate Mass Emissions (kg/yr)***
B101	36000	400 mg/Nm^3	14.4	*126144*
A101	34852	50 mg/Nm^3 >0.5kg/hr 150 mg/Nm^3 <0.5kg/hr	5.23 max.	*15265* *45796 max.*
A102	42400	50 mg/Nm^3 >0.5kg/hr 150 mg/Nm^3 <0.5kg/hr	6.36 max.	*18571* *55714 max.*
A103	5800	7 kg/hr	7	*61320*
A104	11700	6 kg/hr	6	*52560*
A105	6797	50 mg/Nm^3 >0.5kg/hr 150 mg/Nm^3 <0.5kg/hr	1.02 max.	*2977* *8931 max.*
A106	660	50 mg/Nm^3 >0.5kg/hr 150 mg/Nm^3 <0.5kg/hr	0.10 max.	*289.1* *867 max.*
Maximum Annual Particulates Mass Emissions to Atmosphere Limit			-	*351332*

TABLE 4: ANNUAL PARTICULATE MASS EMISSIONS TO ATMOSPHERE (JANUARY – DECEMBER 2005)				
Location	**Annual Average Mass Emission (kg/hr)**	**Hours Production**	**Annual Particulate Mass Emissions (kg/year)**	***Licensed Annual Particulate Mass Emissions (kg/yr)***
B101	56.5	4624	261256	*126144*
A101	3.3	4624	15259.2	*45796 max.*
A102	12.9	4624	59649.6	*55714 max.*
A103	3.7	4624	17108.8	*61320*
A104	11.6	4624	53638.4	*52560*
A105	0.24	4624	1109.8	*8931 max.*
A106	Note 1	4624	Note 1	*867 max.*
Particulate Mass Emissions to Atmosphere			245376.8	*351332*

Note 1 Process serving emission reference point was not operational during monitoring events.

TABLE 5: QUARTERLY COMPLIANCE MONITORING OF TOC (AS C) EMISSIONS TO ATMOSPHERE FROM EMISSION POINT A108 (JANUARY – DECEMBER 2005)					
Quarter	**Sampling Date**	**Job No.**	**Volumetric Flow (Nm^3/hr)**	**TOC (as C) Note 1 (mg/Nm^3)**	**TOC (as C) Mass Emissions (kg/hr)**
1	15+29 Mar	ECS1415-A	1,516	95	0.15
2	Note 1	Note 1	Note 1	Note 1	Note 1
3	27+28/9/05	ECS1648-A	1,232	47	0.06
4	30/11/05	ECS1774 -A	Note 2	Note 2	Note 2
IPC Licence ELV's			*6700*	*170*	*1.14*

Note 1 The plant was non operation during the second quarter.

Note 2 Plant was non operational during the time of monitoring

TABLE 6: ANNUAL TOC (as C) MASS EMISSIONS FROM A108 (JANUARY – DECEMBER 2005)			
Annual Average Mass Emission (kg/hr)	**Hours Production** Note 1	**Annual Mass Emissions (kg/year)**	***Annual Mass Emissions IPC Licence ELV (kg/year)***
0.11	1317	144.9	*9978*

Note 1 Operational hours of the Firelighter plant

TABLE 7: ANNUAL COMPLIANCE MONITORING OF NO_x (as NO_2) EMISSIONS TO ATMOSPHERE FROM EMISSION POINT B101 (JANUARY – DECEMBER 2005)					
Annual	**Sampling Date**	**Job No.**	**Volumetric Flow (Nm^3/hr)**	**NOx (as NO_2) (mg/Nm^3)**	**NOx (as NO_2) Mass Emissions (kg/hr)**
	29/03/05	ECS1415	**40,581**	**492**	20.0
IPC Licence ELV's			*36000*	*100*	*3.6*

TABLE 8: ANNUAL NOx (as NO_2) MASS EMISSIONS FROM B101 (JANUARY – DECEMBER 2005)			
Annual Average Mass Emission (kg/hr) Note 1	**Hours Production**	**Annual Mass Emissions (kg/year)**	***Annual Mass Emissions IPC Licence ELV (kg/year)***
20.0	4624	92,480	*31,536*

Note 1 Based on results from one monitoring event

TABLE 9: ANNUAL COMPLIANCE MONITORING OF SO_2 EMISSIONS TO ATMOSPHERE FROM EMISSION POINT B101 (JANUARY – DECEMBER 2005)					
Annual	**Sampling Date**	**Job No.**	**Volumetric Flow (Nm^3/hr)**	**SO_2 (mg/Nm^3)**	**SO_2 Mass Emissions (kg/hr)**
	21/09/04	ECS1098	**40,581**	506	20.5
IPC Licence ELV's			*36000*	*1000*	*36*

TABLE 10: ANNUAL MASS SO_2 EMISSIONS FROM B101 (JANUARY – DECEMBER 2005)			
Annual Average Mass Emission (kg/hr) Note 1	**Hours Production**	**Annual Mass Emissions (kg/year)**	***Annual Mass Emissions IPC Licence ELV (kg/year)***
20.5	4624	94,792	*315,360*

Note 1 Based on results from one monitoring event

APPENDIX 1

Figure 1: Particulate Mass Emissions to Atmosphere (kg/hr) (January to December 2005) vs. Licence ELV from Emissions Reference Point B101 – Data point 5 is the average yearly emission

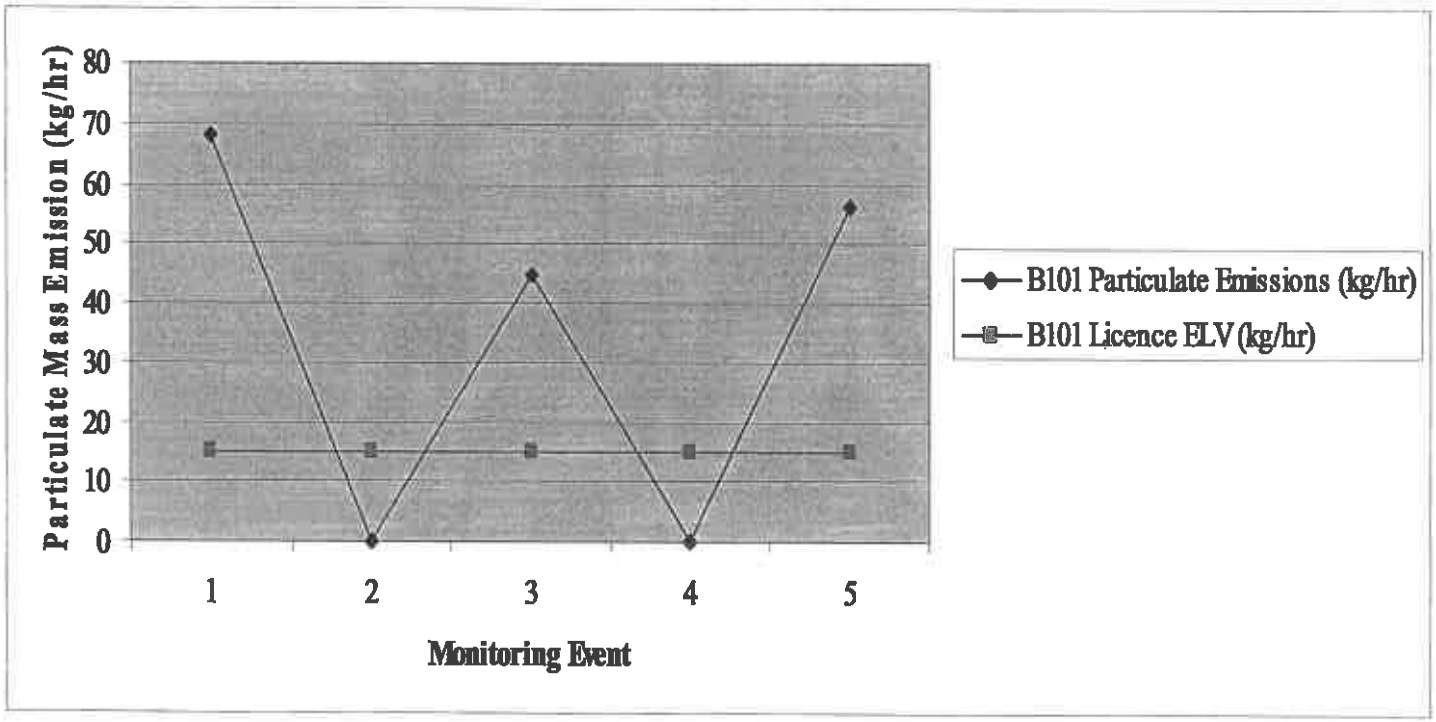


Figure 2: Particulate Mass Emissions to Atmosphere (kg/hr) (to December 2004) vs. Licence ELV from Emissions Reference Point A101– Data point 5 is the average yearly emission

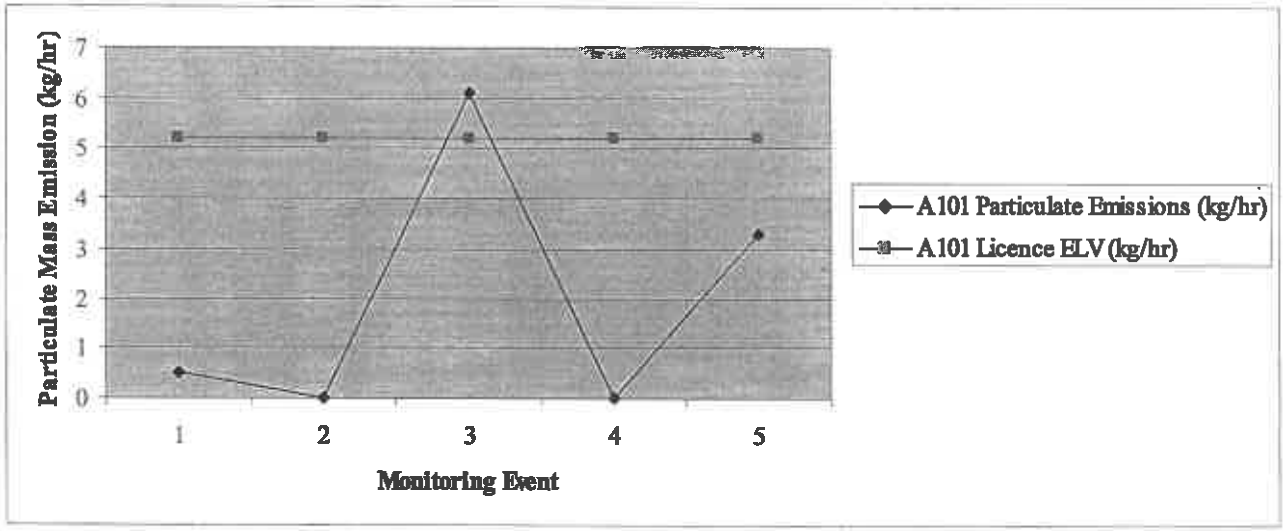


Figure 3: Particulate Mass Emissions to Atmosphere (kg/hr) (January to December 2004) vs. Licence ELV from Emissions Reference Point A102– Data point 5 is the average yearly emission

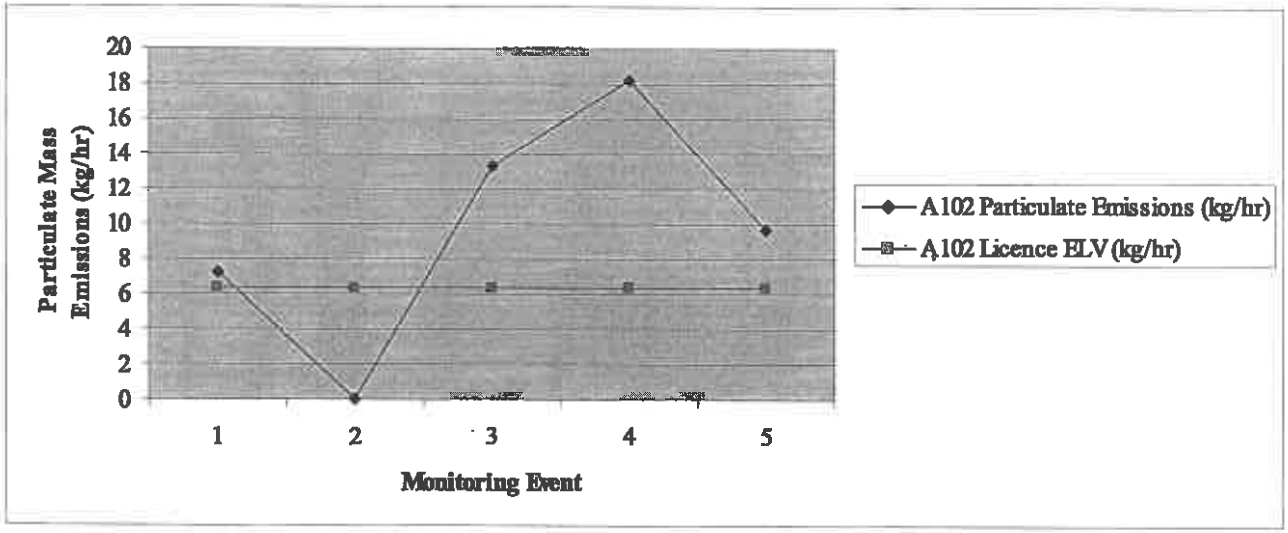


Figure 4: Particulate Mass Emissions to Atmosphere (kg/hr) (January to December 2004) vs. Licence ELV from Emissions Reference Point A103– Data point 5 is the average yearly emission

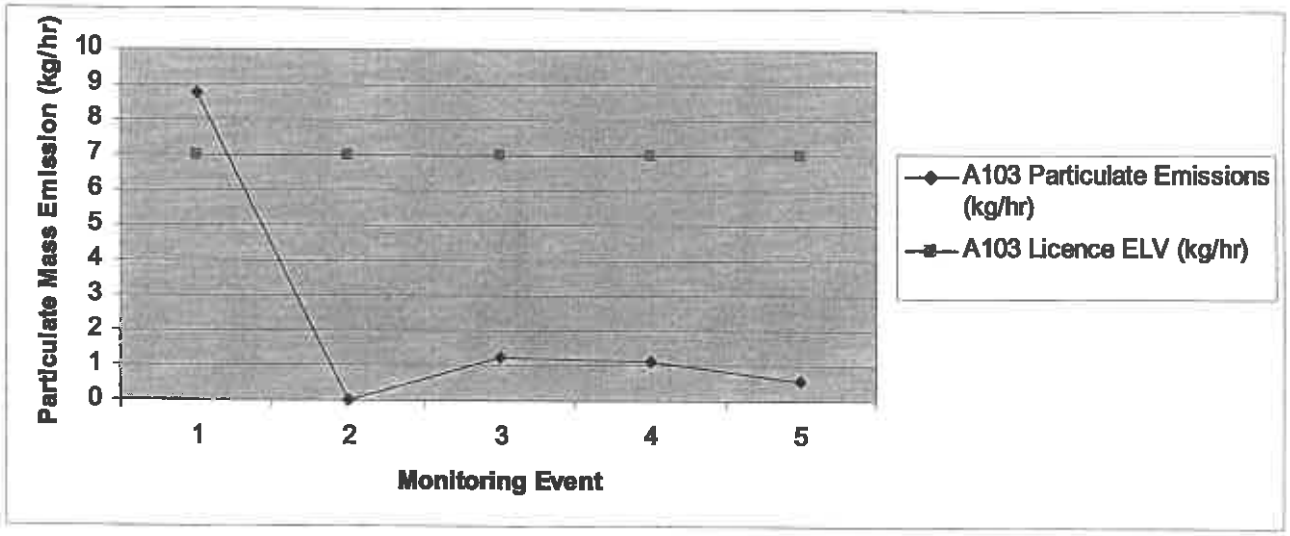


Figure 5: Particulate Mass Emissions to Atmosphere (kg/hr) (January to December 2004) vs. Licence ELV from Emissions Reference Point A104– Data point 5 is the average yearly emission

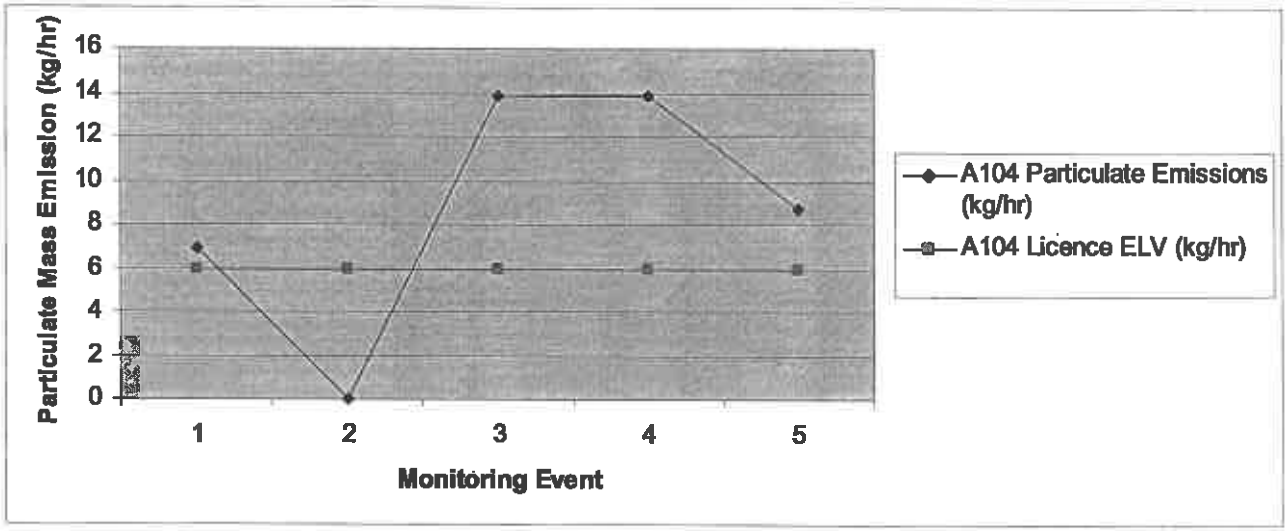


Figure 6: Particulate Mass Emissions to Atmosphere (kg/hr) (January to December 2004) vs. Licence ELV from Emissions Reference Point A105– Data point 5 is the average yearly emission

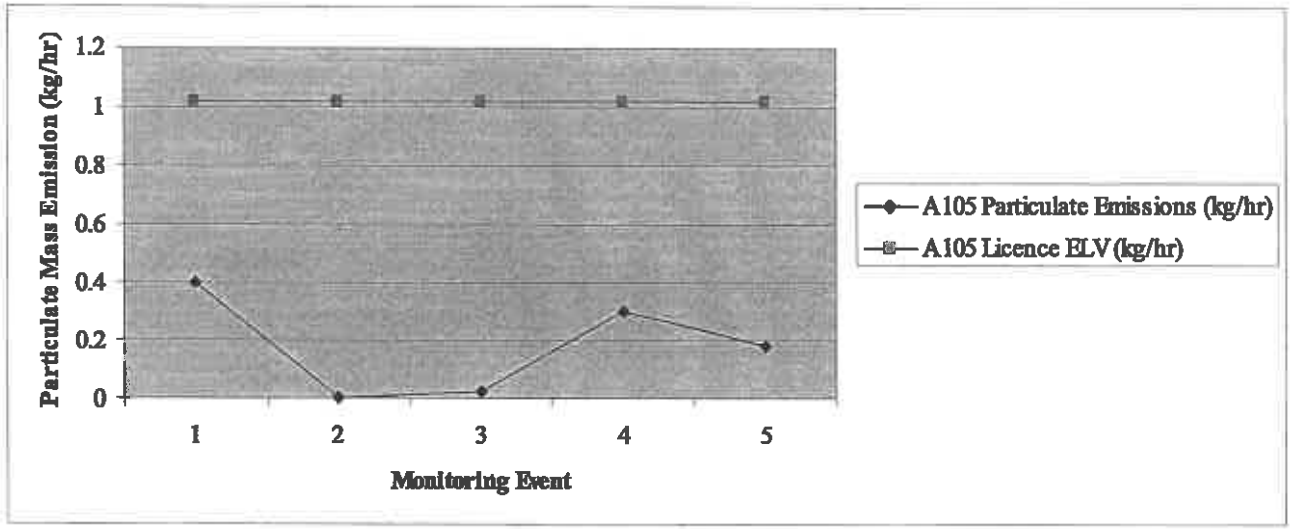
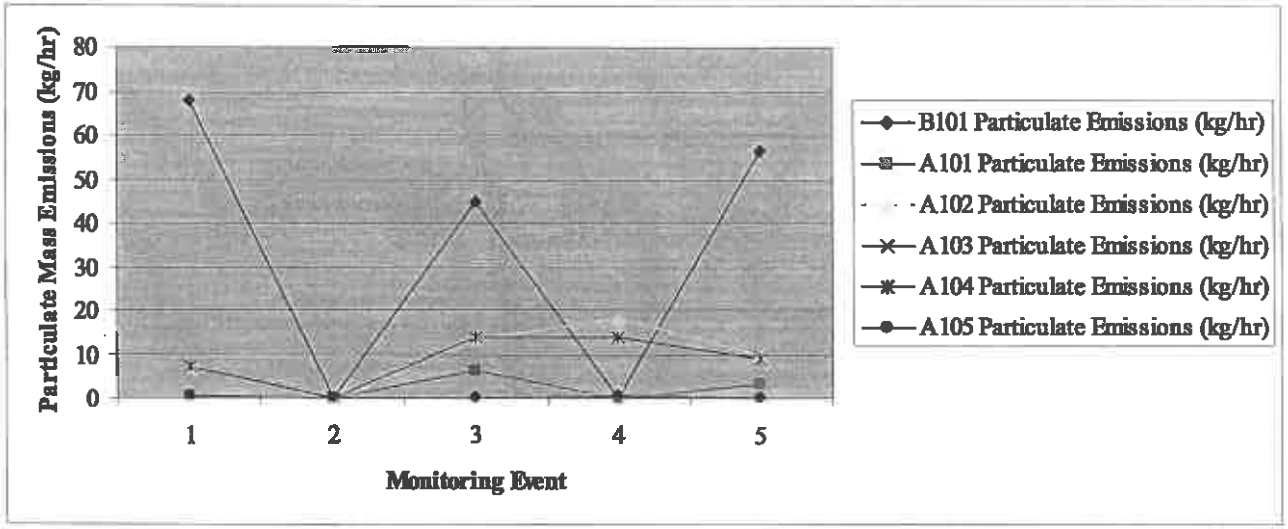


Figure 7: Summary of Particulate Mass Emissions to Atmosphere (kg/hr) (January to December 2004) from Emissions Reference Points B101, A101-A105– Data point 5 is the average yearly emission



Appendix 6

SILT POND

CLEANING RECORD

Littleton AER 2005

I.P.C. LICENSE 499, LITTLETON GROUP, SILT - POND FORTNIGHTLY INSPECTION ANNUAL LOG. 2005

SILT POND	EMISSION PT. REF.	LAST '02 CLEANED	JAN 1	2	FEB 3	4	MAR. 5	6	APR. 7	8	MAY 9	10	JUN. 11	12	JUL. 13	14	AUG. 15	16	SEP. 17	18	OCT. 19	20	NOV. 21	22	DEC. 23	24	25	26
KN1	SW1	FT 20	0	0	0	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/2	1/2	1/2	1/2	1/2		0	0	0	1/4	
KN2	SW2	FT 19	0	0	0	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/2		0	0	0	0	0	0	
KN3	SW3	FT 23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1/4	1/4	1/4	1/4	1/4	0	0	0	0	0	
KN4	SW4	FT 19	1/4	1/4		0	0	0	0	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2		0	1/4	
KN5	SW5	FT 19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4		
KN6	SW6	FT 3	1/4	1/4		1/4	1/4	1/4	1/4	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2		0	0	1/4	
KN7	SW7	FT 13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1/4	1/4	1/4	1/4	1/4	1/4	1/4		
KN8	SW8	FT 23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1/4	1/4	1/4	1/4	1/4		0	0	0	0	
KN9	SW9	FT 13	0	0	0	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4		
LK10	SW10	FT 13	0	0	0	0	0	0	0	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4		
BG11	SW11	FT 12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	1/4	
BG12	SW12	FT 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1/4	1/4	1/4	1/4	1/4	1/4		
BG13	SW13	FT 11	1/4	1/4		0	0	0	0	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	
LK14	SW14		0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0		
LK15	SW15	FT 19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1/4	1/4	1/4	1/4	1/4	1/4	1/4		
LK16	SW16	FT 21	1/4	1/4		1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4		
LT34	TRENCH 6	FT 24	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		
LT35	TRENCH 1	FT 23			0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0		
LS29		F15	1/4	1/4	1/4	1/4	1/4		0	0	1/4	1/2	1/2	1/2		0	0	0	0	0	0	0	0	0	0	0	0	1/4
LS17	SW17	not in use	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
LS18	SW18	FT 3	0	1/4	1/4		0	0	0	0	1/4	1/2	1/2		0	0	0	0	0	0	0	0	0	0	0	0	0	1/4
IE19	SW19	FT 12	1/4	1/4	1/4	1/4	1/4		0	0	1/4	1/2	1/2	1/2		0	0	0	0	0	0	0	0	0	0	0	0	1/4
BE20	SW20	FT 8	1/4	1/4	1/4		0	0	0	0	1/4	1/2	1/2	1/2		0	0	0	0	0	0	0	0	0	0	0	0	1/4
BE21	SW21	FT 24	1/4	1/4	1/4	1/4	1/4		0	0	1/4	1/2	1/2		0	0	0	0	0	0	0	0	0	0	0	0	0	1/4
DE22	SW22	FT 9	0	0	1/4	1/4	1/4		0	0	1/4	1/2	1/2	1/2		0	0	0	0	0	0	0	0	0	0	0	0	1/4
BE23	SW23	FT 6	1/4	1/4	1/4		0	0	0	0	1/4	1/2	1/2		0	0	0	0	0	0	0	0	0	0	0	0	0	1/4
DE24	SW24	FT 5	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/2	1/2	1/2		0	0	0	0	0	0	0	0	0	0	0	0	1/4
CL25	SW25	FT 24	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/2	1/2	1/2		0	0	0	0	0	0	0	0	0	0	0	0	1/4
CL26	SW26	FT 3	0	0	0	1/4	1/4	1/4	1/4	1/4	1/4	1/2	1/2	1/2		0	0	0	0	0	0	0	0	0	0	0	0	1/4
BL27	SW27	16/09/2004	0	0	0	1/4	1/4	1/4	1/4	1/4	1/4	1/2	1/2	1/2		0	0	0	0	0	0	0	0	0	0	0	0	1/4
BL28	SW28	16/09/2004	0	0	0	1/4	1/4	1/4	1/4	1/4	1/4	1/2	1/2	1/2		0	0	0	0	0	0	0	0	0	0	0	0	1/4
TY29		FT24	0	1/4	1/4	1/4	1/4		0	0	1/4	1/2	1/2	1/2		0	0	0	0	0	0	0	0	0	0	0	0	1/4
BE24	SW20	JUN '04	0	1/4	1/4		0	0	0	0	1/4	1/2	1/2	1/2		0	0	0	0	0	0	0	0	0	0	0	0	1/4

* bog not in production

Appendix 7

BOILER

EFFICIENCY

Littleton AER 2005

Boiler Services

SERVICE/COMMISSION

REPORT No. 4280

Allenstown, Broadway, Co. Wexford.
Tel.: 053 - 31308 • Mobile: 087 - 2604276
Industrial • Commercial & Domestic • Service & Repairs
• Oil & Gas • Free Estimates • 23 hour Call Out • V.A.T. No. IE 3505423T

City & Guilds of London

CUSTOMER: C&M Delaney SITE ADDRESS RG. BORD NA MONA. TEMPLETOUHY	ENGINEER SIGNATURE Con Moran	DATE 1/12/2005
	CUSTOMER TEL-CONTACT	O No/JOB No
	WORKING TIME	MILEAGE
	MATERIALS USED 2. OIL NOZZLES. 2. SOLENOID COILS	

SITE TELEPHONE No & CONTACT

BOILER No	No1	~~No2~~	~~No3~~
BURNER TYPE & MAKE	BUDERUS GE 575		
OUTPUT	455 kw		
SERIAL No	02391697 11		
BURNER	RIELLO. RLSO		
SERIAL No	02449000109		
GAS TRAIN SIZE REF	N/A		
FUEL	GAS OIL		

BOILER No	No1		No2		No3	
BURNER STATUS	LOW FIRE	HIGH FIRE	LOW FIRE	HIGH FIRE	LOW FIRE	HIGH FIRE
CO2	11.0	11.5				
CO	0	0				
O2	6.0	6.2.				
NOX	—	—				
FLUE TEMP GROSS	190	190				
AMBIENT TEMP	10	10				
FLUE TEMP NETT	180	180				
EFFICIENCY	91.2	92.3				
FLUE DRAUGHT MB	2	1				
BOILER TEMP °C	75	75				
GAS INLET PRESS (STATIC)	—	—				
GAS INLET PRESS (RUNNING)	—	—				
IONIZATION CURRENT UA	—	—				
GAS HEAD PRESS	—	—				
GAS RATE Pr3/M3h	—	—				
NOZZLE SIZE & TYPE	6.0	3.0				
SMOKE No	0	0				
OIL PUMP PRESS BAR	12	12				
COMBUSTION CHAMBER PRESS	0	.5				
FAN STATIC PRESS	—	—				
AIR SETTING	30	45				
HEAD SETTING	3	3				

COMMENTS

CLEANED & OTHERWISE BOILER.
CLEANED & CHECKED BURNER
REPLACED NOZZLES.
REPLACED FAULTY SOLENOID COILS.
CALIBRATED BURNER FOR GAS OIL.
TESTED BOILER COMMISSIONS WITH ANALYSER

AIR REQUIREMENTS BS6644	
TOTAL KW INPUT	
AIR REQUIREMENTS HIGH CM²	
LEVEL LOW CM²	
AIR AVAILABLE HIGH CM²	
LEVEL LOW CM²	

CUSTOMER SIGNATURE

SIGN:

PRINT:

White: INVOICE Yellow: FILE Pink: SITE

ENVIRONMENTAL PROTECTION AGENCY
01 MAY 2007

BORD NA MÓNA
BORD NA MÓNA FUELS LIMITED

Annual Environmental Report 2006
P0499-01

March 2007

Contents

1.0 Introduction

1.1 IPC Licence Register No

1.2 Name & Location of Site

1.3 Brief Description of Activities

1.4 Environmental Management of the Company

1.5 Environmental Policy Statement

2.0 Summary Information

2.1 Emissions to Water Summary

2.1.1 Silt Pond Emissions

2.1.2 Yard Discharges

2.1.3 Composite Sampler Report

2.1.4 Emissions to Water Non-compliance's

2.2 Emissions to Air Summary

2.2.1 Dust Monitoring

2.2.2 Emissions to Air Non-compliance's

2.3 Waste Arising

2.3.1 Non-Hazardous Waste

2.3.2 Hazardous Waste

2.4 Energy and Water Consumption

2.4.1 Energy Consumption

2.5 Environmental Incidents and Complaints

2.5.1 Incidents

2.5.2 Complaints

3.0 Management of the Activity

3.1 Environmental Management Programme Report

3.2 Environmental Management Programme Proposal

3.3 Environmental Expenditure

4.0 Licence Specific Reports

4.1 Surface Water Discharge Monitoring Location Programme Review

4.2 Bunding Programme

4.3 Boiler Combustion Efficiency

4.4 Resource Consumption Summary

4.5 Report on de-silting Programme

4.6 Bog Development and Operational Programme

4.7 Bog Rehabilitation Report

4.8 Archaeological Report

5.0 Summary

Appendix 1: Emissions to Water Monitoring Results. (Bogs)

Appendix 2: Emissions to Water Monitoring Results. (Yards)

Appendix 3: Emissions to Water Monitoring Results. (PW102)

Appendix 4: Emissions to Water Monitoring Results. (Composite)

Appendix 5: Emissions to Air Monitoring Results. (Bogs)

Appendix 6: Emissions to Air Monitoring Results. (Factory)

Appendix 7: De-silting Programme Review

1.0 Introduction

1.1 IPPC Licence No: **P0499-01**

1.2 Name & Location of Site

Name:	**Bord na Mona Fuels Limited – Littleton Group**
Address:	**Littleton, Thurles, Co Tipperary**
Telephone No:	**0504-44215**
Contact Name	**Ray Yates**
Position	**General Manager**
National Grid Reference	**E220186 N151400**

1.3 Description of Activities

Peat Milling Operations.

For milled peat production the bog is laid out in a series of rectangular fields of varying length and 15m wide with drains located between. There are essentially four operations involved in milled peat production:
Milling.
Harrowing.
Ridging.
Harvesting.

Milling.

Special milling machines work there way along the fields, milling approximately 15mm of peat of the top of the bog in a pass.

Harrowing

In the course of drying, the milled peat is turned a number of times to avail of the drying conditions. This is achieved with a machine called a harrow. The milled peat is harrowed until its moisture content is down to approximately 40-50%, which can take up to two to three days, weather depending.

Ridging

The dry peat is then scraped into long ridges running down the centre of each field. This is done with a ridger, a machine consisting of a series of blades in the shape of a v that opens the full width of the field.

Harvesting

During harvesting every eleventh field is used to stockpile the peat, with this field receiving the milled peat from the five fields either side.

The milled peat is then transported via the existing network of peatland railways to the Briquette Factory.

Sod Peat was produced on an area of 223 hectares during 2006. Production was from April to August with sales to the public from September to December. Bog preparation and drainage was ongoing throughout the year but was mainly in the period January to March.

The Firelighter Plant operated from January to April and again from September to December.

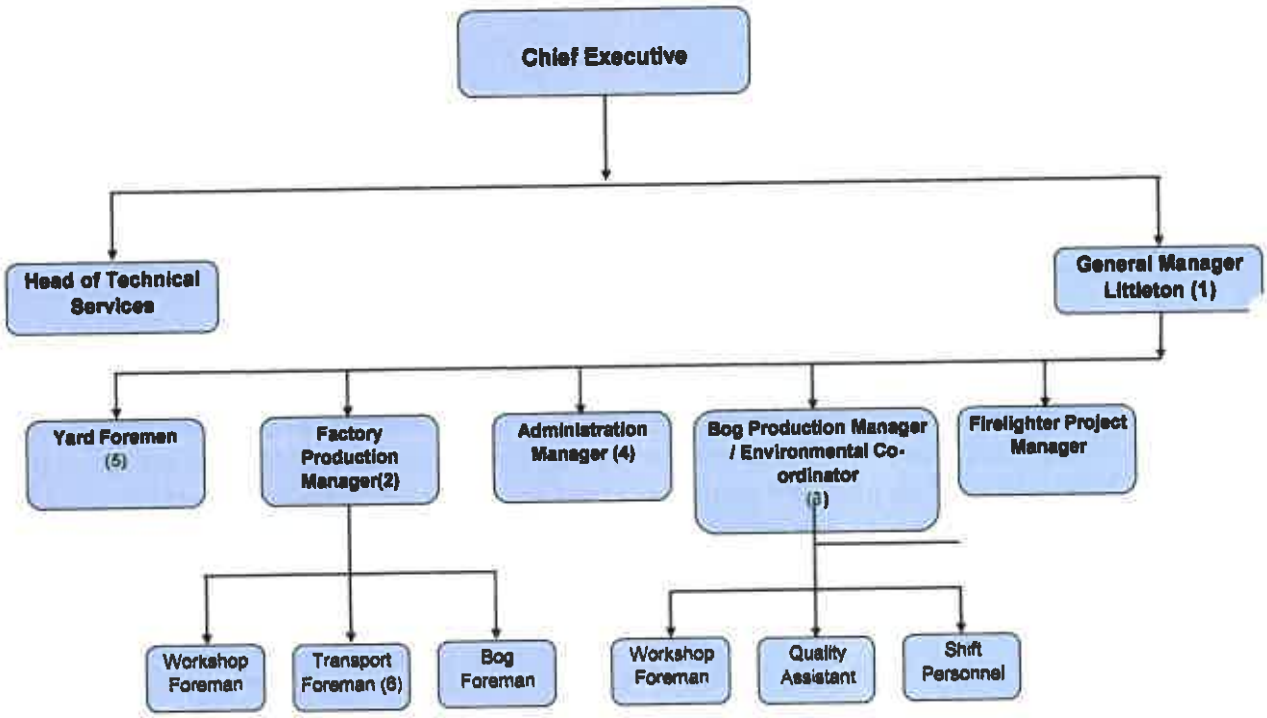
The Group has its own workshop facilities for the maintenance, repair and fabrication of plant used in the operations outlined.

In total 135 permanent workers and 26 seasonal workers at peak were employed during 2006.

1.4 Environmental Management of the Company

The organisational structure within Bord na Mona Fuels Limited is presented in the flow chart below.

Environmental Responsibilities



(1) Overall environmental responsibility.
(2) Factory Process production and maintenance include, settling ponds, effluent, emissions.
(3) Bog Production, maintenance and transport activities, include silt ponds, tea centres, polyethylene etc. Co-ordinating Environmental Affairs.
(4) Administration include sales, payroll, stores.
(5) Yard sales, include cleaning, recycling, disposal.
(6) Factory chemicals, effluent readings, water readings, process checks.

1.5 Environmental Policy

BORD NA MÓNA

BORD NA MÓNA FUELS LIMITED

Bord na Mona Fuels Limited operates in line with Bord na Mona plc group environmental policies. It is a registered member of Repak and promotes the efficient use of energy in its briqueting processes and operates under an Integrated Pollution Prevention Control (IPPC) licence at its Littleton works.

Bord na Mona plc is a commercial semi-state body with responsibility to develop Irelands peat resources in the national interest.

Bord na Mona Fuels Limited recognises the importance of peatland conservation and has a conservation policy statement.

Bord na Mona Fuels Limited will leave behind all areas it owns as either an economically or socially integrated resource of a high environmental value.

Bord na Mona Fuels Limited seeks to conduct all aspects of its business in an environmentally sensitive manner.

Bord na Mona Fuels Limited will establish an environmental management system specifically addressing the following impacts.

Discharges to water.
Emissions to atmosphere.
Waste disposal.
Use of natural resources.
Noise, vibration, odour, dust and visual effects.
Natural environment and Eco-system.

The environmental management system will be monitored, maintained and continually improved.

A system of regular environmental audits will be put in place.

Bord na Mona Fuels Limited will continue research and development into all aspects of its environmental impact.

This statement is published and is available at all locations within the company and its contents are brought to the attention of all employees.

2.0 Summary Information

2.1 Emissions to Water Summary

2.1.1 Silt Pond Emissions

Comment
Surface water monitoring was carried out four times during the reporting period. In total analysis was carried out at three different locations. These locations are as follows, Killeens @ SW4, Lanespark @ SW15 and Carrickhill @ SW26. The parameters measured during each sampling event were as follows. Total Phosphorus, Total Solids, Suspended Solids, pH, Ammonia, Colour and COD.
In general results were constant across all parameters at each monitoring location.
May was the wettest month of 2006, while June was the driest.
There was one non-compliance in relation to grab sampling and it involved an elevated suspended solids result of 112 mg/l against an emission limit of 35mg/l. The Agency was informed. It is our opinion that this elevated result was primarily due to excessive pumping from the adjacent Lisheen mine. **pH** values were between 7 and 7.9, with normal emission limit values being of the range 6 and 9.
Suspended solids varied from 5mg/l to 112mg/l and would depend on activities (piping, ditching) etc in the catchments at the time of sampling. With the exception of the last quarter as mentioned above at SW 26 (112mg/l) all results were within the licence limit of 35mg/l.
Ammonia levels with the exception of Lanespark SW15 showed no great variations during each sampling event. The slightly elevated results at SW 15 would not be unusual for waters emanating from peatlands and are typical of a lot of Bord na Mona production bogs nationwide.
COD readings were consistent across all sampling locations during the reporting period.
Flow rates are as expected at SW4 and SW15. This however is not the case at SW26 as at this location due to excessive pumping from Lisheen Mine, the flow is often into the pond.
Sampling will continue at the same locations during 2007.

Surface Water Results are contained in Appendix 1

2.1.2 Yard Discharges

Comment
Inspections are undertaken and logged weekly at the following locations: SWE1: Factory / Lanespark Workshop / Firelighter area. SWE2: Factory Transport and Fueling Area, SWE3: Templetuohy Workshop and SWE4: Templetuohy Fueling Area.
Yard runoff monitoring took place at these four different locations on a monthly basis during the reporting period and COD was the parameter requiring analysis. As is evident from the graph, on several occasions no sample was available on the day of sampling at SWE2,3 & 4. This was due to no flow at the emission point as the catchments are so small. In fact in most instances it would have to be raining quite heavily in order to attain a sample.
In general results were normal with the exception of SWE 1 during the December monitoring event. On investigation of that result, it was found that the settlement pond preceding the emission point required cleaning, this work was in progress at the time of sampling and hence the elevated result. Subsequent results have shown a marked improvement, the results of which will be included in next years AER.
Sampling will continue at the same locations during 2007.

Yard Monitoring Results are contained in Appendix 2

PW-102 Factory and Yard Discharges to Ballybeg River
Comment
Samples are taken at this location on a weekly and quarterly basis and the parameters measured are; COD, Suspended Solids, Ph and Flow on a weekly basis and Total Phosphorus, Ammonia and Oils, Fats and Greases quarterly. **pH** values were within the range 7.2 and 9.4 with a mean value of 7.9. **COD** values averaged 82 mg/l and with the exception of 1 peak 232 mg/l were for the most part constant. **SS** results averaged 31 mg/l and also with the exception of 1 peak 133 mg/l were constant. **Flows** averaged 14 l/sec, with no flow during periods when the factory was down for overhaul.
Quarterly **TP** averaged 0.045 mg/l, while **Ammonia** averaged 0.365 mg/l. **Oils, Fats & Greases** averaged 2.25 mg/l.

PW102 Results are contained in Appendix 3

2.1.3 Composite Sampler Report

Comment
The composite sampler has been operating at SW22 during the reporting period.
The parameters measured were Total Phosphorus, Total Solids, Suspended Solids, pH, Ammonia, Colour and COD, with Suspended solids being the only parameter with an emission limit value (35mg/l). In general result were satisfactory with only two non-compliances being recorded for the period.
May was the wettest month of 2006, while June was the driest.
A proposal to relocate the composite sampler during 2007 will be submitted to the agency, as a suitable site has been identified at Popes Bog SW18. This site because of its nature has the potential to give more accurate flow data when it becomes operational.

Composite Sampler Results are contained in Appendix 4.

2.1.4 Emissions to Water Non-compliance's

IPPC Licence: P0499-01

Works: Littleton

Type	Non-Compliances	Location / SW Nr
Composite	2	SW 22
Quarterly Grab	1	SW26
PW 102	1	PW 102 (Factory)
Totals	**4**	

Note: Emission Limit Value = 35mg/litre

2.2 Emissions to Air

2.2.1 Dust Monitoring

Comment
The Dust Emissions are being monitored monthly at DSL 1 (Factory Lawn South West), DSL 2 (Rail Yard Boundary) & DSL 3 (North East Lanespark Bog). The additional DSL 4 (Factory Lawn South East) agreed as a result of your audit was installed and sampled for the year.
There were two non-compliances in relation to dust during the period. On both occasions the sampling location was adjacent to machine pass ways. No complaints were received at the time. It is proposed to relocate the gauges closer to our boundary in the vicinity.
Sampling will continue at the same locations during 2007.

Emission to Air Results (Bogs) are contained in Appendix 5

Factory
The Boiler (B101) emissions of particulates were again above the Emission Limit Values on each of the occasions when measures were taken. This was disappointing especially after further alterations have been carried out.
We are now providing for the milling of all peat fuel to the boiler in order to reduce the particle size to below ten millimetres. This will provide for better combustion and less carryover of unburned carbon to the gritarrester.
The gritarrester will itself be partially renewed to prevent the ingress of air which can take from its effectiveness. These measures should result in bringing the dust emissions to within the permitted value.
We will carry out a review on emissions at all other points in the factory before the coming summer stop with a view to minimising dust emissions at all points.

Emission to Air Results (Factory) are contained in Appendix 6

2.2.2 Emissions to Air Non-compliance's

IPPC Licence: P0499-01

Works: Littleton

Location / DM Nr	Non-Compliances
DSL 1	0
DSL 2	1
DSL 3	1
DSL 4	0
Total	**2**

Emission Limit Value = 350mg/m²/day

2.3 Waste Arisings

2.3.1 Non-Hazardous Waste

IPPC Licence: P0499-01

Works: Littleton **2006**

Type	Tonnes	EWC Code	Contractor	Licence Nr
Skips	0.00	20 03 01	Ryan Waste Recycling	088(2)/OY/385/06
Wheelie Bins	79.42	20 03 01	Ryan Waste Recycling	088(2)/OY/385/06
Polyethylene	28.08	02 01 04	Ryan / Leinster	WP204/30
Scrap Steel	55.06	17 04 07	Hammond Lane	050/OY/162/04
Timber Pallets	144.38	15 01 02	Kiawa Ltd	WP/TN/24
Cardboard	9.64	15 01 01	Smurfit Kappa	WPR021-3
Silt Pond Cleanings	1915.86	01 01 02	Bord na Mona	P0499-01
Peat Screenings	474.00	01 01 02	Bord na Mona	P0499-01
Totals	**2706.44**			

Note: Timber, Polyethylene, Steel and Cardboard are all recycled.

2.3.2 Hazardous Waste

IPPC Licence: P0499-01

Works: Littleton **2006**

Type	Tonnes	EWC Code	Contractor	Licence Nr
Waste Oil	21.300	13 02 05	Enva Ireland Ltd Portlaoise	184-1
Oil Filters	0.420	16 01 07	Enva Ireland Ltd Portlaoise	184-1
Oily Rags	0.000	15 02 02	Enva Ireland Ltd Portlaoise	184-1
Waste Grease	0.999	13 08 99	Enva Ireland Ltd Portlaoise	184-1
Lead Acid Batt	1.600	16 06 01	Returnbatt Ltd	067/OY/11/02
Fluorescent Tubes	0.093	2000 02	Irish Lamp Recycling Co.Ltd	035/OY/80/03
Parts Wash	1.200	11 01 13	Safety Kleen, Tallaght, Dublin	99-1
Asbestos	0	17 06 05		
Total	**25.612**			

2.4 Energy and Water Consumption

2.4.1 Energy

IPPC:			
YEAR 2006			
1. Factory Units	Diesel (Litres)	Derve (Litres)	Electricity (Units)
Totals	254961	53164	1252385
MW Hours	2496.7	480.60025	1252.385
Sub-Total MW Hrs	4229.7		
2. Factory Units	Mill/Peat (Tonnes)	Screens (Tonnes)	Br/Out (Tonnes)
Totals	57640	4270	477
MW Hours	16211.3	20154.4	2251.44
Sub-Total MW Hrs	38617.1		
3. Bog Units	Diesel (Litres)	Derve (Litres)	Electricity (Units)
Totals	605696	0	276650
MW Hours	5931.2	0	276.65
Sub-Total MW Hrs	6207.9		
1. + 2. + 3.			
Total MW Hours	49054.6		

2.5 Environmental Incidents and Complaints

2.5.1 Incidents

IPPC Licence: P0499-01	
Works: Littleton	Number
Incidents	1
Requiring corrective action	1
Category	
Water	
Air	
Procedural	
Miscellaneous	1
Total	1

There was one incident during the reporting period, this involved an oil spill which was contained within a bunded area. The Agency was informed at the time. Ref (LT/06/01).

2.5.2 Complaints

IPPC Licence: P0499-01 Works: Littleton	Number
Complaints	1
Requiring corrective action	0
Category	
Water	1
Air	
Procedural	
Miscellaneous	
Total	1

There was one complaint which came from local farmers via the Agency. It related to high water levels in the Black River which Bord na Mona attributed to excessive pumping from Lisheen Mines.

3.0 Management of the Activity

3.1 Environmental Management Programme Report 2006

Project	Description & Status
Project 1: Reduction of fugitive dust emissions.	**Training.** Ongoing **Hydraulic Harrows.** Two hydraulic harrows supplied to potential dust sensitive locations, with two more planned for 2007. **Headland Peat Collection.** Headland peat collection project didn't materialise. A water bauser was purchased and deployed to a potential dust sensitive location.
Project 2: Minimisation of suspended solids	**On Site Inspections.** Project didn't materialise. Will commence at start of production 2007.
Project 3: Effective spill leak management of mobile fuelling units.	**On Site Inspections.** Two self bunded mobile fueling tanks provided during 2006. Biannual inspections ongoing.
Project 4: Reuse of silt pond waste.	**Trials.** Trials in the past proved unsuccessful. For peat silt to be reused, it must be available on the production bog for transfer into the piles. 99 % of all silt ponds are located on the outfall. Another factor is contamination, as these ponds are excavated into the mineral soil to achieve gravity drainage, and as such the silt excavated from the pond is contaminated with mineral soil. Should suitable bog come into production in the future, this project will be considered.
Project 5: Collection storage and reuse of polyethylene.	**Identify Recyclers.** Ongoing Polyethylene sent to Leinster Environmental for recycling (20t) during 2006. Sample load also sent to new local recycler for suitability testing
Project 6: Provision of measures to protect Dust Sensitive Areas.	**Planting.** No planting took place during the reporting period.

3.2 Environmental Management Programme Proposal for 2007

Project	Description & Status
Project 1: Reduction of fugitive dust emissions.	**Training.** Continue to train all new employees in environmental matters. Copy environmental video to disk and distribute more widely. A programme of training is due to commence in early Summer 2007 and will cover bog and workshop operatives. **Hydraulic Harrows.** Continue to supply hydraulic harrows. Prioritising potential dust sensitive locations. Two additional harrows to be supplied in 2007. **Headland Peat Collection.** Continue with the collection of headland peat, particularly at potential dust sensitive locations. Supply more headland peat collection machinery as required and research efficient ways of collecting such peat for use as a saleable product. A headland harvester and associated plant is also planned for 2007.
Project 2: Minimisation of suspended solids	**On Site Inspections.** A full programme of internal audits will be carried out as soon as production commences. Particular emphasis will be put on cleaner production procedures, milling, harrowing, ridging, harvesting and loading.
Project 3: Effective spill leak management of mobile fuelling units.	**On Site Inspections.** As part of the above project, service trains will also be prioritised with a fitter accompanying the auditor during inspections to highlight any risks or potential risks that may occur. Two additional self bunded mobile fueling tanks are planned for 2007.
Project 4: Fire Prevention.	**Fire Patrols.** There will be extra emphasis on fire patrols this coming production season. Research on improved fire fighting techniques will also be investigated. The newly adopted Fire and Environmental Plan will be communicated to all personnel.
Project 5: Collection storage and reuse of polyethylene.	**Identify Recyclers.** Continue with the recycling of polyethylene. The sourcing of more recycling contractors will be ongoing. As mentioned above a local recycler will be testing our product for suitability.
Project 6: Provision of measures to protect Dust Sensitive Areas.	**Planting.** Ongoing Planting is ongoing as required, with areas in the periphery of production bogs that are being developed for housing being prioritised.

3.3 Environmental Expenditure

Licence:P0499-01
Works: Littleton

Description	Cost €
Capital Costs	96582
Silt Control	105404
Analytical & Consultancy Costs	58806
EPA Fees	12069
Bog Rehabilitation	0
Total	€272,861.00

4.0 Licence Specific Reports

4.1 Surface Water Discharge Monitoring Location Programme Review

The programme has operated satisfactorily; it is proposed to continue at the same locations for 2007.

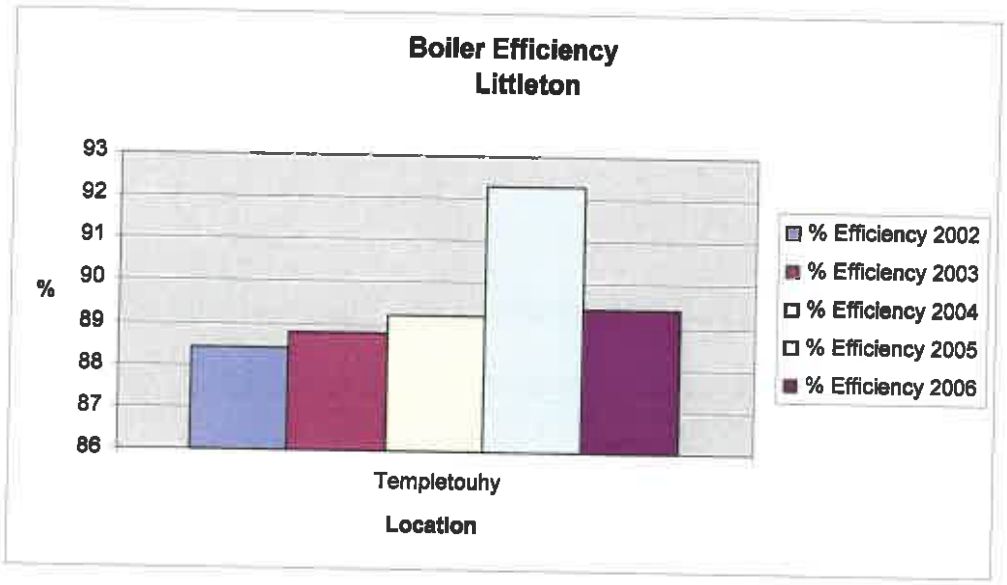
4.2 Bunding Programme

The four concrete fuel bunds within the Littleton Group were examined and cracks sealed. They are presently being prepared for testing which is planned to be completed by the end of April 2007.

4.3 Boiler Combustion Efficiency

Licence: P0499-01
Works: Littleton

Boiler Location	% Efficiency 2002	% Efficiency 2003	% Efficiency 2004	% Efficiency 2005	% Efficiency 2006
Templetouhy	88.4	88.8	89.2	92.3	89.4



There is one boiler located at the Templetouhy Workshop. It is a twin burner oil boiler. The facilities at the Littleton Factory are heated directly from surplus heated water produced in the process.

4.4 Resource consumption summary

Resource Consumption			
Licence: P0499-01			
Works: Littleton			
Product	**Tonnes Produced**	**Tonnes Sold**	**Customer**
Milled Peat	288201	288201	Littleton Briquette Factory
Turf	7554	8667	Public / Domestic
Totals	**295755**	**296868**	

Proposed Production 2007	
Licence: P0499-01	
Works: Littleton	
Product	**Proposed Target**
Milled Peat	270000
Moss	NA
Turf	7200
Totals	**277200**

4.5 De-Silting Report

The upgrade programme for silt ponds was completed with the development of two trenches as ponds in Littleton area.
The ponds were all cleaned as required by the inspections. The fact that 60 % of the ponds were cleaned only once is explained by their capacity being above the design capacity and pre-cleaning of open outfalls leading into the ponds.

The silt pond cleaning programme is outlined in Appendix 7.

4.6 Bog Development and Operational Programme

No new bog has been developed for 2006. The production target has remained the same.
Development work is in progress in Littleton to replace cutaway areas, this will not be complete until 2008.

4.7 Bog Rehabilitation Report

One thousand metres of old disused sod bog rail network was lifted in Templetouhy bog. This was refurbished for reuse at milled peat locations within the works.

4.8 Archaeological Report

LITTLETON GOUP

The 2006 Peatland Survey was carried out in the Littleton Group. Some of the bogs had been pilot surveyed in the early 1990s by the Irish Archaeological Wetland Unit during which time 298 sits were recorded. 238 of these sites were recorded in Derryville Bog in advance of the construction of the Lisheen Mine tailings pond. 118 sites were recorded during the 2006 survey carried out by ADS Ltd. The sites varied considerably in their nature form and extent but there were several substantial plank trackways recorded.

Killeen Bog had nine archaeological sites which concentrated around the dryland island of Derrynaflan. Seventeen sites were recorded in Ballybeg Bog which consisted of 6 trackways, 5 possible trackways and 6 archaeological wood sightings. Five of the sites have been dated and the dates range from 1880-1620BC to AD550-710. Derryvella Bog had 5 trackways including a substantial gravel and plank trackway 255m in length. The remaining sites included 2 possible trackways, a platform and 15 sightings of archaeological wood. Four sites were dated and these dates ranged from 1940-1630BC to 770-390BC. Littleton Bog had the highest number of sites with 33 sites recorded. The sites were located mainly in the northern extent of the bog. The sites were mainly roundwood and brushwood structures with the exception of two plank trackways and a gravel, stone and plank trackway. The remaining sites were 8 archaeological wood sites, 4 platforms and 18 trackways of varying lengths and widths. Nine of the sites were dated and the dates ranged from 1740-1420BC to AD130-420. Six sites were recorded in Longford Pass Bog which comprised a substantial gravel and plank trackway dating to 986BC, two further plank trackways, a roundwood trackway, a possible animal trap and an archaeological wood site. Two sites were recorded in Inchirourke Bog during the course of the survey; a plank trackway 240m in length dated to after 1607BC and a sighting of archaeological wood. In Baunmore Bog 5 sites were recorded comprising a single plank trackway dated to AD753±9, two small trackway sites and two sightings of archaeological wood. A stray find of bog butter was also reported to the survey team by a BnM worker which was collected and transferred to the National Museum of Ireland. In Derryville Bog there were 12 sites which comprised of three plank trackways, 2 roundwood trackways, 4 platforms and 7 sightings of archaeological wood. Six of the sites were dated and the dates ranged from 2470-2140BC to 780-370BC. Carrickhill Bog had a single site located at the base of a drain while two plank trackway sites were recorded in the northern extent of Templetouhy Bog. Two bog butter finds were reported to the ADS Survey team in Templetouhy Bog by BnM workers and these were recorded and transferred to the National Museum for conservation.

There were no sites recorded in Lanespark Bog and Ballysorrell and Knockahaw Bogs were too overgrown to facilitate archaeological survey.

5.0 Summary

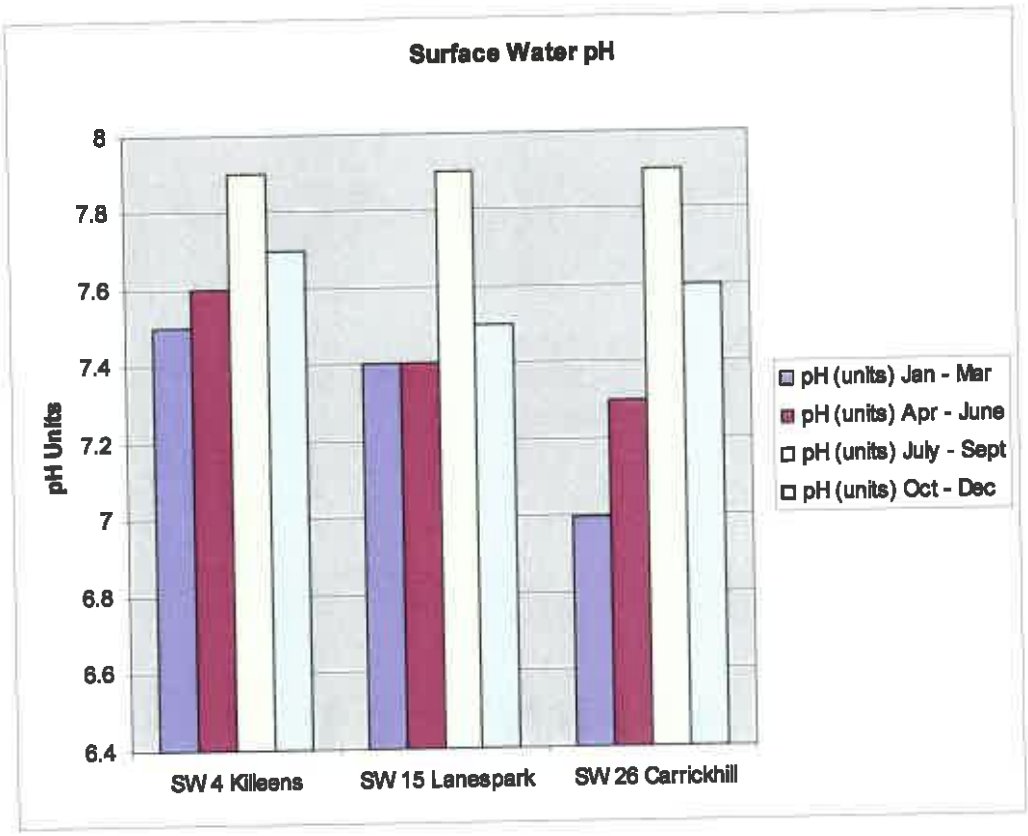
The Environmental Management Programme has been implemented throughout the group, operating procedures have been put in place, and training has been provided for all personnel involved in compliance with the licence.

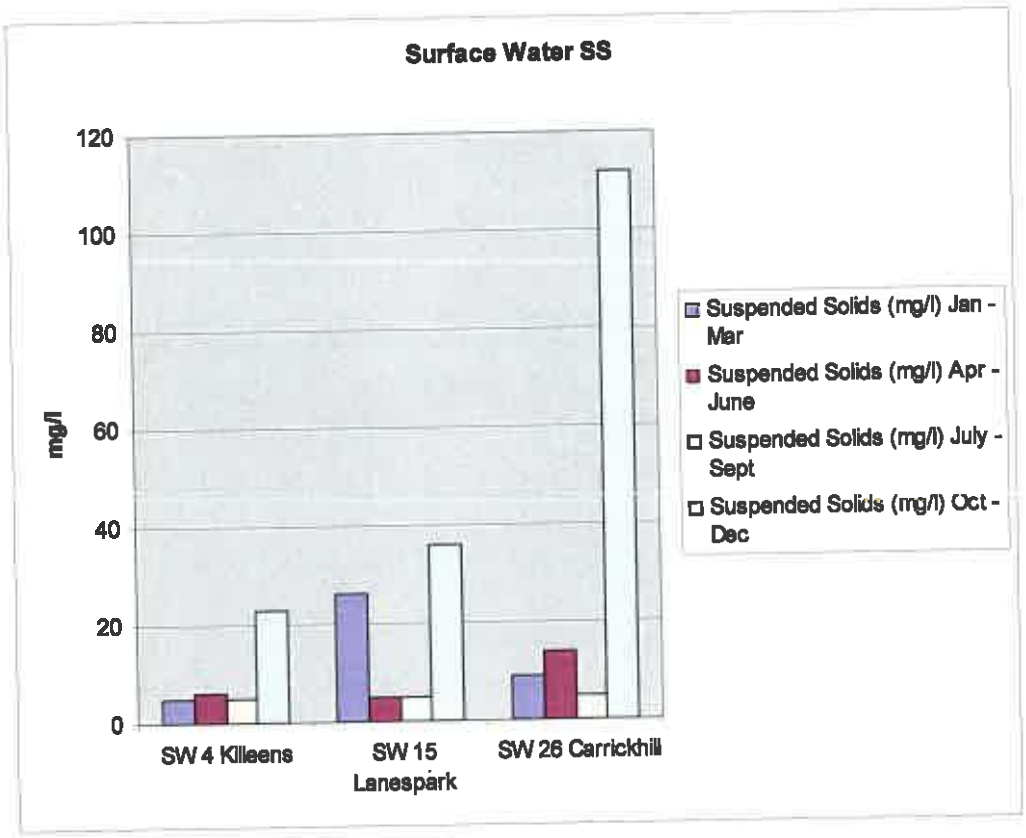
Bord na Mona Energy Ltd are represented on the Management Group of both the Shannon River and South-eastern River Basin District Management Systems, set up under the Water Framework Directive, and on the Steering Group of the Catchment Management on the River Barrow.

Bord na Mona Fuels Ltd would like to take this opportunity to advise the Environmental Protection Agency of its continued commitment to improving its environmental performance by adopting cleaner production methods and improving its environmental protection measures.

APPENDIX 1

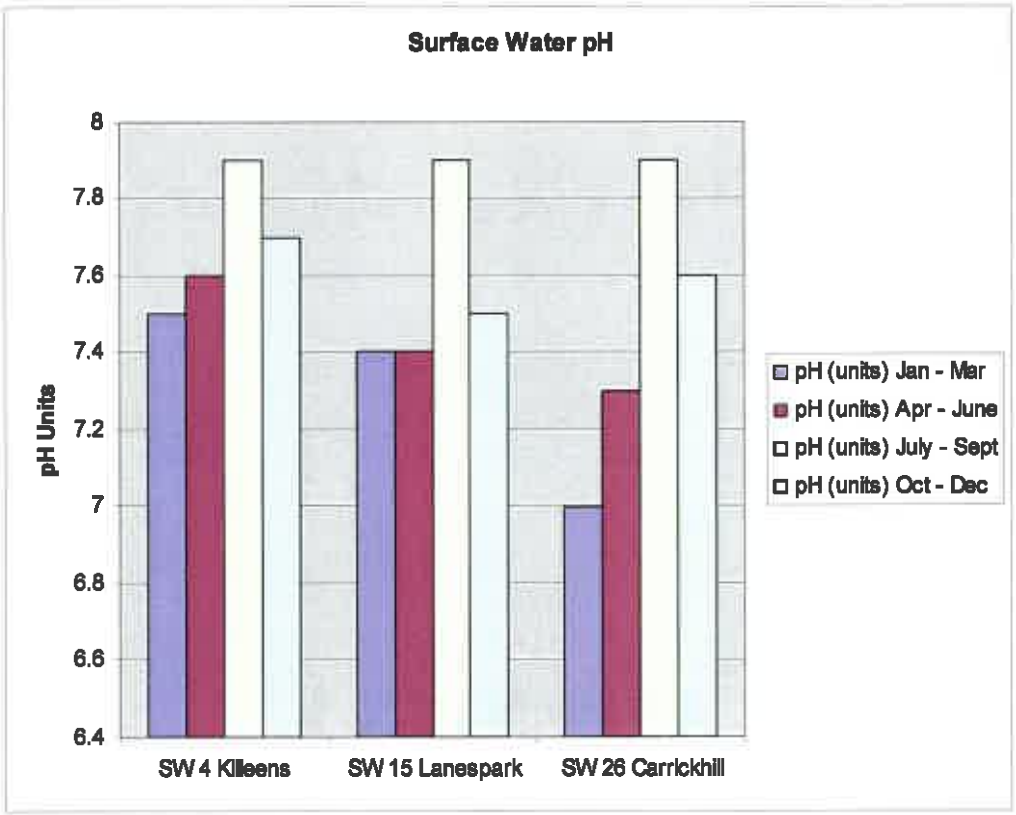
Surface Water Discharge Monitoring Results Bogs

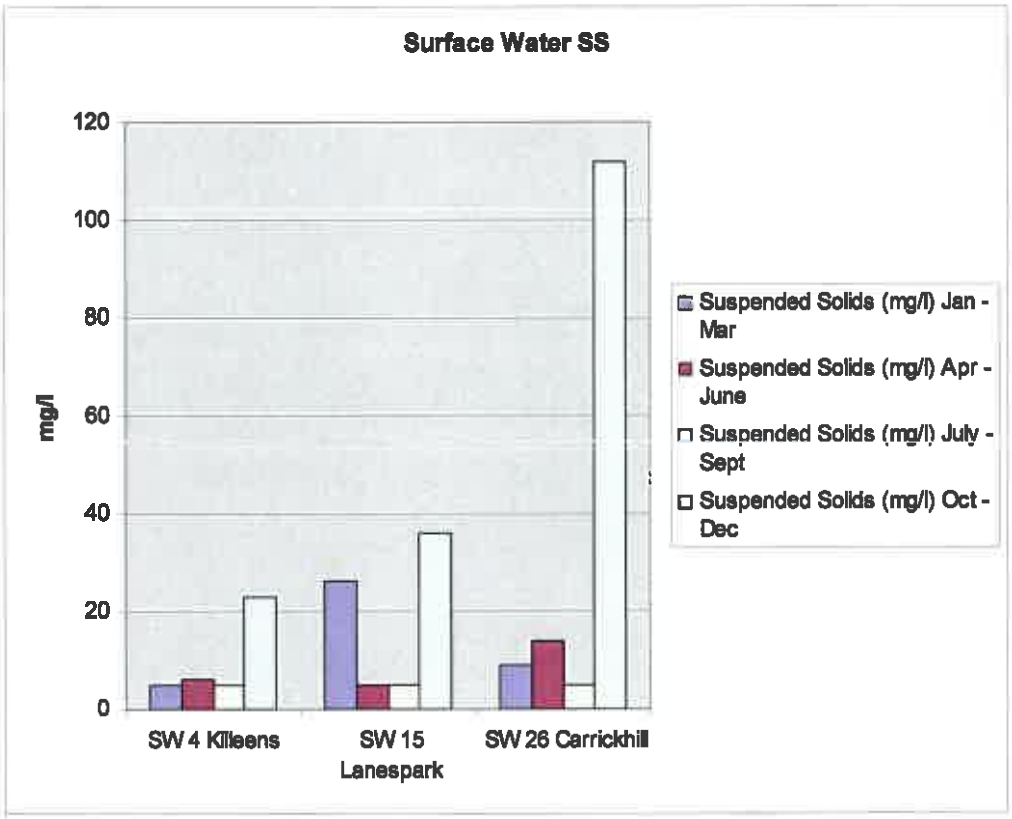

Surface Water pH
8
7.8
7.6
7.4
7.2
7
6.8
6.6
6.4
pH Units
SW 4 Killeens
SW 15 Lanespark
SW 26 Carrickhill
pH (units) Jan - Mar
pH (units) Apr - June
pH (units) July - Sept
pH (units) Oct - Dec

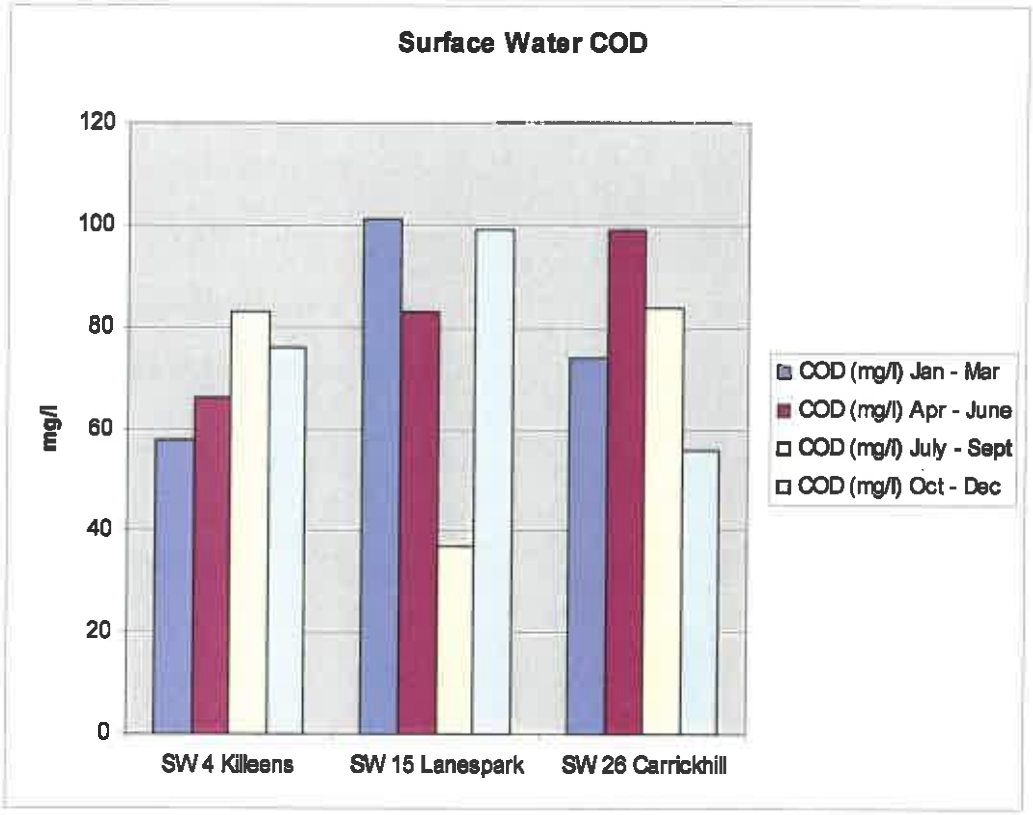

Surface Water SS
120
100
80
60
40
20
0
mg/l
SW 4 Killeens
SW 15 Lanespark
SW 26 Carrickhill
Suspended Solids (mg/l) Jan - Mar
Suspended Solids (mg/l) Apr - June
Suspended Solids (mg/l) July - Sept
Suspended Solids (mg/l) Oct - Dec

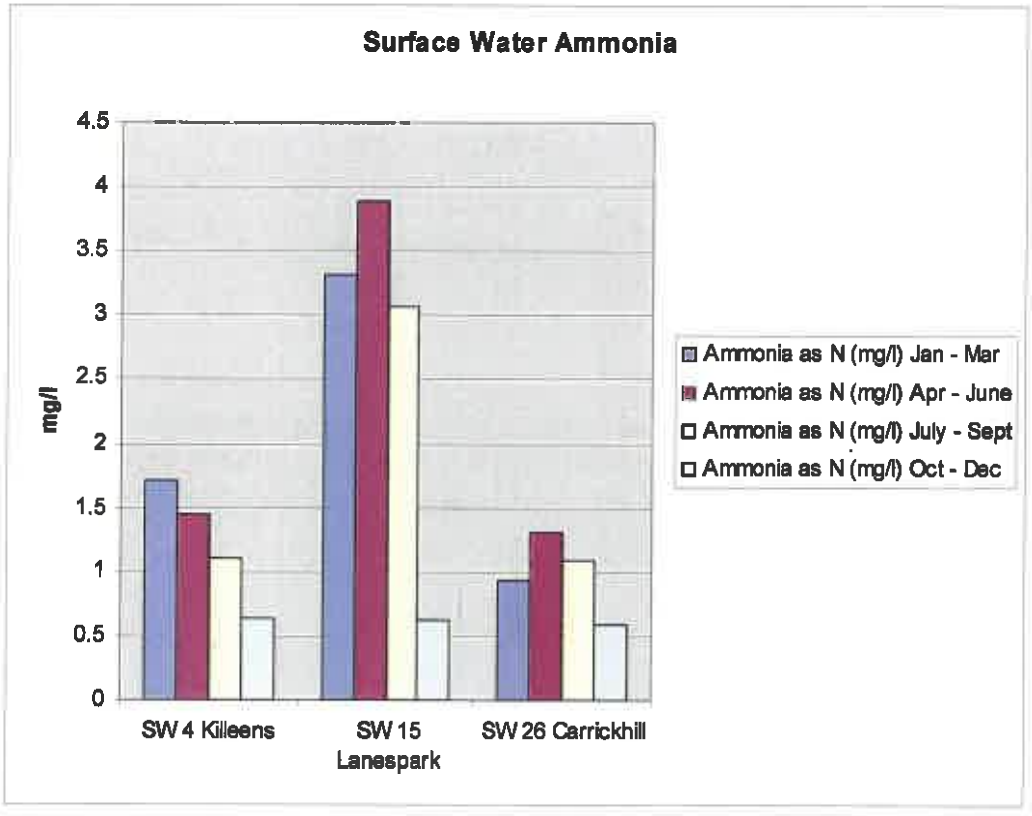
APPENDIX 1

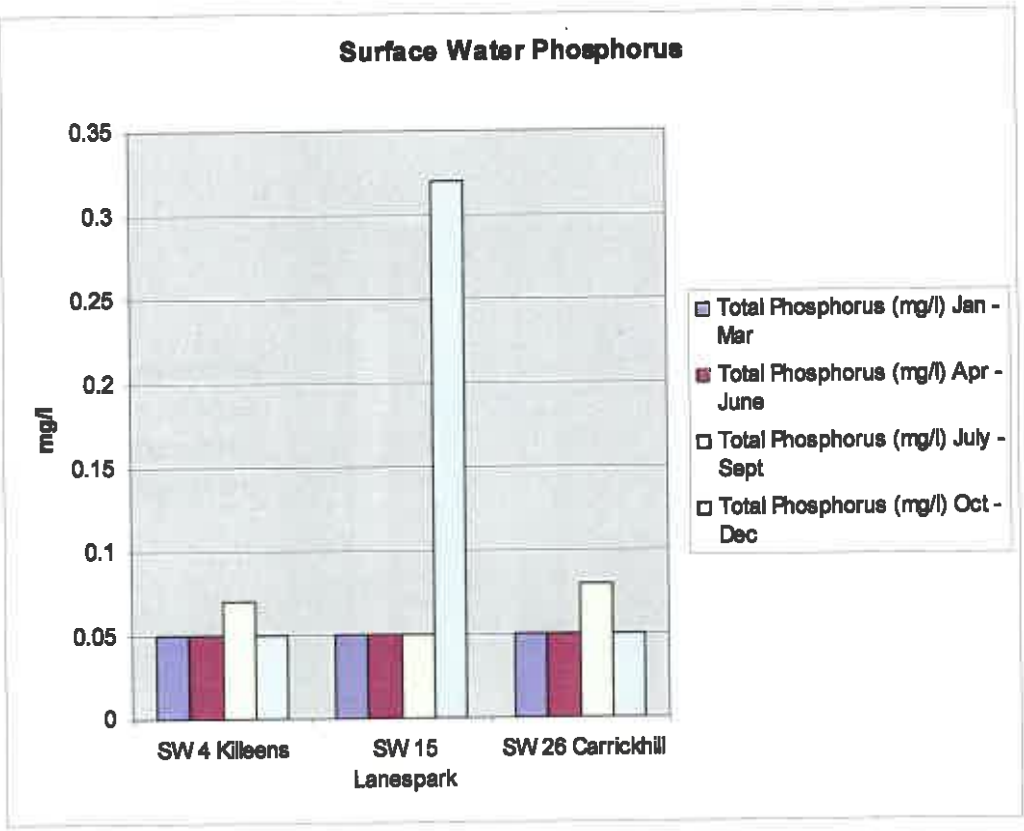
Surface Water Discharge Monitoring Results Bogs

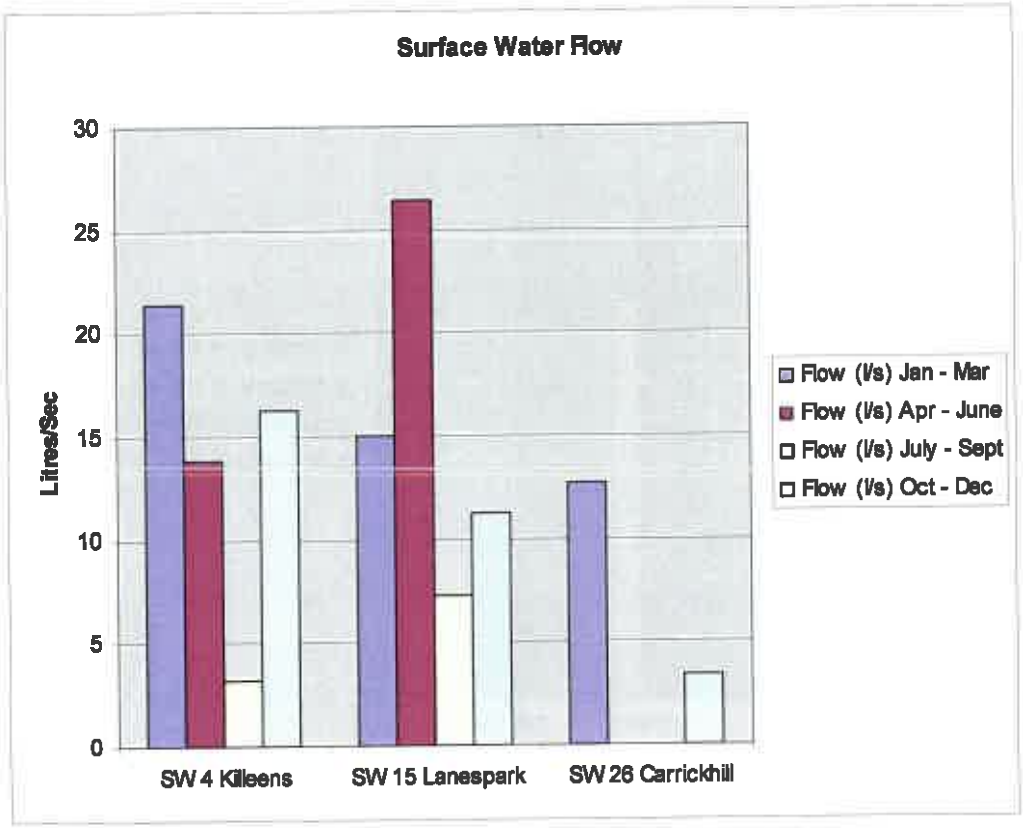

Surface Water pH
8
7.8
7.6
7.4
7.2
7
6.8
6.6
6.4
pH Units
SW 4 Killeens
SW 15 Lanespark
SW 26 Carrickhill
pH (units) Jan - Mar
pH (units) Apr - June
pH (units) July - Sept
pH (units) Oct - Dec


Surface Water SS
120
100
80
60
40
20
0
mg/l
SW 4 Killeens
SW 15 Lanespark
SW 26 Carrickhill
Suspended Solids (mg/l) Jan - Mar
Suspended Solids (mg/l) Apr - June
Suspended Solids (mg/l) July - Sept
Suspended Solids (mg/l) Oct - Dec


Surface Water COD
120
100
80
60
40
20
0
mg/l
SW 4 Killeens
SW 15 Lanespark
SW 26 Carrickhill
COD (mg/l) Jan - Mar
COD (mg/l) Apr - June
COD (mg/l) July - Sept
COD (mg/l) Oct - Dec


Surface Water Ammonia
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
mg/l
SW 4 Killeens
SW 15 Lanespark
SW 26 Carrickhill
Ammonia as N (mg/l) Jan - Mar
Ammonia as N (mg/l) Apr - June
Ammonia as N (mg/l) July - Sept
Ammonia as N (mg/l) Oct - Dec

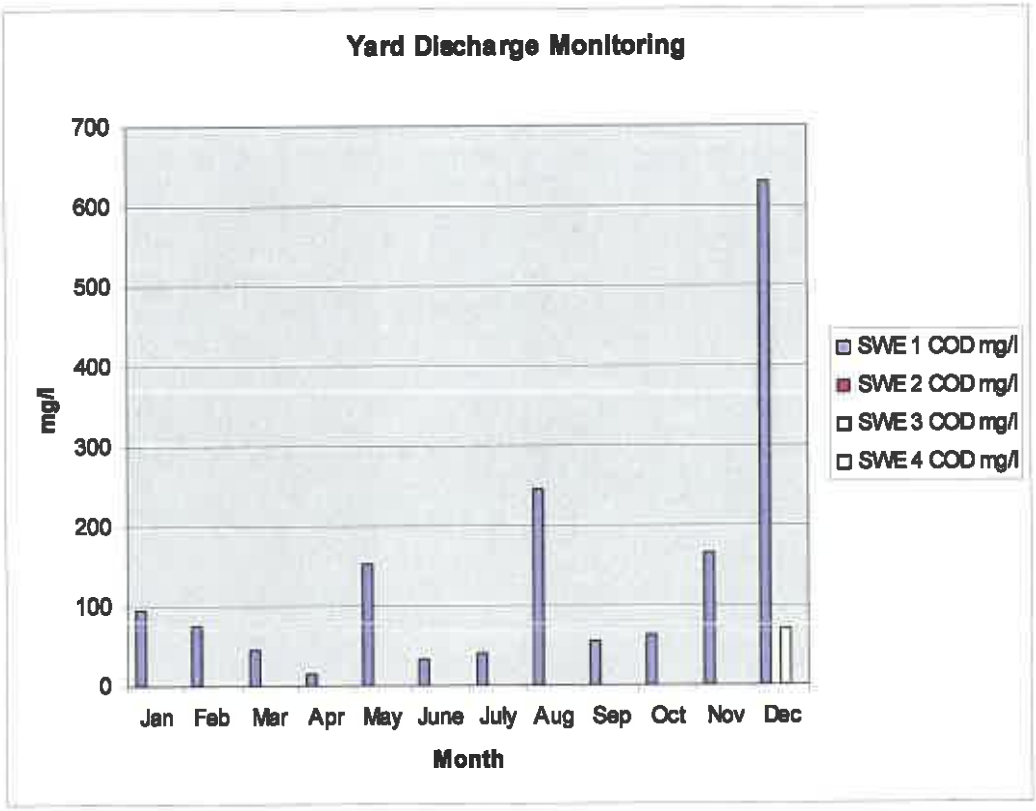

Surface Water Phosphorus
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
mg/l
SW 4 Killeens
SW 15 Lanespark
SW 26 Carrickhill
Total Phosphorus (mg/l) Jan - Mar
Total Phosphorus (mg/l) Apr - June
Total Phosphorus (mg/l) July - Sept
Total Phosphorus (mg/l) Oct - Dec


Surface Water Flow
30
25
20
15
10
5
0
Litres/Sec
SW 4 Killeens
SW 15 Lanespark
SW 26 Carrickhill
Flow (l/s) Jan - Mar
Flow (l/s) Apr - June
Flow (l/s) July - Sept
Flow (l/s) Oct - Dec

APPENDIX 2

Surface Water Discharge Monitoring Results Yards

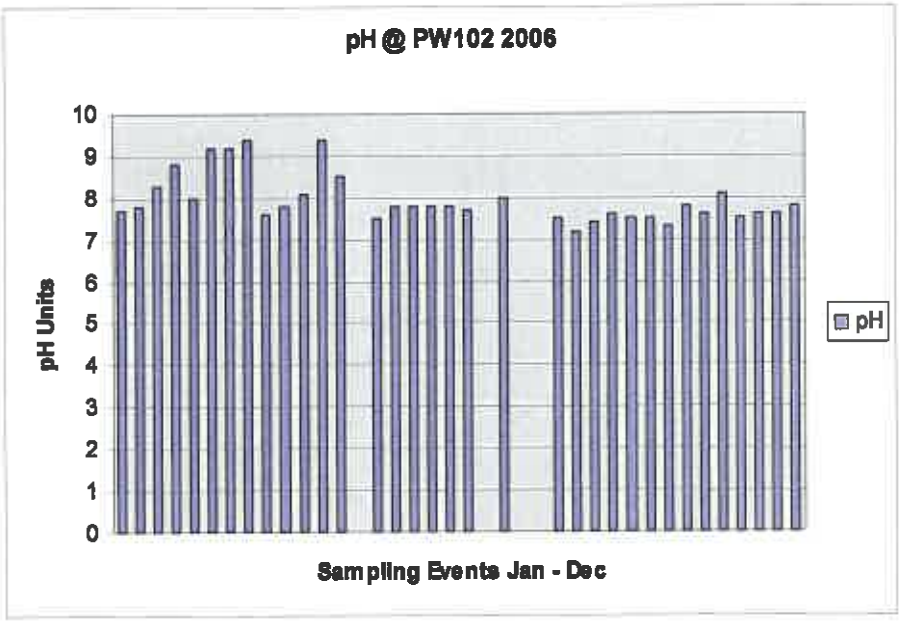
Licence No: P0499-01				
Works: Littleton				
Month	SWE 1 COD mg/l	SWE 2 COD mg/l	SWE 3 COD mg/l	SWE 4 COD mg/l
Jan	96	N/F	N/F	N/F
Feb	76	N/F	N/F	N/F
Mar	44	N/F	N/F	N/F
Apr	16	N/F	N/F	N/F
May	152	N/F	N/F	N/F
June	33	N/F	N/F	N/F
July	40	N/F	N/F	N/F
Aug	244	N/F	N/F	N/F
Sep	56	N/F	N/F	N/F
Oct	62	N/F	N/F	N/F
Nov	164	N/F	N/F	N/F
Dec	630	N/F	69	N/F

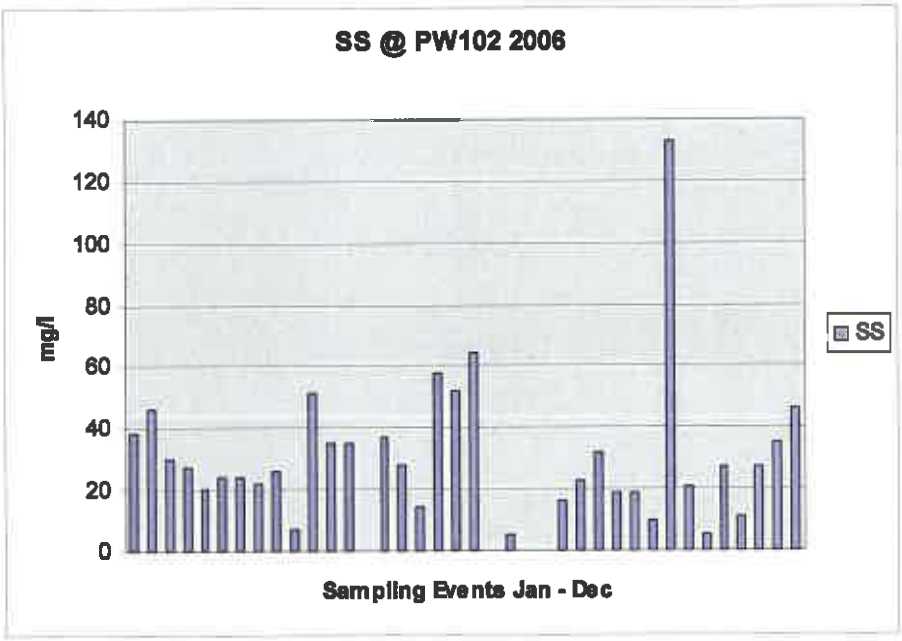


Note: NF denotes no flow available on day of sampling. This is primarily due to the very small collection slabs involved.

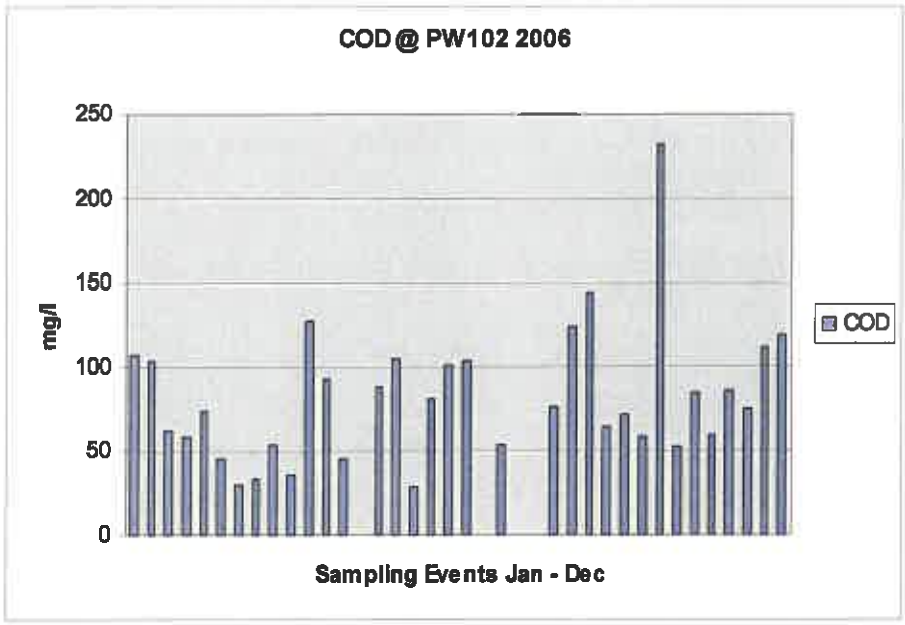
APPENDIX 3

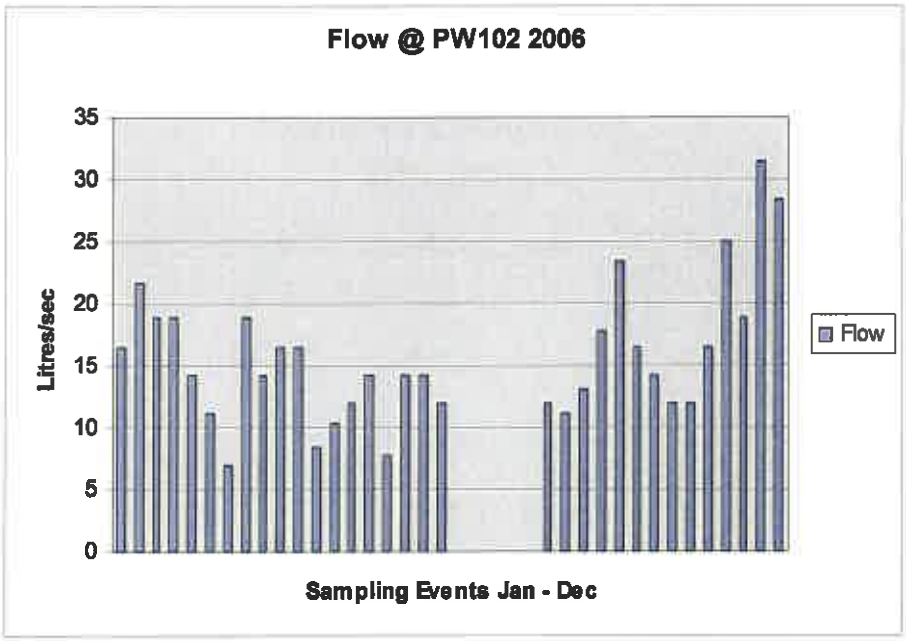
Surface Water Discharge Monitoring Results PW102





Note: Missing data relates to no emissions due to factory down for overhaul

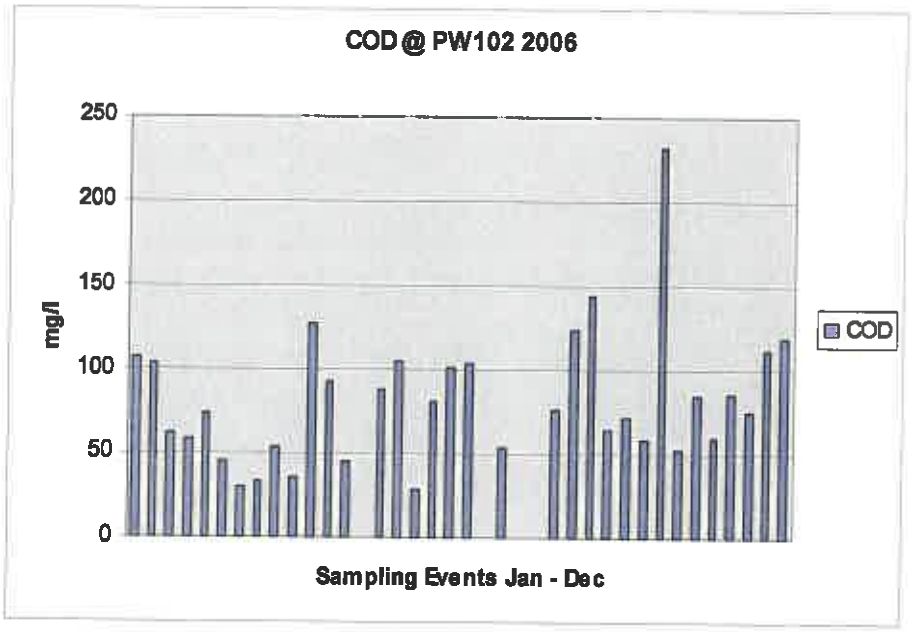


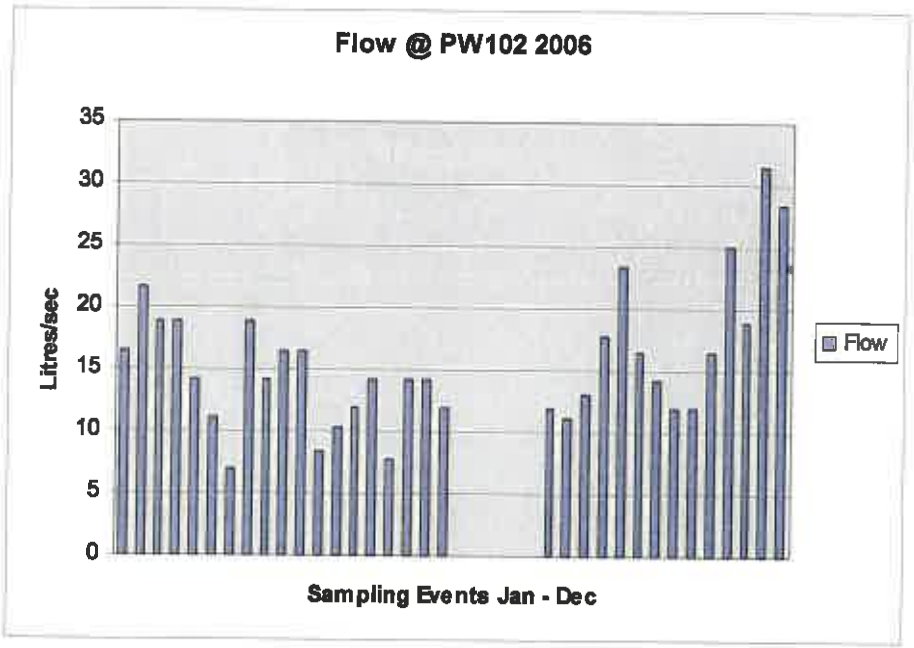


Note: Missing data relates to no emissions due to factory down for overhaul

APPENDIX 4

Surface Water Discharge Monitoring Results Composite





Note: Missing data relates to no emissions due to factory down for overhaul

APPENDIX 4

Surface Water Discharge Monitoring Results Composite

APPENDIX 4

Surface Water Discharge Monitoring Results Composite

Bord Na Mona Energy Ltd, Littleton Group, Littleton, Thurles, Co Tipperary.

Composite Sampler Results 2006

Month				Parameters								Daily Totals		
Jan-06	pH	COD	Ammonia as	Total	Suspended	Total	Colour	Flow	COD	Ammonia as	Total	Suspended	Total
SW	22	mg/l	N mg/l	Phosphorus	Solids	Solids	Pt/Co	Daily	Kg/Day	Kg/Day	Phosphorus	Solids	Solids
				mg/l	mg/l	mg/l	units	Total (litres)			Kg/Day	Kg/Day	Kg/Day
1					4	312		11906260				47.63	3714.75
2					4	370		10164240				40.66	3760.77
3	8.2	54	0.24	0.05	4	412	145	11088950	598.80	2.66	0.55	44.36	4568.65
4					4	402		11665290				46.66	4689.45
5					5	418		12162580				60.81	5083.96
6					4	431		12545360				50.18	5407.05
7					4	442		12908850				51.64	5705.71
8					4	436		13403340				53.61	5843.86
9					4	442		14038450				56.15	6204.99
10	8.2	39	0.34	0.05	4	432	84	16259200	634.11	5.53	0.81	65.04	7023.97
11					4	258		23650780				94.60	6101.90
12					4	312		19219040				76.88	5996.34
13					6	310		28134960				168.81	8721.84
14					5	274		24606580				123.03	6742.20
15					9	348		26040720				234.37	9062.17
16					19	266		32983790				626.69	8773.69
17	7.5	74	0.32	0.05	11	302	201	27337320	2022.96	8.75	1.37	300.71	8255.87
18					6	350		23562630				141.38	8246.92
19					9	416		23687370				213.19	9853.95
20					4	272		23953150				95.81	6515.26
21					4	320		23959680				95.84	7667.10
22					4	411		24145470				96.58	9923.79
23					4	318		24332520				97.33	7737.74
24	8.5	55	0.16	0.13	6	356	126	24129770	1327.14	3.86	3.14	144.78	8590.20
25					4	410		23953330				95.81	9820.87
26					5	408		24234690				121.17	9887.75
27					12	416		24406600				292.88	10153.15
28					4	414		24579630				98.32	10175.97
29					10	442		24831410				248.31	10975.48
30					6	418		24953620				149.72	10430.61
31	8	15	0.42	0.06	16	446	52	25023490	375.35	10.51	1.50	400.38	11160.48

A minus figure usually means the pond was flooded or backflowing

Bord Na Mona Energy Ltd, Littleton Group Littleton, Thurles, Co Tipperary.

Composite Sampler Results 2006

Month				Parameters							Daily Totals		
Feb	pH	COD	Ammonia as	Total	Suspended	Total	Colour	Flow	COD	Ammonia as	Total	Suspended	Total
SW	22	mg/l	N mg/l	Phosphorus	Solids	Solids	Pt Co	Daily	Kg/Day	Kg/Day	Phosphorus	Solids	Solids
				mg/l	mg/l	mg/l	units	Total (litres)			Kg/Day	Kg/Day	Kg/Day
1					4	388		25298530				101.19	9815.83
2					4	266		25441950				101.77	6767.56
3					4	252		25322690				101.29	6381.32
4					4	384		25404400				101.62	9755.29
5					4	304		25183860				100.74	7655.89
6					4	260		25000650				100.00	6500.17
7	8.2	36	0.21	0.05	7	192	54	24975070	899.10	5.24	1.25	174.83	4795.21
8					4	64		25310280				101.24	1619.86
9					4	460		25293210				101.17	11634.88
10					4	338		25317130				101.27	8557.19
11					4	306		25551750				102.21	7818.84
12					4	232		25941750				103.77	6018.49
13					4	354		26062260				104.25	9226.04
14	8.1	34	0.14	0.05	4	290	56	27431850	932.68	3.84	1.37	109.73	7955.24
15					5	264		31081590				155.41	8205.54
16					4	294		31287090				125.15	9198.40
17					4	226		34317280				137.27	7755.71
18					6	252		29982110				179.89	7555.49
19					4	352		28437220				113.75	10009.90
20					4	380		28190180				112.76	10712.27
21	8	43	0.43	0.05	4	374	127	27614390	1187.42	11.87	1.38	110.46	10327.78
22					4	426		27483450				109.93	11707.95
23					4	222		27591330				110.37	6125.28
24					4	428		28062670				112.25	12010.82
25					4	430		28079300				112.32	12074.10
26					4	414		27833690				111.33	11523.15
27					5	464		27773470				138.87	12886.89
28	8.3	23	0.26	0.05	4	448	66	28006590	644.15	7.28	1.40	112.03	12546.95

A minus figure usually means the pond was flooded or backflowing

Bord Na Mona Energy Ltd, Littleton Group Littleton, Thurles, Co Tipperary.

Composite Sampler Results 2006

Mar	pH	COD	Ammonia as	Total	Suspended	Total	Colour	Flow	COD	Ammonia as	Total	Suspended	Total
SW	22	mg/l	N mg/l	Phosphorus	Solids	Solids	Pt Co	Daily	Kg/Day	Kg/Day	Phosphorus	Solids	Solids
				mg/l	mg/l	mg/l	units	Total (litres)			Kg/Day	Kg/Day	Kg/Day
1					4	404		27826920				111.31	11242.08
2					4	402		27709700				110.84	11139.30
3					4	432		27519040				110.08	11888.23
4					5	410		27183950				135.92	11145.42
5					4	414		27272450				109.09	11290.79
6					7	428		26926500				188.49	11524.54
7	8.2	34	0.3	0.05	4	412	52	27430120	932.62	8.23	1.37	109.72	11301.21
8					4	342		28115970				112.46	9615.66
9					4	328		28282580				113.13	9276.69
10					4	328		28809550				115.24	9449.53
11					4	312		28221850				112.89	8805.22
12					4	224		32147050				128.59	7200.94
13					4	306		31239020				124.96	9559.14
14	7.8	64	0.57	0.05	10	252	196	33600860	2150.46	19.15	1.68	336.01	8467.42
15					4	270		30578650				122.31	8256.24
16					4	340		30030080				120.12	10210.23
17					4	406		29637350				118.55	12032.76
18					4	352		29572630				118.29	10409.57
19					4	430		29540170				118.16	12702.27
20					4	452		29419070				117.68	13297.42
21	8.2	39	0.19	0.05	4	418	70	29285600	1142.14	5.56	1.46	117.14	12241.38
22					4	404		29209850				116.84	11800.78
23					4	318		29238600				116.95	9297.87
24					4	426		29870420				119.48	12724.80
25					4	354		30730660				122.92	10878.65
26					4	316		31903540				127.61	10081.52
27					6	202		35190680				211.14	7108.52
28	8.1	63	0.22	0.05	4	274	201	33003110	2079.20	7.26	1.65	132.01	9042.85
29					4	364		31666560				126.67	11526.63
30					4	684		33605070				134.42	22985.87
31					4	292		36145790				144.58	10554.57

A minus figure usually means the pond was flooded or backflowing

Bord Na Mona Energy Ltd, Littleton Group Littleton, Thurles, Co Tipperary.

Composite Sampler Results 2006

Apr	pH	COD	Ammonia as	Total	Suspended	Total	Colour	Flow	COD	Ammonia as	Total	Suspended	Total
SW	22	mg/l	N mg/l	Phosphorus	Solids	Solids	Pt Co	Daily	Kg/Day	Kg/Day	Phosphorus	Solids	Solids
				mg/l	mg/l	mg/l	units	Total (litres)			Kg/Day	Kg/Day	Kg/Day
1					4	350		27826920				111.31	9739.42
2					4	314		27709700				110.84	8700.85
3					4	384		27519040				110.08	10567.31
4	8.6	64	0.11	0.05	4	50	136	27183950	1739.77	2.99	1.36	108.74	1359.20
5					4	438		27272450				109.09	11945.33
6					4	428		26926500				107.71	11524.54
7					4	470		27430120				109.72	12892.16
8					4	446		28115970				112.46	12539.72
9					4	466		28282580				113.13	13179.68
10					4	412		28809550				115.24	11869.53
11	8.4	24	0.1	0.05	4	426	62	28221850	677.32	2.82	1.41	112.89	12022.51
12					4	454		32147050				128.59	14594.76
13					4	444		31239020				124.96	13870.12
14					4	422		33600860				134.40	14179.56
15					4	470		30578650				122.31	14371.97
16					4	456		30030080				120.12	13693.72
17					4	416		29637350				118.55	12329.14
18	8.4	54	0.04	0.05	4	450	54	29572630	1596.92	1.18	1.48	118.29	13307.68
19					5	394		29540170				147.70	11638.83
20					4	420		29419070				117.68	12356.01
21					4	404		29285600				117.14	11831.38
22					4	394		29209850				116.84	11508.68
23					4	360		29238600				116.95	10525.90
24					4	386		29870420				119.48	11529.98
25	8.1	47	0.03	0.05	4	394	120	30730660	1444.34	0.92	1.54	122.92	12107.88
26					4	422		31903540				127.61	13463.29
27					4	424		35190680				140.76	14920.85
28					6	444		33003110				198.02	14653.38
29					4	428		31666560				126.67	13553.29
30					4	452		33605070				134.42	15189.49
					4	404		36145790				144.58	14602.90

A minus figure usually means the pond was flooded or backflowing

Bord Na Mona Energy Ltd, Littleton Group. Littleton, Thurles, Co Tipperary.

Composite Sampler Results 2006

May	pH	COD	Ammonia as	Total	Suspended	Total	Colour	Flow	COD	Ammonia as	Total	Suspended	Total
SW	22	mg/l	N mg/l	Phosphorus	Solids	Solids	Pt-Co	Daily	Kg/Day	Kg/Day	Phosphorus	Solids	Solids
				mg/l	mg/l	mg/l	units	Total (litres)			Kg/Day	Kg/Day	Kg/Day
1					4	404		29383110				117.53	11870.78
2	8.3	48	0.03	0.05	4	424	43	29311810	1406.97	0.88	1.47	117.25	12428.21
3					4	430		29536580				118.15	12700.73
4					4	434		29470510				117.88	12790.20
5					4	413		29487210				117.95	12178.22
6					4	400		29649000				118.60	11859.60
7					4	405		29432090				117.73	11920.00
8					6	426		29412020				176.47	12529.52
9	7.7	39	0.07	0.05	6	308	57	29605540	1154.62	2.07	1.48	177.63	9118.51
10					25	328		29736130				743.40	9753.45
11					28	360		29392570				822.99	10581.33
12					4	364		29140590				116.56	10607.17
13					35	386		31339840				1096.89	12097.18
14					22	370		30600640				673.21	11322.24
15					29	370		30883190				895.61	11426.78
16	8.4	24	0.02	0.05	27	360	68	31188050	748.51	0.62	1.56	842.08	11227.70
17					4	299		31009190				124.04	9271.75
18					8	316		31877920				255.02	10073.42
19					4	298		32361110				129.44	9643.61
20					4	284		31993570				127.97	9086.17
21					4	322		33698130				134.79	10850.80
22					4	232		45385350				181.54	10529.40
23	8.1	75	0.17	0.05	4	298	228	32903380	2467.75	5.59	1.65	131.61	9805.21
24					4	380		32136870				128.55	12212.01
25					4	388		31759540				127.04	12322.70
26					4	236		32324340				129.30	7628.54
27					4	306		31653690				126.61	9686.03
28					4	224		31188100				124.75	6986.13
29					4	362		30911350				123.65	11189.91
30	8	37	0.15	0.05	4	394	125	30128610	1114.76	4.52	1.51	120.51	11870.67
31					4	386		29839660				119.36	11518.11

A minus figure usually means the pond was flooded or backflowing

Bord Na Mona Energy Ltd, Littleton Group, Littleton, Thurles, Co Tipperary.

Composite Sampler Results 2006

Jun	pH	COD	Ammonia as	Total	Suspended	Total	Colour	Flow	COD	Ammonia as	Total	Suspended	Total
SW	22	mg/l	N mg/l	Phosphorus	Solids	Solids	Pt Co	Daily	Kg/Day	Kg/Day	Phosphorus	Solids	Solids
				mg/l	mg/l	mg/l	units	Total (litres)			Kg/Day	Kg/Day	Kg/Day
1					4	328		29899250				119.60	9806.95
2					5	358		28845410				144.23	10326.66
3					4	366		28270780				113.08	10347.11
4					4	436		27766450				111.07	12106.17
5					4	410		27174440				108.70	11141.52
6	8.2	34	0.03	0.05	4	568	73	26359120	896.21	0.79	1.32	105.44	14971.98
7					4	404		26158860				104.64	10568.18
8					5	426		25904640				129.52	11035.38
9					5	390		25717320				128.59	10029.75
10					4	422		25783570				103.13	10880.67
11					4	426		25565110				102.26	10890.74
12					5	444		25247720				126.24	11209.99
13	8.4	51	0.02	0.12	5	388	51	24983650	1274.17	0.50	3.00	124.92	9693.66
14					4	394		22449150				89.80	8844.97
15					4	390		20642700				82.57	8050.65
16					4	490		19234450				76.94	9424.88
17					4	450		18386410				73.55	8273.88
18					4	384		19580270				78.32	7518.82
19					4	381		20790760				83.16	7921.28
20	8.4	27	0.07	0.09	4	374	83	19509990	526.77	1.37	1.76	78.04	7296.74
21					4	366		18326910				73.31	6707.65
22					4	364		15070460				60.28	5485.65
23					4	366		17370950				69.48	6357.77
24					4	398		24715930				98.86	9836.94
25					4	376		23605490				94.42	8875.66
26					4	382		19596710				78.39	7485.94
27	8.3	30	0.03	0.07	4	278	51	18488820	554.66	0.55	1.29	73.96	5139.89
28					4	366		18136720				72.55	6638.04
29					4	364		16503960				66.02	6007.44
30					4	386		18355600				73.42	7085.26
												0.00	0.00

A minus figure usually means the pond was flooded or backflowing

Bord Na Mona Energy Ltd, Littleton Group- Littleton, Thurles, Co Tipperary.

Composite Sampler Results 2006

Jun	pH	COD	Ammonia as	Total	Suspended	Total	Colour	Flow	COD	Ammonia as	Total	Suspended	Total
SW	22	mg/l	N mg/l	Phosphorus	Solids	Solids	Pt Co	Daily	Kg/Day	Kg/Day	Phosphorus	Solids	Solids
				mg/l	mg/l	mg/l	units	Total (litres)			Kg/Day	Kg/Day	Kg/Day
1					4	328		29899250				119.60	9806.95
2					5	358		28845410				144.23	10326.66
3					4	366		28270780				113.08	10347.11
4					4	436		27766450				111.07	12106.17
5					4	410		27174440				108.70	11141.52
6	8.2	34	0.03	0.05	4	568	73	26359120	896.21	0.79	1.32	105.44	14971.98
7					4	404		26158860				104.64	10568.18
8					5	426		25904640				129.52	11035.38
9					5	390		25717320				128.59	10029.75
10					4	422		25783570				103.13	10880.67
11					4	426		25565110				102.26	10890.74
12					5	444		25247720				126.24	11209.99
13	8.4	51	0.02	0.12	5	388	51	24983650	1274.17	0.50	3.00	124.92	9693.66
14					4	394		22449150				89.80	8844.97
15					4	390		20642700				82.57	8050.65
16					4	490		19234450				76.94	9424.88
17					4	450		18386410				73.55	8273.88
18					4	384		19580270				78.32	7518.82
19					4	381		20790760				83.16	7921.28
20	8.4	27	0.07	0.09	4	374	83	19509990	526.77	1.37	1.76	78.04	7296.74
21					4	366		18326910				73.31	6707.65
22					4	364		15070460				60.28	5485.65
23					4	366		17370950				69.48	6357.77
24					4	398		24715930				98.86	9836.94
25					4	376		23605490				94.42	8875.66
26					4	382		19596710				78.39	7485.94
27	8.3	30	0.03	0.07	4	278	51	18488820	554.66	0.55	1.29	73.96	5139.89
28					4	366		18136720				72.55	6638.04
29					4	364		16503960				66.02	6007.44
30					4	386		18355600				73.42	7085.26
												0.00	0.00

A minus figure usually means the pond was flooded or backflowing

Bord Na Mona Energy Ltd, Littleton Group. Littleton, Thurles, Co Tipperary.

Composite Sampler Results 2006

July	pH	COD	Ammonia as	Total	Suspended	Total	Colour	Flow	COD	Ammonia as	Total	Suspended	Total
SW	22	mg/l	N mg/l	Phosphorus	Solids	Solids	Pt.Co	Daily	Kg/Day	Kg/Day	Phosphorus	Solids	Solids
				mg/l	mg/l	mg/l	units	Total (litres)			Kg/Day	Kg/Day	Kg/Day
1					4	398		15343040				61.37	6106.53
2					4	376		14208030				56.83	5342.22
3					4	382		13831990				55.33	5283.82
4	8.3	30	0.03	0.07	4	278	51	9932335	297.97	0.30	0.70	39.73	2761.19
5					4	381		880157				3.52	335.34
6					4	340		880157				3.52	299.25
7					4	354		880157				3.52	311.58
8					4	266		880157				3.52	234.12
9					4	386		880157				3.52	339.74
10					4	354		894756				3.58	316.74
11	8.2	39	0.04	0.05	4	380	63	1065323	41.55	0.04	0.05	4.26	404.82
12					26	482		862172				22.42	415.57
13					6	382		730991				4.39	279.24
14					20	426		154271				3.09	65.72
15					15	348		256656				3.85	89.32
16					8	412		167344				1.34	68.95
17					15	405		78762				1.18	31.90
18	8.7	47	0.15	0.15	31	400	61	115420	5.42	0.02	0.02	3.58	46.17
19	no flow due to mine dewatering							104710	0.00	0.00	0.00	0.00	0.00
20	no flow due to mine dewatering							2191943	0.00	0.00	0.00	0.00	0.00
21	no flow due to mine dewatering							5051289	0.00	0.00	0.00	0.00	0.00
22	no flow due to mine dewatering							5051289	0.00	0.00	0.00	0.00	0.00
23	no flow due to mine dewatering							5051289	0.00	0.00	0.00	0.00	0.00
24	no flow due to mine dewatering							5051289	0.00	0.00	0.00	0.00	0.00
25	no flow due to mine dewatering							5051289	0.00	0.00	0.00	0.00	0.00
26	no flow due to mine dewatering							5051289	0.00	0.00	0.00	0.00	0.00
27	no flow due to mine dewatering							5051289	0.00	0.00	0.00	0.00	0.00
28	no flow due to mine dewatering							5051289	0.00	0.00	0.00	0.00	0.00
29	no flow due to mine dewatering							5051289	0.00	0.00	0.00	0.00	0.00
30	no flow due to mine dewatering							5051289	0.00	0.00	0.00	0.00	0.00
31	no flow due to mine dewatering							5051289	0.00	0.00	0.00	0.00	0.00

A minus figure usually means the pond was flooded or backflowing

Bord Na Mona Energy Ltd, Littleton Group, Littleton, Thurles, Co Tipperary.

Composite Sampler Results 2006

Aug	pH	COD	Ammonia as	Total	Suspended	Total	Colour	Flow	COD	Ammonia as	Total	Suspended	Total
SW	22	mg/l	N mg/l	Phosphorus	Solids	Solids	Pt Co	Daily	Kg/Day	Kg/Day	Phosphorus	Solids	Solids
				mg/l	mg/l	mg/l	units	Total (litres)			Kg/Day	Kg/Day	Kg/Day
1	no flow due to mine dewatering							5051289	0.00	0.00	0.00	0.00	0.00
2	no flow due to mine dewatering							5051289	0.00	0.00	0.00	0.00	0.00
3	no flow due to mine dewatering							5051289	0.00	0.00	0.00	0.00	0.00
4	no flow due to mine dewatering							5051289	0.00	0.00	0.00	0.00	0.00
5	no flow due to mine dewatering							5051289	0.00	0.00	0.00	0.00	0.00
6	no flow due to mine dewatering							5051289	0.00	0.00	0.00	0.00	0.00
7	no flow due to mine dewatering							5051289	0.00	0.00	0.00	0.00	0.00
8	no flow due to mine dewatering							5051289	0.00	0.00	0.00	0.00	0.00
9	no flow due to mine dewatering							5051289	0.00	0.00	0.00	0.00	0.00
10	no flow due to mine dewatering							5051289	0.00	0.00	0.00	0.00	0.00
11	no flow due to mine dewatering							5051289	0.00	0.00	0.00	0.00	0.00
12	no flow due to mine dewatering							5051289	0.00	0.00	0.00	0.00	0.00
13	no flow due to mine dewatering							5051289	0.00	0.00	0.00	0.00	0.00
14	no flow due to mine dewatering							5051289	0.00	0.00	0.00	0.00	0.00
15	no flow due to mine dewatering							5051289	0.00	0.00	0.00	0.00	0.00
16	no flow due to mine dewatering							5051289	0.00	0.00	0.00	0.00	0.00
17	no flow due to mine dewatering							5051289	0.00	0.00	0.00	0.00	0.00
18	no flow due to mine dewatering							5051289	0.00	0.00	0.00	0.00	0.00
19	no flow due to mine dewatering							5051289	0.00	0.00	0.00	0.00	0.00
20	no flow due to mine dewatering							5051289	0.00	0.00	0.00	0.00	0.00
21	no flow due to mine dewatering							5051289	0.00	0.00	0.00	0.00	0.00
22	no flow due to mine dewatering							5051289	0.00	0.00	0.00	0.00	0.00
23	no flow due to mine dewatering							5051289	0.00	0.00	0.00	0.00	0.00
24	no flow due to mine dewatering							5051289	0.00	0.00	0.00	0.00	0.00
25	no flow due to mine dewatering							5051289	0.00	0.00	0.00	0.00	0.00
26	no flow due to mine dewatering							5051289	0.00	0.00	0.00	0.00	0.00
27	no flow due to mine dewatering							5051289	0.00	0.00	0.00	0.00	0.00
28	no flow due to mine dewatering							5051289	0.00	0.00	0.00	0.00	0.00
29	no flow due to mine dewatering							5051289	0.00	0.00	0.00	0.00	0.00
30	no flow due to mine dewatering							5051289	0.00	0.00	0.00	0.00	0.00
31	no flow due to mine dewatering							5051289	0.00	0.00	0.00	0.00	0.00

A minus figure usually means the pond was flooded or backflowing

Bord Na Mona Energy Ltd, Littleton Group. Littleton, Thurles, Co Tipperary.

Composite Sampler Results 2006

Sep	pH	COD	Ammonia a	Total	Suspended	Total	Colour	Flow	COD	Ammonia a	Total	Suspended	Total
SW	22	mg/l	N mg/l	Phosphorus	Solids	Solids	Pt Co	Daily	Kg/Day	Kg/Day	Phosphorus	Solids	Solids
				mg/l	mg/l	mg/l	units	Total (litres)			Kg/Day	Kg/Day	Kg/Day
1	no flow due to mine dewatering							5051289	0.00	0.00	0.00	0.00	0.00
2	no flow due to mine dewatering							5051289	0.00	0.00	0.00	0.00	0.00
3	no flow due to mine dewatering							5051289	0.00	0.00	0.00	0.00	0.00
4	no flow due to mine dewatering							5051289	0.00	0.00	0.00	0.00	0.00
5	no flow due to mine dewatering							5051289	0.00	0.00	0.00	0.00	0.00
6	no flow due to mine dewatering							5051289	0.00	0.00	0.00	0.00	0.00
7	no flow due to mine dewatering							5051289	0.00	0.00	0.00	0.00	0.00
8	no flow due to mine dewatering							5051289	0.00	0.00	0.00	0.00	0.00
9	no flow due to mine dewatering							5051289	0.00	0.00	0.00	0.00	0.00
10	no flow due to mine dewatering							5051289	0.00	0.00	0.00	0.00	0.00
11	no flow due to mine dewatering							5051289	0.00	0.00	0.00	0.00	0.00
12	no flow due to mine dewatering							5051289	0.00	0.00	0.00	0.00	0.00
13	no flow due to mine dewatering							5051289	0.00	0.00	0.00	0.00	0.00
14	no flow due to mine dewatering							5051289	0.00	0.00	0.00	0.00	0.00
15	no flow due to mine dewatering							5051289	0.00	0.00	0.00	0.00	0.00
16	no flow due to mine dewatering							5051289	0.00	0.00	0.00	0.00	0.00
17	no flow due to mine dewatering							5051289	0.00	0.00	0.00	0.00	0.00
18	no flow due to mine dewatering							5051289	0.00	0.00	0.00	0.00	0.00
19	no flow due to mine dewatering							5051289	0.00	0.00	0.00	0.00	0.00
20					4	229		5221993				20.89	1195.84
21					7	220		8256094				57.79	1816.34
22					11	246		7008464				77.09	1724.08
23					20	226		11277090				225.54	2548.62
24					14	212		15807420				221.30	3351.17
25					7	242		7445601				52.12	1801.84
26	7.7	50	0.45	0.05	6	258	279	3985851	199.29	1.79	0.20	23.92	1028.35
27					7	260		5108428				35.76	1328.19
28					8	298		5557092				44.46	1656.01
29					4	232		5106118				20.42	1184.62
30					4	283		4734112				18.94	1339.75

A minus figure usually means the pond was flooded or backflowing

Bord Na Mona Energy Ltd, Littleton Group, Littleton, Thurles, Co Tipperary.

Composite Sampler Results 2006

Oct	pH	COD	Ammonia as	Total	Suspended	Total	Colour	Flow	COD	Ammonia as	Total	Suspended	Total
SW	22	mg/l	N mg/l	Phosphorus	Solids	Solids	Pt Co	Daily	Kg/Day	Kg/Day	Phosphorus	Solids	Solids
				mg/l	mg/l	mg/l	units	Total (litres)			Kg/Day	Kg/Day	Kg/Day
1					10	228		6628239				66.28	1511.24
2					5	260		5162766				25.81	1342.32
3	7.7	81	0.09	0.05	4	276	291	4563399	369.64	0.41	0.23	18.25	1259.50
4					5	306		4213129				21.07	1289.22
5					4	306		5065948				20.26	1550.18
6					4	232		5808735				23.23	1347.63
7					9	304		5030588				45.28	1529.30
8					4	314		4465278				17.86	1402.10
9					4	348		5303922				21.22	1845.76
10	7.7	83	0.21	0.05	4	278	281	4980700	413.40	1.05	0.25	19.92	1384.63
11					4	270		7005244				28.02	1891.42
12					4	282		5830802				23.32	1644.29
13					4	322		5266471				21.07	1695.80
14					4	348		5043073				20.17	1754.99
15					4	364		4674189				18.70	1701.40
16					6	364		4459520				26.76	1623.27
17	7.9	86	0.06	0.05	4	390	177	4789398	411.89	0.29	0.24	19.16	1867.87
18					4	239		6581683				26.33	1573.02
19					4	302		5689500				22.76	1718.23
20					4	330		6311320				25.25	2082.74
21					4	288		6302028				25.21	1814.98
22					7	274		14552130				101.86	3987.28
23					8	244		9616257				76.93	2346.37
24	7.8	85	0.03	0.05	11	358	276	5804125	493.35	0.17	0.29	63.85	2077.88
25					4	334		7195749				28.78	2403.38
26					10	286		21452100				214.52	6135.30
27					10	246		19994910				199.95	4918.75
28					8	288		14215880				113.73	4094.17
29					8	330		7384048				59.07	2436.74
30					4	390		6052894				24.21	2360.63
31	7.9	62	0.02	0.05	11	426	166	5877192	364.39	0.12	0.29	64.65	2503.68

A minus figure usually means the pond was flooded or backflowing

Bord Na Mona Energy Ltd, Littleton Group, Littleton, Thurles, Co Tipperary.

Composite Sampler Results 2006

Nov	pH	COD	Ammonia as	Total	Suspended	Total	Colour	Flow	COD	Ammonia as	Total	Suspended	Total
SW	22	mg/l	N mg/l	Phosphorus	Solids	Solids	Pt.Co	Daily	Kg/Day	Kg/Day	Phosphorus	Solids	Solids
				mg/l	mg/l	mg/l	units	Total (litres)			Kg/Day	Kg/Day	Kg/Day
1					4	436		5581393				22.33	2433.49
2					4	448		5219179				20.88	2338.19
3					4	462		4979075				19.92	2300.33
4					4	472		4854057				19.42	2291.11
5					4	478		4713122				18.85	2252.87
6					4	466		4738162				18.95	2207.98
7	8	48	0.04	0.16	4	480	81	4913086	235.83	0.20	0.79	19.65	2358.28
8					4	468		5159295				20.64	2414.55
9					4	452		5180007				20.72	2341.36
10					4	428		4958270				19.83	2122.14
11					4	472		5161963				20.65	2436.45
12					4	470		4450105				17.80	2091.55
13					4	418		5174390				20.70	2162.90
14	8.3	39	0.03	0.05	4	472	86	5112618	199.39	0.15	0.26	20.45	2413.16
15					4	472		6930324				27.72	3271.11
16					4	340		19042440				76.17	6474.43
17					4	332		15569860				62.28	5169.19
18					4	344		13590450				54.36	4675.11
19					4	372		9359214				37.44	3481.63
20					13	350		14747580				191.72	5161.65
21	7.7	84	0.12	0.05	4	374	218	10946110	919.47	1.31	0.55	43.78	4093.85
22					4	346		7140968				28.56	2470.77
23					4	320		12572430				50.29	4023.18
24					4	335		11783830				47.14	3947.58
25					4	288		15912700				63.65	4582.86
26					4	336		10188310				40.75	3423.27
27					7	300		15151550				106.06	4545.47
28	7.7	82	0.18	0.05	7	288	218	16649150	1365.23	3.00	0.83	116.54	4794.96
29					13	316		12916340				167.91	4081.56
30					4	350		8553283				34.21	2993.65

A minus figure usually means the pond was flooded or backflowing

Bord Na Mona Energy Ltd, Littleton Group, Littleton, Thurles, Co Tipperary.

Composite Sampler Results 2006

Dec	pH	COD	Ammonia as	Total	Suspended	Total	Colour	Flow	COD	Ammonia as	Total	Suspended	Total
SW	22	mg/l	N mg/l	Phosphorus	Solids	Solids	Pt/Co	Daily	Kg/Day	Kg/Day	Phosphorus	Solids	Solids
				mg/l	mg/l	mg/l	units	Total (litres)			Kg/Day	Kg/Day	Kg/Day
1					61	342		17104780				1043.39	5849.83
2					4	318		15806560				63.23	5026.49
3					9	290		16896230				152.07	4899.91
4					13	292		16842820				218.96	4918.10
5	7.6	70	0.15	0.07	17	305	208	17550320	1228.52	2.63	1.23	298.36	5352.85
6					4	324		17915690				71.66	5804.68
7					4	330		17936460				71.75	5919.03
8					6	324		18359060				110.15	5948.34
9					66	346		16053460				1059.53	5554.50
10					9	330		14843900				133.60	4898.49
11					4	308		17992190				71.97	5541.59
12	7.9	87	0.02	0.12	31	344	177	12066020	1049.74	0.24	1.45	374.05	4150.71
13	sampler being overhauled							5815325				#VALUE!	0.00
14	sampler being overhauled							5815325				0.00	0.00
15	sampler being overhauled							5815325				0.00	0.00
16	sampler being overhauled							5815325				0.00	0.00
17	sampler being overhauled							5815325				0.00	0.00
18	sampler being overhauled							5815325				0.00	0.00
19	sampler being overhauled							5815325				0.00	0.00
20					4	274		5745206				22.98	1574.19
21					4	264		5356365				21.43	1414.08
22					4	266		4963152				19.85	1320.20
23					4	460		4721625				18.89	2171.95
24					4	392		4693851				18.78	1839.99
25					4	295		4484597				17.94	1322.96
26	7.8	60	0.08	0.4	4	432	100	4308560	258.51	0.34	1.72	17.23	1861.30
27					4	152		4999472				20.00	759.92
28					4	360		5326993				21.31	1917.72
29					4	378		7088309				28.35	2679.38
30					5	312		9405969				47.03	2934.66
31						350		6627256				0.00	2319.54

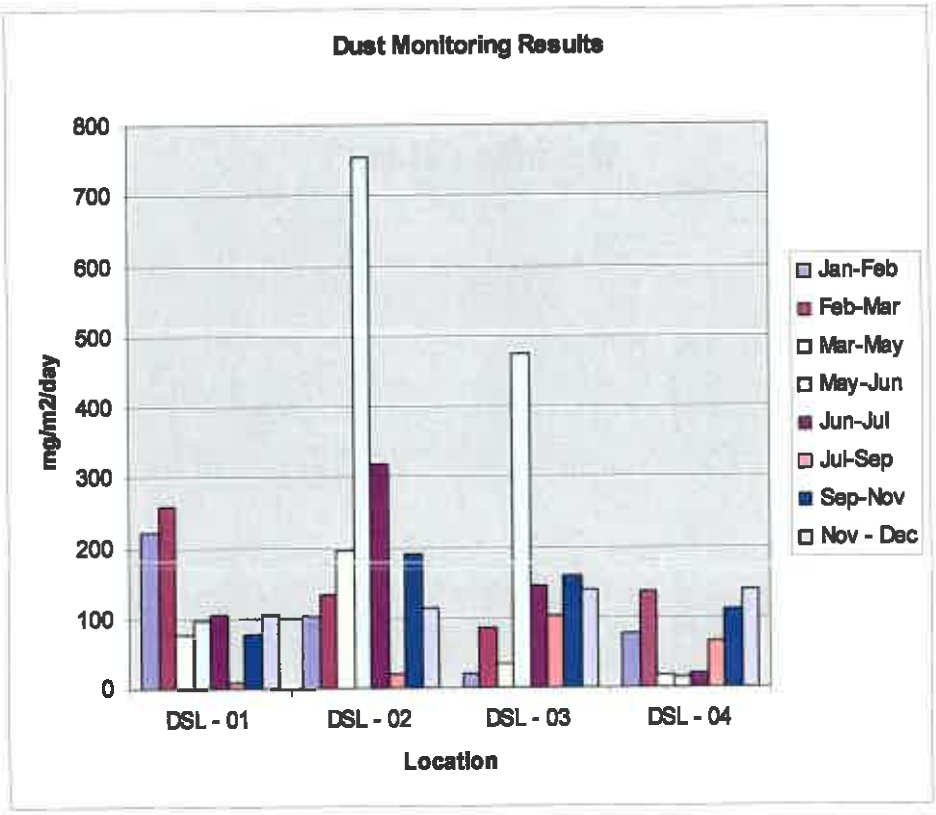
A minus figure usually means the pond was flooded or backflowing

APPENDIX 5

Dust Monitoring Results. (Bogs)

Licence:P0499-01
Works: Littleton 2006

Sample Period	DSL - 01	DSL - 02	DSL - 03	DSL - 04
Jan-Feb	220	103	21	76
Feb-Mar	258	132	86	137
Mar-May	77	197	34	18
May-Jun	96	755	473	14
Jun-Jul	106	318	146	20
Jul-Sep	8	19	103	64
Sep-Nov	78	190	159	110
Nov - Dec	104	113	140	140

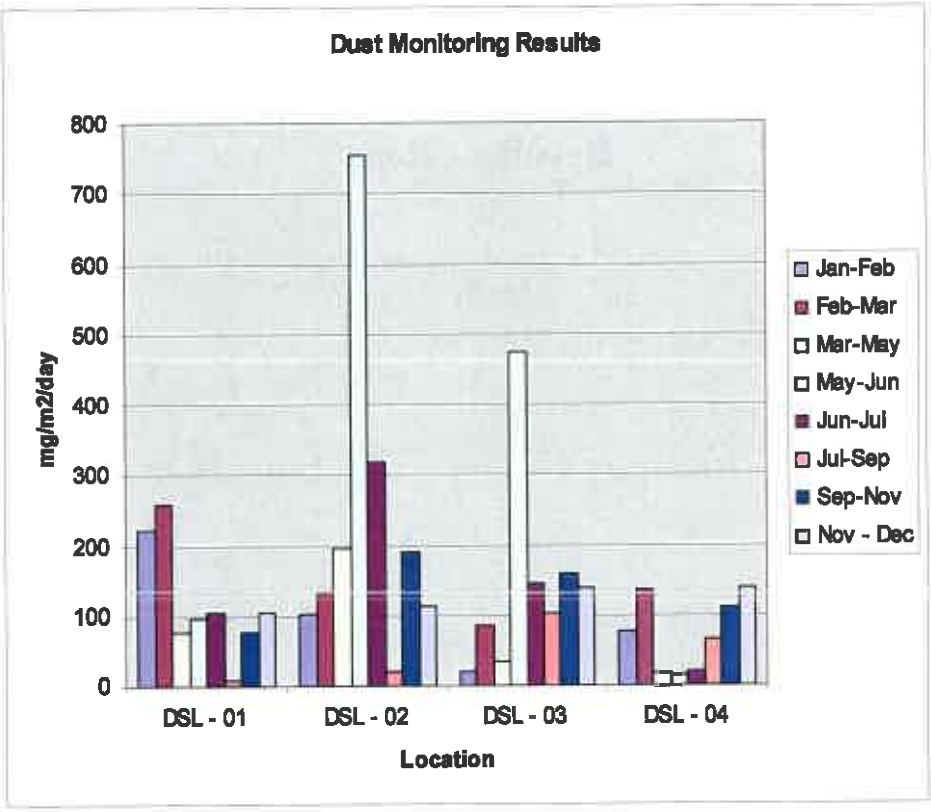


APPENDIX 5

Dust Monitoring Results. (Bogs)

Licence:P0499-01
Works: Littleton 2006

Sample Period	DSL - 01	DSL - 02	DSL - 03	DSL - 04
Jan-Feb	220	103	21	76
Feb-Mar	258	132	86	137
Mar-May	77	197	34	18
May-Jun	96	755	473	14
Jun-Jul	106	318	146	20
Jul-Sep	8	19	103	64
Sep-Nov	78	190	159	110
Nov - Dec	104	113	140	140



APPENDIX 6

Dust Monitoring Results. (Factory)

Summary Results of Emissions to Atmosphere compliance monitoring from the Bord na Móna Fuels Limited Littleton Briquette Factory at Littleton (January 2006 to December 2006) in accordance with the requirements of Integrated Pollution Control Licence Register No. P0499-01.

Report No.: ECS2418

Attention: Mr. Martin Conlan
Bord na Móna Fuels Limited
c/o Littleton Briquette Factory
Thurles
Co. Tipperary

Prepared by: Mr. Sean Creedon
Senior Environmental Consultant

Date: March 2007

Executive Summary

As part of the requirements of Integrated Pollution Control Licence, Register No. P0499-01, Bord na Móna Fuels Limited are required to submit to the Agency, an Annual Environmental Report (AER). Bord na Móna Environmental Limited were commissioned to prepare a summary report of emissions to atmosphere monitored at the Littleton Briquette Factory from the period to January 2006 to December 2006.

This report is certified as accurate and representative of the sampling and associated analysis carried out.

Respectively submitted,

Mr Sean Creedon	***Ms Lisa Blyth***
Senior Environmental Consultant	***Operations Manager***

1.0 INTRODUCTION

A summary of IPC Licence Register No. P0499-01 environmental monitoring results from the period January 2006 to December 2006 are presented as follows:

Table 1: Quarterly Compliance Monitoring of Particulate Emissions to Atmosphere

Table 2: Summary of Quarterly Compliance Monitoring of Particulate Mass Emissions to Atmosphere

Table 3: IPC Licence Particulate Emissions to Atmosphere Emission Limit Values (ELV's)

Table 4: Annual Particulate Mass Emissions to Atmosphere

Table 5: Quarterly Compliance Monitoring of TOC (as C) Emissions to Atmosphere from Emission Point A108

Table 6: Annual TOC (as C) Emissions to Atmosphere from Emission Point A108

Table 7: Annual Compliance Monitoring of NOx (as NO_2) Emissions to Atmosphere from Emission Point B101

Table 8: Annual NOx (as NO_2) Emissions to Atmosphere from Emission Point B101

Table 9: Annual Compliance Monitoring of SO_2 Emissions to Atmosphere from Emission Point B101

Table 10 Annual SO_2 Emissions to Atmosphere from Emission Point B101

Appendix 1

Figures 1-6: Particulate Mass Emissions to Atmosphere (kg) (January 2006 to December 2006) vs. Licence ELV from Emissions Reference Points B101, A101-A105 respectively.

Figure 7: Summary of Particulate Mass Emissions to Atmosphere (kg) (January 2006 to December 2006) from Emissions Reference Points B101, A101-A106.

Note

Figures in bold represent sample results for specific parameters that exceed IPC Licence Emission Limit Values (ELV's).

TABLE 1: QUARTERLY COMPLIANCE MONITORING OF PARTICULATE EMISSIONS TO ATMOSPHERE (JANUARY – DECEMBER 2006)						
Quarter	**Sampling Date**	**Job No.**	**Emission Point Ref.**	**Volumetric Flow (Nm^3/hr)**	**Particulates (mg/Nm^3)**	**Particulate Mass Emissions (kg/hr)**
1	15+16 Mar	ECS1908-A	B101	**42,684**	**1,360**	58.1
			A101	**84,980**	**67.3**	5.7
			A102	**95,661**	**141**	13.5
			A103	**7,493**	146	1.1
			A104	**14,266**	315	4.5
			A105	**9,716**	22.1	0.2
			A106	Note 1	Note 1	Note 1
2	9+10 May	ECS2002-A	B101	**45,239**	**865**	39.1
			A101	**85,154**	**62.6**	5.3
			A102	**88,709**	**179**	15.9
			A103	**6,213**	282	1.8
			A104	**12,136**	822	**9.9**
			A105	**10,450**	**205**	2.1
			A106	Note 1	Note 1	Note 1
3	14, 28+29 Sept	ECS2185-A	B101	**45,945**	**1508**	69.3
			A101	**72,656**	**184**	13.7
			A102	**78,504**	**245**	19.2
			A103	**6,101**	2543	**15.5**
			A104	**11,732**	699	**8.2**
			A105	**9,190**	68.6	0.63
			A106	Note 1	Note 1	Note 1
4	20 Dec	ECS2299-A	Note 2	Note 2	Note 2	Note 2

Note 1 Emission point A106 is not currently suitable for Isokinectic Particulate Sampling as it is undergoing modifications.

Note 2 Not possible to monitor as appropriate iso-kinetic sampling equipment was not available during that period

TABLE 2: SUMMARY OF QUARTERLY COMPLIANCE MONITORING OF PARTICULATE MASS EMISSIONS TO ATMOSPHERE (JANUARY – DECEMBER 2006)				
Emission Point Ref.	**Particulate Mass Emissions during each Quarterly Monitoring Event (kg/hr)**			
	1	**2**	**3**	**4**
B101	58.1	39.1	69.3	Note 2
A101	5.7	5.3	13.7	Note 2
A102	13.5	15.9	19.2	Note 2
A103	1.1	1.8	**15.5**	Note 2
A104	4.5	**9.9**	**8.2**	Note 2
A105	0.2	2.1	0.63	Note 2
A106	Note 1	Note 1	Note 1	Note 1

Note 1 : Emission point A106 is not currently suitable for Isokinectic Particulate Sampling as it is undergoing modifications.

Note 2 Not possible to monitor as appropriate iso-kinetic sampling equipment was not available during that period

TABLE 3: IPC LICENCE PARTICULATE EMISSIONS TO ATMOSPHERE EMISSION LIMIT VALUES (ELV's)				
Emission Point Ref.	**Maximum Volumetric Flow (Nm^3/hr)**	**Particulate ELV (mg/Nm^3 or kg/hr)**	**Particulate ELV (kg/hr)**	***Licensed Annual Particulate Mass Emissions (kg/yr)***
B101	36000	400 mg/Nm^3	14.4	*126144*
A101	34852	50 mg/Nm^3 >0.5kg/hr 150 mg/Nm^3 <0.5kg/hr	5.23max.	*15265* *45796max.*
A102	42400	50 mg/Nm^3 >0.5kg/hr 150 mg/Nm^3 <0.5kg/hr	6.36max.	*18571* *55714max.*
A103	5800	7 kg/hr	7	*61320*
A104	11700	6 kg/hr	6	*52560*
A105	6797	50 mg/Nm^3 >0.5kg/hr 150 mg/Nm^3 <0.5kg/hr	1.02max.	*2977* *8931 max.*
A106	660	50 mg/Nm^3 >0.5kg/hr 150 mg/Nm^3 <0.5kg/hr	0.10max.	*289.1* *867max.*
Maximum Annual Particulates Mass Emissions to Atmosphere Limit			-	*351332*

TABLE 4: ANNUAL PARTICULATE MASS EMISSIONS TO ATMOSPHERE (JANUARY – DECEMBER 2005)				
Location	**Annual Average Mass Emission (kg/hr)**	**Hours Production**	**Annual Particulate Mass Emissions (kg/year)**	***Licensed Annual Particulate Mass Emissions (kg/yr)***
B101	55.5	6034	334887	*126144*
A101	8.2	6034	49478.8	*45796 max.*
A102	16.2	6034	97750.8	*55714 max.*
A103	6.13	6034	36988.42	*61320*
A104	7.53	6034	45436.02	*52560*
A105	0.976	6034	5895.22	*8931 max.*
A106	Note 1	6034	Note 1	*867 max.*
Particulate Mass Emissions to Atmosphere			**570436.3**	*351332*

Note 1 Emission point A106 is not currently suitable for Isokinectic Particulate Sampling as it is undergoing modifications

TABLE 5: QUARTERLY COMPLIANCE MONITORING OF TOC (AS C) EMISSIONS TO ATMOSPHERE FROM EMISSION POINT A108 (JANUARY – DECEMBER 2006)					
Quarter	**Sampling Date**	**Job No.**	**Volumetric Flow (Nm^3/hr)**	**TOC (as C) (mg/Nm^3)**	**TOC (as C) Mass Emissions (kg/hr)**
1	15+16 Mar	ECS1908	1,319	132	0.17
2	9+10 May	ECS2002-A	1,255	75	0.09
3	14, 28+29 Sept	ECS2185-A	1,389	76	0.11
4	20 Dec	ECS2299-A	1,362	91	0.12
IPC Licence ELV's			*6700*	*170*	*1.14*

TABLE 6: ANNUAL TOC (as C) MASS EMISSIONS FROM A108 (JANUARY – DECEMBER 2006)			
Annual Average Mass Emission (kg/hr)	**Hours Production** Note 1	**Annual Mass Emissions (kg/year)**	***Annual Mass Emissions IPC Licence ELV (kg/year)***
0.12	1538.5	184.62	*9978*

Note 1 Operational hours of the Firelighter plant

TABLE 7: ANNUAL COMPLIANCE MONITORING OF NO_x (as NO_2) EMISSIONS TO ATMOSPHERE FROM EMISSION POINT B101 (JANUARY – DECEMBER 2006)					
Annual	**Sampling Date**	**Job No.**	**Volumetric Flow (Nm^3/hr)**	**NO_x (as NO_2) (mg/Nm^3)**	**NO_x (as NO_2) Mass Emissions (kg/hr)**
	15 -16/03/05	ECS1908-A	**42,684**	**289**	12.3
IPC Licence ELV's			*36000*	*100*	*3.6*

TABLE 8: ANNUAL NO_x (as NO_2) MASS EMISSIONS FROM B101 (JANUARY – DECEMBER 2006)			
Annual Average Mass Emission (kg/hr) Note 1	**Hours Production**	**Annual Mass Emissions (kg/year)**	***Annual Mass Emissions IPC Licence ELV (kg/year)***
12.3	6034	**74,218**	*31,536*

Note 1 Based on results from one monitoring event

TABLE 9: ANNUAL COMPLIANCE MONITORING OF SO_2 EMISSIONS TO ATMOSPHERE FROM EMISSION POINT B101 (JANUARY – DECEMBER 2006)					
Annual	**Sampling Date**	**Job No.**	**Volumetric Flow (Nm^3/hr)**	**SO_2 (mg/Nm^3)**	**SO_2 Mass Emissions (kg/hr)**
	15 -16/03/05	ECS1908-A	**42,684**	31	1.32
IPC Licence ELV's			*36000*	*1000*	*36*

TABLE 10: ANNUAL MASS SO_2 EMISSIONS FROM B101 (JANUARY – DECEMBER 2006)			
Annual Average Mass Emission (kg/hr) Note 1	**Hours Production**	**Annual Mass Emissions (kg/year)**	***Annual Mass Emissions IPC Licence ELV (kg/year)***
1.32	6034	7,964	*315,360*

Note 1 Based on results from one monitoring event

APPENDIX 1

Figure 1: Particulate Mass Emissions to Atmosphere (kg/hr) (January to December 2006) vs. Licence ELV from Emissions Reference Point B101 – Data point 5 is the average yearly emission

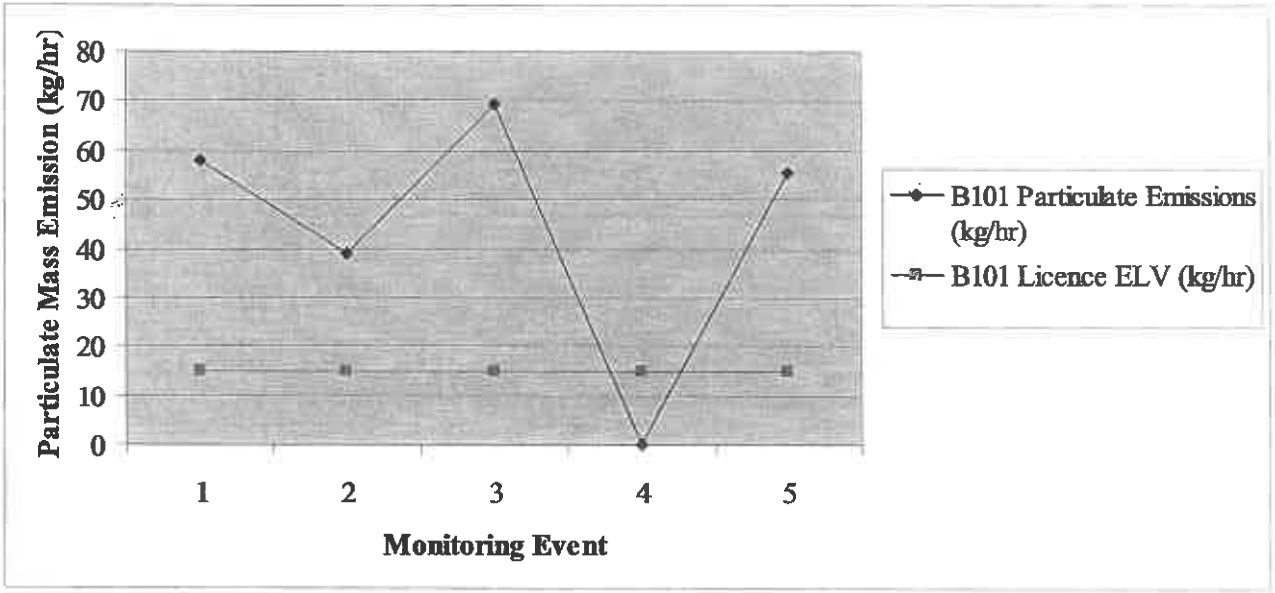


Figure 2: Particulate Mass Emissions to Atmosphere (kg/hr) (January to December 2006) vs. Licence ELV from Emissions Reference Point A101– Data point 5 is the average yearly emission

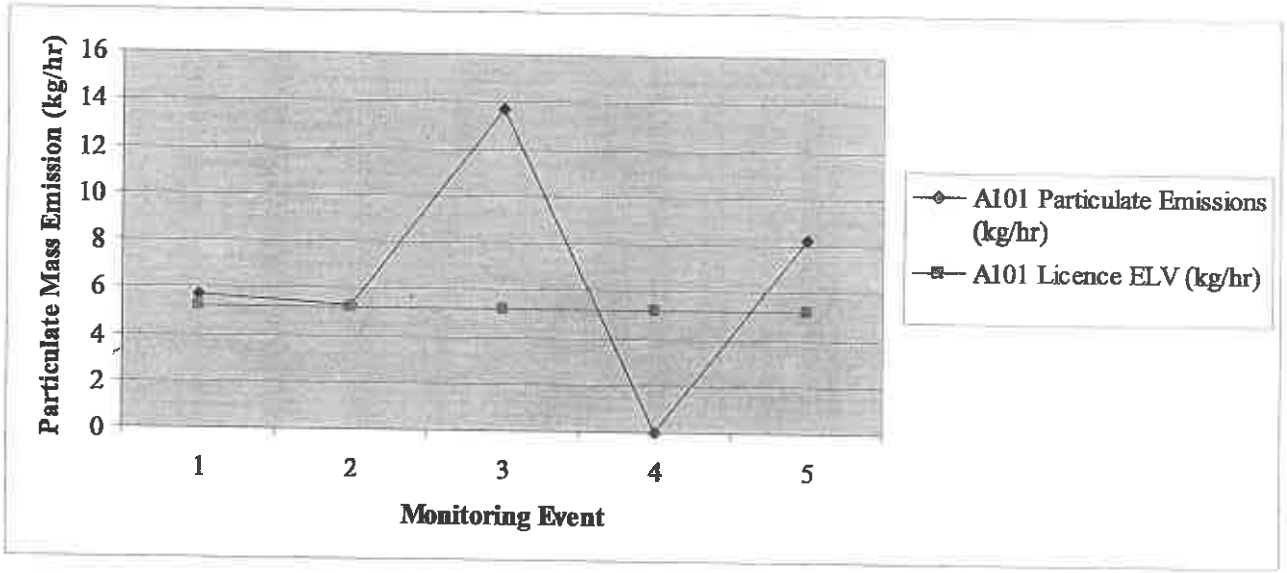


Figure 3: Particulate Mass Emissions to Atmosphere (kg/hr) (January to December 2006) vs. Licence ELV from Emissions Reference Point A102– Data point 5 is the average yearly emission

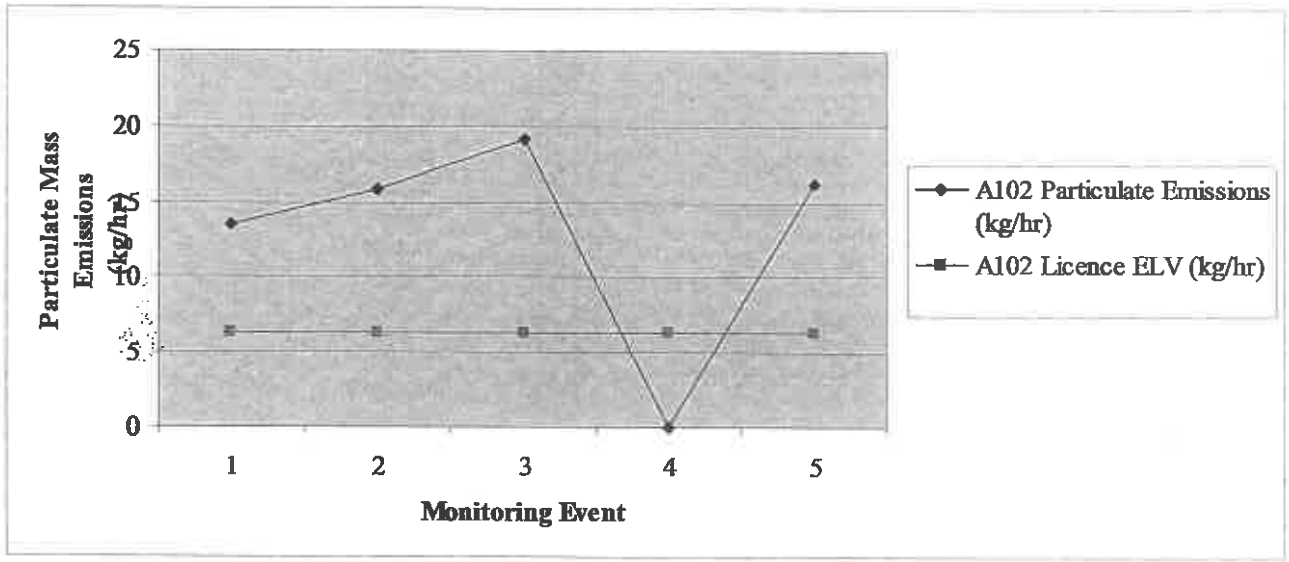


Figure 4: Particulate Mass Emissions to Atmosphere (kg/hr) (January to December 2006) vs. Licence ELV from Emissions Reference Point A103– Data point 5 is the average yearly emission

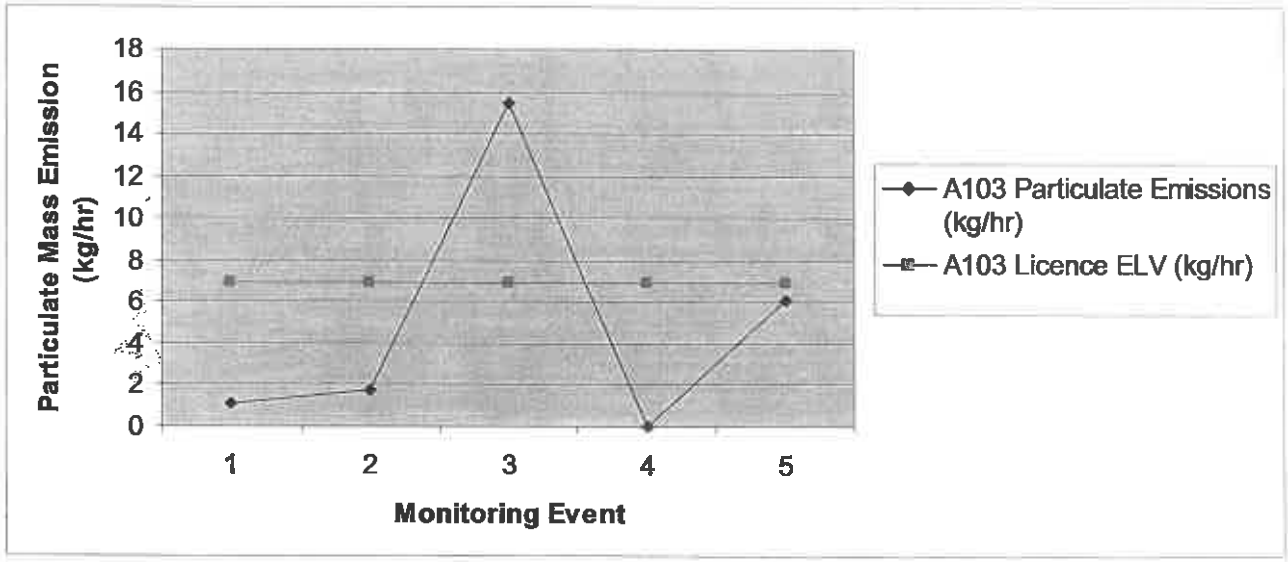


Figure 5: Particulate Mass Emissions to Atmosphere (kg/hr) (January to December 2006) vs. Licence ELV from Emissions Reference Point A104– Data point 5 is the average yearly emission

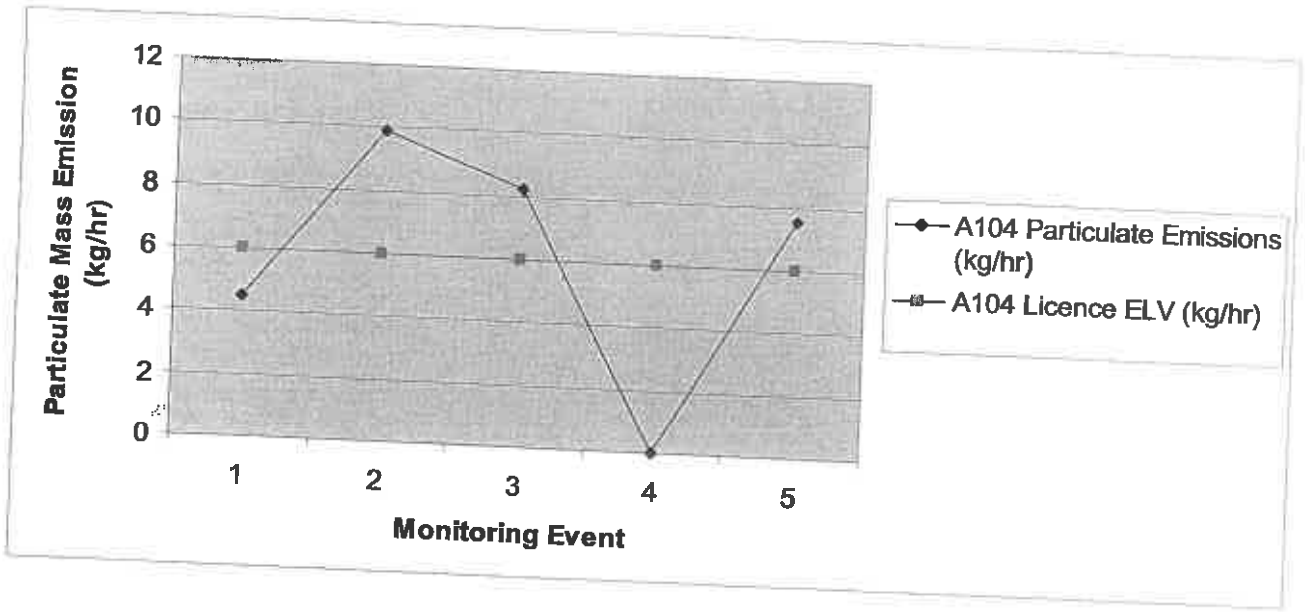


Figure 6: Particulate Mass Emissions to Atmosphere (kg/hr) (January to December 2006) vs. Licence ELV from Emissions Reference Point A105– Data point 5 is the average yearly emission

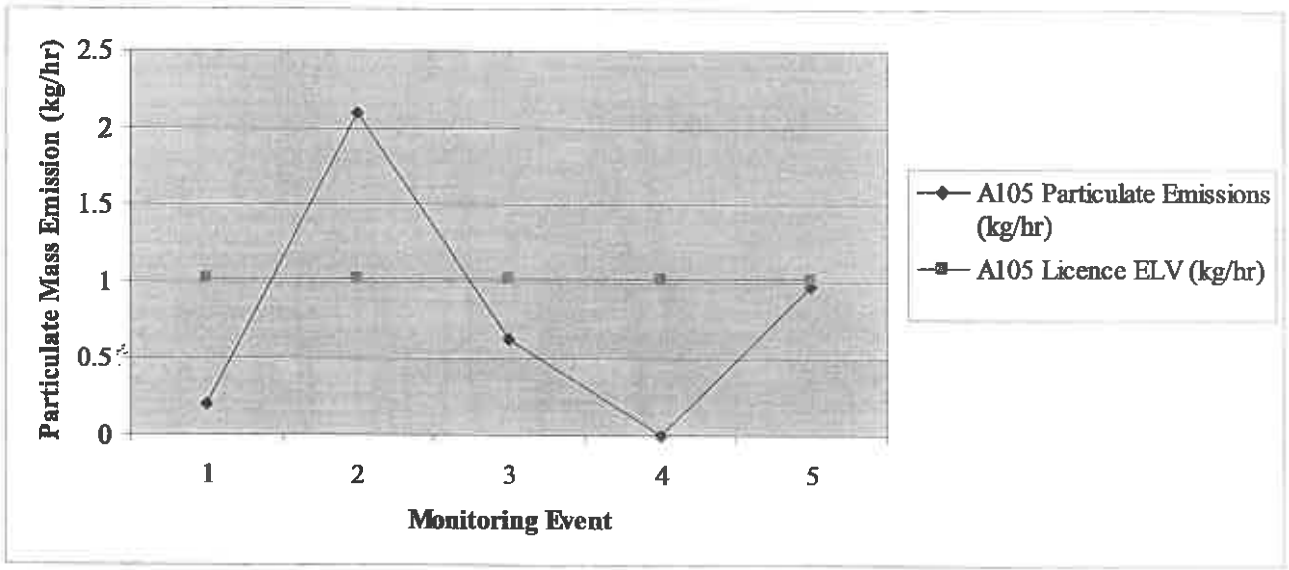
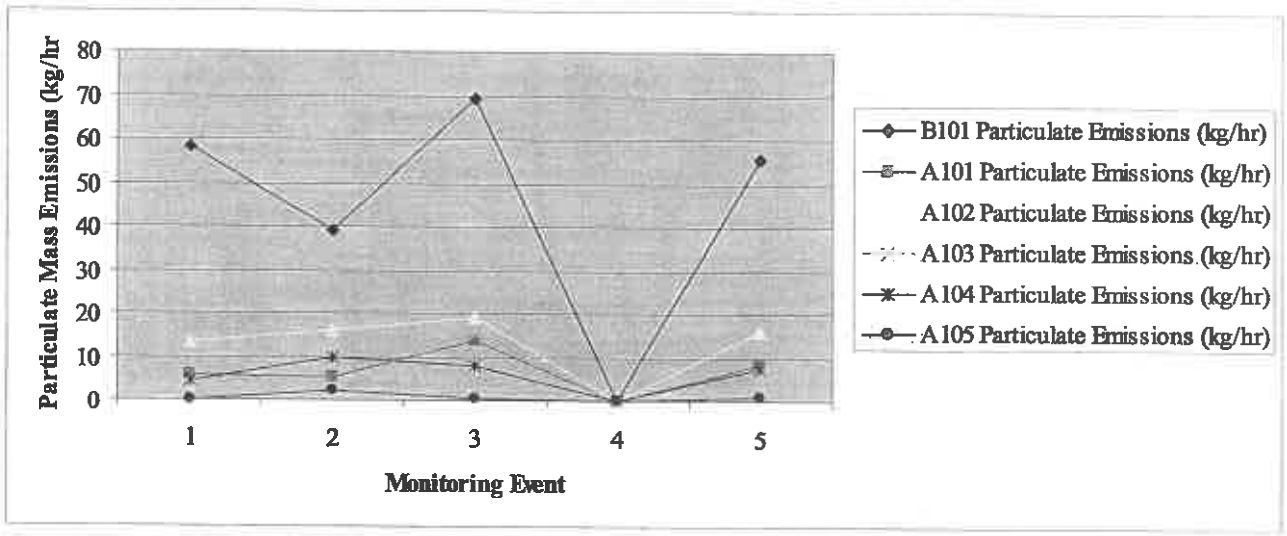


Figure 7: Summary of Particulate Mass Emissions to Atmosphere (kg/hr) (January to December 2006) from Emissions Reference Points B101, A101-A105– Data point 5 is the average yearly emission

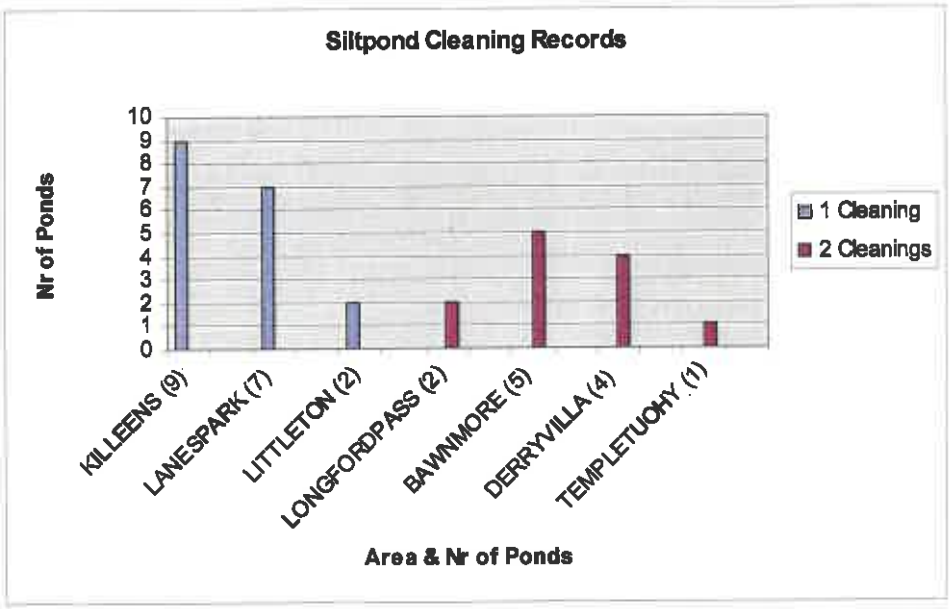


APPENDIX 7

De-silting Programme Review.

Licence:P0499-01
Year 2006

Bog Area & Nr Ponds	1 Cleaning	2 Cleanings
KILLEENS (9)	9	
LANESPARK (7)	7	
LITTLETON (2)	2	
LONGFORDPASS (2)		2
BAWNMORE (5)		5
DERRYVILLA (4)		4
TEMPLETUOHY (1)		1



Environmental Protection Agency
- 4 APR 2007
FAX RECEIVED BY

BORD NA MÓNA

BORD NA MÓNA ENERGY LIMITED

FACSIMILE TRANSMITTAL SHEET

TO: Niamh O' Carrol	FROM: Enda McDonagh
COMPANY: Bord na Mona Energy Ltd	DATE: 02/04/2007
FAX NUMBER:	TOTAL NO. OF PAGES INCLUDING COVER: 1
PHONE NUMBER:	SENDER'S REFERENCE NUMBER:
RE: IPPC P0499-01 2006 AER	YOUR REFERENCE NUMBER:

☐ URGENT ☐ FOR REVIEW ☐ PLEASE COMMENT ☐ PLEASE REPLY ☐ PLEASE RECYCLE

Dear Ms O' Carrol

The Annual Environmental Report 2006, for Littleton, has been delayed and will not be submitted by the 31st March. The AER will instead be submitted by the end of April 2007.

Sorry for the inconvience.
If you have any further queries on the matter, please contact me.

Regards

Enda McDonagh
Bord na Mona Energy Ltd

Ph. 057 93 45911
Fax. 057 93 45160

EPA
OEE CORK
Main File ✓
Public File ✓
Evaluation File noc
Date 19/4/07
For Assessment by Inspector

[CLICK HERE AND TYPE RETURN ADDRESS]

BORD NA MÓNA

BORD NA MÓNA ENERGY LIMITED

Annual Environmental Report 2007
IPPC LICENCE P0499-01

March 2008

Contents

1.0 Introduction

1.1 IPC Licence Register No

1.2 Name & Location of Site

1.3 Brief Description of Activities

1.4 Environmental Management of the Company

1.5 Environmental Policy Statement

2.0 Summary Information

2.1 Emissions to Water Summary

2.1.1 Silt Pond Emissions

2.1.2 Factory Processes Discharge @ PW-102

2.1.3 Workshops, Transport & Yard Discharges

2.1.4 Composite Sampler Report

2.1.5 Emissions to Water Non-compliance's

2.2 Emissions to Air Summary

2.2.1 Dust Monitoring Factory.

2.2.2 Dust Monitoring DSL's

2.2.3 Dust Non-compliance's

2.3 Waste Arising

2.3.1 Non-Hazardous Waste

2.3.2 Hazardous Waste

2.4 Energy and Water Consumption

2.4.1 Energy Consumption

2.5 Environmental Incidents and Complaints

2.5.1 Incidents

2.5.2 Complaints

3.0 Management of the Activity

3.1 Environmental Management Programme Report

3.2 Environmental Management Programme Proposal

3.3 Environmental Expenditure

4.0 Licence Specific Reports

4.1 Surface Water Discharge Monitoring Location Programme Review

4.2 Bunding Programme

4.3 Boiler Combustion Efficiency

4.4 Resource Consumption Summary

4.5 Report on de-silting Programme

4.6 Bog Development and Operational Programme

4.7 Bog Rehabilitation Report

4.8 Archaeological Report

5.0 Summary

Appendix 1: Emissions to Water Monitoring Results. (Bogs)

Appendix 2: Emissions to Water Monitoring Results. (Yards)

Appendix 3: Emissions to Water Monitoring Results. (Composite)

Appendix 4: Emissions to Air Monitoring Results.

Appendix 5: De-silting Programme Review

Appendix 6: AER & PRTR Data

1.0 Introduction

Bord na Móna Fuels Limited was granted an Integrated Pollution Control Licence by the E.P.A. on 17th August 2001 for it's operation in the Littleton group of bogs. This report is the fifth A.E.R. for the operations and covers the period from 1st January 2007 to 31st December 2007.

1.1 IPC Licence Number: P0499-01

1.2 Name & Location of Site

The Littleton group of bogs consists of a cluster of bogs approximately ten miles from Thurles in Co. Tipperary.
The main contact and location details of the company are presented in summary form below

Company Name:	Bord na Móna Fuels Limited
Site Address:	Littleton Group Thurles Co. Tipperary.
Telephone No:	0504-44215
Fax No:	0504-44225
Contact Name:	Ray Yates
Position:	General Manager

1.3 Description of Activities

Milled Peat Operations

For milled peat production the bog is laid out in a series of rectangular fields of varying length and 15m wide with drains located between. There are essentially four operations involved in milled peat production:
Milling.
Harrowing.
Ridging.
Harvesting.
Milling.
Special milling machines work there way along the fields, milling approximately 15mm of peat off the top of the bog in a pass.

Harrowing

This is achieved with a machine called a harrow. The milled peat is harrowed until its moisture content is down to approximately 40-50%, which can take up to two to three days, weather depending.

Ridging

The dry peat is then scraped into long ridges running down the centre of each field. This is done with a ridger, a machine consisting of a series of blades in the shape of a v that opens the full width of the field.

Harvesting

During harvesting every eleventh field is used to stockpile the peat, with this field receiving the milled peat from the five fields either side.
Milled Peat is produced on the Littleton group of bogs for transfer to the Briquette Factory for the manufacture of peat solid fuel products. Littleton has a total area of 4,530 hectares. Of this, 1,475 hectares were used for the production of milled peat during the period of the AER.

The production of milled peat is a seasonal activity with production opportunities only possible during the period from late spring to early autumn when drying conditions are suitable. When production operations are underway, they are typically carried out over a seven-day week and for 10 to 15 hours per day. Bog drainage and field conditioning operations are carried out throughout the year, along with peat haulage operations from stockpiles located on the bog to the Briquette Factory. Transport operations are carried out on all days throughout the year that the Briquette Factory is in operation.

Sod Peat was produced on an area of 223 hectares during 2007. Production was from April to August with sales to the public from September to December. Bog preparation and drainage was ongoing throughout the year but was mainly in the period January to March.
The Firelighter Plant operated from January to April and again from September to December.

The Group has its own workshop facilities for the maintenance, repair and fabrication of plant used in the operations outlined.

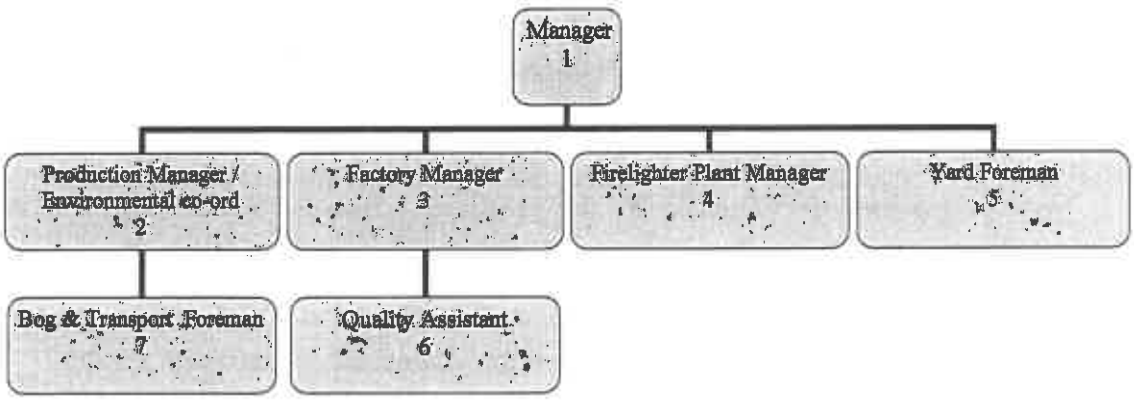
In total 128 permanent workers and 20 seasonal workers at peak were employed during 2007.

1.4 Environmental Management of the Company

The organisational structure within the Littleton Group is presented in the flow chart below.

Littleton Group

Environmental Responsibilities



(1) Overall environmental responsibilities
(2) Bog production and maintenance including siltponds and polyethylene: co-ordinating environmental affairs.
(3) Factory process and maintenance including, effluent, settleing ponds and stack emissions.
(4) All firelighter plant environmental issues.
(5) Environmental issues in relation to yard management, storage and sales.
(6) Factory chemicals, effluent readings and environmental sampling.
(7) Siltpond inspections and cleaning

1.5 **Environmental Policy**

BORD NA MÓNA

BORD NA MÓNA FUELS LIMITED

Bord na Mona Energy Limited is a commercial semi-state body with responsibility to develop Ireland's peat resources in the national interest.

Bord na Mona Energy Limited is committed to gather and make available information on all aspects of its environmental impact and to help improve understanding among the public generally of its role and the importance of Irish peatlands.

Bord na Mona Energy Limited recognises the importance of peatland conservation.

Bord na Mona Energy Limited will leave behind all areas it owns as either an economically or socially integrated resource of a high environmental value.

Bord na Mona Energy Limited seeks to conduct all aspects of its business in an environmentally sensitive value.

Bord na Mona Energy Limited will establish an environmental management system specifically addressing the following impacts.

Discharges to water.
Emissions to atmosphere.
Waste disposal.
Use of natural resources.
Noise, vibration, odour, dust and visual effects.
Natural environment and eco-system.

The environmental management system will be monitored, maintained and continually improved.

A system of regular environmental audits will be put in place.

Bord na Mona Energy Limited will continue research and development into all aspects of its environmental impact.

This statement is published and is available at all locations within the division and its contents are brought to the attention of all employees.

2.0 Summary Information

2.1 Emissions to water summary

2.1.1 Silt Pond Emissions

Surface Waters
Comment
Surface water monitoring was carried out four times during the reporting period. In total analysis was carried out at three different locations. These locations are as follows, Killeens @ SW4, Lanespark @ SW15 and Carrickhill @ SW26. The parameters measured during each sampling event were as follows.
Total Phosphorus, Total Solids, Suspended Solids, pH, Nitrogen, Colour and COD.
In general results were constant across all parameters at each monitoring location.
July was the wettest month of 2007, while April was the driest.
The quarterly grab sampling programme proved to be 100% compliant for the year as was the 2005 and 2006 regimes.

pH values were between 6.9 and 7.8, with normal emission limit values being of the range 6 and 9.
Suspended solids varied from 4mg/l to 50mg/l and would depend on activities (piping, ditching) etc in the catchments at the time of sampling. With the exception of the first quarter at SW15 (50mg/l) & SW26 (41mg/l) all results were within the licence limit of 35mg/l. In fact although above the emission limit value, these results did not constitute a non-compliance as they were only one of four results and were not above 105mg/l.
Ammonia values ranged from 0.26mg/l and 3.33mg/l.The I/PV for A3 waters is of the range 4mg/l. It is however not unusual for surface waters emanating from production peatlands to be slightly elevated
COD readings were slightly elevated during the reporting period, with SW15 being consistently elevated. The I/PV for A3 waters is of the range 40mg/l. All locations will be watched closely and any continuing elevated COD trends will be investigated.
Total Phosphorus result was slightly elevated at SW15 1st quarter 2007 when compared with results at the other locations, this result was however well below any trigger level in any of the guidance documents and of no cause for concern.
Flow rates were slightly elevated in the first quarter monitoring event. This elevated flow would account for the slight increase in suspended solids at that time. The non recording of a flow at SW26 Carrickhill, during each monitoring event is primarily due to the fact that the location is adjacent to Lisheen mine surface water discharge point, which creates due to enormous volumes, a back up of water at the siltpond outlet, thus prohibiting the measuring of a correct flow.

Sampling will continue at the same locations during 2008.

Surface Water Results are contained in Appendix 1

2.1.2 PW-102 Factory and Yard Discharge to Ballybeg river.

Comment
Samples are taken at this location on a weekly and quarterly basis and the parameters measured are; COD, Suspended Solids, Ph and Flow on a weekly basis and Total Phosphorus, Ammonia and Oils, Fats and Greases quarterly. **pH** values were within the range 7.2 and 9.3 with a mean value of 7.8. **COD** values averaged 82.1 mg/l and with the exception of 1 peak 232 mg/l were for the most part constant. **SS** results averaged 25 mg/l and also with the exception of 1 peak 121 mg/l were constant.
Although the emission limit value of 35mg/l was exceed occasionally during the reporting period, only on two occasions did it constitute a non – compliance. The Agency was informed at the time.
Quarterly **TP** averaged 0.576 mg/l, while **Ammonia** averaged 0.4 mg/l. **Oils, Fats & Greases** averaged 6.33 mg/l.

2.1.3. Monitoring of workshop/depot surface water run-off.

Comment
Inspections are undertaken and logged weekly at the following locations: SWE1: Factory / Lanespark Workshop / Firelighter area. SWE2: Factory Transport and Fueling Area, SWE3: Templetuohy Workshop and SWE4: Templetuohy Fueling Area.
Yard runoff monitoring took place at these four different locations on a monthly basis during the reporting period and COD was the parameter requiring analysis. As is evident from the graph, on several occasions no sample was available on the day of sampling. This was due to no flow at the emission point as the catchments are so small. In fact in most instances it would have to be raining quite heavily in order to attain a sample.

Sampling will continue at the same locations during 2008.

Results are attached in Appendix 2

2.1.4 Composite Sampler Programme

The composite sampling regime at Littleton needs to be reassessed. At present due to the continual dewatering at Lisheen Mine it has proven next to impossible to guarantee a continuous flow of water from a number of locations. A new location was selected but on further inspection, this site also was found to have similar problems of interrupted flow due to pumped drainage.
One alternative would be to switch a current quarterly grab location which has a constant flow with the composite sampler's present site.

Composite Sampler results are contained in Appendix 3

2.1.5 Emissions to Water Non-compliance's

The non-compliances associated with agreed sampling of water effluent at Littleton are outlined in table under.

Emissions to Water Non-Compliances

IPPC Licence: P0499-01

Works: Littleton 2007

Type	Non-Compliances	Location / SW Nr
Composite	0	
Quarterly Grab	0	
PW 102	2	
Totals	**2**	

Note: Emission Limit Value = 35mg/litre

2.2 Emissions to Air Summary

2.2.1 Factory Emissions

It was not possible to measure the emissions at A102 and A103 during the year. This was due to the requirement for extended platform space to accommodate new measuring equipment. The platforms will now be extended at both locations to facilitate this.

Regarding dust emissions from the boiler (B101) we are now ready to test a new method of peat fuel supply to the burner. This test will be completed before the next boiler stop and if successful will be permanently installed. This will improve the burning and reduce emissions.

We also intend to improve or replace the installed grit arrester to bring the emissions within the licence limits.

Attached in Appendix 4 are Emission to Air Results.

2.2.2 Dust Emissions (Dust Sensitive Locations)

The Dust Emissions are being monitored monthly as per proposal of 18th February 2002 on D.S.L.'s. Results in general were good with only two non-compliances being recorded for the period.
The results are also displayed in Appendix 4.

2.2.3 Non-compliance's

Dust Non-compliance 2007

IPPC Licence: P0499-01

Works: Littleton

Location / DM Nr	Non-Compliances
DM 01	0
DM 02	2
DM 03	0
DM 04	0
Total	**2**

As is evident there were 2 non-compliances in relation to dust monitoring during the reporting period. The Agency was informed.

2.3 Waste Management Report

2.3.1 Non Hazardous Waste

Non Hazardous Waste

IPPC Licence: P0499-01

Waste Emission

2007

Type	Tonnes	EWC Code	Contractor	Licence Nr
Skips	0.00	20 03 01	Ryan Waste Recycling	088(2)/OY/385/06
Wheelie Bins	89.60	20 03 01	Ryan Waste Recycling	088(2)/OY/385/06
Polyethlene	189.76	02 01 04	Apec Plastics Ltd	205/2005
Scrap Steel	74.61	17 04 07	Hammond Lane	WP4620033
Timber Pallets	200.46	15 01 02	Kiawa Ltd	WP/TN/24
Cardboard	5.82	03 03 08	Smurfit Kappa	WPR021-3
Silt Pond Cleanings	323.61	01 01 02	Bord na Mona	P0499-01
Peat Screenings	0.00	01 04 99	Bord na Mona	P0499-01
Totals	**883.87**			

2.3.2 Hazardous Waste

Hazardous Waste Data

IPPC Licence: P0499-01

Waste Emission 2007

Type	Tonnes	EWC Code	Contractor	Licence Nr
Waste Oil	2.000	13 02 05	Enva Ireland Ltd Portlaoise	184-1
Oil Filters	0.560	16 01 07	Enva Ireland Ltd Portlaoise	184-1
Oily Rags	0.684	15 02 02	Enva Ireland Ltd Portlaoise	184-1
Waste Grease	0.000	13 08 99	Enva Ireland Ltd Portlaoise	184-1
Lead Acid Batt	2.600	16 06 01	Returnbatt Ltd	067/OY/11/02
Fluorescent Tubes	0.400	20 00 02	Irish Lamp Recycling Co.Ltd	035/OY/80/03
Parts Wash	1.980	11 01 13	Safety Kleen, Tallaght, Dublin	99-1
Asbestos	**0**	**17 06 05**		
Total	**8.224**			

2.4 Energy Consumption

The usage of diesel and electricity in the Factory are to supplement the power supplied by Milled Peat. The Bog usage of both is to provide the Milled Peat for Briquetting. Derv is used for road transport service to Milled Peat operations.

IPPC:	P0499-01		
YEAR 2007			
1. Factory Units	Diesel (Litres)	Derve (Litres)	Electricity (Units)
Totals	186528	43926	1252385
MW Hours	1826.6	397.089134	1252.385
Total MW Hours	**3476.0**		
2. Factory Units	Mill/Peat (Tonnes)	Screens (Tonnes)	Br/Out (Tonnes)
Totals	46394	5054	317
MW Hours	13048.3	23854.88	1496.24
Total MW Hours	**38399.4**		
3. Bog Units	Diesel (Litres)	Derve (Litres)	Electricity (Units)
Totals	481718	0	276650
MW Hours	4717.2	0	276.65
Total MW Hours	**4993.8**		
1. + 2. + 3.			
Total MW Hours	**46869.3**		

2.5 Environmental Incidents & Complaints

There were no environmental incidents during the reporting period and two complaints summarised below.

Environmental Complaints	
IPPC Licence: P0499-01	
Works: Littleton 2007	
	Number
Complaints	2
Requiring corrective action	1
Category	
Water	
Air	
Procedural	
Miscellaneous	2
Total	2

3.1 Achievement of Objectives & Targets 2007

Project	Description & Status
Project 1: Reduction of fugitive dust emissions.	**Training.** Continue to train all new employees in environmental matters. Copy environmental video to disk and distribute more widely. All new employees will be trained during the year. **Status** The training video was successfully transferred onto DVD and distributed to all Licence holders. The DVD was also edited to include new improved poly stripping and rolling techniques. In total 43 personnel received training in 2007. **Hydraulic Harrows.** Continue to supply hydraulic harrows. Prioritising dust sensitive locations. There is one Hydraulic Harrow in operation at the moment we will continue to monitor the situation regarding introducing any more. **Status** Two hydraulic harrows were introduced in 2007. **Headland Peat Collection.** Continue with the collection of headland peat, particularly at dust sensitive locations. Supply more headland peat collection machinery as required and research efficient ways of collecting such peat for use as a saleable product. **Status** As the production season was greatly hampered by inclement weather, July 114.9mm and August 119.6mm of rainfall, headland peat dust was not an issue. However a new headland peat harvester was assembled and is ready for use in 2008.
Project 2: Minimisation of suspended solids	**On Site Inspections.** A full programme of internal audits will be carried out as soon as production commences. Particular emphasis will be put on cleaner production procedures, milling, harrowing, ridging, harvesting and loading. **Status** A comprehensive internal audit took place, which proved very successful. Follow up audits were subsequently carried out to ensure that initial findings were addressed and closed out.
Project 3: Effective spill leak management of mobile fuelling units.	**On Site Inspections.** As part of the above project, service trains will also be prioritised with a fitter accompanying the auditor during inspections to highlight any risks or potential risks that may occur. **Status** In conjunction with the above, the fitter at each location audited was present to inspect the service train. Any repairs that were required were identified and rectified.

Project 4: Fire Prevention.	**Fire Patrols.** There will be extra emphasis on fire patrols this coming production season. Research on improved fire fighting techniques will also be investigated. The newly adopted Fire and Environmental Plan will be communicated to all personnel. **Status** The fire prevention plan was communicated to all personnel
Project 5: Collection storage and reuse of polyethylene.	**Identify Recyclers.** Continue with the recycling of polyethylene. The sourcing of more recycling contractors will be ongoing. **Status** During the year a total of 117 tonnes of polythene has been sent for recycling to Apec Plastics Co. Kildare and Leinster Environmentals, Dundalk.
Project 6: Provision of measures to protect Dust Sensitive Areas.	**Planting.** Planting is ongoing as required, with areas in the periphery of production bogs that are being developed for housing being prioritised. **Status** No planting took place in 2007.

3.2 Environmental Management Programme Proposal 2008

Project	Description & Status
Project 1: Reduction of fugitive dust emissions.	**Training.** Train all employees in environmental matters. Training will be by means of the screening of an environmental DVD, followed by a power point presentation. **Hydraulic Harrows.** There are two new Hydraulic Harrows programmed for delivery for 2008 to be used in Dust Sensitive Locations. **Headland Peat Collection.** Continue with the collection of headland peat, particularly at dust sensitive locations. A new mobile Haku Harvestor is programmed for delivery for 2008/09 which will include dust sensitive headlands in its operations.
Project 2: Waste Management	**On Site Inspections.** A full programme of internal audits will be carried out as soon as production commences. This will be an annual exercise with the 2008 audit placing more emphasis on waste management.
Project 3: Minimisation of Suspended Solids.	**Training.** Train all employees in environmental matters. Training will be by means of the screening of an environmental DVD, followed by a power point presentation. A pile field ditcher will also be put in operation.
Project 4: Effective spill leak management of mobile fuelling units.	**Research and Development.** The identification and ultimately the introduction of mobile fuelling units which will enhance the spill / leak management of fuel oils. Increased bund provisions are planned for 2008. In addition to this, one new rail operated Fuel Service Wagon will be introduced in Littleton.
Project 5: Collection storage and reuse of polyethylene.	**Identify Recyclers.** Continue with the recycling of polyethylene. The sourcing of more recycling contractors will be ongoing.
Project 6: Provision of measures to protect Dust Sensitive Areas.	**Planting.** Ongoing Planting is ongoing as required, with areas in the periphery of production bogs that are being developed for housing being prioritised.

3.3 Environmental Expenditure

Environmental Expenditure 2007	
Description	**Cost €**
Capital Costs	€220 666
Silt Control	€124 067
Analytical & Consultancy Costs	€46 706
EPA Fees	€10 373
Bog Rehabilitation	€0
Total	€401,812

4.0 Licence Specific Reports

4.1 Surface Water Discharge Monitoring Location Programme Review

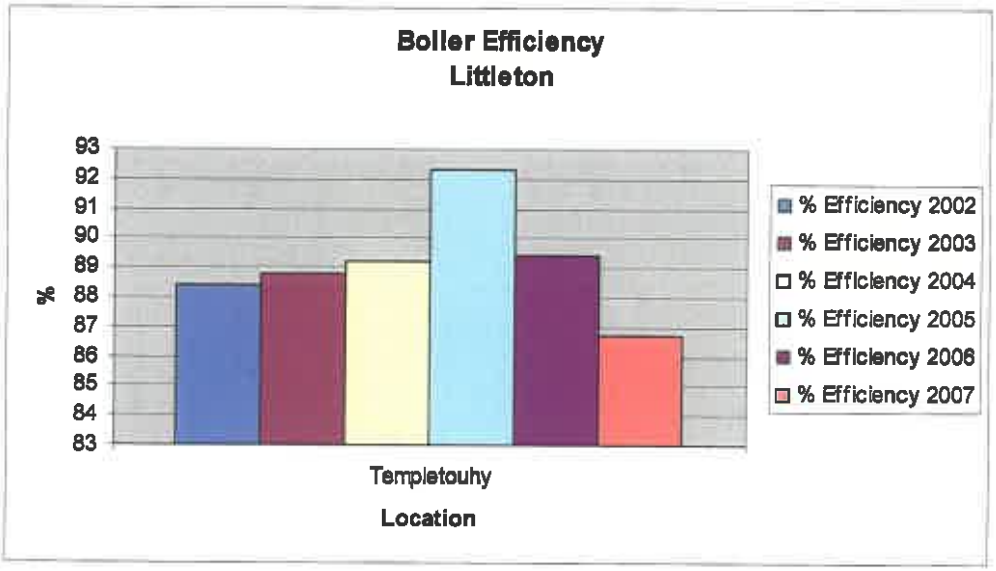
The programme has operated satisfactorily; it is proposed to continue at the same locations for 2007. As mentioned above a proposal to switch the composite sampler location with a quarterly grab location may be proposed.

4.2 Bunding Programme

The four concrete fuel bunds were examined and cracks sealed. Follow up integrity test were carried out during the reporting period and all bunds passed.

4.3 Boiler Combustion Efficiency

Boiler Emissions						
Licence: P0499-01						
Works: Littleton 2007						
Boiler Location	% Efficiency 2002	% Efficiency 2003	% Efficiency 2004	% Efficiency 2005	% Efficiency 2006	% Efficiency 2007
Templetouhy	88.4	88.8	89.2	92.3	89.4	86.75



4.4 Resource Consumption

Resource Consumption			
IPPC:			
Year:2007			
Product	Tonnes Produced	Tonnes Sold	Customer
Milled Peat	288201	288201	Littleton Factory
Moss	0	0	
Turf	7554	8667	Domestic
Totals	295755	296868	

Proposed Production 2008	
Licence: P0499-01	
Works: Littleton	
Product	Proposed Target
Milled Peat	266000
Moss	
Turf	6500
Totals	272500

4.5 De-silting Programme Report

The cleaning roster is based on the fortnightly inspection of ponds. Some ponds were cleaned only once during 2007, as inspections dictated, they did not require a second cleaning.
The production catchments at some ponds are also declining, due to the bogs being cut away: This is reflected in the reduced targets year on year.

Programme review is contained in Appendix 5.

4.6 Bog development and Operational Programme.

There was no bog development in 2007.

4.7 Bog Rehabilitation

Some obsolete 30 lbs rail track was lifted from old exhausted sod bog and refurbished and re-laid on milled peat production bog.

4.8 Archaeological Report.

An initial survey was completed in 2006. No excavations took place during 2007, however excavations are planned for 2008.

5.0 Summary

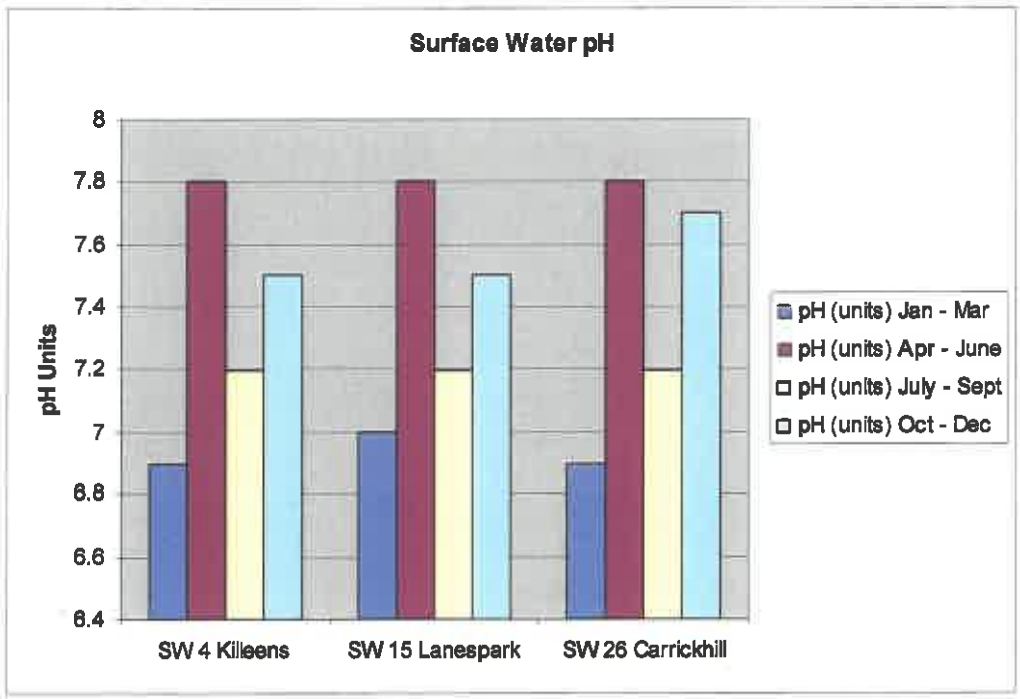
The Environmental Management Programme has been implemented throughout the group, operating procedures have been put in place, and training has been provided for all personnel involved in compliance with the licence.

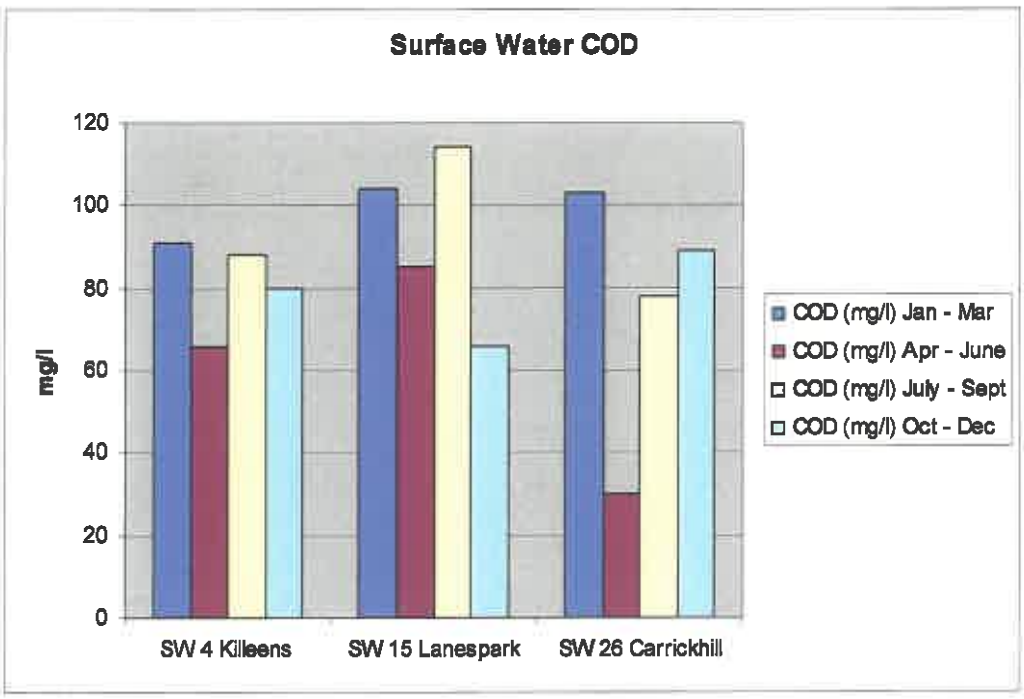
Bord na Mona Energy Ltd are represented on the Management Group of both the Shannon River and Eastern River Basin District Management Systems, set up under the Water Framework Directive, and on the Steering Group of the Catchment Management on the River Barrow.

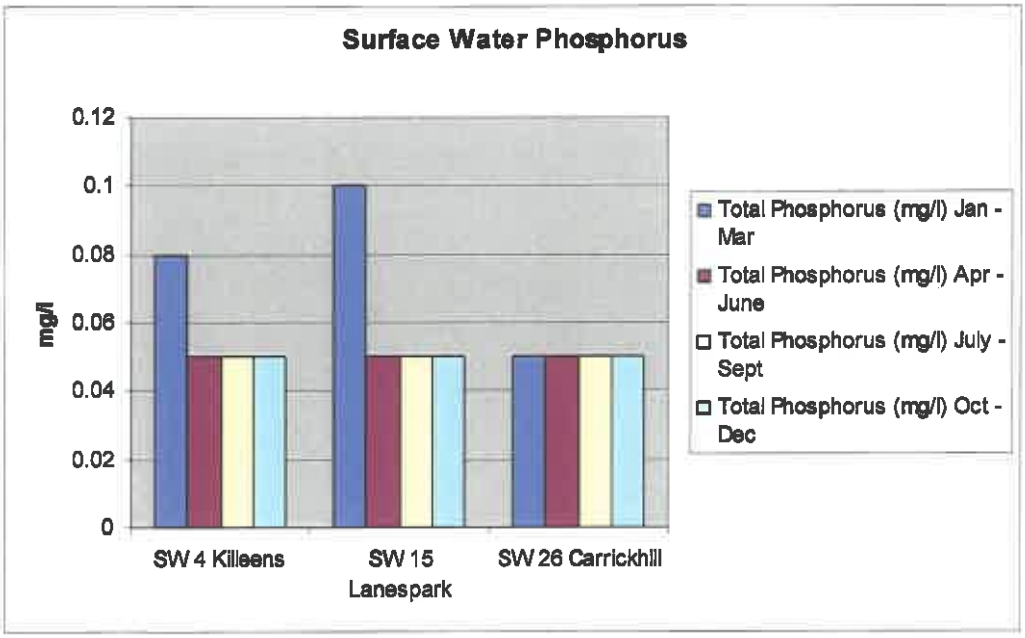
Bord na Mona Fuels Ltd would like to take this opportunity to advise the Environmental Protection Agency of its continued commitment to improving its environmental performance by adopting cleaner production methods and improving its environmental protection measures.

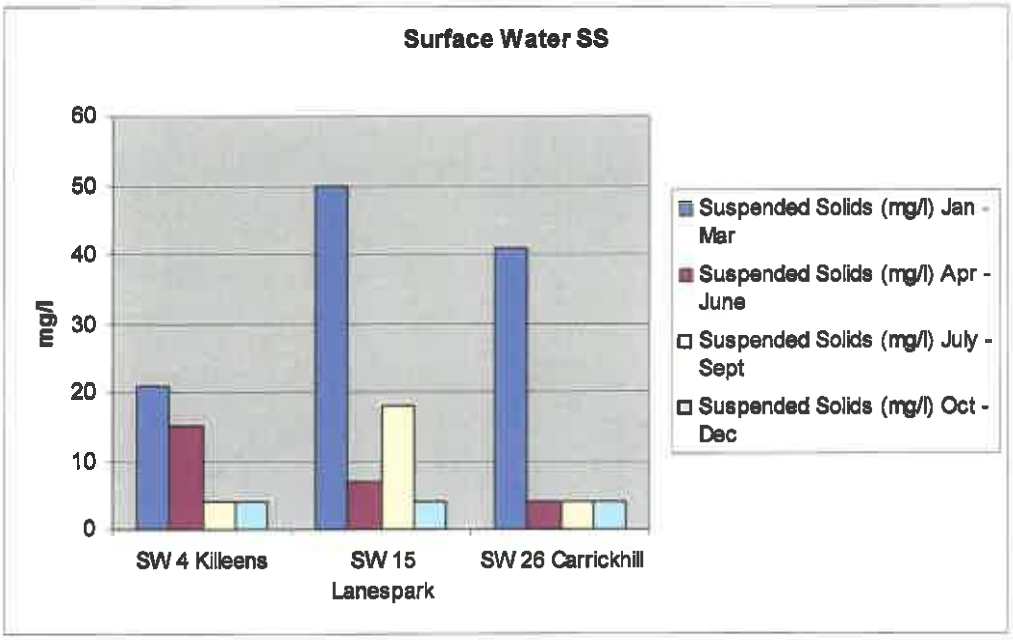
APPENDIX 1

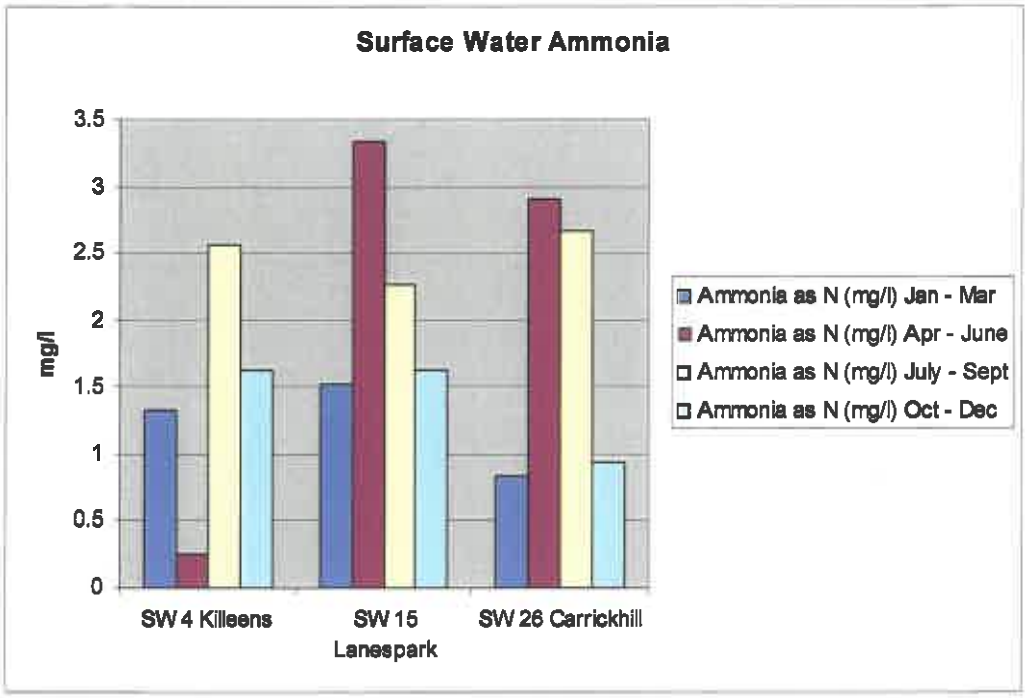
Surface Water Discharge Monitoring Results Bogs

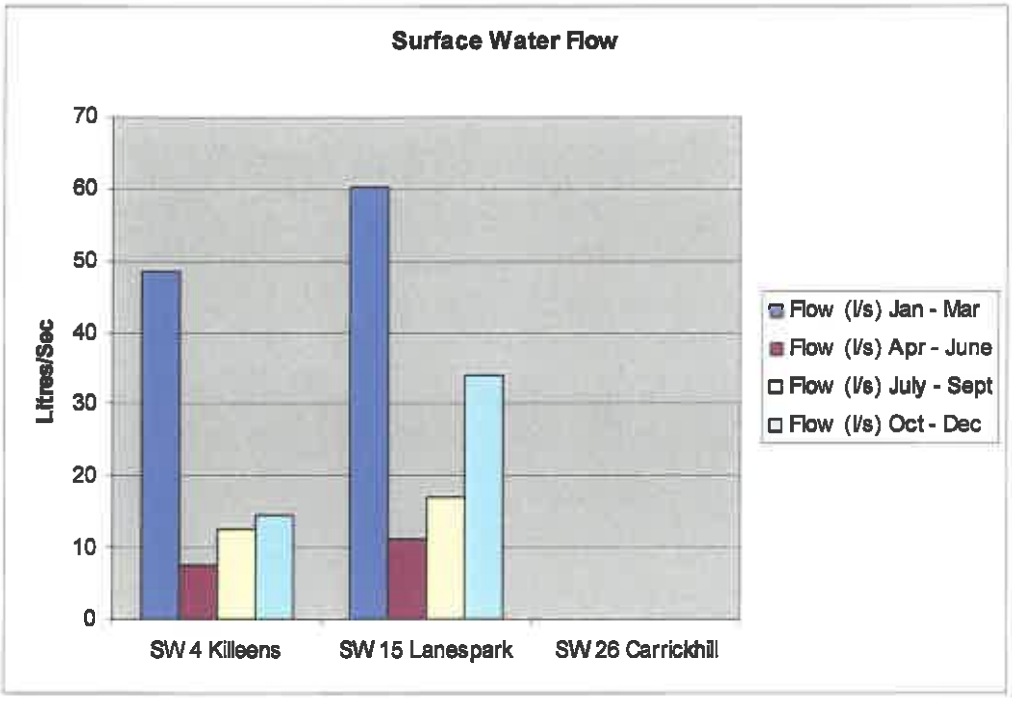

Surface Water pH
pH Units
8
7.8
7.6
7.4
7.2
7
6.8
6.6
6.4
SW 4 Killeens
SW 15 Lanespark
SW 26 Carrickhill
pH (units) Jan - Mar
pH (units) Apr - June
pH (units) July - Sept
pH (units) Oct - Dec


Surface Water COD
mg/l
120
100
80
60
40
20
0
SW 4 Killeens
SW 15 Lanespark
SW 26 Carrickhill
COD (mg/l) Jan - Mar
COD (mg/l) Apr - June
COD (mg/l) July - Sept
COD (mg/l) Oct - Dec


Surface Water Phosphorus
0.12
0.1
0.08
0.06
0.04
0.02
0
mg/l
SW 4 Killeens
SW 15 Lanespark
SW 26 Carrickhill
Total Phosphorus (mg/l) Jan - Mar
Total Phosphorus (mg/l) Apr - June
Total Phosphorus (mg/l) July - Sept
Total Phosphorus (mg/l) Oct - Dec


Surface Water SS
60
50
40
30
20
10
0
mg/l
SW 4 Killeens
SW 15 Lanespark
SW 26 Carrickhill
Suspended Solids (mg/l) Jan - Mar
Suspended Solids (mg/l) Apr - June
Suspended Solids (mg/l) July - Sept
Suspended Solids (mg/l) Oct - Dec

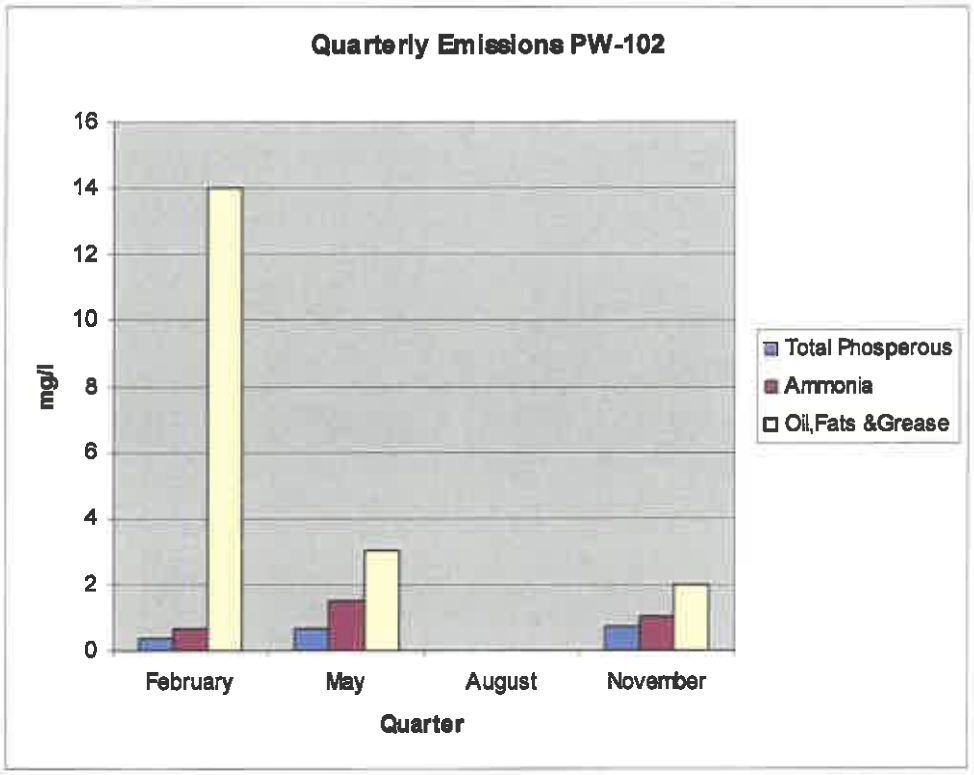

Surface Water Ammonia
mg/l
3.5
3
2.5
2
1.5
1
0.5
0
SW 4 Killeens
SW 15 Lanespark
SW 26 Carrickhill
Ammonia as N (mg/l) Jan - Mar
Ammonia as N (mg/l) Apr - June
Ammonia as N (mg/l) July - Sept
Ammonia as N (mg/l) Oct - Dec


Surface Water Flow
Litres/Sec
70
60
50
40
30
20
10
0
SW 4 Killeens
SW 15 Lanespark
SW 26 Carrickhill
Flow (l/s) Jan - Mar
Flow (l/s) Apr - June
Flow (l/s) July - Sept
Flow (l/s) Oct - Dec

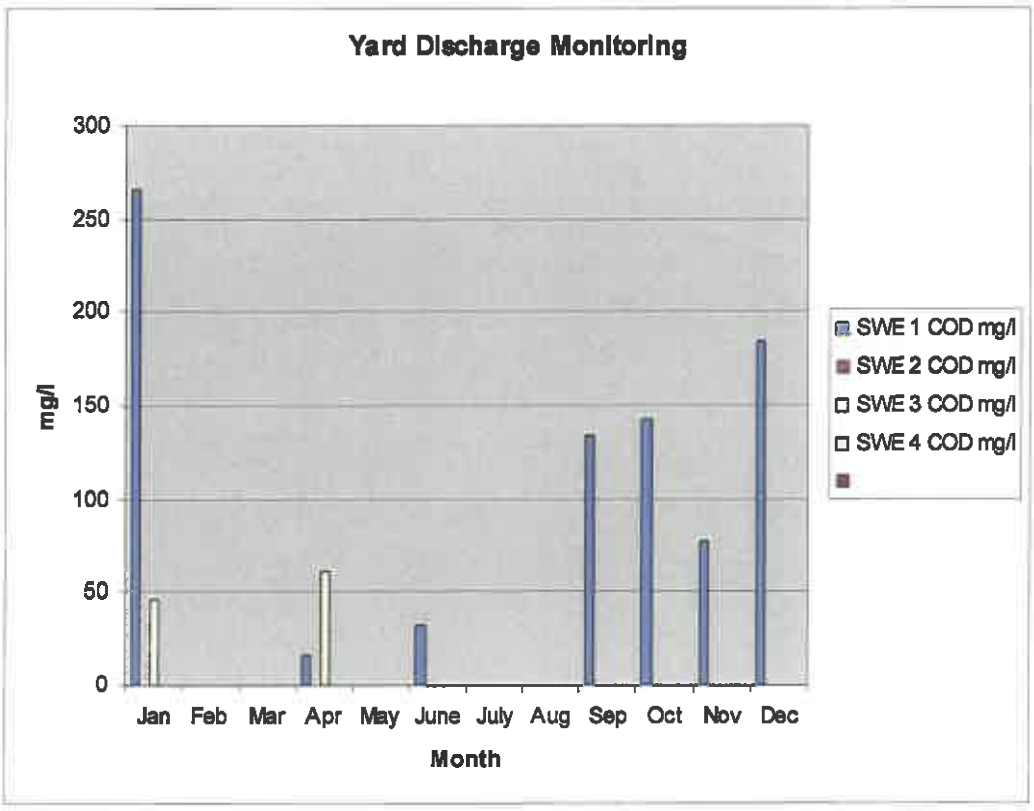
APPENDIX 2

Surface Water Discharge Monitoring Results

Yards



Note: No sample available in August due to Factory Overhaul.



Note: See main body of report in relation to missing data.

APPENDIX 3

Surface Water Discharge Monitoring Results Composite

Bord Na Mona Energy Ltd, Littleton Group, Littleton, Thurles, Co Tipperary.

Composite Sampler Results 2007

Month				Parameters								Daily Totals		
Jan-07	pH	COD	Ammonia as	Total	Suspended	Total	Colour	Flow	COD	Ammonia as	Total	Suspended	Total
SW	22	mg/l	N mg/l	Phosphorus	Solids	Solids	Pt Co	Daily	Kg/Day	Kg/Day	Phosphorus	Solids	Solids
				mg/l	mg/l	mg/l	units	Total(litres)			Kg/Day	Kg/Day	Kg/Day
1					4	344		11906260				47.63	4095.75
2					4	350		10164240				40.66	3557.48
3	7.7	68	0.18	0.3	4	196	145	11088950	754.05	2.00	3.33	44.36	2173.43
4					4	330		11665290				46.66	3849.55
5					4	372		12162580				48.65	4524.48
6					4	387		12545360				50.18	4855.05
7					5	408		12908850				64.54	5266.81
8					4	412		13403340				53.61	5522.18
9					4	386		14038450				56.15	5418.84
10	7.6	61	0.06	0.08	4	344	175	16259200	991.81	0.98	1.30	65.04	5593.16
11					7	242		23650780				165.56	5723.49
12					5	274		19219040				96.10	5266.02
13					30	340		28134960				844.05	9565.89
14					27	366		24606580				664.38	9006.01
15					19	426		26040720				494.77	11093.35
16					4	430		32983790				131.94	14183.03
17	7.8	50	0.06	0.05	4	442	133	27337320	1366.87	1.64	1.37	109.35	12083.10
18					4	318		23562630				94.25	7492.92
19					12	289		23687370				284.25	6845.65
20					23	256		23953150				550.92	6132.01
21					4	352		23959680				95.84	8433.81
22					4	382		24145470				96.58	9223.57
23					4	422		24332520				97.33	10268.32
24	7.4	55	0.13	0.06	4	401	136	24129770	1327.14	3.14	1.45	96.52	9676.04
25					4	453		23953330				95.81	10850.86
26					4	360		24234690				96.94	8724.49
27					4	466		24406600				97.63	11373.48
28					4	288		24579630				98.32	7078.93
29					4	420		24831410				99.33	10429.19
30					4	360		24953620				99.81	8983.30
31	7.8	44	0.11	0.06	6	428	93	25023490	1101.03	2.75	1.50	150.14	10710.05

A minus figure usually means the pond was flooded or backflowing

Bord Na Mona Energy Ltd, Littleton Group, Littleton, Thurles, Co Tipperary.

Composite Sampler Results 2007

Month				Parameters							Daily Totals		
Feb	pH	COD	Ammonia as	Total	Suspended	Total	Colour	Flow	COD	Ammonia as	Total	Suspended	Total
SW	22	mg/l	N mg/l	Phosphorus	Solids	Solids	Pt Co	Daily	Kg/Day	Kg/Day	Phosphorus	Solids	Solids
				mg/l	mg/l	mg/l	units	Total (litres)			Kg/Day	Kg/Day	Kg/Day
1					14	344		25298530				354.18	8702.69
2					4	390		25441950				101.77	9922.36
3					4	438		25322690				101.29	11091.34
4					4	444		25404400				101.62	11279.55
5					4	456		25183860				100.74	11483.84
6					4	445		25000650				100.00	11125.29
7	8.2	35	0.19	0.05	4	476	64	24975070	874.13	4.75	1.25	99.90	11888.13
8					4	470		25310280				101.24	11895.83
9					4	426		25293210				101.17	10774.91
10					6	366		25317130				151.90	9266.07
11					4	412		25551750				102.21	10527.32
12					4	444		25941750				103.77	11518.14
13					4	416		26062260				104.25	10841.90
14	8.4	29	0.08	0.05	4	456	121	27431850	795.52	2.19	1.37	109.73	12508.92
15					4	408		31081590				124.33	12681.29
16					4	305		31287090				125.15	9542.56
17					4	340		34317280				137.27	11667.88
18					6	360		29982110				179.89	10793.56
19					6	428		28437220				170.62	12171.13
20					4	420		28190180				112.76	11839.88
21	8	60	0.21	0.05	4	358	159	27614390	1656.86	5.80	1.38	110.46	9885.95
22								27483450				0.00	0.00
23								27591330				0.00	0.00
24								28062670				0.00	0.00
25								28079300				0.00	0.00
26								27833690				0.00	0.00
27								27773470				0.00	0.00
28								28006590	0.00	0.00	0.00	0.00	0.00

A minus figure usually means the pond was flooded or backflowing

Bord Na Mona Energy Ltd, Littleton Group, Littleton, Thurles, Co Tipperary.

Composite Sampler Results 2007

Mar	pH	COD	Ammonia as	Total	Suspended	Total	Colour	Flow	COD	Ammonia as	Total	Suspended	Total
SW	22	mg/l	N mg/l	Phosphorus	Solids	Solids	Pt Co	Daily	Kg/Day	Kg/Day	Phosphorus	Solids	Solids
				mg/l	mg/l	mg/l	units	Total (litres)			Kg/Day	Kg/Day	Kg/Day
1					4	376		27826920				111.31	10462.92
2					35	446		27709700				969.84	12358.53
3					9	361		27519040				247.67	9934.37
4								27183950				0.00	0.00
5					4	410		27272450				109.09	11181.70
6								26926500				0.00	0.00
7								27430120	0.00	0.00	0.00	0.00	0.00
8					4	287		28115970				112.46	8069.28
9					4	310		28282580				113.13	8767.60
10					7	354		28809550				201.67	10198.58
11					7	396		28221850				197.55	11175.85
12					4	408		32147050				128.59	13116.00
13					8	292		31239020				249.91	9121.79
14	8	53	0.16	0.05	5	316	187	33600860	1780.85	5.38	1.68	168.00	10617.87
15					4	406		30578650				122.31	12414.93
16					4	322		30030080				120.12	9669.69
17					4	438		29637350				118.55	12981.16
18					4	482		29572630				118.29	14254.01
19					4	496		29540170				118.16	14651.92
20					4	460		29419070				117.68	13532.77
21	8.3	56	0.31	0.05	4	384	147	29285600	1639.99	9.08	1.46	117.14	11245.67
22					5	370		29209850				146.05	10807.64
23					7	432		29238600				204.67	12631.08
24					7	456		29870420				209.09	13620.91
25					5	444		30730660				153.65	13644.41
26					6	470		31903540				191.42	14994.66
27					8	488		35190680				281.53	17173.05
28	8.2	49	0.07	0.05	6	446	70	33003110	1617.15	2.31	1.65	198.02	14719.39
29					4	494		31666560				126.67	15643.28
30					4	502		33605070				134.42	16869.75
31					4	496		36145790				144.58	17928.31

A minus figure usually means the pond was flooded or backflowing

Bord Na Mona Energy Ltd, Littleton Group, Littleton, Thurles, Co Tipperary.

Composite Sampler Results 2007

Apr	pH	COD	Ammonia as	Total	Suspended	Total	Colour	Flow	COD	Ammonia as	Total	Suspended	Total
SW	22	mg/l	N mg/l	Phosphorus	Solids	Solids	Pt Co	Daily	Kg/Day	Kg/Day	Phosphorus	Solids	Solids
				mg/l	mg/l	mg/l	units	Total (litres)			Kg/Day	Kg/Day	Kg/Day
1					9	508		27826920				250.44	14136.08
2					4	518		27709700				110.84	14353.62
3					4	508		27519040				110.08	13979.67
4	8.6	48	0.05	0.05	4	524	48	27183950	1304.83	1.36	1.36	108.74	14244.39
5					4	426		27272450				109.09	11618.06
6					4	454		26926500				107.71	12224.63
7					4	342		27430120				109.72	9381.10
8					4	484		28115970				112.46	13608.13
9					4	296		28282580				113.13	8371.64
10					4	496		28809550				115.24	14289.54
11	8.2	43	0.01	0.14	4	500	51	28221850	1213.54	0.28	3.95	112.89	14110.93
12					5	510		32147050				160.74	16395.00
13					9	468		31239020				281.15	14619.86
14					4	492		33600860				134.40	16531.62
15					4	468		30578650				122.31	14310.81
16					4	464		30030080				120.12	13933.96
17					6	482		29637350				177.82	14285.20
18	8.6	9	0.04	0.08	4	474	38	29572630	266.15	1.18	2.37	118.29	14017.43
19					11	484		29540170				324.94	14297.44
20					9	464		29419070				264.77	13650.45
21					5	500		29285600				146.43	14642.80
22					4	462		29209850				116.84	13494.95
23					4	468		29238600				116.95	13683.66
24					4	476		29870420				119.48	14218.32
25	8.6	9	0.02	0.05	6	474	40	30730660	276.58	0.61	1.54	184.38	14566.33
26					4	452		31903540				127.61	14420.40
27					4	396		35190680				140.76	13935.51
28					6	488		33003110				198.02	16105.52
29					4	510		31666560				126.67	16149.95
30					4	595		33605070				134.42	19995.02
								36145790				0.00	0.00

A minus figure usually means the pond was flooded or backflowing

Bord Na Mona Energy Ltd, Littleton Group, Littleton, Thurles, Co Tipperary

Composite Sampler Results 2007

May	pH	COD	Ammonia as	Total	Suspended	Total	Colour	Flow	COD	Ammonia as	Total	Suspended	Total
SW	22	mg/l	N mg/l	Phosphorus	Solids	Solids	Pt Co	Daily	Kg/Day	Kg/Day	Phosphorus	Solids	Solids
				mg/l	mg/l	mg/l	units	Total (litres)			Kg/Day	Kg/Day	Kg/Day
1					4	476		29383110				117.53	13986.36
2	8.5	20	0.41	0.05	4	448	48	29311810	586.24	12.02	1.47	117.25	13131.69
3					30	430		29536580				886.10	12700.73
4					14	398		29470510				412.59	11729.26
5					11	422		29487210				324.36	12443.60
6					5	436		29649000				148.25	12926.96
7					11	466		29432090				323.75	13715.35
8					11	458		29412020				323.53	13470.71
9	8.6	34	0.03	0.1	13	416	39	29605540	1006.59	0.89	2.96	384.87	12315.90
10					18	426		29736130				535.25	12667.59
11					13	418		29392570				382.10	12286.09
12					4	424		29140590				116.56	12355.61
13					14	442		31339840				438.76	13852.21
14					18	420		30600640				550.81	12852.27
15					5	352		30883190				154.42	10870.88
16	8.3	19	0.07	0.08	4	429	56	31188050	592.57	2.18	2.50	124.75	13379.67
17	no flow due to mine dewatering											0.00	0.00
18	no flow due to mine dewatering											0.00	0.00
19	no flow due to mine dewatering											0.00	0.00
20	no flow due to mine dewatering											0.00	0.00
21	no flow due to mine dewatering											0.00	0.00
22	no flow due to mine dewatering											0.00	0.00
23	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
24	no flow due to mine dewatering											0.00	0.00
25	no flow due to mine dewatering											0.00	0.00
26	no flow due to mine dewatering											0.00	0.00
27	no flow due to mine dewatering											0.00	0.00
28	no flow due to mine dewatering											0.00	0.00
29	no flow due to mine dewatering											0.00	0.00
30	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
31	no flow due to mine dewatering											0.00	0.00

A minus figure usually means the pond was flooded or backflowing

Bord Na Mona Energy Ltd, Littleton Group, Littleton, Thurles, Co Tipperary.

Composite Sampler Results 2007

Jun	pH	COD	Ammonia as	Total	Suspended	Total	Colour	Flow	COD	Ammonia as	Total	Suspended	Total
SW	22	mg/l	N mg/l	Phosphorus	Solids	Solids	Pt-Co	Daily	Kg/Day	Kg/Day	Phosphorus	Solids	Solids
				mg/l	mg/l	mg/l	units	Total (litres)			Kg/Day	Kg/Day	Kg/Day
1	no flow due to mine dewatering											0.00	0.00
2	no flow due to mine dewatering											0.00	0.00
3	no flow due to mine dewatering											0.00	0.00
4	no flow due to mine dewatering											0.00	0.00
5	no flow due to mine dewatering											0.00	0.00
6	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
7	no flow due to mine dewatering											0.00	0.00
8	no flow due to mine dewatering											0.00	0.00
9	no flow due to mine dewatering											0.00	0.00
10	no flow due to mine dewatering											0.00	0.00
11	no flow due to mine dewatering											0.00	0.00
12	no flow due to mine dewatering											0.00	0.00
13	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
14	no flow due to mine dewatering											0.00	0.00
15	no flow due to mine dewatering											0.00	0.00
16	no flow due to mine dewatering											0.00	0.00
17	no flow due to mine dewatering											0.00	0.00
18	no flow due to mine dewatering											0.00	0.00
19	no flow due to mine dewatering											0.00	0.00
20	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
21	no flow due to mine dewatering											0.00	0.00
22	no flow due to mine dewatering											0.00	0.00
23	no flow due to mine dewatering											0.00	0.00
24	no flow due to mine dewatering											0.00	0.00
25	no flow due to mine dewatering											0.00	0.00
26	no flow due to mine dewatering											0.00	0.00
27	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
28	no flow due to mine dewatering											0.00	0.00
29	no flow due to mine dewatering											0.00	0.00
30	no flow due to mine dewatering											0.00	0.00
												0.00	0.00

A minus figure usually means the pond was flooded or backflowing

Bord Na Mona Energy Ltd, Littleton Group, Littleton, Thurles, Co Tipperary

Composite Sampler Results 2007

July	pH	COD	Ammonia as	Total	Suspended	Total	Colour	Flow	COD	Ammonia as	Total	Suspended	Total
SW	22	mg/l	N mg/l	Phosphorus	Solids	Solids	Pt Co	Daily	Kg/Day	Kg/Day	Phosphorus	Solids	Solids
				mg/l	mg/l	mg/l	units	Total (litres)			Kg/Day	Kg/Day	Kg/Day
1	no flow due to mine dewatering											0.00	0.00
2	no flow due to mine dewatering											0.00	0.00
3	no flow due to mine dewatering											0.00	0.00
4	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
5	no flow due to mine dewatering											0.00	0.00
6	no flow due to mine dewatering											0.00	0.00
7	no flow due to mine dewatering											0.00	0.00
8	no flow due to mine dewatering											0.00	0.00
9	no flow due to mine dewatering											0.00	0.00
10	no flow due to mine dewatering											0.00	0.00
11	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
12	no flow due to mine dewatering											0.00	0.00
13	no flow due to mine dewatering											0.00	0.00
14	no flow due to mine dewatering											0.00	0.00
15	no flow due to mine dewatering											0.00	0.00
16	no flow due to mine dewatering											0.00	0.00
17	no flow due to mine dewatering											0.00	0.00
18	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
19	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
20	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
21	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
22	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
23	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
24	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
25	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
26	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
27	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
28	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
29	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
30	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
31	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00

A minus figure usually means the pond was flooded or backflowing

Bord Na Mona Energy Ltd, Littleton Group, Littleton, Thurles, Co Tipperary.

Composite Sampler Results 2007

Aug	pH	COD	Ammonia as	Total	Suspended	Total	Colour	Flow	COD	Ammonia as	Total	Suspended	Total
SW	22	mg/l	N mg/l	Phosphorus	Solids	Solids	Pt Co	Daily	Kg/Day	Kg/Day	Phosphorus	Solids	Solids
				mg/l	mg/l	mg/l	units	Total (litres)			Kg/Day	Kg/Day	Kg/Day
1	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
2	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
3	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
4	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
5	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
6	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
7	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
8	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
9	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
10	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
11	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
12	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
13	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
14	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
15	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
16	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
17	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
18	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
19	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
20	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
21	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
22	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
23	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
24	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
25	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
26	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
27	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
28	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
29	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
30	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
31	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00

A minus figure usually means the pond was flooded or backflowing

Bord Na Mona Energy Ltd, Littleton Group, Littleton, Thurles, Co Tipperary

Composite Sampler Results 2007

Sep	pH	COD	Ammonia as	Total	Suspended	Total	Colour	Flow	COD	Ammonia as	Total	Suspended	Total
SW	22	mg/l	N mg/l	Phosphorus	Solids	Solids	PtCo	Daily	Kg/Day	Kg/Day	Phosphorus	Solids	Solids
				mg/l	mg/l	mg/l	units	Total (litres)			Kg/Day	Kg/Day	Kg/Day
1	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
2	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
3	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
4	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
5	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
6	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
7	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
8	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
9	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
10	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
11	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
12	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
13	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
14	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
15	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
16	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
17	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
18	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
19	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
20	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
21	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
22	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
23	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
24	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
25	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
26	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
27	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
28	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
29	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
30	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
	no flow due to mine dewatering								0.00	0.00	0.00		

A minus figure usually means the pond was flooded or backflowing

Bord Na Mona Energy Ltd, Littleton Group, Littleton, Thurles, Co Tipperary.

Composite Sampler Results 2007

Oct	pH	COD	Ammonia as	Total	Suspended	Total	Colour	Flow	COD	Ammonia as	Total	Suspended	Total
SW	22	mg/l	N mg/l	Phosphorus	Solids	Solids	Pt Co	Daily	Kg/Day	Kg/Day	Phosphorus	Solids	Solids
				mg/l	mg/l	mg/l	units	Total (litres)			Kg/Day	Kg/Day	Kg/Day
1	no flow due to mine dewatering											0.00	0.00
2	no flow due to mine dewatering											0.00	0.00
3	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
4	no flow due to mine dewatering											0.00	0.00
5	no flow due to mine dewatering											0.00	0.00
6	no flow due to mine dewatering											0.00	0.00
7	no flow due to mine dewatering											0.00	0.00
8	no flow due to mine dewatering											0.00	0.00
9	no flow due to mine dewatering											0.00	0.00
10	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
11	no flow due to mine dewatering											0.00	0.00
12	no flow due to mine dewatering											0.00	0.00
13	no flow due to mine dewatering											0.00	0.00
14	no flow due to mine dewatering											0.00	0.00
15	no flow due to mine dewatering											0.00	0.00
16	no flow due to mine dewatering											0.00	0.00
17	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
18	no flow due to mine dewatering											0.00	0.00
19	no flow due to mine dewatering											0.00	0.00
20	no flow due to mine dewatering											0.00	0.00
21	no flow due to mine dewatering											0.00	0.00
22	no flow due to mine dewatering											0.00	0.00
23	no flow due to mine dewatering											0.00	0.00
24	no flow due to mine dewatering								0.00	0.00	0.00	0.00	0.00
25	sampler being prepared for new location											0.00	0.00
26	sampler being prepared for new location											0.00	0.00
27	sampler being prepared for new location											0.00	0.00
28	sampler being prepared for new location											0.00	0.00
29	sampler being prepared for new location											0.00	0.00
30	sampler being prepared for new location											0.00	0.00
31	sampler being prepared for new location								0.00	0.00	0.00	0.00	0.00

A minus figure usually means the pond was flooded or backflowing

Bord Na Mona Energy Ltd, Littleton Group, Littleton, Thurles, Co Tipperary.

Composite Sampler Results 2007

Nov	pH	COD	Ammonia as	Total	Suspended	Total	Colour	Flow	COD	Ammonia as	Total	Suspended	Total
SW	22	mg/l	N mg/l	Phosphorus	Solids	Solids	Pt Co	Daily	Kg/Day	Kg/Day	Phosphorus	Solids	Solids
				mg/l	mg/l	mg/l	units	Total (litres)			Kg/Day	Kg/Day	Kg/Day
1	sampler being prepared for new location											0.00	0.00
2	sampler being prepared for new location											0.00	0.00
3	sampler being prepared for new location											0.00	0.00
4	sampler being prepared for new location											0.00	0.00
5	sampler being prepared for new location											0.00	0.00
6	sampler being prepared for new location											0.00	0.00
7	sampler being prepared for new location								0.00	0.00	0.00	0.00	0.00
8	sampler being prepared for new location											0.00	0.00
9	sampler being prepared for new location											0.00	0.00
10	sampler being prepared for new location											0.00	0.00
11	sampler being prepared for new location											0.00	0.00
12	sampler being prepared for new location											0.00	0.00
13	sampler being prepared for new location											0.00	0.00
14	sampler being prepared for new location								0.00	0.00	0.00	0.00	0.00
15	sampler being prepared for new location											0.00	0.00
16	sampler being prepared for new location											0.00	0.00
17	sampler being prepared for new location											0.00	0.00
18	sampler being prepared for new location											0.00	0.00
19	sampler being prepared for new location											0.00	0.00
20	sampler being prepared for new location											0.00	0.00
21	sampler being prepared for new location								0.00	0.00	0.00	0.00	0.00
22	sampler being prepared for new location											0.00	0.00
23	sampler being prepared for new location											0.00	0.00
24	sampler being prepared for new location											0.00	0.00
25	sampler being prepared for new location											0.00	0.00
26	sampler being prepared for new location											0.00	0.00
27	sampler being prepared for new location											0.00	0.00
28	sampler being prepared for new location								0.00	0.00	0.00	0.00	0.00
29	sampler being prepared for new location											0.00	0.00
30	sampler being prepared for new location											0.00	0.00
	sampler being prepared for new location												

A minus figure usually means the pond was flooded or backflowing

Bord Na Mona Energy Ltd, Littleton Group, Littleton, Thurles, Co Tipperary.

Composite Sampler Results 2007

Dec	pH	COD	Ammonia as	Total	Suspended	Total	Colour	Flow	COD	Ammonia as	Total	Suspended	Total
SW	22	mg/l	N mg/l	Phosphorus	Solids	Solids	Pt/Co	Daily	Kg/Day	Kg/Day	Phosphorus	Solids	Solids
				mg/l	mg/l	mg/l	units	Total (litres)			Kg/Day	Kg/Day	Kg/Day
1	sampler being prepared for new location											0.00	0.00
2	sampler being prepared for new location											0.00	0.00
3	sampler being prepared for new location											0.00	0.00
4	sampler being prepared for new location											0.00	0.00
5	sampler being prepared for new location								0.00	0.00	0.00	0.00	0.00
6	sampler being prepared for new location											0.00	0.00
7	sampler being prepared for new location											0.00	0.00
8	sampler being prepared for new location											0.00	0.00
9	sampler being prepared for new location											0.00	0.00
10	sampler being prepared for new location											0.00	0.00
11	sampler being prepared for new location											0.00	0.00
12	sampler being prepared for new location								0.00	0.00	0.00	0.00	0.00
13	sampler being prepared for new location											#VALUE!	0.00
14	sampler being prepared for new location											0.00	0.00
15	sampler being prepared for new location											0.00	0.00
16	sampler being prepared for new location											0.00	0.00
17	sampler being prepared for new location											0.00	0.00
18	sampler being prepared for new location											0.00	0.00
19	sampler being prepared for new location											0.00	0.00
20	sampler being prepared for new location											0.00	0.00
21	sampler being prepared for new location											0.00	0.00
22	sampler being prepared for new location											0.00	0.00
23	sampler being prepared for new location											0.00	0.00
24	sampler being prepared for new location											0.00	0.00
25	sampler being prepared for new location											0.00	0.00
26	sampler being prepared for new location								0.00	0.00	0.00	0.00	0.00
27	sampler being prepared for new location											0.00	0.00
28	sampler being prepared for new location											0.00	0.00
29	sampler being prepared for new location											0.00	0.00
30	sampler being prepared for new location											0.00	0.00
31	sampler being prepared for new location											0.00	0.00

A minus figure usually means the pond was flooded or backflowing

APPENDIX 4

Dust Monitoring Results.

Summary Results of Emissions to Atmosphere compliance monitoring from the Bord na Móna Fuels Limited Littleton Briquette Factory at Littleton (January 2007 to December 2007) in accordance with the requirements of Integrated Pollution Control Licence Register No. P0499-01.

Report No.: ECS2898

Attention: Mr. Sean McCabe
Bord na Móna Fuels Limited
c/o Littleton Briquette Factory
Thurles
Co. Tipperary

Prepared by: Mr. Paul Crimmins
Environmental Technician

Mr. Andrew Mahon
Environmental Scientist

Date: March 2008

Executive Summary

As part of the requirements of Integrated Pollution Control Licence, Register No. P0499-01, Bord na Móna Fuels Limited are required to submit to the Agency, an Annual Environmental Report (AER). Bord na Móna Environmental Limited were commissioned to prepare a summary report of emissions to atmosphere monitored at the Littleton Briquette Factory from the period to January 2007 to December 2007.

This report is certified as accurate and representative of the sampling and associated analysis carried out.

Respectively submitted,

Mr Andrew Mahon
Environmental Scientist

Ms Lisa Blyth
Operations Manager

1.0 INTRODUCTION

A summary of IPC Licence Register No. P0499-01 environmental monitoring results from the period January 2007 to December 2007 are presented as follows:

Table 1: Quarterly Compliance Monitoring of Particulate Emissions to Atmosphere

Table 2: Summary of Quarterly Compliance Monitoring of Particulate Mass Emissions to Atmosphere

Table 3: IPC Licence Particulate Emissions to Atmosphere Emission Limit Values (ELV's)

Table 4: Annual Particulate Mass Emissions to Atmosphere

Table 5: Quarterly Compliance Monitoring of TOC (as C) Emissions to Atmosphere from Emission Point A108

Table 6: Annual TOC (as C) Emissions to Atmosphere from Emission Point A108

Table 7: Annual Compliance Monitoring of NOx (as NO_2) Emissions to Atmosphere from Emission Point B101

Table 8: Annual NOx (as NO_2) Emissions to Atmosphere from Emission Point B101

Table 9: Annual Compliance Monitoring of SO_2 Emissions to Atmosphere from Emission Point B101

Table 10 Annual SO_2 Emissions to Atmosphere from Emission Point B101

Appendix 1

Figures 1-6: Particulate Mass Emissions to Atmosphere (kg) (January 2007 to December 2007) vs. Licence ELV from Emissions Reference Points B101, A101-A105 respectively.

Figure 7: Summary of Particulate Mass Emissions to Atmosphere (kg) (January 2007 to December 2007) from Emissions Reference Points B101, A101-A106.

TABLE 1: QUARTERLY COMPLIANCE MONITORING OF PARTICULATE EMISSIONS TO ATMOSPHERE (JANUARY – DECEMBER 2007)						
Quarter	**Sampling Date**	**Job No.**	**Emission Point Ref.**	**Volumetric Flow (Nm^3/hr)**	**Particulates (mg/Nm^3)**	**Particulate Mass Emissions (kg/hr)**
1	01/02/07, 02/03/07	ECS2443	B101	34,470	802	27.6
			A101	60,084	102.5	6.2
			A102	Note 2	Note 2	Note 2
			A103	Note 2	Note 2	Note 2
			A104	10,620	263.9	2.8
			A105	7,843	83.6	0.66
			A106	Note 1	Note 1	Note 1
2			Note 3	Note 3	Note 3	Note 3
3	6,7, 12/09/07	ECS2682	B101	37,365	1307	48.8
			A101	77,748	21.6	1.7
			A102	Note 2	Note 2	Note 2
			A103	Note 2	Note 2	Note 2
			A104	10,255	155	1.6
			A105	11,954	139	1.7
			A106	Note 1	Note 1	Note 1
4	20-23/11/07 (incl.)	ECS2775	B101	39,202	2837	111.2
			A101	76,589	246	18.8
			A103	Note 2	Note 2	Note 2
			A102	Note 2	Note 2	Note 2
			A104	10,289	922	9.5
			A105	10,049	27	0.3
			A106	1,043	475	0.5

Note 1: Emission point A106 was not suitable for Isokinectic Particulate Sampling for the first 3 quarters of 2007 as it was undergoing modifications.

Note 2: It was not possible to monitor emission points A102 and A103 during 2007 due to health and safety constraints.

Note 3: The second quarterly monitoring event was not carried out as the Littleton briquette factory was closed during most of quarter 2

TABLE 2: SUMMARY OF QUARTERLY COMPLIANCE MONITORING OF PARTICULATE MASS EMISSIONS TO ATMOSPHERE (JANUARY – DECEMBER 2007)				
Emission Point Ref.	**Particulate Mass Emissions during each Quarterly Monitoring Event (kg/hr)**			
	1	**2**	**3**	**4**
B101	27.6	Note 3	48.8	111.2
A101	6.2	Note 3	1.7	18.8
A102	Note 2	Note 3	Note 2	Note 2
A103	Note 2	Note 3	Note 2	Note 2
A104	2.8	Note 3	1.6	9.5
A105	0.66	Note 3	1.7	0.3
A106	Note 1	Note 3	Note 1	0.5

Note 1: Emission point A106 was not suitable for Isokinectic Particulate Sampling for the first 3 quarters of 2007 as it was undergoing modifications.

Note 2: It was not possible to monitor emission points A102 and A103 during 2007 due to health and safety constraints.

Note 3: The second quarterly monitoring event was not carried out as the Littleton briquette factory was closed during most of quarter 2

TABLE 3: IPC LICENCE PARTICULATE EMISSIONS TO ATMOSPHERE EMISSION LIMIT VALUES (ELV's)				
Emission Point Ref.	**Maximum Volumetric Flow (Nm^3/hr)**	**Particulate ELV (mg/Nm^3 or kg/hr)**	**Particulate ELV (kg/hr)**	***Licensed Annual Particulate Mass Emissions (kg/yr)***
B101	36000	400 mg/Nm^3	14.4	*126144*
A101	34852	50 mg/Nm^3 >0.5kg/hr 150 mg/Nm^3 <0.5kg/hr	5.23max.	*15265* *45796max.*
A102	42400	50 mg/Nm^3 >0.5kg/hr 150 mg/Nm^3 <0.5kg/hr	6.36max.	*18571* *55714max.*
A103	5800	7 kg/hr	7	*61320*
A104	11700	6 kg/hr	6	*52560*
A105	6797	50 mg/Nm^3 >0.5kg/hr 150 mg/Nm^3 <0.5kg/hr	1.02max.	*2977* *8931 max.*
A106	660	50 mg/Nm^3 >0.5kg/hr 150 mg/Nm^3 <0.5kg/hr	0.10max.	*289.1* *867max.*
Maximum Annual Particulates Mass Emissions to Atmosphere Limit			-	*351332*

TABLE 4: ANNUAL PARTICULATE MASS EMISSIONS TO ATMOSPHERE (JANUARY – DECEMBER 2007)				
Location	**Annual Average Mass Emission (kg/hr)**	**Hours Production** (hr/year)	**Annual Particulate Mass Emissions** (kg/year)	***Licensed Annual Particulate Mass Emissions** (kg/yr)*
B101	62.5	5174	323,547	*126144*
A101	8.2	5174	42,427	*45796 max.*
A102	Note 1	5174	Note 1	*55714 max.*
A103	Note 1	5174	Note 1	*61320*
A104	7.5	5174	38,805	*52560*
A105	0.98	5174	5071	*8931 max.*
A106	0.5 Note 2	5174	2,587 Note 2	*867 max.*
Particulate Mass Emissions to Atmosphere			**412,437**	*351332*

Note 1 It was not possible to monitor emission points A102 and A103 during 2007 due to health and safety constraints.

Note 2: Emission values for emission point A106 is based on results from the fourth quarter only as the necessary sampling port was only operational in the final quarter of 2007

TABLE 5: QUARTERLY COMPLIANCE MONITORING OF TOC (AS C) EMISSIONS TO ATMOSPHERE FROM EMISSION POINT A108 (JANUARY – DECEMBER 2007)					
Quarter	**Sampling Date**	**Job No.**	**Volumetric Flow (Nm^3/hr)**	**TOC (as C) (mg/Nm^3)**	**TOC (as C) Mass Emissions (kg/hr)**
1	02/03/07	ECS2443	Note 1	81.5	N/A
2	Note 2	Note 2	Note 2	Note 2	Note 2
3	11/10/07	ECS2682	1,310	144	0.19
4	23/11/07	ECS2775	2,403	186	0.45
IPC Licence ELV's			*6700*	*170*	*1.14*

Note 1: No flows were taken during the first quarterly monitoring event

Note 2: The second quarterly monitoring event was not carried out as the Littleton briquette factory was closed during most of quarter 2

TABLE 6: ANNUAL TOC (as C) MASS EMISSIONS FROM A108 (JANUARY – DECEMBER 2007)			
Annual Average Mass Emission (kg/hr)	**Hours Production** (hr/year) Note 1	**Annual Mass Emissions (kg/year)**	***Annual Mass Emissions IPC Licence ELV (kg/year)***
0.32	5174	1656	*9978*

Note 1 Operational hours of the Firelighter plant

TABLE 7: ANNUAL COMPLIANCE MONITORING OF NO_x (as NO_2) EMISSIONS TO ATMOSPHERE FROM EMISSION POINT B101 (JANUARY – DECEMBER 2007)					
Annual	**Sampling Date**	**Job No.**	**Volumetric Flow (Nm^3/hr)**	**NO_x (as NO_2) (mg/Nm^3)**	**NO_x (as NO_2) Mass Emissions (kg/hr)**
	01/03/07	ECS2443	34,470	343	11.8
IPC Licence ELV's			*36000*	*100*	*3.6*

Note: Results are referenced to 6% oxygen, temperature 273°K, and pressure 1013.5

TABLE 8: ANNUAL NO_x (as NO_2) MASS EMISSIONS FROM B101 (JANUARY – DECEMBER 2007)			
Annual Average Mass Emission (kg/hr) Note 1	**Hours Production** (hr/year)	**Annual Mass Emissions (kg/year)**	***Annual Mass Emissions IPC Licence ELV (kg/year)***
11.8	5174	**61.053**	*31,536*

Note 1 Based on results from one monitoring event

TABLE 9: ANNUAL COMPLIANCE MONITORING OF SO_2 EMISSIONS TO ATMOSPHERE FROM EMISSION POINT B101 (JANUARY – DECEMBER 2007)					
Annual	**Sampling Date**	**Job No.**	**Volumetric Flow (Nm^3/hr)**	**SO_2 (mg/Nm^3)**	**SO_2 Mass Emissions (kg/hr)**
	02/03/07	ECS2443	34,470	292	10.1
IPC Licence ELV's			*36000*	*1000*	*36*

TABLE 10: ANNUAL MASS SO_2 EMISSIONS FROM B101 (JANUARY – DECEMBER 2007)			
Annual Average Mass Emission (kg/hr) Note 1	**Hours Production** (hr/year)	**Annual Mass Emissions (kg/year)**	***Annual Mass Emissions IPC Licence ELV (kg/year)***
10.1	5174	52,257	*315,360*

Note 1 Based on results from one monitoring event

TABLE 11: ANNUAL COMPLIANCE MONITORING OF NOx (as NO_2) EMISSIONS TO ATMOSPHERE FROM EMISSION POINT B101 (JANUARY – DECEMBER 2007)					
Annual	**Sampling Date**	**Job No.**	**Volumetric Flow (Nm^3/hr)**	**CO (mg/Nm^3)**	**CO Mass Emissions (kg/hr)**
	02/03/07	ECS2443	34,470	913	31.5
IPC Licence ELV's			*36000*	*100*	*3.6*

TABLE 12: ANNUAL MASS CO EMISSIONS FROM B101 (JANUARY – DECEMBER 2007)			
Annual Average Mass Emission (kg/hr) Note 1	**Hours Production** (hr/year)	**Annual Mass Emissions (kg/year)**	***Annual Mass Emissions IPC Licence ELV (kg/year)***
31.5	5174	162,981	*315,360*

Note 1 Based on results from one monitoring event

APPENDIX 1

Figure 1: Particulate Mass Emissions to Atmosphere (kg/hr) (January to December 2007) vs. Licence ELV from Emissions Reference Point B101 – Data point 5 is the average yearly emission

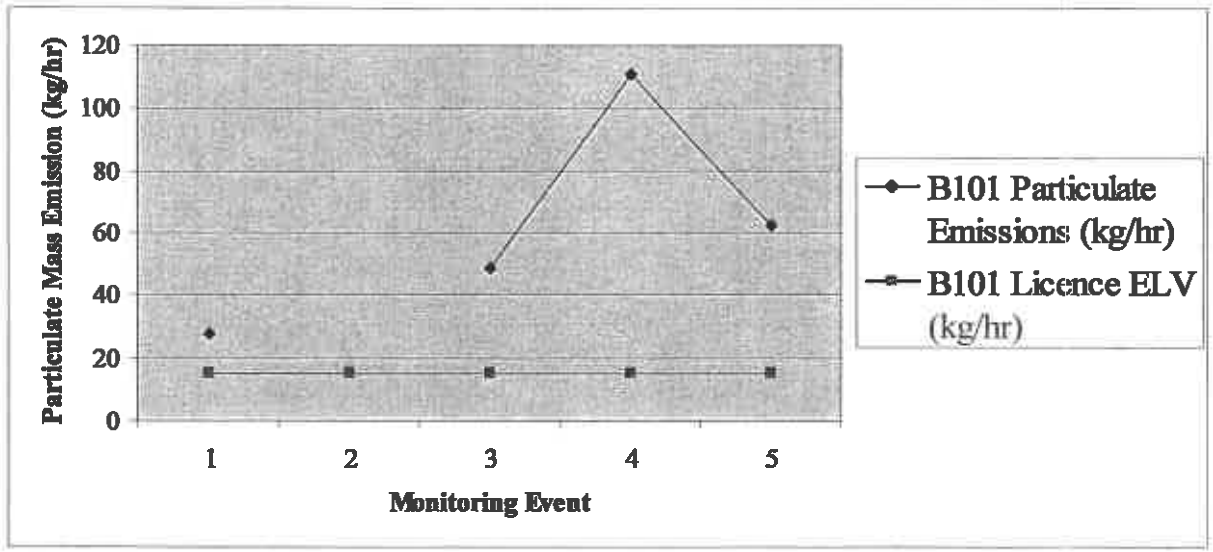


Figure 2: Particulate Mass Emissions to Atmosphere (kg/hr) (January to December 2007) vs. Licence ELV from Emissions Reference Point A101– Data point 5 is the average yearly emission

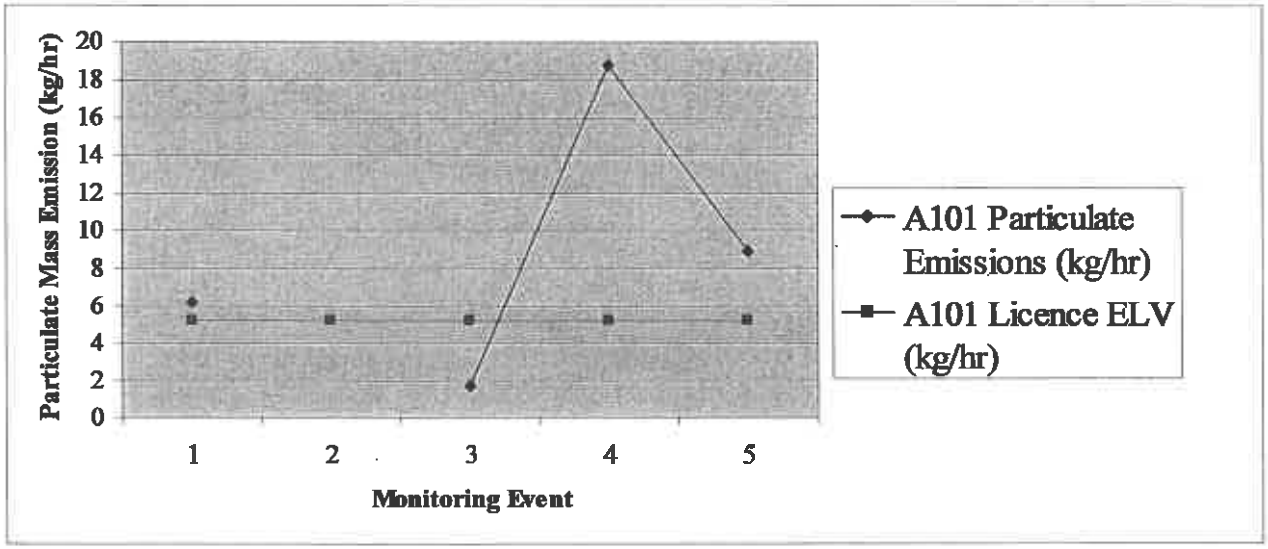


Figure 3: Particulate Mass Emissions to Atmosphere (kg/hr) (January to December 2007) vs. Licence ELV from Emissions Reference Point A104– Data point 5 is the average yearly emission

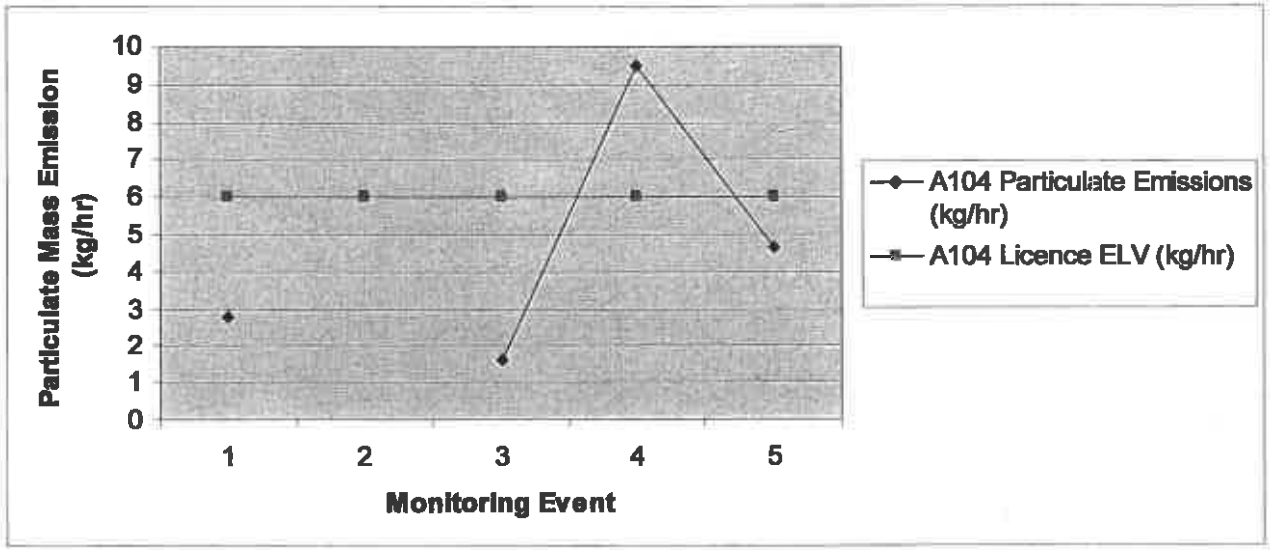


Figure 4: Particulate Mass Emissions to Atmosphere (kg/hr) (January to December 2007) vs. Licence ELV from Emissions Reference Point A105– Data point 5 is the average yearly emission

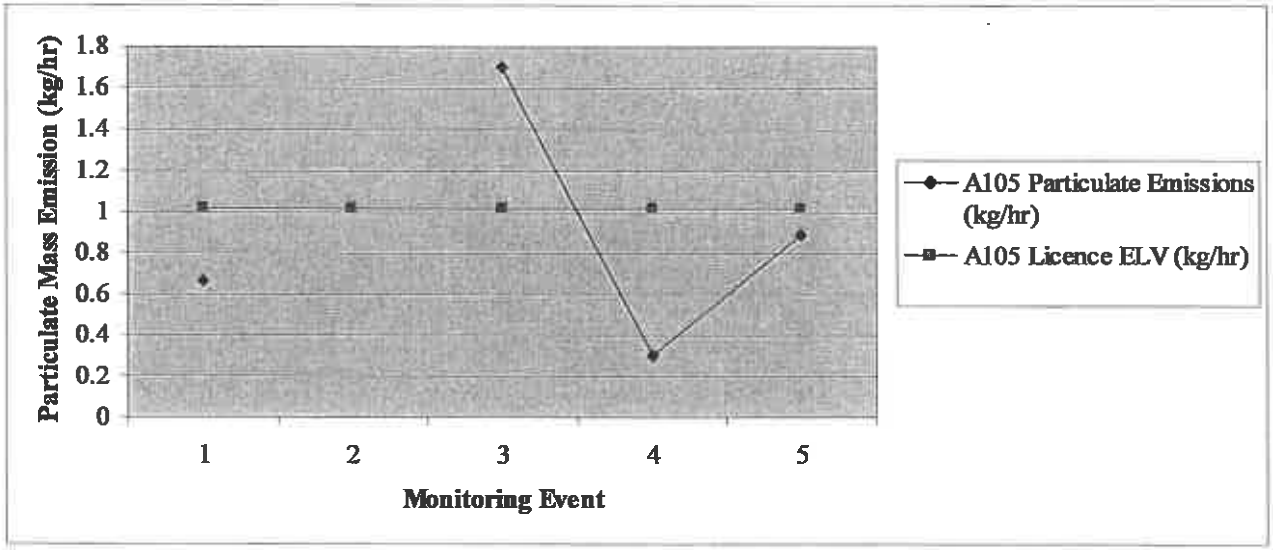
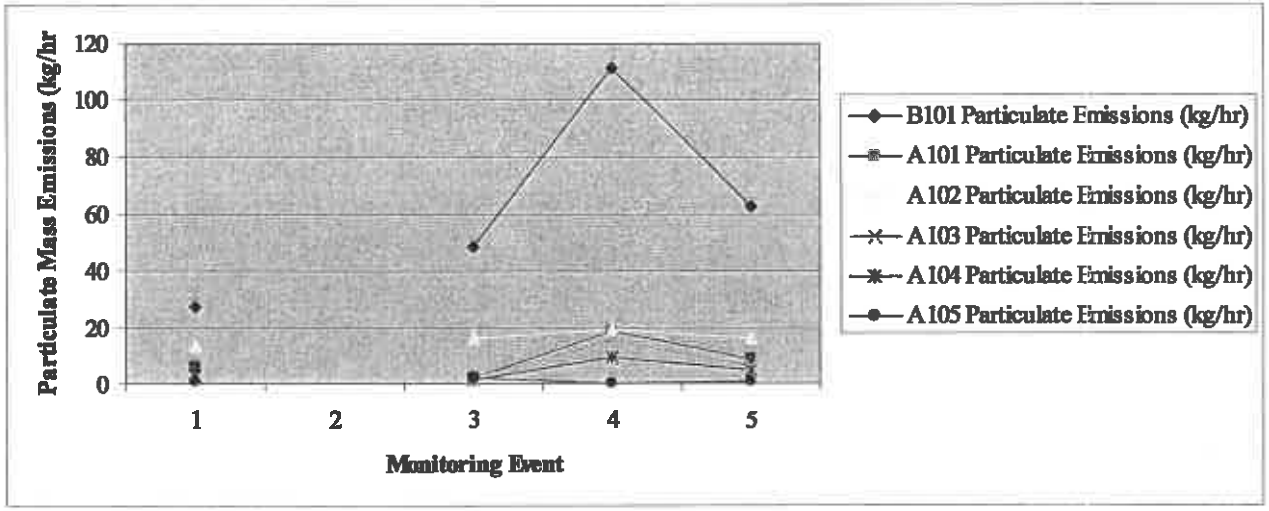
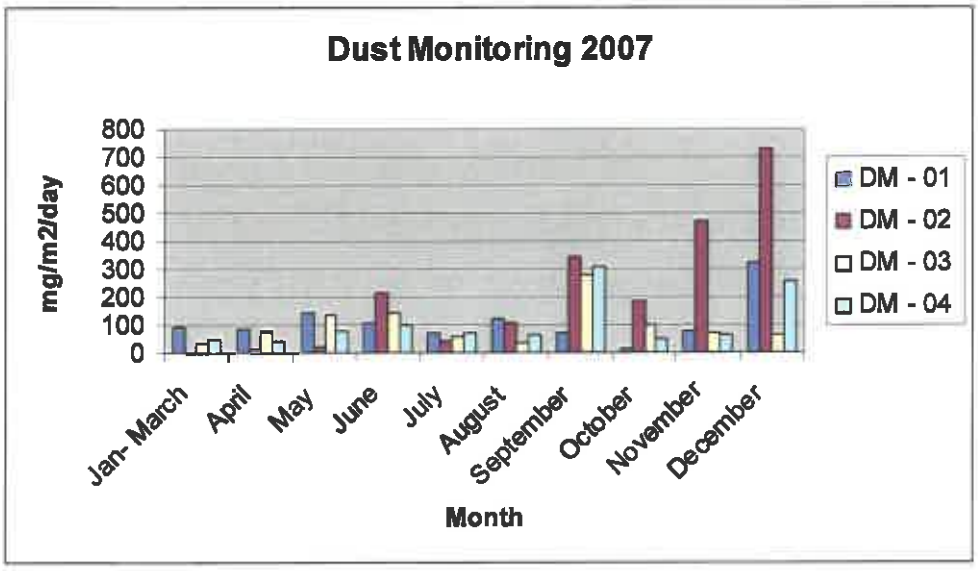


Figure 7: Summary of Particulate Mass Emissions to Atmosphere (kg/hr) (January to December 2007) from Emissions Reference Points B101, A101, A104 and A105



Dust Monitoring Results 2007				
IPPC Licence: P0499-01				
Works: Littleton				
Sample Period	**DM - 01**	**DM - 02**	**DM - 03**	**DM - 04**
Jan- March	95		39	49
April	86	14	81	46
May	141	22	133	78
June	108	211	143	98
July	69	46	57	69
August	124	108	38	65
September	74	344	277	307
October	17	184	98	49
November	81	471	71	66
December	324	729	66	258



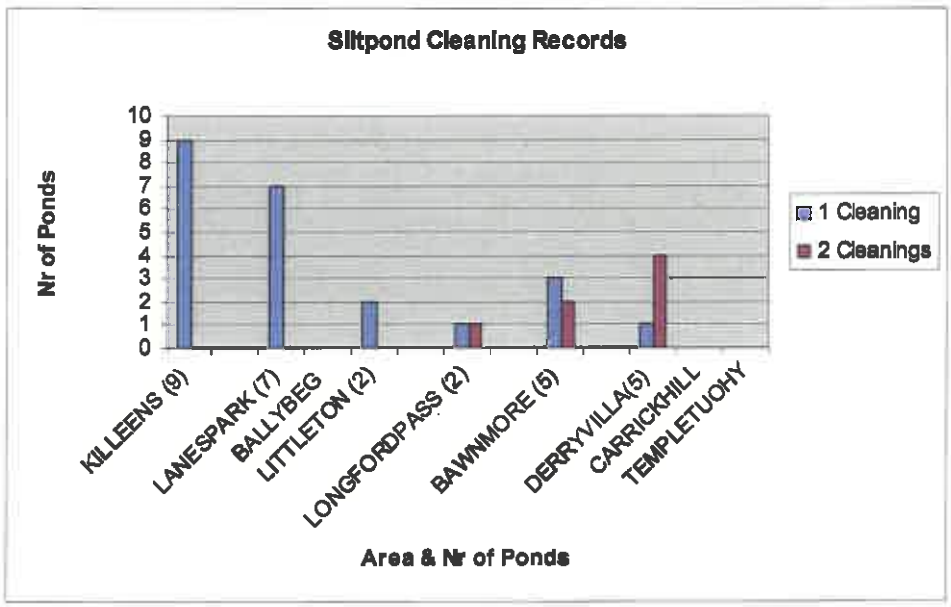
APPENDIX 5

De-silting Programme Review.

Siltpond Cleaning Programme

IPPC Licence:499
Year 2007

Bog Area & Nr Ponds	1 Cleaning	2 Cleanings
KILLEENS (9)	9	
LANESPARK (7)	7	
BALLYBEG		
LITTLETON (2)	2	
LONGFORDPASS (2)	1	1
BAWNMORE (5)	3	2
DERRYVILLA(5)	1	4
CARRICKHILL		
TEMPLETUOHY		



APPENDIX 6

AER & PRTR Data

Environmental Protection Agency

AER Returns Worksheet

Version 1.0.4

REFERENCE YEAR	2007

1. FACILITY IDENTIFICATION

Parent Company Name	Bord na Mona Fuels Limited
Facility Name	Bord na Mona Fuels Limited
PRTR Identification Number	P0499
Licence Number	P0499-01

Waste or IPPC Classes of Activity

No.	class_name
1	The extraction of peat in the course of business which involves an area exceeding 50 hectares.

Address 1	Littleton Briquette Factory
Address 2	Littleton
Address 3	Thurles
City/Town/Village	County Tipperary
Postal Code	
County	
Country	Ireland
Coordinates of Location	22011514
River Basin District	
NACE Code	0892
Main Economic Activity	Extraction of peat
Production Volume	295755
Number of Installations	3
Number of Operating Hours in Year	5174
Number of Employees	148
User Feedback/Comments	
Web Address	www.bordnamona.ie

2. PRTR CLASS ACTIVITIES

Activity Number	Activity Name

3. SOLVENTS DIRECTIVE

Is it applicable?	No
Have you been granted an exemption ?	No
Reason for exemption	

SECTION A : SECTOR SPECIFIC PRTR POLLUTANTS

RELEASES TO AIR										
POLLUTANT			METHOD			QUANTITY				
			Method Used							
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year	
					0	0	0	0	

SECTION B : REMAINING PRTR POLLUTANTS

RELEASES TO AIR									
POLLUTANT			METHOD			QUANTITY			
			Method Used						
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year	
18	Nitrogen Oxides (NO and NO2)	E	ALT	ISO 10849	61053	61053	0	0	
11	Sulphur Oxides (SO2/SO3)	E	ALT	ISO 7935	52257	52257	0	0	
20	Carbon Dioxide (CO2)	E	ALT	ISO 12039	162961	162961	0	0	

SECTION C : LICENSED POLLUTANTS

RELEASES TO AIR																						
POLLUTANT			METHOD																QUANTITY			
			Method Used																			
Pollutant No	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	Emission Point 2	Emission Point 3	Emission Point 4	Emission Point 5	Emission Point 6	Emission Point 7	Emission Point 8	Emission Point 9	T (Total) KG/Year	A (Accidental) KG/Year	(Fugitive) KG/Year	
A1	Dust	C	ALT	BS EN 13284-1:2002	323547	42427	5071	2567	0	0	0	0	412438.86	0	1858	
W1	Total Organic Carbon (as C)	C	ALT	EN 12619 (1999)	0	0	0	0	0	1858	0	0	0	1858	0	0	

Additional Data Requested from Landfill operators

For the purposes of the National Inventory on Greenhouse Gases, landfill operators are requested to provide summary data on landfill gas (Methane) flared or utilised on their facilities to accompany the figures for total methane generated. Please complete the table below:

Landfill: **Bord na Mona Fuels Limited**

Please enter summary data on the quantities of methane flared and / or utilised:	T (Total) kg/Year	M/C/E	Method Used: Method Code	Method Used: Designation or Description	Facility Total Capacity m³/year
Methane flared					
Methane utilised in engines:					

SECTION A : SECTOR SPECIFIC PRTR POLLUTANTS

RELEASES TO WATERS								
POLLUTANT		Method Used			QUANTITY			
No Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
					0	0	0	0

SECTION B : REMAINING PRTR POLLUTANTS

RELEASES TO WATERS								
POLLUTANT		Method Used			QUANTITY			
No Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
					0	0	0	0

SECTION C : LICENSED POLLUTANTS

RELEASES TO WATERS										
POLLUTANT		Method Used			SW#	SW15	SW22	QUANTITY		
Pollutant No	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	Emission Point 2	Emission Point 3	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
A20	Suspended solids	E	OTH	Q/19 Based on APHA 1998 20th Edition Method 2540D	7198	19074	22818	49090	0	0

SECTION A : PRTR POLLUTANTS

OFFSITE TRANSFER OF POLLUTANTS DESTINED FOR WASTE-WATER TREATMENT OR SEWER								
POLLUTANT		METHOD			QUANTITY			
			Method Used					
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
						0	0	0

SECTION B : LICENSED POLLUTANTS

OFFSITE TRANSFER OF POLLUTANTS DESTINED FOR WASTE-WATER TREATMENT OR SEWER								
POLLUTANT		METHOD			QUANTITY			
			Method Used					
Pollutant No.	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
						0	0	0

SECTION A : PRTR POLLUTANTS

RELEASES TO LAND							
POLLUTANT		METHOD			QUANTITY		
			Method Used				
No Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year
					0	0	0

SECTION B : LICENSED POLLUTANTS

RELEASES TO LAND							
POLLUTANT		METHOD			QUANTITY		
			Method Used				
Pollutant No	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year
					0	0	0

5. ONSITE TREATMENT & OFFSITE TRANSFERS OF WASTE

| PRTR# : P0499 | Facility Name : Bord na Mona Ferbane Limited | Filename : P0499_2007.xls | Return Year : 2007 |

Transfer Destination	European Waste Code	Hazardous	Quantity (Tonne)	Description of Waste	Waste Treatment Operation	Method Used		Location of Treatment	Name and Licence / Permit No. of Recoverer / Disposer / Broker	Address of Recoverer / Disposer / Broker	Name and Address of Final Destination i.e. Final Recovery / Disposal Site (HAZARDOUS WASTE ONLY)	Licence / Permit No. of Final Destination i.e. Final Recovery / Disposal Site (HAZARDOUS WASTE ONLY)
						M/C/E	Method Used					
Within the Country	20 03 01	No	89.6	Municipal	D1	C	Volume Calculation	Offsite in Ireland	088(2)/OY/385/06	Ryans Waste Recycling Thurles Co Tipperary		
Within the Country	02 01 04	No	189.76	Waste Plastic	R5	M	Weighed	Offsite in Ireland	Apec Plastics 205/2005	Clane Co Kildare		
Within the Country	17 04 07	No	74.61	Scrap metal	R4	M	Weighed	Offsite in Ireland	Hammond Lane WP462003	Athlone Co Westmeath		
Within the Country	15 01 03	No	200.46	Pallets	R5	M	Weighed	Offsite in Ireland	Kilsaint Ltd WFTN/24	Littleton Thurles Co. Tipperary		
Within the Country	03 03 08	No	5.82	Baled cardboard	R5	C	Volume Calculation	Offsite in Ireland	Smurfit Kappa WPR021-3	Dublin		
Within the Country	01 01 02	No	323.61	Silt Pond Cleanings	D1	E	Volume Calculation	Offsite in Ireland	P0499-01	Bord na Mona Littleton Littleton Thurles Co Tipperary		
Within the Country	13 02 05	Yes	.2	Waste Oil	R9	C	Volume Calculation	Offsite in Ireland	Enva Ireland 184-1	Portlaoise Co Laois	Enva Ireland Portlaoise Co Laois	184-1
Within the Country	16 01 07	Yes	0.66	Oil Filters	R11	C	Volume Calculation	Offsite in Ireland	Enva Ireland 184-1	Portlaoise Co Laois	Enva Ireland Portlaoise Co Laois	184-1
To Other Countries	15 02 02	Yes	0.684	Oily Rags	D10	C	Volume Calculation	Abroad	Enva Ireland 184-1	Portlaoise Co Laois	Kreuzpal, Lindenschmidt, Germany	E 97095037
Within the Country	16 06 01	Yes	2.6	Lead Acid Batteries	R11	M	Weighed	Offsite in Ireland	Return Batt 087/OY/11M2	Athy Co Kildare	Athy Co Kildare	087/OY/11/02
Within the Country	20 01 21	Yes	0.4	Fluorescent Tubes	R13	M	Weighed	Offsite in Ireland	Irish Lamp Recycling 035/OY/60/03	Athy Co Kildare	Athy Co Kildare	035/OY/60/03
Within the Country	11 01 13	Yes	1.86	Parts Wash Waste	R11	C	Volume Calculation	Offsite in Ireland	Safety Kleen 99-1	Rathcoole Co Dublin	Safety Kleen Rathcoole Co Dublin	99-1

Facility Information Summary	
AER Reporting Year	2012
Licence Register Number	P0499-01
Name of site	Bord na Moma Littleton
Site Location	Lanespark, Littleton, Thurles, Co Tipperary
NACE Code	0892
Class/Classes of Activity	1.4
National Grid Reference (6E, 6 N)	220443, 151233
A description of the activities/processes at the site for the reporting year. This should include information such as production increases or decreases on site, any infrastructural changes, environmental performance which was measured during the reporting year **and an overview of compliance with your licence** listing all exceedances of licence limits (where applicable) and what they relate to e.g. air, water, noise.	Activities on site can be divided into two components, firstly the milling, harrowing, ridiging and harvesting of peat into stockpiles and secondly the transportation of that peat via an internal rail network to the Briquette Factory for processing into peat briquettes. Due to the inclement weather experienced during the 2012 production season 19.3% of production target was achieved. This equates to approximately 53,735 tonnes which is a reduction of 80% of the 2011 production. There was no turf production during 2012 with the remaining 3415 tonnes sold during the reporting period. This brought to a close turf production at Littleton. Infrastructurally, there was bog development in Templetouhy works included ditching and leveling on an area of approximately 51 hectares. During the reporting period the firelighter plant ceased production.There were five non-compliances, four related to emissions to water and one to air. There were three incidents, one related to air and two related to water.There were no environmental complaints received during the reporting period. In relation to silt pond cleaning, 100% of ponds received one cleaning with some ponds receiving more. Decommissioning and Rehabilitation works are desc

Declaration:

All the data and information presented in this report has been checked and certified as being accurate. The quality of the information is assured to meet licence requirements.

[signature]	27/3/13
Signature Group/Facility manager (or nominated, suitably qualified and experienced deputy)	Date

AIR-summary template Lic No: P0499-01 Year 2012

Answer all questions and complete all tables where relevant

			Additional information
1	Does your site have licensed air emissions? If yes please complete table A1 and A2 below for the current reporting year and answer further questions. If **you do not have** licenced emissions and **do not complete a solvent management plan** (table A4 and A5) you do not need to complete the tables	Yes	

Periodic/Non-Continuous Monitoring

2	Are there any results in breach of licence requirements? If yes please provide brief details in the comment section of TableA1 below		Yes	
3	Was all monitoring carried out in accordance with EPA guidance note AG2 and using the basic air monitoring checklist?	Basic air monitoring checklist	Yes	

Table A1: Licensed Mass Emissions/Ambient data-periodic monitoring (non-continuous)

Emission reference no:	Parameter/ Substance	Frequency of Monitoring	ELV in licence or any revision therof	Licence Compliance criteria	Measured value	Unit of measurement	Compliant with licence limit	Method of analysis	Annual mass load (kg)	Comments - reason for change in % mass load from previous year if applicable
B101	Nitrogen oxides (NOx/NO2)	Annual	31536	100 % of values < ELV	8.59	kg/hour	no (if no please enter details in comments box)	ISO 10849:1996	48576.5	Corrective actions ongoing
B101	Sulphur oxides (SOx/SO2)	Annual	315360	100 % of values < ELV	16.8	kg/hour	yes	ISO 7935: 1992	95004	
B101	Carbon monoxide (CO)	Annual	NA	NA	7.24	kg/hour	yes	ISO 12039:2001	40942	
B101										
B101	Total Particulates	Annual	126114	100 % of values < ELV	32.85	kg/hour	no (if no please enter details in comments box)	OTH	185.767	Corrective actions ongoing
A101	Total Particulates	Annual	45796	100 % of values < ELV	9.02	kg/hour	no (if no please enter details in comments box)	OTH	51008	Corrective actions ongoing
A102	Total Particulates	Annual	55714	100 % of values < ELV	6.72	kg/hour	yes	OTH	38002	
A103	Total Particulates	Annual	61320	100 % of values < ELV	1.06	kg/hour	yes	OTH	5994	
A104	Total Particulates	Annual	52560	100 % of values < ELV	4.95	kg/hour	yes	OTH	27992	
A105	Total Particulates	Annual	8931	101 % of values < ELV	0.12	kg/hour	yes	OTH	679	
A106	Total Particulates	Annual	867	102 % of values < ELV	0.07	kg/hour	yes	OTH	396	
A108	Total Organic Carbon (as C)	Annual	9986	103 % of values < ELV	0.36	kg/hour	yes	OTH	152.3	
	SELECT			SELECT		SELECT	SELECT	SELECT		

Note 1: Volumetric flow shall be included as a reportable parameter

AIR-summary template	Lic No:	P0499-01	Year	2012

AIR-summary template	Lic No:	P0499-01	Year	2012
Continuous Monitoring				

4	Does your site carry out continuous air emissions monitoring?	No	
	If yes please review your continuous monitoring data and report the required fields below in Table 3 and compare it to its relevant Emission Limit Value (ELV)		
5	Did continuous monitoring equipment experience downtime? If yes please record downtime in table 3 below	NA	
6	Do you have a proactive service agreement for each piece of continuous monitoring equipment?	NA	
7	Did your site experience any abatement system bypasses? If yes please detail them in table 4 below	NA	

Table A2: Summary of average emissions -continuous monitoring

Emission reference no:	Parameter/ Substance	ELV in licence or any revision therof	Averaging Period	Compliance Criteria	Units of measurement	Annual Emission	Annual maximum	Monitoring Equipment downtime (hours)	Number of ELV exceedences in current reporting year	Comments
DM-01	Total Particulates	350	308	Daily average < ELV	mg/m2/day	21000	135	1368	0	Fugitive Dust Monitoring
DM-02	Total Particulates	350	308	Daily average < ELV	mg/m2/day	53340	363	1368	1	Fugitive Dust Monitoring
DM-03	Total Particulates	350	308	Daily average < ELV	mg/m2/day	17836	172	1368	0	Fugitive Dust Monitoring
DM-04	Total Particulates	350	308	Daily average < ELV	mg/m2/day	42056	236	1368	0	Fugitive Dust Monitoring
	SELECT				SELECT					

note 1: Volumetric flow shall be included as a reportable parameter.

Table A3: Abatement system bypass reporting table Bypass protocol

Date*	Duration** (hours)	Location	Reason for bypass	Impact magnitude	Corrective action

* this should include all dates that an abatement system bypass occurred

** an accurate record of time bypass beginning and end should be logged on site and maintained for future Agency inspections please refer to bypass protocol link

AIR-summary template	Lic No:	P0499-01	Year	2012

Solvent use and management on site

8 Do you have a total Emission Limit Value of direct and fugitive emissions on site? if yes please fill out tables A4 and A5

SELECT

Table A4: Solvent Management Plan Summary
Total VOC Emission limit value

Solvent regulations — Please refer to linked solvent regulations to complete table 5 and 6

Reporting year	Total solvent input on site (kg)	Total VOC emissions to Air from entire site	Total VOC emissions as %of solvent	Total Emission Limit Value (ELV) in licence or any revision therof	Compliance
					SELECT
					SELECT

Table A5: Solvent Mass Balance summary

	(I) Inputs (kg)	(O) Outputs (kg)						
Solvent	(I) Inputs (kg)	Organic solvent emission in	Solvents lost in water (kg)	Collected waste solvent (kg)	Fugitive Organic Solvent (kg)	Solvent released in other ways e.g. by-	Solvents destroyed onsite through	Total emission of Solvent to air (kg)
							Total	

AER Monitoring returns summary template-WATER/WASTEWATER(SEWER) Lic No: P0499-01 Year 2012

			Additional information
1	Does your site have licensed emissions direct to surface water or direct to sewer? If yes please complete table W2 and W3 below for the current reporting year and answer further questions. If **you do not have** licenced emissions you only need to complete table W1 and or W2 for surface water analysis and visual inspections	Yes	
2	Was it a requirement of your licence to carry out visual inspections on any surface water discharges or watercourses on or near your site? If yes please complete table W2 below summarising only any evidence of contamination noted during visual inspections	Yes	Monthly COD analysis of yard runoff is attached.

Table W1 Surface water monitoring

Location reference	Location relative to site activities	PRTR Parameter	Licenced Parameter	Monitoring date	ELV or trigger level in licence or any revision thereof*	Licence Compliance criteria	Measured value	Unit of measurement	Compliant with licence	Comments
	SELECT	SELECT	SELECT			SELECT		SELECT	SELECT	
	SELECT	SELECT	SELECT			SELECT		SELECT	SELECT	

*trigger values may be agreed by the Agency outside of licence conditions

Table W2 Visual inspections-Please only enter details where contamination was observed.

Location Reference	Date of inspection	Description of contamination	Source of contamination	Corrective action	Comments
			SELECT		
			SELECT		

Licensed Emissions to water and /or wastewater(sewer)-periodic monitoring (non-continuous)

				Additional information
3	Was there any result in breach of licence requirements? If yes please provide brief details in the comment section of Table W3 below		Yes	
4	Was all monitoring carried out in accordance with EPA guidance and checklists for Quality of Aqueous Monitoring Data Reported to the EPA? If no please detail what areas require improvement in additional information box	External /Internal Lab Quality checklist / Assessment of results checklist	SELECT	Surface water monitoring was carried out on a quarterly basis. Weekly sampling was carried out at PW102, the results of which are attached.

Table W3: Licensed Emissions to water and /or wastewater (sewer)-periodic monitoring (non-continuous)

Emission reference no:	Emission released to	Parameter/ SubstanceNote 1	Type of sample	Frequency of monitoring	Averaging period	ELV or trigger values in licence or any revision therof[Note 2]	Licence Compliance criteria	Measured value	Unit of measurement	Compliant with licence	Method of analysis	Procedural reference source	Procedural reference standard number	Annual mass load (kg)	Comments

Note 1: Volumetric flow shall be included as a reportable parameter

Note 2: Where Emission Limit Values (ELV) do not apply to your licence please compare results against EQS for Surface water or relevant receptor quality standards

AER Monitoring returns summary template-WATER/WASTEWATER(SEWER) Lic No: P0499-01 Year 2012

Continuous monitoring

			Additional Information
5	Does your site carry out continuous emissions to water/sewer monitoring?	Yes	See Note above
	If yes please summarise your continuous monitoring data below in Table W4 and compare it to its relevant Emission Limit Value (ELV)		
6	Did continuous monitoring equipment experience downtime? **If yes please record downtime in table W4 below**	Yes	
7	Do you have a proactive service contract for each piece of continuous monitoring equipment on site?	Yes	Annual calibration schedule and trouble shooting service
8	Did abatement system bypass occur during the reporting year? **If yes please complete table W5 below**	No	

Table W4: Summary of average emissions -continuous monitoring

Emission reference no:	Emission released to	Parameter/ Substance	ELV or trigger values in licence or any revision thereof	Averaging Period	Compliance Criteria	Units of measurement	Annual Emission for current reporting year (kg)	% change +/- from previous reporting year	Monitoring Equipment downtime (hours)	Number of ELV exceedences in reporting year	Comments
SW18	Water	Suspended Solids	35	24 hour	All results < 1.5 times ELV, plus 8 from ten results must be < ELV	mg/L	22548	368%	1752 (4512 hours 2011)	2	The sampler was relocated from its previous location and this contributed to the kg/year increase as the previous site would run dry with no results for extended periods.
SW18	Water	Ammonia (as N)	NA	Weekly	NA	mg/L	323.14	1346%	168	0	Down time due to battery failure and or frozen pipes
SW18	Water	Total phosphorus	NA	Weekly	NA	mg/L	12.87	173%	168	0	Down time due to battery failure and or frozen pipes
SW18	Water	COD	NA	Weekly	NA	mg/L	19258	327%	168	0	Down time due to battery failure and or frozen pipes
SW18	Water	Total Dissolved Solids	NA	Weekly	NA	mg/L	284593	15%	168	0	Down time due to battery failure and or frozen pipes
SW18	Water	volumetric flow	NA	24 hour	NA	m3/day	1420580561	92%	168	0	Down time due to battery failure and or frozen pipes

note 1: Volumetric flow shall be included as a reportable parameter.

Table W5: Abatement system bypass reporting table

Date	Duration (hours)	Location	Resultant emissions	Reason for bypass	Corrective action*	Was a report submitted to the EPA?	When was this report submitted?
						SELECT	

*Measures taken or proposed to reduce or limit bypass frequency

Bund/Pipeline testing template

Lic No: P0499-01 Year 2012

Bund testing dropdown menu click to see options

			Additional information
1	Are you required by your licence to undertake integrity testing on bunds and containment structures ? if yes please fill out table B1 below listing all **new bunds and containment structures** on site, **in addition to all bunds which failed** the integrity test-**all bunding structures which failed including mobile bunds must be listed in the table below**	Yes	Included are details of bund test results, however going forward only new and failed bunds will be included.
2	Please provide integrity testing frequency period	2 Yearly	
3	Does the site maintain a register of bunds, underground pipelines (including stormwater and foul), Tanks, sumps and containers? (containers refers to "Chemstore" type units and mobile bunds)	Yes	
4	How many bunds are on site?	4	The site had 6 bunded structures of which 2 are now obsolete.
5	How many of these bunds have been tested witin the required test schedule?	4	
6	How many mobile bunds are on site?	8	These include barrel trays located within workshops
7	Are the mobile bunds included in the bund test schedule?	No	
8	How many of these mobile bunds have been tested witin the required test schedule?	NA	
9	How many sumps on site are included in the integrity test schedule?	NA	
10	How many of these sumps are integrity tested within the test schedule?	NA	
	Please list any sump integrity failures in table B1		
11	Do all sumps and chambers have high level liquid alarms?	N/A	
12	If yes to Q11 are these failsafe systems included in a maintenance and testing programme?	N/A	

Table B1: Summary details of bund /containment structure integrity test

Bund/Containment structure ID	Type	Specify Other type	Product containment	Actual capacity	Capacity required*	Type of integrity test	Other test type	Test date	Integrity reports maintained on site?	Results of test	Integrity test failure explanation <50 words	Corrective action taken	Scheduled date for retest	Results of retest(if in current reporting year)
499-13-01	reinforced concrete		Fuel Oil	65400	48400	Hydraulic test		Sep-11	Yes	Pass		SELECT	Sep-13	
499-13-03	reinforced concrete		Fuel Oil	52675	27500	Hydraulic test		Sep-11	Yes	Pass			Sep-13	
499-13-04	reinforced concrete		Fuel Oil	57618	48400	Hydraulic test		Sep-11	Yes	Pass			Sep-13	
499-13-05	reinforced concrete		Acid	16170	14448	Hydraulic test		Sep-11	Yes	Pass		SELECT	Sep-13	

* Capacity required should comply with 25% or 110% containment rule as detailed in your licence

			Commentary
14	Has integrity testing been carried out in accordance with licence requirements and are all structures tested in line with BS8007/EPA Guidance? bunding and storage guidelines	Yes	
15	Are channels/transfer systems to remote containment systems tested?	NA	
16	Are channels/transfer systems compliant in both integrity and available volume?	NA	

Pipeline/underground structure testing

1	Are you required by your licence to undertake integrity testing on underground structures e.g. pipelines or sumps etc ? if yes please fill out table 2 below listing all underground structures and pipelines on site **which failed the integrity test**	No	
2	Please provide integrity testing frequency period	NA	

Table B2: Summary details of pipeline/underground structures integrity test

Structure ID	Type system	Material of construction:	Does this structure have Secondary containment?	Type of secondary containment	Type integrity testing	Integrity reports maintained on site?	Results of test	Integrity test failure explanation <50 words	Corrective action taken	Scheduled date for retest	Results of retest(if in current reporting year)
	SELECT	SELECT	SELECT	SELECT	SELECT	SELECT	SELECT				SELECT

Please use commentary for additional details not answered by tables/ questions above

Groundwater/Soil monitoring template	Lic No:	P0499-01	Year	2012

			Comments
1	Are you required to carry out groundwater monitoring as part of your licence requirements?	no	
2	Are you required to carry out soil monitoring as part of your licence requirements?	no	
3	Do you extract groundwater for use on site? If yes please specify use in comment section	no	
4	Is there contaminated land and /or groundwater on site? If yes please answer q's 5-12	no	
5	Is the contamination related to operations at the facility (either current and/or historic)	N/A	
6	Have actions been taken to address contamination issues?If yes please summarise remediation strategies proposed/undertaken for the site	NA	
7	Please specify the proposed time frame for the remediation strategy	NA	
8	Is there a licence condition to carry out/update ELRA for the site?	NA	
9	Has any type of risk assesment been carried out for the site?	NA	
10	Has a Conceptual Site Model been developed for the site?	NA	
11	Have potential receptors been identified on and off site?	NA	
12	Is there evidence that contamination is migrating offsite?	NA	

Table 1: Upgradient Groundwater monitoring results

Date of sampling	Sample location reference	Parameter/ Substance	Methodology	Monitoring frequency	Maximum Concentration++	Average Concentration+	unit	GTV's*	SELECT**	% change in average concentration previous year +/-	Upward trend in pollutant concentration over last 5 years of monitoring data
							SELECT				SELECT
							SELECT				SELECT

.+ where average indicates arithmetic mean

.++ maximum concentration indicates the maximum measured concentration from all monitoring results produced during the reporting year

Table 2: Downgradient Groundwater monitoring results

Date of sampling	Sample location reference	Parameter/ Substance	Methodology	Monitoring frequency	Maximum Concentration	Average Concentration	unit	GTV's*	SELECT**	% change in average concentration previous year +/-	Upward trend in yearly average pollutant concentration over last 5 years of monitoring data
							SELECT				SELECT
							SELECT				SELECT

* please note exceedance of a relevant Groundwater threshold value (GTV) at a representative monitoring point does not indicate non compliance, an exceedance triggers further investigation to confirm whether the criteria for poor groundwater chemical status are being met.

**Depending on location of the site and proximity to other sensitive receptors alternative Receptor based Water Quality standards should be used in addition to the GTV e.g. if the site is close to surface water compare to Surface Water Environmental Quality Standards (SWEQS), If the site is close to a drinking water supply compare results to the Drinking Water Standards (DWS)

Surface water EQS | Groundwater regulations GTV's | Drinking water (private supply) standards | Drinking water (public supply) standards | Interim Guideline Values (IGV)

Groundwater/Soil monitoring template Lic No: P0499-01 Year 2012

Table 3: Soil results

Date of sampling	Sample location reference	Parameter/ Substance	Methodology	Monitoring frequency	Maximum Concentration	Average Concentration	unit
							SELECT
							SELECT

Where additional detail is required please enter it here in 200 words or less

Environmental Liabilities template	Lic No:	P0499-01	Year	2012

Click here to access EPA guidance on Environmental Liabilities and Financial provision

			Commentary
1	ELRA initial agreement status	Not a Licence Requirement	
2	ELRA review status	NA	
3	Amount of Financial Provision cover required as determined by the latest ELRA	NA	
4	Financial Provision for ELRA status	NA	
5	Financial Provision for ELRA - amount of cover	NA	
6	Financial Provision for ELRA - type	NA	
7	Financial provision for ELRA expiry date	NA	
8	Closure plan initial agreement status	Required but not submitted	
9	Closure plan review status	Review required and completed	
10	Financial Provision for Closure status	Required but not submitted	
11	Financial Provision for Closure - amount of cover	NA	Internal Budget Provision
12	Financial Provision for Closure - type	Other please specify	Budgeted Financial Provision
13	Financial provision for Closure expiry date	2030	

Environmental Management Programme/Continuous Improvement Programme template	Lic No:	P0499-01	Year	2012

	Highlighted cells contain dropdown menu click to view		Additional Information
1	Do you maintain an Environmental Mangement System (EMS) for the site. If yes, please detail in additional information	Yes	Internal unaccredited EMS.
2	Does the EMS reference the most significant environmental aspects and associated impacts on-site	Yes	
3	Does the EMS maintain an Environmental Management Programme (EMP) as required in accordance with the licence requirements	Yes	
4	Do you maintain an environmental documentation/communication system to inform the public on environmental performance of the facility, as required by the licence	Yes	

Environmental Management Programme (EMP) report

Objective Category	Target	Status (% completed)	How target was progressed	Responsibility	Intermediate outcomes
Reduction of emissions to Air	Training.Continue to train all employees in environmental matters. Training will be by means of the screening of an	70	In total 66 Personnel received training in 2012. Headland peat was collected but was minimal due to weather conditions.	Section Head	Reduced emissions
Waste reduction/Raw material usage efficiency	Waste Streamlining.It is planned to continue with and where possible improve the current waste management service provided by AES Ltd	100	Installed a waste management system. Quarterly waste reports are returned for records/filing and waste streams are segrated on site to maximise recycling potential.	Section Head	Improved Environmental Management Practices
Reduction of emissions to Water	Training. Continue to train all employees in environmental matters. Training will be by means of the screening of an environmental DVD, followed by a power point presentation. Silt Pond survey also planned.	100	In total 66 Personnel received training in 2012. Silt pond catchments were resurveyed with final upgrades identified and work schedule planned.	Section Head	Reduced emissions
Materials Handling/Storage/Bunding	Increased bund capacity will be provided where required.	100	The mobile bund capacity was increased in both workshops. Bund integrity testing was not required during 2012.	Section Head	Improved Environmental Management Practices

Environmental Management Programme/Continuous Improvement Programme template				Lic No:	P0499-01	Year	2012
Waste reduction/Raw material usage efficiency	Continue with the recycling of polyethylene. The sourcing of more recycling contractors will be ongoing.	100	In total approximately 420 tonnes were sent off site for recycling. Procurement also exploring the possibility of securing further recyclers.	Section Head	Reduced emissions		
Energy Efficiency/Utility conservation	Carry out a review of energy aspects identifying significant energy users.	90	An energy survey was completed at each of the main workshops and the main areas of improvement identified. Three pump sites have been identified for the fitting of smart meters to allow for greater consumption monitoring.	Section Head	Improved Environmental Management Practices		

Noise monitoring summary report	Lic No:	P0499-01	Year	2012

1	Was noise monitoring a licence requirement for the AER period? If yes please fill in table N1 noise summary below	No
2	Was noise monitoring carried out using the EPA Guidance note including completion of the "Checklist for noise measurement report" included in the guidance note as table 6?	NA
3	Does your site have a noise reduction plan	NA
4	When was the noise reduction plan last updated?	
5	Have there been changes relevant to site noise emissions (e.g. plant or operational changes) since the last noise survey?	NA

Noise Guidance note NG4

Table N1: Noise monitoring summary

Date of monitoring	Time period	Noise location (on site)	Noise sensitive location -NSL (if applicable)	LA_{eq}	LA_{90}	LA_{10}	LA_{max}	Tonal or Impulsive noise* (Y/N)	If tonal /impulsive noise was identified was 5dB penalty applied?	Comments (ex. main noise sources on site, & extraneous noise ex. road traffic)	Is site compliant with noise limits (day/evening/night)?
								SELECT	SELECT		SELECT

*Please ensure that a tonal analysis has been carried out as per guidance note NG4. These records must be maintained onsite for future inspection

If noise limits exceeded as a result of noise attributed to site activities, please choose the corrective action from the following options? SELECT

** please explain the reason for not taking action/resolution of noise issues?
Any additional comments? (less than 200 words)

Resource Usage/Energy efficiency summary

Lic No: P0499-01 Year 2012

			Additional information
1	When did the site carry out the most recent energy efficiency audit? Please list the recommendations in table 3 below		
2	Is the site a member of any accredited programmes for reducing energy usage/water conservation such as the SEAI programme linked to the right? If yes please list them in additional information	SEAI - Large Industry Energy Network (LIEN) yes	
3	Where Fuel Oil is used in boilers on site is the sulphur content compliant with licence conditions? Please state percentage in additional information	SELECT	

Table R1 Energy usage on site

Energy Use	Previous year	Current year	Production +/- % compared to previous reporting year**	Energy Consumption +/- % vs overall site production*
Total Energy Used (MWHrs)	134377	120402	-80%	-10.00%
Total Energy Generated (MWHrs)				
Total Renewable Energy Generated (MWHrs)				
Electricity Consumption (MWHrs)	1562	1704	-80%	12.80%
Fossil Fuels Consumption:				
Heavy Fuel Oil (m3)				
Light Fuel Oil (m3)	920	695	-80%	-24%
Natural gas (CMN)				
Coal/Solid fuel (metric tonnes)				
Peat (metric tonnes)	57021	51684		
Renewable Biomass				
Renewable energy generated on site				

* where consumption of energy can be compared to overall site production please enter this information as percentage increase or decrease compared to the previous reporting year.
** where site production information is available please enter percentage increase or decrease compared to previous year

Table R2 Water usage on site

					Water Emissions	**Water Consumption**	
Water use	Water extracted Previous year m3/yr.	Water extracted Current year m3/yr.	Production +/- % compared to previous reporting year**	Energy Consumption +/- % vs overall site production*	Volume Discharged back to environment(m^3yr):	Volume used i.e not discharged to environment e.g. released as steam m3/yr	Unaccounted for Water:
Groundwater							
Surface water							
Public supply							
Recycled water							
Total							

* where consumption of water can be compared to overall site production please enter this information as percentage increase or decrease compared to the previous reporting year.
** where site production information is available please enter percentage increase or decrease compared to previous year

Table R3 Waste Stream Summary

	Total	Landfill	Incineration	Recycled	Other
Hazardous (Tonnes)	6.62	1	0.6	5.02	
Non-Hazardous (Tonnes)	1684	85.618		693.382	905

Resource Usage/Energy efficiency summary Lic No: P0499-01 Year 2012

Table R4: Energy Audit finding recommendations

Date of audit	Recommendations	Description of Measures proposed	Origin of measures	Predicted energy savings %	Implementation date	Responsibility	Completion date	Status and comments
			SELECT					
			SELECT					
			SELECT					

Table R5: Power Generation: Where power is generated onsite (e.g. power generation facilities/food and drink industry)please complete the following information

	Unit ID	Unit ID	Unit ID	Unit ID	Station Total
Technology					
Primary Fuel					
Thermal Efficiency					
Unit Date of Commission					
Total Starts for year					
Total Running Time					
Total Electricity Generated (GWH)					
House Load (GWH)					
KWH per Litre of Process Water					
KWH per Litre of Total Water used on Site					

Complaints and Incidents summary template

Lic No: P0499-01 Year 2012

Complaints

Have you received any environmental complaints in the current reporting year? If yes please complete summary details of complaints received on site in table 1 below	No	Additional information

Table 1 Complaints summary

Date	Category	Other type (please specify)	Brief description of complaint (Free txt <20 words)	Corrective action< 20 words	Resolution status	Resolution date	Further information
	SELECT				SELECT		
	SELECT				SELECT		
	SELECT				SELECT		
	SELECT				SELECT		
	SELECT				SELECT		

Total complaints open at start of reporting year	0
Total new complaints received during reporting year	0
Total complaints closed during reporting year	0
Balance of complaints end of reporting year	0

Incidents

Have any incidents occurred on site in the current reporting year? Please list all incidents for current reporting year in Table 2 below	Yes	Additional information

*For information on how to report and what constitutes an incident	What is an incident

Table 2 Incidents summary

Date of occurrence	Incident nature	Location of occurrence	Incident category*please refer to guidance	Receptor	Cause of incident	Other cause(please specify)	Activity in progress at time of incident	Communication	Occurrence	Corrective action<20 words	Preventative action <20 words	Resolution status	Resolution date	Liklihood of reoccurence
26/03/2012	Breach of ELV	Licenced discharge point (PW102)	1. Minor	Water	Other (add details)	Shell marl in peat being processed at the time.	Normal activities	EPA	Recurring	The area where marl originsted was taken out of production	Area now out of production	Complete	May-12	Low
26/03/2012	Trigger level reached	Licenced discharge point (PW102)	1. Minor	Water	Other (add details)	Shell marl in peat being processed at the time.	Normal activities	EPA	Recurring	The area where marl originsted was taken out of production	Area now out of production	Complete	May-12	Low
29/03/2012	Breach of ELV	Licenced discharge point (SW18)	1. Minor	Water	Adverse weather		Normal activities	EPA	New	Proposal to improve outlet control.		Ongoing	NA	Low
17/07/2012	Breach of ELV	Licenced discharge point (SW18)	1. Minor	Water	Adverse weather		Normal activities	EPA	Recurring	Proposal to improve outlet control.		Ongoing	NA	Medium
05/11/2012	Trigger level reached	Licenced discharge point (SWE2 & SWE3)	1. Minor	Water	Plant or equipment issues		Normal activities		Recurring	Discuss interceptor control with manufacturer		Ongoing	NA	Low

Complaints and Incidents summary template					Lic No:	P0499-01		Year	2012					
12/11/2012	Breach of ELV	Licenced discharge point (DM02)	1. Minor	Air	Other (add details)	Leaf litter/sedement in gauge	Normal activities	NO	New	Proposed to relocate gauge away from adjacent foliage	Relocated gauge away from foliage following EPA approval	Complete	Dec-12	Low
23/12/2012	Fire	Other location (Littleton Factory)	2. Limited	Air	Other (add details)	Cause not identified	Routine maintenance	EPA & Local Authority	New	Fire service attended	Relocated gauge away from foliage following EPA approval			Low
27/12/2012	Breach of ELV	Licenced discharge point (SW4)	1. Minor	Water	Adverse weather		Normal activities			Integrity of sample doubtfull due to adverse weather.				Low

Total number of incidents current year	8
Total number of incidents previous year	22
% reduction/ increase	-63%

WASTE SUMMARY Lic No: P0499-01 Year 2012

SECTION A-PRTR ON SITE WASTE TREATMENT AND WASTE TRANSFERS TAB- TO BE COMPLETED BY ALL IPPC AND WASTE FACILITIES PRTR facility logon dropdown list click to see options

SECTION B- WASTE ACCEPTED ONTO SITE-TO BE COMPLETED BY ALL IPPC AND WASTE FACILITIES

			Additional Information
1	Were any wastes accepted onto your site for recovery or disposal or treatment prior to recovery or disposal within the boundaries of your facility ?; (waste generated within your boundaries is to be captured through PRTR reporting) If yes please enter details in table 1 below	N/A	
2	Did your site have any rejected consignments of waste in the current reporting year? If yes please give a brief explanation in the additional information	N/A	
3	Was waste accepted onto your site that was generated outside the Republic of Ireland? If yes please state the quantity in tonnes in additional information	N/A	

Table 1 Details of waste accepted onto your site for recovery, disposal or treatment (do not include wastes generated at your site, as these will have been reported in your PRTR workbook)

Licenced annual tonnage limit for your site (total tonnes/annum)	EWC code European Waste Catalogue EWC codes	Source of waste accepted	Description of waste accepted **Please enter an accurate and detailed description which applies to** European Waste Catalogue EWC codes	Quantity of waste accepted in current reporting year (tonnes)	Quantity of waste accepted in previous reporting year (tonnes)	Reduction/Increase over previous year +/ - %	Reason for reduction/increase from previous reporting year	Packaging Content (%)- only applies if the waste has a packaging component	Disposal/Recovery or treatment operation carried out at your site and the description of this operation	Quantity of waste remaining on site at the end of reporting year (tonnes)	Comments -

SECTION C-TO BE COMPLETED BY ALL WASTE FACILITIES (waste transfer stations, Composters, Material recovery facilities etc) EXCEPT LANDFILL SITES

4	Is all waste processing infrastructure as required by your licence and approved by the Agency in place? If no please list waste processing infrastructure required onsite	SELECT	
5	Is all waste storage infrastructure as required by your licence and approved by the Agency in place? If no please list waste storage infrastructure required on site	SELECT	
6	Does your facility have relevant nuisance controls in place?	SELECT	
7	Do you have an odour management system in place for your facility? If no why?	SELECT	
8	Do you maintain a sludge register on site?	SELECT	

SECTION D-TO BE COMPLETED BY LANDFILL SITES ONLY

Table 2 Waste type and tonnage-landfill only

Waste types permitted for disposal	Authorised/licenced annual intake for disposal (tpa)	Actual intake for disposal in reporting year (tpa)	Remaining licensed capacity at end of reporting year (m3)	Comments

Table 3 General information-Landfill only

Area ID	Date landfilling commenced	Date landfilling ceased	Currently landfilling	Private or Public Operated	Inert or non-hazardous	Predicted date to cease landfilling	Licence permits asbestos	Is there a separate cell for asbestos?	Accepted asbestos in reporting year	Total disposal area occupied by waste	Lined disposal area occupied by waste	Unlined area	Comments on liner type
										SELECT UNIT	SELECT UNIT	SELECT UNIT	
Cell 8													

WASTE SUMMARY Lic No: P0499-01 Year 2012

Table 4 Environmental monitoring-landfill only

Landfill Manual-Monitoring Standards

Was meterological monitoring in compliance with Landfill Directive (LD) standard in reporting year +	Was leachate monitored in compliance with LD standard in reporting year	Was Landfill Gas monitored in compliance with LD standard in reporting year	Was SW monitored in compliance with LD standard in reporting year	Have GW trigger levels been established	Were emission limit values agreed with the Agency (ELVs)	Was topography of the site surveyed in reporting year	Has the statement under S53(A)(5) of WMA been submitted in reporting year	Comments

.+ please refer to Landfill Manual linked above for relevant Landfill Directive monitoring standards

Table 5 Capping-Landfill only

Area uncapped*	Area with temporary cap	Area with final cap to LD Standard m2 ha, a	Area capped other	Area with waste that should be permanently capped to date under licence	What materials are used in the cap	Comments
SELECT UNIT	SELECT UNIT					

*please note this includes daily cover area

Table 6 Leachate-Landfill only

9	Is leachate from your site treated in a Waste Water Treatment Plant?	SELECT
10	Is leachate released to surface water? If yes please complete leachate mass load information below	SELECT

Volume of leachate in reporting year(m3)	Leachate (BOD) mass load (kg/annum)	Leachate (COD) mass load (kg/annum)	Leachate (NH4) mass load (kg/annum)	Leachate (Chloride) mass load kg/annum	Leachate treatment on-site	Specify type of leachate treatment	Comments

Please ensure that all information reported in the landfill gas section is consistent with the Landfill Gas Survey submitted in conjunction with PRTR returns

Table 7 Landfill Gas-Landfill only

Gas Captured&Treated by LFG System m3	Power generated (MW / KWh)	Used on-site or to national grid	Was surface emissions monitoring performed during the reporting year?	Comments
			SELECT	

BNM Group:	Littleton		Quarterly Grabs	
IPPC Licence No.	PO499-01	2012		
pH (units)				
	Jan - Mar	Apr - June	July - Sept	Oct - Dec
SW 4 Killeens	7.4	7.6	6.7	6.4
SW 15 Lanespark	7.5	7.8	6.9	6.7
SW 26 Carrickhill	7.5	6.6	6.8	6.3
COD (mg/l)				
	Jan - Mar	Apr - June	July - Sept	Oct - Dec
SW 4 Killeens	41	39	85	288
SW 15 Lanespark	34	50	67	118
SW 26 Carrickhill	78	113	99	97
Ammonia as N (mg/l)				
	Jan - Mar	Apr - June	July - Sept	Oct - Dec
SW 4 Killeens	1.39	3.25	1.6	0.96
SW 15 Lanespark	2.68	2.32	1.2	1
SW 26 Carrickhill	2.6	1.62	1.1	0.67
Total Phosphorus (mg/l)				
	Jan - Mar	Apr - June	July - Sept	Oct - Dec
SW 4 Killeens	<.05	<.05	<.05	0.14
SW 15 Lanespark	<.05	<.05	<.05	<.05
SW 26 Carrickhill	<.05	<.05	<.05	0.05
Suspended Solids (mg/l)				
	Jan - Mar	Apr - June	July - Sept	Oct - Dec
SW 4 Killeens	5	6	19	145
SW 15 Lanespark	21	5	7	26
SW 26 Carrickhill	42	6	19	29
Total Solids (mg/l)				
	Jan - Mar	Apr - June	July - Sept	Oct - Dec
SW 4 Killeens	176	316	136	238
SW 15 Lanespark	214	258	134	174
SW 26 Carrickhill	222	202	168	97
Colour (pt Co Units)				
	Jan - Mar	Apr - June	July - Sept	Oct - Dec
SW 4 Killeens	185	59	322	187
SW 15 Lanespark	193	82	331	267
SW 26 Carrickhill	276	299	440	168
Flow (l/s)				
	Jan - Mar	Apr - June	July - Sept	Oct - Dec
SW 4 Killeens	7	3	16	0
SW 15 Lanespark	14	11	7	19
SW 26 Carrickhill	4.0	8	8	18

Oil Interceptor Results	
Licence No:	499
YEAR: 2012	

LOCATION	FA YARD	TR FUEL	TT YARD	TT FUEL
Month	SWE 1 COD mg/l	SWE 2 COD mg/l	SWE 3 COD mg/l	SWE 4 COD mg/l
Jan	121	NF	306	NF
Feb	57	NF	NF	NF
Mar	20	NF	NF	NF
Apr	53	470	NF	NF
May	30	NF	NF	NF
June	NF	52	NF	122
July	10	NF	NF	NF
Aug	20	68	NF	NF
Sep	102	NF	NF	NF
Oct	210	580	573	207
Nov	47	NF	NF	NF
Dec	86	NF	NF	NF

Note: NF denotes no flow on day of sampling

Weekly Emissions to Water PW - 102. 2012

Works: Littleton

IPPC: 499

	Head mm	M3 / Hour	Litres / Sec
04/01/2012		16	4.44
11/01/2012	165	18	5.00
18/01/2012	200	20	5.56
25/01/2012	115	22	6.11
01/02/2012	120	25	6.94
08/02/2012	125	28	7.78
15/02/2012	130	30	8.33
22/02/2012	135	33	9.17
29/02/2012	140	37	10.28
07/03/2012	145	40	11.11
14/03/2012	150	43	11.94
21/03/2012	155	47	13.06
28/03/2012	160	51	14.17
04/04/2012	165	55	15.28
11/04/2012	170	59	16.39
18/04/2012	175	64	17.78
25/04/2012	180	68	18.89
02/05/2012	185	73	20.28
09/05/2012	190	78	21.67
16/05/2012	195	84	23.33
23/05/2012	100	16	4.44
30/05/2012	105	18	5.00
06/06/2012	110	20	5.56
13/06/2012	115	22	6.11
20/06/2012	120	25	6.94
27/06/2012	125	28	7.78
04/07/2012	130	30	8.33
11/07/2012	135	33	9.17
18/07/2012	140	37	10.28
25/07/2012	145	40	11.11
01/08/2012	150	43	11.94
08/08/2012	155	47	13.06
15/08/2012	160	51	14.17
22/08/2012	165	55	15.28
29/08/2012	170	59	16.39
05/09/2012	175	64	17.78
12/09/2012	180	68	18.89
19/09/2012	185	73	20.28
26/09/2012	190	78	21.67
03/10/2012	195	84	23.33
10/10/2012	200	90	25.00
17/10/2012	205	96	26.67
24/10/2012	210	100	27.78
31/10/2012	215	107	29.72
07/11/2012	220	113	31.39
14/11/2012	225	119	33.06
21/11/2012	230	126	35.00
28/11/2012	235	133	36.94
05/12/2012	240	140	38.89
12/12/2012	245	148	41.11
19/12/2012	250	155	43.06
26/12/2012	255	163	45.28

Weekly Emissions to Water PW - 102. 2012

Works: Littleton

IPPC: 499

Date	Ph (Ph Units)	COD (mg/l)	SS (mg/l)	Flow l/sec	Head mm
04/01/2012	9.2	60	27		
11/01/2012	8	52	17	15.3	165
18/01/2012	11.84	15	121	25.0	200
25/01/2012	11.91	<10	160		
01/02/2012	11.57	45	99	18.9	180
08/02/2012	11.97	105	139	21.7	190
15/02/2012	8.5	67	75	16.4	170
22/02/2012	8.5	85	56	18.9	180
29/02/2012	8.4	80	35	21.7	190
07/03/2012	7.9	97	37	3.9	90
14/03/2012	7.6	97	34	10.3	140
21/03/2012	7.9	85	16	18.9	180
28/03/2012	7.8	89	34	18.9	180
04/04/2012	7.9	91	26	18.9	180
11/04/2012	7.8	106	35		
18/04/2012	8	127	42	21.7	190
25/04/2012	7.7	190	116	21.7	190
02/05/2012	8	113	48	25.0	200
09/05/2012	7.3	113	68	1.9	50
16/05/2012	7.5	42	12		
23/05/2012	no flow				
30/05/2012	8.4	74	33	1.1	30
06/06/2012	7.6	86	30	0.8	20
13/06/2012	7.8	54	<5	1.1	30
20/06/2012	no flow			0.0	
27/06/2012	no flow			0.0	
04/07/2012	7.6	37	40	1.9	50
11/07/2012	7.6	46	43	1.4	40
18/07/2012	7.6	29	7	0.0	
25/07/2012	7.7	39	8	0.0	
01/08/2012	7.9	63	34	0.0	
08/08/2012	7.6	26	<5	0.0	
15/08/2012	7.7	83	43	0.0	
22/08/2012		76	17	18.9	180
29/08/2012	7.5	61	25	18.9	180
05/09/2012	8.7	34	11	18.9	180
12/09/2012	7.4	51	12	14.2	160
19/09/2012	7.3	78	19	13.1	155
26/09/2012	7.3	147	50	18.9	180
03/10/2012	7.6	54	18	21.7	190
10/10/2012	7.7	79	12	23.3	195
17/10/2012	7.4	174	102	27.8	210
24/10/2012	7.7	70	10		
31/10/2012	7.7	70	26	23.3	195
07/11/2012	9	71	25	16.4	170
14/11/2012	8.4	81	32	18.9	180
21/11/2012	8	74	20	18.9	180
28/11/2012	7.6	81	22		
05/12/2012	7.6	112	37	17.8	175
12/12/2012	8.1	85	36	18.9	180
19/12/2012	8	102	57	23	195
26/12/2012	7.6	95	46		

Quarterly Emissions to Water PW - 102 2012

Works: Littleton

IPPC: 499

Quarter	Total Phosperous	Ammonia	Oil,Fats &Grease
Feb	0.13	0.8	7
May	0.22	1.71	7
August	0.22	0.85	6
November	0.36	0.64	6.3

Littleton
Decommissioning and Rehabilitation
AER Overview 2012.

Bog decommissioning took place the works extended to the removal and recycling of obsolete rail line, machinery and historic polyethylene. In relation to rehabilitation, draft rehabilitation plans have been drawn up for all licensed areas and are available on file with the local environmental co-ordinators. The plans will be submitted to the EPA for review in April 2013. Consultation with statutory and non-statutory consultees is ongoing as part of Bord na Mona rehabilitation planning under its Biodiversity Objective. A review day of the Bord na Mona Biodiversity Action Plan 2010-2015 for the period 2012 was held in January 2013 and attended by up to 90 interest groups including members of the NPWS, BWI, EPA, Bord na Mona, Coillte, ESBi, IPCC, Golden Eagle Trust, Butterfly Conservation Ireland, NARGC, local game councils, Midland Regional Planning Authority as well as a range of local community groups and Heritage Officers from counties Laois, Offaly, Kildare, Roscommon, Longford, Meath, Galway, Westmeath and Dublin.

Guidance to completing the PRTR workbook

AER Returns Workbook

Version 1.1.15

REFERENCE YEAR	2012

1. FACILITY IDENTIFICATION

Parent Company Name	Bord na Mona Fuels Limited
Facility Name	Bord na Mona Fuels Limited
PRTR Identification Number	P0499
Licence Number	P0499-01

Waste or IPPC Classes of Activity

No.	class_name
1.4	The extraction of peat in the course of business which involves an area exceeding 50 hectares.

Address 1	Littleton Briquette Factory
Address 2	Littleton
Address 3	Thurles
Address 4	County Tipperary
	Tipperary
Country	Ireland
Coordinates of Location	-7.69986 52.6123
River Basin District	IESE
NACE Code	0892
Main Economic Activity	Extraction of peat
AER Returns Contact Name	Enda McDonagh
AER Returns Contact Email Address	enda.mcdonagh@bnm.ie
AER Returns Contact Position	Head of Environment
AER Returns Contact Telephone Number	057 9345911
AER Returns Contact Mobile Phone Number	086 2370816
AER Returns Contact Fax Number	057 9345160
Production Volume	53737.0
Production Volume Units	Tonnes
Number of Installations	3
Number of Operating Hours in Year	5174
Number of Employees	148
User Feedback/Comments	
Web Address	www.bnm.ie

2. PRTR CLASS ACTIVITIES

Activity Number	Activity Name
50.1	General

3. SOLVENTS REGULATIONS (S.I. No. 543 of 2002)

Is it applicable?	No
Have you been granted an exemption ?	
If applicable which activity class applies (as per Schedule 2 of the regulations) ?	
Is the reduction scheme compliance route being used ?	

4. WASTE IMPORTED/ACCEPTED ONTO SITE

Guidance on waste imported/accepted onto site

Do you import/accept waste onto your site for on-site treatment (either recovery or disposal activities) ?	No

SECTION A : SECTOR SPECIFIC PRTR POLLUTANTS

RELEASES TO AIR					Please enter all quantities in this section in KGs			
POLLUTANT		METHOD			QUANTITY			
			Method Used					
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
					0.0	0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

SECTION B : REMAINING PRTR POLLUTANTS

RELEASES TO AIR					Please enter all quantities in this section in KGs			
POLLUTANT		METHOD			QUANTITY			
			Method Used		B101			
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
08	Nitrogen oxides (NOx/NO2)	M	ISO 10849:1996		48576.5	48576.5	0.0	0.0
11	Sulphur oxides (SOx/SO2)	M	ISO 7935: 1992		95004.0	95004.0	0.0	0.0
02	Carbon monoxide (CO)	M	ISO 12039:2001		40942.0	0.0	0.0	0.0
03	Carbon dioxide (CO2)	C	ETS		41590828.0	41590828.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

SECTION C : REMAINING POLLUTANT EMISSIONS (As required in your Licence)

RELEASES TO AIR					Please enter all quantities in this section in KGs											
POLLUTANT		METHOD												QUANTITY		
			Method Used		B101	A101	A102	A103	A104	A105	A106	A108	DM01-DM04			
Pollutant No.	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	Emission Point 2	Emission Point 3	Emission Point 4	Emission Point 5	Emission Point 6	Emission Point 7	Emission Point 8	Emission Point 9	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
210	Dust	E	OTH	VDI 2119 Blatt 2/Part 2	185767.0	51008.0	38002.0	5994.0	27992.0	679.0	397.0	0.0	0.0	########	0.0	0.134232
351	**Total Organic Carbon (as C)**	M	OTH	EN 13526	0.0	0.0	0.0	0.0	0.0	0.0	0.0	152.3	0.0	152.3	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

Additional Data Requested from Landfill operators

For the purposes of the National Inventory on Greenhouse Gases, landfill operators are requested to provide summary data on landfill gas (Methane) flared or utilised on their facilities to accompany the figures for total methane generated. Operators should only report their Net methane (CH4) emission to the environment under T(total) KG/yr for Section A: Sector specific PRTR pollutants above. Please complete the table below:

Landfill: Bord na Mona Fuels Limited

Please enter summary data on the quantities of methane flared and / or utilised	**T (Total) kg/Year**	**M/C/E**	**Method Used**		**Facility Total Capacity m3 per hour**	
			Method Code	**Designation or Description**		
Total estimated methane generation (as per site model)	0.0				N/A	
Methane flared	0.0				0.0	(Total Flaring Capacity)
Methane utilised in engine/s	0.0				0.0	(Total Utilising Capacity)
Net methane emission (as reported in Section A above)	0.0				N/A	

4.2 RELEASES TO WATERS

Link to previous years emissions data

SECTION A : SECTOR SPECIFIC PRTR POLLUTANTS

Data on ambient monitoring of storm/surface water or groundwater, conducted as part of your licence requirements, should NOT be submitted under AER / PRTR Reporting as this only concerns Releases from your facility

RELEASES TO WATERS					Please enter all quantities in this section in KGs			
POLLUTANT					QUANTITY			
			Method Used					
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
					0.0	0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

SECTION B : REMAINING PRTR POLLUTANTS

RELEASES TO WATERS					Please enter all quantities in this section in KGs			
POLLUTANT					QUANTITY			
			Method Used					
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
					0.0	0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

SECTION C : REMAINING POLLUTANT EMISSIONS (as required in your Licence)

RELEASES TO WATERS					Please enter all quantities in this section in KGs						
POLLUTANT									QUANTITY		
			Method Used		SW4	SW15	SW26	SW18			
Pollutant No.	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	Emission Point 2	Emission Point 3	Emission Point 4	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
240	**Suspended Solids**	E	OTH	G/19 Based on ALPHA,1998,20th Edition, Method 2540D	8968.0	5930.0	7190.0	22697.0	44785.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

4.3 RELEASES TO WASTEWATER OR SEWER

Link to previous years emissions data

SECTION A : PRTR POLLUTANTS

OFFSITE TRANSFER OF POLLUTANTS DESTINED FOR WASTE-WATER TREATMENT OR SEWER					Please enter all quantities in this section in KGs			
POLLUTANT		METHOD			QUANTITY			
			Method Used					
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
					0.0	0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

SECTION B : REMAINING POLLUTANT EMISSIONS (as required in your Licence)

OFFSITE TRANSFER OF POLLUTANTS DESTINED FOR WASTE-WATER TREATMENT OR SEWER					Please enter all quantities in this section in KGs			
POLLUTANT		METHOD			QUANTITY			
			Method Used					
Pollutant No.	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
					0.0	0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

4.4 RELEASES TO LAND

Link to previous years emissions data

SECTION A : PRTR POLLUTANTS

RELEASES TO LAND					Please enter all quantities in this section in KGs		
POLLUTANT		METHOD			QUANTITY		
			Method Used				
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year
					0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

SECTION B : REMAINING POLLUTANT EMISSIONS (as required in your Licence)

RELEASES TO LAND					Please enter all quantities in this section in KGs		
POLLUTANT		METHOD			QUANTITY		
			Method Used				
Pollutant No.	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year
					0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

5. ONSITE TREATMENT & OFFSITE TRANSFERS OF WASTE

| PRTR# : P0499 | Facility Name : Bord na Mona Fuels Limited | Filename : P0499_2012(1).xls | Return Year : 2012 | 03/04/2013 11:53

Please enter all quantities on this sheet in Tonnes 0

Transfer Destination	European Waste Code	Hazardous	Quantity (Tonnes per Year)	Description of Waste	Waste Treatment Operation	Method Used		Location of Treatment	Haz Waste : Name and Licence/Permit No of Next Destination Facility Non Haz Waste: Name and Licence/Permit No of Recover/Disposer	Haz Waste : Address of Next Destination Facility Non Haz Waste: Address of Recover/Disposer	Name and License / Permit No. and Address of Final Recoverer / Disposer (HAZARDOUS WASTE ONLY)	Actual Address of Final Destination i.e. Final Recovery / Disposal Site (HAZARDOUS WASTE ONLY)
						M/C/E	Method Used					
Within the Country	01 01 02	No	230.0	wastes from mineral non-metalliferous excavation	D1	E	Volume Calculation	Onsite of generatic	Bord na Mona Fuels Ltd,P0499-01	Littleton,Thurles,Co Tipperary,.,Ireland		
Within the Country	01 01 02	No	675.0	wastes from mineral non-metalliferous excavation	D1	E	Volume Calculation	Onsite of generatic	Bord na Mona Fuels Ltd,P0499-01	Littleton,Thurles,Co Tipperary,.,Ireland		
Within the Country	02 01 04	No	423.0	waste plastics (except packaging)	R3	M	Weighed	Offsite in Ireland	Leinster Environmentals,WP 2008/06	Haggardstown,Dundalk ,Co Louth,.,Ireland		
To Other Countries	11 01 13	Yes	2.34	degreasing wastes containing dangerous substances	R2	C	Volume Calculation	Abroad	Safety Kleen Ltd,W0099-01	Tallaght,Dublin,.,.,Ireland	Solvent Recovery Management,PP33345F,Wheeland Rd,Knottingly,West Yorks,WF118DZ,United Kingdom	Wheeland Rd,Knottingly,West Yorks,WF118DZ,United Kingdom
Within the Country	13 02 05	Yes	1.1	mineral-based non-chlorinated engine, gear and lubricating oils	R1	C	Volume Calculation	Offsite in Ireland	Enva Ireland Ltd,W0184-1	Clonminam Ind Estate,Portlaoise,Co Laois,.,Ireland	Enva Ireland Ltd,W0184-1,Clonminam Ind Estate,Portlaoise,Co Laois,.,Ireland	Clonminam Ind Estate,Portlaoise,Co Laois,.,Ireland
Within the Country	15 01 03	No	183.19	wooden packaging	R1	M	Weighed	Offsite in Ireland	Kiawa Ltd,WP/TN/24	Tipperary,.,.,.,Ireland		
To Other Countries	15 02 02	Yes	0.6	absorbents, filter materials (including oil filters not otherwise specified), wiping cloths, protective clothing contaminated by dangerous substances	D10	E	Volume Calculation	Abroad	Enva Ireland Ltd,W0184-1	Clonminam Ind Estate,Portlaoise,Co Laois,.,Ireland	KWA,E17012100,Lintfort,.,.,., Germany	Lintfort,.,.,.,Germany
To Other Countries	16 01 07	Yes	0.56	oil filters	R4	C	Volume Calculation	Abroad	Enva Ireland Ltd,W0184-1	Clonminam Ind Estate,Portlaoise,Co Laois,.,Ireland	R. D Recycling,51727/1/KD,Houthalen,.,.,.,Belgium	Houthalen,.,.,.,Belgium
To Other Countries	16 06 01	Yes	1.0	lead batteries	R4	M	Weighed	Abroad	Enva Ireland Ltd,W0184-1	Clonminam Ind Estate,Portlaoise,Co Laois,.,Ireland	Campine Recycling,MLAV/05-173/GVDA,Beerse,.,.,.,Belgium	Beerse,.,.,.,Belgium
Within the Country	17 04 07	No	47.22	mixed metals	R4	M	Weighed	Offsite in Ireland	Hammond Lane Ltd,WP4620033	Athlone,Co Westmeath,.,.,Ireland		
Within the Country	20 01 01	No	0.0	paper and cardboard	R3	M	Weighed	Offsite in Ireland	Smurfit Kappa Ltd,WPR021/3	Glasnevin,Dublin,.,.,Ireland		
Within the Country	20 01 21	Yes	0.02	fluorescent tubes and other mercury-containing waste	R13	M	Weighed	Offsite in Ireland	Irish Lamp Recycling,WFP-KE-08-0348-01	Athy,.,.,.,Ireland	Irish Lamp Recycling,WFP-KE-08-0348-01,Athy,Co Kildare,.,.,Ireland	Athy,Co Kildare,.,.,Ireland
Within the Country	20 03 01	No	26.56	mixed municipal waste	D1	M	Weighed	Offsite in Ireland	AES,WP-OY-08-601-01	Nenagh,Tipperary,.,.,Ireland		
Within the Country	20 03 01	No	98.43	mixed municipal waste	D1	E	Volume Calculation	Offsite in Ireland	AES,WP-OY-08-601-01	Nenagh,Tipperary,.,.,Ireland		

* Select a row by double-clicking the Description of Waste then click the delete button

Facility Information Summary	
AER Reporting Year	2013
Licence Register Number	P0499-01
Name of site	Bord na Moma Littleton
Site Location	Lanespark, Littleton, Thurles, Co Tipperary
NACE Code	0892
Class/Classes of Activity	1.4
National Grid Reference (6E, 6 N)	220443, 151233
A description of the activities/processes at the site for the reporting year. This should include information such as production increases or decreases on site, any infrastructural changes, environmental performance which was measured during the reporting year **and an overview of compliance with your licence** listing all exceedances of licence limits (where applicable) and what they relate to e.g. air, water, noise.	Activities on site can be divided into two components, firstly the milling, harrowing, ridiging and harvesting of peat into stockpiles and secondly the transportation of that peat via an internal rail network to the Briquette Factory for processing into peat briquettes. Due to the exceptionally good weather experienced during the 2013 production season, production increased 8 fold to 433235 tonnes from 53737 tonnes. There was 690 tonnes of turf produced during 2013. Infrastructurally 53 hectares developed in 2012 was brought into production in 2013. In addition works continued on the Wind Farm site in Templetuohy. There were 31 non-compliances/incidents, 11 related to factory stack emissions, 13 related to emissions to water. Of these 7 were breaches of ELV and 6 related to elevated COD. There were no environmental complaints received during the reporting period. In relation to silt pond cleaning, 100% of ponds received one cleaning with some ponds receiving more depending on inspection results. The silt pond upgrade program was ongoing during the reporting year. Decommissioning and Rehabilitation works are described in an attachment.

Declaration:

All the data and information presented in this report has been checked and certified as being

Signature	Date: 31-3-2014
Group/Facility manager (or nominated, suitably qualified and	

AIR-summary template	Lic No:	P0499-01	Year	2013

Answer all questions and complete all tables where relevant

			Additional information
1	Does your site have licensed air emissions? If yes please complete table A1 and A2 below for the current reporting year and answer further questions. If **you do not have** licenced emissions and **do not complete a solvent management plan** (table A4 and A5) you do not need to complete the tables	Yes	Fugitive emissions also

Periodic/Non-Continuous Monitoring

2	Are there any results in breach of licence requirements? If yes please provide brief details in the comment section of TableA1 below	Yes	
3	Was all monitoring carried out in accordance with EPA guidance note AG2 and using the basic air monitoring checklist? Basic air monitoring checklist AGN2	Yes	

Table A1: Licensed Mass Emissions/Ambient data-periodic monitoring (non-continuous)

Emission reference no:	Parameter/ Substance	Frequency of Monitoring	ELV in licence or any revision therof	Licence Compliance criteria	Measured value	Unit of measurement	Compliant with licence limit	Method of analysis	Annual mass load (kg)	Comments - reason for change in % mass load from previous year if applicable
B101	Nitrogen oxides (NOx/NO2)	Annual	31536	100 % of values < ELV	11.21	kg/hour	no (if no please enter details in comments box)	ISO 10849:1996	74137	
B101	Sulphur oxides (SOx/SO2)	Annual	315360	100 % of values < ELV	12.77	kg/hour	yes	ISO 7935: 1992	84454	
B101	Carbon monoxide (CO)	Annual	NA	NA	7.58	kg/hour	yes	ISO 12039:2001	50130	
B101	Total Particulates	Annual	126114	100 % of values < ELV	31.35	kg/hour	no (if no please enter details in comments box)	OTH	207333	
A101	Total Particulates	Annual	45796	100 % of values < ELV	19.38	kg/hour	no (if no please enter details in comments box)	OTH	128170	
A102	Total Particulates	Annual	55714	100 % of values < ELV	11.15	kg/hour	yes	OTH	73741	
A103	Total Particulates	Annual	61320	100 % of values < ELV	0.72	kg/hour	yes	OTH	4762	
A104	Total Particulates	Annual	52560	100 % of values < ELV	7.05	kg/hour	yes	OTH	46625	
A105	Total Particulates	Annual	8931	101 % of values < ELV	0.08	kg/hour	yes	OTH	529	
A106	Total Particulates	Annual	867	102 % of values < ELV	0.04	kg/hour	yes	OTH	265	

Note 1: Volumetric flow shall be included as a reportable parameter

AIR-summary template	Lic No:	P0499-01	Year	2013

Continuous Monitoring

4	Does your site carry out continuous air emissions monitoring?	No	
	If yes please review your continuous monitoring data and report the required fields below in Table A2 and compare it to its relevant Emission Limit Value (ELV)		
5	Did continuous monitoring equipment experience downtime? If yes please record downtime in table A2 below	NA	
6	Do you have a proactive service agreement for each piece of continuous monitoring equipment?	NA	
7	Did your site experience any abatement system bypasses? If yes please detail them in table A3 below	NA	

Table A2: Summary of average emissions -continuous monitoring

Emission reference no:	Parameter/ Substance	ELV in licence or any revision therof	Averaging Period	Compliance Criteria	Units of measurement	Annual Emission	Annual maximum	Monitoring Equipment downtime (hours)	Number of ELV exceedences in current reporting year	Comments
DM-01	Total Particulates	350	308	Daily average < ELV	mg/m2/day	33964	208	0	0	
DM-02	Total Particulates	350	308	Daily average < ELV	mg/m2/day	42532	324	0	0	
DM-03	Total Particulates	350	308	Daily average < ELV	mg/m2/day	26152	379	0	1	Reported on ALDER
DM-04	Total Particulates	350	308	Daily average < ELV	mg/m2/day	43064	294	0	0	
	SELECT				SELECT					

note 1: Volumetric flow shall be included as a reportable parameter.

Table A3: Abatement system bypass reporting table Bypass protocol

Date*	Duration** (hours)	Location	Reason for bypass	Impact magnitude	Corrective action

* this should include all dates that an abatement system bypass occurred

** an accurate record of time bypass beginning and end should be logged on site and maintained for future Agency inspections please refer to bypass protocol link

AIR-summary template	Lic No:	P0499-01	Year	2013

Solvent use and management on site

8 Do you have a total Emission Limit Value of direct and fugitive emissions on site? if yes please fill out tables A4 and A5

SELECT

Table A4: Solvent Management Plan Summary
Total VOC Emission limit value

Solvent regulations — Please refer to linked solvent regulations to complete table 5 and 6

Reporting year	Total solvent input on site (kg)	Total VOC emissions to Air from entire site (direct and fugitive)	Total VOC emissions as %of solvent input	Total Emission Limit Value (ELV) in licence or any revision therof	Compliance
					SELECT
					SELECT

Table A5: Solvent Mass Balance summary

	(I) Inputs (kg)	(O) Outputs (kg)						
Solvent	(I) Inputs (kg)	Organic solvent emission in waste	Solvents lost in water (kg)	Collected waste solvent (kg)	Fugitive Organic Solvent (kg)	Solvent released in other ways e.g.	Solvents destroyed onsite through	Total emission of Solvent to air (kg)
							Total	

AER Monitoring returns summary template-WATER/WASTEWATER(SEWER) Lic No: P0499-01 Year 2013

			Additional information
1	Does your site have licensed emissions direct to surface water or direct to sewer? If yes please complete table W2 and W3 below for the current reporting year and answer further questions. If **you do not have** licenced emissions you only need to complete table W1 and or W2 for storm water analysis and visual inspections	Yes	
2	Was it a requirement of your licence to carry out visual inspections on any surface water discharges or watercourses on or near your site? If yes please complete table W2 below summarising only any evidence of contamination noted during visual inspections	Yes	Monthly COD analysis of yard runoff is attached in a separate document.

Table W1 Storm water monitoring

Location reference	Location relative to site activities	PRTR Parameter	Licenced Parameter	Monitoring date	ELV or trigger level in licence or any revision thereof*	Licence Compliance criteria	Measured value	Unit of measurement	Compliant with licence	Comments
	SELECT	SELECT	SELECT			SELECT		SELECT	SELECT	
	SELECT	SELECT	SELECT			SELECT		SELECT	SELECT	

*trigger values may be agreed by the Agency outside of licence conditions

Table W2 Visual inspections-Please only enter details where contamination was observed.

Location Reference	Date of inspection	Description of contamination	Source of contamination	Corrective action	Comments
			SELECT		
			SELECT		

Licensed Emissions to water and /or wastewater(sewer)-periodic monitoring (non-continuous)

				Additional information
3	Was there any result in breach of licence requirements? If yes please provide brief details in the comment section of Table W3 below		No	
4	Was all monitoring carried out in accordance with EPA guidance and checklists for Quality of Aqueous Monitoring Data Reported to the EPA? If no please detail what areas require improvement in additional information box	External /Internal Lab Quality checklist / Assessment of results checklist	Yes	Surface water monitoring was carried out on a quarterly basis. The results of which are attached. Monthly COD yard runoff results are also attached.

Table W3: Licensed Emissions to water and /or wastewater (sewer)-periodic monitoring (non-continuous)

Emission reference no:	Emission released to	Parameter/ SubstanceNote 1	Type of sample	Frequency of monitoring	Averaging period	ELV or trigger values in licence or any revision thereof[Note 2]	Licence Compliance criteria	Measured value	Unit of measurement	Compliant with licence	Method of analysis	Procedural reference source	Procedural reference standard number	Annual mass load (kg)	Comments
	SELECT	SELECT	SELECT		SELECT		SELECT		SELECT	SELECT	SELECT	SELECT			

Note 1: Volumetric flow shall be included as a reportable parameter

Note 2: Where Emission Limit Values (ELV) do not apply to your licence please compare results against EQS for Surface water or relevant receptor quality standards

AER Monitoring returns summary template-WATER/WASTEWATER(SEWER) Lic No: P0499-01 Year 2013

Continuous monitoring

			Additional Information
5	Does your site carry out continuous emissions to water/sewer monitoring?	Yes	

If yes please summarise your continuous monitoring data below in Table W4 and compare it to its relevant Emission Limit Value (ELV)

6	Did continuous monitoring equipment experience downtime? **If yes please record downtime in table W4 below**	Yes	Down time is primarily due to no flow/discharge, battery failure and or frozen pipes.
7	Do you have a proactive service contract for each piece of continuous monitoring equipment on site?	Yes	Annual calibration schedule and trouble shooting service
8	Did abatement system bypass occur during the reporting year? **If yes please complete table W5 below**	No	

Table W4: Summary of average emissions -continuous monitoring

Emission reference no:	Emission released to	Parameter/ Substance	ELV or trigger values in licence or any revision thereof	Averaging Period	Compliance Criteria	Units of measurement	Annual Emission for current reporting year (kg)	% change +/- from previous reporting year	Monitoring Equipment downtime (hours)	Number of ELV exceedences in reporting year	Comments
SW18	Water	Suspended Solids	35	24 hour	All results < 1.5 times ELV, plus 8 from ten results must be < ELV	mg/L	26600	17.9	4512	6	Down time primarily due to battery failure, frozen pipes and in particular at this site no flow as it is a pumped site.
SW18	Water	Ammonia (as N)	NA	Weekly	NA	mg/L	705	118.21	360		
SW18	Water	Total phosphorus	NA	Weekly	NA	mg/L	29	124.36	360		
SW18	Water	COD	NA	Weekly	NA	mg/L	52069	170.37	360		
SW18	Water	Total Dissolved Solids	NA	Weekly	NA	mg/L	273153	4.01	360		
SW18	Water	volumetric flow	NA	24 hour	NA	m3/day	5133518466	261.36	1032		

note 1: Volumetric flow shall be included as a reportable parameter.

Table W5: Abatement system bypass reporting table

Date	Duration (hours)	Location	Resultant emissions	Reason for bypass	Corrective action*	Was a report submitted to the EPA?	When was this report submitted?
						SELECT	

*Measures taken or proposed to reduce or limit bypass frequency

Bund/Pipeline testing template

Lic No: P0499-01 Year 2013

Bund testing

dropdown menu click to see options

			Additional information
1	Are you required by your licence to undertake integrity testing on bunds and containment structures ? if yes please fill out table B1 below listing all **new bunds and containment structures** on site, in addition to **all bunds which failed** the integrity test-**all bunding structures which failed including mobile bunds must be listed in the table below, please include all bunds outside the licenced testing period** (mobile bunds and chemstore included)	Yes	
2	Please provide integrity testing frequency period	2 Yearly	
3	Does the site maintain a register of bunds, underground pipelines (including stormwater and foul), Tanks, sumps and containers? (containers refers to "Chemstore" type units and mobile bunds)	Yes	
4	How many bunds are on site?	4	
5	How many of these bunds have been tested within the required test schedule?	0	Scheduled for testing in 2014
6	How many mobile bunds are on site?	8	These include barrel trays located within workshops
7	Are the mobile bunds included in the bund test schedule?	No	
8	How many of these mobile bunds have been tested within the required test schedule?	NA	
9	How many sumps on site are included in the integrity test schedule?	NA	
10	How many of these sumps are integrity tested within the test schedule? **Please list any sump integrity failures in table B1**	NA	
11	Do all sumps and chambers have high level liquid alarms?	N/A	
12	If yes to Q11 are these failsafe systems included in a maintenance and testing programme?	N/A	
13	Is the Fire Water Retention Pond included in your integrity test programme?	SELECT	

Table B1: Summary details of bund /containment structure integrity test

Bund/Containment structure ID	Type	Specify Other type	Product containment	Actual capacity	Capacity required*	Type of integrity test	Other test type	Test date	Integrity reports maintained on site?	Results of test	Integrity test failure explanation <50 words	Corrective action taken	Scheduled date for retest	Results of retest(if in current reporting year)
	SELECT					SELECT			SELECT	SELECT		SELECT		
	SELECT					SELECT			SELECT	SELECT		SELECT		

* Capacity required should comply with 25% or 110% containment rule as detailed in your licence

			Commentary
15	Has integrity testing been carried out in accordance with licence requirements and are all structures tested in line with BS8007/EPA Guidance?	bunding and storage guidelines	SELECT
16	Are channels/transfer systems to remote containment systems tested?		SELECT
17	Are channels/transfer systems compliant in both integrity and available volume?		SELECT

Pipeline/underground structure testing

1	Are you required by your licence to undertake integrity testing* on underground structures e.g. pipelines or sumps etc ? if yes please fill out table 2 below listing all underground structures and pipelines on site **which failed the integrity test and all which have not been tested withing the integrity test period as specified**	Yes	
2	Please provide integrity testing frequency period	3 years	

*please note integrity testing means water tightness testing for process and foul pipelines (as required under your licence)

Table B2: Summary details of pipeline/underground structures integrity test

Structure ID	Type system	Material of construction:	Does this structure have Secondary containment?	Type of secondary containment	Type integrity testing	Integrity reports maintained on site?	Results of test	Integrity test failure explanation <50 words	Corrective action taken	Scheduled date for retest	Results of retest(if in current reporting year)
	SELECT	SELECT	SELECT	SELECT	SELECT	SELECT	SELECT				SELECT

Please use commentary for additional details not answered by tables/ questions above

Groundwater/Soil monitoring template	Lic No:	P0499-01	Year	2013

			Comments	
1	Are you required to carry out groundwater monitoring as part of your licence requirements?	no		Please provide an interpretation of groundwater monitoring data in the interpretation box below or if you require additional space please include a groundwater/contaminated land monitoring results interpretaion as an additional section in this AER
2	Are you required to carry out soil monitoring as part of your licence requirements?	no		
3	Do you extract groundwater for use on site? If yes please specify use in comment section	no	Process water extracted from surface water river.	
4	Do monitoring results show that groundwater generic assessment criteria such as GTVs or IGVs are exceeded or is there an upward trend in results for a substance? If yes, please complete the Groundwater Monitoring Guideline Template Report (link in cell G8) and submit separately through ALDER as a licensee return AND answer questions 5-12 below. Groundwater monitoring template	no		
5	Is the contamination related to operations at the facility (either current and/or historic)	N/A		
6	Have actions been taken to address contamination issues?If yes please summarise remediation strategies proposed/undertaken for the site	NA		
7	Please specify the proposed time frame for the remediation strategy	NA		
8	Is there a licence condition to carry out/update ELRA for the site?	NA		
9	Has any type of risk assesment been carried out for the site?	NA		
10	Has a Conceptual Site Model been developed for the site?	NA		
11	Have potential receptors been identified on and off site?	NA		
12	Is there evidence that contamination is migrating offsite?	NA		Please enter interpretation of data here

Table 1: Upgradient Groundwater monitoring results

Date of sampling	Sample location reference	Parameter/ Substance	Methodology	Monitoring frequency	Maximum Concentration++	Average Concentration+	unit	GTV's*	SELECT**	Upward trend in pollutant concentration over last 5 years of monitoring data
							SELECT			SELECT
							SELECT			SELECT

.+ where average indicates arithmetic mean

.++ maximum concentration indicates the maximum measured concentration from all monitoring results produced during the reporting year

Table 2: Downgradient Groundwater monitoring results

Date of sampling	Sample location reference	Parameter/ Substance	Methodology	Monitoring frequency	Maximum Concentration	Average Concentration	unit	GTV's*	SELECT**	Upward trend in yearly average pollutant concentration over last 5 years of monitoring data
							SELECT			SELECT
							SELECT			SELECT

Groundwater/Soil monitoring template	Lic No:	P0499-01	Year	2013

*please note exceedance of generic assessment criteria (GAC) such as a Groundwater Threshold Value (GTV) or an Interim Guideline Value (IGV) or an upward trend in results for a substance indicates that further interpretation of monitoring results is required. In addition to completing the above table, please complete the Groundwater Monitoring Guideline Template Report at the link provided and submit separately through ALDER as a licensee return or as otherwise instructed by the EPA.	Groundwater monitoring template
More information on the use of soil and groundwater standards/ generic assessment criteria (GAC) and risk assessment tools is available in the EPA published guidance (see the link in G31)	Guidance on the Management of Contaminated Land and Groundwater at EPA Licensed Sites (EPA 2013).

**Depending on location of the site and proximity to other sensitive receptors alternative Receptor based Water Quality standards should be used in addition to the GTV e.g. if the site is close to surface water compare to Surface Water Environmental Quality Standards (SWEQS), If the site is close to a drinking water supply compare results to the Drinking Water Standards (DWS)	Surface water EQS	Groundwater regulations GTV's	Drinking water (private supply) standards	Drinking water (public supply) standards	Interim Guideline Values (IGV)

Groundwater/Soil monitoring template	Lic No:	P0499-01	Year	2013

Table 3: Soil results

Date of sampling	Sample location reference	Parameter/ Substance	Methodology	Monitoring frequency	Maximum Concentration	Average Concentration	unit
							SELECT
							SELECT

Where additional detail is required please enter it here in 200 words or less

Environmental Liabilities template	Lic No:	P0499-01	Year	2013

Click here to access EPA guidance on Environmental Liabilities and Financial provision

			Commentary
1	ELRA initial agreement status	Not a Licence Requirement	
2	ELRA review status	NA	
3	Amount of Financial Provision cover required as determined by the latest ELRA	NA	
4	Financial Provision for ELRA status	NA	
5	Financial Provision for ELRA - amount of cover	NA	
6	Financial Provision for ELRA - type	NA	
7	Financial provision for ELRA expiry date	NA	
8	Closure plan initial agreement status	NA	Internal Budget Provision
9	Closure plan review status	NA	Internal Budget Provision
10	Financial Provision for Closure status	NA	Internal Budget Provision
11	Financial Provision for Closure - amount of cover	NA	Internal Budget Provision
12	Financial Provision for Closure - type	NA	Internal Budget Provision
13	Financial provision for Closure expiry date	NA	

Environmental Management Programme/Continuous Improvement Programme template	Lic No:	P0499-01	Year	2013

Highlighted cells contain dropdown menu click to view

			Additional Information
1	Do you maintain an Environmental Mangement System (EMS) for the site. If yes, please detail in additional information	SELECT	
2	Does the EMS reference the most significant environmental aspects and associated impacts on-site	SELECT	
3	Does the EMS maintain an Environmental Management Programme (EMP) as required in accordance with the licence requirements	SELECT	
4	Do you maintain an environmental documentation/communication system to inform the public on environmental performance of the facility, as required by the licence	SELECT	

Environmental Management Programme (EMP) report

Objective Category	Target	Status (% completed)	How target was progressed	Responsibility	Intermediate outcomes
Reduction of emissions to Air	Training.Continue to train all employees in environmental matters. Training will be by means of the screening of an environmental DVD, followed by a power point presentation. Headland Peat Collection. Continue with the collection of headland peat, particularly at dust sensitive locations.	70	In total 19 Personnel received training in 2013. Approximately 3000 tonnes of headland peat was collected and returned as part of overall production figures. In addition hydraulic harrows were deployed at all dust sensitive locations.	Section Head	Reduced emissions
Waste reduction/Raw material usage efficiency	Waste Streamlining.It is planned to continue with and where possible improve the current waste management service provided by AES Ltd	100	Installed a waste management system. Quarterly waste reports are returned for records/filing and waste streams are segrated on site to maximise recycling potential.	Section Head	Improved Environmental Management Practices

Environmental Management Programme/Continuous Improvement Programme template				Lic No:	P0499-01	Year	2013
Reduction of emissions to Water	Training. Continue to train all employees in environmental matters. Training will be by means of the screening of an environmental DVD, followed by a power point presentation. Silt Pond survey also planned.	100	In total 19 Personnel received training in 2013. Following last years silt pond catchments survey, upgrade works were ongoing.	Section Head	Reduced emissions		
Materials Handling/Storage/Bunding	Increased bund capacity will be provided where required.	100	There was no increased bund capacity provided or required.	Section Head	Improved Environmental Management Practices		
Waste reduction/Raw material usage efficiency	Continue with the recycling of polyethylene. The sourcing of more recycling contractors will be ongoing.	100	In total approximately 113.1 tonnes were sent off site for recycling. Procurement also exploring the possibility of securing further recyclers.	Section Head	Reduced emissions		
Energy Efficiency/Utility conservation	Carry out a review of energy aspects identifying significant energy users.	50	Workshop audits were carried out the purpose being to establish the possibility of utilising natural light.	Section Head	Improved Environmental Management Practices		

Noise monitoring summary report	Lic No:	P0499-01	Year	2013

1	Was noise monitoring a licence requirement for the AER period? If yes please fill in table N1 noise summary below	No
2	Was noise monitoring carried out using the EPA Guidance note, including completion of the "Checklist for noise measurement report" included in the guidance note as table 6?	NA
3	Does your site have a noise reduction plan	NA
4	When was the noise reduction plan last updated?	
5	Have there been changes relevant to site noise emissions (e.g. plant or operational changes) since the last noise survey?	NA

Noise Guidance note NG4

Table N1: Noise monitoring summary

Date of monitoring	Time period	Noise location (on site)	Noise sensitive location -NSL (if applicable)	LA_{eq}	LA_{90}	LA_{10}	LA_{max}	Tonal or Impulsive noise* (Y/N)	If tonal /impulsive noise was identified was 5dB penalty applied?	Comments (ex. main noise sources on site, & extraneous noise ex. road traffic)	Is site compliant with noise limits (day/evening/night)?
								SELECT	SELECT		SELECT

*Please ensure that a tonal analysis has been carried out as per guidance note NG4. These records must be maintained onsite for future inspection

If noise limits exceeded as a result of noise attributed to site activities, please choose the corrective action from the following options? SELECT

** please explain the reason for not taking action/resolution of noise issues?
Any additional comments? (less than 200 words)

Resource Usage/Energy efficiency summary

Lic No: P0499-01 Year 2013

			Additional information
1	When did the site carry out the most recent energy efficiency audit? Please list the recommendations in table 3 below	Enter date of audit	
2	Is the site a member of any accredited programmes for reducing energy usage/water conservation such as the SEAI programme linked to the right? If yes please list them in additional information	Yes	
3	Where Fuel Oil is used in boilers on site is the sulphur content compliant with licence conditions? Please state percentage in additional information	SELECT	

SEAI - Large Industry Energy Network (LIEN)

Table R1 Energy usage on site

Energy Use	Previous year	Current year	Production +/- % compared to previous reporting year**	Energy Consumption +/- % vs overall site production*
Total Energy Used (MWHrs)	120402	143733		
Total Energy Generated (MWHrs)				
Total Renewable Energy Generated (MWHrs)				
Electricity Consumption (MWHrs)	1704	1749.51		
Fossil Fuels Consumption:				
Heavy Fuel Oil (m3)				
Light Fuel Oil (m3)	695	1130.12		
Natural gas (m3)				
Coal/Solid fuel (metric tonnes)				
Peat (metric tonnes)	51684	57376		
Renewable Biomass				
Renewable energy generated on site				

* where consumption of energy can be compared to overall site production please enter this information as percentage increase or decrease compared to the previous reporting year.

** where site production information is available please enter percentage increase or decrease compared to previous year

Table R2 Water usage on site

					Water Emissions	Water Consumption	
Water use	Water extracted Previous year m3/yr.	Water extracted Current year m3/yr.	Production +/- % compared to previous reporting year**	Energy Consumption +/- % vs overall site production*	Volume Discharged back to environment(m^3yr):	Volume used i.e not discharged to environment e.g. released as steam m3/yr	Unaccounted for Water:
Groundwater							
Surface water							
Public supply							
Recycled water							
Total							

* where consumption of water can be compared to overall site production please enter this information as percentage increase or decrease compared to the previous reporting year.

** where site production information is available please enter percentage increase or decrease compared to previous year

Table R3 Waste Stream Summary

	Total	Landfill	Incineration	Recycled	Other
Hazardous (Tonnes)	6.299	0	0.6	5.699	
Non-Hazardous (Tonnes)	2513.43	136.2	0	478.23	1899

Resource Usage/Energy efficiency summary Lic No: P0499-01 Year 2013

Table R4: Energy Audit finding recommendations

Date of audit	Recommendations	Description of Measures proposed	Origin of measures	Predicted energy savings %	Implementation date	Responsibility	Completion date	Status and comments
			SELECT					
			SELECT					
			SELECT					

Table R5: Power Generation: Where power is generated onsite (e.g. power generation facilities/food and drink industry)please complete the following information

	Unit ID	Unit ID	Unit ID	Unit ID	Station Total
Technology					
Primary Fuel					
Thermal Efficiency					
Unit Date of Commission					
Total Starts for year					
Total Running Time					
Total Electricity Generated (GWH)					
House Load (GWH)					
KWH per Litre of Process Water					
KWH per Litre of Total Water used on Site					

Complaints and Incidents summary template Lic No: P0459-01 Year 2013

Complaints

Have you received any environmental complaints in the current reporting year? If yes please complete summary details of complaints received on site in table 1 below		Additional information
	No	

Table 1: Complaints summary

Date	Category	Other type (please specify)	Brief description of complaint (Free txt <20 words)	Corrective action< 20 words	Resolution status	Resolution date	Further information
	SELECT				SELECT		
	SELECT				SELECT		
	SELECT				SELECT		
	SELECT				SELECT		
	SELECT				SELECT		

Total complaints open at start of reporting year	
Total new complaints received during reporting year	
Total complaints closed during reporting year	
Balance of complaints end of reporting year	

Incidents

Have any incidents occurred on site in the current reporting year? Please list all incidents for current reporting year in Table 2 below		Additional information
	Yes	

*For information on how to report and what constitutes an incident — What is an incident

Table 2 Incidents summary

Date of occurrence	Incident nature	Location of occurrence	Incident category* please refer to guidance	Receptor	Cause of incident	Other cause(please specify)	Activity in progress at time of incident	Communication	Occurrence	Corrective action<20 words	Preventative action <20 words	Resolution status	Resolution date	Likelihood of reoccurrence
13/11/2013	Breach of ELV	Licenced discharge point (typ	1. Minor	Air	Plant or equipment issues		Normal activities	EPA	Recurring	Five companies have been contacted in relation to expressions of interest in the installation of an abatement system	We are now currently reviewing the NOx levels for previous years and will have put a plan together when this is complete.	Ongoing	17/01/2014	High
13/11/2013	Breach of ELV	Licenced discharge point (typ	1. Minor	Air	Plant or equipment issues		Normal activities	EPA	Recurring	Five companies have been contacted in relation to expressions of interest in the installation of an abatement system	Currently there are 5 companies expressing and interest. Proposals will be sought from them immediately.	Ongoing	07/07/2014	High
25/09/2013	Breach of ELV	Licenced discharge point (typ	1. Minor	Air	Plant or equipment issues		Normal activities	EPA	Recurring	results on 24 - 10 -13 the Filter system was checked for operation and compressed air supply was operational. The bag filters were not choked and the system seemed ok. Q4 measurements were subsequently returned to normal.	No Preventative Actions Taken as results back to normal compliance	Complete	24/10/2013	Medium
25/09/2013	Breach of ELV	Licenced discharge point (typ	1. Minor	Air	Other (add details)	High M/C of raw m	Normal activities	EPA	Recurring	No Corrective Actions Taken	Preventative Action required, results back to normal at next monitoring period	Complete	08/11/2013	Medium
25/09/2013	Breach of ELV	Licenced discharge point (typ	1. Minor	Air	Plant or equipment issues		Normal activities	EPA	New	point is the IIA drying circuit. ELV 150 mg/Nm3 < 0.5 kg/hr & 50 mg/Nm3 > 0.5 kg/hr. The reading taken on the 23 -9 -13 (12.05 - 12.35 pm) shows 121.13 mg/Nm3 at a flow rate of 65.711 Nm3/hr. The circuit had been cleaned out on the 22 -9 - 2013 as the 1st effect circuit had been choked. Peat was a good average at 55% m/c and 235 g/lt density. Normal Q4 monitoring results in Nov 2013. Q4. 13 - 11 -2013. 13.67	No preventative Actions taken	Complete	22/09/2013	Medium
23/09/2013	Breach of ELV	Licenced discharge point (typ	1. Minor	Air	Plant or equipment issues		Normal activities	EPA	Recurring	The boiler stack emission continues to be a problem. The ELV needs to be revisited/reviewed to reflect the operation	Existing supplier of abatement equipment not providing any solutions. Bord na Mona Fuels advertising on the European Journal for a solution to the abatement issue.	Ongoing	07/07/2014	High
16/05/2013	Breach of ELV	Licenced discharge point (typ	1. Minor	Air	Plant or equipment issues		Normal activities	EPA	Recurring	stopped for overhaul in early June and was thoroughly cleaned and checked for operating conditions. The volume of air through the IIA drier is normally at 60,000 - 80,000Nm3/hr. Q3 & Q4 results were good on particulates.	Abatement equipment commissioned in 2009. Emission data being compiled for meeting with the EPA on the 28th May	Complete	01/06/2013	Medium

Complaints and Incidents summary template Lic No: P0499-01 Year 2013

										drier/grit Arrester circuit. ELV 150 mg/Nm3 < 0.5 kg/hr & 50 mg/Nm3 > 0.5 kg/hr. Redading taken on the 16 - 5 -2013 (12.10 - 12.40 pm) gave a result of 103.04 mg/Nm3 @ 65,404 Nm3/hr. The density of the peat was 265 g/lt and the moisture was 60%. The peat was good at this monitoring stage and conditions no different to Q2 (A102). The mass flow ELV is not correct as the fan operated at more or less 60000 - 80000 Nm3/hr. New Abatement equipment commissioned in 2009. Emissions Data being compiled for a meeting with the EPA on the 28th May			
16/05/2013	Breach of ELV	Licenced discharge point (typ	1. Minor	Air	Plant or equipment issues		Normal activities	EPA	Recurring		Ongoing	07/07/2014	High
										1491.2935 for Emissions Point Reference No. B101. This Emission point B101 is the Boiler Stack. The ELV is 400 mg/Nm3 @ 36,000 m3/hr. Readings taken: 5 -2 - 2013. 1345 mg/Nm3 @ 32,080 m3/hr. 16 - 5 - 2013. 1163 mg/Nm3 @ 37,729 m3/hr. 23 - 9 - 1217. 1217 mg/Nm3 @ 31,116 m3/hr. The boiler stack emission continues to be a problem. The ELV needs to be revisited/reviewed to reflect the operation. Abatement measure put in place in 2009. Emissions data being compiled for a meeting with the EPA on the 28th May			
16/05/2013	Breach of ELV	Licenced discharge point (typ	1. Minor	Air	Plant or equipment issues		Normal activities	EPA	Recurring		Ongoing	07/07/2014	High
										Actions taken. The boiler stack emission continues to be a problem. The ELV needs to be revisited/reviewed to reflect the operation. Emissions data being compiled for a meeting with the EPA on the 28th May 2013			
05/02/2013	Breach of ELV	Licenced discharge point (typ	1. Minor	Air	Plant or equipment issues		Normal activities	EPA	Recurring		Ongoing	07/07/2014	High
										A101 is the IIB circuit, the first in the series of drying. This is the first drier/cyclone/grit arrestor and introduces heat to commence drying. Highest volume of peat enters this stage. Unusually high density peat (285 g/l)for Littleton peat and was also dry at 53%. Previous quarter results Q4 2012, on the 16/11/12 was 39.40 mg/Nm3 @ 69788 Nm3/hr volumetric which was compliant. Emissions monitoring data is being compiled for presentation to the EPA at meeting arranged for the 28th of May			
05/02/2013	Breach of ELV	Licenced discharge point (typ	1. Minor	Air	Plant or equipment issues		Normal activities	EPA	Recurring		Ongoing	07/07/2014	High
10/03/2013	Breach of ELV	SW18	1. Minor	Water	Adverse weather		Normal activities	EPA	New	Site Inspected	Pond cleaned as required	Complete	18/04/2013	Medium
11/03/2013	Breach of ELV	SW18	1. Minor	Water	Adverse weather		Normal activities		Recurring	Site Inspected	Pond cleaned as required	Complete	18/04/2013	Medium
12/03/2013	Breach of ELV	SW18	1. Minor	Water	Adverse weather		Normal activities	EPA	Recurring	Site Inspected	Pond cleaned as required	Complete	18/04/2013	Medium
18/06/2013	Trigger level reached	SW18	1. Minor	Water	Not related to site activities		Normal activities		New	Site Inspected	Pond cleaned as required	Complete	17/09/2013	Medium
06/08/2013	Trigger level reached	SW18	1. Minor	Water	Not related to site activities		Normal activities		Recurring	Site Inspected	Pond cleaned as required	Complete	17/09/2013	Medium
13/08/2013	Trigger level reached	SW18	1. Minor	Water	Not related to site activities		Normal activities		Recurring	Site Inspected	Pond cleaned as required	Complete	17/09/2013	Medium
20/08/2013	Trigger level reached	SW18	1. Minor	Water	Not related to site activities		Normal activities		Recurring	Site Inspected	Pond cleaned as required	Complete	17/09/2013	Medium
27/08/2013	Trigger level reached	SW18	1. Minor	Water	Not related to site activities		Normal activities		Recurring	Site Inspected	Pond cleaned as required	Complete	17/09/2013	Medium
03/09/2013	Trigger level reached	SW18	1. Minor	Water	Not related to site activities		Normal activities		Recurring	Site Inspected	Pond cleaned as required	Complete	17/09/2013	Medium
02/10/2013	Breach of ELV	PW-102	1. Minor	Water	Adverse weather		Normal activities		New	Site Inspected	Flash flood subsequent reading ok.	Complete	15/10/2013	Low
14/01/2013	Breach of ELV	SW18	1. Minor	Water	Adverse weather		Normal activities		New			Complete	Open on ALDER	Medium
15/01/2014	Breach of ELV	SW18	1. Minor	Water	Adverse weather		Normal activities		Recurring			Complete	Open on ALDER	Medium
17/01/2015	Breach of ELV	SW18	1. Minor	Water	Adverse weather		Normal activities		Recurring			Complete	Open on ALDER	Medium
01/08/2013 - 30/08/2	Breach of ELV	GM-03	1. Minor	Air	Adverse weather		Normal activities		New			Complete	09/09/2013	Low

Total number of incidents current year	
Total number of incidents previous year	
% reduction/ increase	

WASTE SUMMARY	Lic No:	P0499-01	Year	2013
SECTION A-PRTR ON SITE WASTE TREATMENT AND WASTE TRANSFERS TAB- TO BE COMPLETED BY ALL IPPC AND WASTE FACILITIES		PRTR facility logon	dropdown list click to see options	

SECTION B- WASTE ACCEPTED ONTO SITE-TO BE COMPLETED BY ALL IPPC AND WASTE FACILITIES

			Additional Information
1	Were any wastes accepted onto your site for recovery or disposal or treatment prior to recovery or disposal within the boundaries of your facility ?; (waste generated within your boundaries is to be captured through PRTR reporting) If yes please enter details in table 1 below	N/A	
2	Did your site have any rejected consignments of waste in the current reporting year? If yes please give a brief explanation in the additional information	SELECT	
3	Was waste accepted onto your site that was generated outside the Republic of Ireland? If yes please state the quantity in tonnes in additional information	SELECT	

Table 1 Details of waste accepted onto your site for recovery, disposal or treatment (do not include wastes generated at your site, as these will have been reported in your PRTR workbook)

Licenced annual tonnage limit for your site (total tonnes/annum)	EWC code European Waste Catalogue EWC codes	Source of waste accepted	Description of waste accepted **Please enter an accurate and detailed description - which applies to relevant EWC code** European Waste Catalogue EWC codes	Quantity of waste accepted in current reporting year (tonnes)	Quantity of waste accepted in previous reporting year (tonnes)	Reduction/ Increase over previous year +/ - %	Reason for reduction/ increase from previous reporting year	Packaging Content (%)- only applies if the waste has a packaging component	Disposal/Recovery or treatment operation carried out at your site and the description of this operation	Quantity of waste remaining on site at the end of reporting year (tonnes)	Comments -

SECTION C-TO BE COMPLETED BY ALL WASTE FACILITIES (waste transfer stations, Composters, Material recovery facilities etc) EXCEPT LANDFILL SITES

4	Is all waste processing infrastructure as required by your licence and approved by the Agency in place? If no please list waste processing infrastructure required onsite	SELECT	
5	Is all waste storage infrastructure as required by your licence and approved by the Agency in place? If no please list waste storage infrastructure required on site	SELECT	
6	Does your facility have relevant nuisance controls in place?	SELECT	
7	Do you have an odour management system in place for your facility? If no why?	SELECT	
8	Do you maintain a sludge register on site?	SELECT	

SECTION D-TO BE COMPLETED BY LANDFILL SITES ONLY

Table 2 Waste type and tonnage-landfill only

Waste types permitted for disposal	Authorised/licenced annual intake for disposal (tpa)	Actual intake for disposal in reporting year (tpa)	Remaining licensed capacity at end of reporting year (m3)	Comments

Table 3 General information-Landfill only

Area ID	Date landfilling commenced	Date landfilling ceased	Currently landfilling	Private or Public Operated	Inert or non-hazardous	Predicted date to cease landfilling	Licence permits asbestos	Is there a separate cell for asbestos?	Accepted asbestos in reporting year	Total disposal area occupied by waste	Lined disposal area occupied by waste	Unlined area
										SELECT UNIT	SELECT UNIT	SELECT UNIT
Cell 8												

WASTE SUMMARY	Lic No:	P0499-01	Year	2013

Table 4 Environmental monitoring-landfill only

Landfill Manual-Monitoring Standards

Was meterological monitoring in compliance with Landfill Directive (LD) standard in reporting year +	Was leachate monitored in compliance with LD standard in reporting year	Was Landfill Gas monitored in compliance with LD standard in reporting year	Was SW monitored in compliance with LD standard in reporting year	Have GW trigger levels been established	Were emission limit values agreed with the Agency (ELVs)	Was topography of the site surveyed in reporting year	Has the statement under S53(A)(5) of WMA been submitted in reporting year	Comments

.+ please refer to Landfill Manual linked above for relevant Landfill Directive monitoring standards

Table 5 Capping-Landfill only

Area uncapped*	Area with temporary cap	Area with final cap to LD Standard m2 ha, a	Area capped other	Area with waste that should be permanently capped to date under licence	What materials are used in the cap	Comments
SELECT UNIT	SELECT UNIT					

*please note this includes daily cover area

Table 6 Leachate-Landfill only

9	Is leachate from your site treated in a Waste Water Treatment Plant?	SELECT
10	Is leachate released to surface water? If yes please complete leachate mass load information below	SELECT

Volume of leachate in reporting year(m3)	Leachate (BOD) mass load (kg/annum)	Leachate (COD) mass load (kg/annum)	Leachate (NH4) mass load (kg/annum)	Leachate (Chloride) mass load kg/annum	Leachate treatment on-site	Specify type of leachate treatment	Comments

Please ensure that all information reported in the landfill gas section is consistent with the Landfill Gas Survey submitted in conjunction with PRTR returns

Table 7 Landfill Gas-Landfill only

Gas Captured&Treated by LFG System m3	Power generated (MW / KWh)	Used on-site or to national grid	Was surface emissions monitoring performed during the reporting year?	Comments
			SELECT	

Comments on liner type

Bord na Mona Littleton

IPPC Licence P0499-01

Siltpond Monitoring Frequency & Results

X	Y	Bog	SW	Monitoring	pH	SS	TS	Ammoni	TP	COD	Colour
220646.62	148976.02	Killeen	SW-7	Q2 13	7.6	5	352	0.13	0.09	73	146
219043.69	152329.52	Ballybeg	SW-11	Q2 13	7.7	5	391	0.18	0.07	40	57
219974.84	169100.19	Carrickhill	SW-26	Q2 13	8	5	360	0.18	0.05	29	71
218669.54	148343.90	Killeen	SW-2	Q3 13	7.1	5	304	2.4	0.05	70	168
221193.73	150442.04	Lanespark	SW-10	Q3 13	7.6	5	272	0.07	0.05	91	177
223518.00	163330.63	Baunmore	SW-20	Q3 13	8.2	5	388	0.04	0.05	49	89
219661.05	168030.60	Carrickhill	SW-25	Q4 13	7.8	8	240	0.26	0.05	71	145
219974.84	169100.19	Carrickhill	SW-26	Q4 13	7.7	7	276	0.69	0.05	52	169
221701.79	170410.93	Templetouhy	SW-30	Q3 13	8.1	85	486	2.1	0.11	52	35

Note: Quarter 1 sampling omitted in error.

Oil Interceptor Results				
Licence No:	499			
YEAR: 2013				
LOCATION	FA YARD	TR FUEL	TT YARD	TT FUEL
Month	SWE 1 COD mg/l	SWE 2 COD mg/l	SWE 3 COD mg/l	SWE 4 COD mg/l
Jan	84	no flow	88	56
Feb	103	82		
Mar	45	no flow		
Apr	22	no flow	no flow	no flow
May	44	no flow		
June	34	no flow		
July	no flow	no flow	no flow	no flow
Aug	52	no flow		
Sep	43	no flow		
Oct	70	no flow	no flow	no flow
Nov	38	no flow		
Dec	78	no flow		

Head mm	M3 / Hour	Litres / Sec
100	16	4.4
105	18	5.0
110	20	5.6
115	22	6.1
120	25	6.9
125	28	7.8
130	30	8.3
135	33	9.2
140	37	10.3
145	40	11.1
150	43	11.9
155	47	13.1
160	51	14.2
165	55	15.3
170	59	16.4
175	64	17.8
180	68	18.9
185	73	20.3
190	78	21.7
195	84	23.3
100	16	4.4
105	18	5.0
110	20	5.6
115	22	6.1
120	25	6.9
125	28	7.8
130	30	8.3
135	33	9.2
140	37	10.3
145	40	11.1
150	43	11.9
155	47	13.1
160	51	14.2
165	55	15.3
170	59	16.4
175	64	17.8
180	68	18.9
185	73	20.3
190	78	21.7
195	84	23.3
200	90	25.0
205	96	26.7
210	100	27.8
215	107	29.7
220	113	31.4
225	119	33.1
230	126	35.0
235	133	36.9
240	140	38.9
245	148	41.1
250	155	43.1
255	163	45.3
260	171	47.5
265	180	50.0
270	188	52.2
275	197	54.7
280	206	57.2
285	216	60.0
290	225	62.5
295	235	65.3
300	249	69.2

Weekly Emissions to Water PW - 102. 2013

Works: Littleton

IPPC: 499

Date	Ph (Ph Units)	COD (mg/l)	SS (mg/l)	Flow l/sec	Head mm
02/01/2013	7.7	98	18	2.0	58
09/01/2013	8	82	16	23.3	195
16/01/2013	8.8	64	38	31.4	220
23/01/2013	8.7	77	44	23.3	195
30/01/2013	7.9	104	46	25.0	200
06/02/2013	8.9	86	43	25.0	200
13/02/2013	8.1	92	35	27.8	210
20/02/2013	8	87	29	14.2	160
27/02/2013	8.2	59	19	27.8	210
06/03/2013	8	59	17	17.8	175
13/03/2013	8.7	65	25	14.2	160
20/03/2013	8.2	64	24	31.4	220
27/03/2013	8.1	87	40	21.7	190
03/04/2013	7.9	89	42	21.7	190
10/04/2013	8.7	65	26	26.7	205
17/04/2013	8.1	68	30	27.8	210
24/04/2013	7.9	56	18	16.4	170
01/05/2013	8.2	51	17	27.8	210
08/05/2013	7.9	49	23	29.7	215
15/05/2013	8.3	39	19	27.8	210
22/05/2013	8.2	38	18	27.8	210
29/05/2013	9.6	25	17	25.0	200
05/06/2013	9.4	46	14	29.7	215
12/06/2013	9.7	22	8	27.8	210
19/06/2013	8.7	24	<5	3.0	75
26/06/2013	8	22	9	1.4	40
03/07/2013	8.4	39	11	1.9	57
10/07/2013	7.8	36	7	0.8	15
17/07/2013	No Flow				
24/07/2013	No Flow				
31/07/2013	No Flow				
07/08/2013	No Flow				
14/08/2013	9.6	42	16	18.9	180
21/08/2013	9.4	31	12	18.9	180
28/08/2013	8.4	33	11	25.0	200
04/09/2013	8.4	30	11	21.7	190
11/09/2013	8.5	74	28	18.9	180
18/09/2013	8	71	19	23.3	195
25/09/2013	7.9	56	17	25.0	200
02/10/2013	7.6	270	156	25.0	200
09/10/2013	7.8	67	15	20.3	185
16/10/2013	7.9	83	68	25.0	260
23/10/2013	9.4	66	24		
30/10/2013	10.9	43	89	16.4	170
06/11/2013	8.8	48	20	1.8	55
13/11/2013	8.9	52	17	15.3	165
20/11/2013	7.8	61	16	11.0	143
27/11/2013	7.9	110	45		
04/12/2013	8.1	77	24	11.9	150
11/12/2013	7.9	75	14	11.9	150
18/12/2013	8	10	14	14.2	160
25/12/2013	No Flow				

Quarterly Emissions to Water PW - 102 2013

Works: Littleton

IPPC: 499

Quarter	Total Phosperous	Ammonia	Oil,Fats &Grease
Feb	0.37	0.52	15
May	0.52	0.22	12
August	0.11	0.32	
November	0.14	0.63	8

Littleton
Decommissioning and Rehabilitation
AER Overview 2013.

Within the Littleton licensed area (P0409-01) there were no bogs available for rehabilitation in 2013. Ongoing monitoring of cutaway within the Littleton licensing area included the development of the Bruckana Windfarm.
Draft rehabilitation plans for the Littleton bogs licensed area, including more detailed draft plans for each component bog unit were submitted to the EPA in 2013. The plans will be reviewed in Winter 2014/2015 and updated accordingly. The BNM Ecology Team (who plan and manage rehabilitation) met with the EPA inspectorate in 2013 to outline the general content and a review process was agreed. This will involve a biannual review and update of plans as well as more detail and finalisation of plans for sites that have been taken out of production.
The annual Biodiversity Action Plan review day was held in December 2013 and this included an update on progress of this plan, bog restoration and cutaway rehabilitation for a wide range on statutory and non-statutory consultees including members of the NPWS, BWI, Bord na Mona, Coillte, Inland Fisheries Ireland, An Taisce, IPCC, Irish Red Grouse Association, Irish Wildlife Trust, NARGC, local game councils, Midland Regional Planning Authority as well as a range of local community groups and Heritage Officers from counties Laois, Offaly, Kildare, Roscommon, Longford, Meath, Galway, Westmeath and Dublin.

The Restoration and Aftercare Plans for the Littleton Group of Bogs was submitted to the Agency in April 2013.

A copy of our Biodiversity Action Plan is available to view and download at http://www.bordnamona.ie/our-company/biodiversity/

Guidance to completing the PRTR workbook

AER Returns Workbook

Version 1.1.18

REFERENCE YEAR	2013

1. FACILITY IDENTIFICATION

Parent Company Name	Bord na Mona Fuels Limited
Facility Name	Bord na Mona Fuels Limited
PRTR Identification Number	P0499
Licence Number	P0499-01

Waste or IPPC Classes of Activity

No.	class_name
1.4	The extraction of peat in the course of business which involves an area exceeding 50 hectares.

Address 1	Littleton Briquette Factory
Address 2	Littleton
Address 3	Thurles
Address 4	County Tipperary
	Tipperary
Country	Ireland
Coordinates of Location	-7.69986 52.6123
River Basin District	IESE
NACE Code	0892
Main Economic Activity	Extraction of peat
AER Returns Contact Name	Enda McDonagh
AER Returns Contact Email Address	enda.mcdonagh@bnm.ie
AER Returns Contact Position	Head of Environment
AER Returns Contact Telephone Number	057 9345911
AER Returns Contact Mobile Phone Number	086 2370816
AER Returns Contact Fax Number	057 9345160
Production Volume	433235.0
Production Volume Units	Tonnes
Number of Installations	3
Number of Operating Hours in Year	5174
Number of Employees	148
User Feedback/Comments	In accordance with licence condition 6.2 of Technical Amendment A, quarterly sampling is now rotated every quarter and therefore suspended solids results are not factored into loading. Monitoring of pollutant 351 Total Organic Carbon is no longer a requirement as the
Web Address	www.bnm.ie

2. PRTR CLASS ACTIVITIES

Activity Number	Activity Name
50.1	General

3. SOLVENTS REGULATIONS (S.I. No. 543 of 2002)

Is it applicable?	No
Have you been granted an exemption ?	
If applicable which activity class applies (as per Schedule 2 of the regulations) ?	
Is the reduction scheme compliance route being used ?	

4. WASTE IMPORTED/ACCEPTED ONTO SITE Guidance on waste imported/accepted onto site

Do you import/accept waste onto your site for on-site treatment (either recovery or disposal activities) ?	No

This question is only applicable if you are an IPPC or Quarry site

4.1 RELEASES TO AIR Link to previous years emissions data

SECTION A : SECTOR SPECIFIC PRTR POLLUTANTS

RELEASES TO AIR					Please enter all quantities in this section in KGs			
POLLUTANT		METHOD			QUANTITY			
		Method Used						
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
					0.0	0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

SECTION B : REMAINING PRTR POLLUTANTS

RELEASES TO AIR					Please enter all quantities in this section in KGs				
POLLUTANT		METHOD			QUANTITY				
		Method Used			B101				
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	Emission Point 2	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
08	Nitrogen oxides (NOx/NO2)	M	ISO 10849:1996		74137.0	0.0	74137.0	0.0	0.0
11	Sulphur oxides (SOx/SO2)	M	ISO 7935: 1992		84454.0	0.0	84454.0	0.0	0.0
02	Carbon monoxide (CO)	M	ISO 12039:2001		0.0	0.0	0.0	0.0	0.0
03	Carbon dioxide (CO2)	C	ETS		54063.5	0.0	54063.5	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

SECTION C : REMAINING POLLUTANT EMISSIONS (As required in your Licence)

RELEASES TO AIR					Please enter all quantities in this section in KGs											
POLLUTANT		METHOD												QUANTITY		
		Method Used			B101	A101	A102	A103	A104	A105	A106	A108	DM01-DM04			
Pollutant No.	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	Emission Point 2	Emission Point 3	Emission Point 4	Emission Point 5	Emission Point 6	Emission Point 7	Emission Point 8	Emission Point 9	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
210	Dust	E	OTH	VDI 2119 Blatt 2/Part 2	207333.0	128170.0	73741.0	4762.0	46625.0	529.0	265.0	0.0	0.0	#########	0.0	0.145712

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

Additional Data Requested from Landfill operators

For the purposes of the National Inventory on Greenhouse Gases, landfill operators are requested to provide summary data on landfill gas (Methane) flared or utilised on their facilities to accompany the figures for total methane generated. Operators should only report their Net methane (CH4) emission to the environment under T(total) KG/yr for Section A: Sector specific PRTR pollutants above. Please complete the table below:

Landfill: Bord na Mona Fuels Limited

Please enter summary data on the quantities of methane flared and / or utilised	**T (Total) kg/Year**	**M/C/E**	**Method Used: Method Code**	**Method Used: Designation or Description**	**Facility Total Capacity m3 per hour**	
Total estimated methane generation (as per site model)	0.0				N/A	
Methane flared	0.0				0.0	(Total Flaring Capacity)
Methane utilised in engine/s	0.0				0.0	(Total Utilising Capacity)
Net methane emission (as reported in Section A above)	0.0				N/A	

4.2 RELEASES TO WATERS Link to previous years emissions data | PRTR# : P0499 | Facility Name : Bord na Mona Fuels Limited | Filename : P0499_2013(1).xls | Return Year : 2013 | 09/04/2014 12:26

SECTION A : SECTOR SPECIFIC PRTR POLLUTANTS

Data on ambient monitoring of storm/surface water or groundwater, conducted as part of your licence requirements, should NOT be submitted under AER / PRTR Reporting as this only co

RELEASES TO WATERS					Please enter all quantities in this section in KGs			
POLLUTANT					QUANTITY			
			Method Used					
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
					0.0	0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

SECTION B : REMAINING PRTR POLLUTANTS

RELEASES TO WATERS					Please enter all quantities in this section in KGs			
POLLUTANT					QUANTITY			
			Method Used					
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
					0.0	0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

SECTION C : REMAINING POLLUTANT EMISSIONS (as required in your Licence)

RELEASES TO WATERS					Please enter all quantities in this section in KGs			
POLLUTANT					QUANTITY			
			Method Used		SW-18			
Pollutant No.	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
240	**Suspended Solids**	E	OTH	G/19 Based on ALPHA,1998,20th Edition, Method 2540D	0.0	26600.0	0.0	26600.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

4.3 RELEASES TO WASTEWATER OR SEWER

Link to previous years emissions data

SECTION A : PRTR POLLUTANTS

OFFSITE TRANSFER OF POLLUTANTS DESTINED FOR WASTE-WATER TREATMENT OR SEWER					Please enter all quantities in this section in KGs			
POLLUTANT		METHOD			QUANTITY			
			Method Used					
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
					0.0	0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

SECTION B : REMAINING POLLUTANT EMISSIONS (as required in your Licence)

OFFSITE TRANSFER OF POLLUTANTS DESTINED FOR WASTE-WATER TREATMENT OR SEWER					Please enter all quantities in this section in KGs			
POLLUTANT		METHOD			QUANTITY			
			Method Used					
Pollutant No.	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
					0.0	0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

4.4 RELEASES TO LAND

Link to previous years emissions data

SECTION A : PRTR POLLUTANTS

RELEASES TO LAND					Please enter all quantities in this section in KGs		
POLLUTANT		METHOD			QUANTITY		
			Method Used				
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year
					0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

SECTION B : REMAINING POLLUTANT EMISSIONS (as required in your Licence)

RELEASES TO LAND					Please enter all quantities in this section in KGs		
POLLUTANT		METHOD			QUANTITY		
			Method Used				
Pollutant No.	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year
					0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

5. ONSITE TREATMENT & OFFSITE TRANSFERS OF WASTE

| PRTR# : P0499 | Facility Name : Bord na Mona Fuels Limited | Filename : P0499_2013(1).xls | Return Year : 2013 | 09/04/2014 12:28

Please enter all quantities on this sheet in Tonnes 0

Transfer Destination	European Waste Code	Hazardous	Quantity (Tonnes per Year)	Description of Waste	Waste Treatment Operation	Method Used		Location of Treatment	Haz Waste : Name and Licence/Permit No of Next Destination Facility Non Haz Waste: Name and Licence/Permit No of Recover/Disposer	Haz Waste : Address of Next Destination Facility Non Haz Waste: Address of Recover/Disposer	Name and License / Permit No. and Address of Final Recoverer / Disposer (HAZARDOUS WASTE ONLY)	Actual Address of Final Destination i.e. Final Recovery / Disposal Site (HAZARDOUS WASTE ONLY)
						M/C/E	Method Used					
Within the Country	01 01 02	No	1334.0	wastes from mineral non-metalliferous excavation	D1	E	Volume Calculation	Onsite of generatic	Bord na Mona Fuels Ltd,P0499-01	Littleton,Thurles,Co Tipperary,.,Ireland		
Within the Country	01 01 02	No	565.0	wastes from mineral non-metalliferous excavation	D1	E	Volume Calculation	Onsite of generatic	Bord na Mona Fuels Ltd,P0499-01	Littleton,Thurles,Co Tipperary,.,Ireland		
Within the Country	02 01 04	No	134.14	waste plastics (except packaging)	R3	M	Weighed	Offsite in Ireland	Leinster Environmentals,WP 2008/06	Haggardstown,Dundalk ,Co Louth,.,Ireland		
To Other Countries	11 01 13	Yes	2.34	degreasing wastes containing dangerous substances	R2	C	Volume Calculation	Abroad	Safety Kleen Ltd,W0099-01	Tallaght,Dublin,.,.,Ireland	Solvent Recovery Management,PP33345F,Wheeland Rd,Knottingly,West Yorks,WF118DZ,United Kingdom	Wheeland Rd,Knottingly,West Yorks,WF118DZ,United Kingdom
Within the Country	13 02 05	Yes	1.8	mineral-based non-chlorinated engine, gear and lubricating oils	R1	C	Volume Calculation	Offsite in Ireland	Enva Ireland Ltd,W0184-1	Clonminam Ind Estate,Portlaoise,Co Laois,.,Ireland	Enva Ireland Ltd,W0184-1,Clonminam Ind Estate,Portlaoise,Co Laois,.,Ireland	Clonminam Ind Estate,Portlaoise,Co Laois,.,Ireland
Within the Country	15 01 03	No	225.74	wooden packaging	R1	M	Weighed	Offsite in Ireland	Kiawa Ltd,WP/TN/24	Tipperary,.,.,.,Ireland		
To Other Countries	15 02 02	Yes	0.6	absorbents, filter materials (including oil filters not otherwise specified), wiping cloths, protective clothing contaminated by dangerous substances	D10	E	Volume Calculation	Abroad	Enva Ireland Ltd,W0184-1	Clonminam Ind Estate,Portlaoise,Co Laois,.,Ireland	KWA,E17012100,Lintfort,.,.,., Germany	Lintfort,.,.,.,Germany
To Other Countries	16 01 07	Yes	0.56	oil filters	R4	C	Volume Calculation	Abroad	Enva Ireland Ltd,W0184-1	Clonminam Ind Estate,Portlaoise,Co Laois,.,Ireland	R. D Recycling,51727/1/KD,Houthalen,.,.,.,Belgium	Houthalen,.,.,.,Belgium
Within the Country	17 04 07	No	106.51	mixed metals	R4	M	Weighed	Offsite in Ireland	Hammond Lane Ltd,WP4620033	Athlone,Co Westmeath,.,.,Ireland		
Within the Country	20 01 01	No	11.84	paper and cardboard	R3	M	Weighed	Offsite in Ireland	Smurfit Kappa Ltd,WPR021/3	Glasnevin,Dublin,.,.,Ireland		
Within the Country	20 01 21	Yes	0.2	fluorescent tubes and other mercury-containing waste	R13	M	Weighed	Offsite in Ireland	Irish Lamp Recycling,WFP-KE-08-0348-01	Athy,.,.,.,Ireland	Irish Lamp Recycling,WFP-KE-08-0348-01,Athy,Co Kildare,.,.,Ireland	Athy,Co Kildare,.,.,Ireland
Within the Country	20 03 01	No	42.64	mixed municipal waste	D1	M	Weighed	Offsite in Ireland	AES,WP-OY-08-601-01	Nenagh,Tipperary,.,.,Ireland		
Within the Country	20 03 01	No	93.56	mixed municipal waste	D1	E	Volume Calculation	Offsite in Ireland	AES,WP-OY-08-601-01	Nenagh,Tipperary,.,.,Ireland		
To Other Countries	13 08 99	Yes	0.8	wastes not otherwise specified	R1	E	Volume Calculation	Abroad	Enva Ireland Ltd,W0184-1	Clonminam Ind Estate,Portlaoise,Co Laois,.,Ireland	KWA,E17012100,Lintfort,.,.,., Germany	Lintfort,.,.,.,Germany

* Select a row by double-clicking the Description of Waste then click the delete button

Facility Information Summary	
AER Reporting Year	2015
Licence Register Number	P0499-01
Name of site	Bord na Moma Littleton
Site Location	Lanespark, Littleton, Thurles, Co Tipperary
NACE Code	0892
Class/Classes of Activity	1.4
National Grid Reference (6E, 6 N)	220443, 151233

A description of the activities/processes at the site for the reporting year. This should include information such as production increases or decreases on site, any infrastructural changes, environmental performance which was measured during the reporting year **and an overview of compliance with your licence** listing all exceedances of licence limits (where applicable) and what they relate to e.g. air, water, noise.

Activities on site can be divided into two components, firstly the milling, harrowing, ridiging and harvesting of peat into stockpiles and secondly the transportation of that peat via an internal rail network to the Briquette Factory for processing into peat briquettes. Production achieved was approximately 256806 tonnes of milled peat and 575 tonnes of machine turf during 2015. Infrastructurally bog development extended to approximately 30 hectares at Templetuohy. This work included levelling and ditching. There were nine non-compliances/incidents/breach of ELV, seven related to factory stack emissions, one was associated with a spillage and one related to emissions to water. There were no environmental complaint received during the reporting period. In relation to silt pond cleaning, 100% of ponds received two cleanings, with some ponds receiving more depending on inspection results. Six Hydraulic Harrows were deployed during production and the silt pond upgrade program was ongoing during the reporting year. There was a big effort made to recycle old sod turf machinery and obsolete rail line, this work will be continued into 2016. Decommissioning and Rehabilitation works are described in an attachment.

Declaration:

All the data and information presented in this report has been checked and certified as being accurate. The quality of the information is assured to meet licence requirements.

Tommy Magner	17/6/16
Signature	Date
Group/Facility manager	
(or nominated, suitably qualified and experienced deputy)	

AIR-summary template

Lic No: #REF! Year #REF!

Answer all questions and complete all tables where relevant

			Additional information
1	Does your site have licensed air emissions? If yes please complete table A1 and A2 below for the current reporting year and answer further questions. If **you do not have** licenced emissions and **do not complete a solvent management plan** (table A4 and A5) you do not need to complete the tables	Yes	Fugitive emissions also

Periodic/Non-Continuous Monitoring

2	Are there any results in breach of licence requirements? If yes please provide brief details in the comment section of TableA1 below	Yes	
3	Was all monitoring carried out in accordance with EPA guidance note AG2 and using the basic air monitoring checklist? (Basic air monitoring checklist / AGN2)	Yes	

Table A1: Licensed Mass Emissions/Ambient data-periodic monitoring (non-continuous)

Emission reference no:	Parameter/ Substance	Frequency of Monitoring	ELV in licence or any revision therof	Licence Compliance criteria	Measured value	Unit of measurement	Compliant with licence limit	Method of analysis	Annual mass load (kg)	Comments - reason for change in % mass load from previous year if applicable
B101	Nitrogen oxides (NOx/NO2)	Annual	31536	100 % of values < ELV	20.3	kg/hour	no (if no please enter details in comments box)	ISO 10849:1996	86234	
B101	Sulphur oxides (SOx/SO2)	Annual	315360	100 % of values < ELV	10.09	kg/hour	yes	ISO 7935: 1992	42862	
B101	Carbon monoxide (CO)	Annual	NA	NA	5.47	kg/hour	yes	ISO 12039:2001	23236	
B101	Total Particulates	Annual	126144	100 % of values < ELV	29.69	kg/hour	Yes	OTH	126122	
A101	Total Particulates	Annual	45796	100 % of values < ELV	47.3	kg/hour	no (if no please enter details in comments box)	OTH	200926	
A102	Total Particulates	Annual	55714	100 % of values < ELV	6.44	kg/hour	yes	OTH	27341	
A103	Total Particulates	Annual	61320	100 % of values < ELV	0.06	kg/hour	yes	OTH	234	
A104	Total Particulates	Annual	52560	100 % of values < ELV	2.01	kg/hour	yes	OTH	8541	
A105	Total Particulates	Annual	8931	101 % of values < ELV	0.06	kg/hour	yes	OTH	249	
A106	Total Particulates	Annual	867	102 % of values < ELV	0.06	kg/hour	yes	OTH	263	

Note 1: Volumetric flow shall be included as a reportable parameter

AIR-summary template	Lic No:	#REF!	Year	#REF!

Continuous Monitoring

4	Does your site carry out continuous air emissions monitoring?	No	
	If yes please review your continuous monitoring data and report the required fields below in Table A2 and compare it to its relevant Emission Limit Value (ELV)		
5	Did continuous monitoring equipment experience downtime? If yes please record downtime in table A2 below	NA	
6	Do you have a proactive service agreement for each piece of continuous monitoring equipment?	NA	
7	Did your site experience any abatement system bypasses? If yes please detail them in table A3 below	NA	

Table A2: Summary of average emissions -continuous monitoring

Emission reference no:	Parameter/ Substance	ELV in licence or any revision therof	Averaging Period	Compliance Criteria	Units of measurement	Annual Emission	Annual maximum	Monitoring Equipment downtime (hours)	Number of ELV exceedences in current reporting year	Comments
DM-01	Total Particulates	350	308	Daily average < ELV	mg/m2/day	30142	146	0	0	
DM-02	Total Particulates	350	308	Daily average < ELV	mg/m2/day	24411	270	0	0	
DM-03	Total Particulates	350	308	Daily average < ELV	mg/m2/day	24243	231	0	0	
DM-04	Total Particulates	350	308	Daily average < ELV	mg/m2/day	32754	214	0	0	
	SELECT				SELECT					

note 1: Volumetric flow shall be included as a reportable parameter.

Table A3: Abatement system bypass reporting table

Bypass protocol

Date*	Duration** (hours)	Location	Reason for bypass	Impact magnitude	Corrective action

* this should include all dates that an abatement system bypass occurred

** an accurate record of time bypass beginning and end should be logged on site and maintained for future Agency inspections please refer to bypass protocol link

AIR-summary template	Lic No:	#REF!	Year	#REF!

Solvent use and management on site

8 Do you have a total Emission Limit Value of direct and fugitive emissions on site? if yes please fill out tables A4 and A5

SELECT

Table A4: Solvent Management Plan Summary
Total VOC Emission limit value

Solvent regulations — Please refer to linked solvent regulations to complete table 5 and 6

Reporting year	Total solvent input on site (kg)	Total VOC emissions to Air from entire site (direct and fugitive)	Total VOC emissions as %of solvent input	Total Emission Limit Value (ELV) in licence or any revision therof	Compliance
					SELECT
					SELECT

Table A5: Solvent Mass Balance summary

	(I) Inputs (kg)	(O) Outputs (kg)						
Solvent	(I) Inputs (kg)	Organic solvent emission in waste	Solvents lost in water (kg)	Collected waste solvent (kg)	Fugitive Organic Solvent (kg)	Solvent released in other ways e.g.	Solvents destroyed onsite through	Total emission of Solvent to air (kg)
							Total	

AER Monitoring returns summary template-WATER/WASTEWATER(SEWER) Lic No: #REF! Year #REF!

			Additional information
1	Does your site have licensed emissions direct to surface water or direct to sewer? If yes please complete table W2 and W3 below for the current reporting year and answer further questions. If **you do not have** licenced emissions you only need to complete table W1 and or W2 for storm water analysis and visual inspections	Yes	
2	Was it a requirement of your licence to carry out visual inspections on any surface water discharges or watercourses on or near your site? If yes please complete table W2 below summarising only any evidence of contamination noted during visual inspections	Yes	Monthly COD analysis of yard runoff is attached in a separate document.

Table W1 Storm water monitoring

Location reference	Location relative to site activities	PRTR Parameter	Licenced Parameter	Monitoring date	ELV or trigger level in licence or any revision thereof*	Licence Compliance criteria	Measured value	Unit of measurement	Compliant with licence	Comments
	SELECT	SELECT	SELECT			SELECT		SELECT	SELECT	
	SELECT	SELECT	SELECT			SELECT		SELECT	SELECT	

*trigger values may be agreed by the Agency outside of licence conditions

Table W2 Visual inspections-Please only enter details where contamination was observed.

Location Reference	Date of inspection	Description of contamination	Source of contamination	Corrective action	Comments
			SELECT		
			SELECT		

Licensed Emissions to water and /or wastewater(sewer)-periodic monitoring (non-continuous)

3	Was there any result in breach of licence requirements? If yes please provide brief details in the comment section of Table W3 below		Yes	There was one breach at PW-102 however this can only be established at year end when 100% of results are assessed.
4	Was all monitoring carried out in accordance with EPA guidance and checklists for Quality of Aqueous Monitoring Data Reported to the EPA? If no please detail what areas require improvement in additional information box	External /Internal Lab Quality checklist / Assessment of results checklist	Yes	Surface water monitoring was carried out on a quarterly basis. The results of which are attached. Monthly COD yard runoff results are also attached.

Table W3: Licensed Emissions to water and /or wastewater (sewer)-periodic monitoring (non-continuous)

Emission reference no:	Emission released to	Parameter/ SubstanceNote 1	Type of sample	Frequency of monitoring	Averaging period	ELV or trigger values in licence or any revision thereof[Note 2]	Licence Compliance criteria	Measured value	Unit of measurement	Compliant with licence	Method of analysis	Procedural reference source	Procedural reference standard number	Annual mass load (kg)	Comments
									SELECT	SELECT	SELECT	SELECT			

Note 1: Volumetric flow shall be included as a reportable parameter

Note 2: Where Emission Limit Values (ELV) do not apply to your licence please compare results against EQS for Surface water or relevant receptor quality standards

AER Monitoring returns summary template-WATER/WASTEWATER(SEWER) Lic No: #REF! Year #REF!

Continuous monitoring

			Additional Information
5	Does your site carry out continuous emissions to water/sewer monitoring?	Yes	

If yes please summarise your continuous monitoring data below in Table W4 and compare it to its relevant Emission Limit Value (ELV)

6	Did continuous monitoring equipment experience downtime? **If yes please record downtime in table W4 below**	Yes	Down time is primarily due to no flow/discharge, battery failure and or frozen pipes.
7	Do you have a proactive service contract for each piece of continuous monitoring equipment on site?	Yes	Annual calibration schedule and trouble shooting service
8	Did abatement system bypass occur during the reporting year? **If yes please complete table W5 below**	No	

Table W4: Summary of average emissions -continuous monitoring

Emission reference no:	Emission released to	Parameter/ Substance	ELV or trigger values in licence or any revision thereof	Averaging Period	Compliance Criteria	Units of measurement	Annual Emission for current reporting year (kg)	% change +/- from previous reporting year	Monitoring Equipment downtime (hours)	Number of ELV exceedences in reporting year	Comments
SW18	Water	Suspended Solids	35	24 hour	All results < 1.5 times ELV, plus 8 from ten results must be < ELV	mg/L	12432		4464	1	Down time primarily due to battery failure and no flow. The site is downstream of a pumping station and there are extended periods of no flow during dry periods.
SW18	Water	Ammonia (as N)	NA	Weekly	NA	mg/L	469				
SW18	Water	Total phosphorus	NA	Weekly	NA	mg/L	14				
SW18	Water	COD	NA	Weekly	NA	mg/L	21291				
SW18	Water	Total Dissolved Solids	NA	Weekly	NA	mg/L	277102				
SW18	Water	volumetric flow	NA	24 hour	NA	m3/day					The flow rates due to extended periods of no flow or down time have been omitted.

note 1: Volumetric flow shall be included as a reportable parameter.

Table W5: Abatement system bypass reporting table

Date	Duration (hours)	Location	Resultant emissions	Reason for bypass	Corrective action*	Was a report submitted to the EPA?	When was this report submitted?
						SELECT	

*Measures taken or proposed to reduce or limit bypass frequency

Bund/Pipeline testing template

Lic No: #REF! Year #REF!

Bund testing

dropdown menu click to see options

			Additional information
1	Are you required by your licence to undertake integrity testing on bunds and containment structures ? if yes please fill out table B1 below listing all **new bunds and containment structures** on site, in addition to **all bunds which failed** the integrity test-**all bunding structures which failed including mobile bunds must be listed in the table below, please include all bunds outside the licenced testing period** (mobile bunds and chemstore included)	Yes	
2	Please provide integrity testing frequency period	2 Yearly	
3	Does the site maintain a register of bunds, underground pipelines (including stormwater and foul), Tanks, sumps and containers? (containers refers to "Chemstore" type units and mobile bunds)	Yes	
4	How many bunds are on site?	4	
5	How many of these bunds have been tested within the required test schedule?	3	3 Tested and passed IN 2014. All scheduled for testing in 2016.
6	How many mobile bunds are on site?	8	These include barrel trays located within workshops
7	Are the mobile bunds included in the bund test schedule?	No	
8	How many of these mobile bunds have been tested within the required test schedule?	NA	
9	How many sumps on site are included in the integrity test schedule?	NA	
10	How many of these sumps are integrity tested within the test schedule? **Please list any sump integrity failures in table B1**	NA	
11	Do all sumps and chambers have high level liquid alarms?	N/A	
12	If yes to Q11 are these failsafe systems included in a maintenance and testing programme?	N/A	
13	Is the Fire Water Retention Pond included in your integrity test programme?	SELECT	

Table B1: Summary details of bund /containment structure integrity test

Bund/Containment structure ID	Type	Specify Other type	Product containment	Actual capacity	Capacity required*	Type of integrity test	Other test type	Test date	Integrity reports maintained on site?	Results of test	Integrity test failure explanation <50 words	Corrective action taken	Scheduled date for retest	Results of retest(if in current reporting year)
	SELECT					SELECT			SELECT	SELECT		SELECT		
	SELECT					SELECT			SELECT	SELECT		SELECT		

* Capacity required should comply with 25% or 110% containment rule as detailed in your licence

			Commentary
15	Has integrity testing been carried out in accordance with licence requirements and are all structures tested in line with BS8007/EPA Guidance?	bunding and storage guidelines	SELECT	
16	Are channels/transfer systems to remote containment systems tested?		SELECT	
17	Are channels/transfer systems compliant in both integrity and available volume?		SELECT	

Pipeline/underground structure testing

1	Are you required by your licence to undertake integrity testing* on underground structures e.g. pipelines or sumps etc ? if yes please fill out table 2 below listing all underground structures and pipelines on site **which failed the integrity test and all which have not been tested withing the integrity test period as specified**	Yes	
2	Please provide integrity testing frequency period	3 years	

*please note integrity testing means water tightness testing for process and foul pipelines (as required under your licence)

Table B2: Summary details of pipeline/underground structures integrity test

Structure ID	Type system	Material of construction:	Does this structure have Secondary containment?	Type of secondary containment	Type integrity testing	Integrity reports maintained on site?	Results of test	Integrity test failure explanation <50 words	Corrective action taken	Scheduled date for retest	Results of retest(if in current reporting year)
	SELECT	SELECT	SELECT	SELECT	SELECT	SELECT	SELECT				SELECT

Please use commentary for additional details not answered by tables/ questions above

Groundwater/Soil monitoring template	Lic No:	#REF!	Year	#REF!

			Comments	
1	Are you required to carry out groundwater monitoring as part of your licence requirements?	no		Please provide an interpretation of groundwater monitoring data in the interpretation box below or if you require additional space please include a groundwater/contaminated land monitoring results interpretaion as an additional section in this AER
2	Are you required to carry out soil monitoring as part of your licence requirements?	no		
3	Do you extract groundwater for use on site? If yes please specify use in comment section	no	Process water extracted from surface water river.	
4	Do monitoring results show that groundwater generic assessment criteria such as GTVs or IGVs are exceeded or is there an upward trend in results for a substance? If yes, please complete the Groundwater Monitoring Guideline Template Report (link in cell G8) and submit separately through ALDER as a licensee return AND answer questions 5-12 below. Groundwater monitoring template	no		
5	Is the contamination related to operations at the facility (either current and/or historic)	N/A		
6	Have actions been taken to address contamination issues?If yes please summarise remediation strategies proposed/undertaken for the site	NA		
7	Please specify the proposed time frame for the remediation strategy	NA		
8	Is there a licence condition to carry out/update ELRA for the site?	NA		
9	Has any type of risk assesment been carried out for the site?	NA		
10	Has a Conceptual Site Model been developed for the site?	NA		
11	Have potential receptors been identified on and off site?	NA		
12	Is there evidence that contamination is migrating offsite?	NA		Please enter interpretation of data here

Table 1: Upgradient Groundwater monitoring results

Date of sampling	Sample location reference	Parameter/ Substance	Methodology	Monitoring frequency	Maximum Concentration++	Average Concentration+	unit	GTV's*	SELECT**	Upward trend in pollutant concentration over last 5 years of monitoring data
							SELECT			SELECT
							SELECT			SELECT

.+ where average indicates arithmetic mean

.++ maximum concentration indicates the maximum measured concentration from all monitoring results produced during the reporting year

Table 2: Downgradient Groundwater monitoring results

Date of sampling	Sample location reference	Parameter/ Substance	Methodology	Monitoring frequency	Maximum Concentration	Average Concentration	unit	GTV's*	SELECT**	Upward trend in yearly average pollutant concentration over last 5 years of monitoring data
							SELECT			SELECT
							SELECT			SELECT

Groundwater/Soil monitoring template	Lic No:	#REF!	Year	#REF!

*please note exceedance of generic assessment criteria (GAC) such as a Groundwater Threshold Value (GTV) or an Interim Guideline Value (IGV) or an upward trend in results for a substance indicates that further interpretation of monitoring results is required. In addition to completing the above table, please complete the Groundwater Monitoring Guideline Template Report at the link provided and submit separately through ALDER as a licensee return or as otherwise instructed by the EPA.	Groundwater monitoring template
More information on the use of soil and groundwater standards/ generic assessment criteria (GAC) and risk assessment tools is available in the EPA published guidance (see the link in G31)	Guidance on the Management of Contaminated Land and Groundwater at EPA Licensed Sites (EPA 2013).

**Depending on location of the site and proximity to other sensitive receptors alternative Receptor based Water Quality standards should be used in addition to the GTV e.g. if the site is close to surface water compare to Surface Water Environmental Quality Standards (SWEQS), If the site is close to a drinking water supply compare results to the Drinking Water Standards (DWS)	Surface water EQS	Groundwater regulations GTV's	Drinking water (private supply) standards	Drinking water (public supply) standards	Interim Guideline Values (IGV)

Groundwater/Soil monitoring template Lic No: #REF! Year #REF!

Table 3: Soil results

Date of sampling	Sample location reference	Parameter/ Substance	Methodology	Monitoring frequency	Maximum Concentration	Average Concentration	unit
							SELECT
							SELECT

Where additional detail is required please enter it here in 200 words or less

Environmental Liabilities template	Lic No:	#REF!	Year	#REF!

Click here to access EPA guidance on Environmental Liabilities and Financial provision

			Commentary
1	ELRA initial agreement status	Not a Licence Requirement	
2	ELRA review status	NA	
3	Amount of Financial Provision cover required as determined by the latest ELRA	NA	
4	Financial Provision for ELRA status	NA	
5	Financial Provision for ELRA - amount of cover	NA	
6	Financial Provision for ELRA - type	NA	
7	Financial provision for ELRA expiry date	NA	
8	Closure plan initial agreement status	NA	Internal Budget Provision
9	Closure plan review status	NA	Internal Budget Provision
10	Financial Provision for Closure status	NA	Internal Budget Provision
11	Financial Provision for Closure - amount of cover	NA	Internal Budget Provision
12	Financial Provision for Closure - type	NA	Internal Budget Provision
13	Financial provision for Closure expiry date	NA	

Environmental Management Programme/Continuous Improvement Programme template

Lic No: #REF! Year #REF!

Highlighted cells contain dropdown menu click to view

			Additional Information
1	Do you maintain an Environmental Mangement System (EMS) for the site. If yes, please detail in additional information	Yes	Internal unaccredited EMS
2	Does the EMS reference the most significant environmental aspects and associated impacts on-site	Yes	
3	Does the EMS maintain an Environmental Management Programme (EMP) as required in accordance with the licence requirements	Yes	
4	Do you maintain an environmental documentation/communication system to inform the public on environmental performance of the facility, as required by the licence	Yes	

Environmental Management Programme (EMP) report

Objective Category	Target	Status (% completed)	How target was progressed	Responsibility	Intermediate outcomes
Reduction of emissions to Air	Training.Continue to train all employees in environmental matters. Training will be by means of the screening of an environmental DVD, followed by a power point presentation. Headland Peat Collection. Continue with the collection of headland peat, particularly at dust sensitive locations.	70	Approximately 5000 tonnes of headland peat was collected and returned as part of overall production figures. In addition six hydraulic harrows were deployed at dust sensitive locations.	Section Head	Reduced emissions
Waste reduction/Raw material usage efficiency	Waste Streamlining.It is planned to continue with and where possible improve the current waste management service provided by AES Ltd	100	Installed a waste management system. Quarterly waste reports are returned for records/filing and waste streams are segrated on site to maximise recycling potential.	Section Head	Improved Environmental Management Practices

Environmental Management Programme/Continuous Improvement Programme template				Lic No:	#REF!	Year	#REF!
Reduction of emissions to Water	Training. Continue to train all employees in environmental matters. Training will be by means of the screening of an environmental DVD, followed by a power point presentation. Silt Pond survey also planned.	100	Silt pond upgrade works were ongoing and forthnightly silt pond inspections.	Section Head	Reduced emissions		
Materials Handling/Storage/Bunding	Increased bund capacity will be provided where required.	100	There was no increased bund capacity provided or required. All Bunds are scheduled for testing in 2016.	Section Head	Improved Environmental Management Practices		
Waste reduction/Raw material usage efficiency	Continue with the recycling of polyethylene. The sourcing of more recycling contractors	100	In total approximately 182.48 tonnes were sent off site for recycling. Procurement also exploring the possibility of securing further recyclers.	Section Head	Reduced emissions		
Energy Efficiency/Utility conservation	Carry out a review of energy aspects identifying significant energy users.	50	Energy management is ongoing with energy users divided up into three pillars. Bog Ops, Customer Supply and Asset Management. Each pillar monitoring its own consumption	Section Head	Improved Environmental Management Practices		

Noise monitoring summary report	Lic No:	#REF!	Year	#REF!

1	Was noise monitoring a licence requirement for the AER period? If yes please fill in table N1 noise summary below	No
2	Was noise monitoring carried out using the EPA Guidance note, including completion of the "Checklist for noise measurement report" included in the guidance note as table 6? (Noise Guidance note NG4)	NA
3	Does your site have a noise reduction plan	NA
4	When was the noise reduction plan last updated?	
5	Have there been changes relevant to site noise emissions (e.g. plant or operational changes) since the last noise survey?	NA

Table N1: Noise monitoring summary

Date of monitoring	Time period	Noise location (on site)	Noise sensitive location -NSL (if applicable)	LA_{eq}	LA_{90}	LA_{10}	LA_{max}	Tonal or Impulsive noise* (Y/N)	If tonal /impulsive noise was identified was 5dB penalty applied?	Comments (ex. main noise sources on site, & extraneous noise ex. road traffic)	Is site compliant with noise limits (day/evening/night)?
								SELECT	SELECT		SELECT

*Please ensure that a tonal analysis has been carried out as per guidance note NG4. These records must be maintained onsite for future inspection

If noise limits exceeded as a result of noise attributed to site activities, please choose the corrective action from the following options? SELECT

** please explain the reason for not taking action/resolution of noise issues?
Any additional comments? (less than 200 words)

Resource Usage/Energy efficiency summary Lic No: #REF! Year #REF!

			Additional information
1	When did the site carry out the most recent energy efficiency audit? Please list the recommendations in table 3 below	2013	
2	Is the site a member of any accredited programmes for reducing energy usage/water conservation such as the SEAI programme linked to the right? If yes please list them in additional information	Yes	SEAI - Large Industry Energy Network (LIEN)
3	Where Fuel Oil is used in boilers on site is the sulphur content compliant with licence conditions? Please state percentage in additional information	SELECT	

Table R1 Energy usage on site

Energy Use	Previous year	Current year	Production +/- % compared to previous reporting year**	Energy Consumption +/- % vs overall site production*
Total Energy Used (MWHrs)	135852	28563		
Total Energy Generated (MWHrs)				
Total Renewable Energy Generated (MWHrs)				
Electricity Consumption (MWHrs)	1820.19	1585.469		
Fossil Fuels Consumption:				
Heavy Fuel Oil (m3)				
Light Fuel Oil (m3)	917.64	654.81		
Natural gas (m3)				
Coal/Solid fuel (metric tonnes)				
Peat (metric tonnes)	57682	38807		
Renewable Biomass				
Renewable energy generated on site				

* where consumption of energy can be compared to overall site production please enter this information as percentage increase or decrease compared to the previous reporting year.

** where site production information is available please enter percentage increase or decrease compared to previous year

Table R2 Water usage on site

					Water Emissions	**Water Consumption**	
Water use	Water extracted Previous year m3/yr.	Water extracted Current year m3/yr.	Production +/- % compared to previous reporting year**	Energy Consumption +/- % vs overall site production*	Volume Discharged back to environment(m^3yr):	Volume used i.e not discharged to environment e.g. released as steam m3/yr	Unaccounted for Water:
Groundwater							
Surface water							
Public supply							
Recycled water							
Total							

* where consumption of water can be compared to overall site production please enter this information as percentage increase or decrease compared to the previous reporting year.

** where site production information is available please enter percentage increase or decrease compared to previous year

Table R3 Waste Stream Summary

	Total	Landfill	Incineration	Recycled	Other
Hazardous (Tonnes)	5.14	0	0	5.14	
Non-Hazardous (Tonnes)	4143.77	80.21	0	196.56	3867

Resource Usage/Energy efficiency summary Lic No: #REF! Year #REF!

Table R4: Energy Audit finding recommendations

Date of audit	Recommendations	Description of Measures proposed	Origin of measures	Predicted energy savings %	Implementation date	Responsibility	Completion date	Status and comments
			SELECT					
			SELECT					
			SELECT					

Table R5: Power Generation: Where power is generated onsite (e.g. power generation facilities/food and drink industry)please complete the following information

	Unit ID	Unit ID	Unit ID	Unit ID	Station Total
Technology					
Primary Fuel					
Thermal Efficiency					
Unit Date of Commission					
Total Starts for year					
Total Running Time					
Total Electricity Generated (GWH)					
House Load (GWH)					
KWH per Litre of Process Water					
KWH per Litre of Total Water used on Site					

Complaints and Incidents summary template Lic No: #REF! Year #REF!

Complaints		
		Additional information
Have you received any environmental complaints in the current reporting year? If yes please complete summary details of complaints received on site in table 1 below	No	

Table 1 Complaints summary

Date	Category	Other type (please specify)	Brief description of complaint (Free txt <20 words)	Corrective action< 20 words	Resolution status	Resolution date	Further information
	SELECT				SELECT		
	SELECT				SELECT		
	SELECT				SELECT		
	SELECT				SELECT		

Total complaints open at start of reporting year	0
Total new complaints received during reporting year	0
Total complaints closed during reporting year	0
Balance of complaints end of reporting year	0

Incidents		
		Additional information
Have any incidents occurred on site in the current reporting year? Please list all incidents for current reporting year in Table 2 below	Yes	

*For information on how to report and what constitutes an incident	What is an incident

Complaints and Incidents summary template Lic No: #REF! Year #REF!

Table 2 Incidents summary

Date of occurrence	Incident nature	Location of occurrence	Incident category*please refer to guidance	Receptor	Cause of incident	Other cause(please specify)	Activity in progress at time of incident	Communication	Occurrence	Corrective action<20 words	Preventative action <20 words	Resolution status	Resolution date	Likelihood of reoccurence
01/11/2015	Breach of ELV	SW18	1. Minor	Water	Adverse weather		Normal activities	None	New	Pond inspected and shown to be flooded.	Continued to inspect ponds as per licence	Complete	01/12/2015	Low
12/02/2015	Breach of ELV	B101	1. Minor	Air	Plant or equipment issues		Normal activities	EPA INCI006747	Recurring	Dispersion modeling in progress		Ongoing		High
12/02/2015	Breach of ELV	A101	1. Minor	Air	Plant or equipment issues		Normal activities	EPA INCI006750	Recurring	Dispersion modeling in progress		Ongoing		Low
25/07/2014	Spillage	Diesel Tank	1. Minor	Ground	Plant or equipment issues		Normal activities	EPA INCI007365	New	Spill Kit Deployed	Inspections	Complete	01/08/2014	Low
20/10/2015	Breach of ELV	B101	1. Minor	Air	Plant or equipment issues		Normal activities	EPA INCI009257	Recurring	Dispersion modeling in progress		Ongoing		Low
20/10/2015	Breach of ELV	B101	1. Minor	Air	Plant or equipment issues		Normal activities	EPA INCI009259	Recurring			Ongoing		High
20/10/2015	Breach of ELV	A101	1. Minor	Air	Plant or equipment issues		Normal activities	EPA INCI009261	Recurring	Dispersion modeling in progress		Ongoing		High
20/10/2015	Breach of ELV	A102	1. Minor	Air	Plant or equipment issues		Normal activities	EPA INCI009262	Recurring	Dispersion modeling in progress		Ongoing		High
20/10/2015	Breach of ELV	A104	1. Minor	Air	Plant or equipment issues		Normal activities	EPA INCI009271	Recurring	Dispersion modeling in progress		Ongoing		Medium

Total number of incidents current year	9
Total number of incidents previous year	33
% reduction/ increase	-72.00%

WASTE SUMMARY Lic No: #REF! Year #REF!

SECTION A-PRTR ON SITE WASTE TREATMENT AND WASTE TRANSFERS TAB- TO BE COMPLETED BY ALL IPPC AND WASTE FACILITIES | PRTR facility logon | dropdown list click to see options

SECTION B- WASTE ACCEPTED ONTO SITE-TO BE COMPLETED BY ALL IPPC AND WASTE FACILITIES

			Additional Information
1	Were any wastes accepted onto your site for recovery or disposal or treatment prior to recovery or disposal within the boundaries of your facility ?; (waste generated within your boundaries is to be captured through PRTR reporting) If yes please enter details in table 1 below	N/A	
2	Did your site have any rejected consignments of waste in the current reporting year? If yes please give a brief explanation in the additional information	SELECT	
3	Was waste accepted onto your site that was generated outside the Republic of Ireland? If yes please state the quantity in tonnes in additional information	SELECT	

Table 1 Details of waste accepted onto your site for recovery, disposal or treatment (do not include wastes generated at your site, as these will have been reported in your PRTR workbook)

Licenced annual tonnage limit for your site (total tonnes/annum)	EWC code European Waste Catalogue EWC codes	Source of waste accepted	Description of waste accepted **Please enter an accurate and detailed description - which applies to relevant EWC code** European Waste Catalogue EWC codes	Quantity of waste accepted in current reporting year (tonnes)	Quantity of waste accepted in previous reporting year (tonnes)	Reduction/ Increase over previous year +/ - %	Reason for reduction/ increase from previous reporting year	Packaging Content (%)- only applies if the waste has a packaging component	Disposal/Recovery or treatment operation carried out at your site and the description of this operation	Quantity of waste remaining on site at the end of reporting year (tonnes)	Comments -

SECTION C-TO BE COMPLETED BY ALL WASTE FACILITIES (waste transfer stations, Composters, Material recovery facilities etc) EXCEPT LANDFILL SITES

4	Is all waste processing infrastructure as required by your licence and approved by the Agency in place? If no please list waste processing infrastructure required onsite	SELECT	
5	Is all waste storage infrastructure as required by your licence and approved by the Agency in place? If no please list waste storage infrastructure required on site	SELECT	
6	Does your facility have relevant nuisance controls in place?	SELECT	
7	Do you have an odour management system in place for your facility? If no why?	SELECT	
8	Do you maintain a sludge register on site?	SELECT	

SECTION D-TO BE COMPLETED BY LANDFILL SITES ONLY

Table 2 Waste type and tonnage-landfill only

Waste types permitted for disposal	Authorised/licenced annual intake for disposal (tpa)	Actual intake for disposal in reporting year (tpa)	Remaining licensed capacity at end of reporting year (m3)	Comments

Table 3 General information-Landfill only

Area ID	Date landfilling commenced	Date landfilling ceased	Currently landfilling	Private or Public Operated	Inert or non-hazardous	Predicted date to cease landfilling	Licence permits asbestos	Is there a separate cell for asbestos?	Accepted asbestos in reporting year	Total disposal area occupied by waste SELECT UNIT	Lined disposal area occupied by waste SELECT UNIT	Unlined area SELECT UNIT	Comments on liner type
Cell 8													

WASTE SUMMARY Lic No: #REF! Year #REF!

Table 4 Environmental monitoring-landfill only

Landfill Manual-Monitoring Standards

Was meterological monitoring in compliance with Landfill Directive (LD) standard in reporting year +	Was leachate monitored in compliance with LD standard in reporting year	Was Landfill Gas monitored in compliance with LD standard in reporting year	Was SW monitored in compliance with LD standard in reporting year	Have GW trigger levels been established	Were emission limit values agreed with the Agency (ELVs)	Was topography of the site surveyed in reporting year	Has the statement under S53(A)(5) of WMA been submitted in reporting year	Comments

.+ please refer to Landfill Manual linked above for relevant Landfill Directive monitoring standards

Table 5 Capping-Landfill only

Area uncapped*	Area with temporary cap	Area with final cap to LD Standard m2 ha, a	Area capped other	Area with waste that should be permanently capped to date under licence	What materials are used in the cap	Comments
SELECT UNIT	SELECT UNIT					

*please note this includes daily cover area

Table 6 Leachate-Landfill only

9	Is leachate from your site treated in a Waste Water Treatment Plant?	SELECT
10	Is leachate released to surface water? If yes please complete leachate mass load information below	SELECT

Volume of leachate in reporting year(m3)	Leachate (BOD) mass load (kg/annum)	Leachate (COD) mass load (kg/annum)	Leachate (NH4) mass load (kg/annum)	Leachate (Chloride) mass load kg/annum	Leachate treatment on-site	Specify type of leachate treatment	Comments

Please ensure that all information reported in the landfill gas section is consistent with the Landfill Gas Survey submitted in conjunction with PRTR returns

Table 7 Landfill Gas-Landfill only

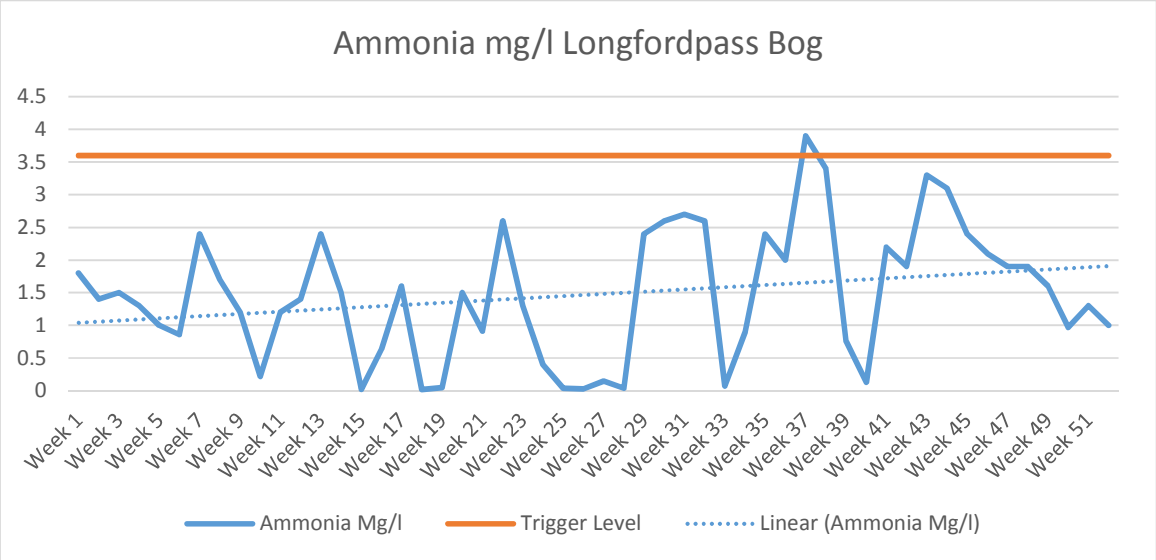
Gas Captured&Treated by LFG System m3	Power generated (MW / KWh)	Used on-site or to national grid	Was surface emissions monitoring performed during the reporting year?	Comments
			SELECT	

Bord na Mona Littleton

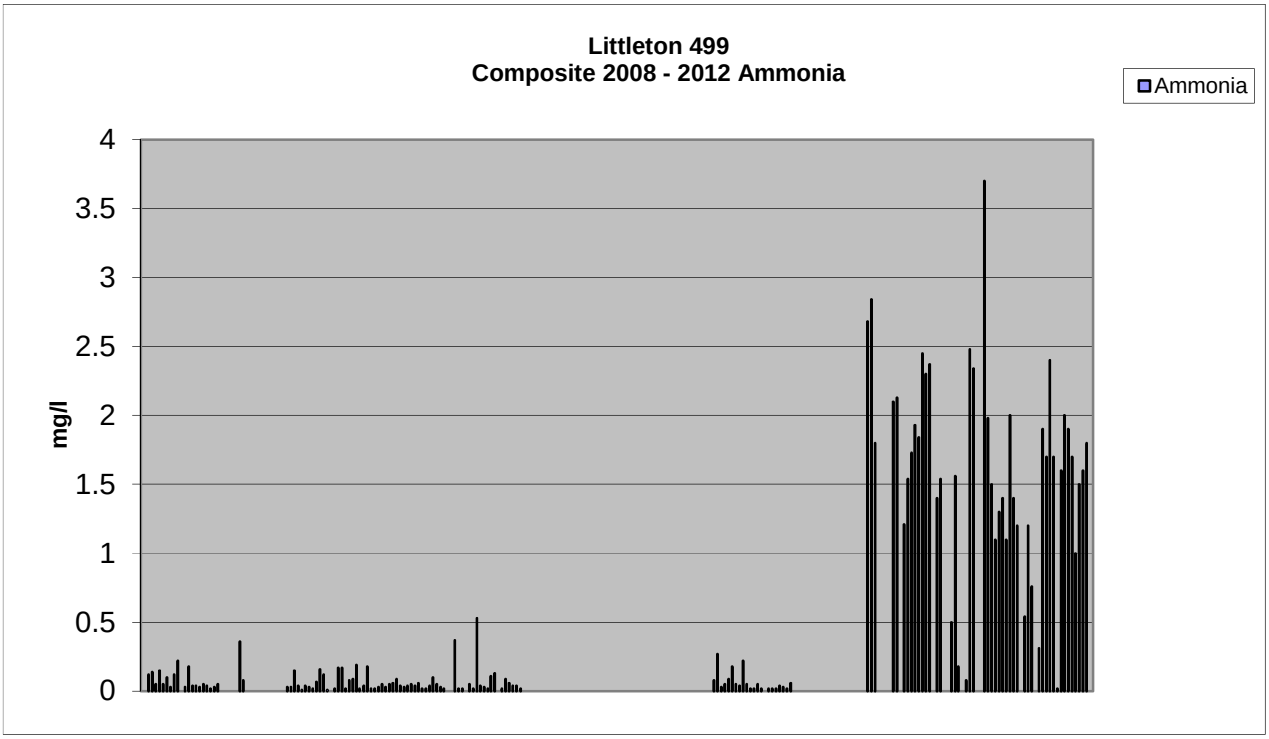
IPPC Licence P0499-01

Siltpond Monitoring Frequency & Results 2015

X	Y	Bog	SW	Monitoring	Sampled	pH	SS	TS	Ammonia	TP	COD	Colour
220444.92	149508.42	Killeen	SW-8	Q1 15	24/03/2015	7.5	5	300	0.39	<0.05	27	120
220367.14	150474.40	Killeen	SW-9	Q1 15	24/03/2015	7.6	9	302	1	<0.05	43	136
221193.73	150442.04	Lanespark	SW-10	Q1 15	24/03/2015	7.4	<5	286	1.9	<0.05	47	142
219043.69	152329.52	Ballybeg	SW-11	Q2 15	27/05/2015	7.8	<5	296	0.64	0.07	37	122
216988.56	171937.10	Ballysorrell	SW-27	Q2 15	27/05/2015	7.4	6	472	0.08	<0.05	16	238
216905.92	173765.85	Ballysorrell	SW-28	Q2 15	27/05/2015	7.3	24	268	2	0.06	71	248
223088.89	158398.90	Littleton	SW-34	Q3 15	15/09/2015	7.7	<5	248	2.1	<0.05	72	216
218669.54	148343.90	Killeen	SW-2	Q3 15	15/09/2015	7.7	<5	204	0.49	<0.05	60	195
221429.53	152116.02	Lanespark	SW-16	Q4 15	15/09/2015	7.8	<5	352	4.1	<0.05	30	85
219908.67	148183.13	Killeen	SW-6	Q4 15	11/12/2014	7.3	10	156	0.66	0.05	83	239
220646.62	148976.02	Killeen	SW-7	Q4 15	11/12/2014	7.2	13	154	0.52	<0.05	61	136
221890.00	160698.73	Longford Pass	SW-17	Q4 15	11/12/2014	7.5	<5	430	1.2	<0.05	43	89



Longfordpass bog is an active production bog with the composite sampler located here during 2015. The composite sampler takes a flow proportional composite sample over a 24 hour period. The sampler had 52% downtime during the period and but returned 52 weekly ammonia results, the balance being undertaken using a grab sample.. The ammonia trigger level of 3.6mg/l, as agreed with the Agency, was exceeded once during the period. Overall the results are trending upwards as peat extraction continues. Generally, ammonia is trending downwards as in other licensed bogs with the downwards trends submitted to the EPA in 2013 as required by condition 6.14 below. Due to the new licence condition 6.2, where all monitoring locations are required to be sampled at least once in a 5 yr period, it is not possible to trend these ammonia results for each individual location due to the new licence requirement.



Oil Interceptor Results				
Licence No:	**499**			
YEAR: 2015				
LOCATION	**FA YARD**	**TR FUEL**	**TT YARD**	**TT FUEL**
Month	**SWE 1 COD mg/l**	**SWE 2 COD mg/l**	**SWE 3 COD mg/l**	**SWE 4 COD mg/l**
Jan	35	221		
Feb	15	531	62	73
Mar	30	no flow		
Apr	17	no flow		
May	31	123	78	91
June	16	no flow		
July	no flow	no flow		
Aug	no flow	37	82	27
Sep	no flow	no flow		
Oct	55	no flow		
Nov	no flow	38	64	32
Dec	77	no flow		

Flow Data

Head mm	M3 / Hour	Litres / Sec
100	16	4.4
105	18	5.0
110	20	5.6
115	22	6.1
120	25	6.9
125	28	7.8
130	30	8.3
135	33	9.2
140	37	10.3
145	40	11.1
150	43	11.9
155	47	13.1
160	51	14.2
165	55	15.3
170	59	16.4
175	64	17.8
180	68	18.9
185	73	20.3
190	78	21.7
195	84	23.3
100	16	4.4
105	18	5.0
110	20	5.6
115	22	6.1
120	25	6.9
125	28	7.8
130	30	8.3
135	33	9.2
140	37	10.3
145	40	11.1
150	43	11.9
155	47	13.1
160	51	14.2
165	55	15.3
170	59	16.4
175	64	17.8
180	68	18.9
185	73	20.3
190	78	21.7
195	84	23.3
200	90	25.0
205	96	26.7
210	100	27.8
215	107	29.7
220	113	31.4
225	119	33.1
230	126	35.0
235	133	36.9
240	140	38.9
245	148	41.1
250	155	43.1
255	163	45.3
260	171	47.5
265	180	50.0
270	188	52.2
275	197	54.7
280	206	57.2
285	216	60.0
290	225	62.5
295	235	65.3
300	249	69.2

Weekly Emissions to Water PW - 102. 2015

Works: Littleton

IPPC: 499

Date	Ph (Ph Units)	COD (mg/l)	SS (mg/l)	Flow l/sec	Head mm
06/01/2015	7.7	50	19	5.6	110
14/01/2015	11.2	52	**90**	25.0	200
21/01/2015	9.6	38	**116**	25.0	200
28/01/2015	10.9	21	**144**	26.7	205
04/02/2015	9.1	50	**74**	21.7	190
11/02/2015	11.8	18	**90**	25.0	200
18/02/2015	9.2	59	33	26.7	205
25/02/2015	9.3	94	**41**	25.0	200
04/03/2015	8.6	58	30	21.7	190
11/03/2015	8.8	51	32	21.7	190
18/03/2015	8.6	102	**57**	17.8	175
25/03/2015	8.2	75	**40**	13.1	155
31/03/2015	7.7	33	21	3.0	60
08/04/2015	7.8	29	12	3.0	60
15/04/2015	8.2	24	10	2.2	50
22/04/2015	8.3	45	31	6.9	120
29/04/2015	8.5	32	14	1.7	38
06/05/2015	8.0	31	<5	15.3	165
14/05/2015	7.8	34	27	23.3	195
21/05/2015	8.1	29	8	0.6	5
27/05/2015	8.0	<10	10	15.3	165
03/06/2015	7.6	14	5	3.0	60
09/06/2015	7.8	11	5	3.8	95
16/06/2015	7.6	<10	5		10
23/06/2015		No	Flow		
01/07/2015		No	Flow		
10/07/2015	7.9	12	13		
15/07/2015	7.8	14	<5		No flow
22/07/2015	no flow				
30/07/2015	no flow				
05/08/2015	8.0	<10	<5		No flow
12/08/2015	no flow				
19/08/2015	no flow				
26/08/2015	no flow				
02/09/2015	no flow				
09/09/2015	no flow				
16/09/2015	no flow				
23/09/2015	7.9	59	**37**	21.7	190
30/09/2015	7.8	58	23	16.4	170
07/10/2015	11.2	30	**43**	17.8	175
14/10/2015	7.9	126	**75**	16.4	170
21/10/2015	9.4	77	31	16.4	170
28/10/2015	7.8	89	26	16.4	170
04/11/2015	7.8	94	34	17.8	175
11/11/2015	8.2	76	**39**	6.9	120
18/11/2015	8.4	109	**101**	20.3	185
25/11/2015	7.8	73	23	27.8	210
02/12/2015	8.0	84	33	25.0	200
09/12/2015	7.6	52	20	4.0	90
16/12/2015	7.7	65	19	23.3	195
23/12/2015	factory down				
30/12/2015	factory down				

Quarterly Emissions to Water PW - 102 2015

Works: Littleton

IPPC: 499

Quarter	Total Phosperous	Ammonia	Oil,Fats &Grease
Feb	0.3	0.44	<1
May	0.13	0.75	<1
November	0.26	0.36	<1

Littleton
Decommissioning and Rehabilitation
AER Overview 2015.

Within the Littleton licensed area (P0409-01) there were no bog areas available for rehabilitation in 2015. Ongoing monitoring of cutaway within the Littleton licensing area included the area of the Bruckana Windfarm development with some active rehabilitation work carried out within the footprint of the development. Ongoing monitoring of cutaway within the Littleton bogs was carried out.
Draft rehabilitation plans for the Littleton bogs licensed area, including more detailed draft plans for each component bog unit were submitted to the EPA in 2013 and these were reviewed and updated in 2015.
The annual Biodiversity Action Plan review day was held in November 2015 and this included an update on progress of this plan, bog restoration and cutaway rehabilitation for a wide range on statutory and non-statutory consultees including members of the EPA, NPWS, BWI, Bord na Mona, Coillte, Inland Fisheries Ireland, An Taisce, IPCC, Irish Red Grouse Association, Irish Wildlife Trust, NARGC, local game councils, Midland Regional Planning Authority as well as a range of local community groups and Heritage Officers from counties Laois, Offaly, Kildare, Roscommon, Longford, Meath, Galway, Westmeath and Dublin. At this meeting the draft of the new Biodiversity Action Plan was discussed, with a further extensive engagement with consultees held online.
The new Biodiversity Action Plan will be available from April 2016.
A copy of our Biodiversity Action Plan is available to view and download at http://www.bordnamona.ie/our-company/biodiversity/

Environmental Protection Agency

Guidance to completing the PRTR workbook

PRTR Returns Workbook

Version 1.1.19

REFERENCE YEAR	2015

1. FACILITY IDENTIFICATION

Parent Company Name	Bord na Mona Fuels Limited
Facility Name	Bord na Mona Fuels Limited (Littleton)
PRTR Identification Number	P0499
Licence Number	P0499-01

Classes of Activity

No.	class_name
-	Refer to PRTR class activities below

Address 1	Littleton Group
Address 2	c/o Littleton Briquette Factory
Address 3	Thurles
Address 4	
	Tipperary
Country	Ireland
Coordinates of Location	-7.69986 52.6123
River Basin District	IESE
NACE Code	0892
Main Economic Activity	Extraction of peat
AER Returns Contact Name	Enda McDonagh
AER Returns Contact Email Address	enda.mcdonagh@bnm.ie
AER Returns Contact Position	Head of Environment
AER Returns Contact Telephone Number	057 9345911
AER Returns Contact Mobile Phone Number	086 2370816
AER Returns Contact Fax Number	057 9345160
Production Volume	256806.0
Production Volume Units	Tonnes
Number of Installations	3
Number of Operating Hours in Year	5174
Number of Employees	148
User Feedback/Comments	In accordance with licence condition 6.2 of Technical Amendment A, quarterly sampling is now rotated every quarter and therefore suspended solids results are not factored into loading. Monitoring of pollutant 351 Total Organic Carbon is no longer a requirement as the Firelighter Plant is currently closed.
Web Address	www.bnm.ie

2. PRTR CLASS ACTIVITIES

Activity Number	Activity Name
50.1	General

3. SOLVENTS REGULATIONS (S.I. No. 543 of 2002)

Is it applicable?	No
Have you been granted an exemption ?	
If applicable which activity class applies (as per Schedule 2 of the regulations) ?	
Is the reduction scheme compliance route being used ?	

4. WASTE IMPORTED/ACCEPTED ONTO SITE Guidance on waste imported/accepted onto site

Do you import/accept waste onto your site for on-site treatment (either recovery or disposal activities) ?	

This question is only applicable if you are an IPPC or Quarry site

4.1 RELEASES TO AIR Link to previous years emissions data

SECTION A : SECTOR SPECIFIC PRTR POLLUTANTS

RELEASES TO AIR					Please enter all quantities in this section in KGs			
POLLUTANT		METHOD			QUANTITY			
			Method Used					
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
					0.0	0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

SECTION B : REMAINING PRTR POLLUTANTS

RELEASES TO AIR					Please enter all quantities in this section in KGs			
POLLUTANT		METHOD			QUANTITY			
			Method Used		B101			
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
08	Nitrogen oxides (NOx/NO2)	M	ISO 10849:1996		86234.0	86234.0	0.0	0.0
11	Sulphur oxides (SOx/SO2)	M	ISO 7935: 1992		42862.0	42862.0	0.0	0.0
02	**Carbon monoxide (CO)**	M	ISO 12039:2001		23236.0	23236.0	0.0	0.0
03	Carbon dioxide (CO2)				35661.3	35661.3	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

SECTION C : REMAINING POLLUTANT EMISSIONS (As required in your Licence)

RELEASES TO AIR					Please enter all quantities in this section in KGs										
POLLUTANT		METHOD			QUANTITY										
			Method Used		B101	A101	A102	A103	A104	A105	A106	DM-01 - DM-04			
Pollutant No.	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	Emission Point 2	Emission Point 3	Emission Point 4	Emission Point 5	Emission Point 6	Emission Point 7	Emission Point 8	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
210	Dust	E	OTH	VDI 2119 Blatt 2/Part 2	126122.0	200926.0	27341.0	234.0	8541.0	249.0	263.0	0.132	363676.132	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

Additional Data Requested from Landfill operators

For the purposes of the National Inventory on Greenhouse Gases, landfill operators are requested to provide summary data on landfill gas (Methane) flared or utilised on their facilities to accompany the figures for total methane generated. Operators should only report their Net methane (CH4) emission to the environment under T(total) KG/yr for Section A: Sector specific PRTR pollutants above. Please complete the table below:

Landfill: Bord na Mona Fuels Limited (Littleton)

Please enter summary data on the quantities of methane flared and / or utilised			Method Used			
	T (Total) kg/Year	**M/C/E**	**Method Code**	**Designation or Description**	**Facility Total Capacity m3 per hour**	
Total estimated methane generation (as per site model)	0.0				N/A	
Methane flared	0.0				0.0	(Total Flaring Capacity)
Methane utilised in engine/s	0.0				0.0	(Total Utilising Capacity)
Net methane emission (as reported in Section A above)	0.0				N/A	

4.2 RELEASES TO WATERS Link to previous years emissions data | PRTR# : P0499 | Facility Name : Bord na Mona Fuels Limited (Littleton) | Filename : P0499_2015.xls | Return Year : 2015 | 17/06/2016 09:07

SECTION A : SECTOR SPECIFIC PRTR POLLUTANTS

Data on ambient monitoring of storm/surface water or groundwater, conducted as part of your licence requirements, should NOT be submitted under AER / PRTR Reporting as this

RELEASES TO WATERS					Please enter all quantities in this section in KGs			
POLLUTANT					QUANTITY			
			Method Used					
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
					0.0	0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

SECTION B : REMAINING PRTR POLLUTANTS

RELEASES TO WATERS					Please enter all quantities in this section in KGs			
POLLUTANT					QUANTITY			
			Method Used					
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
					0.0	0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

SECTION C : REMAINING POLLUTANT EMISSIONS (as required in your Licence)

RELEASES TO WATERS					Please enter all quantities in this section in KGs			
POLLUTANT					QUANTITY			
			Method Used		SW18			
Pollutant No.	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
240	**Suspended Solids**	E	OTH	G/19 Based on ALPHA,1998,20th Edition, Method 2540D	12432.0	12432.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

4.3 RELEASES TO WASTEWATER OR SEWER

Link to previous years emissions data

SECTION A : PRTR POLLUTANTS

OFFSITE TRANSFER OF POLLUTANTS DESTINED FOR WASTE-WATER TREATMENT OR SEWER					Please enter all quantities in this section in KGs			
POLLUTANT		METHOD			QUANTITY			
			Method Used					
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
					0.0	0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

SECTION B : REMAINING POLLUTANT EMISSIONS (as required in your Licence)

OFFSITE TRANSFER OF POLLUTANTS DESTINED FOR WASTE-WATER TREATMENT OR SEWER					Please enter all quantities in this section in KGs			
POLLUTANT		METHOD			QUANTITY			
			Method Used					
Pollutant No.	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
					0.0	0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

4.4 RELEASES TO LAND

Link to previous years emissions data

SECTION A : PRTR POLLUTANTS

RELEASES TO LAND					Please enter all quantities in this section in KGs		
POLLUTANT		METHOD			QUANTITY		
			Method Used				
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year
					0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

SECTION B : REMAINING POLLUTANT EMISSIONS (as required in your Licence)

RELEASES TO LAND					Please enter all quantities in this section in KGs		
POLLUTANT		METHOD			QUANTITY		
			Method Used				
Pollutant No.	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year
					0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

5. ONSITE TREATMENT & OFFSITE TRANSFERS OF WASTE

| PRTR# : P0499 | Facility Name : Bord na Mona Fuels Limited (Littleton) | Filename : P0499_2015.xls | Return Year : 2015 | 17/06/2016 09:09

Please enter all quantities on this sheet in Tonnes 3

Transfer Destination	European Waste Code	Hazardous	Quantity (Tonnes per Year)	Description of Waste	Waste Treatment Operation	Method Used		Location of Treatment	Haz Waste : Name and Licence/Permit No of Next Destination Facility Non Haz Waste: Name and Licence/Permit No of Recover/Disposer	Haz Waste : Address of Next Destination Facility Non Haz Waste: Address of Recover/Disposer	Name and License / Permit No. and Address of Final Recoverer / Disposer (HAZARDOUS WASTE ONLY)	Actual Address of Final Destination i.e. Final Recovery / Disposal Site (HAZARDOUS WASTE ONLY)
						M/C/E	Method Used					
Within the Country	01 01 02	No	3287.0	wastes from mineral non-metalliferous excavation	D1	E	Volume Calculation	Onsite of generati	Bord na Mona Fuels Ltd,P0499-01	Littleton,Thurles,Co Tipperary,.,Ireland		
Within the Country	01 01 02	No	580.0	wastes from mineral non-metalliferous excavation	D1	E	Volume Calculation	Onsite of generati	Bord na Mona Fuels Ltd,P0499-01	Littleton,Thurles,Co Tipperary,.,Ireland		
Within the Country	02 01 04	No	189.7	waste plastics (except packaging)	R3	M	Weighed	Offsite in Ireland	Leinster Environmentals,WP 2008/06	Haggardstown,Dundalk ,Co Louth,.,Ireland		
To Other Countries	11 01 13	Yes	2.34	degreasing wastes containing dangerous substances	R2	C	Volume Calculation	Abroad	Safety Kleen Ltd,W0099-01	Tallaght,Dublin,.,.,Ireland	Solvent Recovery Management,PP33345F,Wheeland Rd,Knottingly,West Yorks,WF118DZ,United Kingdom	Wheeland Rd,Knottingly,West Yorks,WF118DZ,United Kingdom
Within the Country	13 02 05	Yes	2.5	mineral-based non-chlorinated engine, gear and lubricating oils	R1	C	Volume Calculation	Offsite in Ireland	Enva Ireland Ltd,W0184-1	Clonminam Ind Estate,Portlaoise,Co Laois,.,Ireland	Enva Ireland Ltd,W0184-1,Clonminam Ind Estate,Portlaoise,Co Laois,.,Ireland	Clonminam Ind Estate,Portlaoise,Co Laois,.,Ireland
Within the Country	13 05 03	Yes	0.0	interceptor sludges	R1	M	Volume Calculation	Offsite in Ireland	Enva Ireland Ltd,W0184-1	Clonminam Ind Estate,Portlaoise,Co Laois,.,Ireland	Enva Ireland Ltd,W0184-1,Clonminam Ind Estate,Portlaoise,Co Laois,.,Ireland	Clonminam Ind Estate,Portlaoise,Co Laois,.,Ireland
To Other Countries	13 08 99	Yes	0.0	wastes not otherwise specified	R1	E	Volume Calculation	Abroad	Enva Ireland Ltd,W0184-1	Clonminam Ind Estate,Portlaoise,Co Laois,.,Ireland	KWA,E17012100,Lintfort,.,.,., Germany	Lintfort,.,.,.,Germany
Within the Country	15 01 03	No	2.86	wooden packaging	R1	M	Weighed	Offsite in Ireland	Kiawa Ltd,WP/TN/24	Tipperary,.,.,.,Ireland		
To Other Countries	15 02 02	Yes	0.0	absorbents, filter materials (including oil filters not otherwise specified), wiping cloths, protective clothing contaminated by dangerous substances	D10	E	Volume Calculation	Abroad	Enva Ireland Ltd,W0184-1	Clonminam Ind Estate,Portlaoise,Co Laois,.,Ireland	KWA,E17012100,Lintfort,.,.,., Germany	Lintfort,.,.,.,Germany
To Other Countries	16 01 07	Yes	0.0	oil filters	R4	C	Volume Calculation	Abroad	Enva Ireland Ltd,W0184-1	Clonminam Ind Estate,Portlaoise,Co Laois,.,Ireland	R. D Recycling,51727/1/KD,Houthalen,.,.,.,Belgium	Houthalen,.,.,.,Belgium
Within the Country	17 04 07	No	0.0	mixed metals	R4	M	Weighed	Offsite in Ireland	Hammond Lane Ltd,WP4620033	Athlone,Co Westmeath,.,.,Ireland		
Within the Country	20 01 21	Yes	0.0	fluorescent tubes and other mercury-containing waste	R13	M	Weighed	Offsite in Ireland	Irish Lamp Recycling,WFP-KE-08-0348-01	Athy,.,.,.,Ireland	Irish Lamp Recycling,WFP-KE-08-0348-01,Athy,Co Kildare,.,.,Ireland	Athy,Co Kildare,.,.,Ireland
Within the Country	20 03 01	No	18.3	mixed municipal waste	D1	M	Weighed	Offsite in Ireland	AES,WP-OY-08-601-01	Nenagh,Tipperary,.,.,Ireland		
Within the Country	20 03 01	No	61.91	mixed municipal waste	D1	E	Volume Calculation	Offsite in Ireland	AES,WP-OY-08-601-01	Nenagh,Tipperary,.,.,Ireland		

* Select a row by double-clicking the Description of Waste then click the delete button

Facility Information Summary	
AER Reporting Year	2016
Licence Register Number	P0499-01
Name of site	Bord na Mona Littleton
Site Location	Lanespark, Littleton, Thurles, Co Tipperary
NACE Code	0892
Class/Classes of Activity	1.4
National Grid Reference (6E, 6N)	220443, 151233

A description of the activities/processes at the site for the reporting year. This should include information such as production increases or decreases on site, any infrastructural changes, environmental performance which was measured during the reporting year **and an overview of compliance with your licence** listing all exceedances of licence limits (where applicable) and what they relate to e.g. air, water, noise.	Activities on site can be divided into two components, firstly the milling, harrowing, ridging and harvesting of peat into stockpiles and secondly the transportation of that peat via an internal rail network to the Briquette Factory for processing into peat briquettes. Production achieved was approximately 223,865 tonnes of milled peat and 87,412 tonnes of briquettes during 2016. In addition to this, approximately 500 tonnes of sod turf was produced. Infrastructurally there was no bog development during 2016. There were 27 non-compliances/incidents/breach of ELV, 23 related to factory stack emissions, 1 was associated with a spillage, 1 was a breach of Trigger level in discharges to water and 2 fugitive dust emissions. There were no environmental complaints received during the reporting period. In relation to silt pond cleaning, 100% of ponds received two cleanings, with some ponds receiving more depending on inspection results. Hydraulic harrows were deployed at dust sensitive locations during production. There was a big effort made to recycle obsolete rail line, this work will be continued into 2017. Decommissioning and Rehabilitation works are described in an attachment. Bord na Mona Fuels also appointed a Compliance Manager during 2016. A main part of his duties include management of all environmental issues including all aspects of IPC compliance.

Declaration:

All the data and information presented in this report has been checked and certified as being accurate. The quality of the information is assured to meet licence requirements.

Jonny Maguire	20/3/17
Signature	Date
Group/Facility manager (or nominated, suitably qualified and experienced deputy)	

AIR-summary template	Lic No:	P0499-01	Year	2016

Answer all questions and complete all tables where relevant

			Additional information
1	Does your site have licensed air emissions? If yes please complete table A1 and A2 below for the current reporting year and answer further questions.	Yes	Fugitive emissions also

ic/Non-Continuous Mon

2	Are there any results in breach of licence requirements? If yes please provide brief details in the comment section of TableA1 below	Yes	
3	Was all monitoring carried out in accordance with EPA guidance note AG2 and using the basic air monitoring checklist AGN2	Yes	

Table A1: Licensed Mass Emissions/Ambient data-periodic monitoring (non-continuous)

Emission reference no:	Frequency of Monitoring	ELV in licence or any revision therof	Licence Compliance criteria	Measured value	Unit of measurement	Compliant with licence limit	Method of analysis	Annual mass load (kg)	Comments - reason for change in % mass load from previous year if applicable
B101	Annual	31536	100 % of values < ELV	125639	kg/hour	no (if no please enter details in comments box)	ISO 10849:1996	86234	
B101	Annual	315360	100 % of values < ELV	113222	kg/hour	yes	ISO 7935: 1992	42862	
B101	Annual	NA	NA	30384	kg/hour	yes	ISO 12039:2001	23236	
B101	Annual	126144	100 % of values < ELV	113653	kg/hour	Yes	OTH	126122	
A101	Annual	45796	100 % of values < ELV	99521	kg/hour	no (if no please enter details in comments box)	OTH	200926	
A102	Annual	55714	100 % of values < ELV	72047	kg/hour	yes	OTH	27341	
A103	Annual	61320	100 % of values < ELV	3	kg/hour	yes	OTH	234	
A104	Annual	52560	100 % of values < ELV	402	kg/hour	yes	OTH	8541	
A105	Annual	8931	101 % of values < ELV	219	kg/hour	yes	OTH	249	
A106	Annual	867	102 % of values < ELV	266	kg/hour	yes	OTH	263	

Note 1: Volumetric flow shall be included as a reportable parameter

AIR-summary template	Lic No:	P0499-01	Year	2016

Continuous Monitoring

4	Does your site carry out continuous air emissions monitoring?	No	Fugitive dust monitoring results are entered in table A2 below as directed by the Agency
	If yes please review your continuous monitoring data and report the required		
5	Did continuous monitoring equipment experience downtime? If yes please record downtime in table A2 below	NA	
6	Do you have a proactive service agreement for each piece of continuous monitoring equipment?	NA	
7	Did your site experience any abatement system bypasses? If yes please detail them in table A3 below	NA	

Table A2: Summary of average emissions -continuous monitoring

Emission reference no:	ELV in licence or any revision therof	Averaging Period	Compliance Criteria	Units of measurement	Annual Emission	Annual maximum	Monitoring Equipment downtime (hours)	Number of ELV exceedences in current reporting year	Comments
DM-01	350	308	Daily average < ELV	mg/m2/day	122322	1788	0	2	Reported on Eden. Autumnal debris was found to be in the dust gauge.
DM-02	350	308	Daily average < ELV	mg/m2/day	55440	413	0	1	Reported on Eden
DM-03	350	308	Daily average < ELV	mg/m2/day	50428	344	0	0	
DM-04	350	308	Daily average < ELV	mg/m2/day	77644	801	0	3	Reported on Eden

note 1: Volumetric flow shall be included as a reportable parameter.

Table A3: Abatement system bypass r Bypass protocol

Date*	Location	Reason for bypass	Impact magnitude	Corrective action

* this should include all dates that an abatement system bypass occurred

** an accurate record of time bypass beginning and end should be logged on site and maintained for future Agency inspections please refer to bypass protocol link

AIR-summary template	Lic No:	P0499-01	Year	2016

Solvent use and management on site

8 Do you have a total Emission Limit Value of direct and fugitive emissions on site? if yes please fill out tables A4 and A5

SELECT

Table A4: Solvent Management Plan Summary Total VOC Emission limit value

Solvent regulations — Please refer to linked solvent regulations to complete table 5 and 6

Reporting year	Total VOC emissions to Air from entire site	Total VOC emissions as %of solvent input	Total Emission Limit Value (ELV) in licence or any revision therof	Compliance
				SELECT
				SELECT

Table A5: Solvent

	(O) Outputs (kg)						
Solvent	Organic solvent	Solvents lost in water (kg)	Collected waste solvent (kg)	Fugitive Organic Solvent (kg)	Solvent released in other ways e.g. by-passes (kg)	Solvents destroyed onsite through	Total emission of Solvent to air (kg)
						Total	

AER Monitoring returns summary template-WATER/WASTEWATER(SEWER) Lic No: P0499-01 Year 2016

			Additional information
1	Does your site have licensed emissions direct to surface water or direct to sewer? If yes please complete table W2 and W3 below for the current reporting year and answer further questions. If **you do not have** licenced emissions you only need to complete table W1 and or W2 for storm water analysis and visual inspections	Yes	
2	Was it a requirement of your licence to carry out visual inspections on any surface water discharges or watercourses on or near your site? If yes please complete table W2 below summarising only any evidence of contamination noted during visual inspections	Yes	Monthly COD analysis of yard runoff is attached in a separate document.

Table W1 Storm water monitoring

Location reference	Location relative to site activities	PRTR Parameter	Licenced Parameter	Monitoring date	ELV or trigger level in licence or any revision thereof*	Licence Compliance criteria	Measured value	Unit of measurement	Compliant with licence	Comments
	SELECT	SELECT	SELECT			SELECT		SELECT	SELECT	
	SELECT	SELECT	SELECT			SELECT		SELECT	SELECT	

*trigger values may be agreed by the Agency outside of licence conditions

Table W2 Visual inspections-Please only enter details where contamination was observed.

Location Reference	Date of inspection	Description of contamination	Source of contamination	Corrective action	Comments
			SELECT		
			SELECT		

Licensed Emissions to water and /or wastewater(sewer)-periodic monitoring (non-continuous)

3	Was there any result in breach of licence requirements? If yes please provide brief details in the comment section of Table W3 below		Yes	There were five breaches at PW-102 however this can only be established at year end when 100% of results are assessed.
4	Was all monitoring carried out in accordance with EPA guidance and checklists for Quality of Aqueous Monitoring Data Reported to the EPA? If no please detail what areas require improvement in additional information box	External /Internal Lab Quality checklist / Assessment of results checklist	Yes	Surface water monitoring was carried out on a quarterly basis. The results of which are attached. Monthly COD yard runoff results are also attached.

Table W3: Licensed Emissions to water and /or wastewater (sewer)-periodic monitoring (non-continuous)

Emission reference no:	Emission released to	Parameter/ SubstanceNote 1	Type of sample	Frequency of monitoring	Averaging period	ELV or trigger values in licence or any revision thereof[Note 2]	Licence Compliance criteria	Measured value	Unit of measurement	Compliant with licence	Method of analysis	Procedural reference source	Procedural reference standard number	Annual mass load (kg)	Comments
									SELECT	SELECT	SELECT	SELECT			

Note 1: Volumetric flow shall be included as a reportable parameter

Note 2: Where Emission Limit Values (ELV) do not apply to your licence please compare results against EQS for Surface water or relevant receptor quality standards

AER Monitoring returns summary template-WATER/WASTEWATER(SEWER)	Lic No:	P0499-01	Year	2016

Continuous monitoring

			Additional Information
5	Does your site carry out continuous emissions to water/sewer monitoring?	Yes	

If yes please summarise your continuous monitoring data below in Table W4 and compare it to its relevant Emission Limit Value (ELV)

6	Did continuous monitoring equipment experience downtime? **If yes please record downtime in table W4 below**	Yes	Down time is primarily due to no flow/discharge, battery failure and or frozen pipes.
7	Do you have a proactive service contract for each piece of continuous monitoring equipment on site?	Yes	Annual calibration schedule and trouble shooting service
8	Did abatement system bypass occur during the reporting year? **If yes please complete table W5 below**	No	

Table W4: Summary of average emissions -continuous monitoring

Emission reference no:	Emission released to	Parameter/ Substance	ELV or trigger values in licence or any revision thereof	Averaging Period	Compliance Criteria	Units of measurement	Annual Emission for current reporting year (kg)	% change +/- from previous reporting year	Monitoring Equipment downtime (hours)	Number of ELV exceedences in reporting year	Comments
SW18	Water	Suspended Solids	35	24 hour	All results < 1.5 times ELV, plus 8 from ten results must be < ELV	mg/L	17235		2664		Down time primarily due to battery failure and no flow. The site is downstream of a pumping station and there are periods of no flow during dry spells. The increase in SS loading is due to the sampler experiencing almost 50% less down time than 2015.
SW18	Water	Ammonia (as N)	NA	Weekly	NA	mg/L	945				Annual loading not representative as parameter only carried out weekly
SW18	Water	Total phosphorus	NA	Weekly	NA	mg/L	24.4				Annual loading not representative as parameter only carried out weekly
SW18	Water	COD	NA	Weekly	NA	mg/L	32204				Annual loading not representative as parameter only carried out weekly
SW18	Water	Total Dissolved Solids	NA	24 hour	NA	mg/L	735249				Increase on 2015 due to less down time.
SW18	Water	volumetric flow	NA	24 hour	NA	m3/day	8250				Total flow divided by 365

note 1: Volumetric flow shall be included as a reportable parameter.

Table W5: Abatement system bypass reporting table

Date	Duration (hours)	Location	Resultant emissions	Reason for bypass	Corrective action*	Was a report submitted to the EPA?	When was this report submitted?
						SELECT	

*Measures taken or proposed to reduce or limit bypass frequency

Bund/Pipeline testing template	Lic No:	P0499-01	Year	2016	

Bund testing

dropdown menu click to see options

			Additional information
1	Are you required by your licence to undertake integrity testing on bunds and containment structures ? if yes please fill out table B1 below listing all **new bunds and containment structures** on site, in addition to **all bunds which failed** the integrity test-**all bunding structures which failed including mobile bunds must be listed in the table below, please include all bunds outside the licenced testing period** (mobile bunds and chemstore included)	Yes	
2	Please provide integrity testing frequency period	2 Yearly	
3	Does the site maintain a register of bunds, underground pipelines (including stormwater and foul), Tanks, sumps and containers? (containers refers to "Chemstore" type units and mobile bunds)	Yes	
4	How many bunds are on site?	5	Double skinned tank replaced bund 499-13-06 (Acid Bund)
5	How many of these bunds have been tested within the required test schedule?	3	Two bunds passed with one awaiting a retest due to initial results proving inconclusive. The remaining two bunds are to be tested in summer 2017.
6	How many mobile bunds are on site?	8	These include barrel trays located within workshops
7	Are the mobile bunds included in the bund test schedule?	No	
8	How many of these mobile bunds have been tested within the required test schedule?	NA	
9	How many sumps on site are included in the integrity test schedule?	NA	
10	How many of these sumps are integrity tested within the test schedule?	NA	
	Please list any sump integrity failures in table B1		
11	Do all sumps and chambers have high level liquid alarms?	N/A	
12	If yes to Q11 are these failsafe systems included in a maintenance and testing programme?	N/A	
13	Is the Fire Water Retention Pond included in your integrity test programme?	SELECT	

Table B1: Summary details of bund /containment structure integrity test

Bund/Containment structure ID	Type	Specify Other type	Product containment	Actual capacity	Capacity required*	Type of integrity test	Other test type	Test date	Integrity reports maintained on site?	Results of test	Integrity test failure explanation <50 words	Corrective action taken	Scheduled date for retest	Results of retest(if in current reporting year)
499-13-06	reinforced concrete		HCl (Aqueous Hydrochloric Acid)	16170 litres	NA Obsolete followin failure	Hydraulic test		19/07/2016	Yes	Fail	Bund made obsolete following failure and replaced with doubled skinned tank	Replaced with double skinned tank.	NA	NA
	SELECT					SELECT			SELECT	SELECT		SELECT		

* Capacity required should comply with 25% or 110% containment rule as detailed in your licence

			Commentary
15	Has integrity testing been carried out in accordance with licence requirements and are all structures tested in line with BS8007/EPA Guidance?	SELECT	
16	Are channels/transfer systems to remote containment systems tested?	SELECT	
17	Are channels/transfer systems compliant in both integrity and available volume?	SELECT	

bunding and storage guidelines

Pipeline/underground structure testing

1	Are you required by your licence to undertake integrity testing* on underground structures e.g. pipelines or sumps etc ? if yes please fill out table 2 below listing all underground structures and pipelines on site **which failed the integrity test and all which have not been tested withing the integrity test period as specified**	Yes	
2	Please provide integrity testing frequency period	3 years	

*please note integrity testing means water tightness testing for process and foul pipelines (as required under your licence)

Table B2: Summary details of pipeline/underground structures integrity test

Structure ID	Type system	Material of construction:	Does this structure have Secondary containment?	Type of secondary containment	Type integrity testing	Integrity reports maintained on site?	Results of test	Integrity test failure explanation <50 words	Corrective action taken	Scheduled date for retest	Results of retest(if in current reporting year)
	SELECT	SELECT	SELECT	SELECT	SELECT	SELECT	SELECT				SELECT

Please use commentary for additional details not answered by tables/ questions above

Groundwater/Soil monitoring template	Lic No:	P0499-01	Year	2016

			Comments	
1	Are you required to carry out groundwater monitoring as part of your licence requirements?	no		Please provide an interpretation of groundwater monitoring data in the interpretation box below or if you require additional space please include a groundwater/contaminated land monitoring results interpretaion as an additional section in this AER
2	Are you required to carry out soil monitoring as part of your licence requirements?	no		
3	Do you extract groundwater for use on site? If yes please specify use in comment section	no	Process water extracted from surface water river.	
4	Do monitoring results show that groundwater generic assessment criteria such as GTVs or IGVs are exceeded or is there an upward trend in results for a substance? If yes, please complete the Groundwater Monitoring Guideline Template Report (link in cell G8) and submit separately through ALDER as a licensee return AND answer questions 5-12 below. Groundwater monitoring template	no		
5	Is the contamination related to operations at the facility (either current and/or historic)	N/A		
6	Have actions been taken to address contamination issues?If yes please summarise remediation strategies proposed/undertaken for the site	NA		
7	Please specify the proposed time frame for the remediation strategy	NA		
8	Is there a licence condition to carry out/update ELRA for the site?	NA		
9	Has any type of risk assesment been carried out for the site?	NA		
10	Has a Conceptual Site Model been developed for the site?	NA		
11	Have potential receptors been identified on and off site?	NA		
12	Is there evidence that contamination is migrating offsite?	NA		Please enter interpretation of data here

Groundwater/Soil monitoring template Lic No: P0499-01 Year 2016

Table 1: Upgradient Groundwater monitoring results

Date of sampling	Sample location reference	Parameter/ Substance	Methodology	Monitoring frequency	Maximum Concentration++	Average Concentration+	unit	GTV's*	SELECT**	Upward trend in pollutant concentration over last 5 years of monitoring data
							SELECT			SELECT
							SELECT			SELECT

.+ where average indicates arithmetic mean

.++ maximum concentration indicates the maximum measured concentration from all monitoring results produced during the reporting year

Table 2: Downgradient Groundwater monitoring results

Date of sampling	Sample location reference	Parameter/ Substance	Methodology	Monitoring frequency	Maximum Concentration	Average Concentration	unit	GTV's*	SELECT**	Upward trend in yearly average pollutant concentration over last 5 years of monitoring data
							SELECT			SELECT
							SELECT			SELECT

*please note exceedance of generic assessment criteria (GAC) such as a Groundwater Threshold Value (GTV) or an Interim Guideline Value (IGV) or an upward trend in results for a substance indicates that further interpretation of monitoring results is required. In addition to completing the above table, please complete the Groundwater Monitoring Guideline Template Report at the link provided and submit separately through ALDER as a licensee return or as otherwise instructed by the EPA. Groundwater monitoring template

More information on the use of soil and groundwater standards/ generic assessment criteria (GAC) and risk assessment tools is available in the EPA published guidance (see the link in G31) Guidance on the Management of Contaminated Land and Groundwater at EPA Licensed Sites (EPA 2013).

**Depending on location of the site and proximity to other sensitive receptors alternative Receptor based Water Quality standards should be used in addition to the GTV e.g. if the site is close to surface water compare to Surface Water Environmental Quality Standards (SWEQS), If the site is close to a drinking water supply compare results to the Drinking Water Standards (DWS)

Surface water EQS | Groundwater regulations GTV's | Drinking water (private supply) standards | Drinking water (public supply) standards | Interim Guideline Values (IGV)

Table 3: Soil results

Date of sampling	Sample location reference	Parameter/ Substance	Methodology	Monitoring frequency	Maximum Concentration	Average Concentration	unit
							SELECT
							SELECT

Where additional detail is required please enter it here in 200 words or less

	Environmental Liabilities template	Lic No:	P0499-01	Year	2016

Click here to access EPA guidance on Environmental Liabilities and Financial provision

			Commentary
1	ELRA initial agreement status	Not a Licence Requirement	
2	ELRA review status	NA	
3	Amount of Financial Provision cover required as determined by the latest ELRA	NA	
4	Financial Provision for ELRA status	NA	
5	Financial Provision for ELRA - amount of cover	NA	
6	Financial Provision for ELRA - type	NA	
7	Financial provision for ELRA expiry date	NA	
8	Closure plan initial agreement status	NA	Internal Budget Provision
9	Closure plan review status	NA	Internal Budget Provision
10	Financial Provision for Closure status	NA	Internal Budget Provision
11	Financial Provision for Closure - amount of cover	NA	Internal Budget Provision
12	Financial Provision for Closure - type	NA	Internal Budget Provision
13	Financial provision for Closure expiry date	NA	

Environmental Management Programme/Continuous Improvement Programme template		Lic No:	P0499-01	Year	2016

	Highlighted cells contain dropdown menu click to view		Additional Information
1	Do you maintain an Environmental Mangement System (EMS) for the site. If yes, please detail in additional information	Yes	Internal unaccredited EMS
2	Does the EMS reference the most significant environmental aspects and associated impacts on-site	Yes	
3	Does the EMS maintain an Environmental Management Programme (EMP) as required in accordance with the licence requirements	Yes	
4	Do you maintain an environmental documentation/communication system to inform the public on environmental performance of the facility, as required by the licence	Yes	

Environmental Management Programme (EMP) report

Objective Category	Target	Status (% completed)	How target was progressed	Responsibility	Intermediate outcomes
Reduction of emissions to Air	Training.Continue to train all employees in environmental matters. Training will be by means of the screening of an environmental DVD, followed by a power point presentation. Headland Peat Collection. Continue with the collection of headland peat, particularly at dust sensitive locations.	70	In total 40 personnel received training during the reporting period. Headland peat was collected and returned as part of overall production figures. In addition six hydraulic harrows were deployed at dust sensitive locations. An outside consulting firm have been appointed to examine ways by which air emissions can be abated. Bord na Mona Fuels appointed a compliance manager during the reporting period.	Section Head	Reduced emissions
Waste reduction/Raw material usage efficiency	Waste Streamlining.It is planned to continue with and where possible improve the current waste management service provided by AES Ltd	100	Installed a waste management system. Quarterly waste reports are returned for records/filing and waste streams are segrated on site to maximise recycling potential.	Section Head	Improved Environmental Management Practices
Reduction of emissions to Water	Training. Continue to train all employees in environmental matters. Training will be by means of the screening of an environmental DVD, followed by a power point presentation. Silt Pond survey also planned.	100	In total 40 personnel received training during the reporting period. Silt pond upgrade works were ongoing and forthnightly silt pond inspections. Bord na Mona Fuels appointed a compliance manager during the reporting period.	Section Head	Reduced emissions
Materials Handling/Storage/Bunding	Increased bund capacity will be provided where required.	100	A new double skinned HCl (Acid) tank was installed at Littleton factory during the reporting period. Bord na Mona Fuels appointed a compliance manager during the reporting period.	Section Head	Improved Environmental Management Practices
Waste reduction/Raw material usage efficiency	Continue with the recycling of polyethylene. The sourcing of more recycling contractors will be ongoing.	100	In total approximately 125.18 tonnes were sent off site for recycling. Procurement also exploring the possibility of securing further recyclers.	Section Head	Reduced emissions
Energy Efficiency/Utility conservation	Carry out a review of energy aspects identifying significant energy users.	50	The monthly consumption of energy was regurally communicated to the relevant personnel. This included the KPI's for peat production, maintenance and transportation as well as bog pumping and workshop electrical consumption. It is planned that the site achieve ISO50001 status in 2017.	Section Head	Improved Environmental Management Practices

Noise monitoring summary report	Lic No:	P0499-01	Year	2016

1	Was noise monitoring a licence requirement for the AER period? If yes please fill in table N1 noise summary below	No
2	Was noise monitoring carried out using the EPA Guidance note, including completion of the "Checklist for noise measurement report" included in the guidance note as table 6? (Noise Guidance note NG4)	NA
3	Does your site have a noise reduction plan	NA
4	When was the noise reduction plan last updated?	
5	Have there been changes relevant to site noise emissions (e.g. plant or operational changes) since the last noise survey?	NA

Table N1: Noise monitoring summary

Date of monitoring	Time period	Noise location (on site)	Noise sensitive location -NSL (if applicable)	LA_{eq}	LA_{90}	LA_{10}	LA_{max}	Tonal or Impulsive noise* (Y/N)	If tonal /impulsive noise was identified was 5dB penalty applied?	Comments (ex. main noise sources on site, & extraneous noise ex. road traffic)	Is site compliant with noise limits (day/evening/night)?
								SELECT	SELECT		SELECT

*Please ensure that a tonal analysis has been carried out as per guidance note NG4. These records must be maintained onsite for future inspection

If noise limits exceeded as a result of noise attributed to site activities, please choose the corrective action from the following options? SELECT

** please explain the reason for not taking action/resolution of noise issues?
Any additional comments? (less than 200 words)

Resource Usage/Energy efficiency summary

Lic No: P0499-01 Year 2016

			Additional information
1	When did the site carry out the most recent energy efficiency audit? Please list the recommendations in table 3 below	2013	
2	Is the site a member of any accredited programmes for reducing energy usage/water conservation such as the SEAI programme linked to the right? If yes please list them in additional information	Yes	Site currently working towards achieving ISO50001
3	Where Fuel Oil is used in boilers on site is the sulphur content compliant with licence conditions? Please state percentage in additional information	SELECT	

SEAI - Large Industry Energy Network (LIEN)

Table R1 Energy usage on site

Energy Use	Previous year	Current year	Production +/- % compared to previous reporting year**	Energy Consumption +/- % vs overall site production*
Total Energy Used (MWHrs)	91285	104171		
Total Energy Generated (MWHrs)				
Total Renewable Energy Generated (MWHrs)				
Electricity Consumption (MWHrs)	1585.469	1511.748		
Fossil Fuels Consumption:				
Heavy Fuel Oil (m3)				
Light Fuel Oil (m3)	654.81	708.723		
Natural gas (m3)				
Coal/Solid fuel (metric tonnes)				
Peat (metric tonnes)	38807	44630		
Renewable Biomass				
Renewable energy generated on site				

* where consumption of energy can be compared to overall site production please enter this information as percentage increase or decrease compared to the previous reporting year.

** where site production information is available please enter percentage increase or decrease compared to previous year

Table R2 Water usage on site

					Water Emissions	Water Consumption	
Water use	Water extracted Previous year m3/yr.	Water extracted Current year m3/yr.	Production +/- % compared to previous reporting year**	Energy Consumption +/- % vs overall site production*	Volume Discharged back to environment(m^3yr):	Volume used i.e not discharged to environment e.g. released as steam m3/yr	Unaccounted for Water:
Groundwater							
Surface water							
Public supply							
Recycled water							
Total							

* where consumption of water can be compared to overall site production please enter this information as percentage increase or decrease compared to the previous reporting year.

** where site production information is available please enter percentage increase or decrease compared to previous year

Resource Usage/Energy efficiency summary

Lic No: P0499-01 Year 2016

Table R3 Waste Stream Summary

	Total	Landfill	Incineration	Recycled	Other
Hazardous (Tonnes)	7.18	0	0.9	6.28	
Non-Hazardous (Tonnes)	4813.07	65.976		297.761	4449.33

Table R4: Energy Audit finding recommendations

Date of audit	Recommendations	Description of Measures proposed	Origin of measures	Predicted energy savings %	Implementation date	Responsibility	Completion date	Status and comments
			SELECT					
			SELECT					
			SELECT					

Table R5: Power Generation: Where power is generated onsite (e.g. power generation facilities/food and drink industry)please complete the following information

	Unit ID	Unit ID	Unit ID	Unit ID	Station Total
Technology					
Primary Fuel					
Thermal Efficiency					
Unit Date of Commission					
Total Starts for year					
Total Running Time					
Total Electricity Generated (GWH)					
House Load (GWH)					
KWH per Litre of Process Water					
KWH per Litre of Total Water used on Site					

Complaints and Incidents summary template Lic No: P0499-01 Year 2016

Complaints		
		Additional information
Have you received any environmental complaints in the current reporting year? If yes please complete summary details of complaints received on site in table 1 below	No	

Table 1 Complaints summary

Date	Category	Other type (please specify)	Brief description of complaint (Free txt <20 words)	Corrective action< 20 words	Resolution status	Resolution date	Further information
Total complaints open at start of reporting year	0						
Total new complaints received during reporting year	0						
Total complaints closed during reporting year	0						
Balance of complaints end of reporting year	0						

Complaints and Incidents summary template Lic No: P0499-01 Year 2016

Incidents		
		Additional information
Have any incidents occurred on site in the current reporting year? Please list all incidents for current reporting year in Table 2 below	Yes	

*For information on how to report and what constitutes an incident	What is an incident

Table 2 Incidents summary

Date of occurrence	Incident nature	Location of occurrence	Incident category*please refer to guidance	Receptor	Cause of incident	Other cause(please specify)	Activity in progress at time of incident	Communication	Occurrence	Corrective action<20 words	Preventative action <20 words	Resolution status	Resolution date	Likelihood of reoccurence
Example														
16/07/2016	Uncontrolled Release	PW-102	2. Limited	Water	Plant or equipment issues		Routine maintenance	INCI010513	New	Dilution, containment, repair works	Procedural review, appointment of Compliance Manager, Env training on site	Complete	13/01/2017	Low
01/03/2016	Breach of ELV	B101	1. Minor	Air	Plant or equipment issues		Normal activities	INCI010745	Recurring	Currently in discussion with the Agency	Currently in discussion with the Agency	Ongoing		High
01/03/2016	Breach of ELV	A101	1. Minor	Air	Plant or equipment issues		Normal activities	INCI010746	Recurring	Currently in discussion with the Agency	Currently in discussion with the Agency	Complete	25/08/2016	High
01/03/2016	Breach of ELV	A101	1. Minor	Air	Plant or equipment issues		Normal activities	INCI010747	Recurring	Currently in discussion with the Agency	Currently in discussion with the Agency	Ongoing		High
01/03/2016	Breach of ELV	A102	1. Minor	Air	Plant or equipment issues		Normal activities	INCI010748	Recurring	Currently in discussion with the Agency	Currently in discussion with the Agency	Ongoing		High
01/03/2016	Breach of ELV	A106	1. Minor	Air	Plant or equipment issues		Normal activities	INCI010749	Recurring	Currently in discussion with the Agency	Currently in discussion with the Agency	Ongoing		High
19/04/2016	Breach of ELV	B101	1. Minor	Air	Plant or equipment issues		Normal activities	INCI010751	Recurring	Currently in discussion with the Agency	Currently in discussion with the Agency	Ongoing		High
19/04/2016	Breach of ELV	B101	1. Minor	Air	Plant or equipment issues		Normal activities	INCI010752	Recurring	Currently in discussion with the Agency	Currently in discussion with the Agency	Ongoing		High
19/04/2016	Breach of ELV	B101	1. Minor	Air	Plant or equipment issues		Normal activities	INCI010753	Recurring	Currently in discussion with the Agency	Currently in discussion with the Agency	Complete	25/08/2016	High
19/04/2016	Breach of ELV	A101	1. Minor	Air	Plant or equipment issues		Normal activities	INCI010754	Recurring	Currently in discussion with the Agency	Currently in discussion with the Agency	Ongoing		High
19/04/2016	Breach of ELV	A102	1. Minor	Air	Plant or equipment issues		Normal activities	INCI010755	Recurring	Currently in discussion with the Agency	Currently in discussion with the Agency	Complete	25/08/2016	High
19/04/2016	Breach of ELV	A102	1. Minor	Air	Plant or equipment issues		Normal activities	INCI010756	Recurring	Currently in discussion with the Agency	Currently in discussion with the Agency	Ongoing		High
19/04/2016	Breach of ELV	A104	1. Minor	Air	Plant or equipment issues		Normal activities	INCI010757	Recurring	Currently in discussion with the Agency	Currently in discussion with the Agency	Ongoing		High
19/04/2016	Breach of ELV	A105	1. Minor	Air	Plant or equipment issues		Normal activities	INCI010758	Recurring	Currently in discussion with the Agency	Currently in discussion with the Agency	Ongoing		High
19/04/2016	Breach of ELV	A106	1. Minor	Air	Plant or equipment issues		Normal activities	INCI010759	Recurring	Currently in discussion with the Agency	Currently in discussion with the Agency	Ongoing		High

Complaints and Incidents summary template Lic No: P0499-01 Year 2016

21/09/2016	Trigger level reached	PW-102	1. Minor	Water	Plant or equipment issues		Normal activities	INCI010913	New	None	Weekly results check	Complete	27/09/2016	Medium
30/09/2016	Breach of ELV	B101	1. Minor	Air	Plant or equipment issues		Normal activities	INCI011203	Recurring	Currently in discussion with the Agency	Currently in discussion with the Agency	Ongoing		High
30/09/2016	Breach of ELV	A101	1. Minor	Air	Plant or equipment issues		Normal activities	INCI011260	Recurring	Currently in discussion with the Agency	Currently in discussion with the Agency	Ongoing		High
30/09/2016	Breach of ELV	A101	1. Minor	Air	Plant or equipment issues		Normal activities	INCI010261	Recurring	Currently in discussion with the Agency	Currently in discussion with the Agency	Ongoing		High
30/09/2016	Breach of ELV	A102	1. Minor	Air	Plant or equipment issues		Normal activities	INCI011343	Recurring	Currently in discussion with the Agency	Currently in discussion with the Agency	Ongoing		High
30/09/2016	Breach of ELV	A104	1. Minor	Air	Plant or equipment issues		Normal activities	INCI011345	Recurring	Currently in discussion with the Agency	Currently in discussion with the Agency	Ongoing		High
30/09/2016	Breach of ELV	A106	1. Minor	Air	Plant or equipment issues		Normal activities	INCI011346	Recurring	Currently in discussion with the Agency	Currently in discussion with the Agency	Ongoing		High
30/11/2016	Breach of ELV	A101	1. Minor	Air	Plant or equipment issues		Normal activities	INCI011477	Recurring	Currently in discussion with the Agency	Currently in discussion with the Agency	Ongoing		High
30/11/2016	Breach of ELV	A102	1. Minor	Air	Plant or equipment issues		Normal activities	INCI011478	Recurring	Currently in discussion with the Agency	Currently in discussion with the Agency	Ongoing		High
30/11/2016	Breach of ELV	A106	1. Minor	Air	Plant or equipment issues		Normal activities	INCI011479	Recurring	Currently in discussion with the Agency	Currently in discussion with the Agency	Ongoing		High
03/10/2016	Breach of ELV	DM4	1. Minor	Air	Sample contamination		Normal activities	INCI011566	New	Ongoing monitoring	Continued vigilance and ongoing monitoring	Complete	31/01/2017	Low
03/11/2016	Breach of ELV	DM1	1. Minor	Air	Sample contamination		Normal activities	INCI011567	New	Ongoing monitoring	Continued vigilance and ongoing monitoring	Complete	31/01/2017	Low

Total number of incidents current year	27
Total number of incidents previous year	9
% reduction/ increase	200.00%

WASTE SUMMARY	Lic No:	P0499-01	Year	2016
SECTION A-PRTR ON SITE WASTE TREATMENT AND WASTE TRANSFERS TAB- TO BE COMPLETED BY ALL IPPC AND WASTE FACILITIES		PRTR facility logon	dropdown list click to see options	

SECTION B- WASTE ACCEPTED ONTO SITE-TO BE COMPLETED BY ALL IPPC AND WASTE FACILITIES

			Additional Information
1	Were any wastes accepted onto your site for recovery or disposal or treatment prior to recovery or disposal within the boundaries of your facility ?; (waste generated within your boundaries is to be captured through PRTR reporting)	N/A	
	If yes please enter details in table 1 below		
2	Did your site have any rejected consignments of waste in the current reporting year? If yes please give a brief explanation in the additional information	SELECT	
3	Was waste accepted onto your site that was generated outside the Republic of Ireland? If yes please state the quantity in tonnes in additional information	SELECT	

Table 1 Details of waste accepted onto your site for recovery, disposal or treatment (do not include wastes generated at your site, as these will have been reported in your PRTR workbook)

Licenced annual tonnage limit for your site (total tonnes/annum)	EWC code European Waste Catalogue EWC codes	Source of waste accepted	Description of waste accepted **Please enter an accurate and detailed description - which applies to relevant EWC code** European Waste Catalogue EWC codes	Quantity of waste accepted in current reporting year (tonnes)	Quantity of waste accepted in previous reporting year (tonnes)	Reduction/ Increase over previous year +/ - %	Reason for reduction/ increase from previous reporting year	Packaging Content (%)- only applies if the waste has a packaging component	Disposal/Recovery or treatment operation carried out at your site and the description of this operation	Quantity of waste remaining on site at the end of reporting year (tonnes)	Comments -

SECTION C-TO BE COMPLETED BY ALL WASTE FACILITIES (waste transfer stations, Composters, Material recovery facilities etc) EXCEPT LANDFILL SITES

4	Is all waste processing infrastructure as required by your licence and approved by the Agency in place? If no please list waste processing infrastructure required onsite	SELECT	
5	Is all waste storage infrastructure as required by your licence and approved by the Agency in place? If no please list waste storage infrastructure required on site	SELECT	
6	Does your facility have relevant nuisance controls in place?	SELECT	
7	Do you have an odour management system in place for your facility? If no why?	SELECT	
8	Do you maintain a sludge register on site?	SELECT	

SECTION D-TO BE COMPLETED BY LANDFILL SITES ONLY

Table 2 Waste type and tonnage-landfill only

Waste types permitted for disposal	Authorised/licenced annual intake for disposal (tpa)	Actual intake for disposal in reporting year (tpa)	Remaining licensed capacity at end of reporting year (m3)	Comments

Table 3 General information-Landfill only

Area ID	Date landfilling commenced	Date landfilling ceased	Currently landfilling	Private or Public Operated	Inert or non-hazardous	Predicted date to cease landfilling	Licence permits asbestos	Is there a separate cell for asbestos?	Accepted asbestos in reporting year	Total disposal area occupied by waste SELECT UNIT	Lined disposal area occupied by waste SELECT UNIT	Unlined area SELECT UNIT	Comments on liner type
Cell 8													

WASTE SUMMARY Lic No: P0499-01 Year 2016

Table 4 Environmental monitoring-landfill only

Landfill Manual-Monitoring Standards

Was meterological monitoring in compliance with Landfill Directive (LD) standard in reporting year +	Was leachate monitored in compliance with LD standard in reporting year	Was Landfill Gas monitored in compliance with LD standard in reporting year	Was SW monitored in compliance with LD standard in reporting year	Have GW trigger levels been established	Were emission limit values agreed with the Agency (ELVs)	Was topography of the site surveyed in reporting year	Has the statement under S53(A)(5) of WMA been submitted in reporting year	Comments

.+ please refer to Landfill Manual linked above for relevant Landfill Directive monitoring standards

Table 5 Capping-Landfill only

Area uncapped*	Area with temporary cap	Area with final cap to LD Standard m2 ha, a	Area capped other	Area with waste that should be permanently capped to date under licence	What materials are used in the cap	Comments
SELECT UNIT	SELECT UNIT					

*please note this includes daily cover area

Table 6 Leachate-Landfill only

9	Is leachate from your site treated in a Waste Water Treatment Plant?	SELECT
10	Is leachate released to surface water? If yes please complete leachate mass load information below	SELECT

Volume of leachate in reporting year(m3)	Leachate (BOD) mass load (kg/annum)	Leachate (COD) mass load (kg/annum)	Leachate (NH4) mass load (kg/annum)	Leachate (Chloride) mass load kg/annum	Leachate treatment on-site	Specify type of leachate treatment	Comments

Please ensure that all information reported in the landfill gas section is consistent with the Landfill Gas Survey submitted in conjunction with PRTR returns

Table 7 Landfill Gas-Landfill only

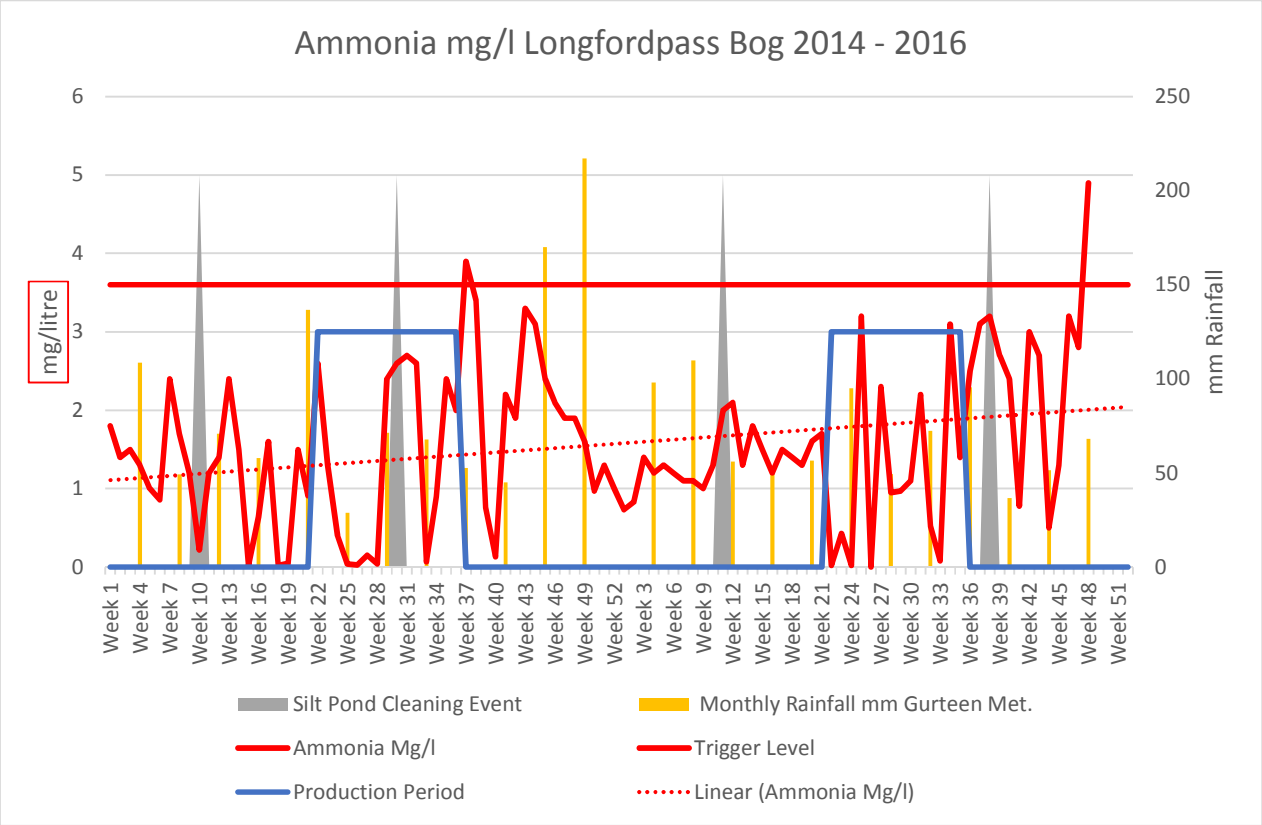
Gas Captured&Treated by LFG System m3	Power generated (MW / KWh)	Used on-site or to national grid	Was surface emissions monitoring performed during the reporting year?	Comments
			SELECT	

Bord na Mona Littleton

IPPC Licence P0499-01

Siltpond Monitoring Frequency & Results 2016

X	Y	Bog	SW	Monitoring	Sampled	pH	SS	TS	Ammonia	TP	COD	Colour	Ortho P
224936.84	162017.90	Inch	SW 19	Q1 2016	10/03/2016	7.8	7	254	0.80	<0.05	42	100	0.13
223518.00	163330.63	Baunmore	SW 20	Q1 2016	10/03/2016	7.7	<5	402	0.18	<0.05	36	106	0.02
225463.17	163546.72	Baunmore	SW 21	Q1 2016	10/03/2016	8.1	12	338	0.32	<0.05	39	88	<0.01
223379.98	165067.73	Baunmore	SW 22	Q2 2016	16/06/2016	7.8	<5	400	0.10	<0.05	23	67	<0.01
223835.12	163353.33	Baunmore	SW 23	Q2 2016	16/06/2016	8.0	<5	356	1.4	<0.05	37	64	<0.01
223607.15	166814.52	Derryville	SW 24	Q2 2016	16/06/2016	8.0	<5	370	0.33	<0.05	34	66	0.02
219661.05	168030.60	Carrickhill	SW 25	Q3 2016	13/09/2016	7.6	28	218	1.8	0.06	148	219	0.01
219974.84	169100.19	Carrickhill	SW 26	Q3 2016	13/09/2016	8.1	<5	214	0.21	0.38	77	102	<0.01
222140.83	170097.94	Templetouhy	SW 29	Q3 2016	13/09/2016	7.6	5	217	1.8	<0.05	91	184	<0.01
222828.25	162569.41	Longfordpass	SW 18	Q4 2016	22/11/2016	7.3	<5	158	3.4	<0.05	72	161	<0.01
221701.79	170410.93	Templetuohy	SW 30	Q4 2016	22/11/2016	7.5	8	268	1.9	0.05	50	106	<0.01
222828.25	162569.41	Longfordpass	SW 31	Q4 2016	22/11/2016	7.6	<5	318	2.1	0.05	53	103	<0.01



Longfordpass bog is an active production bog with the composite sampler located here during 2015 and 2016. The composite sampler takes a flow proportional composite sample over a 24 hour period. The sampler had a 48% downtime during the period being reported, but returned 52 weekly ammonia results, the balance being undertaken using a grab sample. The ammonia trigger level of 3.6mg/l, as agreed with the Agency, was exceeded once during the period. Combining the 2015 and 2016 results above, shows concentrations trending upwards over this two year period as peat extraction continues. Generally, ammonia is trending downwards as in other licensed bogs with the downwards trends submitted to the EPA in 2013 as required by condition 6.14 below. There is no obvious link between the summer production, winter maintenance, or silt pond maintenance events on the concentration of Ammonia discharging from this peatland. The only link expected would be that related to rainfall events, seasonal weather patterns and the subsequent surface water run-off and associated ammonia concentrations.

Oil Interceptor Results	
Licence No:	P0499-01
YEAR: 2016	

LOCATION	FA YARD	TR FUEL	TT YARD	TT FUEL
Month	SWE 1 COD mg/l	SWE 2 COD mg/l	SWE 3 COD mg/l	SWE 4 COD mg/l
Jan	31	183	No flow	No flow
Feb	53	No flow	No flow	No flow
Mar	26	No flow	No flow	No flow
Apr	57	No flow	No flow	No flow
May	52	38	No flow	No flow
June	No flow	47	22	13
July	No flow	No flow	No flow	No flow
Aug	No flow	No flow	No flow	No flow
Sep	No flow	52	53	28
Oct	No flow	No flow	No flow	No flow
Nov	No flow	No flow	No flow	No flow
Dec	No flow	No flow	No flow	No flow

FLOW 2016		
Head mm	M3 / Hour	Litres / Sec
0	0	0
100	16	4.4
105	18	5.0
110	20	5.6
115	22	6.1
120	25	6.9
125	28	7.8
130	30	8.3
135	33	9.2
140	37	10.3
145	40	11.1
150	43	11.9
155	47	13.1
160	51	14.2
165	55	15.3
170	59	16.4
175	64	17.8
180	68	18.9
185	73	20.3
190	78	21.7
195	84	23.3
100	16	4.4
105	18	5.0
110	20	5.6
115	22	6.1
120	25	6.9
125	28	7.8
130	30	8.3
135	33	9.2
140	37	10.3
145	40	11.1
150	43	11.9
155	47	13.1
160	51	14.2
165	55	15.3
170	59	16.4
175	64	17.8
180	68	18.9
185	73	20.3
190	78	21.7
195	84	23.3
200	90	25.0
205	96	26.7
210	100	27.8
215	107	29.7
220	113	31.4
225	119	33.1
230	126	35.0
235	133	36.9
240	140	38.9
245	148	41.1
250	155	43.1
255	163	45.3
260	171	47.5
265	180	50.0
270	188	52.2
275	197	54.7
280	206	57.2
285	216	60.0
290	225	62.5
295	235	65.3
300	249	69.2

Weekly Emissions to Water PW - 102. 2016

Works: Littleton

IPPC: 499

Date	pH (pH Units)	COD (mg/l)	SS (mg/l)	Flow l/sec	Head mm	Ammonia
06/01/2016	7.4	56	11	16.4	170	*0.57*
13/01/2016	7.9	90	31	18.9	180	0.60
19/01/2016	8.9	87	10	4	90	1.60
27/01/2016	7.8	91	34	25	200	0.48
02/02/2016	8.6	41	12	20.3	185	*0.68*
09/02/2016	9.4	41	12	21.7	190	0.48
16/02/2016	8.0	107	30	20.3	185	0.90
23/02/2016	9.2	50	29			0.53
01/03/2016	8.4	88	46			0.02
08/03/2016	8.0	58	29			0.38
15/03/2016	7.1	66	27	18.9	180	0.02
22/03/2016	8.4	99	40	26.7	205	0.07
29/03/2016	7.8	44	30	20.3	185	0.60
06/04/2016	8.3	108	27	15.3	165	0.39
12/04/2016	9.0	93	26	18.9	180	0.50
19/04/2016	7.6	97	48	26.7	205	0.93
25/04/2016	8.2	33	23	25	200	0.58
02/05/2016	7.8	34	31	???	29	0.03
10/05/2016	8.0	45	16	6.9	120	0.79
18/05/2016	8.1	32	42	6.1	117	0.65
25/05/2016	7.8	44	8		35	0.93
01/06/2016	7.8	28	10		17	1.70
07/06/2016						
14/06/2016	7.6	39	10		0	0.02
21/06/2016						
29/06/2016	7.1	25	6		0	0.49
08/07/2016	factory down					
13/07/2016	factory down					
20/07/2016	factory down					
28/07/2016	factory down					
03/08/2016	factory down					
10/08/2016	factory down					
17/08/2016	factory down					
24/08/2016	factory down					
31/08/2016	factory down					
07/09/2016	factory down					
14/09/2016	7.7	95	33	27.8	210	1.30
21/09/2016	7.9	101	5	27.8	210	0.75
27/09/2016	7.8	67	5	26.7	205	0.02
04/10/2016	8.5	58	5	36.9	235	0.76
12/10/2016	9.1	90	5	38.9	240	0.85
18/10/2016	8.7	113	6	38.9	240	0.57
26/10/2016	8.8	84	50	21.7	190	0.36
02/11/2016	8.8	123	97	35.0	230	0.01
10/11/2016	8.3	88	34	45.3	255	0.59
16/11/2016	9.3	104	46	43.1	250	0.1
23/11/2016	8.7	108	43	41.1	245	1.2
30/11/2016	8.7	106	46	38.9	240	0.9
07/12/2016	9.2	91	48	43.1	250	2.90
16/12/2016	8	69	55	52.2	270	0.82
23/12/2016	8.1	61	34	35	230	0.62
30/12/2016	factory down					

Quarterly Emissions to Water PW - 102 2016

Works: Littleton

IPPC: 499

Quarter	Total Phosporous	Ammonia	Oil,Fats &Grease
Feb	0.21	0.90	<1
May	0.19	0.79	<1
November	0.60	0.59	<1

Note: No samping in Q3 due to Factory outage

Littleton
Decommissioning and Rehabilitation
AER Overview 2016.

Within the Littleton licensed area (P0499-01) there were limited bog areas available for rehabilitation in 2016. A small amount of rehabilitation (hydrological management) was carried out in Templetuohy Bog in conjunction with the Bruckana Windfarm development to reinforce and raise water levels in several wetland areas. Ongoing monitoring of cutaway within the Littleton licensing area included the area of the Bruckana Windfarm development. Ongoing monitoring of cutaway within the Littleton bogs was carried out.

Draft rehabilitation plans for the Littleton bogs licensed area, including more detailed draft plans for each component bog unit were submitted to the EPA in 2013 and these were reviewed and updated in 2015.

The new Biodiversity Action Plan (2016-2021) was launched in 2016 with the annual Biodiversity Action Plan review day being held in February 2017, this included an update on the progress of the plan, bog restoration and cutaway rehabilitation for a wide range on statutory and non-statutory consultees including members of the EPA, NPWS, BWI, Bord na Mona, Coillte, Inland Fisheries Ireland, An Taisce, IPCC, Irish Red Grouse Association, Irish Wildlife Trust, NARGC, local game councils, Midland Regional Planning Authority as well as a range of local community groups and Heritage Officers from counties Laois, Offaly, Kildare, Roscommon, Longford, Meath, Galway, Westmeath and Dublin.

A copy of our Biodiversity Action Plan is available to view and download at http://www.bordnamona.ie/our-company/biodiversity/

As required by condition *10.2 Cutaway Bog Rehabilitation Plans*, draft peatland rehabilitation plans for all the individual bog units were submitted to the agency in 2013, reviewed and amended in 2015 and re-submitted to the agency in 2015. All draft rehabilitation plans are currently in the process of being reviewed (2017). These reviewed and amended plans will be re-submitted to the agency in due course.

Guidance to completing the PRTR workbook

PRTR Returns Workbook

Version 1.1.19

REFERENCE YEAR	2016

1. FACILITY IDENTIFICATION

Parent Company Name	Bord na Mona Fuels Limited
Facility Name	Bord na Mona Fuels Limited (Littleton)
PRTR Identification Number	P0499
Licence Number	P0499-01

Classes of Activity

No.	class_name
-	Refer to PRTR class activities below

Address 1	Littleton Group
Address 2	c/o Littleton Briquette Factory
Address 3	Thurles
Address 4	
	Tipperary
Country	Ireland
Coordinates of Location	-7.69986 52.6123
River Basin District	IESE
NACE Code	0892
Main Economic Activity	Extraction of peat
AER Returns Contact Name	Jeff Murphy
AER Returns Contact Email Address	jeff.murphy@bnm.ie
AER Returns Contact Position	Compliance Manager - Bord na Móna (Fuels)
AER Returns Contact Telephone Number	085 7310779
AER Returns Contact Mobile Phone Number	
AER Returns Contact Fax Number	
Production Volume	311777.0
Production Volume Units	Tonnes
Number of Installations	3
Number of Operating Hours in Year	5008
Number of Employees	148
User Feedback/Comments	In accordance with licence condition 6.2 of Technical Amendment A, quarterly sampling is now rotated every quarter and therefore suspended solids results are not factored into loading. The increase in SS at SW18 can be attributed to less down time of the sampler. The 2015 CO2 figure was reported in tonnes rather than kilograms as it should have been. This explains the % variance.
Web Address	www.bnm.ie

2. PRTR CLASS ACTIVITIES

Activity Number	Activity Name
50.1	General

3. SOLVENTS REGULATIONS (S.I. No. 543 of 2002)

Is it applicable?	No
Have you been granted an exemption ?	
If applicable which activity class applies (as per Schedule 2 of the regulations) ?	
Is the reduction scheme compliance route being used ?	

4. WASTE IMPORTED/ACCEPTED ONTO SITE Guidance on waste imported/accepted onto site

Do you import/accept waste onto your site for on-site treatment (either recovery or disposal activities) ?	No

This question is only applicable if you are an IPPC or Quarry site

4.1 RELEASES TO AIR Link to previous years emissions data | PRTR# : P0499 | Facility Name : Bord na Mona Fuels Limited (Littleton) | Filename : P0499_2016.xls | Return Year : 2016 | 28/03/2017 09:50

SECTION A : SECTOR SPECIFIC PRTR POLLUTANTS

RELEASES TO AIR					Please enter all quantities in this section in KGs			
POLLUTANT		METHOD			QUANTITY			
			Method Used					
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
					0.0	0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

SECTION B : REMAINING PRTR POLLUTANTS

RELEASES TO AIR					Please enter all quantities in this section in KGs			
POLLUTANT		METHOD			QUANTITY			
			Method Used		B101			
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
08	Nitrogen oxides (NOx/NO2)	M	ISO 10849:1996		125639.0	125639.0	0.0	0.0
11	Sulphur oxides (SOx/SO2)	M	ISO 7935: 1992		113222.0	113222.0	0.0	0.0
02	Carbon monoxide (CO)	M	ISO 12039:2001		30384.0	30384.0	0.0	0.0
03	**Carbon dioxide (CO2)**	M	ETS		44163000.0	44163000.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

SECTION C : REMAINING POLLUTANT EMISSIONS (As required in your Licence)

RELEASES TO AIR					Please enter all quantities in this section in KGs										
POLLUTANT		METHOD											QUANTITY		
			Method Used		B101	A101	A102	A103	A104	A105	A106	DM01-DM04		A	
Pollutant No.	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	Emission Point 2	Emission Point 3	Emission Point 4	Emission Point 5	Emission Point 6	Emission Point 7	Emission Point 8	T (Total) KG/Year	(Accidental) KG/Year	F (Fugitive) KG/Year
210	Dust	E	OTH	VDI 2119 Blatt 2/Part 2	113653.0	99521.0	72047.0	3.0	402.0	219.0	266.0	0.3058	#########	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

Additional Data Requested from Landfill operators

For the purposes of the National Inventory on Greenhouse Gases, landfill operators are requested to provide summary data on landfill gas (Methane) flared or utilised on their facilities to accompany the figures for total methane generated. Operators should only report their Net methane (CH4) emission to the environment under T(total) KG/yr for Section A: Sector specific PRTR pollutants above. Please complete the table below:

Landfill: Bord na Mona Fuels Limited (Littleton)

Please enter summary data on the quantities of methane flared and / or utilised			Method Used			
	T (Total) kg/Year	**M/C/E**	**Method Code**	**Designation or Description**	**Facility Total Capacity m3 per hour**	
Total estimated methane generation (as per site model)	0.0				N/A	
Methane flared	0.0				0.0	(Total Flaring Capacity)
Methane utilised in engine/s	0.0				0.0	(Total Utilising Capacity)
Net methane emission (as reported in Section A above)	0.0				N/A	

4.2 RELEASES TO WATERS

Link to previous years emissions data

SECTION A : SECTOR SPECIFIC PRTR POLLUTANTS

Data on ambient monitoring of storm/surface water or groundwater, conducted as part of your licence requirements, should NOT be submitted under AER / PRTR Reporting as this only concerns Releases from your facility

RELEASES TO WATERS					Please enter all quantities in this section in KGs			
POLLUTANT						QUANTITY		
			Method Used					
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
					0.0	0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

SECTION B : REMAINING PRTR POLLUTANTS

RELEASES TO WATERS					Please enter all quantities in this section in KGs			
POLLUTANT						QUANTITY		
			Method Used					
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
					0.0	0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

SECTION C : REMAINING POLLUTANT EMISSIONS (as required in your Licence)

RELEASES TO WATERS					Please enter all quantities in this section in KGs			
POLLUTANT						QUANTITY		
			Method Used		SW18			
Pollutant No.	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
240	**Suspended Solids**	E	OTH	G/19 Based on ALPHA,1998,20th Edition, Method 2540D	17235.0	17235.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

4.3 RELEASES TO WASTEWATER OR SEWER

Link to previous years emissions data

SECTION A : PRTR POLLUTANTS

OFFSITE TRANSFER OF POLLUTANTS DESTINED FOR WASTE-WATER TREATMENT OR SEWER					Please enter all quantities in this section in KGs			
POLLUTANT		METHOD			QUANTITY			
			Method Used					
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
					0.0	0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

SECTION B : REMAINING POLLUTANT EMISSIONS (as required in your Licence)

OFFSITE TRANSFER OF POLLUTANTS DESTINED FOR WASTE-WATER TREATMENT OR SEWER					Please enter all quantities in this section in KGs			
POLLUTANT		METHOD			QUANTITY			
			Method Used					
Pollutant No.	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
					0.0	0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

4.4 RELEASES TO LAND

Link to previous years emissions data

SECTION A : PRTR POLLUTANTS

RELEASES TO LAND					Please enter all quantities in this section in KGs		
POLLUTANT		METHOD			QUANTITY		
			Method Used				
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year
					0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

SECTION B : REMAINING POLLUTANT EMISSIONS (as required in your Licence)

RELEASES TO LAND					Please enter all quantities in this section in KGs		
POLLUTANT		METHOD			QUANTITY		
			Method Used				
Pollutant No.	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year
					0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

5. ONSITE TREATMENT & OFFSITE TRANSFERS OF WASTE

Please enter all quantities on this sheet in Tonnes

Transfer Destination	European Waste Code	Hazardous	Quantity (Tonnes per Year)	Description of Waste	Waste Treatment Operation	Method Used		Location of Treatment	Haz Waste : Name and Licence/Permit No of Next Destination Facility Non Haz Waste: Name and Licence/Permit No of Recover/Disposer	Haz Waste : Address of Next Destination Facility Non Haz Waste: Address of Recover/Disposer	Name and License / Permit No. and Address of Final Recoverer / Disposer (HAZARDOUS WASTE ONLY)	Actual Address of Final Destination i.e. Final Recovery / Disposal Site (HAZARDOUS WASTE ONLY)
						M/C/E	Method Used					
Within the Country	01 01 02	No	2179.33	wastes from mineral non-metalliferous excavation	D1	E	Volume Calculation	Onsite of generati	Bord na Mona Fuels Ltd,P0499-01	Littleton,Thurles,Co Tipperary,,Ireland		
Within the Country	01 01 02	No	2270.0	wastes from mineral non-metalliferous excavation	D1	E	Volume Calculation	Onsite of generati	Bord na Mona Fuels Ltd,P0499-01	Littleton,Thurles,Co Tipperary,,Ireland		
Within the Country	02 01 04	No	125.18	waste plastics (except packaging)	R3	M	Weighed	Offsite in Ireland	Ryston Industries,WFP KE-12-0066-01 & WCP KE-10-0569-01	Castledermot,Co Kildare,,.,.Ireland		
To Other Countries	11 01 13	Yes	2.34	degreasing wastes containing dangerous substances	R2	C	Volume Calculation	Abroad	Safety Kleen Ltd,W0099-01	Tallaght,Dublin,.,.,Ireland	Solvent Recovery Management,PP33345F,Wheeland Rd,Knottingly,West Yorks,WF118DZ,United Kingdom	Wheeland Rd,Knottingly,West Yorks,WF118DZ,United Kingdom
Within the Country	13 02 05	Yes	2.6	mineral-based non-chlorinated engine, gear and lubricating oils	R1	C	Volume Calculation	Offsite in Ireland	Enva Ireland Ltd,W0184-1	Clonminam Ind Estate,Portlaoise,Co Laois,.,Ireland	Enva Ireland Ltd,W0184-1,Clonminam Ind Estate,Portlaoise,Co Laois,.,Ireland	Clonminam Ind Estate,Portlaoise,Co Laois,.,Ireland
Within the Country	13 05 03	Yes	0.0	interceptor sludges	R1	M	Volume Calculation	Offsite in Ireland	Enva Ireland Ltd,W0184-1	Clonminam Ind Estate,Portlaoise,Co Laois,.,Ireland	Enva Ireland Ltd,W0184-1,Clonminam Ind Estate,Portlaoise,Co Laois,.,Ireland	Clonminam Ind Estate,Portlaoise,Co Laois,.,Ireland
To Other Countries	13 08 99	Yes	0.0	wastes not otherwise specified	R1	E	Volume Calculation	Abroad	Enva Ireland Ltd,W0184-1	Clonminam Ind Estate,Portlaoise,Co Laois,.,Ireland	KWA,E17012100,Lintfort,.,.,.,Germany	Lintfort,.,.,.,Germany
Within the Country	**15 01 03**	**No**	96.48	wooden packaging	R1	M	Weighed	Offsite in Ireland	Kiawa Ltd,WP/TN/24	Tipperary,.,.,.,Ireland		
To Other Countries	15 02 02	Yes	0.9	absorbents, filter materials (including oil filters not otherwise specified), wiping cloths, protective clothing contaminated by dangerous substances	D10	E	Volume Calculation	Abroad	Enva Ireland Ltd,W0184-1	Clonminam Ind Estate,Portlaoise,Co Laois,.,Ireland	KWA,E17012100,Lintfort,.,.,.,Germany	Lintfort,.,.,.,Germany
To Other Countries	16 01 07	Yes	0.84	oil filters	R4	C	Volume Calculation	Abroad	Enva Ireland Ltd,W0184-1	Clonminam Ind Estate,Portlaoise,Co Laois,.,Ireland	R. D Recycling,51727/1/KD,Houthalen,.,.,.,Belgium	Houthalen,.,.,.,Belgium
Within the Country	17 04 07	No	35.56	mixed metals	R4	M	Weighed	Offsite in Ireland	Hammond Lane Ltd,WP4620033	Athlone,Co Westmeath,.,.,Ireland		
Within the Country	20 01 21	Yes	0.5	fluorescent tubes and other mercury-containing waste	R13	M	Weighed	Offsite in Ireland	Irish Lamp Recycling,WFP-KE-08-0348-01	Athy,.,.,.,.,Ireland	Irish Lamp Recycling,WFP-KE-08-0348-01,Athy,Co Kildare,.,.,Ireland	Athy,Co Kildare,.,.,Ireland
Within the Country	20 03 01	No	20.82	mixed municipal waste	D1	M	Weighed	Offsite in Ireland	AES,WP-OY-08-601-01	Nenagh,Tipperary,.,.,Ireland		
Within the Country	20 03 01	No	45.156	mixed municipal waste	D1	E	Volume Calculation	Offsite in Ireland	AES,WP-OY-08-601-01	Nenagh,Tipperary,.,.,Ireland		
Within the Country	20 03 01	No	40.541	mixed municipal waste	R11	E	Volume Calculation	Offsite in Ireland	AES,WP-OY-08-601-01	Nenagh,Tipperary,.,.,Ireland		

* Select a row by double-clicking the Description of Waste then click the delete button

Link to previous years waste data
Link to previous years waste summary data & percentage change
Link to Waste Guidance

Facility Information Summary	
AER Reporting Year	2017
Licence Register Number	P0499-01
Name of site	Bord na Mona Littleton
Site Location	Lanespark, Littleton, Thurles, Co Tipperary
NACE Code	0892
Class/Classes of Activity	1.4
National Grid Reference (6E, 6N)	220443, 151233

A description of the activities/processes at the site for the reporting year. This should include information such as production increases or decreases on site, any infrastructural changes, environmental performance which was measured during the reporting year **and an overview of compliance with your licence** listing all exceedances of licence limits (where applicable) and what they relate to e.g. air, water, noise.

Activities on site can be divided into two components, firstly the milling, harrowing, ridging and harvesting of peat into stockpiles and secondly the transportation of that peat via an internal rail network to the Briquette Factory for processing into peat briquettes. Production achieved was approximately 137,273 tonnes of milled peat and 82,798 tonnes of briquettes during 2017. In addition to this, approximately 600 tonnes of sod turf was produced. Infrastructurally there was no bog development during 2017. There were 17 non-compliances/incidents/breach of ELV, 11 related to factory stack emissions, 4 was a breach of Trigger level in discharges to water and 2 fugitive dust emissions. There were no environmental complaints received during the reporting period. In relation to silt pond cleaning, 100% of ponds received two cleanings, with some ponds receiving more depending on inspection results. Ten hydraulic harrows were deployed at dust sensitive locations during production. There was a big effort made to recycle obsolete rail line, this work will be continued into 2018. Decommissioning and Rehabilitation works are described in an attachment. Following a review of peat briquetting operations it was recommended that to sustain the business into the future, the factory at Littleton, would continue production for the coming season and should permanently cease production in April, 2018. This course of action impinged on monitoring results and quantities of wastes generated.

Declaration:

All the data and information presented in this report has been checked and certified as being accurate. The quality of the information is assured to meet licence requirements.

Jonny Mooney	30/5/2018
Signature	Date
Group/Facility manager	
(or nominated, suitably qualified and experienced deputy)	

AIR-summary template	Lic No:	P0499-01	Year	2017

Answer all questions and complete all tables where relevant

			Additional information
1	Does your site have licensed air emissions? If yes please complete table A1 and A2 below for the current reporting year and answer further questions. If **you do not have** licenced emissions and **do not**	Yes	Fugitive emissions also

Periodic/Non-Continuous Monitoring

2	Are there any results in breach of licence requirements? If yes please provide brief details in the comment section of TableA1 below	Yes	
3	Was all monitoring carried out in accordance with EPA guidance note AG2 and using the basic air monitoring checklist? Basic air monitoring checklist AGN2	Yes	

Table A1: Licensed Mass Emissions/Ambient data-periodic monitoring (non-continuous)

Emission reference no:	Parameter/ Substance	Frequency of Monitoring	ELV in licence or any revision therof	Licence Compliance criteria	Measured value	Unit of measurement	Compliant with licence limit	Method of analysis	Annual mass load (kg)	Comments -reason for change in % mass load from previous year if applicable
B101	Nitrogen oxides (NOx/NO2)	Annual	31536	100 % of values < ELV	6.31	kg/hour	no (if no please enter details in comments box)	ISO 10849:1996	32118	
B101	Sulphur oxides (SOx/SO2)	Annual	315360	100 % of values < ELV	11.24	kg/hour	yes	ISO 7935: 1992	57188	
B101	Carbon monoxide (CO)	Annual	NA	NA	9838.44	kg/hour	yes	ISO 12039:2001	50058700	
B101	Total Particulates	Annual	126144	100 % of values < ELV	34.5	kg/hour	Yes	OTH	175527.4025	
A101	Total Particulates	Annual	45796	100 % of values < ELV	7.13	kg/hour	no (if no please enter details in comments box)	OTH	36294.83162	
A102	Total Particulates	Annual	55714	100 % of values < ELV	10.21	kg/hour	yes	OTH	51951.84556	
A103	Total Particulates	Annual	61320	100 % of values < ELV	0.01	kg/hour	yes	OTH	53.78626899	
A104	Total Particulates	Annual	52560	100 % of values < ELV	0.11	kg/hour	yes	OTH	574.6572488	
A105	Total Particulates	Annual	8931	101 % of values < ELV	0.04	kg/hour	yes	OTH	192.0985933	
A106	Total Particulates	Annual	867	102 % of values < ELV	0.02	kg/hour	yes	OTH	123.1367571	

Note 1: Volumetric flow shall be included as a reportable parameter

AIR-summary template	Lic No:	P0499-01	Year	2017
Continuous Monitoring				

4	Does your site carry out continuous air emissions monitoring? If yes please review your continuous monitoring data and report the required fields below in Table A2 and	No	Fugitive dust monitoring results are entered in table A2 below as directed by the Agency
5	Did continuous monitoring equipment experience downtime? If yes please record downtime in table A2 below	NA	
6	Do you have a proactive service agreement for each piece of continuous monitoring equipment?	NA	
7	Did your site experience any abatement system bypasses? If yes please detail them in table A3 below	NA	

Table A2: Summary of average emissions -continuous monitoring

Emission reference no:	Parameter/ Substance	ELV in licence or any revision therof	Averaging Period	Compliance Criteria	Units of measurement	Annual Emission	Annual maximum	Monitoring Equipment downtime (hours)	Number of ELV exceedences in current reporting year	Comments
DM-01	Total Particulates	350	308	Daily average < ELV	mg/m2/day	188131	5147		2	
DM-02	Total Particulates	350	308	Daily average < ELV	mg/m2/day	30774	442		1	
DM-03	Total Particulates	350	308	Daily average < ELV	mg/m2/day	64485	884		2	
DM-04	Total Particulates	350	308	Daily average < ELV	mg/m2/day	35871	544		1	

note 1: Volumetric flow shall be included as a reportable parameter.

Table A3: Abatement system bypass reporting table Bypass protocol

Date*	Duration** (hours)	Location	Reason for bypass	Impact magnitude	Corrective action

* this should include all dates that an abatement system bypass occurred

** an accurate record of time bypass beginning and end should be logged on site and maintained for future Agency inspections please refer to bypass protocol link

AIR-summary template Lic No: P0499-01 Year 2017

Solvent use and management on site

8 Do you have a total Emission Limit Value of direct and fugitive emissions on site? if yes please fill out tables A4 and A5

SELECT

Table A4: Solvent Management Plan Summary
Total VOC Emission limit value

Solvent regulations — Please refer to linked solvent regulations to complete table 5 and 6

Reporting year	Total solvent input on site (kg)	Total VOC emissions to Air from entire site (direct and fugitive)	Total VOC emissions as %of solvent input	Total Emission Limit Value (ELV) in licence or any revision therof	Compliance
					SELECT
					SELECT

Table A5: Solvent Mass Balance summary

	(I) Inputs (kg)	(O) Outputs (kg)						
Solvent	(I) Inputs (kg)	Organic solvent emission in	Solvents lost in water (kg)	Collected waste solvent (kg)	Fugitive Organic Solvent (kg)	Solvent released in other ways e.g. by-passes (kg)	Solvents destroyed onsite through	Total emission of Solvent to air (kg)
							Total	

AER Monitoring returns summary template-WATER/WASTEWATER(SEWER) Lic No: P0499-01 Year 2017

			Additional information
1	Does your site have licensed emissions direct to surface water or direct to sewer? If yes please complete table W2 and W3 below for the current reporting year and answer further questions. If **you do not have** licenced emissions you only need to complete table W1 and or W2 for storm water analysis and visual inspections	Yes	The continuous monitoring sampler was relocated at the begining of the reporting period. The sampler experienced technical difficulties which inhibited the collection of flow data and subsequent annual loading calculations. It was therefore decided to present the sampling results in graphical form as an attachment.
2	Was it a requirement of your licence to carry out visual inspections on any surface water discharges or watercourses on or near your site? If yes please complete table W2 below summarising only any evidence of contamination noted during visual inspections	Yes	Monthly COD analysis of yard runoff is attached in a separate document.

Table W1 Storm water monitoring

Location reference	Location relative to site activities	PRTR Parameter	Licenced Parameter	Monitoring date	ELV or trigger level in licence or any revision thereof*	Licence Compliance criteria	Measured value	Unit of measurement	Compliant with licence	Comments
	SELECT	SELECT	SELECT			SELECT		SELECT	SELECT	
	SELECT	SELECT	SELECT			SELECT		SELECT	SELECT	

*trigger values may be agreed by the Agency outside of licence conditions

Table W2 Visual inspections-Please only enter details where contamination was observed.

Location Reference	Date of inspection	Description of contamination	Source of contamination	Corrective action	Comments
			SELECT		
			SELECT		

Licensed Emissions to water and /or wastewater(sewer)-periodic monitoring (non-continuous)

3	Was there any result in breach of licence requirements? If yes please provide brief details in the comment section of Table W3 below		Yes	There were five breaches at PW-102 however this can only be established at year end when 100% of results are assessed.
4	Was all monitoring carried out in accordance with EPA guidance and checklists for Quality of Aqueous Monitoring Data Reported to the EPA? If no please detail what areas require improvement in additional information box	External /Internal Lab Quality checklist / Assessment of results checklist	Yes	Surface water monitoring was carried out on a quarterly basis. The results of which are attached. Monthly COD yard runoff results are also attached.

Table W3: Licensed Emissions to water and /or wastewater (sewer)-periodic monitoring (non-continuous)

Emission reference no:	Emission released to	Parameter/ SubstanceNote 1	Type of sample	Frequency of monitoring	Averaging period	ELV or trigger values in licence or any revision therof[Note 2]	Licence Compliance criteria	Measured value	Unit of measurement	Compliant with licence	Method of analysis	Procedural reference source	Procedural reference standard number	Annual mass load (kg)	Comments
									SELECT	SELECT	SELECT	SELECT			

Note 1: Volumetric flow shall be included as a reportable parameter

Note 2: Where Emission Limit Values (ELV) do not apply to your licence please compare results against EQS for Surface water or relevant receptor quality standards

AER Monitoring returns summary template-WATER/WASTEWATER(SEWER)	Lic No:	P0499-01	Year	2017

Continuous monitoring

			Additional Information
5	Does your site carry out continuous emissions to water/sewer monitoring?	Yes	See note above

If yes please summarise your continuous monitoring data below in Table W4 and compare it to its relevant Emission Limit Value (ELV)

6	Did continuous monitoring equipment experience downtime? **If yes please record downtime in table W4 below**	Yes	2880 hours
7	Do you have a proactive service contract for each piece of continuous monitoring equipment on site?	Yes	Annual calibration schedule and trouble shooting service
8	Did abatement system bypass occur during the reporting year? **If yes please complete table W5 below**	No	

Table W4: Summary of average emissions -continuous monitoring

Emission reference no:	Emission released to	Parameter/ Substance	ELV or trigger values in licence or any revision thereof	Averaging Period	Compliance Criteria	Units of measurement	Annual Emission for current reporting year (kg)	% change +/- from previous reporting year	Monitoring Equipment downtime (hours)	Number of ELV exceedences in reporting year	Comments

note 1: Volumetric flow shall be included as a reportable parameter.

Table W5: Abatement system bypass reporting table

Date	Duration (hours)	Location	Resultant emissions	Reason for bypass	Corrective action*	Was a report submitted to the EPA?	When was this report submitted?
						SELECT	

*Measures taken or proposed to reduce or limit bypass frequency

Bund/Pipeline testing template

Lic No: P0499-01 Year 2017

Bund testing

dropdown menu click to see options

			Additional information
1	Are you required by your licence to undertake integrity testing on bunds and containment structures ? if yes please fill out table B1 below listing all **new bunds and containment structures** on site, in addition to **all bunds which failed** the integrity test-**all bunding structures which failed including mobile bunds must be listed in the table below, please include all bunds outside the licenced testing period** (mobile bunds and chemstore included)	Yes	
2	Please provide integrity testing frequency period	2 Yearly	
3	Does the site maintain a register of bunds, underground pipelines (including stormwater and foul), Tanks, sumps and containers? (containers refers to "Chemstore" type units and mobile bunds)	Yes	
4	How many bunds are on site?	4	
5	How many of these bunds have been tested within the required test schedule?	3	Three bunds tested 2016 and due for retest in 2018. The Templetouhy bund was not tested as it is no longer required and empty.
6	How many mobile bunds are on site?	8	These include barrel trays located within workshops
7	Are the mobile bunds included in the bund test schedule?	No	
8	How many of these mobile bunds have been tested within the required test schedule?	NA	
9	How many sumps on site are included in the integrity test schedule?	NA	
10	How many of these sumps are integrity tested within the test schedule?	NA	
	Please list any sump integrity failures in table B1		
11	Do all sumps and chambers have high level liquid alarms?	N/A	
12	If yes to Q11 are these failsafe systems included in a maintenance and testing programme?	N/A	
13	Is the Fire Water Retention Pond included in your integrity test programme?	SELECT	

Table B1: Summary details of bund /containment structure integrity test

Bund/Containment structure ID	Type	Specify Other type	Product containment	Actual capacity	Capacity required*	Type of integrity test	Other test type	Test date	Integrity reports maintained on site?	Results of test	Integrity test failure explanation <50 words	Corrective action taken	Scheduled date for retest	Results of retest(if in current reporting year)
	SELECT					SELECT			SELECT	SELECT		SELECT		

* Capacity required should comply with 25% or 110% containment rule as detailed in your licence

			Commentary
15	Has integrity testing been carried out in accordance with licence requirements and are all structures tested in line with BS8007/EPA Guidance?	bunding and storage guidelines	SELECT
16	Are channels/transfer systems to remote containment systems tested?		SELECT
17	Are channels/transfer systems compliant in both integrity and available volume?		SELECT

Pipeline/underground structure testing

1	Are you required by your licence to undertake integrity testing* on underground structures e.g. pipelines or sumps etc ? if yes please fill out table 2 below listing all underground structures and pipelines on site **which failed the integrity test and all which have not been tested withing the integrity test period as specified**	Yes	
2	Please provide integrity testing frequency period	3 years	

*please note integrity testing means water tightness testing for process and foul pipelines (as required under your licence)

Table B2: Summary details of pipeline/underground structures integrity test

Structure ID	Type system	Material of construction:	Does this structure have Secondary containment?	Type of secondary containment	Type integrity testing	Integrity reports maintained on site?	Results of test	Integrity test failure explanation <50 words	Corrective action taken	Scheduled date for retest	Results of retest(if in current reporting year)
	SELECT	SELECT	SELECT	SELECT	SELECT	SELECT	SELECT				SELECT

Please use commentary for additional details not answered by tables/ questions above

Groundwater/Soil monitoring template	Lic No:	P0499-01	Year	2017

			Comments	
1	Are you required to carry out groundwater monitoring as part of your licence requirements?	no		Please provide an interpretation of groundwater monitoring data in the interpretation box below or if you require additional space please include a groundwater/contaminated land monitoring results interpretaion as an additional section in this AER
2	Are you required to carry out soil monitoring as part of your licence requirements?	no		
3	Do you extract groundwater for use on site? If yes please specify use in comment section	no	Process water extracted from surface water river.	
4	Do monitoring results show that groundwater generic assessment criteria such as GTVs or IGVs are exceeded or is there an upward trend in results for a substance? If yes, please complete the Groundwater Monitoring Guideline Template Report (link in cell G8) and submit separately through ALDER as a licensee return AND answer questions 5-12 below. Groundwater monitoring template	no		
5	Is the contamination related to operations at the facility (either current and/or historic)	N/A		
6	Have actions been taken to address contamination issues?If yes please summarise remediation strategies proposed/undertaken for the site	NA		
7	Please specify the proposed time frame for the remediation strategy	NA		
8	Is there a licence condition to carry out/update ELRA for the site?	NA		
9	Has any type of risk assesment been carried out for the site?	NA		
10	Has a Conceptual Site Model been developed for the site?	NA		
11	Have potential receptors been identified on and off site?	NA		
12	Is there evidence that contamination is migrating offsite?	NA		Please enter interpretation of data here

Groundwater/Soil monitoring template Lic No: P0499-01 Year 2017

Table 1: Upgradient Groundwater monitoring results

Date of sampling	Sample location reference	Parameter/ Substance	Methodology	Monitoring frequency	Maximum Concentration++	Average Concentration+	unit	GTV's*	SELECT**	Upward trend in pollutant concentration over last 5 years of monitoring data
							SELECT			SELECT
							SELECT			SELECT

.+ where average indicates arithmetic mean

.++ maximum concentration indicates the maximum measured concentration from all monitoring results produced during the reporting year

Table 2: Downgradient Groundwater monitoring results

Date of sampling	Sample location reference	Parameter/ Substance	Methodology	Monitoring frequency	Maximum Concentration	Average Concentration	unit	GTV's*	SELECT**	Upward trend in yearly average pollutant concentration over last 5 years of monitoring data
							SELECT			SELECT
							SELECT			SELECT

*please note exceedance of generic assessment criteria (GAC) such as a Groundwater Threshold Value (GTV) or an Interim Guideline Value (IGV) or an upward trend in results for a substance indicates that further interpretation of monitoring results is required. In addition to completing the above table, please complete the Groundwater Monitoring Guideline Template Report at the link provided and submit separately through ALDER as a licensee return or as otherwise instructed by the EPA. Groundwater monitoring template

More information on the use of soil and groundwater standards/ generic assessment criteria (GAC) and risk assessment tools is available in the EPA published guidance (see the link in G31) Guidance on the Management of Contaminated Land and Groundwater at EPA Licensed Sites (EPA 2013).

**Depending on location of the site and proximity to other sensitive receptors alternative Receptor based Water Quality standards should be used in addition to the GTV e.g. if the site is close to surface water compare to Surface Water Environmental Quality Standards (SWEQS), If the site is close to a drinking water supply compare results to the Drinking Water Standards (DWS)

Surface water EQS | Groundwater regulations GTV's | Drinking water (private supply) standards | Drinking water (public supply) standards | Interim Guideline Values (IGV)

Table 3: Soil results

Date of sampling	Sample location reference	Parameter/ Substance	Methodology	Monitoring frequency	Maximum Concentration	Average Concentration	unit
							SELECT
							SELECT

Where additional detail is required please enter it here in 200 words or less

Environmental Liabilities template	Lic No:	P0499-01	Year	2017

Click here to access EPA guidance on Environmental Liabilities and Financial provision

			Commentary
1	ELRA initial agreement status	Not a Licence Requirement	
2	ELRA review status	NA	
3	Amount of Financial Provision cover required as determined by the latest ELRA	NA	
4	Financial Provision for ELRA status	NA	
5	Financial Provision for ELRA - amount of cover	NA	
6	Financial Provision for ELRA - type	NA	
7	Financial provision for ELRA expiry date	NA	
8	Closure plan initial agreement status	NA	Internal Budget Provision
9	Closure plan review status	NA	Internal Budget Provision
10	Financial Provision for Closure status	NA	Internal Budget Provision
11	Financial Provision for Closure - amount of cover	NA	Internal Budget Provision
12	Financial Provision for Closure - type	NA	Internal Budget Provision
13	Financial provision for Closure expiry date	NA	

Environmental Management Programme/Continuous Improvement Programme template Lic No: P0499-01 Year 2017

Highlighted cells contain dropdown menu click to view

			Additional Information
1	Do you maintain an Environmental Mangement System (EMS) for the site. If yes, please detail in additional information	Yes	Internal unaccredited EMS
2	Does the EMS reference the most significant environmental aspects and associated impacts on-site	Yes	
3	Does the EMS maintain an Environmental Management Programme (EMP) as required in accordance with the licence requirements	Yes	
4	Do you maintain an environmental documentation/communication system to inform the public on environmental performance of the facility, as required by the licence	Yes	

Environmental Management Programme (EMP) report

Objective Category	Target	Status (% completed)	How target was progressed	Responsibility	Intermediate outcomes
Reduction of emissions to Air	Training.Continue to train all employees in environmental matters. Training will be by means of the screening of an environmental DVD, followed by a power point presentation. Headland Peat Collection. Continue with the collection of headland peat, particularly at dust sensitive locations.	70	In total 18 personnel received training during the reporting period. Headland peat was collected and returned as part of overall production figures. In addition ten hydraulic harrows were deployed at dust sensitive locations. An outside consulting firm have been appointed to examine ways by which air emissions can be abated.	Section Head	Reduced emissions
Waste reduction/Raw material usage efficiency	Waste Streamlining. It is planned to continue with and where possible improve the current waste management service provided by AES Ltd	100	Installed a waste management system. Quarterly waste reports are returned for records/filing and waste streams are segrated on site to maximise recycling potential.	Section Head	Improved Environmental Management Practices
Reduction of emissions to Water	Training. Continue to train all employees in environmental matters. Training will be by means of the screening of an environmental DVD, followed by a power point presentation. Silt Pond survey also planned.	100	In total 18 personnel received training during the reporting period. Silt pond upgrade works were ongoing and forthnightly silt pond inspections.	Section Head	Reduced emissions
Materials Handling/Storage/Bunding	Increased bund capacity will be provided where required.	100	A new double skinned HCl (Acid) tank was installed at Littleton factory during the reporting period. Bord na Mona Fuels appointed a compliance manager during the reporting period.	Section Head	Improved Environmental Management Practices
Waste reduction/Raw material usage efficiency	Continue with the recycling of polyethylene. The sourcing of more recycling contractors will be ongoing.	100	In total approximately 239 tonnes were sent off site for recycling. Procurement also exploring the possibility of securing further recyclers.	Section Head	Reduced emissions
Energy Efficiency/Utility conservation	Carry out a review of energy aspects identifying significant energy users.	50	The monthly consumption of energy was regurally communicated to the relevant personnel. This included the KPI's for peat production, maintenance and transportation as well as bog pumping and workshop electrical consumption. It is planned that the site achieve ISO50001 status in 2017.	Section Head	Improved Environmental Management Practices

Noise monitoring summary report

Lic No: P0499-01 2017

1	Was noise monitoring a licence requirement for the AER period? If yes please fill in table N1 noise summary below	No
2	Was noise monitoring carried out using the EPA Guidance note, including completion of the "Checklist for noise measurement report" included in the guidance note as table 6? (Noise Guidance note NG4)	NA
3	Does your site have a noise reduction plan	NA
4	When was the noise reduction plan last updated?	
5	Have there been changes relevant to site noise emissions (e.g. plant or operational changes) since the last noise survey?	NA

Table N1: Noise monitoring summary

Date of monitoring	Time period	Noise location (on site)	Noise sensitive location -NSL (if applicable)	LA_{eq}	LA_{90}	LA_{10}	LA_{max}	Tonal or Impulsive noise* (Y/N)	If tonal /impulsive noise was identified was 5dB penalty applied?	Comments (ex. main noise sources on site, & extraneous noise ex. road traffic)	Is site compliant with noise limits (day/evening/night)?
								SELECT	SELECT		SELECT

*Please ensure that a tonal analysis has been carried out as per guidance note NG4. These records must be maintained onsite for future inspection

If noise limits exceeded as a result of noise attributed to site activities, please choose the corrective action from the following options? SELECT

** please explain the reason for not taking action/resolution of noise issues?
Any additional comments? (less than 200 words)

Resource Usage/Energy efficiency summary

Lic No: P0499-01 Year 2017

			Additional information
1	When did the site carry out the most recent energy efficiency audit? Please list the recommendations in table 3 below	2017	
2	Is the site a member of any accredited programmes for reducing energy usage/water conservation such as the SEAI programme linked to the right? If yes please list them in additional information	Yes	Site currently working towards achieving ISO50001
3	Where Fuel Oil is used in boilers on site is the sulphur content compliant with licence conditions? Please state percentage in additional information	SELECT	

SEAI - Large Industry Energy Network (LIEN)

Table R1 Energy usage on site

Energy Use	Previous year	Current year	Production +/- % compared to previous reporting year**	Energy Consumption +/- % vs overall site production*
Total Energy Used (MWHrs)	104171	125760		
Total Energy Generated (MWHrs)				
Total Renewable Energy Generated (MWHrs)				
Electricity Consumption (MWHrs)	1511.748	1371.827		
Fossil Fuels Consumption:				
Heavy Fuel Oil (m3)				
Light Fuel Oil (m3)	708.723	1757.13		
Natural gas (m3)				
Coal/Solid fuel (metric tonnes)				
Peat (metric tonnes)	44630	49276		
Renewable Biomass				
Renewable energy generated on site				

* where consumption of energy can be compared to overall site production please enter this information as percentage increase or decrease compared to the previous reporting year.

** where site production information is available please enter percentage increase or decrease compared to previous year

Table R2 Water usage on site

					Water Emissions	Water Consumption	
Water use	Water extracted Previous year m3/yr.	Water extracted Current year m3/yr.	Production +/- % compared to previous reporting year**	Energy Consumption +/- % vs overall site production*	Volume Discharged back to environment(m^3yr):	Volume used i.e not discharged to environment e.g. released as steam m3/yr	Unaccounted for Water:
Groundwater							
Surface water							
Public supply							
Recycled water							
Total							

* where consumption of water can be compared to overall site production please enter this information as percentage increase or decrease compared to the previous reporting year.

** where site production information is available please enter percentage increase or decrease compared to previous year

Resource Usage/Energy efficiency summary

Lic No: P0499-01 Year 2017

Table R3 Waste Stream Summary

	Total	Landfill	Incineration	Recycled	Other
Hazardous (Tonnes)	5.059	0	0.45	4.609	0
Non-Hazardous (Tonnes)	1450.27	47.91	0	463.57	938.79

Table R4: Energy Audit finding recommendations

Date of audit	Recommendations	Description of Measures proposed	Origin of measures	Predicted energy savings %	Implementation date	Responsibility	Completion date	Status and comments
			SELECT					
			SELECT					
			SELECT					

Table R5: Power Generation: Where power is generated onsite (e.g. power generation facilities/food and drink industry)please complete the following information

	Unit ID	Unit ID	Unit ID	Unit ID	Station Total
Technology					
Primary Fuel					
Thermal Efficiency					
Unit Date of Commission					
Total Starts for year					
Total Running Time					
Total Electricity Generated (GWH)					
House Load (GWH)					
KWH per Litre of Process Water					
KWH per Litre of Total Water used on Site					

Complaints and Incidents summary template Lic No: P0499-01 Year 2017

Complaints		
		Additional information
Have you received any environmental complaints in the current reporting year? If yes please complete summary details of complaints received on site in table 1 below	No	

Table 1 Complaints summary

Date	Category	Other type (please specify)	Brief description of complaint (Free txt <20 words)	Corrective action< 20 words	Resolution status	Resolution date	Further information
Total complaints open at start of reporting year	0						
Total new complaints received during reporting year	0						
Total complaints closed during reporting year	0						
Balance of complaints end of reporting year	0						

Complaints and Incidents summary template Lic No: P0499-01 Year 2017

Incidents

Have any incidents occurred on site in the current reporting year? Please list all incidents for current reporting year in Table 2 below	Yes	Additional information: As the factory ceased all production on 21/03/2018 there will be no further stack emissions and limited emissions from PW102.

*For information on how to report and what constitutes an incident: What is an incident

Table 2 Incidents summary

Date of occurrence	Incident nature	Location of occurrence	Incident category*please refer to guidance	Receptor	Cause of incident	Other cause(please specify)	Activity in progress at time of incident	Communication	Occurrence	Corrective action<20 words	Preventative action <20 words	Resolution status	Resolution date	Likelihood of reoccurence
Example														
31/01/2017	Breach of ELV	A101	1. Minor	Air	Plant or equipment issues		Normal activities	INCI011925	Recurring	Currently in discussion with the Agency	Currently in discussion with the Agency	Complete	05/04/2017	High
31/01/2017	Breach of ELV	A102	1. Minor	Air	Plant or equipment issues		Normal activities	INCI011928	Recurring	Currently in discussion with the Agency	Currently in discussion with the Agency	Ongoing	05/04/2017	High
11/01/2017	Breach of ELV	PW102	1. Minor	Water	Other (add details)	Variation in factory boiler peat	Normal activities	INCI011836	New	Inspection of lagoon and lagoon cleaned	Assessment of lagoon capability	Complete	21/03/2017	Medium
11/01/2017	Breach of ELV	PW102	1. Minor	Water	Other (add details)	Variation in factory boiler peat	Normal activities	INCI011794	Recurring	Inspection of lagoon and lagoon cleaned	Assessment of lagoon capability	Complete	14/03/2017	Medium
31/01/2017	Breach of ELV	A106	1. Minor	Air	Plant or equipment issues		Normal activities	INCI011930	Recurring	Currently in discussion with the Agency	Currently in discussion with the Agency	Ongoing	05/04/2017	High
31/01/2017	Breach of ELV	A104	1. Minor	Air	Plant or equipment issues		Normal activities	INCI011929	Recurring	Currently in discussion with the Agency	Currently in discussion with the Agency	Ongoing	05/04/2017	High
31/01/2017	Breach of ELV	B101	1. Minor	Air	Plant or equipment issues		Normal activities	INCI011923	Recurring	Currently in discussion with the Agency	Currently in discussion with the Agency	Ongoing	05/04/2017	High
19/12/2017	Breach of ELV	A101	1. Minor	Air	Plant or equipment issues		Normal activities	INCI013730	Recurring	Currently in discussion with the Agency	Currently in discussion with the Agency	Ongoing	22/01/2018	High
03/10/2017	Breach of ELV	DM04	1. Minor	Air	Plant or equipment issues		Normal activities	INCI013497	New	Repair Grit Arrestor	Repair Grit Arrestor	Complete	08/12/2017	Low
08/03/2017	Breach of ELV	PW102	1. Minor	Water	Other (add details)	Variation in factory boiler peat	Normal activities	INCI011937	Recurring	Inspection of lagoon and lagoon cleaned	Assessment of lagoon capability	Complete	06/04/2017	Low
23/11/2017	Breach of ELV	PW102	1. Minor	Water	Adverse weather		Normal activities	INCI013494	Recurring	None	None	Complete	08/12/2017	Low
09/12/2017	Breach of ELV	A106	1. Minor	Air	Plant or equipment issues		Normal activities	INCI013738	Recurring	Currently in discussion with the Agency	Currently in discussion with the Agency	Ongoing	22/01/2018	Low
05/12/2017	Breach of ELV	DM02	1. Minor	Air	Plant or equipment issues		Normal activities	INCI013780	New	Clean Factory Cyclone	Clean Factory Cyclone	Complete	26/01/2018	Low
19/12/2017	Breach of ELV	A104	1. Minor	Air	Plant or equipment issues		Normal activities	INCI013736	New	Replace an air lock	Replace an air lock	Complete	22/01/2018	Low
19/12/2017	Breach of ELV	A102	1. Minor	Air	Plant or equipment issues		Normal activities	INCI013731	Recurring	Currently in discussion with the Agency	Currently in discussion with the Agency	Complete	22/01/2018	Low
19/12/2017	Breach of ELV	A103	1. Minor	Air	Plant or equipment issues		Normal activities	INCI013734	New	System Cleaned	Inspect at next Factory outage	Complete	22/01/2018	Low
19/12/2017	Breach of ELV	B101	1. Minor	Air	Plant or equipment issues		Normal activities	INCI013728	Recurring	Currently in discussion with the Agency	Currently in discussion with the Agency	Complete	22/01/2018	Low

Total number of incidents current year	17
Total number of incidents previous year	27
% reduction/ increase	-37.00%

WASTE SUMMARY	Lic No:	P0499-01	Year	2017
SECTION A-PRTR ON SITE WASTE TREATMENT AND WASTE TRANSFERS TAB- TO BE COMPLETED BY ALL IPPC AND WASTE FACILITIES		PRTR facility logon	dropdown list click to see options	

SECTION B- WASTE ACCEPTED ONTO SITE-TO BE COMPLETED BY ALL IPPC AND WASTE FACILITIES

			Additional Information
1	Were any wastes accepted onto your site for recovery or disposal or treatment prior to recovery or disposal within the boundaries of your facility ?; (waste generated within your boundaries is to be captured through PRTR reporting) If yes please enter details in table 1 below	N/A	
2	Did your site have any rejected consignments of waste in the current reporting year? If yes please give a brief explanation in the additional information	SELECT	
3	Was waste accepted onto your site that was generated outside the Republic of Ireland? If yes please state the quantity in tonnes in additional information	SELECT	

Table 1 Details of waste accepted onto your site for recovery, disposal or treatment (do not include wastes generated at your site, as these will have been reported in your PRTR workbook)

Licenced annual tonnage limit for your site (total tonnes/annum)	EWC code European Waste Catalogue EWC codes	Source of waste accepted	Description of waste accepted **Please enter an accurate and detailed description - which applies to relevant EWC code** European Waste Catalogue EWC codes	Quantity of waste accepted in current reporting year (tonnes)	Quantity of waste accepted in previous reporting year (tonnes)	Reduction/ Increase over previous year +/ - %	Reason for reduction/ increase from previous reporting year	Packaging Content (%)- only applies if the waste has a packaging component	Disposal/Recovery or treatment operation carried out at your site and the description of this operation	Quantity of waste remaining on site at the end of reporting year (tonnes)	Comments -

SECTION C-TO BE COMPLETED BY ALL WASTE FACILITIES (waste transfer stations, Composters, Material recovery facilities etc) EXCEPT LANDFILL SITES

4	Is all waste processing infrastructure as required by your licence and approved by the Agency in place? If no please list waste processing infrastructure required onsite	SELECT
5	Is all waste storage infrastructure as required by your licence and approved by the Agency in place? If no please list waste storage infrastructure required on site	SELECT
6	Does your facility have relevant nuisance controls in place?	SELECT
7	Do you have an odour management system in place for your facility? If no why?	SELECT
8	Do you maintain a sludge register on site?	SELECT

SECTION D-TO BE COMPLETED BY LANDFILL SITES ONLY

Table 2 Waste type and tonnage-landfill only

Waste types permitted for disposal	Authorised/licenced annual intake for disposal (tpa)	Actual intake for disposal in reporting year (tpa)	Remaining licensed capacity at end of reporting year (m3)	Comments

Table 3 General information-Landfill only

Area ID	Date landfilling commenced	Date landfilling ceased	Currently landfilling	Private or Public Operated	Inert or non-hazardous	Predicted date to cease landfilling	Licence permits asbestos	Is there a separate cell for asbestos?	Accepted asbestos in reporting year	Total disposal area occupied by waste SELECT UNIT	Lined disposal area occupied by waste SELECT UNIT	Unlined area SELECT UNIT	Comments on liner type
Cell 8													

WASTE SUMMARY Lic No: P0499-01 Year 2017

Table 4 Environmental monitoring-landfill only

Landfill Manual-Monitoring Standards

Was meterological monitoring in compliance with Landfill Directive (LD) standard in reporting year +	Was leachate monitored in compliance with LD standard in reporting year	Was Landfill Gas monitored in compliance with LD standard in reporting year	Was SW monitored in compliance with LD standard in reporting year	Have GW trigger levels been established	Were emission limit values agreed with the Agency (ELVs)	Was topography of the site surveyed in reporting year	Has the statement under S53(A)(5) of WMA been submitted in reporting year	Comments

.+ please refer to Landfill Manual linked above for relevant Landfill Directive monitoring standards

Table 5 Capping-Landfill only

Area uncapped*	Area with temporary cap	Area with final cap to LD Standard m2 ha, a	Area capped other	Area with waste that should be permanently capped to date under licence	What materials are used in the cap	Comments
SELECT UNIT	SELECT UNIT					

*please note this includes daily cover area

Table 6 Leachate-Landfill only

9	Is leachate from your site treated in a Waste Water Treatment Plant?	SELECT
10	Is leachate released to surface water? If yes please complete leachate mass load information below	SELECT

Volume of leachate in reporting year(m3)	Leachate (BOD) mass load (kg/annum)	Leachate (COD) mass load (kg/annum)	Leachate (NH4) mass load (kg/annum)	Leachate (Chloride) mass load kg/annum	Leachate treatment on-site	Specify type of leachate treatment	Comments

Please ensure that all information reported in the landfill gas section is consistent with the Landfill Gas Survey submitted in conjunction with PRTR returns

Table 7 Landfill Gas-Landfill only

Gas Captured&Treated by LFG System m3	Power generated (MW / KWh)	Used on-site or to national grid	Was surface emissions monitoring performed during the reporting year?	Comments
			SELECT	

Littleton
Decommissioning and Rehabilitation
AER Overview 2017.

In 2017, Bord na Móna announced the closure of the Littleton Briquette Factory (closing March 2018) and the cessation of industrial peat production in the majority of bogs within the Littleton Bog Group. The only bog site where it is planned to continue milled peat production (for supply of horticulture) is Killeen. Industrial peat production has ceased in the remaining sites and it is expected that the next phase of decommissioning and peatland rehabilitation will start shortly. It is expected that this phase will take 3 years.

Planning has commenced for peatland rehabilitation. All of the draft rehab plans within the Littleton Bog Group are being reviewed and updated. Rehabilitation plans are currently being reviewed internally by BnM stakeholders to align rehabilitation to potential future after-uses. It is expected to carry out some external consultation with external stakeholders and the local community once this process has been completed.

Baseline ecological surveys have been carried out in 2017 to update previous ecological surveys carried out in 2009-2013. Rehabilitation plans for Knockahaw and Ballysorrell have been circulated to external stakeholders and have been finalised. It is expected that bog restoration works will commence on both sites in 2018.

Rehabilitation test programmes are underway in several other cutaway bog areas (Ballysorrell, Baunmore and Carrickhill) to train staff and to trial different rehabilitation techniques.

A small amount of rehabilitation (hydrological management) was carried out in Templetuohy Bog in conjunction with the Bruckana Windfarm development to reinforce and raise water levels in several wetland areas. Ongoing monitoring of cutaway within the Littleton licensing area included the area of the Bruckana Windfarm development.

The new Biodiversity Action Plan (2016-2021) was launched in 2016 with the annual Biodiversity Action Plan review day being held in February 2017, this included an update on the progress of the plan, bog restoration and cutaway rehabilitation for a wide range on statutory and non-statutory consultees including members of the EPA, NPWS, BWI, Bord na Mona, Coillte, Inland Fisheries Ireland, An Taisce, IPCC, Irish Red Grouse Association, Irish Wildlife Trust, NARGC, local game councils, Midland Regional Planning Authority as well as a range of local community groups and Heritage Officers from counties Laois, Offaly, Kildare, Roscommon, Longford, Meath, Galway, Westmeath and Dublin.

A copy of our Biodiversity Action Plan is available to view and download at http://www.bordnamona.ie/our-company/biodiversity/

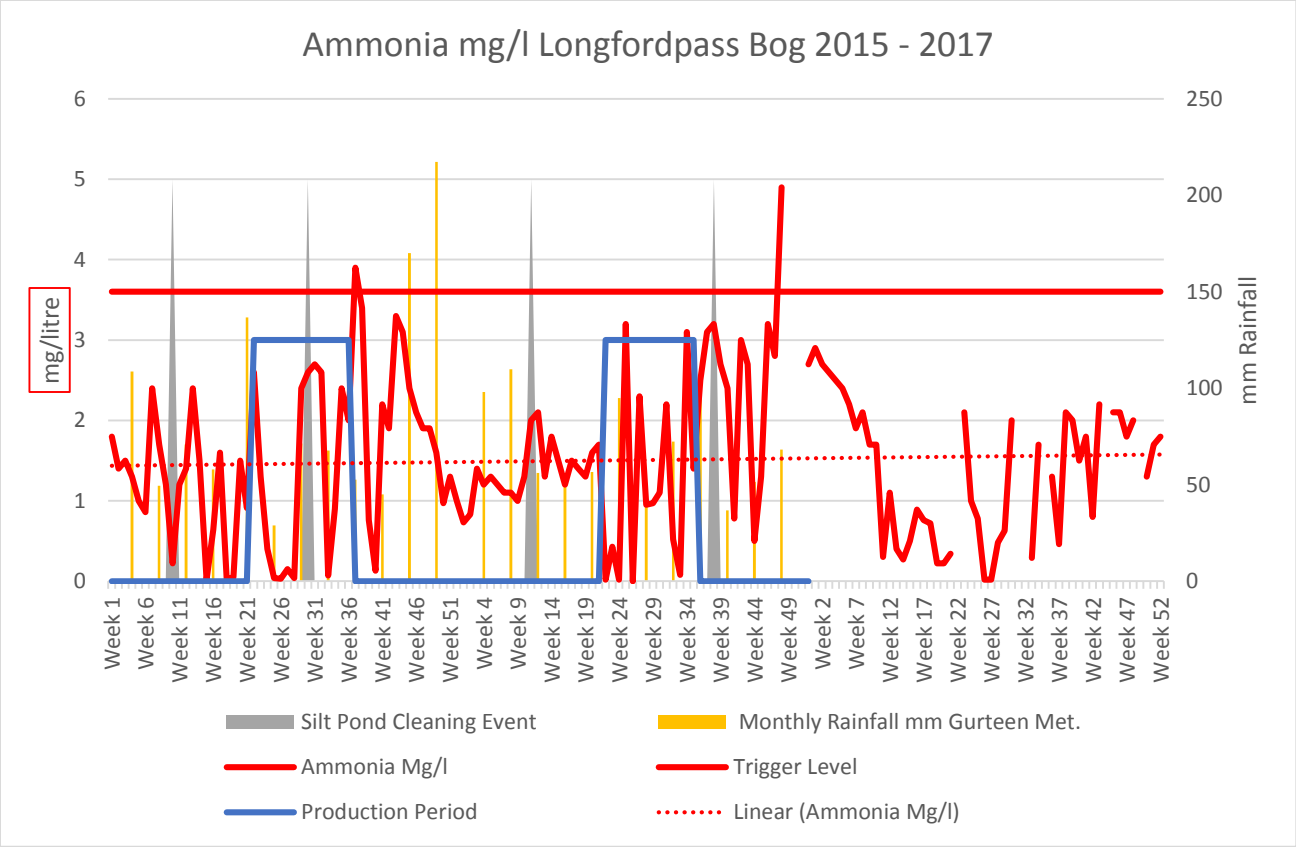
As required by condition *10.2 Cutaway Bog Rehabilitation Plans*, draft peatland rehabilitation plans for all the individual bog units were submitted to the agency in 2013, reviewed and amended in 2015 and re-submitted to the agency in 2015. All draft rehabilitation plans have been reviewed in 2017. These reviewed and amended plans will be re-submitted to the agency in due course.

Bord na Mona Littleton

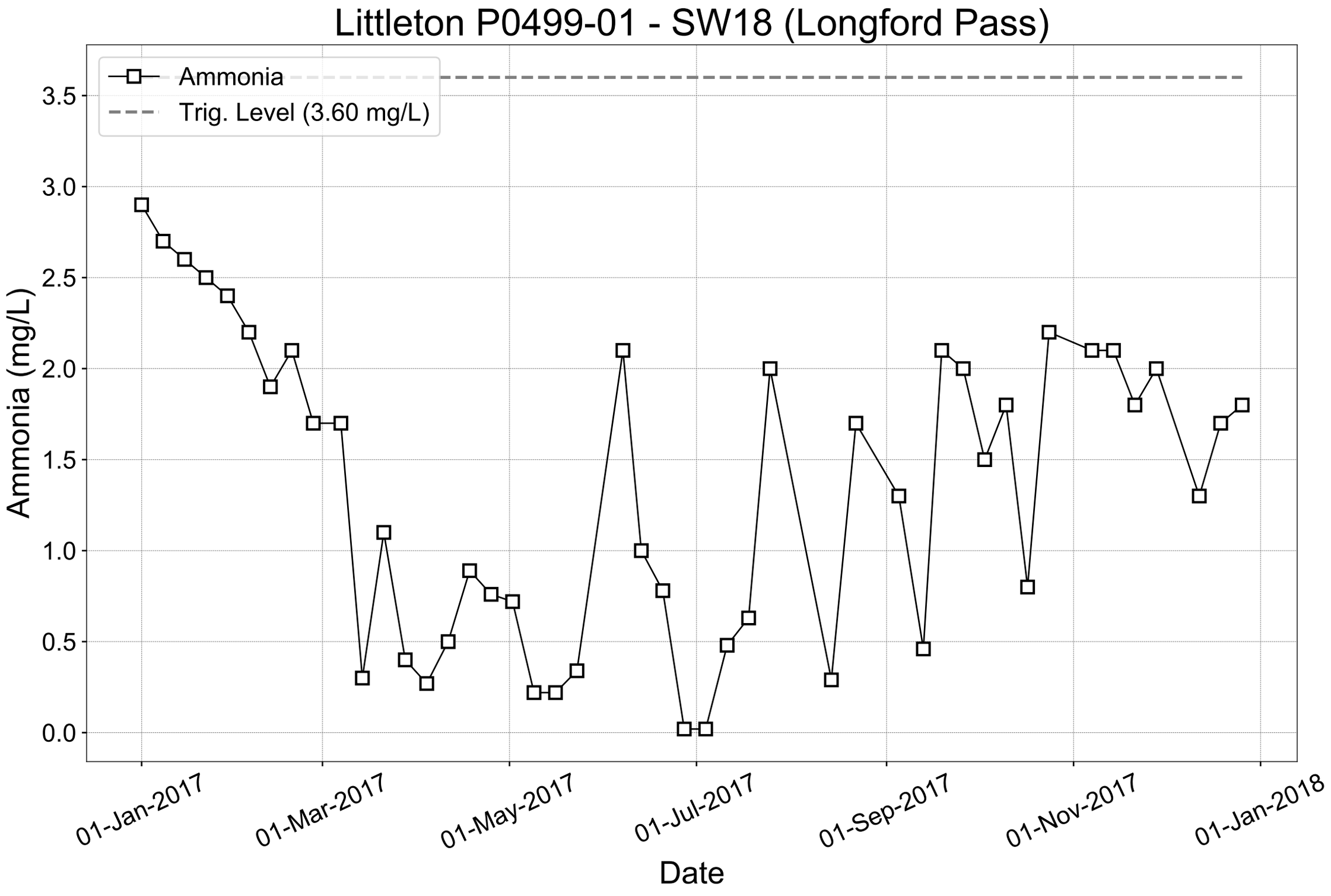
IPPC Licence P0499-01

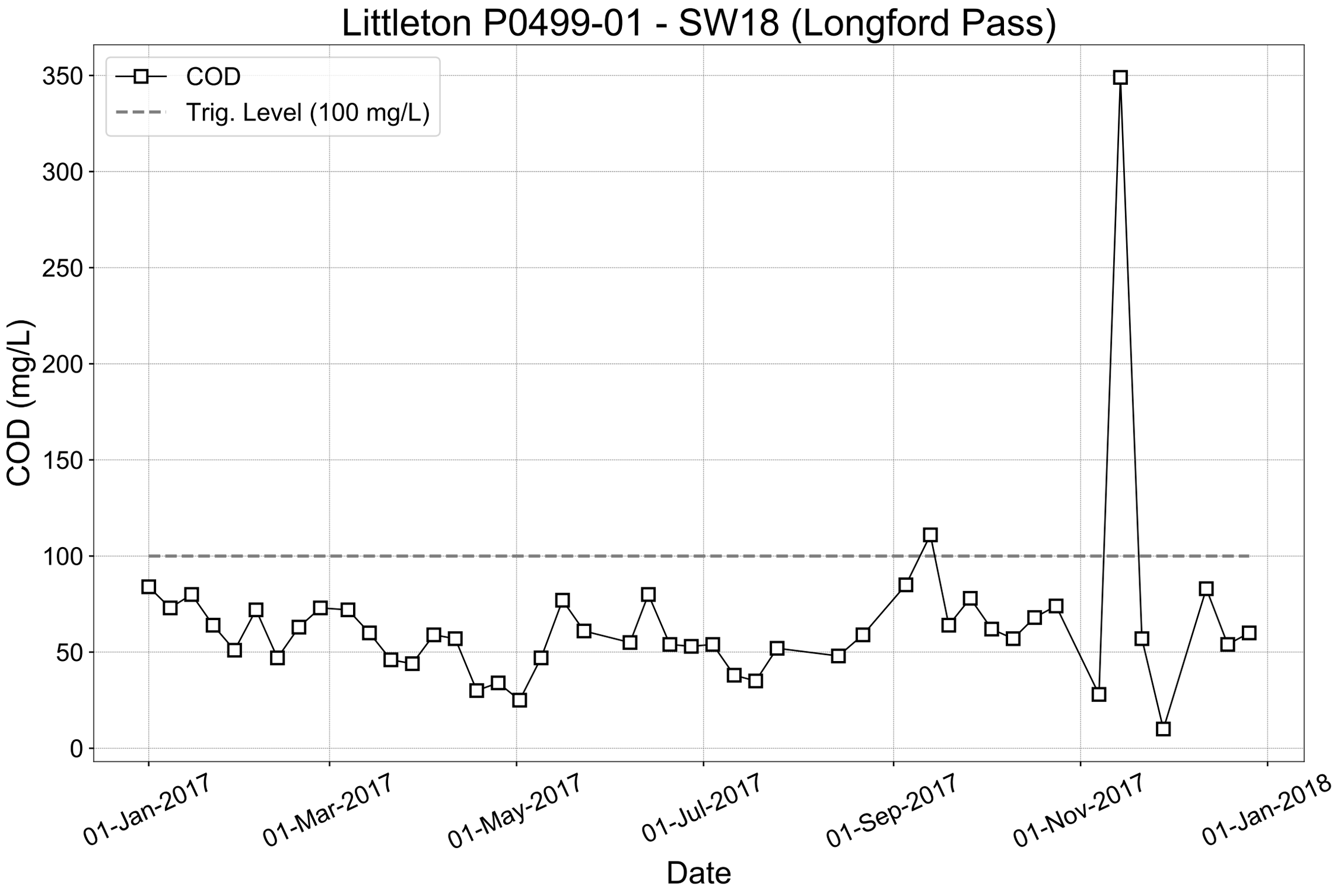
Siltpond Monitoring Frequency & Results 2017

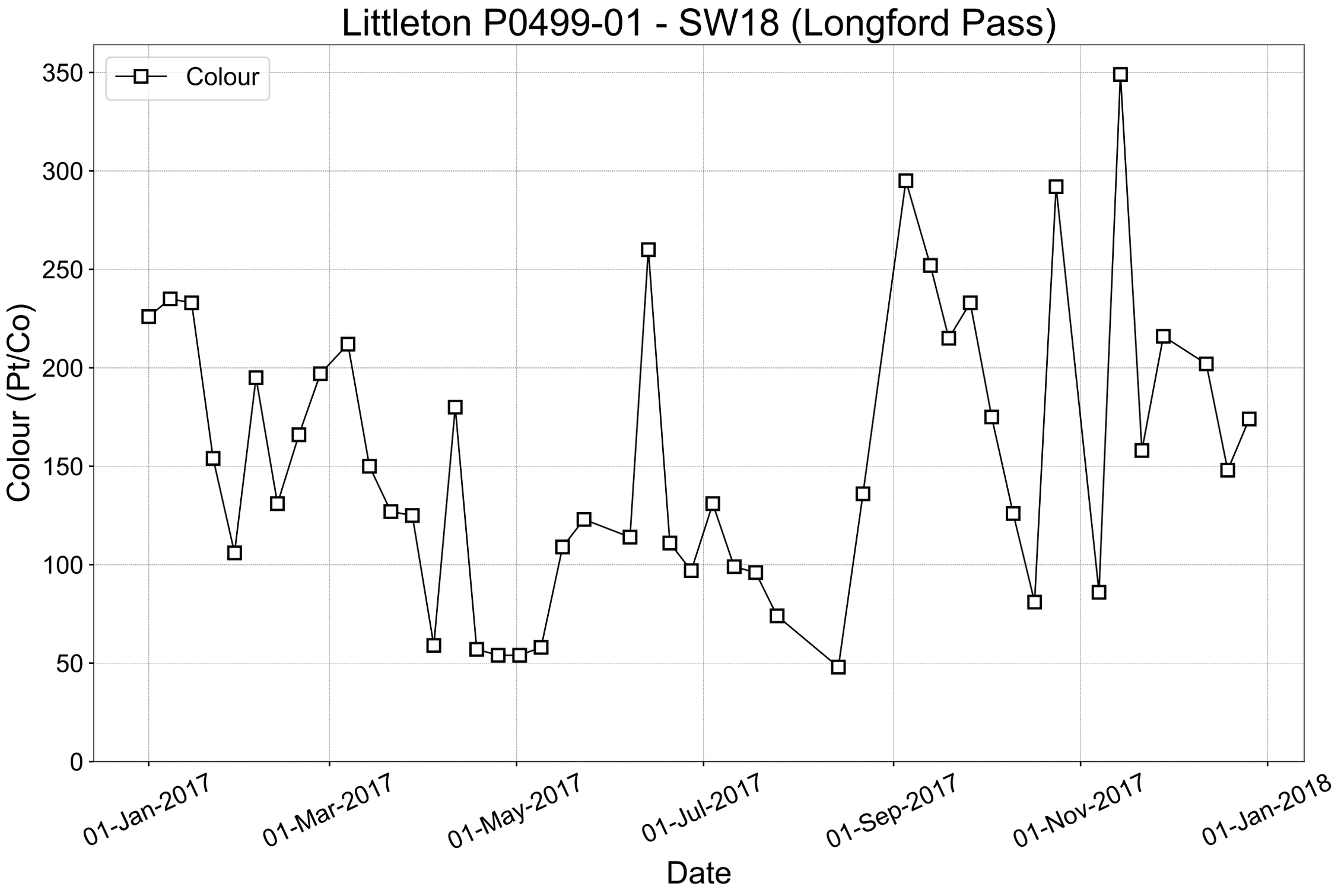
X	Y	Bog	SW	Monitoring	Sampled	pH	SS	TS	Ammonia	TP	COD	Colour	Ortho P
222077.15	154331.42	Littleton	SW-35	Q1 17	14/03/2017	7.3	5	200	0.38	0.3	85	289	0.24
219191.76	153609.45	Ballybeg	SW-12	Q1 17	14/03/2017	7.5	5	382	0.18	0.26	73	133	0.18
219740.68	153117.34	Ballybeg	SW-13	Q1 17	14/03/2017	7.5	5	372	0.78	0.4	71	136	0.34
224936.84	162017.90	Inch	SW-19	Q2 17	15/06/2017	7.6	5	316	1.1	0.05	62	164	0.02
223518.00	163330.63	Baunmore	SW-20	Q2 17	15/06/2017	8	5	320	0.12	0.05	59	128	0.01
225463.17	163546.72	Baunmore	SW-21	Q2 17	15/06/2017	8.2	7	334	3.6	0.05	65	159	0.01
223379.98	165067.73	Baunmore	SW-22	Q2 17	15/06/2017	7.7	5	396	0.09	0.05	62	155	0.01
223835.12	163353.33	Baunmore	SW-23	Q2 17	15/06/2017	7.9	5	298	1	0.05	58	137	0.01
223607.15	166814.52	Derryville	SW-24	Q2 17	15/06/2017	7.8	6	410	2.4	0.05	59	116	0.01
217891.33	150182.12	Killeen	SW-3	Q3 17	22/09/2017	7.5	6	174	0.86	0.05	77	286	0.01
218356.54	150695.86	Killeen	SW-4	Q3 17	22/09/2017	7.4	7	166	1	0.05	90	260	0.01
219213.04	150618.27	Killeen	SW-5	Q3 17	22/09/2017	7.5	8	222	0.54	0.05	72	320	0.01
220444.92	149508.42	Killeen	SW-8	Q3 17	22/09/2017	7.6	6	166	0.86	0.05	76	282	0.01
220367.14	150474.40	Killeen	SW-9	Q3 17	22/09/2017	7.6	5	250	0.36	0.05	48	97	0.02
221193.73	150442.04	Lanespark	SW-10	Q3 17	22/09/2017	7.7	6	302	0.02	0.05	25	75	0.01
219043.69	152329.52	Ballybeg	SW-11	Q4 17	30/11/2017	7.4	5	232	0.78	0.05	75	226	0.01
222140.83	170097.94	Templetouhy	SW-29	Q4 17	30/11/2017	7.4	5	266	0.98	0.05	64	223	0.01
221701.79	170410.93	Templetouhy	SW-30	Q4 17	30/11/2017	7.5	5	279	0.91	0.05	69	212	0.01
222828.25	162569.41	Longford Pass	SW-18	Q4 17	30/11/2017	7.6	5	236	2	0.05	69	225	0.01
219951.49	151803.32	Lanespark	SW-14	Q4 17	30/11/2017	7.6	37	388	0.57	0.2	115	137	2
221890.00	160698.73	Longford Pass	SW-17	Q4 17	30/11/2017	7.6	5	268	2.1	0.05	73	223	0.01

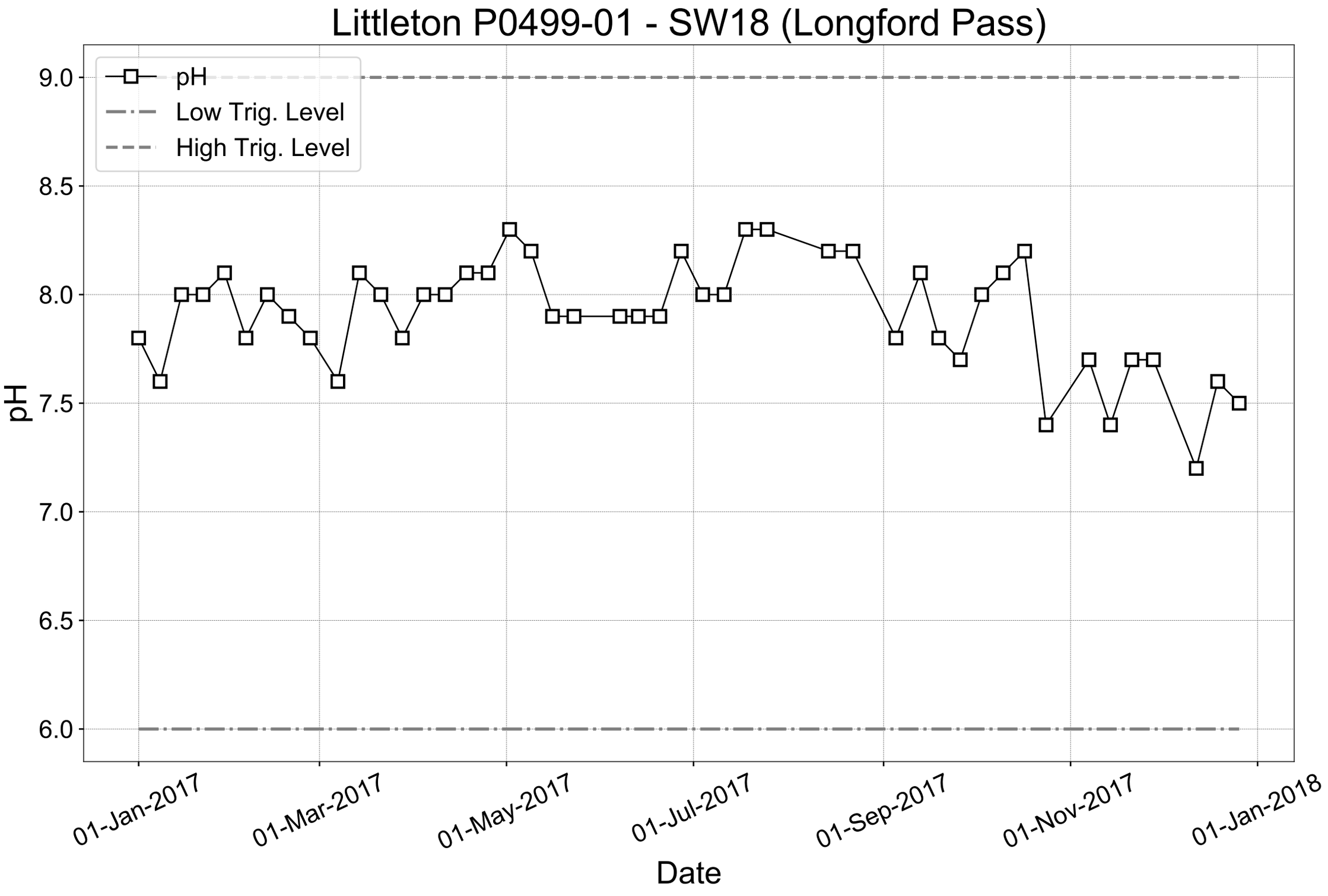


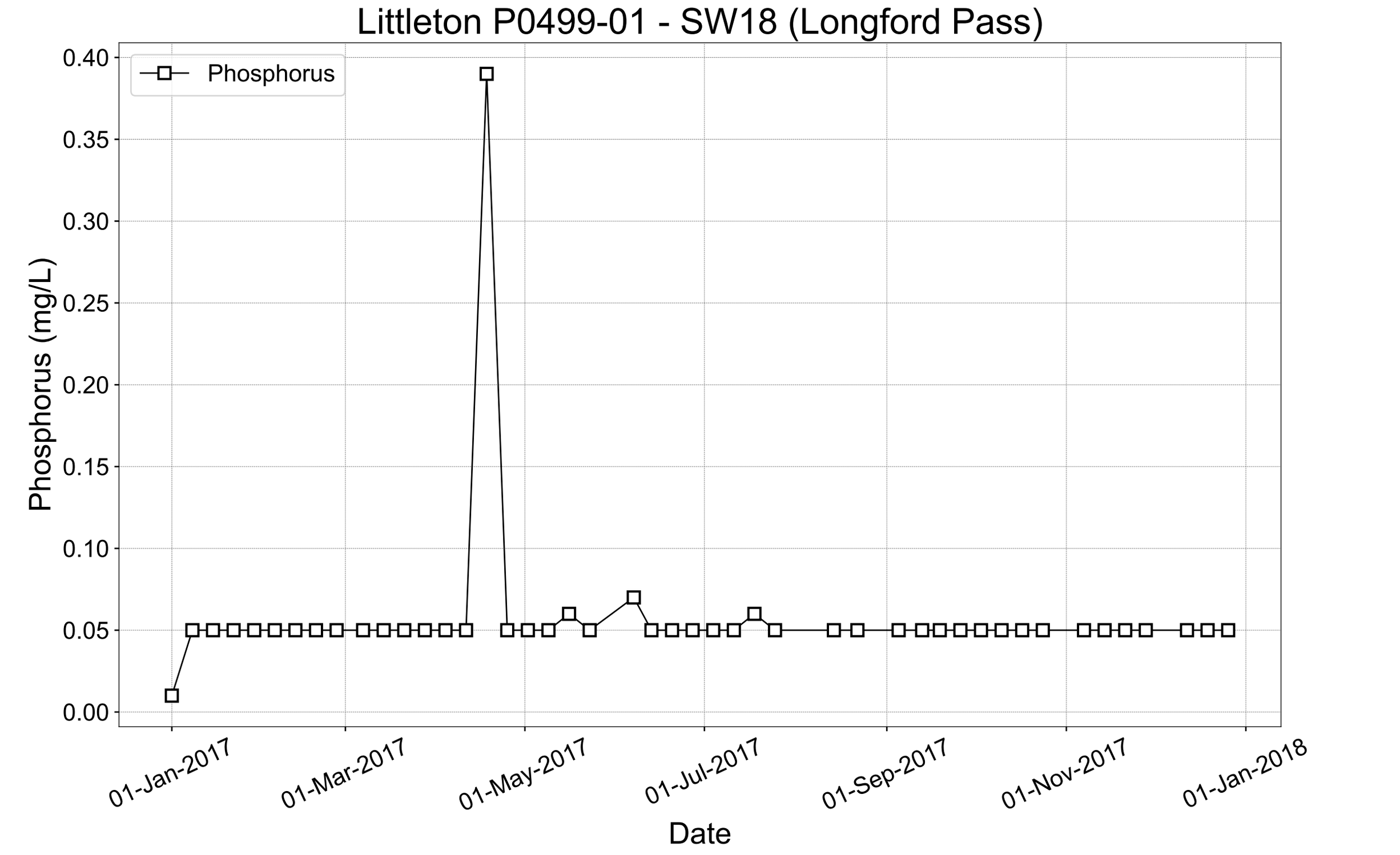
Longfordpass bog is an active production bog with the composite sampler located here during 2015, 16 and 17. The composite sampler takes a flow proportional composite sample over a 24 hour period. The sampler had a 33% downtime during the period being reported, and returned 46 weekly ammonia results, the balance being undertaken using a grab sample. The ammonia trigger level of 3.6mg/l, as agreed with the Agency, was not exceeded during the period. Combining the 2015, 16 & 17 results above, shows concentrations trending level or slightly upwards over this three year period as peat extraction continued. This bog has now been closed and will be scheduled from decommissioning and rehabilitation. However the sampler will be maintained at this location, to identify any trends during this decommissioning/rehab activities. There was no obvious link between the summer production, winter maintenance, or silt pond maintenance events on the concentration of Ammonia discharging from this peatland. The only link expected would be that related to rainfall events, seasonal weather patterns and the expected subsequent surface water run-off and associated ammonia concentrations.

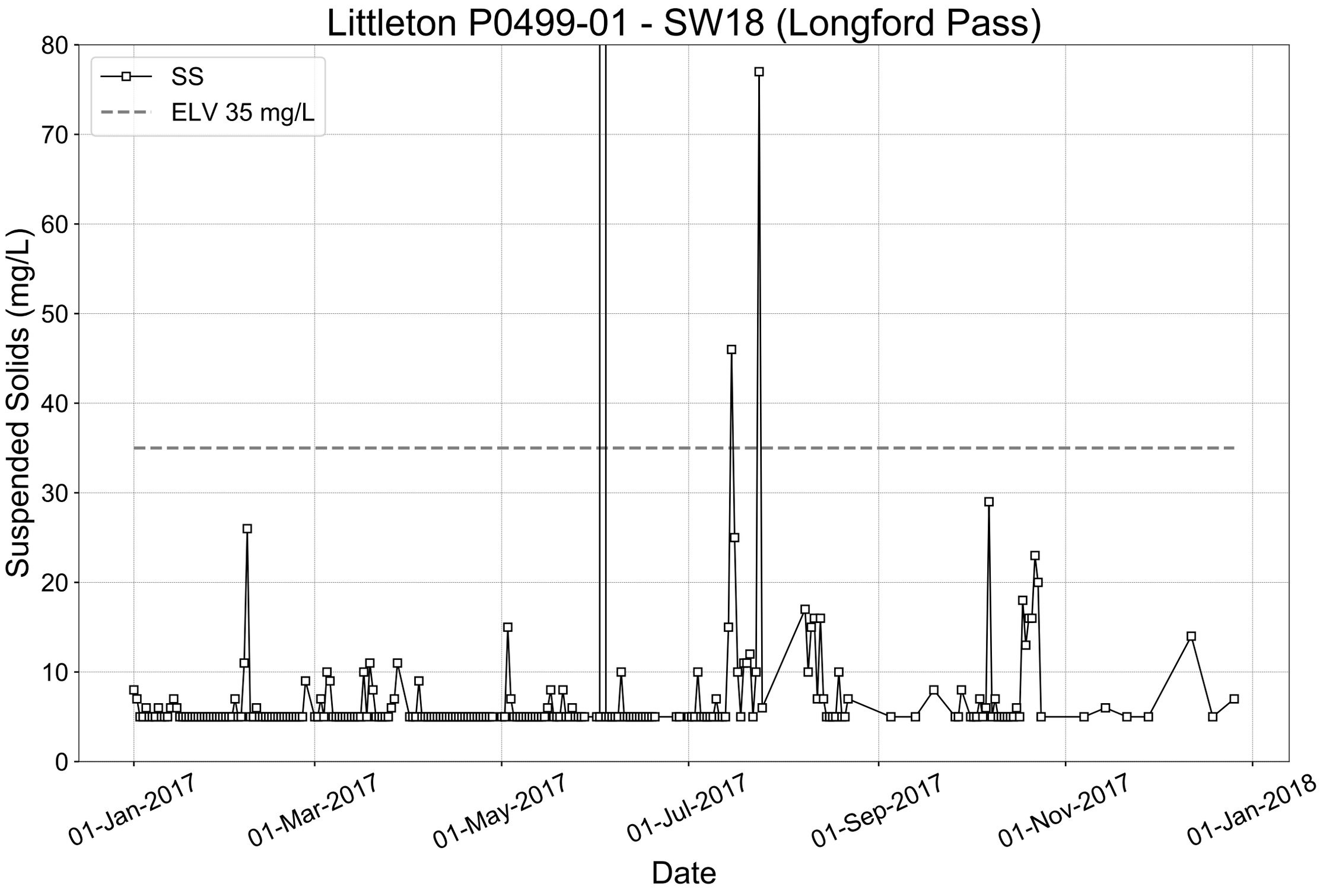

Littleton P0499-01 - SW18 (Longford Pass)
Ammonia
Trig. Level (3.60 mg/L)
Ammonia (mg/L)
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
01-Jan-2017
01-Mar-2017
01-May-2017
01-Jul-2017
01-Sep-2017
01-Nov-2017
01-Jan-2018
Date

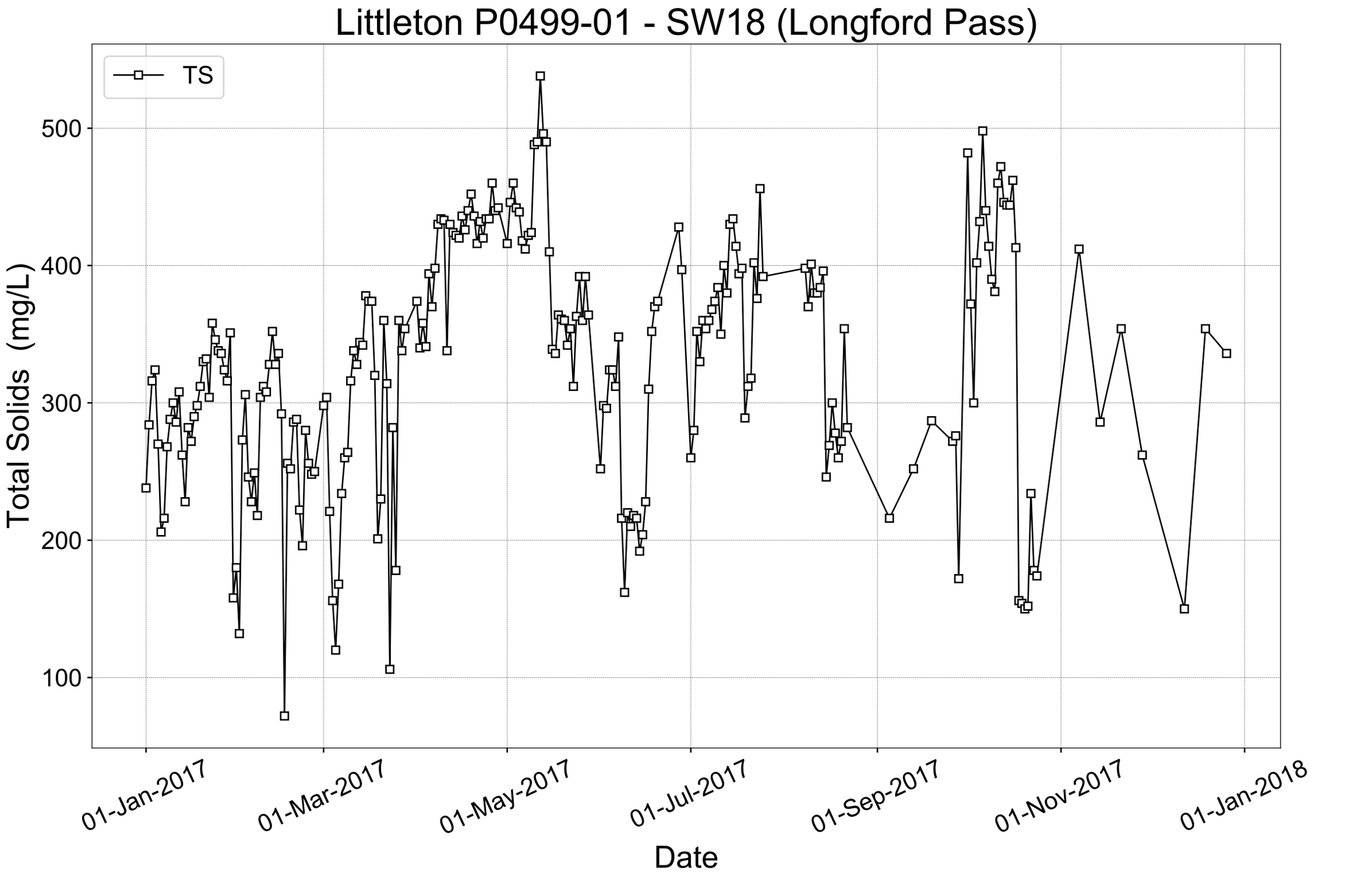

Littleton P0499-01 - SW18 (Longford Pass)
COD
Trig. Level (100 mg/L)
COD (mg/L)
350
300
250
200
150
100
50
0
01-Jan-2017
01-Mar-2017
01-May-2017
01-Jul-2017
01-Sep-2017
01-Nov-2017
01-Jan-2018
Date


Littleton P0499-01 - SW18 (Longford Pass)
Colour
Colour (Pt/Co)
350
300
250
200
150
100
50
0
01-Jan-2017
01-Mar-2017
01-May-2017
01-Jul-2017
01-Sep-2017
01-Nov-2017
01-Jan-2018
Date


Littleton P0499-01 - SW18 (Longford Pass)
pH
Low Trig. Level
High Trig. Level
9.0
8.5
8.0
7.5
7.0
6.5
6.0
pH
01-Jan-2017
01-Mar-2017
01-May-2017
01-Jul-2017
01-Sep-2017
01-Nov-2017
01-Jan-2018
Date


Littleton P0499-01 - SW18 (Longford Pass)
Phosphorus
Phosphorus (mg/L)
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
01-Jan-2017
01-Mar-2017
01-May-2017
01-Jul-2017
01-Sep-2017
01-Nov-2017
01-Jan-2018
Date


Littleton P0499-01 - SW18 (Longford Pass)
SS
ELV 35 mg/L
Suspended Solids (mg/L)
0
10
20
30
40
50
60
70
80
01-Jan-2017
01-Mar-2017
01-May-2017
01-Jul-2017
01-Sep-2017
01-Nov-2017
01-Jan-2018
Date


Littleton P0499-01 - SW18 (Longford Pass)
TS
Total Solids (mg/L)
500
400
300
200
100
01-Jan-2017
01-Mar-2017
01-May-2017
01-Jul-2017
01-Sep-2017
01-Nov-2017
01-Jan-2018
Date

PW102 Flow Data 2017		
Head mm	**M3 / Hour**	**Litres / Sec**
0	**0**	**0**
100	16	4.4
105	18	5.0
110	20	5.6
115	22	6.1
120	25	6.9
125	28	7.8
130	30	8.3
135	33	9.2
140	37	10.3
145	40	11.1
150	43	11.9
155	47	13.1
160	51	14.2
165	55	15.3
170	59	16.4
175	64	17.8
180	68	18.9
185	73	20.3
190	78	21.7
195	84	23.3
200	90	25.0
205	96	26.7
210	100	27.8
215	107	29.7
220	113	31.4
225	119	33.1
230	126	35.0
235	133	36.9
240	140	38.9
245	148	41.1
250	155	43.1
255	163	45.3
260	171	47.5
265	180	50.0
270	188	52.2
275	197	54.7
280	206	57.2
285	216	60.0
290	225	62.5
295	235	65.3
300	249	69.2

Weekly Emissions to Water PW - 102. 2017

Works: Littleton

IPPC: 499

Date	pH (pH Units)	COD (mg/l)	SS (mg/l)	Flow l/sec	Head mm	Ammonia
04/01/2017	7.8	48	7		50	*0.35*
11/01/2017	8.5	94	51	31.4	220	0.48
18/01/2017	8.3	80	38	29.7	215	0.73
25/01/2017	8.2	78	36	25.0	200	0.65
01/02/2017	8.0	112	61	31.4	220	*0.51*
08/02/2017	8.1	96	43	25.0	200	0.32
15/02/2017	7.9	103	80	47.5	260	0.59
22/02/2017	8.0	91	52	35.0	230	0.41
01/03/2017	8.0	74	35	27.8	210	0.57
08/03/2017	8.6	95	54	26.7	205	0.93
15/03/2017	8.4	96	78	27.8	210	0.64
21/03/2017	8.8	92	62	27.8	210	0.51
28/03/2017	8.4	78	47	26.7	205	0.80
04/04/2017	8.2	70	41	27.8	210	0.75
12/04/2017	8.9	87	41	27.8	210	2.10
19/04/2017	8.3	61	26	21.7		0.06
26/04/2017	8.6	96	60	23.3	195	0.73
03/05/2017	8.2	65	42	27.8	210	0.62
10/05/2017	8.2	56	39	26.7	205	0.44
18/05/2017	8.2	70	39			0.19
25/05/2017	8.4	54	32	26.7	205	0.34
01/06/2017	7.8	36	21		24	0.74
08/06/2017	7.8	44	<5		75	0.15
15/06/2017	7.9	38	10		60	0.60
22/06/2017	8.0	51	<5		37	0.48
28/06/2017	7.9	51	5		66	1.4
06/07/2017	No flow					
13/07/2017	No flow					
20/07/2017						
22/07/2017						
27/07/2017	7.8	44	17			0.28
03/08/2017	No flow					
10/08/2017						
19/08/2017	8	17	13			0.37
24/08/2017	7.7	31	<5			0.54
31/08/2017	7.9	40	<5			0.27
06/09/2017				No flow at	v-notch	
13/09/2017	7.9	47	10	No flow at	v-notch	0.53
19/09/2017	7.7	45	6	No flow at	v-notch	0.74
26/09/2017	7.9	41	6	4.4	100	0.47
03/10/2017	7.8	49	9	27.8	210	0.15
10/10/2017	7.8	56	18	69.2	300	0.40
17/10/2017	7.8	43	7		65	0.36
24/10/2017						
31/10/2017	8.9	14	27		20	0.23
07/11/2017	7.3	42	14		60	0.44
16/11/2017	7.4	54	7		50	0.44
21/11/2017					90	
28/11/2017	7.4	46	18			0.45
05/12/2017	8.6	37	29			0.54
12/12/2017						
19/12/2017	7.7	43	23			<0.02

Quarterly Emissions to Water PW - 102 2017

Works: Littleton

IPPC: 499

Quarter	Total Phosperous	Ammonia	Oil,Fats &Grease
Feb	0.51	0.59	<1
May	0.60	0.44	<1
November	<0.05	0.44	<1

Guidance to completing the PRTR workbook

PRTR Returns Workbook

Version 1.1.10

REFERENCE YEAR	2017

1. FACILITY IDENTIFICATION

Parent Company Name	Bord na Mona Fuels Limited
Facility Name	Bord na Mona Fuels Limited (Littleton)
PRTR Identification Number	P0499
Licence Number	P0499-01

Classes of Activity

No.	class_name
	Refer to PRTR class activities below

Address 1	Littleton Group
Address 2	c/o Littleton Briquette Factory
Address 3	Thurles
Address 4	
	Tipperary
Country	Ireland
Coordinates of Location	-7.69986 52.6123
River Basin District	IESE
NACE Code	0892
Main Economic Activity	Extraction of peat
AER Returns Contact Name	Tommy Maguire
AER Returns Contact Email Address	tommy.maguire@bnm.ie
AER Returns Contact Position	Littleton General Manager
AER Returns Contact Telephone Number	050444215
AER Returns Contact Mobile Phone Number	0879728255
AER Returns Contact Fax Number	
Production Volume	137273.0
Production Volume Units	
Number of Installations	3
Number of Operating Hours in Year	0
Number of Employees	148
User Feedback/Comments	In accordance with licence condition 6.2 of Technical Amendment A, quarterly sampling is now rotated every quarter and therefore suspended solids results are not factored into loading. Due to technical difficulties experienced with the composite sampler annual loading was not possible to calculate. All composite sampler results are attached for review in the AER document. Following a review of peat briquetting operations it was recommended that to sustain the business into the future, the factory at Littleton, would continue production for the coming season and should permanently cease production in April, 2018. This course of action impinged on monitoring results and quantities of wastes.
Web Address	

2. PRTR CLASS ACTIVITIES

Activity Number	Activity Name
50.1	General

3. SOLVENTS REGULATIONS (S.I. No. 543 of 2002)

Is it applicable?	No
Have you been granted an exemption ?	
If applicable which activity class applies (as per Schedule 2 of the regulations) ?	
Is the reduction scheme compliance route being used ?	

4. WASTE IMPORTED/ACCEPTED ONTO SITE

Guidance on waste imported/accepted onto site

Do you import/accept waste onto your site for on-site treatment (either recovery or disposal activities) ?	No

This question is only applicable if you are an IPPC or Quarry site

4.1 RELEASES TO AIR Link to previous years emissions data | PRTR# : P0499 | Facility Name : Bord na Mona Fuels Limited (Littleton) | Filename : P0499_2017.xls | Return Year : 2017 | 12/6/2018 14:33

SECTION A : SECTOR SPECIFIC PRTR POLLUTANTS

RELEASES TO AIR					Please enter all quantities in this section in KGs			
POLLUTANT		METHOD			QUANTITY			
			Method Used					
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
					0.0	0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

SECTION B : REMAINING PRTR POLLUTANTS

RELEASES TO AIR					Please enter all quantities in this section in KGs			
POLLUTANT		METHOD			QUANTITY			
			Method Used		B101			
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
08	Nitrogen oxides (NOx/NO2)	M	ISO 10849:1996		32118.0	32118.0	0.0	0.0
11	Sulphur oxides (SOx/SO2)	M	ISO 7935: 1992		57188.0	57188.0	0.0	0.0
02	Carbon monoxide (CO)	M	ISO 12039:2001		381693.0	381693.0	0.0	0.0
03	**Carbon dioxide (CO2)**	M	ETS		50058700.0	50058700.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

SECTION C : REMAINING POLLUTANT EMISSIONS (As required in your Licence)

RELEASES TO AIR					Please enter all quantities in this section in KGs										
POLLUTANT		METHOD											QUANTITY		
			Method Used		B101	A101	A102	A103	A104	A105	A106	DM01-DM04			
Pollutant No.	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	Emission Point 2	Emission Point 3	Emission Point 4	Emission Point 5	Emission Point 6	Emission Point 7	Emission Point 8	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
210	Dust	E	OTH	VDI 2119 Blatt 2/Part 2	175527.0	36295.0	51952.0	54.0	575.0	192.0	123.0	0.319	264718.319	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

Additional Data Requested from Landfill operators

For the purposes of the National Inventory on Greenhouse Gases, landfill operators are requested to provide summary data on landfill gas (Methane) flared or utilised on their facilities to accompany the figures for total methane generated. Operators should only report their Net methane (CH4) emission to the environment under T(total) KG/yr for Section A: Sector specific PRTR pollutants above. Please complete the table below:

Landfill: Bord na Mona Fuels Limited (Littleton)

Please enter summary data on the quantities of methane flared and / or utilised	T (Total) kg/Year	M/C/E	Method Used: Method Code	Method Used: Designation or Description	Facility Total Capacity m3 per hour	
Total estimated methane generation (as per site model)	0.0				N/A	
Methane flared	0.0				0.0	(Total Flaring Capacity)
Methane utilised in engine/s	0.0				0.0	(Total Utilising Capacity)
Net methane emission (as reported in Section A above)	0.0				N/A	

4.2 RELEASES TO WATERS

Link to previous years emissions data

SECTION A : SECTOR SPECIFIC PRTR POLLUTANTS

Data on ambient monitoring of storm/surface water or groundwater, conducted as part of your licence requirements, should NOT be submitted under AER / PRTR Reporting as this only concerns Releases from your facility

RELEASES TO WATERS					Please enter all quantities in this section in KGs			
POLLUTANT					QUANTITY			
			Method Used					
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
					0.0	0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

SECTION B : REMAINING PRTR POLLUTANTS

RELEASES TO WATERS					Please enter all quantities in this section in KGs			
POLLUTANT					QUANTITY			
			Method Used					
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
					0.0	0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

SECTION C : REMAINING POLLUTANT EMISSIONS (as required in your Licence)

RELEASES TO WATERS					Please enter all quantities in this section in KGs			
POLLUTANT					QUANTITY			
			Method Used		SW18			
Pollutant No.	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
240	**Suspended Solids**	E	OTH	G/19 Based on ALPHA,1998,20th Edition, Method 2540D	0.0	0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

4.3 RELEASES TO WASTEWATER OR SEWER

Link to previous years emissions data

SECTION A : PRTR POLLUTANTS

OFFSITE TRANSFER OF POLLUTANTS DESTINED FOR WASTE-WATER TREATMENT OR SEWER					Please enter all quantities in this section in KGs			
POLLUTANT		METHOD			QUANTITY			
			Method Used					
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
					0.0	0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

SECTION B : REMAINING POLLUTANT EMISSIONS (as required in your Licence)

OFFSITE TRANSFER OF POLLUTANTS DESTINED FOR WASTE-WATER TREATMENT OR SEWER					Please enter all quantities in this section in KGs			
POLLUTANT		METHOD			QUANTITY			
			Method Used					
Pollutant No.	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
					0.0	0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

4.4 RELEASES TO LAND

Link to previous years emissions data

SECTION A : PRTR POLLUTANTS

RELEASES TO LAND					Please enter all quantities in this section in KGs		
POLLUTANT		METHOD			QUANTITY		
			Method Used				
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year
					0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

SECTION B : REMAINING POLLUTANT EMISSIONS (as required in your Licence)

RELEASES TO LAND					Please enter all quantities in this section in KGs		
POLLUTANT		METHOD			QUANTITY		
			Method Used				
Pollutant No.	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year
					0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

5. ONSITE TREATMENT & OFFSITE TRANSFERS OF WASTE

Please enter all quantities on this sheet in Tonnes

Transfer Destination	European Waste Code	Hazardous	Quantity (Tonnes per Year)	Description of Waste	Waste Treatment Operation	Method Used		Location of Treatment	Haz Waste : Name and Licence/Permit No of Next Destination Facility Non Haz Waste: Name and Licence/Permit No of Recover/Disposer	Haz Waste : Address of Next Destination Facility Non Haz Waste: Address of Recover/Disposer	Name and License / Permit No. and Address of Final Recoverer / Disposer (HAZARDOUS WASTE ONLY)	Actual Address of Final Destination i.e. Final Recovery / Disposal Site (HAZARDOUS WASTE ONLY)
						M/C/E	Method Used					
Within the Country	01 01 02	No	305.4	wastes from mineral non-metalliferous excavation	D1	E	Volume Calculation	Onsite of generati	Bord na Mona Fuels Ltd,P0499-01	Littleton,Thurles,Co Tipperary,,Ireland		
Within the Country	01 01 02	No	633.6	wastes from mineral non-metalliferous excavation	D1	E	Volume Calculation	Onsite of generati	Bord na Mona Fuels Ltd,P0499-01	Littleton,Thurles,Co Tipperary,,Ireland		
Within the Country	02 01 04	No	239.72	waste plastics (except packaging)	R3	M	Weighed	Offsite in Ireland	Ryston Industries,WFP KE-12-0066-01 & WCP KE-10-0569-01	Castledermot,Co Kildare,,,,Ireland		
To Other Countries	11 01 13	Yes	1.05	degreasing wastes containing dangerous substances	R2	C	Volume Calculation	Abroad	Safety Kleen Ltd,W0099-01	Tallaght,Dublin,,,,Ireland	Solvent Recovery Management,PP33345F,Wheeland Rd,Knottingly,West Yorks,WF118DZ,United Kingdom	Wheeland Rd,Knottingly,West Yorks,WF118DZ,United Kingdom
Within the Country	13 02 05	Yes	3.0	mineral-based non-chlorinated engine, gear and lubricating oils	R1	C	Volume Calculation	Offsite in Ireland	Enva Ireland Ltd,W0184-1	Clonminam Ind Estate,Portlaoise,Co Laois,,Ireland	Enva Ireland Ltd,W0184-1,Clonminam Ind Estate,Portlaoise,Co Laois,,Ireland	Clonminam Ind Estate,Portlaoise,Co Laois,,Ireland
Within the Country	13 05 03	Yes	0.0	interceptor sludges	R1	M	Volume Calculation	Offsite in Ireland	Enva Ireland Ltd,W0184-1	Clonminam Ind Estate,Portlaoise,Co Laois,,Ireland	Enva Ireland Ltd,W0184-1,Clonminam Ind Estate,Portlaoise,Co Laois,,Ireland	Clonminam Ind Estate,Portlaoise,Co Laois,,Ireland
To Other Countries	13 08 99	Yes	0.0	wastes not otherwise specified	R1	E	Volume Calculation	Abroad	Enva Ireland Ltd,W0184-1	Clonminam Ind Estate,Portlaoise,Co Laois,,Ireland	KWA,E17012100,Lintfort,,,,,Germany	Lintfort,,,,,Germany
Within the Country	15 01 03	No	223.85	wooden packaging	R1	M	Weighed	Offsite in Ireland	Kiawa Ltd,WP/TN/24	Tipperary,,,,,,Ireland		
To Other Countries	15 02 02	Yes	0.45	absorbents, filter materials (including oil filters not otherwise specified), wiping cloths, protective clothing contaminated by dangerous substances	D10	E	Volume Calculation	Abroad	Enva Ireland Ltd,W0184-1	Clonminam Ind Estate,Portlaoise,Co Laois,,Ireland	KWA,E17012100,Lintfort,,,,,Germany	Lintfort,,,,,Germany
To Other Countries	16 01 07	Yes	0.56	oil filters	R4	C	Volume Calculation	Abroad	Enva Ireland Ltd,W0184-1	Clonminam Ind Estate,Portlaoise,Co Laois,,Ireland	R. D Recycling,51727/1/KD,Houthalen,,,,,Belgium	Houthalen,,,,,,Belgium
Within the Country	17 04 07	No	0.0	mixed metals	R4	M	Weighed	Offsite in Ireland	Hammond Lane Ltd,WP4620033	Athlone,Co Westmeath,,,,Ireland		
Within the Country	20 01 21	Yes	0.0	fluorescent tubes and other mercury-containing waste	R13	M	Weighed	Offsite in Ireland	Irish Lamp Recycling,WFP-KE-08-0348-01	Athy,,,,,,,Ireland	Irish Lamp Recycling,WFP-KE-08-0348-01,Athy,Co Kildare,,,,Ireland	Athy,Co Kildare,,,,Ireland
Within the Country	20 03 01	No	20.82	mixed municipal waste	D1	M	Weighed	Offsite in Ireland	AES,WP-OY-08-601-01	Nenagh,Tipperary,,,,Ireland		
Within the Country	20 03 01	No	27.09	mixed municipal waste	D1	E	Volume Calculation	Offsite in Ireland	AES,WP-OY-08-601-01	Nenagh,Tipperary,,,,Ireland		
Within the Country	20 03 01	No	27.09	mixed municipal waste	R11	E	Volume Calculation	Offsite in Ireland	AES,WP-OY-08-601-01	Nenagh,Tipperary,,,,Ireland		

* Select a row by double-clicking the Description of Waste then click the delete button

Link to previous years waste data
Link to previous years waste summary data & percentage change
Link to Waste Guidance

Annual Environmental Report 2018

Bord na Mona Fuels Ltd
(Littleton Group of Bogs)
IPC Licence P0499-01

LEABEG, TULLAMORE, CO. OFFALY, IRELAND
TELEPHONE: (05793) 45900. INT: +353-5793-45900. FAX :(05793) 45160. INT: +353-5793-45160

Facility Information Summary	
AER Reporting Year	2018
Licence Register Number	P0499-01
Name of site	Bord na Mona Littleton
Site Location	Lanespark, Littleton, Thurles, Co Tipperary
NACE Code	0892
Class/Classes of Activity	1.4
National Grid Reference (6E, 6N)	220443, 151233

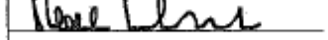
A description of the activities/processes at the site for the reporting year. This should include information such as production increases or decreases on site, any infrastructural changes, environmental performance which was measured during the reporting year **and an overview of compliance with your licence** listing all exceedances of licence limits (where applicable) and what they relate to e.g. air, water, noise.

Bog production activities ceased in the Littleton group of bogs in 2017 and no production took place in 2018. The briquette factory operated from 1st Dec to 21st March 2018 and produced 39376 tonnes of briquettes during that period. There were 22 non-compliances/incidents/breach of ELV, 1 related to factory stack emissions, 11 was a breach of Trigger level in discharges to water, 4 fugitive dust emissions and 6 reported spills. There were no environmental complaints received during the reporting period. In relation to silt pond cleaning, 100% of ponds received two cleanings, with some ponds receiving more depending on inspection results. Decommissioning and Rehabilitation works commenced in 2018 w th a Draft Littleton Bog Rehabilitation Plan, Independent Closure Audit Report and various other requests for approval/agreement submitted to the EPA. These included approval for Wildcrafting of Indigenous herbs and plant water on Bord na Mona Lands, and updates on management changes.

Declaration:

All the data and information presented in this report has been checked and certified as being accurate.

The quality of the information is assured to meet licence requirements.

	02/07/2019.
Signature Group/Facility manager (or nominated, suitably qualified and experienced deputy)	Date

AIR-summary template

Lic No: P0499-01 Year 2018

Answer all questions and complete all tables where relevant

			Additional information
1	Does your site have licensed air emissions? If yes please complete table A1 and A2 below for the current reporting year and answer further questions. If **you do not have** licenced emissions and	Yes	All monitoring activities for air emissions ceased as factory operations are finished.

Periodic/Non-Continuous Monitoring

2	Are there any results in breach of licence requirements? If yes please provide brief details in the comment section of TableA1 below	Yes	
3	Was all monitoring carried out in accordance with EPA guidance note AG2 and using the basic air monitoring checklist? Basic air monitoring checklist AGN2	Yes	

Table A1: Licensed Mass Emissions/Ambient data-periodic monitoring (non-continuous)

Emission reference no:	Parameter/ Substance	Frequency of Monitoring	ELV in licence or any revision therof	Licence Compliance criteria	Measured value	Unit of measurement	Compliant with licence limit	Method of analysis	Annual mass load (kg)	Comments - reason for change in % mass load from previous year if applicable

Note 1: Volumetric flow shall be included as a reportable parameter

Continuous Monitoring

4	Does your site carry out continuous air emissions monitoring? If yes please review your continuous monitoring data and report the required fields below in Table	No	Dust monitoring results are entered in table A2 below as directed by the Agency
5	Did continuous monitoring equipment experience downtime? If yes please record downtime in table A2 below	NA	
6	Do you have a proactive service agreement for each piece of continuous monitoring equipment?	NA	
7	Did your site experience any abatement system bypasses? If yes please detail them in table A3 below	NA	

AIR-summary template Lic No: P0499-01 Year 2018

Table A2: Summary of average emissions -continuous monitoring

Emission reference no:	Parameter/ Substance	ELV in licence or any revision therof	Averaging Period	Compliance Criteria	Units of measurement	Annual Emission	Annual maximum	Monitoring Equipment downtime (hours)	Number of ELV exceedences in current reporting year	Comments
DM-01	Total Particulates	350	308	Daily average < ELV	mg/m2/day	67116	1027		2	
DM-02	Total Particulates	350	308	Daily average < ELV	mg/m2/day	78848	1474		2	
DM-03	Total Particulates	350	308	Daily average < ELV	mg/m2/day	14000	211		0	
DM-04	Total Particulates	350	308	Daily average < ELV	mg/m2/day	30072	267		0	

note 1: Volumetric flow shall be included as a reportable parameter.

Table A3: Abatement system bypass reporting table Bypass protocol

Date*	Duration** (hours)	Location	Reason for bypass	Impact magnitude	Corrective action

* this should include all dates that an abatement system bypass occurred

** an accurate record of time bypass beginning and end should be logged on site and maintained for future Agency inspections please refer to bypass protocol link

Solvent use and management on site

8 Do you have a total Emission Limit Value of direct and fugitive emissions on site? if yes please fill out tables A4 and A5

SELECT

Table A4: Solvent Management Plan Summary Total VOC Emission limit value

Solvent regulations — Please refer to linked solvent regulations to complete table 5 and 6

Reporting year	Total solvent input on site (kg)	Total VOC emissions to Air from entire site (direct and	Total VOC emissions as %of solvent input	Total Emission Limit Value (ELV) in licence or any revision therof	Compliance
					SELECT
					SELECT

Table A5: Solvent Mass Balance summary

	(I) Inputs (kg)	(O) Outputs (kg)						
Solvent	(I) Inputs (kg)	Organic solvent emission in waste gases(kg)	Solvents lost in water (kg)	Collected waste solvent (kg)	Fugitive Organic Solvent (kg)	Solvent released in other ways e.g. by-passes (kg)	Solvents destroyed onsite through physical reaction e.g. incineration(kg)	Total emission of Solvent to air (kg)
							Total	

AER Monitoring returns summary template-WATER/WASTEWATER(SEWER) Lic No: P0499-01 Year 2018

			Additional information
1	Does your site have licensed emissions direct to surface water or direct to sewer? If yes please complete table W2 and W3 below for the current reporting year and answer further questions. If **you do not have** licenced emissions you only need to complete table W1 and or W2 for storm water analysis and visual inspections	Yes	N/A
2	Was it a requirement of your licence to carry out visual inspections on any surface water discharges or watercourses on or near your site? If yes please complete table W2 below summarising only any evidence of contamination noted during visual inspections	Yes	Monthly COD analysis of yard runoff is attached in appendix

Table W1 Storm water monitoring

Location reference	Location relative to site activities	PRTR Parameter	Licenced Parameter	Monitoring date	ELV or trigger level in licence or any revision thereof*	Licence Compliance criteria	Measured value	Unit of measurement	Compliant with licence	Comments
	SELECT	SELECT	SELECT			SELECT		SELECT	SELECT	
	SELECT	SELECT	SELECT			SELECT		SELECT	SELECT	

*trigger values may be agreed by the Agency outside of licence conditions

Table W2 Visual inspections-Please only enter details where contamination was observed.

Location Reference	Date of inspection	Description of contamination	Source of contamination	Corrective action	Comments
			SELECT		
			SELECT		

Licensed Emissions to water and /or wastewater(sewer)-periodic monitoring (non-continuous)

3	Was there any result in breach of licence requirements? If yes please provide brief details in the comment section of Table W3 below			Yes	There were 9 breaches at PW-102
4	Was all monitoring carried out in accordance with EPA guidance and checklists for Quality of Aqueous Monitoring Data Reported to the EPA? If no please detail what areas require improvement in additional information box	External /Internal Lab Quality checklist	Assessment of results checklist	Yes	Surface water monitoring was carried out on a quarterly basis. The results of which are attached. Monthly COD yard runoff results are also attached.

AER Monitoring returns summary template-WATER/WASTEWATER(SEWER) Lic No: P0499-01 Year 2018

Table W3: Licensed Emissions to water and /or wastewater (sewer)-periodic monitoring (non-continuous)

Emission reference no:	Emission released to	Parameter/ SubstanceNote 1	Type of sample	Frequency of monitoring	Averaging period	ELV or trigger values in licence or any revision therof[Note 2]	Licence Compliance criteria	Measured value	Unit of measurement	Compliant with licence	Method of analysis	Procedural reference source	Procedural reference standard number	Annual mass load (kg)	Comments
									SELECT	SELECT	SELECT	SELECT			

Note 1: Volumetric flow shall be included as a reportable parameter

Note 2: Where Emission Limit Values (ELV) do not apply to your licence please compare results against EQS for Surface water or relevant receptor quality standards

Continuous monitoring

			Additional Information
5	Does your site carry out continuous emissions to water/sewer monitoring?	Yes	See note above

If yes please summarise your continuous monitoring data below in Table W4 and compare it to its relevant Emission Limit Value (ELV)

6	Did continuous monitoring equipment experience downtime? **If yes please record downtime in table W4 below**	Yes	145 days
7	Do you have a proactive service contract for each piece of continuous monitoring equipment on site?	Yes	Annual calibration schedule and trouble shooting service
8	Did abatement system bypass occur during the reporting year? **If yes please complete table W5 below**	No	

Table W4: Summary of average emissions -continuous monitoring

Emission reference no:	Emission released to	Parameter/ Substance	ELV or trigger values in licence or any revision thereof	Averaging Period	Compliance Criteria	Units of measurement	Annual Emission for current reporting year (kg)	% change +/- from previous reporting year	Monitoring Equipment downtime (hours)	Number of ELV exceedences in reporting year	Comments

note 1: Volumetric flow shall be included as a reportable parameter.

Table W5: Abatement system bypass reporting table

Date	Duration (hours)	Location	Resultant emissions	Reason for bypass	Corrective action*	Was a report submitted to the EPA?	When was this report submitted?
						SELECT	

*Measures taken or proposed to reduce or limit bypass frequency

Bund/Pipeline testing template

Lic No: P0499-01 Year 2018

Bund testing

dropdown menu click to see options

			Additional information
1	Are you required by your licence to undertake integrity testing on bunds and containment structures ? if yes please fill out table B1 below listing all **new bunds and containment structures** on site, in addition to **all bunds which failed** the integrity test-**all bunding structures which failed including mobile bunds must be listed in the table below, please include all bunds outside the licenced testing period** (mobile bunds and chemstore included)	Yes	
2	Please provide integrity testing frequency period	2 Yearly	
3	Does the site maintain a register of bunds, underground pipelines (including stormwater and foul), Tanks, sumps and containers? (containers refers to "Chemstore" type units and mobile bunds)	Yes	
4	How many bunds are on site?	1	
5	How many of these bunds have been tested within the required test schedule?	0	All factory activities ceased in 2018. Remaining bund to be tested in line with 2019 schedule
6	How many mobile bunds are on site?	8	These include barrel trays located within workshops
7	Are the mobile bunds included in the bund test schedule?	No	
8	How many of these mobile bunds have been tested within the required test schedule?	NA	
9	How many sumps on site are included in the integrity test schedule?	NA	
10	How many of these sumps are integrity tested within the test schedule?	NA	
	Please list any sump integrity failures in table B1		
11	Do all sumps and chambers have high level liquid alarms?	N/A	
12	If yes to Q11 are these failsafe systems included in a maintenance and testing programme?	N/A	
13	Is the Fire Water Retention Pond included in your integrity test programme?	SELECT	

Table B1: Summary details of bund /containment structure integrity test

Bund/Containment structure ID	Type	Specify Other type	Product containment	Actual capacity	Capacity required*	Type of integrity test	Other test type	Test date	Integrity reports maintained on site?	Results of test	Integrity test failure explanation <50 words	Corrective action taken	Scheduled date for retest	Results of retest(if in current reporting year)
	SELECT					SELECT			SELECT	SELECT		SELECT		

* Capacity required should comply with 25% or 110% containment rule as detailed in your licence

			Commentary
15	Has integrity testing been carried out in accordance with licence requirements and are all structures tested in line with BS8007/EPA Guidance?	SELECT	
16	Are channels/transfer systems to remote containment systems tested?	SELECT	
17	Are channels/transfer systems compliant in both integrity and available volume?	SELECT	

bunding and storage guidelines

Pipeline/underground structure testing

1	Are you required by your licence to undertake integrity testing* on underground structures e.g. pipelines or sumps etc ? if yes please fill out table 2 below listing all underground structures and pipelines on site **which failed the integrity test and all which have not been tested withing the integrity test period as specified**	Yes	
2	Please provide integrity testing frequency period	3 years	

*please note integrity testing means water tightness testing for process and foul pipelines (as required under your licence)

Table B2: Summary details of pipeline/underground structures integrity test

Structure ID	Type system	Material of construction:	Does this structure have Secondary containment?	Type of secondary containment	Type integrity testing	Integrity reports maintained on site?	Results of test	Integrity test failure explanation <50 words	Corrective action taken	Scheduled date for retest	Results of retest(if in current reporting year)
	SELECT	SELECT	SELECT	SELECT	SELECT	SELECT	SELECT				SELECT

Please use commentary for additional details not answered by tables/ questions above

Groundwater/Soil monitoring template	Lic No:	P0499-01	Year	2018

			Comments	
1	Are you required to carry out groundwater monitoring as part of your licence requirements?	no		Please provide an interpretation of groundwater monitoring data in the interpretation box below or if you require additional space please include a groundwater/contaminated land monitoring results interpretaion as an additional section in this AER
2	Are you required to carry out soil monitoring as part of your licence requireme	no		
3	Do you extract groundwater for use on site? If yes please specify use in comment section	no	Process water extracted from surface water river.	
4	Do monitoring results show that groundwater generic assessment criteria such as GTVs or IGVs are exceeded or is there an upward trend in results for a substance? If yes, please complete the Groundwater Monitoring Guideline Template Report (link in cell G8) and submit separately through ALDER as a licensee return AND answer questions 5-12 below. Groundwater monitoring template	no		
5	Is the contamination related to operations at the facility (either current and/or historic)	N/A		
6	Have actions been taken to address contamination issues?If yes please summarise remediation strategies proposed/undertaken for the site	NA		
7	Please specify the proposed time frame for the remediation strategy	NA		
8	Is there a licence condition to carry out/update ELRA for the site?	NA		
9	Has any type of risk assesment been carried out for the site?	NA		
10	Has a Conceptual Site Model been developed for the site?	NA		
11	Have potential receptors been identified on and off site?	NA		
12	Is there evidence that contamination is migrating offsite?	NA		Please enter interpretation of data here

Table 1: Upgradient Groundwater monitoring results

Date of sampling	Sample location reference	Parameter/ Substance	Methodology	Monitoring frequency	Maximum Concentration++	Average Concentration+	unit	GTV's*	SELECT**	Upward trend in pollutant concentration over last 5 years of monitoring data
							SELECT			SELECT
							SELECT			SELECT

.+ where average indicates arithmetic mean

.++ maximum concentration indicates the maximum measured concentration from all monitoring results produced during the reporting year

Table 2: Downgradient Groundwater monitoring results

Date of sampling	Sample location reference	Parameter/ Substance	Methodology	Monitoring frequency	Maximum Concentration	Average Concentration	unit	GTV's*	SELECT**	Upward trend in yearly average pollutant concentration over last 5 years of monitoring data
							SELECT			SELECT
							SELECT			SELECT

*please note exceedance of generic assessment criteria (GAC) such as a Groundwater Threshold Value (GTV) or an Interim Guideline Value (IGV) or an upward trend in results for a substance indicates that further interpretation of monitoring results is required. In addition to completing the above table, please complete the Groundwater Monitoring Guideline Template Report at the link provided and submit separately through ALDER as a licensee return or as otherwise instructed by the EPA. Groundwater monitoring template

More information on the use of soil and groundwater standards/ generic assessment criteria (GAC) and risk assessment tools is available in the EPA published guidance (see the link in G31) Guidance on the Management of Contaminated Land and Groundwater at EPA Licensed Sites (EPA 2013)

**Depending on location of the site and proximity to other sensitive receptors alternative Receptor based Water Quality standards should be used in addition to the GTV e.g. if the site is close to surface water compare to Surface Water Environmental Quality Standards (SWEQS), If the site is close to a drinking water supply compare results to the Drinking Water Standards (DWS)

Surface water EQS | Groundwater regulations GTV's | Drinking water (private supply) standards | Drinking water (public supply) standards | Interim Guideline Values (IGV)

Table 3: Soil results

Date of sampling	Sample location reference	Parameter/ Substance	Methodology	Monitoring frequency	Maximum Concentration	Average Concentration	unit
							SELECT
							SELECT

Where additional detail is required please enter it here in 200 words or less

Environmental Liabilities template	Lic No:	P0499-01	Year	2018

Click here to access EPA guidance on Environmental Liabilities and Financial provision

			Commentary
1	ELRA initial agreement status	Not a Licence Requirement	
2	ELRA review status	NA	
3	Amount of Financial Provision cover required as determined by the latest ELRA	NA	
4	Financial Provision for ELRA status	NA	
5	Financial Provision for ELRA - amount of cover	NA	
6	Financial Provision for ELRA - type	NA	
7	Financial provision for ELRA expiry date	NA	
8	Closure plan initial agreement status	NA	Internal Budget Provision
9	Closure plan review status	NA	Internal Budget Provision
10	Financial Provision for Closure status	NA	Internal Budget Provision
11	Financial Provision for Closure - amount of cover	NA	Internal Budget Provision
12	Financial Provision for Closure - type	NA	Internal Budget Provision
13	Financial provision for Closure expiry date	NA	

Environmental Management Programme/Continuous Improvement Programme template		Lic No:	P0499-01	Year	2018

	Highlighted cells contain dropdown menu click to view		Additional Information
1	Do you maintain an Environmental Mangement System (EMS) for the site. If yes, please detail in additional information	Yes	Internal unaccredited EMS
2	Does the EMS reference the most significant environmental aspects and associated impacts on-site	Yes	
3	Does the EMS maintain an Environmental Management Programme (EMP) as required in accordance with the licence requirements	Yes	
4	Do you maintain an environmental documentation/communication system to inform the public on environmental performance of the facility, as required by the licence	Yes	

Environmental Management Programme (EMP) report

Objective Category	Target	Status (% completed)	How target was progressed	Responsibility	Intermediate outcomes
Reduction of emissions to Air	Begin decommissioning plan for factory and all bog sites .	70	Factory operations ceased and rehabilitation plans for bog areas commenced.	Section Head	Reduced emissions
Waste reduction/Raw material usage efficiency	Waste Streamlining. It is planned to continue with and where possible improve the current waste management service provided by AES Ltd	100	Installed a waste management system. Quarterly waste reports are returned for records/filing and waste streams are segrated on site to maximise recycling potential.	Section Head	Improved Environmental Management Practices
Reduction of emissions to Water	Begin decommissioning plan for factory and all bog sites .	100	Factory operations ceased and rehabilitation plans for bog areas commenced.	Section Head	Reduced emissions
Materials Handling/Storage/Bunding	Begin bund decomissioning	100	Bunds decomissioing commenced.	Section Head	Improved Environmental Management Practices
Waste reduction/Raw material usage efficiency	Continue with the recycling of polyethylene. The sourcing of more recycling contractors will be ongoing.	100	No polythene was sent off site in 2018.	Section Head	Reduced emissions
Energy Efficiency/Utility conservation	Carry out a review of energy aspects identifying significant energy users.	50	The monthly consumption of energy was regurally communicated to the relevant personnel. This included the KPI's for peat production, maintenance and transportation as well as bog pumping and workshop electrical consumption.	Section Head	Improved Environmental Management Practices

Noise monitoring summary report

Lic No: P0499-01 2018

1	Was noise monitoring a licence requirement for the AER period? If yes please fill in table N1 noise summary below	No
2	Was noise monitoring carried out using the EPA Guidance note, including completion of the "Checklist for noise measurement report" included in the guidance note as table 6?	Noise Guidance note NG4 — NA
3	Does your site have a noise reduction plan	NA
4	When was the noise reduction plan last updated?	
5	Have there been changes relevant to site noise emissions (e.g. plant or operational changes) since the last noise survey?	NA

Table N1: Noise monitoring summary

Date of monitoring	Time period	Noise location (on site)	Noise sensitive location -NSL (if applicable)	LA_{eq}	LA_{90}	LA_{10}	LA_{max}	Tonal or Impulsive noise* (Y/N)	If tonal /impulsive noise was identified was 5dB penalty applied?	Comments (ex. main noise sources on site, & extraneous noise ex. road traffic)	Is site compliant with noise limits (day/evening/night)?
								SELECT	SELECT		SELECT

*Please ensure that a tonal analysis has been carried out as per guidance note NG4. These records must be maintained onsite for future inspection

If noise limits exceeded as a result of noise attributed to site activities, please choose the corrective action from the following options? SELECT

** please explain the reason for not taking action/resolution of noise issues?

Any additional comments? (less than 200 words)

Resource Usage/Energy efficiency summary

Lic No: P0499-01 Year 2018

			Additional information
1	When did the site carry out the most recent energy efficiency audit? Please list the recommendations in table 3 below	2018	
2	Is the site a member of any accredited programmes for reducing energy usage/water conservation such as the SEAI programme linked to the right? If yes please list them in additional information	Yes	SEAI - Large Industry Energy Network (LIEN)
3	Where Fuel Oil is used in boilers on site is the sulphur content compliant with licence conditions? Please state percentage in additional information	SELECT	

Table R1 Energy usage on site

Energy Use	Previous year	Current year	Production +/- % compared to previous reporting year**	Energy Consumption +/- % vs overall site production*
Total Energy Used (MWHrs)	125760	1703		
Total Energy Generated (MWHrs)				
Total Renewable Energy Generated (MWHrs)				
Electricity Consumption (MWHrs)	1371.827	304.788		
Fossil Fuels Consumption:				
Heavy Fuel Oil (m3)				
Light Fuel Oil (m3)	1757.13	152.587		
Natural gas (m3)				
Coal/Solid fuel (metric tonnes)				
Peat (metric tonnes)	49276	14119		
Renewable Biomass				
Renewable energy generated on site				

* where consumption of energy can be compared to overall site production please enter this information as percentage increase or decrease compared to the previous reporting year.

** where site production information is available please enter percentage increase or decrease compared to previous year

Table R2 Water usage on site

					Water Emissions	**Water Consumption**	
Water use	Water extracted Previous year m3/yr.	Water extracted Current year m3/yr.	Production +/- % compared to previous reporting year**	Energy Consumption +/- % vs overall site production*	Volume Discharged back to environment(m^3yr):	Volume used i.e not discharged to environment e.g. released as steam m3/yr	Unaccounted for Water:
Groundwater							
Surface water							
Public supply							
Recycled water							
Total							

* where consumption of water can be compared to overall site production please enter this information as percentage increase or decrease compared to the previous reporting year.

** where site production information is available please enter percentage increase or decrease compared to previous year

Resource Usage/Energy efficiency summary

Lic No: P0499-01 Year 2018

Table R3 Waste Stream Summary

	Total	Landfill	Incineration	Recycled	Other
Hazardous (Tonnes)	39.8				
Non-Hazardous (Tonnes)	720.43				

Table R4: Energy Audit finding recommendations

Date of audit	Recommendations	Description of Measures proposed	Origin of measures	Predicted energy savings %	Implementation date	Responsibility	Completion date	Status and comments
			SELECT					
			SELECT					
			SELECT					

Table R5: Power Generation: Where power is generated onsite (e.g. power generation facilities/food and drink industry)please complete the following information

	Unit ID	Unit ID	Unit ID	Unit ID	Station Total
Technology					
Primary Fuel					
Thermal Efficiency					
Unit Date of Commission					
Total Starts for year					
Total Running Time					
Total Electricity Generated (GWH)					
House Load (GWH)					
KWH per Litre of Process Water					
KWH per Litre of Total Water used on Site					

Complaints and Incidents summary template Lic No: P0499-01 Year 2018

Complaints		
		Additional information
Have you received any environmental complaints in the current reporting year? If yes please complete summary details of complaints received on site in table 1 below	No	

Table 1 Complaints summary

Date	Category	Other type (please specify)	Brief description of complaint (Free txt <20 words)	Corrective action< 20 words	Resolution status	Resolution date	Further information

Total complaints open at start of reporting year	0
Total new complaints received during reporting year	0
Total complaints closed during reporting year	0
Balance of complaints end of reporting year	0

Incidents		
		Additional information
Have any incidents occurred on site in the current reporting year? Please list all incidents for current reporting year in Table 2 below	Yes	As the factory ceased all production on 21/03/2018 there will be no further stack emissions and limited emissions from PW102.

*For information on how to report and what constitutes an incident	What is an incident

Complaints and Incidents summary template Lic No: P0499-01 Year 2018

Table 2 Incidents summary

Date of occurrence	Incident nature	Location of occurrence	Incident category*please refer to guidance	Receptor	Cause of incident	Other cause(please specify)	Activity in progress at time of incident	Communication	Occurrence	Corrective action<20 words	Preventative action <20 words	Resolution status	Resolution date	Likelihood of reoccurence
23/08/2018	Spillage	PW102	1. Minor	Water	Plant or equipment issues	Overflow	Normal activities	INCI015055	New	Oil booms were in place & Environmental remediation company called	Receiving quote from ENVA for replacement filters to prevent any future overflow	Complete	19/05/2018	Low
17/05/2018	Uncontrolled release	PW102	1. Minor	Water	Plant or equipment issues		Normal activities	INCI014412	New	Enva Environmental contracted to remove any residual oil	Peat operations to open filter chambers and replace filters	Complete	16/05/2018	
04/04/2018	Breach of ELV	PW102	1. Minor	Water	Operational controls		Normal activities	INCI014342	New	Collect majority of yard material	Avoid washing yard	Complete	17/03/2018	Low
16/03/2018	Spillage	PW102	1. Minor	Water	Plant or equipment issues	Oil drip tray leak	Normal activities	INCI014101	New	Enva Environmental contracted to remove any residual oil	Use larger functioning drip tray	Complete	30/03/2018	Low
15/01/2018	Breach of ELV	PW102	1. Minor	Water	Operational controls		Normal activities	INCI014098	New	Ensure any loose silt in yard is removed	Yard cleaned after plant shutdown	Complete	19/02/2018	Low
17/01/2018	Breach of ELV	PW102	1. Minor	Water	Operational controls		Normal activities	INCI013887	New	Ensure any loose silt in yard is removed	Monitor lagoon silt deposit levels	Complete	12/03/2018	Low
09/01/2018	Breach of ELV	DM01	1. Minor	Air	Plant or equipment issues	Failure of abatement equipment (not WWTP)	Normal activities	INCI013815	New	3 cyclone cells unblocked and discharge airlock replaced.	Clean cyclone cells during factory stops with compressed air			

Total number of incidents current year	7
Total number of incidents previous year	17
% reduction/ increase	59.00%

WASTE SUMMARY Lic No: P0499-01 Year 2018

SECTION A-PRTR ON SITE WASTE TREATMENT AND WASTE TRANSFERS TAB- TO BE COMPLETED BY ALL IPPC AND WASTE FACILITIES See waste management record — dropdown list click to see options

SECTION B- WASTE ACCEPTED ONTO SITE-TO BE COMPLETED BY ALL IPPC AND WASTE FACILITIES

			Additional Information
1	Were any wastes accepted onto your site for recovery or disposal or treatment prior to recovery or disposal within the boundaries of your facility ?; (waste generated within your boundaries is to be captured through PRTR reporting) If yes please enter details in table 1 below	N/A	
2	Did your site have any rejected consignments of waste in the current reporting year? If yes please give a brief explanation in the additional information	SELECT	
3	Was waste accepted onto your site that was generated outside the Republic of Ireland? If yes please state the quantity in tonnes in additional information	SELECT	

Table 1 Details of waste accepted onto your site for recovery, disposal or treatment (do not include wastes generated at your site, as these will have been reported in your PRTR workbook)

Licenced annual tonnage limit for your site (total tonnes/annum)	EWC code (European Waste Catalogue EWC codes)	Source of waste accepted	Description of waste accepted **Please enter an accurate and detailed description - which applies to relevant EWC code** (European Waste Catalogue EWC codes)	Quantity of waste accepted in current reporting year (tonnes)	Quantity of waste accepted in previous reporting year (tonnes)	Reduction/ Increase over previous year +/ - %	Reason for reduction/ increase from previous reporting year	Packaging Content (%)- only applies if the waste has a packaging component	Disposal/Recovery or treatment operation carried out at your site and the description of this operation	Quantity of waste remaining on site at the end of reporting year (tonnes)	Comments -

SECTION C-TO BE COMPLETED BY ALL WASTE FACILITIES (waste transfer stations, Composters, Material recovery facilities etc) EXCEPT LANDFILL SITES

4	Is all waste processing infrastructure as required by your licence and approved by the Agency in place? If no please list waste processing infrastructure required onsite	SELECT	
5	Is all waste storage infrastructure as required by your licence and approved by the Agency in place? If no please list waste storage infrastructure required on site	SELECT	
6	Does your facility have relevant nuisance controls in place?	SELECT	
7	Do you have an odour management system in place for your facility? If no why?	SELECT	
8	Do you maintain a sludge register on site?	SELECT	

SECTION D-TO BE COMPLETED BY LANDFILL SITES ONLY

Table 2 Waste type and tonnage-landfill only

Waste types permitted for disposal	Authorised/licenced annual intake for disposal (tpa)	Actual intake for disposal in reporting year (tpa)	Remaining licensed capacity at end of reporting year (m3)	Comments

Table 3 General information-Landfill only

Area ID	Date landfilling commenced	Date landfilling ceased	Currently landfilling	Private or Public Operated	Inert or non-hazardous	Predicted date to cease landfilling	Licence permits asbestos	Is there a separate cell for asbestos?	Accepted asbestos in reporting year	Total disposal area occupied by waste	Lined disposal area occupied by waste	Unlined area	Comments on liner type
										SELECT UNIT	SELECT UNIT	SELECT UNIT	
Cell 8													

Table 4 Environmental monitoring-landfill only Landfill Manual-Monitoring Standards

Was meterological monitoring in compliance with Landfill Directive (LD) standard in reporting year +	Was leachate monitored in compliance with LD standard in reporting year	Was Landfill Gas monitored in compliance with LD standard in reporting year	Was SW monitored in compliance with LD standard in reporting year	Have GW trigger levels been established	Were emission limit values agreed with the Agency (ELVs)	Was topography of the site surveyed in reporting year	Has the statement under S53(A)(5) of WMA been submitted in reporting year	Comments

.+ please refer to Landfill Manual linked above for relevant Landfill Directive monitoring standards

Table 5 Capping-Landfill only

Area uncapped*	Area with temporary cap	Area with final cap to LD Standard m2 ha, a	Area capped other	Area with waste that should be permanently capped to date under licence	What materials are used in the cap	Comments
SELECT UNIT	SELECT UNIT					

*please note this includes daily cover area

Table 6 Leachate-Landfill only

9	Is leachate from your site treated in a Waste Water Treatment Plant?	SELECT
10	Is leachate released to surface water? If yes please complete leachate mass load information below	SELECT

Volume of leachate in reporting year(m3)	Leachate (BOD) mass load (kg/annum)	Leachate (COD) mass load (kg/annum)	Leachate (NH4) mass load (kg/annum)	Leachate (Chloride) mass load kg/annum	Leachate treatment on-site	Specify type of leachate treatment	Comments

Please ensure that all information reported in the landfill gas section is consistent with the Landfill Gas Survey submitted in conjunction with PRTR returns

Table 7 Landfill Gas-Landfill only

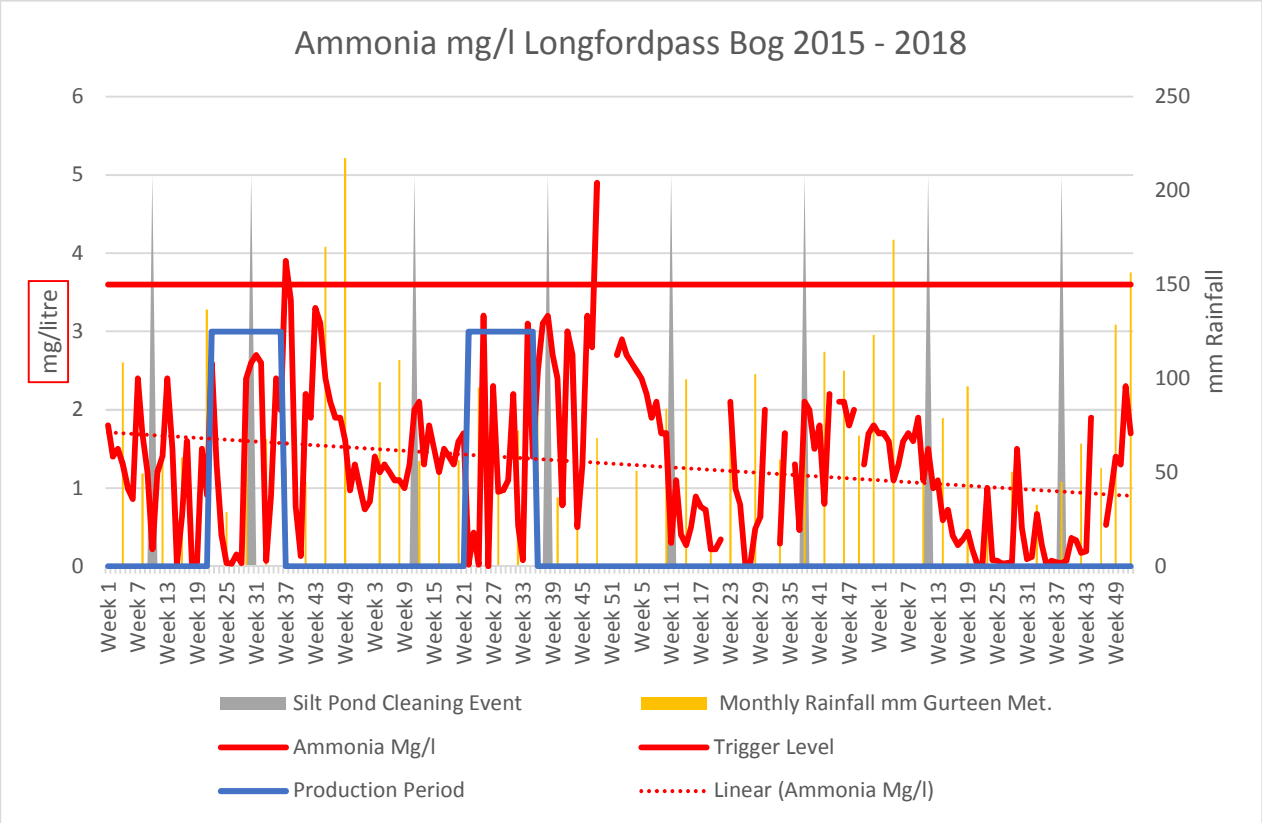
Gas Captured&Treated by LFG System m3	Power generated (MW / KWh)	Used on-site or to national grid	Was surface emissions monitoring performed during the reporting year?	Comments
			SELECT	

Waste Summary Continued Lic No: P0499-01 Year 2018

European Waste Code (EWC)	Description of Waste (in line with applicable EWC code)	Hazardous – YES/NO	Quantity (Tonnes)	Name & Permit No. of Agent/Carrier	Treatment Type – Recovered / Disposed / Recycled	Name, Address & Licence/Permit No. of FINAL Destination	Country
11 01 13*	degreasing wastes containing hazardous substances	Yes	0.25	Safety Kleen Ireland Ltd - W0099	R02 - Solvent reclamation/regeneration	Solvent Recovery Management, PP33345F, Wheeland Rd., Knottingly, West Yorks	UK
13 05 07*	oily water from oil/water separators	Yes	37.05	Enva Ireland Limited (Portlaoise) - W0184	R01 - Use principally as a fuel or other means to generate energy	Enva Ireland Limited, Clonminam Industrial Estate, Portlaoise - W0184	Ireland
17 04 07	mixed metals	No	14.2	The Hammond Lane Metal Company Limited - P1002	R04 - Recycling/reclamation of metals and metal compounds	Hammond Lane Limited, Athlone, Co. Westmeath, P1002	Ireland
20 03 01 A	Municipal mixed residual household	No	2.67	Advanced Environmental Solutions (Ireland) Limited (Nenagh) - W02401	D05 - Specially engineered landfill (e.g. placement into lined discrete cells which are capped and isolated from one another and the environment, etc.)	AES LTD, Solsborough, Springfort Cross , Nenagh, Co.Tipperary, E45EH57 W02401	Ireland
20 03 01 B	Municipal mixed residual non-household	No	119.16	Advanced Environmental Solutions (Ireland) Limited (Nenagh) - W02401	D05 - Specially engineered landfill (e.g. placement into lined discrete cells which are capped and isolated from one another and the environment, etc.)	AES LTD, Solsborough, Springfort Cross , Nenagh, Co.Tipperary, E45EH57 W02401	Ireland
15 01 03	wooden packaging	No	34.4	C.J. Sheeran Limited - P0337	R01 - Use principally as a fuel or other means to generate energy	C.J. Sheeran Limited, Mountrath Sawmills, Shannon Street, Mountrath, Laois P0337	Ireland
13 05 03	Interceptor sludges	Yes	2.5	Enva Ireland Limited (Portlaoise) - W0184	R01 - Use principally as a fuel or other means to generate energy	Enva Ireland Limited, Clonminam Industrial Estate, Portlaoise - W0184	Ireland

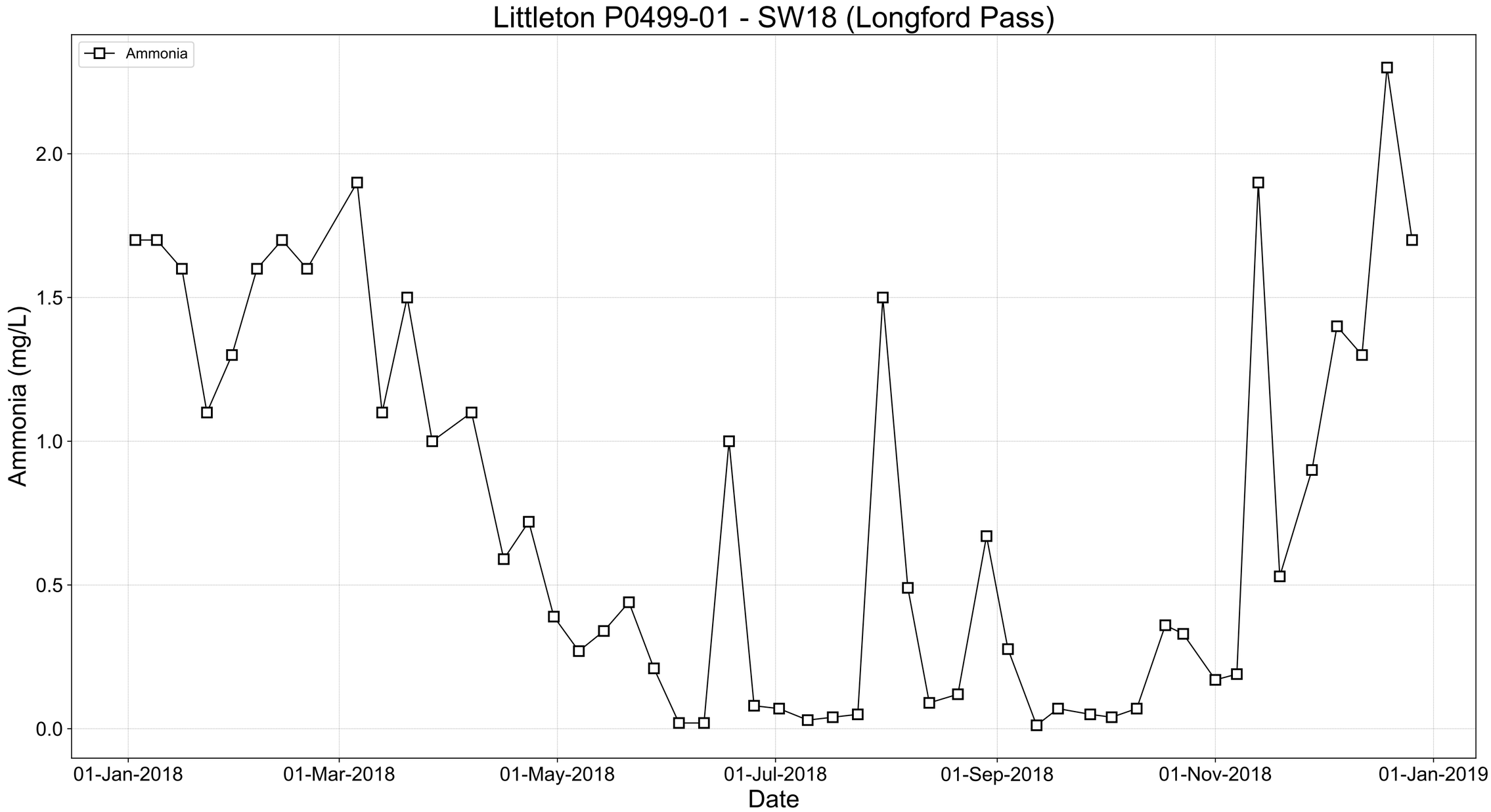
Bord na Mona - Littleton PO499-01
Grab Sampling 2018

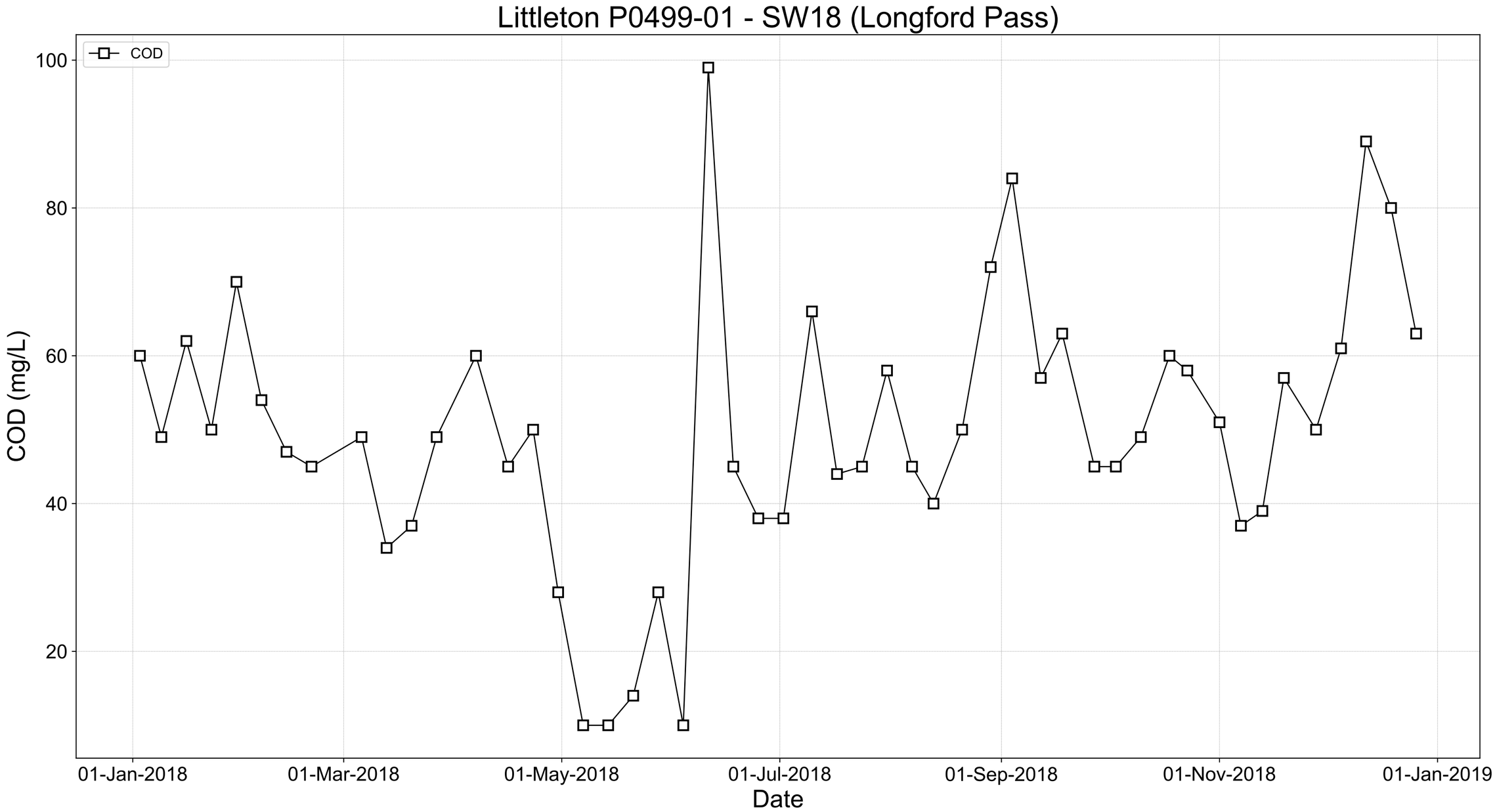
X	Y	Bog	SW	Monitoring	pH	SS	TS	Ammonia	TP	COD	Colour	Ortho P
222077.15	154331.42	Littleton	SW-35	Q1 18	7.3	5	234	0.35	0.05	37	134	0.01
219191.76	153609.45	Ballybeg	SW-12	Q1 18	7.4	5	272	0.21	0.11	53	136	0.08
219740.68	153117.34	Ballybeg	SW-13	Q1 18	7.3	5	316	0.31	0.09	53	147	0.08
221128.48	152059.46	Lanespark	SW-15	Q1 18	7.3	5	178	0.35	0.05	36	107	0.01
221429.53	152116.02	Lanespark	SW-16	Q1 18	7.2	5	182	0.36	0.05	38	131	0.01
220646.62	148976.02	Killeen	SW-7	Q1 18	7.3	5	226	0.35	0.05	37	126	0.01
216744.59	150220.73	Killeen	SW-1	Q2 18	7.7	14	306	0.26	0.09	82	180	0.02
218669.54	148343.90	Killeen	SW-2	Q2 18	7.5	9	294	2.4	0.05	55	172	0.01
219908.67	148183.13	Killeen	SW-6	Q2 18	7.7	18	310	0.24	0.09	82	191	0.01
223088.89	158398.90	Littleton	SW-34	Q2 18	7.5	9	290	2.4	0.05	60	130	0.01
219661.05	168030.60	Carrickhill	SW-25	Q2 18	7.6	6	358	2.4	0.05	22	65	0.02
219974.84	169100.19	Carrickhill	SW-26	Q2 18	7.7	5	360	2.4	0.05	39	65	0.02
224936.84	162017.90	Inch	SW-19	Q3 18	7.5	5	414	0.33	0.05	55	76	0.01
223518.00	163330.63	Baunmore	SW-20	Q3 18	7.6	5	398	0.25	0.05	46	74	0.01
225463.17	163546.72	Baunmore	SW-21	Q3 18	7.6	6	378	0.27	0.05	49	77	0.01
223379.98	165067.73	Baunmore	SW-22	Q3 18	7.6	7	476	0.36	0.05	41	53	0.01
223835.12	163353.33	Baunmore	SW-23	Q3 18	7.7	8	458	0.39	0.05	41	58	0.01
223607.15	166814.52	Derryville	SW-24	Q3 18	7.6	5	526	2.3	0.05	39	56	0.01
217891.33	150182.12	Killeen	SW-3	Q4 18	7.1	5	240	0.72	0.05	69	287	0.02
218356.54	150695.86	Killeen	SW-4	Q4 18	7	5	154	1.3	0.05	45	286	0.01
219213.04	150618.27	Killeen	SW-5	Q4 18	7.1	5	286	0.96	0.05	85	300	0.01
220367.14	150474.40	Killeen	SW-9	Q4 18	6.3	5	132	2.9	0.08	85	303	0.01

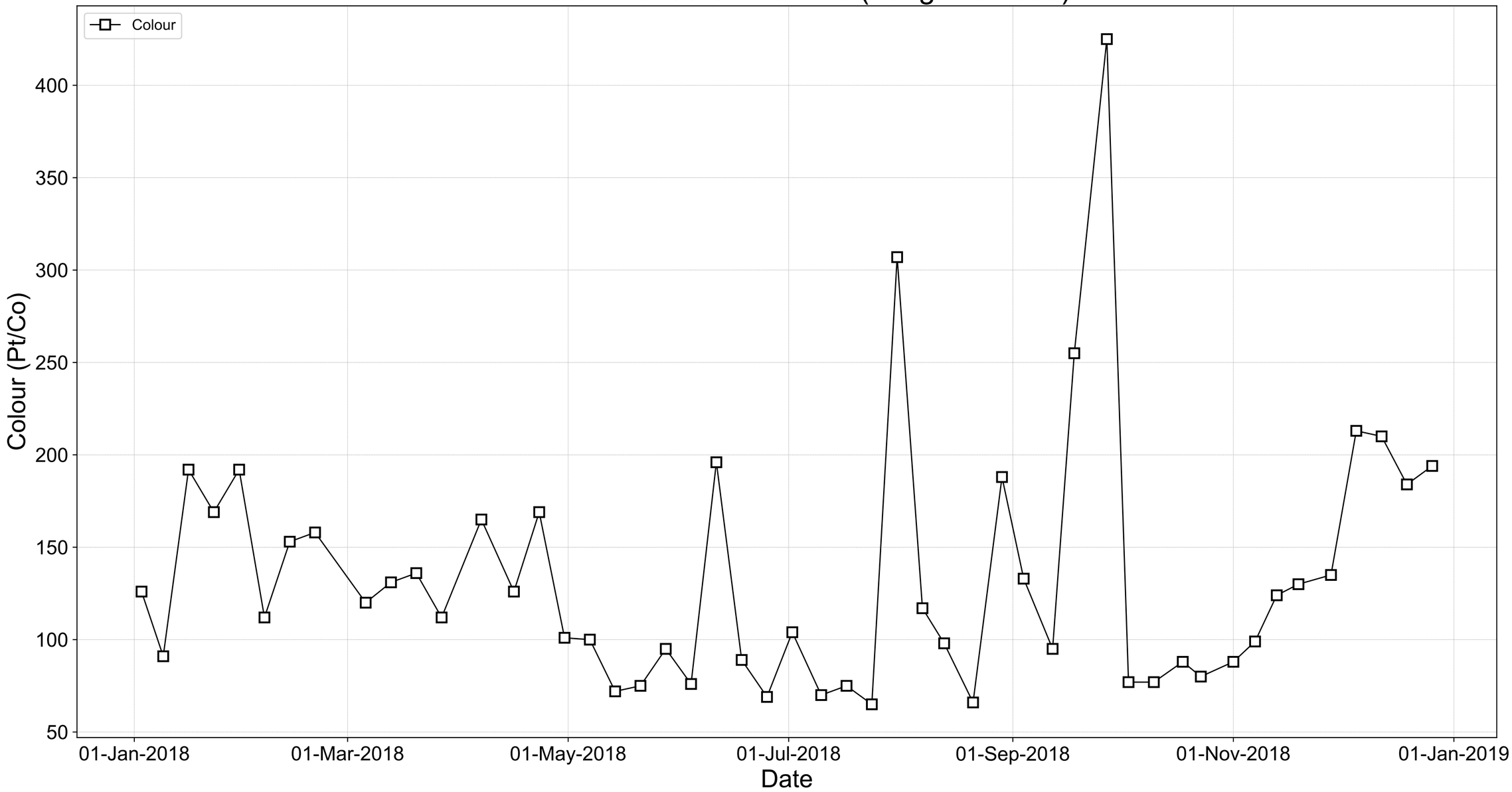


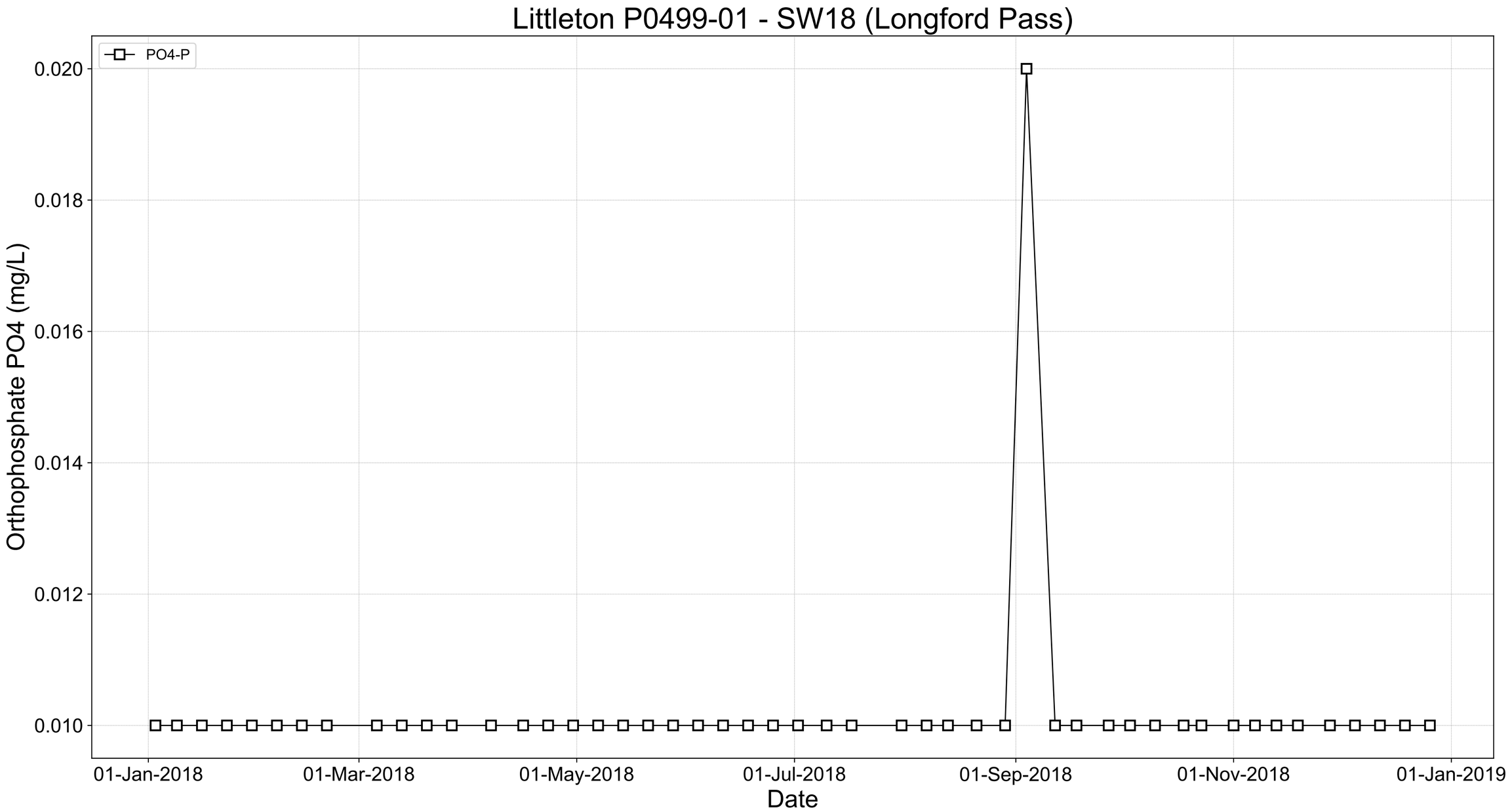
Longfordpass bog is now an inactive production bog with the composite sampler remaining at this located during 2018. The composite sampler takes a flow proportional composite sample over a 24 hour period. The sampler had a 39% downtime during the period being reported, and returned 50/52 weekly ammonia results, the balance being undertaken using a grab sample. The ammonia trigger level of 3.6mg/l, as agreed with the Agency, was not exceeded during the period. Combining the 2015 to 2018 results above, shows concentrations trending downwards over this four year period as peat extraction continued in 2017 and did not occur in 2018. This bog has now been closed and will be scheduled from decommissioning and rehabilitation. However the sampler will be maintained at this location, to identify any trends during this decommissioning/rehab activities. There was no obvious link between the summer production, winter maintenance, or silt pond maintenance events on the concentration of Ammonia discharging from this peatland. The only link expected would be that related to rainfall events, seasonal weather patterns and the expected subsequent surface water run-off and associated ammonia concentrations.

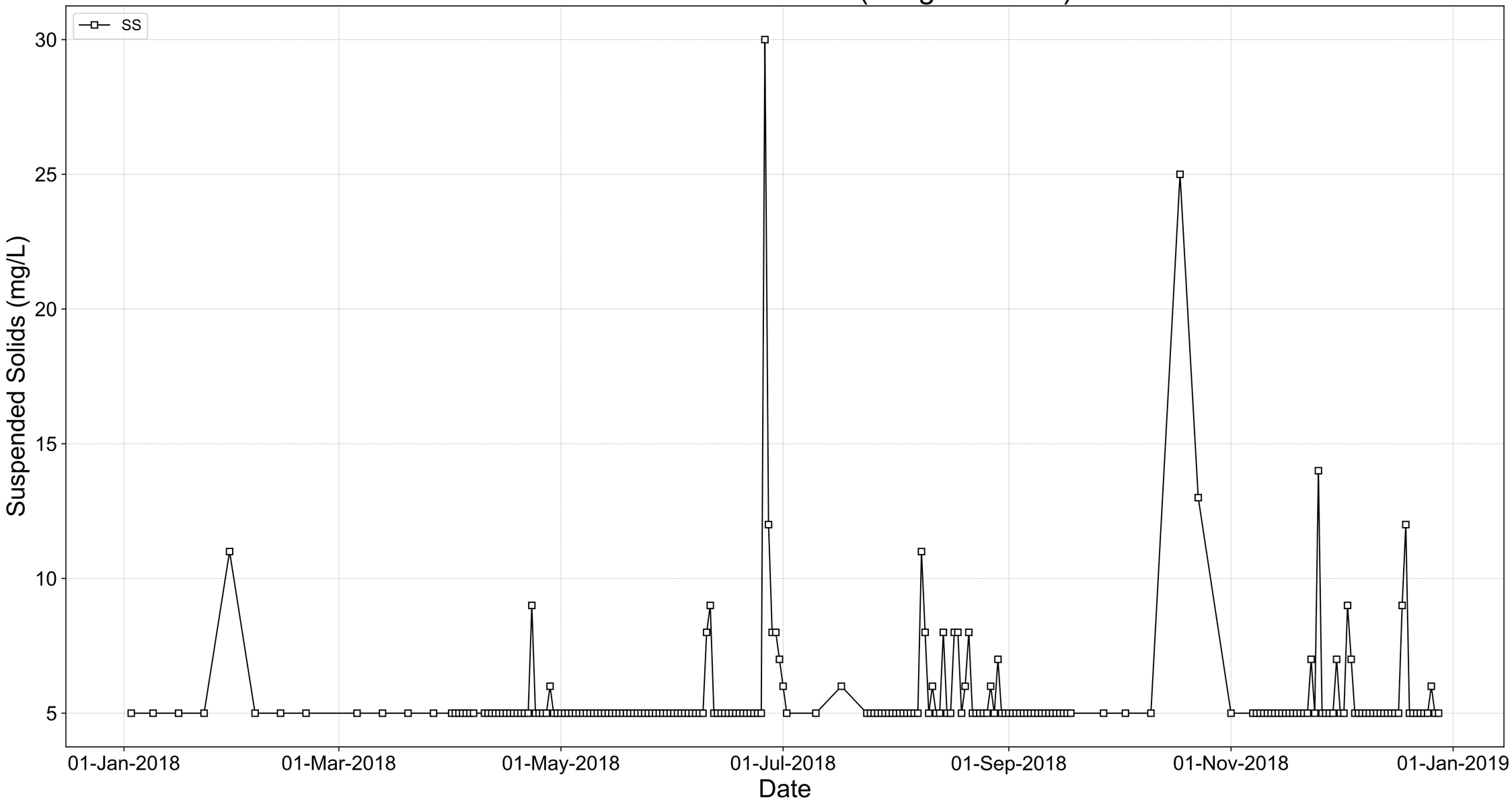
The sampler at this location may be relocated to fill any information gaps on other peatland catchments and to reflect the need to support the information gathering required for the Water Framework Directive's River Basin Management Plan and to support the condition 10 requirements and verification around decommissioning and rehabilitation. There is also an EPA lead research project commencing in 2019, called the SWAMP project, whose aims are to appraise and understand the nutrient impact from peatlands, to evaluate treatment technologies and to propose predictive tools for watershed management.

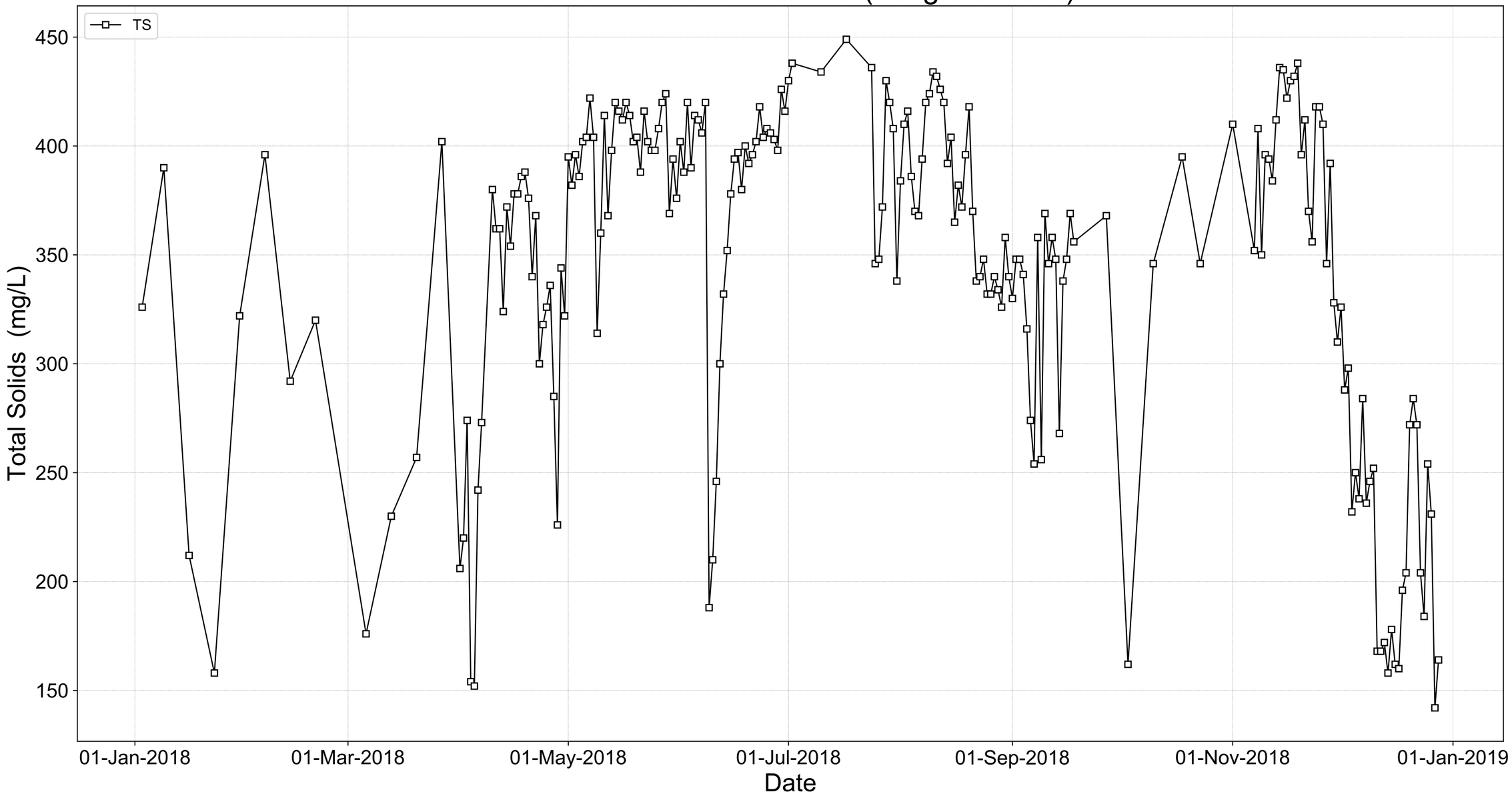

Littleton P0499-01 - SW18 (Longford Pass)
Ammonia
Ammonia (mg/L)
2.0
1.5
1.0
0.5
0.0
01-Jan-2018
01-Mar-2018
01-May-2018
01-Jul-2018
01-Sep-2018
01-Nov-2018
01-Jan-2019
Date

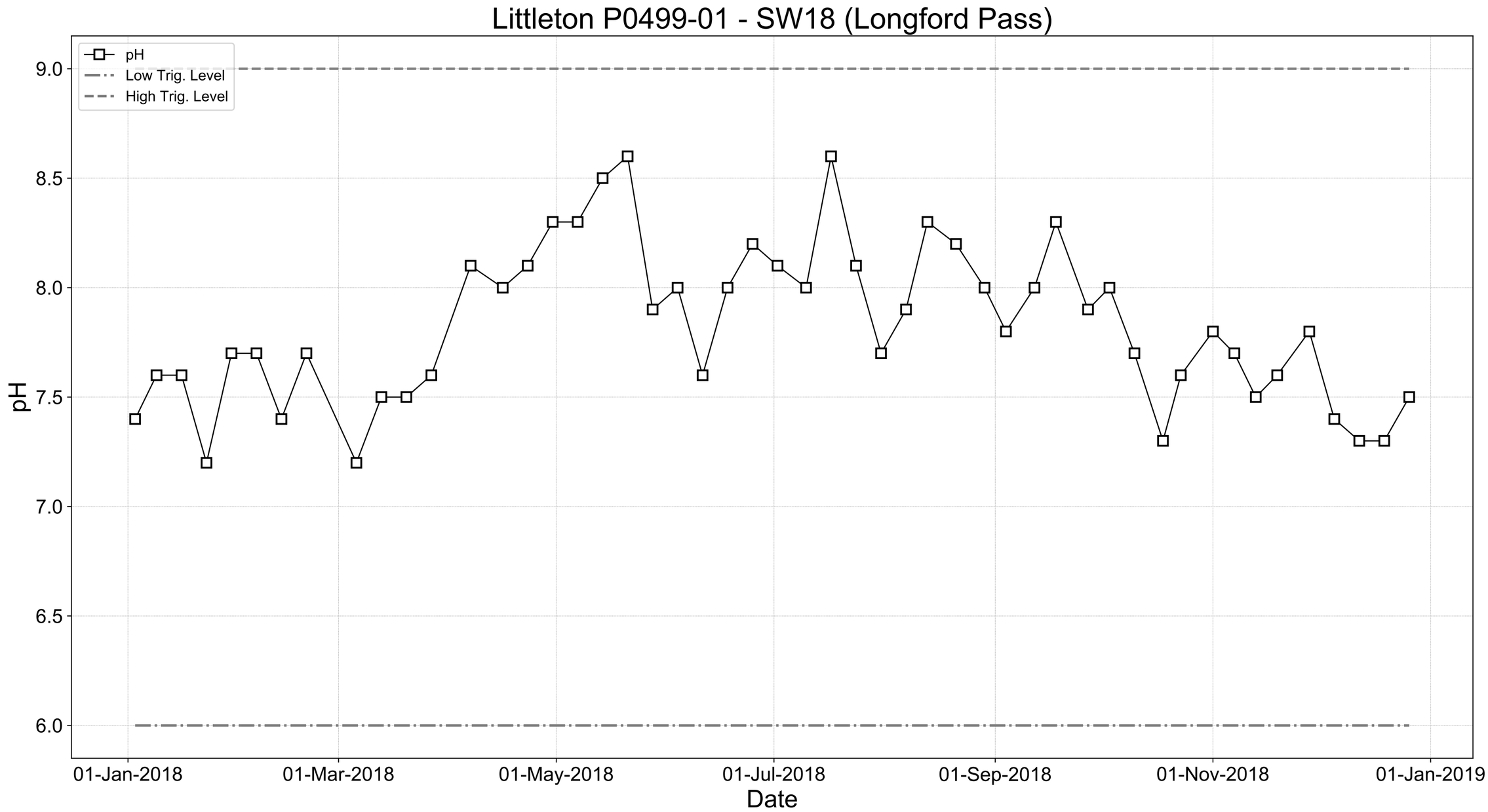

Littleton P0499-01 - SW18 (Longford Pass)
COD
COD (mg/L)
100
80
60
40
20
01-Jan-2018
01-Mar-2018
01-May-2018
01-Jul-2018
01-Sep-2018
01-Nov-2018
01-Jan-2019
Date


Littleton P0499-01 - SW18 (Longford Pass)
Colour
Colour (Pt/Co)
400
350
300
250
200
150
100
50
01-Jan-2018
01-Mar-2018
01-May-2018
01-Jul-2018
01-Sep-2018
01-Nov-2018
01-Jan-2019
Date


Littleton P0499-01 - SW18 (Longford Pass)
PO4-P
0.020
0.018
0.016
0.014
0.012
0.010
Orthophosphate PO4 (mg/L)
01-Jan-2018
01-Mar-2018
01-May-2018
01-Jul-2018
01-Sep-2018
01-Nov-2018
01-Jan-2019
Date


Littleton P0499-01 - SW18 (Longford Pass)
SS
Suspended Solids (mg/L)
30
25
20
15
10
5
01-Jan-2018
01-Mar-2018
01-May-2018
01-Jul-2018
01-Sep-2018
01-Nov-2018
01-Jan-2019
Date


Littleton P0499-01 - SW18 (Longford Pass)
TS
Total Solids (mg/L)
450
400
350
300
250
200
150
01-Jan-2018
01-Mar-2018
01-May-2018
01-Jul-2018
01-Sep-2018
01-Nov-2018
01-Jan-2019
Date


Littleton P0499-01 - SW18 (Longford Pass)
pH
Low Trig. Level
High Trig. Level
9.0
8.5
8.0
7.5
7.0
6.5
6.0
pH
01-Jan-2018
01-Mar-2018
01-May-2018
01-Jul-2018
01-Sep-2018
01-Nov-2018
01-Jan-2019
Date

Weekly Emissions to Water PW - 102. 2018

Works: Littleton

IPPC: 499

Date	pH (pH Units)	COD (mg/l)	SS (mg/l)	Ammonia
03/01/2018	8.5	96	5	0.38
10/01/2018	7.6	97	5	0.22
17/01/2018	7.6	91	44	0.02
24/01/2018	7.6	122	84	0.015
31/01/2018	7.8	36	6	0.34
07/02/2018	8.1	36	16	0.69
14/02/2018	7.7	73	35	0.02
21/02/2018	7.9	36	24	0.32
07/03/2018	7.3	45	5	0.70
14/03/2018	8.2	22	5	0.36
21/03/2018	8.9	20	13	0.49
04/04/2018	7.7	90	51	0.37
12/04/2018	7.9	47	18	0.71
19/04/2018	7.7	43	21	0.63
25/04/2018	8	49	11	0.77
02/05/2018	7.8	48	15	0.29
09/05/2018	7.9	10	8	1.40
16/05/2018	7.8	10	7	1
23/05/2018	7.9	10	8	0.81
30/05/2018	7.8	32	6	0.97
06/06/2018	7.7	40	12	1
13/06/2018	7.7	21	5	0.89
28/06/2018	7.9	21	5	0.74
05/07/2018	7.7	28	31	*0.96*
12/07/2018	7.9	37	32	1.40
17/07/2018	8.2	46	6	0.42
25/07/2018	7.8	15	30	0.31
01/08/2018	7.6	55	34	1.2
09/08/2018	7.7	21	24	1.3
14/08/2018	7.7	39	30	1.50
22/08/2018	7.7	38	5	0.3
30/08/2018	7.6	36	5	0.47
13/09/2018	7.5	34	5	0.34
19/09/2018	7.7	40	5	0.06
27/09/2018	7.4	24	5	0.12
03/10/2018	7.8	26	17	0.23
18/10/2018	7.4	33	5	0.45
18/10/2018	7.4	33	5	0.5
01/11/2018	7.6	31	9	0.55
07/11/2018	7.6	48	32	0.23
14/11/2018	7.6	56	5	0.23
22/11/2018	7.2	143	5	0.66
29/11/2018	7.6	100	60	0.26
06/12/2018	7.3	66	43	1.1
13/12/2018	7.4	95	60	2.00
20/12/2018	7.3	77	34	1.2
27/12/2018	7.4	42	10	1.2

Quarterly Emissions to Water PW - 102 2018

Works: Littleton

IPPC: 499

Quarter	Total Phosperous	Ammonia	Oil,Fats &Grease
Feb	0.05	0.02	<1

Note: No monitoring after March 2018 as all factory activities ceased

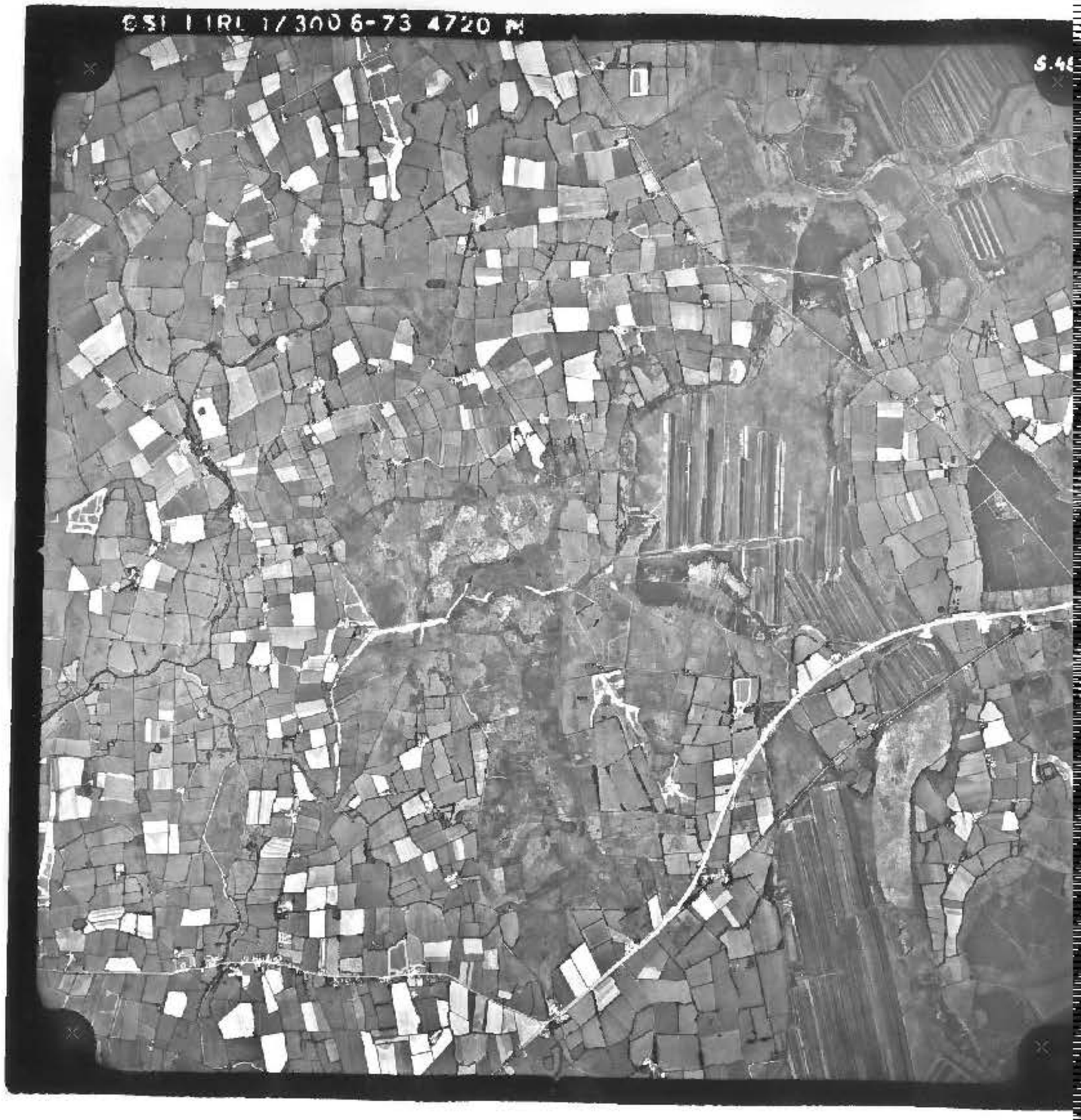
Oil Interceptor Results

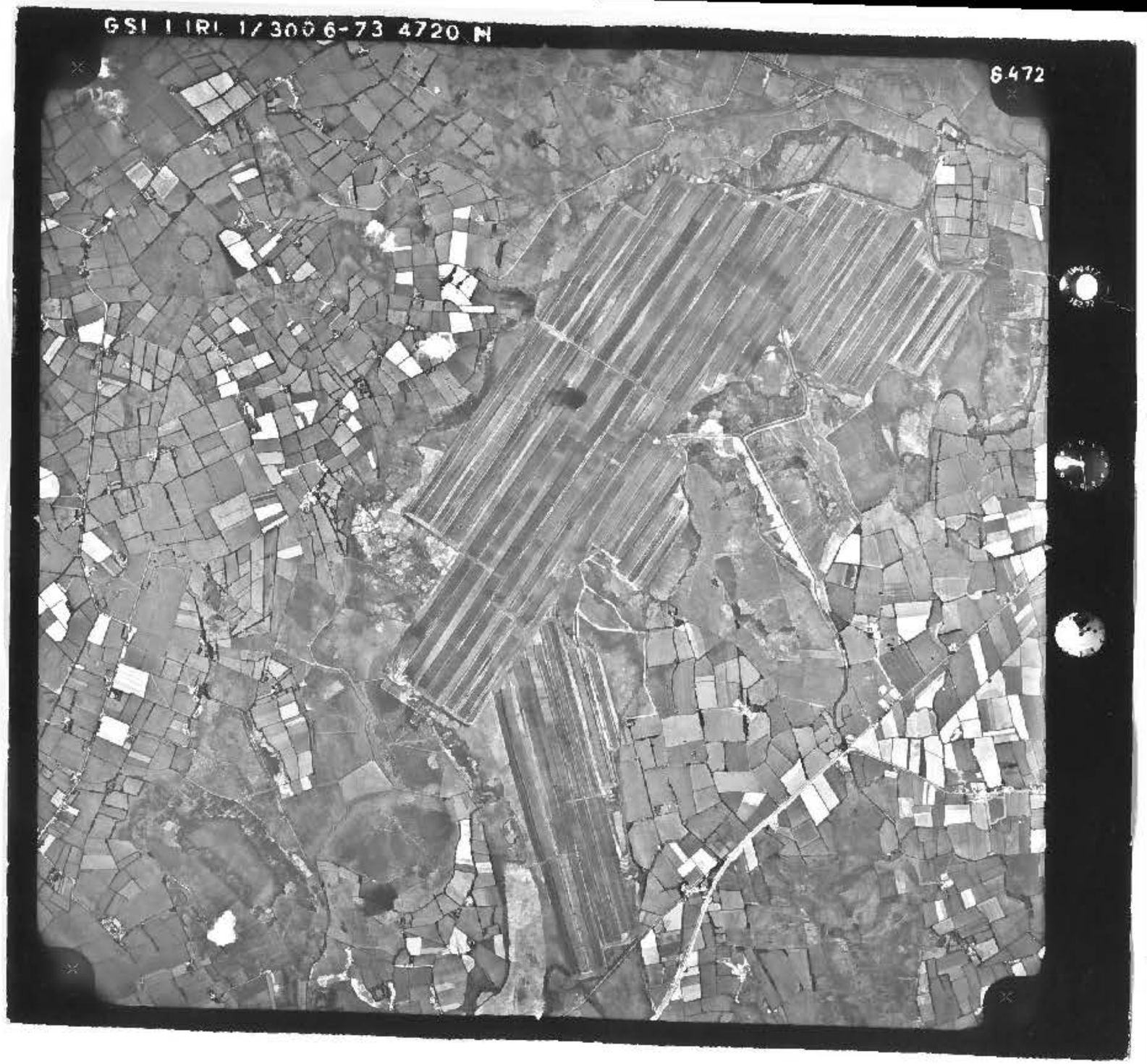
Licence No:	499			
YEAR: 2018				
LOCATION	FA YARD	TR FUEL	TT YARD	TT FUEL
Month	SWE 1 COD mg/l	SWE 2 COD mg/l	SWE 3 COD mg/l	SWE 4 COD mg/l
Jan	NF	NF	NF	NF
Feb	45	NF	NF	NF
Mar	NF	NF	NF	NF
Apr	NF	NF	NF	NF
May	NF	NF	NF	NF
June	34	NF	NF	NF
July	123	NF	NF	NF
Aug	27	NF	NF	NF
Sep	NF	NF	NF	NF
Oct	24	NF	NF	NF
Nov	NF	93	98	99
Dec	NF	NF	NF	NF
Average	50.6	93.0	98.0	99.0

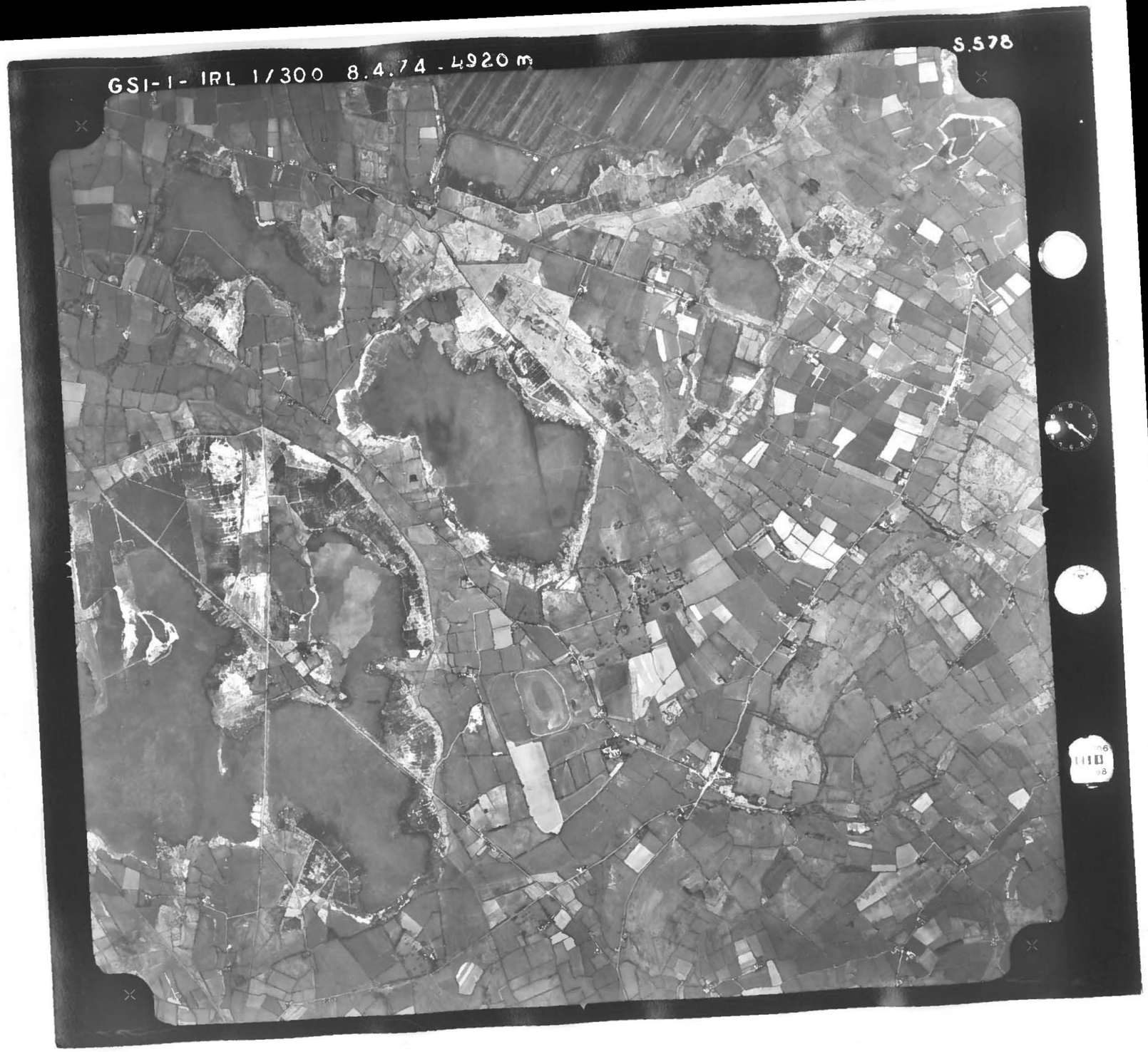
*Note: NF denotes no flow at interceptor or sample unattainable at time of monitoring

Appendix 4-4

Aerial Photos


ESI 1 IRL 1/3006-73 4720 N


GSI I IRL 1/3006-73 4720 N
6472


GSI-1- IRL 1/300 8.4.74 - 4920 m
S.578

Appendix 4-5

IPC Licence Environmental Code of Practice for Peat Energy Works

Bord na Mona Energy Ltd Integrated Pollution Control Licence

Bord na Mona Energy Ltd
Integrated Pollution Control Licence

TRAINING FOR WORKS PERSONNEL ARISING FROM IPC LICENSING

• Introduction by General Manager	9.00am	
• Background	9.15am	D.Wynne
• Introduction to the Environmental Protection Agency		
• Responsibilities IPCLicensing/monitoring/advising etc)		D.Wynne
• Status		
• Organisation		
• Licence application & present position		
• Tea Break	10.00am	
• Integrated Pollution Control Licence (IPCL) (disharges to water, air & land)		E.McDonagh
• Implications for Bord na Mona		
• Workshops & Yards		
• Bog Areas		
• Transport		
• Environmental Management Programme		Donal Wynne
• Annual Environmental Review (AER)		
• Lunch	1.00pm	
• Bord na Mona's Environmental Policy	1.30pm	Donal Wynne
• Environmental Management Systems (EMS)		E.McDonagh
• Planning		
• Implementation & Operation		
• Checking &. Corrective Action		
• Management Review		
• BENEFITS		
• Codes of Practice		M.Nugent
• Production		
• Transport		
• Teacentres		
• Workshops		
• Polythene		
• Individual Responsibilities		
• Discussion	3.00pm	
	Approx 3.30pm Finish	

ENVIRONMENTAL PROTECTION AGENCY

ESTABLISHMENT

The Environmental Protection Agency Act, 1992, was enacted on 23 April, 1992 and under this legislation the Agency was formally established on 26 July, 1993.

RESPONSIBILITIES

The Agency has a wide range of statutory duties and powers under the Act. The main responsibilities of the Agency include the following:

- the licensing and regulation of large/complex industrial and other processes with significant polluting potential, on the basis of integrated pollution control (IPC) and the application of best available technologies for this purpose;
- the monitoring of environmental quality, including the establishment of databases to which the public will have access, and the publication of periodic reports on the state of the environment;
- advising public authorities in respect of environmental functions and assisting local authorities in the performance of their environmental protection functions;
- the promotion of environmentally sound practices through, for example, the encouragement of the use of environmental audits, the establishment of an eco-labelling scheme, the setting of environmental quality objectives and the issuing of codes of practice on matters affecting the environment;
- the promotion and co-ordination of environmental research; and
- generally overseeing the performance by local authorities of their statutory environmental protection functions.

STATUS

The Agency is an independent public body. Its sponsor in Government is the Department of the Environment. Independence is assured through the selection procedures for the Director General and Directors and the freedom, as provided in the legislation, to act on its own initiative. The assignment, under the legislation, of direct responsibility for a wide range of functions underpins this independence. Under the legislation, it is a specific offence to attempt to influence the Agency, or anyone acting on its behalf, in an improper manner.

ORGANISATION

The Agency's headquarters are located in Wexford and it operates five regional inspectorates, located in Dublin, Cork, Kilkenny, Castlebar and Monaghan.

MANAGEMENT

The Agency is managed by a full-time Executive Board consisting of a Director General and four Directors. The Executive Board is appointed by the Government following detailed procedures laid down in the Act.

ADVISORY COMMITTEE

The Agency is assisted by an Advisory Committee of twelve members. The members are appointed by the Minister for the Environment and are selected mainly from those nominated by organisations with an interest in environmental and developmental matters. The Committee has been given a wide range of advisory functions under the Act, both in relation to the Agency and to the Minister.

BORD NA MÓNA

BORD NA MÓNA ENERGY LIMITED

ENVIRONMENTAL POLICY STATEMENT *(currently under review)*

Bord na Móna Energy Limited is a commercial semi-state body with responsibility to develop Irelands peat resources in the national interest.

Bord na Móna Energy Limited is committed to gather and make available information on all aspects of its environmental impact and to help improve understanding among the public generally of its role and of the importance of Irish peatlands.

Bord na Móna Energy Limited recognises the importance of peatland conservation.

Bord na Móna Energy Limited will leave behind all areas it owns as either an economically or socially integrated resource of a high environmental value.

Bord na Móna Energy Limited seeks to conduct all aspects of its business in an environmentally sensitive value.

Bord na Móna Energy Limited will establish an environmental management system specifically addressing the following impacts:

- Discharges to water
- Emissions to atmosphere
- Waste disposal
- Use of natural resources
- Noise, vibration, odour, dust and visual effects
- Natural environment and eco-system

The environmental management system will be monitored, maintained and continually improved.

A system of regular environmental audits will be put in place.

Bord na Móna Energy Limited will continue research and development (R & D) into all aspects of its environmental impact.

This statement is published and is available at all locations within the section and its contents are brought to the attention of all employees.

LEABEG, TULLAMORE, CO. OFFALY, IRELAND
TELEPHONE: (0506) 45900. FAX: (0506) 45160

REGISTERED OFFICE: MAIN STREET, NEWBRIDGE, CO. KILDARE
REGISTERED IN IRELAND NUMBER: 303287

Integrated Pollution Control Licence

1. Workshops & Yards

Monitoring			
	Item	*Frequency*	*Condition of Licence*
	Surface water discharge pts.	Monthly	9.1.2
Inspection & Recording			
	Surface water discharge pts.	Weekly	9.1.2
	Septic tanks	Bi-annually	9.1.9
	Oil Interceptors	Weekly	9.1.9
	Overground Pipelines	Weekly	9.1.10
	Rail/Tractor service wagons	Bi-annually	9.1.12
	Waste management recording		7.3
	Complaints recording	Monthly (if any)	12.3
Testing			
	Integrity of Bunding	After 18mths & every 2 yrs	9.1.6
	Boiler combustion efficiency	Annually	5.1
Improvements			
	All tank & drum storage to be bunded	Within 12mths	9.1.4
	Drainage from bunded areas to be collected & disposed	Within 12mths	9.1.5
	Fuel loading & unloading carried out in bunded areas	Within 6mths	9.1.7
	All surface water discharges to have oil interceptors	Within 24mths	9.1.8
	Adequate supply of containment booms	Within 12mths	9.1.11
	Provision of safe access to monitoring pts.	On-going	11.8
	Identification & labelling of All emission pts	On-going	11.6
Reporting			
	Results of monitoring	Quarterly	9.1.2
	Notification of contamination release, incidents etc.	On-going	9.1.3, 12.2, 4.1, 4.4-4.7

2. Bog Areas

Monitoring			
	Item	*Frequency*	*Condition of Licence*
	Surface water discharge pts.	Quarterly	6.2
	Identification & monitoring of Dust Sensitive Locations	To be agreed	5.3
Inspections & Recording			
	Silt ponds	Fortnightly	6.7
	Complaints recording	Monthly (if any)	12.3
Improvements			
	Implementation of Dust Sensitive Location's procedure	On-going	5.3
	Implementation of 100% drainage water treatment programme	On-going	6.6
	Implementation of de-silting procedure (minimum – bi-annually)	On-going	6.7,6.8
	Implementation of silt pond up-grade programme	On-going	6.9
	1st Nov. de-silting programme for flood plain ponds	On-going	6.11
	Implementation of Cleaner Production procedures	On-going	6.12
	Post-production bog decommissioning procedure	On-going	10.1.1
	Implementation of Cutaway Bog Rehabilitation Plan	On-going	10.1.2
	Installation of Composite sampler	On-going	6.3
	Labelling of all emission pts & provision of safe access	On-going	11.6 & 11.8
Reporting			
	Notification of contamination, release, incidents etc.	On-going	9.1.3, 12.2, 4.1, 4.4-4.7
	Results of monitoring	Quarterly	6.4
	Bog development & operational programme	On-going	4.7

3. Transport

Inspection & Recording			
	Item	*Frequency*	*Condition of Licence*
	Rail & Tractor service wagons	Bi-annually	9.1.12
Improvements			
	Fuel loading & unloading carried out in bunded areas	Within 6 mths	9.1.7
	Road transported peat to be covered at all times	On – going	5.5
Reporting			
	Results of inspections	Annually	9.1
	Notification of contamination	On – going	9.1.3, 12.2, 4.1, 4.4-4.7

ENVIRONMENTAL CODE OF PRACTICE FOR PEAT ENERGY WORKS

PRODUCTION

Silt Control

1. Ensure that properly designed silt control ponds are on all outfalls.
2. Keep silt ponds properly maintained.
3. Keep records of silt control and maintenance.
4. Deal with all complaints promptly.
5. Install weirs on all silt ponds.
6. Raise weirs during heavy rain if stock is not affected.
7. Protect manholes and keep free of peat.
8. Ensure that harrows, millers, ridgers do not drag loose peat into manholes.
9. Have outer harrow spoons directed away from drain.
10. Take precautions to prevent silt run off while piping outfalls.
11. Clean outfalls starting upstream.
12. While cleaning outfalls install barrier (e.g. poles) downstream.
13. Ditch drains in suitable weather.
14. Block outlets from field drains during stockpile loading.
15. Ditch dry peat from drain before unblocking.

ENVIRONMENTAL CODE OF PRACTICE FOR PEAT ENERGY WORKS

PRODUCTION

Dust Control

1. Identify and record sensitive areas.
2. Plant shelter belts in sensitive areas.
3. Avoid harvesting in sensitive areas during windy weather.
4. Use grassed passways for machinery.
5. Keep headlands clean - remove loose peat.
6. Slow down when travelling along dusty headlands.
7. When harvesting keep jib low on stockpile.
8. Roll final harvest on uncovered stockpiles.
9. Plant shelter belts around outloading facilities.
10. Clean road crossings after use.

ENVIRONMENTAL CODE OF PRACTICE FOR PEAT ENERGY WORKS

TRANSPORT

1. Ensure all road transport is clean and well maintained.
2. Keep entrance/exit to outloading areas clean.
3. Ensure that no loose peat remains on top of lorries.
4. Ensure all lorries are properly covered.

TEMPORARY TRACK

1. Ensure all materials are collected following lifting of temporary track.

ENVIRONMENTAL CODE OF PRACTICE FOR PEAT ENERGY WORKS

TEA CENTRES

1. Keep the buildings clean and painted.

2. Arrange for collection of garbage, scrap, waste oil and filters.

3. Ensure public road access is free of hazards.

4. Bund oil tanks.

5. Ensure septic tank is properly maintained.

ENVIRONMENTAL CODE OF PRACTICE FOR PEAT ENERGY WORKS

WORKSHOPS

1. Ensure oil storage tanks are adequately bunded.
2. Have in place emergency procedures for oil spillage.
3. Recycle waste oil.
4. Keep yards clean - free of oil, dust and debris.
5. Have a designated area for scrap.
6. Use bins for garbage and dispose of in County Council landfill.
7. Keep buildings clean and painted.
8. Insulate where possible and keep doors maintained to conserve energy.
9. Landscape all open areas.
10. Ensure septic tanks and treatment works are properly maintained.

ENVIRONMENTAL CODE OF PRACTICE FOR PEAT ENERGY WORKS

Polythene

1. **Remove any damaged or torn polythene immediately.**

2. **Take all used polythene to designated area for collection and recycling.**

Appendix 4-6

IPC Licence Compliance Training Programme

Bord na Mona Energy Ltd Integrated Pollution Control Licence

Bord na Mona Energy Ltd
Integrated Pollution Control Licence

TRAINING FOR WORKS PERSONNEL ARISING FROM IPC LICENSING

• Introduction by General Manager	9.00am	
• Background	9.15am	D.Wynne
• Introduction to the Environmental Protection Agency		
• Responsibilities IPCLicensing/monitoring/advising etc)		D.Wynne
• Status		
• Organisation		
• Licence application & present position		
• Tea Break	10.00am	
• Integrated Pollution Control Licence (IPCL) (disharges to water, air & land)		E.McDonagh
• Implications for Bord na Mona		
• Workshops & Yards		
• Bog Areas		
• Transport		
• Environmental Management Programme		Donal Wynne
• Annual Environmental Review (AER)		
• Lunch	1.00pm	
• Bord na Mona's Environmental Policy	1.30pm	Donal Wynne
• Environmental Management Systems (EMS)		E.McDonagh
• Planning		
• Implementation & Operation		
• Checking &. Corrective Action		
• Management Review		
• BENEFITS		
• Codes of Practice		M.Nugent
• Production		
• Transport		
• Teacentres		
• Workshops		
• Polythene		
• Individual Responsibilities		
• Discussion	3.00pm	
	Approx 3.30pm Finish	

ENVIRONMENTAL PROTECTION AGENCY

ESTABLISHMENT

The Environmental Protection Agency Act, 1992, was enacted on 23 April, 1992 and under this legislation the Agency was formally established on 26 July, 1993.

RESPONSIBILITIES

The Agency has a wide range of statutory duties and powers under the Act. The main responsibilities of the Agency include the following:

- the licensing and regulation of large/complex industrial and other processes with significant polluting potential, on the basis of integrated pollution control (IPC) and the application of best available technologies for this purpose;
- the monitoring of environmental quality, including the establishment of databases to which the public will have access, and the publication of periodic reports on the state of the environment;
- advising public authorities in respect of environmental functions and assisting local authorities in the performance of their environmental protection functions;
- the promotion of environmentally sound practices through, for example, the encouragement of the use of environmental audits, the establishment of an eco-labelling scheme, the setting of environmental quality objectives and the issuing of codes of practice on matters affecting the environment;
- the promotion and co-ordination of environmental research; and
- generally overseeing the performance by local authorities of their statutory environmental protection functions.

STATUS

The Agency is an independent public body. Its sponsor in Government is the Department of the Environment. Independence is assured through the selection procedures for the Director General and Directors and the freedom, as provided in the legislation, to act on its own initiative. The assignment, under the legislation, of direct responsibility for a wide range of functions underpins this independence. Under the legislation, it is a specific offence to attempt to influence the Agency, or anyone acting on its behalf, in an improper manner.

ORGANISATION

The Agency's headquarters are located in Wexford and it operates five regional inspectorates, located in Dublin, Cork, Kilkenny, Castlebar and Monaghan.

MANAGEMENT

The Agency is managed by a full-time Executive Board consisting of a Director General and four Directors. The Executive Board is appointed by the Government following detailed procedures laid down in the Act.

ADVISORY COMMITTEE

The Agency is assisted by an Advisory Committee of twelve members. The members are appointed by the Minister for the Environment and are selected mainly from those nominated by organisations with an interest in environmental and developmental matters. The Committee has been given a wide range of advisory functions under the Act, both in relation to the Agency and to the Minister.

BORD NA MÓNA

BORD NA MÓNA ENERGY LIMITED

ENVIRONMENTAL POLICY STATEMENT *(currently under review)*

Bord na Móna Energy Limited is a commercial semi-state body with responsibility to develop Irelands peat resources in the national interest.

Bord na Móna Energy Limited is committed to gather and make available information on all aspects of its environmental impact and to help improve understanding among the public generally of its role and of the importance of Irish peatlands.

Bord na Móna Energy Limited recognises the importance of peatland conservation.

Bord na Móna Energy Limited will leave behind all areas it owns as either an economically or socially integrated resource of a high environmental value.

Bord na Móna Energy Limited seeks to conduct all aspects of its business in an environmentally sensitive value.

Bord na Móna Energy Limited will establish an environmental management system specifically addressing the following impacts:

- Discharges to water
- Emissions to atmosphere
- Waste disposal
- Use of natural resources
- Noise, vibration, odour, dust and visual effects
- Natural environment and eco-system

The environmental management system will be monitored, maintained and continually improved.

A system of regular environmental audits will be put in place.

Bord na Móna Energy Limited will continue research and development (R & D) into all aspects of its environmental impact.

This statement is published and is available at all locations within the section and its contents are brought to the attention of all employees.

LEABEG, TULLAMORE, CO. OFFALY, IRELAND
TELEPHONE: (0506) 45900. FAX: (0506) 45160

REGISTERED OFFICE: MAIN STREET, NEWBRIDGE, CO. KILDARE
REGISTERED IN IRELAND NUMBER: 303287

Integrated Pollution Control Licence

1. Workshops & Yards

Monitoring			
	Item	*Frequency*	*Condition of Licence*
	Surface water discharge pts.	Monthly	9.1.2
Inspection & Recording			
	Surface water discharge pts.	Weekly	9.1.2
	Septic tanks	Bi-annually	9.1.9
	Oil Interceptors	Weekly	9.1.9
	Overground Pipelines	Weekly	9.1.10
	Rail/Tractor service wagons	Bi-annually	9.1.12
	Waste management recording		7.3
	Complaints recording	Monthly (if any)	12.3
Testing			
	Integrity of Bunding	After 18mths & every 2 yrs	9.1.6
	Boiler combustion efficiency	Annually	5.1
Improvements			
	All tank & drum storage to be bunded	Within 12mths	9.1.4
	Drainage from bunded areas to be collected & disposed	Within 12mths	9.1.5
	Fuel loading & unloading carried out in bunded areas	Within 6mths	9.1.7
	All surface water discharges to have oil interceptors	Within 24mths	9.1.8
	Adequate supply of containment booms	Within 12mths	9.1.11
	Provision of safe access to monitoring pts.	On-going	11.8
	Identification & labelling of All emission pts	On-going	11.6
Reporting			
	Results of monitoring	Quarterly	9.1.2
	Notification of contamination release, incidents etc.	On-going	9.1.3, 12.2, 4.1, 4.4-4.7

2. Bog Areas

Monitoring			
	Item	*Frequency*	*Condition of Licence*
	Surface water discharge pts.	Quarterly	6.2
	Identification & monitoring of Dust Sensitive Locations	To be agreed	5.3
Inspections & Recording			
	Silt ponds	Fortnightly	6.7
	Complaints recording	Monthly (if any)	12.3
Improvements			
	Implementation of Dust Sensitive Location's procedure	On-going	5.3
	Implementation of 100% drainage water treatment programme	On-going	6.6
	Implementation of de-silting procedure (minimum – bi-annually)	On-going	6.7,6.8
	Implementation of silt pond up-grade programme	On-going	6.9
	1st Nov. de-silting programme for flood plain ponds	On-going	6.11
	Implementation of Cleaner Production procedures	On-going	6.12
	Post-production bog decommissioning procedure	On-going	10.1.1
	Implementation of Cutaway Bog Rehabilitation Plan	On-going	10.1.2
	Installation of Composite sampler	On-going	6.3
	Labelling of all emission pts & provision of safe access	On-going	11.6 & 11.8
Reporting			
	Notification of contamination, release, incidents etc.	On-going	9.1.3, 12.2, 4.1, 4.4-4.7
	Results of monitoring	Quarterly	6.4
	Bog development & operational programme	On-going	4.7

3. Transport

Inspection & Recording			
	Item	*Frequency*	*Condition of Licence*
	Rail & Tractor service wagons	Bi-annually	9.1.12
Improvements			
	Fuel loading & unloading carried out in bunded areas	Within 6 mths	9.1.7
	Road transported peat to be covered at all times	On – going	5.5
Reporting			
	Results of inspections	Annually	9.1
	Notification of contamination	On – going	9.1.3, 12.2, 4.1, 4.4-4.7

ENVIRONMENTAL CODE OF PRACTICE FOR PEAT ENERGY WORKS

PRODUCTION

Silt Control

1. Ensure that properly designed silt control ponds are on all outfalls.
2. Keep silt ponds properly maintained.
3. Keep records of silt control and maintenance.
4. Deal with all complaints promptly.
5. Install weirs on all silt ponds.
6. Raise weirs during heavy rain if stock is not affected.
7. Protect manholes and keep free of peat.
8. Ensure that harrows, millers, ridgers do not drag loose peat into manholes.
9. Have outer harrow spoons directed away from drain.
10. Take precautions to prevent silt run off while piping outfalls.
11. Clean outfalls starting upstream.
12. While cleaning outfalls install barrier (e.g. poles) downstream.
13. Ditch drains in suitable weather.
14. Block outlets from field drains during stockpile loading.
15. Ditch dry peat from drain before unblocking.

ENVIRONMENTAL CODE OF PRACTICE FOR PEAT ENERGY WORKS

PRODUCTION

Dust Control

1. Identify and record sensitive areas.
2. Plant shelter belts in sensitive areas.
3. Avoid harvesting in sensitive areas during windy weather.
4. Use grassed passways for machinery.
5. Keep headlands clean - remove loose peat.
6. Slow down when travelling along dusty headlands.
7. When harvesting keep jib low on stockpile.
8. Roll final harvest on uncovered stockpiles.
9. Plant shelter belts around outloading facilities.
10. Clean road crossings after use.

ENVIRONMENTAL CODE OF PRACTICE FOR PEAT ENERGY WORKS

TRANSPORT

1. Ensure all road transport is clean and well maintained.
2. Keep entrance/exit to outloading areas clean.
3. Ensure that no loose peat remains on top of lorries.
4. Ensure all lorries are properly covered.

TEMPORARY TRACK

1. Ensure all materials are collected following lifting of temporary track.

ENVIRONMENTAL CODE OF PRACTICE FOR PEAT ENERGY WORKS

TEA CENTRES

1. Keep the buildings clean and painted.

2. Arrange for collection of garbage, scrap, waste oil and filters.

3. Ensure public road access is free of hazards.

4. Bund oil tanks.

5. Ensure septic tank is properly maintained.

ENVIRONMENTAL CODE OF PRACTICE FOR PEAT ENERGY WORKS

WORKSHOPS

1. Ensure oil storage tanks are adequately bunded.
2. Have in place emergency procedures for oil spillage.
3. Recycle waste oil.
4. Keep yards clean - free of oil, dust and debris.
5. Have a designated area for scrap.
6. Use bins for garbage and dispose of in County Council landfill.
7. Keep buildings clean and painted.
8. Insulate where possible and keep doors maintained to conserve energy.
9. Landscape all open areas.
10. Ensure septic tanks and treatment works are properly maintained.

ENVIRONMENTAL CODE OF PRACTICE FOR PEAT ENERGY WORKS

Polythene

1. **Remove any damaged or torn polythene immediately.**

2. **Take all used polythene to designated area for collection and recycling.**

Appendix 4-7

Silt Committee Interim Report 1976

Ceamram

Bord na Móna

Don Ballivor | Ón Production Manager

Do tag.	Ar dtag.	Ábhar	Dáta
Luaitear an uimhir tagartha		Silt Control	12th March 1976

In October 1975 a silt committee was set up to study the desirability and feasibility of removing silt from our bog effluents. After investigating the problem and visiting several milled peat works the committee produced an interim report and after discussions with the General Manager and myself made firm recommendations.

The interim report states that it is the opinion of the committee that the discharge of peat silt into streams can be reduced considerably by provision of adequate silt ponds and suitably designed drainage systems. The recommendations of the interim report are as follows:-

1. Provision of silt ponds should be a basic feature of new bog development for milled peat and their construction should be planned for all outlet systems.
2. Ideally, ponds should be located in cutaway bog.
3. Sufficient area should be acquired at the initial stage to provide for silt ponds.
4. In production bogs existing large catchments should be broken up into manageable proportions and ponds constructed to accord with local topography.
5. Revision of drainage techniques should be considered such as arranging flatter gradients in external and internal outfalls and extending their width and length in their lower reaches to encourage settlement of silt.
6. Initial drainage effluent should be allowed to spill over face banks (where practicable) until adequate silt ponds have been provided. This should be applied to all new bog development immediately. Similarly, growth and vegetation should not be removed from external outfalls until interference with drainage and/or complaints force us to act. This latter measure would be short term.
7. It is recommended that catchments to be protected by silt ponds should not be greater than 500 acres.
8. Ponds should be designed for maximum run-off of 1 cu.ft. per minute per acre and run-off controlled by provision of small diameter culverts, weirs or sluices.
9. For milled peat 50 sq.ft. of pond per acre of catchment. For 500 acres, 45 ft. wide x 555 ft. long x 7 ft. deep, i.e. 6 ft. max. of silt + 1 ft. min. of water.
10. Ponds should be provided in pairs each sufficient for the catchment protected.
11. Ponds should be cleaned out at regular intervals as required but at least four times a year using a dragline or Hymac retained permanently for this purpose. Investigations to be made into the suitability of pumping units.

/over

12. Second parallel pond should be used during excessively large water flow. (storm water)

13. The problem of discharging into the Clodiagh River at Monettia has become difficult in view of the E.S.B.'s requirement that the entire river be kept free of silt. Silt ponds will be essential and provision should be made in their lay-out to allow for further extension of the ponds if decantation needs to be improved further.

The above recommendations are accepted in general and it is proposed to adopt the following measures immediately:-

(i) At Boora design and construct silt ponds to recommended dimensions for a selected outfall serving a catchment of approximately 500 acres of bog in full production.

(ii) At Monettia bog design and construct silt ponds as necessary to treat that part of the effluent from Monettia bog which will discharge into the Clodiagh River.

(iii) At Littleton construct a second parallel pond to supplement the existing single pond in the centre of Derryvilla bog, to admit of cleaning each pond in turn and to operate as an overflow in spate conditions. Both ponds to conform to recommended dimensions for the area served.

In all cases ponds will be cleaned out on a regular basis and before the level of deposited silt approaches within 2 ft. of the water surface. The Scientific Officer, Newbridge, will carry out sampling above and below the ponds in order to assess their effectiveness under all conditions. Samples will be taken for colour, solids content in parts per million and initially for Biochemical Oxygen Demand (B.O.D.)

At all milled peat bogs in production, works should carry out surveys and select sites for silt ponds as recommended. The processing of these plans for production bogs will be the responsibility of the Production Control Engineer.

At works still being developed for milled peat, sites suitable for silt ponds to the recommended design should be selected and included in the development plans. The Chief Civil Engineer will be responsible for the progress of plans on milled peat bogs still in development.

All plans should be submitted to Head Office for ratification.

The silt committee will act in an advisory capacity only. It will continue to study the silt problem, will monitor the effectiveness of the ponds at the above three locations and will eventually produce its final report and recommendations.

H. F. Flood

Production Manager

HCF/MC

Appendix 4-8

Silt Committee, Excavator records 1984

Chief Civil Engineer : H.O. Manager : Ballivor.

GH/JK DH/AK. Silt Control 9th May, 1984.

Below are figures for numbers of excavator hours spent at present and estimates of future excavator requirements as requested by the General Operations Manager.

In 1983/84 210 Hymac hours were spent in installing our first silt ponds.

The following is a table of expected numbers of Hymac's required at Ballivor works for silt control in the next few years.

Year.	Pond Excavation	Pond Maintenance	Total
1984/'85.	0.11 Hymac Year	0.08 Hymac Year	0.19 Hymac Yr
1985/'86.	0.14 " "	0.30 " "	0.44 " "
1986/'87.	0.10 " "	0.60 " "	0.70 " "
1987/'88.	0.00 " "	0.81 " "	0.81 " "

Manager.

Meamram

Bord na Móna

Don Manager Ballivor | On General Operations Manager

Do Cas.	Ar dtas.	Ábhar	Data
Luaitear an uimhir tagartha		Re: Silt Control	16/4/'84

I attach a copy of report on the silt control meeting held at Derrygreenagh on 4th April 1984. You should submit the following information to the Chief Engineer:-

(a) The annual number of excavator hours (specifying excavator type) spent at present on silt control at your works.

(b) The expected annual number of excavator hours which would be required in complying with Board Policy in this regard i.e. all effluents flowing through silt traps of standard size.

General Operations Manager

GH/JK
ENC.

c.c. Chief Engineer

BORD NA MÓNA
BAILE IOMHAIR.
DATE REC'D. 25 APR 1984
FOR ATTENTION

Meeting on Silt Control held at
Derrygreenagh on 4th April 1984

Present:

Chairman - Mr. S. Grogan - General Operations Manager

Mr. H. Flood - Chief Engineer
Mr. B. Keville - Manager, Mech. Eng. Services
Mr. J. Welsby - Head Civil Works
Mr. G. Hannon - Civil Works

Mr. J. Doyle - Group Manager West
Mr. H. Hickland - " " East
Mr. J. Hughes - " " Briquett
Mr. P. Hughes - Manager Blackwater
Mr. E. Moore - " Derryfadda
Mr. M. Kelly - " Derrygreenag
Mr. S. McCabe - " Littleton
Mr. T. Quinn - " Mountdillor
Mr. L. Concannon - " Oweninny
Mr. D. Wynne - Prod. Eng. Boora

Mr. P. Coffey - Scientific Officer

Mr. C. O Gogain - Manager Lullymore was unavoidably absent

Acceptable Standards of Effluent:

Legal interpretations of the 1977 Water Pollution Act and the various Fisheries Acts suggest that Bord na Mona is not legally obliged to treat bog run-off. These interpretations have not been tested in court nor have they been widely publicised.

Notwithstanding the question of our Statutory obligation, Works should meet their responsibilities towards the provision of acceptable bog effluents in accordance with Board Policy. To comply with this policy all bog and factory effluents should be directed through silt traps before discharge to external waterways.

In attempting to set reasonable standards it is to be noted that there are no clear-cut standards which might be imposed on us in the absence of our "exemption". This vague situation is made more so by the virtual autonomy of individual local authorities in this respect. However, a precedent has been set by An Bord Pleanala's decision in the case of the licencing of effluent discharge from Littleton Briquette Factory when an upper limit of 100 mg/l suspended solids concentration was set. Although the legalities regarding obligation to treat bog effluent and briquette factory effluent may be dissimilar the waste involved is similar. It would, therefore, seem reasonable to assume that a target value of 100 mg/l in the case of bog effluent would satisfy potential complainants whose complaints are based on genuine dissatisfaction with the present standard of our effluents.

Method of Achieving Standards:

No single method of silt trapping (i.e. pond cleaned by excavator; pond initially constructed by excavator and cleaned by pumping; or lagoon) will provide a solution at every outfall to be treated.

Where an area of land exists which seems particularly suited to the provision of a lagoon the area should be examined (i.e. contours, capacity, embankment material availability, land acquisition, pumping, seepage, safety etc.) and the cost of its provision and maintenance compared with that of orthodox silt ponds.

A system for emptying of ponds by pumping should be fully developed and tested on a project basis. The costing of the pumping method as outlined in the Silt Control Study - December 1983 should be viewed as an estimated cost for a proposed but as yet untried system (ref. Silt Control Study Dec. 1983 - Chapter 3 paragraph 4).

Cost of Silt Control

Bearing in mind: (a) the absence of statutory obligation

(b) that untreated similar effluents attract differing degre s of complaint.

(c) the autonomy of bodies responsible for enforcement of regulations.

expenditure to provide less than 100 mg/l suspended solids concentration at all outfalls may be unwarranted except where we are discharging into spawning rivers which are particularly sensitive to siltation, e.g. the Cladiagh (Monettia) and the Shiven (Derryfadda).

In the absence of complaint it might be assumed that an effluent is acceptable. Priority given to individual outfalls could be based on the acceptability of their effluents measured by the number and degree of complaints. Control of expenditure consistent with producing an acceptable standard of effluent is the responsibility of works management.

N.B.

At present, total expenditure on silt is not readily quantifiable and as a starting point in increasing the efficiency of expenditure, budgetary separation of all silt-related costs is essential.

Design of Silt Ponds

Ponds should be provided in accordance with the recommendations outlined in the Silt Control Study - December 1983.

i.e. Sludge Capacity = 525 cu. ft./nett acre

Top Width = 27 ft.

Min. depth below water level = 3 ft. 6 ins.

Length = 1.8 yds./nett acre of catchment.

Pond inlets and outlets should be at the same level. A wall of undisturbed material should be left across the full width of the pond at an approximate distance of two thirds the length of the pond from the inlet. The top width of this wall to be 6 to 12 inches below the water surface level.

On the above basis machine requirements are estimated at:

1 Hymac/1800 nett acres for maintenance

1 Hymac/3600 nett acres for initial excavation.

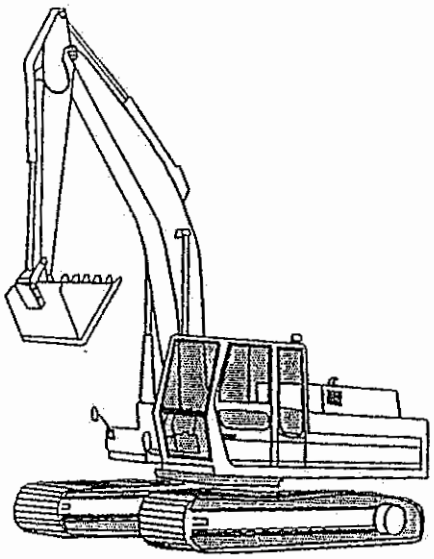
GH/CH
16.4.1984

Appendix 4-9

Internal Bord na Móna Harkins Report 1991

503 Boora

SILT CONTROL



REPORT

FOR

PEAT ENERGY DIVISION

BOOR
BLACKWATER
DERRYGREENAGH
MOUNTDILLON
OWENINNY

by *JIM HARKINS*

BORDNAMÓNA

April 1991

SUMMARY

A study was carried out at three works Boora, Mountdillon and Oweninny to assess the quantity of silt run-off from our bogs. These bogs are representative of Works attached to the Peat Energy Division. The findings show that the silt run-off is substantially less than previous reports indicate. All standards, silt control ponds, plant and labour are based on findings. The estimated cleaning costs for the Division is £425,000 per annum.

Following this, an audit was carried out at each works to quantify the size and number of Silt Control Ponds already constructed. From this, we know the number and capacity of Silt Control ponds outstanding to cater for run-off from bogs. This will cost £324,000 for the Peat Energy Division. An assumption is made that existing draglines will excavate and extend ponds. Depreciation of plant and acquisition of bog for siting silting ponds is not included.

The report has a two-pronged approach to the Silt Control problem:-

(a) Provision of silt control ponds to clean effluent from the bogs.

(b) Ways of minimising silt run-off at operations stage.

Following discussions with works personnel practical measures are outlined to minimise silt run-off. These measures are based on good husbandry and are the most cost effective method for dealing with part of the silt control problem. A system is recommended to control the cleaning and inspection of silt control ponds.

TABLE OF CONTENTS

		Page No.
1.0	INTRODUCTION	1
2.0	QUANTITY OF SUSPENDED SOLIDS AND SETTLED SLUDGE	2
2.8	FINDINGS ON STUDY	6
3.0	DATA ON SILT CONTROL AT WORKS	10
3.9	CONCLUSIONS	14
4.0	PLANT FOR CLEANING SILT CONTROL PONDS	16
	WORK CONTENT FOR CLEANING SILT PONDS	18
	COST OF CLEANING SILT PONDS	20
	EXCAVATION OF SILT PONDS	21
	COST OF EXCAVATING NEW SILT PONDS	22
5.0	PRACTICAL MEASURES TO MINIMISE SILT RUN-OFF FROM BOGS	23
6.0	RECOMMENDATIONS	25
7.0	REFERENCES	28
	APPENDICES	

Appendix No. 1. Boora Works - Tables on Silt Ponds.

Appendix No. 2. Mountdillon Works - Tables on Silt Ponds.

Appendix No. 3. Oweninny Works - Tables on Silt Ponds.

Appendix No. 4. Graphs on Monthly Rainfall, Inlet V Outlets, Data on Silt Pond Characteristics and Operations in progress within catchment area of silt pond.

Appendix No. 5. Moisture Content of Sludge and Silt Run-off/acre/annum.

Appendix No. 6. Rainfall at five works attached to the Division.

Appendix No. 7. Silt Ponds at Blackwater Works.

Appendix No. 8. Silt Ponds at Boora Works.

Appendix No. 9. Silt Ponds at Derrygreenagh Works.

Appendix No. 10. Silt Ponds at Mountdillon Works.

Appendix No. 11. Silt Ponds at Oweninny Works.

Appendix No. 12. Freqency of Cleaning Silt Control Ponds.

Appendix No. 13. Cleaning and Inspection Sheet, Modified Log Sheet.

Appendix No. 14. Peat Silt Related Claims.

Appendix No. 15. Dilution of Receiving Waters.

Appendix No. 16. Output of Plant, Specification of Plant.

1.0 INTRODUCTION.

There is a drive within Bord na Mona to establish an "Environmentally friendly" ethos and protect the environment in all our operations. To that end our long term objective is that all effluent from the bog will be controlled, monitored and conform to a satisfactory standard. In future, we may have to conform with environmental protection laws meeting rigorous standards.

Many good technical reports have been written on silt control. This report forms an addendum to these reports dwelling on a Peat Energy Divisional Environmental control plan to limit the external impact of peat silt.

The report outlines:-

(a) Study to establish standards for sizing silt control ponds and frequency of cleaning same.

(b) Data on silt control at works at present.

(c) Plant to achieve standards.

(d) Practical measures to be adopted to minimise silt run-off.

The project is an overview of the silt control problem in the division on which decisions for the future can be made.

2.0 QUANTITY OF SUSPENDED SOLIDS AND SETTLED SLUDGE.

2.1 Before an investigation can be concluded as to the feasibility of solving the silt control problem, it is necessary to quantify the silt run-off from bogs. To this end, a study was carried out on two silt control ponds at three works Boora, Mountdillon and Oweninny to ascertain the quantities of silt run-off from bogs. For silt control pond characteristics (see appendix No. 4). This study was carried out with data taken on a daily basis except weekends for a calender year.

The following data from each silt control pond was monitored:

(a) Rainfall.

(b) Silt quantity at inlet to ponds.

(c) Silt quantity at outlet from ponds.

(d) Run-off flow quantities using a V-notch.

(e) Operation in progress within the catchment area.

(f) Saturated sludge samples from ponds were tested.

The gross and nett catchment areas for each silt control pond was measured. We interpolated on existing data to ascertain weekend data.

2.2 From the above data, tables were drawn up for each silt pond location under the following headings see appendix No. 1 for Boora Wooks, Appendix No. 2 for Mountdillon Works and Appendix No. 3 for Oweninny Works.

(1) Date.

(2) Height over weir from V-notch reading.

(3) Flow from catchment area in cu.m. per sec.

(4) Flow from catchment area in cu.m. per day.

(5) Cumulative flow in cu.m. from start of monitoring.

(6) Silt quantity in parts per million (p.p.m.) at inlet to silt pond.

(7) The quantity of anhydrous peat silt in kg. per day at inlet to silt pond.

(8) Silt quantity in parts per million (p.p.m.) at outlet from the pond.

(9) The quantity of anhydrous peat silt in kg. per day at outlet from pond.

(10) Silt quantity in parts per million (p.p.m.) retained in the silt control pond.

(11) The quantity of anhydrous peat silt in kg. per day retained in silt pond.

(12) Cumulative quantity of anhydrous peat silt in kg. retained in silt ponds since commencement of monitoring.

(13) Rainfall in m.m.

(14) Date.

(15) Ditching operations.

2.3 From the above tables of information the following graphs were produced. (see appendix No. 4)

(a) Monthly rainfall.

(b) Anhydrous silt in kgs. at inlet **V** Anhydrous silt in kgs. at outlet

(c) Charts showing data from silt control ponds.

2.4 Silt run-off per acre per annum for the Silt ponds under test (see appendix No. 5)

Sludge tests from silt control ponds (see appendix No. 5).

2.5 The rainfall for each works over the past five years is shown in appendix No. 6. The average rainfall for each works is also shown, so it is safe to conclude that the period of study represents average conditions.

2.6 EFFECTIVENESS OF SILT PONDS.

Silt control ponds do not remove all silt. They have limitations. Extensive research has been carried out on drop velocities of peat particles of different sizes and concentrations. 72% of peat silt particle sizes are less than 50 microns. Particle grain size of less than 15 microns do not settle out. The only effective means of removing these particles is filtration. This is not practical with the quantities of run-off waters we are dealing with. (See report 'Decantation of Peat Bog residue' by Laborataire central D'Hydraulique de France and 'Development of methods for purifying run-off water from peat production areas' by Raimo Ihme, Esko Lakso and Kaisa Heikinin).

2.7 NUTRIENT AND B.O.D. COMPOSITION OF RUN-OFF WATERS.

Exhaustive chemical monitoring programmes have been carried out on the river Suck over the past ten years by Bord na Mona and the Central Fisheries Board. Detailed nutrient analysis was carried out by the Central Fisheries Board. Water samples were analyses at inlets and outlets of silt ponds with further samples taken on the main river Suck channel both upstream and downstream of the silt pond outfalls.

From these analyses it is safe to conclude that effluents from bogs do not contribute to nitrification of water, nor do they increase the B.O.D. of receiving waters.
(See reports on River Suck survey by Central Fisheries Board).

2.8 The following findings can be drawn from above study.

(1) (a) One net acre produces 20 cu.m. of sludge annually in Midlands bogs.

(b) One net acre produces 30 cu.m. of sludge annually at Oweninny works.

This is at variance with recommendations of 'Silt Control Study' carried out by Mr. G. Hannon in 1983. That study recommends silt control systems to cater for 60 cu.m. of sludge per acre per annum. I have had discussions with Mr. G. Hannon on our findings. His study was carried out over a period of 3 months, the primary thrust of his project was to devise a mathematical formula, taking all variables in account, to assess silt run-off. However, if the previous report is right then there would be a run-off of 741 p.p.m. suspended solids on average at inlet to silt control ponds assuming there was complete run-off of rainfall for the year. The silt quantities in p.p.m. at inlets to silt ponds are mostly substantially less than 741 p.p.m. as obtained by our study.

(2) Oweninny has a higher silt run-off than midlands bogs for the following reasons:-

(a) Substantially higher rainfall on average than midland bogs.

(b) The gradient to field drains and outalls are greater than midland bogs - thereby giving faster run-off.

(3) Concentration of suspended solids varies with rainfalls. If the rainfall is high then the silt run-off is high, if the rainfall is low then the silt run-off is low.

(4) There is significant silt run-off during ditching operations in October at all bogs.

(5) Periods of highest silt run-off are:-

(a) High rainfall.

(b) Weather break in production. (Boora Works)

(c) Ditching in progress in catchment area.

(6) Peat sludge has no cohesion and re-entrainments occurs easily. Silt control ponds can increase the silt content at oultets during periods of high rainfall or when the suspended solids at inlet are small with pond partially full.

(7) 57% of year with suspended solids less than 30 p.p.m. at inlet for Midland bogs.

(8) 81% of year with suspended solids at inlet less than 100 p.p.m. for Midland bogs.

(9) 80% of year with suspended solids at outlet from silt pond less than 30 p.p.m. for Midland bogs.

(10) 98% of year with supsended solids at outlet from silt pond less than 100 p.p.m. for Midland bogs.

(11) 49% of year with suspended solids less than 30 p.p.m. at inlet for Oweninny Works.

(12) 74% of year with suspended solids at inlet less than 100 p.p.m. for Oweninny Works.

(13) 61% of year with suspended solids at outlet from silt pond less than 30 p.p.m. for Oweninny Works.

(14) 86% of year with suspended solids at outlets from silt pond less than 100 p.p.m. for Oweninny Works.

(15) 63% effectiveness of silt control ponds in Midland Bogs in removing silt.

(16) 47% effectiveness of silt control ponds at Oweninny Works in removing silt.

(17) There is a run-off of 21,000 tonnes peat at 55% moisture content at average suspended solids contentration of 30 p.p.m. at outlets from bogs attached to the Division.

(18) There is a run-off 71,000 tonnes peat at 55% moisture content at average suspended solids concentration of 100 p.p.m. at outlets from bogs attached to the Division.

(19) The frequency of cleaning ponds determines its effectiveness and reduces re-entrainment.

(20) The silt deposited out in silt control ponds starting at pond inlet and filling up to surface of pond and carried on filling to outlet.

(21) Silt control ponds will not produce acceptable levels of suspended solids in effluent when subjected to intense rainfall.

(22) Silt control ponds will not produce effluent to a standard of say 100 p.p.m. suspended solids at all times.

3.0 DATA ON SILT CONTROL AT WORKS.

3.1 In the Peat Energy Division production related operations are carried on 74,000 net acres. The surface is milled to a depth of 8-10 m.m, twelve times per year. With field drains at 15m. centres some milled peat will be deposited into the drains by various means:-

(a) Wind blowing dry peat of the fields.

(b) Rains washing peat of the fields into drains.

(c) Milling machines and harrows inadvertently depositing peat into drains.

At the end of the production season field drains are ditched, some of the ditched peat gets washed back into the drains.

Again some peat gets deposited into drains during rail bed preparation of Peco piles and during the loading out operations.

The above are the main sources of generating silt.

3.2 Silt control ponds have been constructed at all works to trap silt and to keep it within confines of works. They are the only practical way of slowing down the rate of flow of an outfall enabling the silt particles to settle out.

3.3 A survey has been carried out at works giving details of all silt control ponds (see appendix Nos. 7-11) under the following headings:-

(a) Gross catchment area (acres): Land area within confines of watershed - this may include private property, upland etc.

(b) Net catchment area (acres): The area of bog from which silt run-off can occur, i.e. sum of net production area, pile fields and turing grounds.

(c) Storage capacity of silt control pond required in cu.m. to conform with recommendations of study.

(d) Storage capacity of silt control pond provided in cu.m. is the volume of the existing pond below invert level or weir level of outlet to pond.

(e) The percentage coverage is the ratio of storage provided over storage required.

(f) By-pass - status of silt ponds with by-passes.

(g) Pond location: this gives the location of the silt control pond relative to flood plain of receiving rivers or lakes.

(h) The remaining headings are self-explanatory.

3.4 CLEANING OF SILT CONTROL PONDS.

Cleaning of silt control ponds and the construction of more silt ponds was carried out during 1990. A table showing the frequency of cleaning of ponds is outlined in appendix No. 12.

3.5 MANAGEMENT CONTROL OF CLEANING AND INSPECTING SILT PONDS.

There is not a comprehensive control system to monitor frequency of cleaning and condition of ponds at works with the exception of perhaps Oweninny Works.

I recommend that an inspection be carried out on all silt ponds at regular intervals by the supervisor in a bog area. This information is to be logged onto computer giving all relevant data on silt control. See appendix No. 13 giving details of cleaning and Inspection sheet.

Dedicated plant for silt control to have a modified log sheet (see appendix No. 13 showing modified log sheet).

3.6 PEAT SILT RELATED CLAIMS.

Peat siltation can cause interference with normal farm drainage and livestock drinking facilities. It can also affect spawning beds and general water quality for leisure and other uses. Peat silt related claims for the works are listed in appendix No. 14. The monetary settlements are small, this does not reflect the true cost, in practice the silting problems are rectified on the ground by our personnel.

3.7 ACCEPTABLE SUSPENDED SOLIDS CONCENTRATION.

Following the 1977 Water Pollution Act threshold values for maximum allowable suspended solids concentration are left by and large to the discretion of the local authorities involved.

The "Eight Report of the Royal Commission on Water and Sewage" (1912) recommended that "maximum suspended solids concentration" be regarded as 30 p.p.m. (in the case of peat solids = 30 mg/1) assuming an outfall to receiving water flow rate ratio of 1:8.

Although the situation is not clarified, it is reasonable to assume that suspended solids concentration of the order of 100mg/1 should be deemed acceptable by the authorities where the outfall to receiving water flow rate ratio is more that 1:25.

3.8 DESTINATION OF OUTALLS FROM BOGS.

As shown in appendix Nos. 7-11, outfalls from our bogs discharge into tributaries of main rivers.

The dry weather flow of some of these rivers was obtained from the Office of Public Works. We have compiled data on catchment areas of tributaries. See appendix No. 15.

3.9 The following conclusions can be drawn from above

(1) The percentage coverage for each works to proposed standard:

Boora	35.8%
Blackwater	57.3%
Derrygreenagh	62.8%
Mountdillon	41.0%
Oweninny	50.3%

There is insufficient coverage and many outfalls from bogs have no silt control ponds.

(2) The frequency of cleaning ponds is inadequate relative to recommendations. This is because there is old and insufficient plant at the works. Silt control is also the first casualty in times of financial cutbacks.

(3) Each works has different priorities and silt control is more sensitive at some works.

(4) More by-passes to silt control ponds are required for periods of heavy rainfall. If this is not possible a piped outlet to silt ponds should be installed.

(5) Gross catchment area is high relative to net catchment area.

(6) There are not comprehensive silt pond cleaning records at works with the exception of Oweninny Works.

(7) Acceptable suspended solids in run-off from bogs depends on dilution of receiving waters. This may be different for receiving tributaries.

(8) Silt control ponds should be constructed as large as conditions will allow in keeping with previous technical reports to minimise frequency of cleaning.

(9) Net catchment acres for silt ponds may not include turning grounds and pile fields at some works.

(10) Silt Related Claims are low relative to proposed costs of construction and maintainance of silt ponds.

4.0 CLEANING OF SILT CONTROL PONDS.

4.1 Cleaning of silt control ponds is carried out at all works either by dragline excavator or conventional hydraulic excavator. The dragline excavators are old, there is difficulty in getting replacement parts. The conventional hydraulic excavators have limitations in reach and are more suitable for other bog operations.

4.2 Studies were carried out on pumping sludge from silt control ponds on Clooneeny Bog. The object of the exercise was to study pumping as an alternative system for cleaning silt ponds.

A hydrostatically - driven transfer tube piston pump from Putzmeister Ltd. was tested. The findings were as follows:-

(a) Output was low at 13 cu.m. of sludge per hour.

(b) It was capable of pumping sludge, however, it had to be moved to other locations in the silt pond to operate efficiently. The re-location of the pump was labour intensive with discharge pipes having to be moved, the pump itself was moved by a dragline.

(c) Cost of pump £20,500 punts. ex. works. In conclusion, it is not a satisfactory alternative to our present system of cleaning ponds.

4.3 Recently, a long reach hydraulic excavator (VC-15) was purchased by each works in the Peat Energy Divisions. Studies have been carried out on the capabilities of the VC-15 by our Industrial Engineers. Comparisons with our existing machines along with specifications are listed in tables (see appendix No. 16).

It must be remembered that silt control is not just confined to cleaning silt ponds at works. All works clean open outfalls and small rivers on an annual basis. Hy-macs carry out other operations as well as silt cleaning.

4.4 Based on the findings of the study, a table has been drawn up showing the content of work required for a VC-15 hydraulic machine to clean silt control ponds and conform with proposed standards.

A further table has been drawn up showing the content of work required for a dragline to excavate and extend silt control ponds. An assumption is made that half the volume of excavation is above the water level of the silt control ponds.

Further tables show the cost of cleaning Silt Control Ponds for Division at £425,000 per annum.

Cost of excavation and extension of ponds to conform with proposed standard is £324,000. This does not include depreciation of plant or acquisition of bog for silt control ponds. These tables serve as a guide only (see overleaf).

WORK CONTENT FOR CLEANING SILT CONTROL PONDS.

WORKS	BOORA	BLACKWATER	DERRYGREENAGH	MOUNTDILLON	OWENINNY
REQUIRED NO. OF PONDS IN TOTAL	83	171	52	95	118
TOTAL QUANTITY OF SILT (CU.M.)	301,400	366,480	306,960	311,380	290,040
WORK CONTENT (VC 15) CLEANING HOURS	3173	3858	3231	3278	2417
PREPARE/FINISH	83	171	52	95	118
IDLE TRAVEL	83	171	52	95	118
TOTAL STD. HOURS	3339	4200	3335	3468	2653
NO. OF WEEKS 48 HOUR/WEEK	70	88	70	73	56
56.75 HOUR/WEEK	59	74	59	62	47

COST OF REMOVING SILT WITH A VC-15.

	YEAR										
	1	2	3	4	5	6	7	8	9	10	TOTAL
Cost of Machine	92000										
Repayments incl. Interest	16955	16955	16955	16955	16955	16955	16955	16955	16955	16955	169550
Wages	16640	17301	17998	18718	19466	20245	20155	22897	22773	23684	199777
Fuel	4888	5084	5280	5498	5718	5947	6185	6432	6680	6957	58686
Maintenance	5564	5787	6018	6259	6509	6769	7040	7322	7615	7919	66802
Residual Value										(1500)	(15000)
Total Cost	44047	45127	46258	47430	48468	49916	51235	52606	54033	40515	479815

Total cost per year 1 to 10 = £479,815

cost per year = £ 47,982

Cost per Weel (48 Hr.) = £ 923

COST OF CLEANING SILT PONDS WITH A VC-15.

WORKS	BOORA	BLACKWATER	DERRYGREENAGH	MOUNTDILLON	OWENINNY
CUBIC METRES OF SILT	301,400	366,480	306,960	311,380	290,040
MAN HOURS OF WORK	3,339	4,200	3,335	3,468	2,653
COST OF CLEANING @ £923/WK.	£64,206	£80,763	£64,129	£66,687	£51,015
DOZING @ 30% OF VC-15 COST	£19,262	£24,229	£19,239	£20,006	£15,304
TOTAL COST	£83,468	£104,992	£83,368	£86,693	£66,319

Total £424,840

NOTES:-

1. A week is taken as 48 hours.
2. A year is taken as 48 weeks.
3. The costs include repayment plus interest on the VC-15.

EXCAVATE NEW SILT CONTROL PONDS.

WORKS	BOORA	BLACKWATER	DERRYGREENAGH	MOUNTDILLON	OWENINNY
NO. OF NEW PONDS REQUIRED AND EXTENSION TO EXTISING PONDS	59	64	20	57	58
STORAGE NEEDED (CU.M.)	97,410	78,258	75,063	97,740	51,261
WORK CONTENT (DRAGLINE) EXCAVATE HOURS	2,435	1,956	1,427	2,444	1,282
PREPARE/FINISH AT 12 HOURS/POND	708	768	240	648	696
IDLE TRAVEL AT 4 HOURS/POND	236	256	80	228	232
TOTAL STD. HOURS	3,379	2,980	1,747	3,356	2,210
NO. OF WEEKS 48 HOUR/WEEK	71	63	37	70	46

COST OF EXCAVATING NEW SILT PONDS.

WORKS		BOORA	B/WATER	D/GREENAGH	MT.DILLON	OWENINNY
CUBIC METRES OF BOG		97401	78258	57063	97740	51261
STD. HOURS OF WORK		3379	2980	1747	3356	2210
DRAGLINE	LABOUR @ £6.67/HR.	22,538	19,877	11,652	22,385	14,741
	FUEL: 3 GALS/HR @ £.82.GAL	2,771	2,444	1,433	2,752	1,812
	MAINTENANCE	6864	6053	3549	6817	4,489
SUB-TOTAL		32,173	28,374	16,634	31,954	21,042
DOZING @ 30% OF DRAGLINE COST		9,652	8,512	4,990	9,586	6,313
FENCING @ £300/POND		17,700	19,200	6,000	17,100	17,400
PIPES @ £300/POND		17,700	19,200	6,000	17,100	17,400
TOTAL COST		£77,225	£75,286	£33,624	£75,740	£62,155

TOTAL £324,030

NOTES:-

1. DEPRECIATION IS NOT ALLOWED FOR.
2. MAINTENANCE IS £4680 P.A. AND BASED ON DRAGLINE COSTS OVER 4 YRS.
3. A YEAR IS TAKEN AS 2304 HOURS.

5.0 PRACTICAL MEASURES TO MINIMISE SILT RUN-OFF FROM BOGS.

This is an area that can greatly assist in reducing costs associated with silt control. Peat silt is an asset in the form of milled peat and an expensive problem when it leaves our bogs in the form of silt.

Our employees have a big contribution to make in reducing silt run-off from our bogs. The items listed will help to reduce silt run-off as they address the source of the problem, they are as a result of discussions with management at works, the benefits are obvious and are not quantified scientifically.

(1) Harrow spoons are properly handed so that peat during production operations does not enter field drains.

(2) Drivers of millers and harrows do not turn short at turning ground.

(3) New outfalls and manholes to be set 50 m. back from turning ground.

(4) Ridging all fields that have been milled at end of production season.

(5) Ditching operations to be carried out as much as possible during anti-cyclonic weather.

(6) Setting of disc of standard ditcher to match profile of drain.

(7) Clean all silt ponds in an area prior to commencemen of ditching.

(8) Offset peco pile in field for rail bed.

(9) Reduce flooding in bog areas - pumps in working order.

(10) Weirs or piped outlets to all silt ponds maintained.

We propose developing a drain cleaner for cleaning silt during production. This will reduce necessity for ditching bog on an annual basis.

6.0 RECOMMENDATIONS.

(1) (a) That a figure of 20 cu.m. per acre per year be taken as quantity of sludge for design purposes at Midland Bogs.

(b) A figure of 30 cu.m. per acre per year be taken as quantity of sludge for design purpose at Oweninny Bog.

(2) (a) That each silt control pond be designed to cater for 10 cu.m. per acre per annum for Midland bogs.

(b) That each silt control pond be designed to cater for 15 cu.m. per acre per annum for Oweninny bog.

(3) That silt control ponds be cleaned twice per year to cater for production and ditching.

(a) Before production so that the pond is available to cater for run-off during production.

(b) Before ditching. Before moving in to ditch a bog area, all control ponds should be cleaned.

(4) Silt control ponds located in flood plains to be cleaned for a third time prior to river rising in late part of November or early par of December. Otherwise, an embankment should be constructed around silt control area with a piped outlet.

(5) A phased programme be adopted by each works to construct silt control ponds on all bog outfalls within a specified time limit. This will give consistency throughout the works.

(6) As peat silt is more sensitive at some works, greater emphasis should be placed on getting an agreed plan in place more quickly.

(7) All employees to be informed of methods of reducing silt run-off from bogs. Great emphasis is to be placed on this as it can reduce silt control costs.

(8) Introduce a uniform system of controlling and recording cleaning of silt control ponds at all works.

(9) Construct by-passes to all silt control ponds where practical. This is very essential as at times some ponds will be full, we may not be in a position to clean it immediately. During periods of heavy rainfall, silt ponds can disimprove effluents.

(10) Upland catchment areas to silt control ponds should be diverted away so that run-off amounts during periods of high rainfall will be lessened.

(11) A silt pond should be deemed full when peat silt is visible on 75% of surface area of pond.

(12) Long reach hydraulic excavator (VC-15) is only suitable for cleaning ponds and not excavating new ponds.

(13) If legislation is introduced on acceptable effluents from our bogs, silt control ponds cannot conform with standards at all times. Part of the legislation should include achieving standards 90% to 95% of the time.

(14) Acceptable effluents from our bogs is based on dilution of receiving waters. O.P.W. have some information on tributaries into which our bog outfalls flow. More information is required to ascertain dilution rates.

7.0 REFERENCES

(1) Mr. G. Hannon, Bord na Mona, Civil Engineering Division 1983. : Silt Control Study No. 1.

(2) Mr. P. Coffey, Bord na Mona, Scientific Office, Newbridge, 1980. : Water Pollution Report.

(3) Mr. J. Feely, Bord na Mona, Civil Engineering Division : Environmental Aspects of Peat Production.

(4) Mr. L. Byrne, Bord na Mona, Boora Works 1989 : Milled Peat Silt Control.

(5) Mr. J. M. Caffrey and J. J. King, Central Fisheries Board, Glasnevin : Report on the Affects of Peat Bog Development on the River Suck Fishery.

(6) Labaratoire Central D'Hydraulique De France, France 1969 : Decantation of Peat Bog Residue.

(7) Esko Lakso, Raimo Inme, Kaisa Heikinen, University of Oulu, Finland : Development of methods of Purifying run-off water from Peat Production Areas.

Appendix No. 1

BOORA WORKS

TABLE ON MONETTIA SILT POND

DATE 1	Height Over Weir 2	Flow M/sec 3	Flow M/day 4	Cumulativ Flow 5	Part/Mil Influent 6	KG.INF 7	Part/Mil Effluent 8	KG.EFF 9	Part/Mil Retained 10	CUM. Retained. 10A	KG.Silt per day 11	CUM KG.silt 12	Rainfall. 13	DATE 14
01-Apr-90		.0000000	.00	2151	86.89	.00	47.07	.00	39.83	1074.00	.00	.0	0.00	1
02-Apr-91		.0000000	.00	0	86.89	.00	47.07	.00	39.83	79.65	.00	.0	0.00	2
03-Apr-91		.0000000	.00	0	94.13	.00	47.07	.00	47.07	126.72	.00	.0	0.00	3
04-Apr-90		.0000000	.00	0	100.17	.00	47.07	.00	53.10	179.82	.00	.0	0.00	4
05-Apr-90		.0504482	4358.72	4359	106.20	462.91	47.07	205.15	59.14	238.96	257.76	257.8	2.50	5
06-Apr-90		.0000000	.00	4359	112.24	.00	47.07	.00	65.17	304.13	.00	257.8	0.00	6
07-Apr-90		.0000000	.00	4359	182.24	.00	37.41	.00	144.82	448.95	.00	257.8	0.00	7
08-Apr-90		.0000000	.00	4359	182.24	.00	37.41	.00	144.82	593.77	.00	257.8	0.00	8
09-Apr-90		.0000000	.00	4359	182.24	.00	37.41	.00	144.82	738.60	.00	257.8	0.00	9
10-Apr-90		.0100896	871.74	5230	182.24	158.86	37.41	32.61	144.82	883.42	126.25	384.0	.50	10
11-Apr-90		.0050448	435.87	5666	66.38	28.93	10.86	4.73	55.52	938.93	24.20	408.2	.25	11
12-Apr-90		.0100896	871.74	6538	83.27	72.59	9.65	8.42	73.62	1012.55	64.18	472.4	.50	12
13-Apr-90		.0302689	2615.23	9153	4.83	12.62	10.86	28.41	-6.03	1006.52	-15.78	456.6	1.50	13
14-Apr-90		.0000000	.00	9153	55.52	.00	7.24	.00	48.27	1054.79	.00	456.6	0.00	14
15-Apr-90		.0000000	.00	9153	9.65	.00	7.24	.00	2.41	1057.20	.00	456.6	0.00	15
16-Apr-90		.0000000	.00	9153	9.65	.00	10.86	.00	-1.21	1056.00	.00	456.6	0.00	16
17-Apr-90		.1563893	13512.03	22665	9.65	130.46	10.86	146.76	-1.21	1054.79	-16.31	440.3	7.75	17
18-Apr-90		.1008963	8717.44	31383	4.83	42.08	8.45	73.64	-3.62	1051.17	-31.56	408.7	5.00	18
19-Apr-90		.0605378	5230.46	36613	3.62	18.94	9.65	50.50	-6.03	1045.14	-31.56	377.2	3.00	19
20-Apr-90		.0000000	.00	36613	15.69	.00	12.07	.00	3.62	1048.76	.00	377.2	0.00	20
21-Apr-90		.0000000	.00	36613	32.59	.00	8.45	.00	24.14	1072.89	.00	377.2	0.0	21
22-Apr-90		.0000000	.00	36613	6.03	.00	8.45	.00	-2.41	1070.48	.00	377.2	0.0	22
23-Apr-90		.0000000	.00	36613	3.62	.00	8.45	.00	-4.83	1065.65	.00	377.2	0.00	23
24-Apr-90		.0000000	.00	36613	14.48	.00	9.65	.00	4.83	1070.48	.00	377.2	0.00	24
25-Apr-90		.0000000	.00	36613	4.83	.00	9.65	.00	-4.83	1065.65	.00	377.2	0.00	25
26-Apr-90		.0151344	1307.62	37921	9.65	12.62	2.41	3.16	7.24	1072.89	9.47	386.6	.75	26
27-Apr-90		.0302689	2615.23	40536	15.69	41.03	13.28	34.72	2.41	1075.31	6.31	392.9	1.50	27
28-Apr-90		.0100896	871.74	41408	6.03	5.26	6.03	5.26	.00	1075.31	.00	392.9	.50	28
29-Apr-90		.0000000	.00	41408	12.07	.00	7.24	.00	3.00	1078.31	.00	392.9	0.00	29
30-Apr-90		.0000000	.00	41408	22.93	.00	10.86	.00	12.07	1090.38	.00	392.9	0.00	30
			41407.84			986.31		593.37					23.75	

DATE	Height Over Weir	Flow M/sec	Flow M/day	Cumulativ Flow	Part/Mil Influent	KG.INF	Part/Mil Effluent	KG.EFF	Part/Mil Retained	CUM. Retained.	KG.Silt per day	CUM KG.silt	Rainfall.	DATE	KM. DITCHED
01-May-90		.0000000	.00	41408	121.89	.00	12.07	.00	109.82	1200.20	.00	392.9	0.00	1	6.27
02-May-90		.0000000	.00	41408	53.10	.00	9.65	.00	43.45	1243.65	.00	392.9	0.00	2	6.27
03-May-90		.0000000	.00	41408	477.91	.00	9.65	.00	468.26	1711.91	.00	392.9	0.00	3	7.95
04-May-90		.0000000	.00	41408	24.14	.00	9.65	.00	14.48	1726.39	.00	392.9	0.00	4	7.95
05-May-90		.0000000	.00	41408	16.90	.00	7.24	.00	9.65	1736.04	.00	392.9	0.00	5	7.95
06-May-90		.0000000	.00	41408	14.48	.00	8.45	.00	6.03	1742.08	.00	392.9	0.00	6	7.95
07-May-90		.0050448	435.87	41844	13.28	5.79	8.45	3.68	4.83	1746.91	2.10	395.1	.25	7	7.95
08-May-90		.1008963	8717.44	50561	96.55	841.65	12.07	105.21	84.48	1831.39	736.45	1131.5	5.00	8	7.95
09-May-90		.0403585	3486.98	54048	319.82	1115.19	10.86	37.87	308.95	2140.34	1077.32	2208.8	2.00	9	7.95
10-May-90		.1412548	12204.42	66253	27.76	338.77	8.45	103.10	19.31	2159.65	235.66	2444.5	7.00	10	0.00
11-May-90		.0050448	435.87	66688	60.34	26.30	14.48	6.31	45.86	2205.51	19.99	2464.5	.25	11	0.00
12-May-90		.0000000	.00	66688	243.78	.00	12.07	.00	231.72	2437.23	.00	2464.5	0.00	12	0.00
13-May-90		.0000000	.00	66688	120.63	.00	60.34	.00	60.34	2497.57	.00	2464.5	0.00	13	0.00
14-May-90		.0000000	.00	66688	59.14	.00	106.20	.00	-47.07	2450.50	.00	2464.5	0.00	14	0.00
15-May-90		.0605378	5230.46	71919	25.34	132.56	61.55	321.93	-36.21	2414.30	-189.37	2275.1	3.00	15	0.00
16-May-90		.1917030	16563.14	88482	67.58	1119.40	190.68	3158.31	-123.10	2291.20	-2038.91	236.2	9.50	16	0.00
17-May-90		.0100896	871.74	89354	25.34	22.09	143.62	125.20	-118.27	2172.93	-103.10	133.1	.50	17	11.17
18-May-90		.0000000	.00	89354	27.76	.00	22.93	.00	4.83	2177.75	.00	133.1	0.00	18	11.17
19-May-90		.0000000	.00	89354	26.55	.00	15.69	.00	10.86	2188.61	.00	133.1	0.00	19	11.17
20-May-90		.0000000	.00	89354	22.93	.00	14.48	.00	8.45	2197.06	.00	133.1	0.00	20	11.17
21-May-90		.0000000	.00	89354	19.31	.00	13.28	.00	6.03	2203.10	.00	133.1	0.00	21	11.17
22-May-90		.0000000	.00	89354	20.52	.00	16.90	.00	3.62	2206.72	.00	133.1	0.00	22	11.17
23-May-90		.0000000	.00	89354	18.10	.00	15.69	.00	2.41	2209.13	.00	133.1	0.00	23	11.17
24-May-90		.0000000	.00	89354	789.28	.00	19.31	.00	769.97	2979.10	.00	133.1	0.00	24	5.87
25-May-90		.0000000	.00	89354	19.31	.00	8.45	.00	10.86	2989.97	.00	133.1	0.00	25	5.87
26-May-90		.0000000	.00	89354	133.96	.00	12.07	.00	121.89	3111.86	.00	133.1	0.00	26	5.87
27-May-90		.0000000	.00	89354	60.34	.00	60.34	.00	.00	3111.86	.00	133.1	0.00	27	5.87
28-May-90		.0000000	.00	89354	27.76	.00	242.58	.00	-214.82	2897.04	.00	133.1	0.00	28	5.87
29-May-90		.1109859	9589.18	98943	86.89	833.24	26.55	254.60	60.34	2957.38	578.64	711.7	5.50	29	5.87
30-May-90		.1816133	15691.39	114634	21.72	340.87	27.76	435.56	-6.03	2951.35	-94.69	617.0	9.00	30	5.87
31-May-90		.0000000	.00	114634	8.45	.00	19.31	.00	-10.86	2940.48	.00	617.0	0.00	31	0.00
			73226.50			4775.87		4551.77					42.00		

DATE	Height Over Weir	Flow M/sec	Flow M/day	Cumulativ Flow	Part/Mil Influent	KG.INF	Part/Mil Effluent	KG.EFF	Part/Mil Retained	CUM. Retained.	KG.Silt per day	CUM KG.silt	Rainfall.	DATE	KM. DITCHED
01-Jun-90		.0403585	3486.98	118121	12.07	42.08	20.52	71.54	-8.45	2932.04	-29.46	587.6	2.00	1	0.00
02-Jun-90		.1008963	8717.44	126839	33.79	294.58	42.24	368.22	-8.45	2923.59	-73.64	513.9	5.00	2	0.00
03-Jun-90		.0000000	.00	126839	60.34	.00	38.62	.00	21.72	2945.31	.00	513.9	0.00	3	0.00
04-Jun-90		.0000000	.00	126839	120.69	.00	36.21	.00	84.48	3029.79	.00	513.9	0.00	4	0.00
05-Jun-90		.1412548	12204.42	139043	214.82	2621.75	38.62	471.33	176.20	3205.99	2150.43	2664.4	7.00	5	0.00
06-Jun-90		.0353137	3051.10	142094	9.65	29.46	35.00	106.78	-25.34	3180.65	-77.33	2587.0	1.75	6	0.00
07-Jun-90		.0151344	1307.62	143402	14.48	18.94	24.14	31.56	-9.65	3170.99	-12.62	2574.4	.75	7	0.00
08-Jun-90		.1008963	8717.44	152119	9.65	84.17	25.34	220.93	-15.69	3155.31	-136.77	2437.6	5.00	8	0.00
09-Jun-90		.0958515	8281.57	160401	32.59	269.86	31.38	259.86	1.21	3156.51	9.99	2447.6	4.75	9	0.00
10-Jun-90		.0000000	.00	160401	28.96	.00	31.38	.00	-2.41	3154.10	.00	2447.6	0.00	10	0.00
11-Jun-90		.0000000	.00	160401	26.55	.00	27.76	.00	-1.21	3152.89	.00	2447.6	0.00	11	0.00
12-Jun-90		.0000000	.00	160401	76.03	.00	25.34	.00	50.69	3203.58	.00	2447.6	0.00	12	0.00
13-Jun-90		.0000000	.00	160401	494.81	.00	32.59	.00	462.23	3665.80	.00	2447.6	0.00	13	0.00
14-Jun-90		.0000000	.00	160401	6.03	.00	19.31	.00	-13.28	3652.53	.00	2447.6	0.00	14	0.00
15-Jun-90		.0000000	.00	160401	55.52	.00	25.34	.00	30.17	3682.70	.00	2447.6	0.00	15	0.00
16-Jun-90		.0000000	.00	160401	7.24	.00	19.31	.00	-12.07	3670.63	.00	2447.6	0.00	16	0.00
17-Jun-90		.0000000	.00	160401	15.69	.00	26.55	.00	-10.86	3659.77	.00	2447.6	0.00	17	0.00
18-Jun-90		.0908067	7845.70	168247	24.14	189.37	33.79	265.12	-9.65	3650.12	-75.75	2371.9	4.50	18	0.00
19-Jun-90		.0605378	5230.46	173477	8.45	44.19	37.41	195.68	-28.96	3621.15	-151.50	2220.4	3.00	19	0.00
20-Jun-90		.0706274	6102.21	179579	133.96	817.46	7.24	44.19	126.72	3747.87	773.27	2993.7	3.50	20	0.00
21-Jun-90		.0000000	.00	179579	72.41	.00	36.21	.00	36.21	3784.08	.00	2993.7	0.00	21	5.56
22-Jun-90		.3228682	27895.81	207475	48.27	1346.65	26.55	740.66	21.72	3805.80	605.99	3599.7	16.00	22	5.56
23-Jun-90		.0201793	1743.49	209219	14.48	25.25	7.24	12.62	7.24	3813.04	12.62	3612.3	1.00	23	5.56
24-Jun-90		.0000000	.00	209219	22.93	.00	15.69	.00	7.24	3820.28	.00	3612.3	0.00	24	5.56
25-Jun-90		.0706274	6102.21	215321	31.38	191.48	28.96	176.75	2.41	3822.70	14.73	3627.0	3.50	25	5.56
26-Jun-90		.0100896	871.74	216193	54.31	47.34	20.52	17.89	33.79	3856.49	29.46	3656.5	.50	26	5.56
27-Jun-90		.0706274	6102.21	222295	28.96	176.75	12.07	73.64	16.90	3873.38	103.10	3759.6	3.50	27	5.56
28-Jun-90		.0000000	.00	222295	10.86	.00	12.07	.00	-1.21	3872.18	.00	3759.6	0.00	28	6.76
29-Jun-90		.0100896	871.74	223166	12.07	10.52	13.28	11.57	-1.21	3870.97	-1.05	3758.5	.50	29	6.76
30-Jun-90		.2724200	23537.09	246704	27.76	653.33	10.86	255.65	16.90	3887.87	397.68	4156.2	13.50	30	6.76
			132069.22			6863.17		3324.01					75.75		

DATE	Height Over Weir	Flow M/sec	Flow M/day	Cumulativ Flow	Part/Mil Influent	KG.INF	Part/Mil Effluent	KG.EFF	Part/Mil Retained	CUM. Retained.	KG.Silt per day	CUM KG.silt	Rainfall.	DATE	KM. DITCHED
01-Jul-90		.0000000	.00	246704	16.90	.00	9.65	.00	7.24	3895.11	.00	4156.2	0.00	1	6.76
02-Jul-90		.0706274	6102.21	252806	6.03	36.82	9.65	58.92	-3.62	3891.49	-22.09	4134.1	3.50	2	6.76
03-Jul-90		.0403585	3486.98	256293	3.62	12.62	7.24	25.25	-3.62	3887.87	-12.62	4121.5	2.00	3	6.76
04-Jul-90		.2522408	21793.60	278086	323.44	7048.86	16.90	368.22	306.54	4194.41	6680.64	10802.1	12.50	4	6.76
05-Jul-90		.1816133	15691.39	293778	35.00	549.18	8.45	132.56	26.55	4220.96	416.62	11218.7	9.00	5	7.84
06-Jul-90		.0000000	.00	293778	13.28	.00	9.65	.00	3.62	4224.58	.00	11218.7	0.00	6	7.84
07-Jul-90		.0000000	.00	293778	12.07	.00	8.45	.00	3.62	4228.20	.00	11218.7	0.00	7	7.84
08-Jul-90		.0000000	.00	293778	12.07	.00	7.24	.00	4.83	4233.03	.00	11218.7	0.00	8	7.84
09-Jul-90		.1109859	9589.18	303367	12.07	115.73	6.03	57.86	6.03	4239.06	57.86	11276.6	5.50	9	7.84
10-Jul-90		.0403585	3486.98	306854	9.65	33.67	7.24	25.25	2.41	4241.47	8.42	11285.0	2.00	10	7.84
11-Jul-90		.0000000	.00	306854	13.28	.00	8.45	.00	4.83	4246.30	.00	11285.0	0.00	11	7.84
12-Jul-90		.0000000	.00	306854	24.14	.00	9.65	.00	14.48	4260.78	.00	11285.0	0.00	12	11.26
13-Jul-90		.0000000	.00	306854	55.52	.00	9.65	.00	45.86	4306.64	.00	11285.0	0.00	13	11.26
14-Jul-90		.0000000	.00	306854	26.55	.00	9.65	.00	16.90	4323.54	.00	11285.0	0.00	14	11.26
15-Jul-90		.0000000	.00	306854	15.69	.00	9.65	.00	6.03	4329.57	.00	11285.0	0.00	15	11.26
16-Jul-90		.0302689	2615.23	309469	6.03	15.78	9.65	25.25	-3.62	4325.95	-9.47	11275.5	1.50	16	11.26
17-Jul-90		.0000000	.00	309469	65.17	.00	14.48	.00	50.69	4376.64	.00	11275.5	0.00	17	11.26
18-Jul-90		.0000000	.00	309469	10.86	.00	22.93	.00	-12.07	4364.57	.00	11275.5	0.00	18	11.26
19-Jul-90		.0000000	.00	309469	12.07	.00	18.10	.00	-6.03	4358.54	.00	11275.5	0.00	19	7.86
20-Jul-90		.0000000	.00	309469	120.69	.00	10.86	.00	109.82	4468.36	.00	11275.5	0.00	20	7.86
21-Jul-90		.0000000	.00	309469	101.38	.00	14.48	.00	86.89	4555.26	.00	11275.5	0.00	21	7.86
22-Jul-90		.0000000	.00	309469	72.41	.00	12.07	.00	60.34	4615.60	.00	11275.5	0.00	22	7.86
23-Jul-90		.0000000	.00	309469	779.63	.00	10.86	.00	768.77	5384.37	.00	11275.5	0.00	23	7.86
24-Jul-90		.0000000	.00	309469	15.69	.00	15.69	.00	.00	5384.37	.00	11275.5	0.00	24	7.86
25-Jul-90		.0000000	.00	309469	15.69	.00	19.31	.00	-3.62	5380.75	.00	11275.5	0.00	25	7.86
26-Jul-90		.0000000	.00	309469	43.45	.00	16.90	.00	26.55	5407.30	.00	11275.5	0.00	26	10.26
27-Jul-90		.1109859	9589.18	319058	267.92	2569.15	14.48	138.87	253.44	5660.74	2430.28	13705.8	5.50	27	10.26
28-Jul-90		.3430474	29639.30	348698	852.04	25253.85	10.86	321.93	841.18	6501.91	24931.92	38637.7	17.00	28	10.26
29-Jul-90		.0000000	.00	348698	9.65	.00	9.65	.00	.00	6501.91	.00	38637.7	0.00	29	10.26
30-Jul-90		.1210756	10460.93	359159	4.83	50.50	8.45	88.37	-3.62	6498.29	-37.87	38599.9	6.00	30	10.26
31-Jul-90		.0000000	.00	359159	24.14	.00	13.28	.00	10.86	6509.15	.00	38599.9	0.00	31	10.26
			112454.98			35686.17		1242.49					64.50		

DATE	Height Over Weir	Flow M/sec	Flow M/day	Cumulativ Flow	Part/Mil Influent	KG.INF	Part/Mil Effluent	KG.EFF	Part/Mil Retained	CUM. Retained.	KG.Silt per day	CUM KG.silt	Rainfall.	DATE	KM. DITCHED
01-Aug-90		.0000000	.00	359159	42.24	.00	26.55	.00	15.69	6524.84	.00	38599.9	0.00	1	10.26
02-Aug-90		.0000000	.00	359159	21.72	.00	24.14	.00	-2.41	6522.43	.00	38599.9	0.00	2	8.88
03-Aug-90		.0000000	.00	359159	10.86	.00	12.07	.00	-1.21	6521.22	.00	38599.9	0.00	3	8.88
04-Aug-90		.0000000	.00	359159	42.24	.00	16.90	.00	25.34	6546.57	.00	38599.9	0.00	4	8.88
05-Aug-90		.0000000	.00	359159	60.34	.00	13.28	.00	47.07	6593.63	.00	38599.9	0.00	5	8.88
06-Aug-90		.0000000	.00	359159	438.09	.00	9.65	.00	428.43	7022.07	.00	38599.9	0.00	6	8.88
07-Aug-90		.0000000	.00	359159	279.99	.00	13.28	.00	266.71	7288.78	.00	38599.9	0.00	7	8.88
08-Aug-90		.0000000	.00	359159	596.19	.00	16.90	.00	579.29	7368.07	.00	38599.9	0.00	8	8.88
09-Aug-90		.0177698	1535.31	360694	483.95	743.01	7.24	11.12	476.71	8344.78	731.89	39331.8	1.00	9	8.07
10-Aug-90		.0266547	2302.97	362997	358.44	825.47	9.65	22.23	348.78	8693.56	803.23	40135.0	1.50	10	3.07
11-Aug-90		.0000000	.00	362997	545.50	.00	12.07	.00	533.43	9226.99	.00	40135.0	0.00	11	8.07
12-Aug-90		.0000000	.00	362997	965.48	.00	13.28	.00	952.21	10179.20	.00	40135.0	0.00	12	8.07
13-Aug-90		.0577518	4989.76	367987	1647.36	8219.91	14.48	72.26	1632.87	11812.08	8147.65	48282.6	3.25	13	8.07
14-Aug-90		.0266547	2302.97	370290	441.71	1017.24	16.90	38.91	424.81	12236.89	978.33	49261.0	1.50	14	8.07
15-Aug-90		.1110612	9595.69	379885	22.93	220.03	14.48	138.97	8.45	12245.34	81.06	49342.0	6.25	15	8.07
16-Aug-90		.0000000	.00	379885	15.69	.00	9.65	.00	6.03	12251.37	.00	49342.0	0.00	16	1.56
17-Aug-90		.0355396	3070.62	382956	8.45	25.94	7.24	22.23	1.21	12252.58	3.71	49345.7	2.00	17	1.56
18-Aug-90		.1332735	11514.83	394471	6.03	69.48	10.86	125.07	-4.83	12247.75	-55.59	49290.2	7.50	18	1.56
19-Aug-90		.0000000	.00	394471	12.07	.00	10.86	.00	1.21	12248.96	.00	49290.2	0.00	19	1.56
20-Aug-90		.2487771	21494.35	415965	15.69	337.23	12.07	259.41	3.62	12252.58	77.82	49368.0	14.00	20	1.56
21-Aug-90		.0000000	.00	415965	33.79	.00	7.24	.00	26.55	12279.13	.00	49368.0	0.00	21	1.56
22-Aug-90		.0000000	.00	415965	24.14	.00	1.21	.00	22.93	12302.06	.00	49368.0	0.00	22	1.56
23-Aug-90		.0222122	1919.14	417884	21.72	41.69	10.86	20.85	10.86	12312.92	20.85	49388.8	1.25	23	0.00
24-Aug-90		.0444245	3838.28	421722	10.86	41.69	9.65	37.06	1.21	12314.13	4.63	49393.5	2.50	24	0.00
25-Aug-90		.0000000	.00	421722	10.86	.00	9.65	.00	1.21	12315.33	.00	49393.5	0.00	25	0.00
26-Aug-90		.0000000	.00	421722	9.65	.00	8.45	.00	1.21	12316.54	.00	49393.5	0.00	26	0.00
27-Aug-90		.4087053	35312.14	457035	8.45	298.32	7.24	255.70	1.21	12317.75	42.62	49436.1	23.00	27	0.00
28-Aug-90		.0444245	3838.28	460873	8.45	32.43	7.24	27.79	1.21	12318.95	4.63	49440.7	2.50	28	0.00
29-Aug-90		.2665469	23029.66	483903	568.43	13090.72	7.24	166.76	561.19	12880.14	12923.96	62364.7	15.00	29	0.00
30-Aug-90		.0710792	6141.24	490044	27.76	170.47	20.52	126.00	7.24	12887.38	44.47	62409.1	4.00	30	0.00
31-Aug-90		.1599282	13817.79	503862	31.38	433.58	7.24	100.06	24.14	12911.52	333.52	62742.7	9.00	31	0.00
			144703.00			25567.20		1424.41					94.25		

APPENDIX NO. 14

PEAT SILT RELATED CLAIMS.

Appendix No. 14

1990 PEAT SILT RELATED CLAIMS.

WORKS	NO. OF CLAIMS RELATING TO PEAT SILT	SILTING FLOODING CLAIMS IR£
BLACKWATER	153	625
BOORA	113	1,170
DERRYGREENAGH	6	--
MOUNTDILLON	32	4,000
OWENINNY	10	9,750
TOTAL	314	17,299

These claims may not be a true reflection of actual claims as the area foreman may deal with some of the silt problems on the ground as they arise.

ACKNOWLEDGEMENT

I have drawn on many inputs on both a formal and informal basis and am thankful to all.

Studies on the Silt Control Project was carried out at three Works:- Boora, Mountdillon and Oweninny.

Special thanks to Pat Fitzgerald who devised the project, to Celine Robbins who analysed the samples, to Terry McGovern who set up computer programmes in compiling data, to the General Manager, Boora and his staff Aidan O'Hara and Patricia Fahy for their assistance and to the General Manager, Oweninny Works, in particular Gerry Loftus and Richard Cosgrove.

Thanks to Donal Wynne, Michael Hoban, Sean Canny, Louis Byrne and John Welsby from the Peat Energy Division in assisting with data.

Thanks to General Manager, Blackwater and Derrygreenagh Works and their staff Gerry Salmon and John McDermott for their assistance.

Thanks to Eugene Dalton for taking the samples at Mountdillon Works, to Michael O'Sullivan for study on plant and finally thanks to Sharon Gray for her patience in typing and amending the report.

APPENDIX NO. 15

	PAGE NO.
RIVER SHANNON	1.
TRIBUTARIES	2.

RIVER SHANNON

The net catchment area of bog for the Peat Energy Division is 50,000 acres. This does not include Derryfadda Works. The gross catchment area owned by Bord na Mona is 2.7% of total catchment area of River Shannon. The area of peat soils within catchment is 540,300 acres or 19.4% of total catchment. Bord na Mona operates on 13.95% of the peatland in the catchment (see Environmental aspects of Peat Production by J. Feely).

Lough Ree

Catchment Area	1,147,000 acres
Mountdillon bogs	16,600 acres
Catchment	1.45%
Volume	651 x 10 6 cu.m.
Water Residence time	80 days.

Appendix No. 15

CATCHMENT	RIVER	GUAGE PT.	DRY WEATHER FLOW (CU.M./SEC)	BORD NA MONA NETT ACRE	TOTAL CATCHMENT AREA OF RIVER IN ACRES
Boyne	Boyne	Trim	1.730	2,036	316,777
Barrow	Figile	Clonbullogue	0.230	5,328	70,916
	Cushina	Cushina	0.110	830	16,802
Camlin	Camlin	Mullagh	0.110	317	64,245
	Fallon	Kilmore	0.010	546	15,073
Brosna	Brosna	Ferbane		11,056	298,245
	Cladagh	Rahan	0.190	1,720	67,704
	Silver	Millbroke		1,430	40,771

APPENDIX NO. 16

	PAGE NO.
OUTOUT OF PLANT	1.
PLANT SPECIFICATION	2.

Appendix No. 16

A study was carried out on the new long reach excavators (VC15's) to establish their output, and to compare them with a Hy-mac and Dragline.

The output of the machines were as follows:-

WORKS	MACHINE TYPE	BUCKET SIZE	CUBIC METRES /STANDARD HR.
Mountdillon	VC 15	.84 Cub. Metres	95
Oweninny	VC 15	.84 Cub. Metres	120
	Hy-Mac	.31 Cub. Metres	65
	19 RB	1 Cub. Metre	78

Appendix No. 16

MACHINE SPECIFICATIONS

	HY-MAC	19 RB	VC 15
Weight	13.2 Tonnes	19 tonnes	19.5 Tonnes
Bearing Pressure	2 lbs/sq. in	1.75 lbs/sq. in	2.15 lbs/sq.in
Idle travel Speed	2000 M/Hr.	2800 M/Hr.	2400 M/Hr.
Reach (from Centre of m/c)	7.46 M	12.2 M dropped	15 M
Max. Digging Depth	2.8 M	4.6 M	6 M
Max. Load		1.2 T @ 11.6 M	1.4 T @ 15 M
Pond Width (Max) Cleaning from both sides	8.00 m	22.5 m	19.00 m

Appendix No. 4

SILT CONTROL POND CHARACTERISTICS.

	STORAGE CAPACITY (CU.M.)	GROSS CATCHMENT AREA (ACRES)	NET CATCHMENT AREA (ACRES)
BOORA			
Monettia	3880	776	643
Noggus	2416	665	451
MOUNTDILLON			
Cloontagh	3762	401	137
Derryshannogue	3480	500	424
OWENINNY			
O'Connells	6285	274	243
Railway 100	330	68	50

Appendix 4-10

BnM Peat Development in Ireland 1954

APPENDIX 4-10

BORD NA MÓNA PEAT DEVELOPMENT IN IRELAND 1954

BORD NA MÓNA

Peat Development in Ireland

bord na móna

A Statutory Organisation for the Development of the Peat Resources of Ireland

BOGS are a characteristic feature of the Irish landscape. It has been calculated that one seventh of the area of Ireland is bogland. Throughout the centuries these great wastelands have provided fuel for the farmers living in their vicinity: but only the perimeter of the bogs was used and the implements were of the simplest—the slean, the barrow and the fork.

Inside these outer fringes the bogs were impenetrable and unuseable. It was impossible to walk on them, because bog, despite its seemingly solid surface is ninety-three per cent. water and only seven per cent. solid matter. The problem of converting this very low-grade but abundant material to useful ends presented a challenge to which the successful response is described in this brochure. In essence the problem is to remove the water from the peat economically; the methods and stages by which this is done are shown herein.

Bord na Móna or in English the Peat Board is an organization set up by the Oireachtas i.e. the Irish Parliament, to carry out the task of producing fuel from the bogs. It was established in 1946 following successful experiments carried out by its predecessor the Turf Development Board Ltd. on the large scale production of fuel from a bog at Clonsast near Portarlington. It is endowed with statutory powers and is authorised by legislation to spend on its projects up to £14 million of public funds all of which is repayable with interest.

There are two main methods in use by the Board for the production of fuel:

(a) Machine sod peat process.

(b) Milled peat process.

THE two methods are here illustrated and described in outline. The objective of the Board is to produce one million tons of sod peat and two and a half million tons of milled peat. The sod peat is used partly for electricity generating stations and partly for domestic and industrial consumption; the milled peat except for a relatively small quantity used at present for conversion to briquettes will be used only in power stations.

The Board employs seven thousand workers at peak and an executive staff of four hundred consisting of engineers, accountants, clerks and supervisors. It has built villages for its employees and maintains hostels where two thousand men are catered for and housed. There is a research station, museum and library. The Board constructs and maintains light railway systems which when completed will comprise nearly four hundred miles of rail; it also has a road transport system. It operates shops, canteens and recreation halls. Trees, flowers and shrubs are planted to make bright and cheerful the environment of its works, villages and buildings.

Mechanisation is the keynote of the Board's response to the challenge of the bogs and a rural population is being industrialized without being up-rooted. When the peat is cut away the land will be left in a fit condition for the cultivation of crops or for afforestation.

The swamps which for so long were a dreary and useless wasteland are already sustaining new families; the fuel from them is producing cheap electricity for the national network and heat and power for factory and home.

STAGES OF DEVELOPMENT

ACQUISITION, DRAINAGE, BUILDINGS, RAILWAYS, MACHINES, POWER

STAGES OF PRODUCTION

SOD PEAT

Stripping

Cutting and Spreading

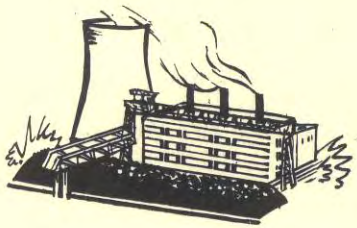
Windrowing or Footing

Windrow Turning

Collecting and Ricking

Loading

Transport



POWER STATION

PRIVATE CONSUMERS

MILLED PEAT

Disc Ditching

Milling

Harrowing

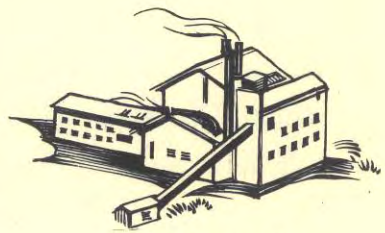
Ridging

Harvesting

Loading

Transport

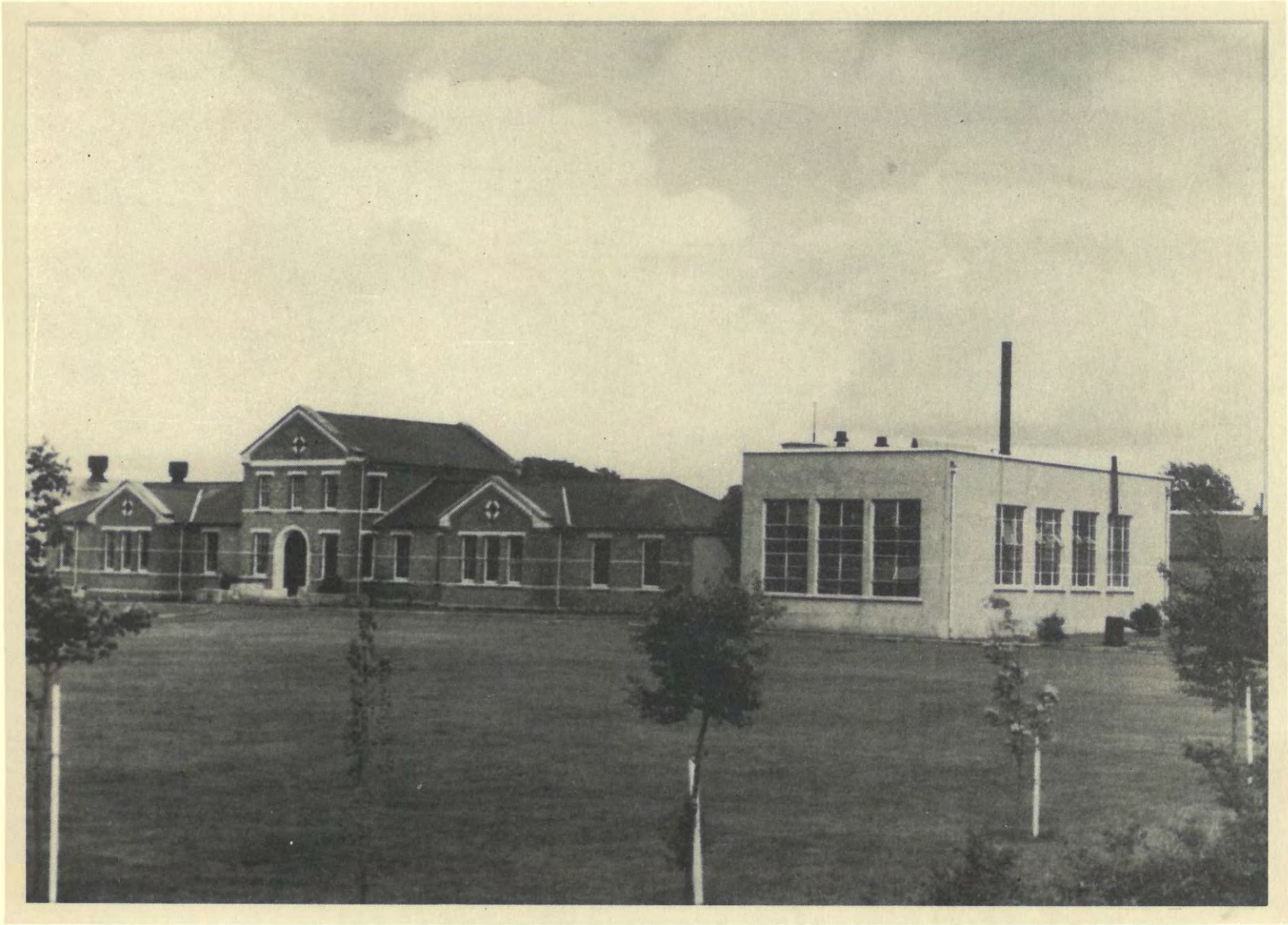
POWER STATION



BRIQUETTE FACTORY

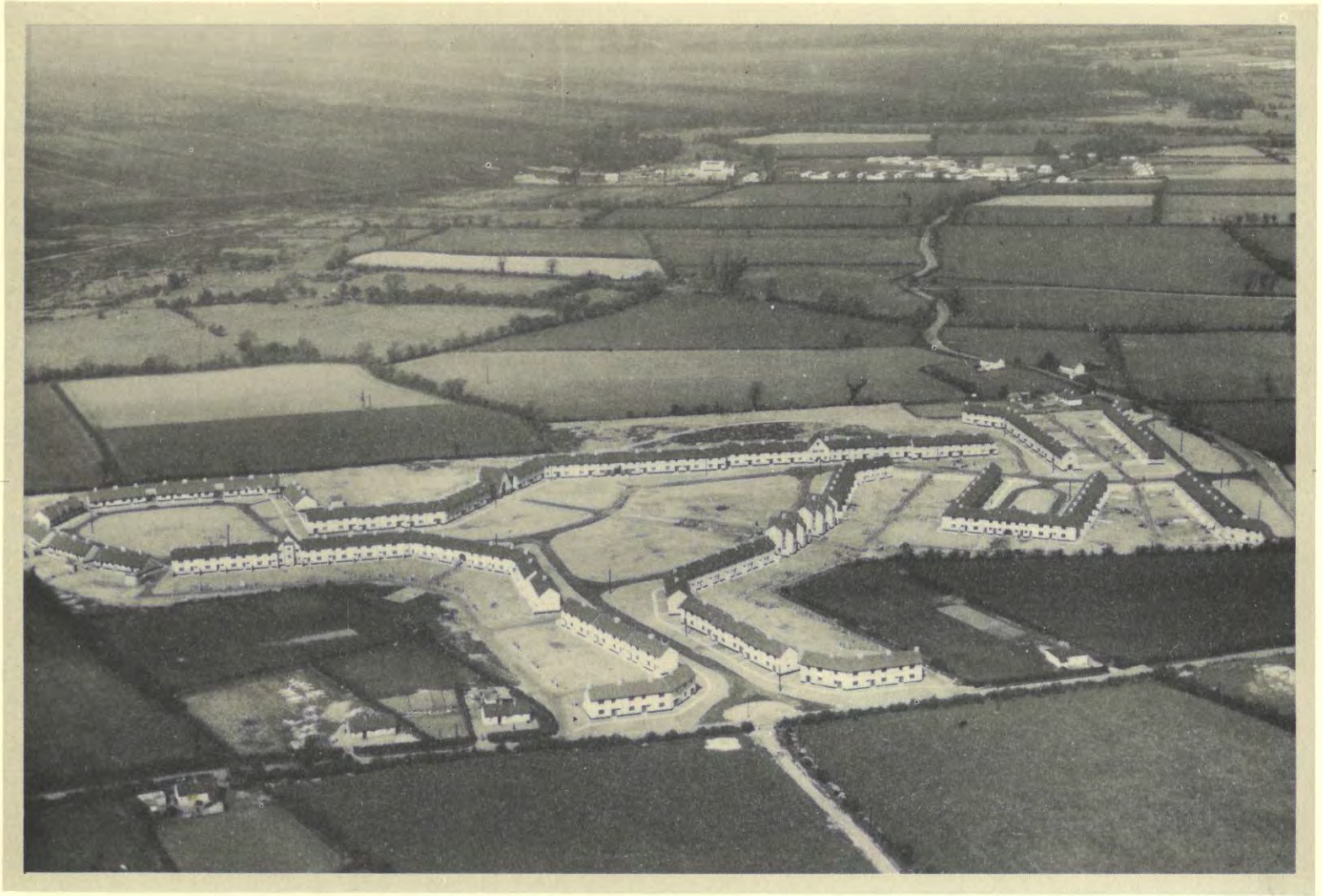
BAILE DHIARMADA HOSTEL

SITUATED NEAR RATHANGAN, CO. KILDARE, THIS HOSTEL IS TYPICAL OF OTHERS IN VARIOUS AREAS. SEASONAL WORKERS CAN OBTAIN FULL BOARD AND ACCOMMODATION AS REQUIRED



STAISIUN TURGHNAMHACH AT DROICHEAD NUA

HEADQUARTERS OF THE BOARD'S RESEARCH STAFF

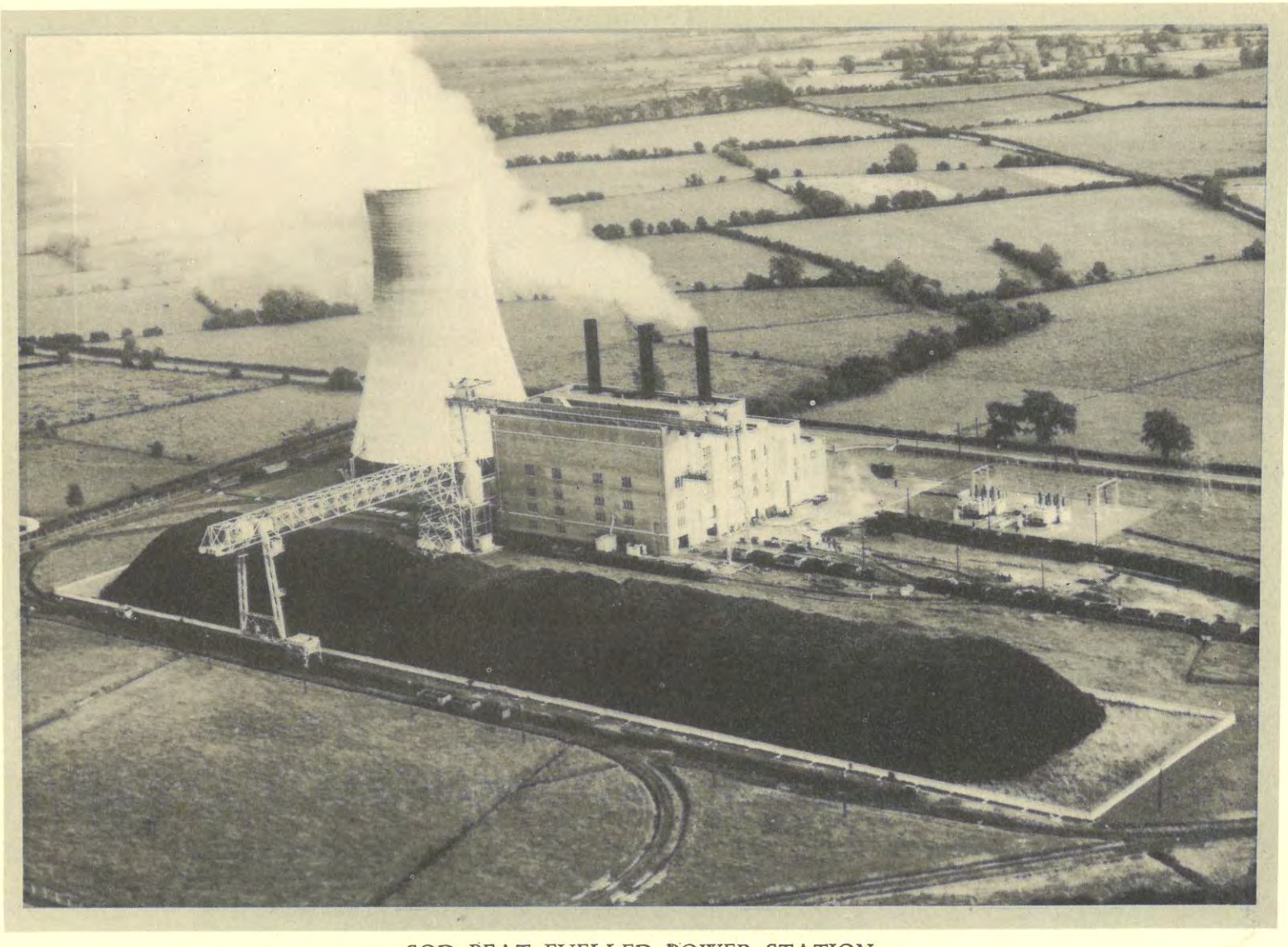


COILL DUBH VILLAGE

ONE OF THE BOARD'S NEW HOUSING SCHEMES OF ONE HUNDRED AND FIFTY-SIX HOUSES AND FOUR SHOPS FOR THE BOARD'S PERMANENT EMPLOYEES AT TIGH MOCHUA, CO. KILDARE. THE WORKS BUILDINGS AND HOSTEL CAN BE SEEN IN THE BACKGROUND

COILL DUBH VILLAGE

CHILDREN AT PLAY IN THE NEW VILLAGE



SOD PEAT FUELLED POWER STATION

PORTARLINGTON POWER STATION HAD A DESIGNED AVERAGE CONSUMPTION OF ONE HUNDRED AND TWENTY THOUSAND TONS OF PEAT PER ANNUM PRODUCING NINETY MILLION UNITS OF ELECTRICITY. IT IS NOW KNOWN THAT THE STATION CAN USE AND PRODUCE AT LEAST FIFTY PER CENT MORE

THIS POWER STATION IS OWNED AND OPERATED BY THE ELECTRICITY SUPPLY BOARD

SOD PEAT STRIPPER

A TWO METRE WIDTH OF MOSS AND HEATHER UP TO HALF A METRE DEEP IS MILLED FROM THE BANK AND DISCHARGED IN THE CUTAWAY BELOW

UNDRAINED BOG

WESTERN BOG INTENDED FOR MILLED PEAT DEVELOPMENT. THE BOG HAS RISING ROLLING CONTOURS BROKEN BY LAKES AND OUTFALLS

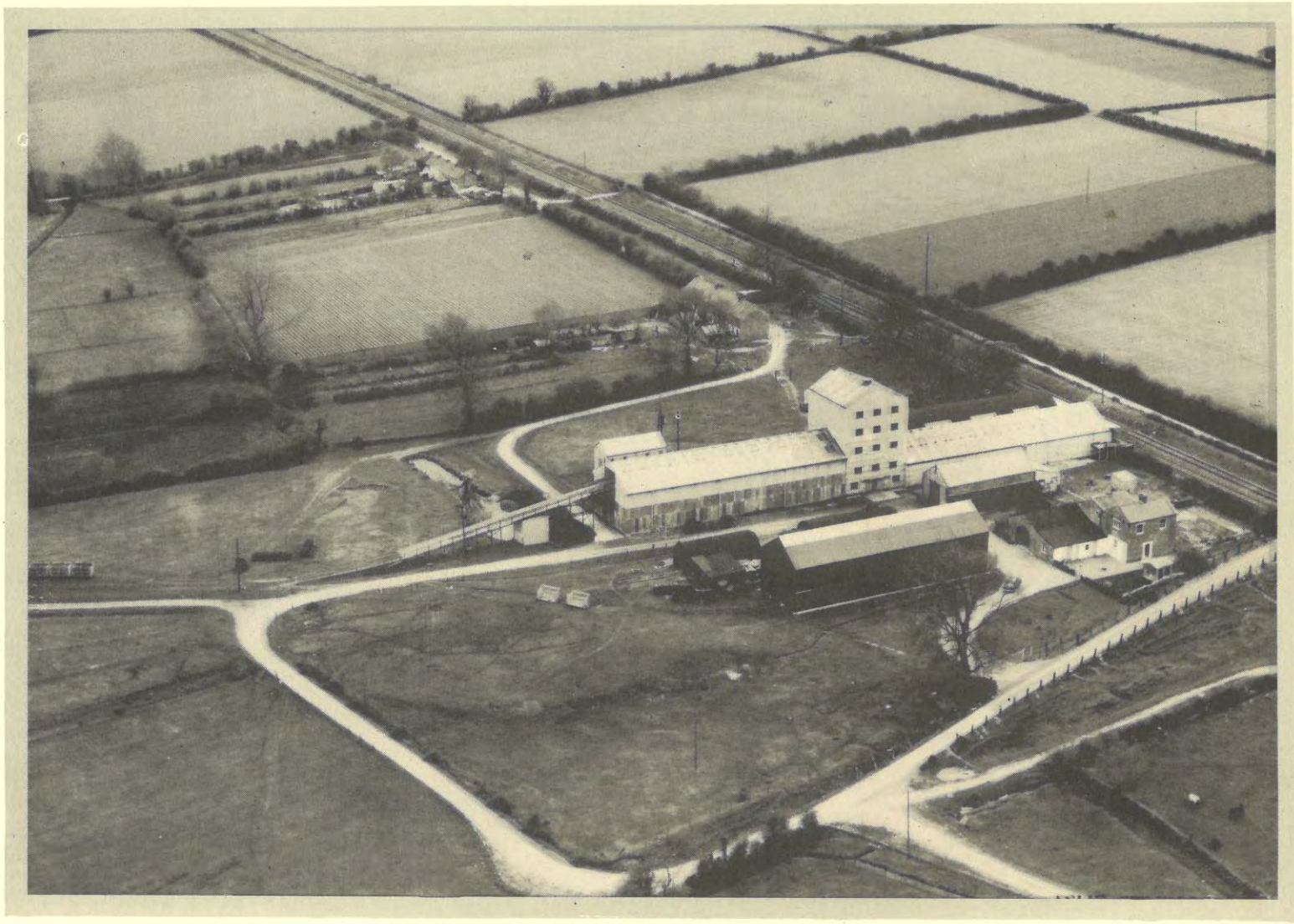
MILLED PEAT BOG BEING DRAINED

INITIAL PLOUGH AND DISC DITCHER DRAINS

SPACED AT FIFTY FEET INTERVALS

PEAT MOSS CUTTING TRENCHES AND SPREAD FIELDS

PEAT MOSS IS CUT BY HAND FROM THE TRENCHES, WEATHERED, FOOTED, HARVESTED AND SUBSEQUENTLY RICKED IN OPEN SIDED DRYING SHEDS ON THE BOG

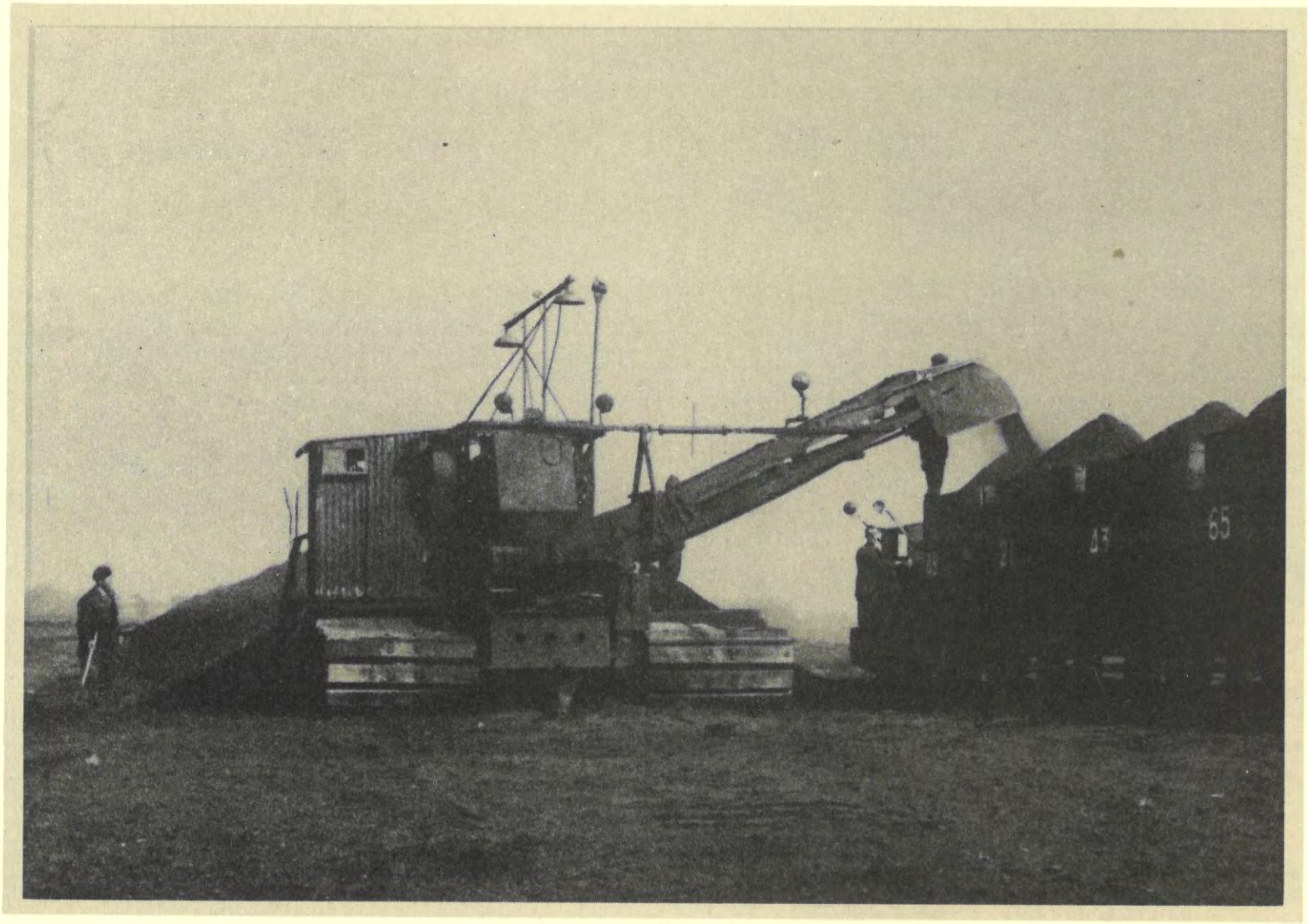


CILL BEARA PEAT MOSS FACTORY

THE DRIED PEAT MOSS IS DELIVERED INTO THE FACTORY WHERE IT IS DISINTEGRATED, SCREENED, GRADED AND BALED READY FOR DELIVERY BY ROAD OR RAIL TO THE CONSUMER

DISC DITCHER

BOG DRAIN BEING EXCAVATED TO A DEPTH OF FOUR FEET SIX INCHES.
THE SPOIL IS UNIFORMLY DISPERSED OVER ADJOINING AREAS



LOADER

THE LOADER CONVEYS MILLED PEAT AT THE RATE OF FIFTY TONS PER HOUR FROM THE RAILPILE INTO RAILWAY WAGONS WHENCE DELIVERY IS MADE EITHER TO THE FACTORY FOR THE MANUFACTURE OF BRIQUETTES OR TO THE POWER STATION FOR THE GENERATION OF ELECTRIC POWER

DRAINAGE PLOUGH

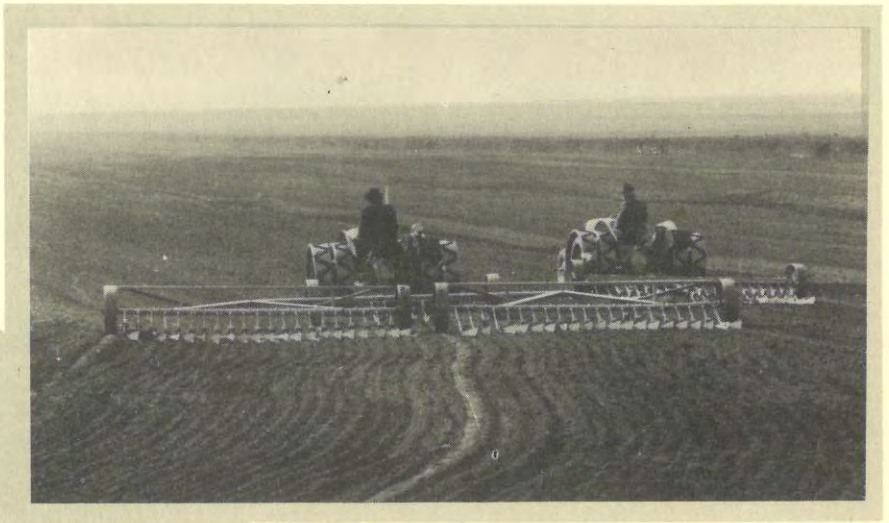
PRELIMINARY MARKING OUT AND INITIAL SHALLOW CUTS ON DRAINS CAN BE RAPIDLY MADE ON VIRGIN BOGS.

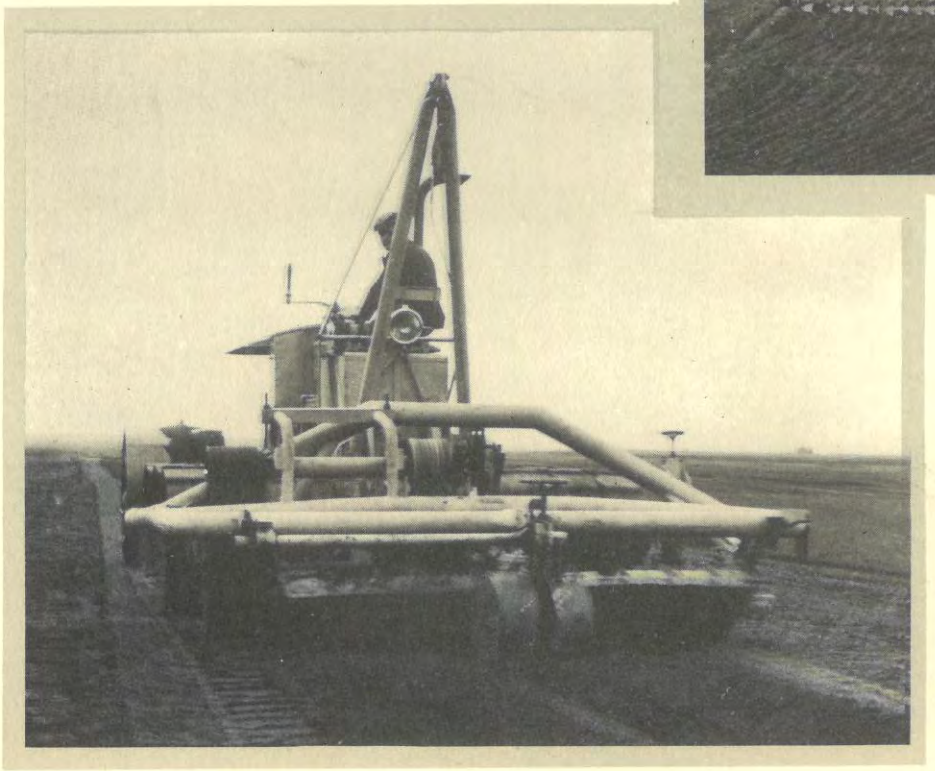
MOLE DRAINER

IMPROVEMENT OF SURFACE CONDITIONS ON SPREAD GROUNDS CAN BE ACHIEVED AT RELATIVELY LITTLE COST. THE MACHINE IS MAINLY USED TO SUPPLEMENT THE CROSS DRAIN SYSTEM BETWEEN MAIN TRENCHES ON SOD PEAT BOGS.

HARROWS

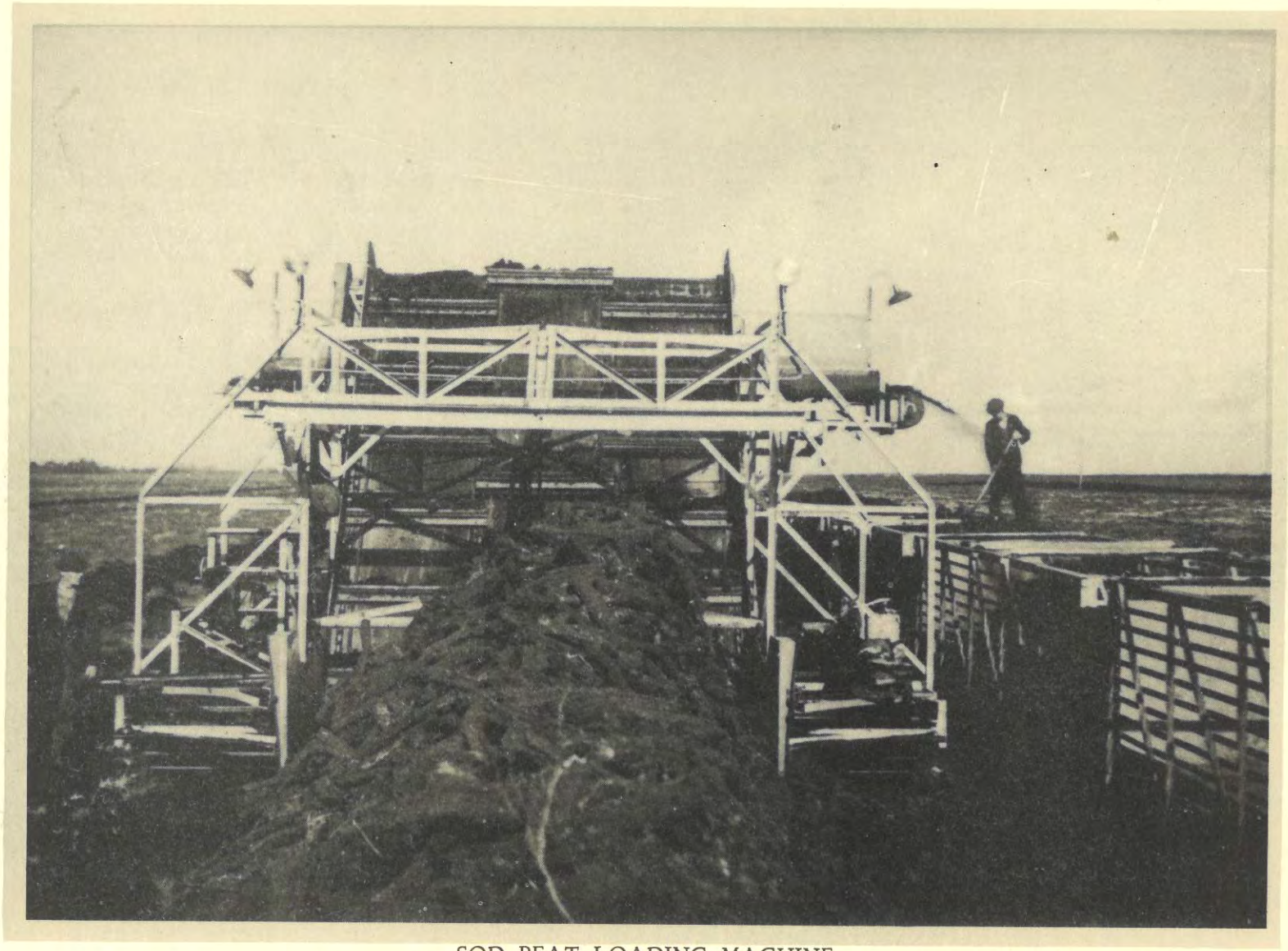
SINGLE AND DOUBLE SPOON HARROWS ACCELERATE THE DRYING OF THE MILLED PEAT





MILLER

THE SURFACE AREA OF THE FIELD IS CUT TO A DEPTH OF APPROXIMATELY HALF AN INCH BY THE MILLING ATTACHMENT FITTED TO A SPECIALLY DESIGNED HALF-TRACK TRACTOR

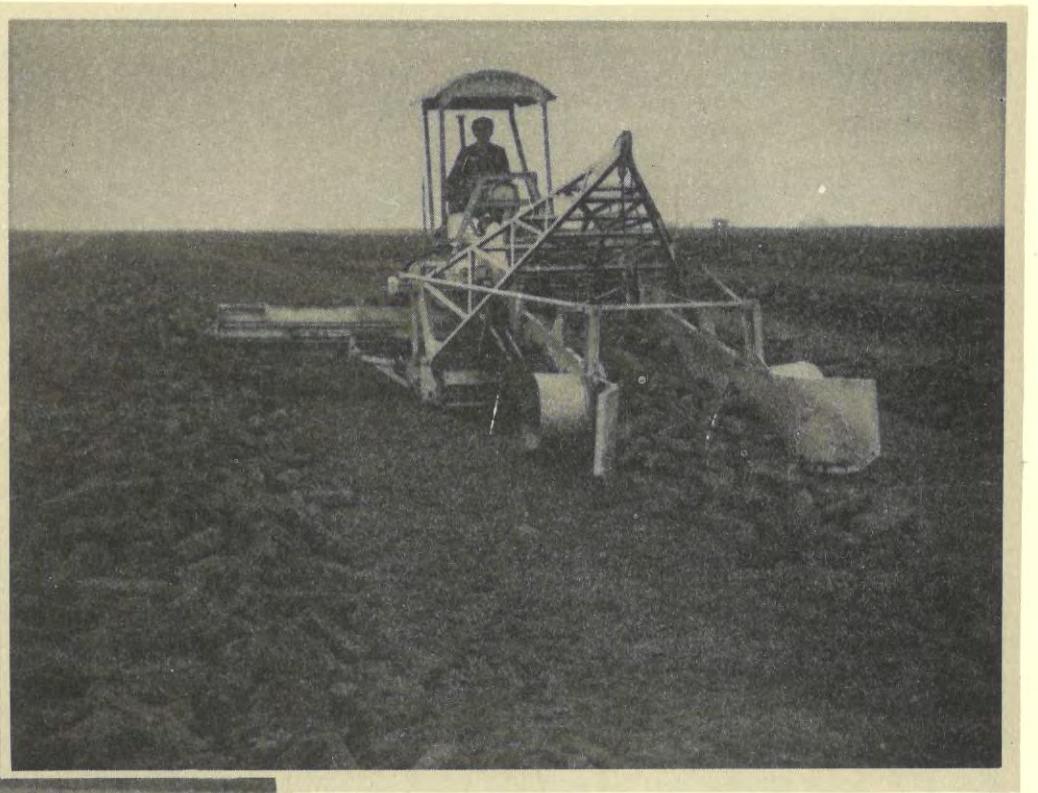


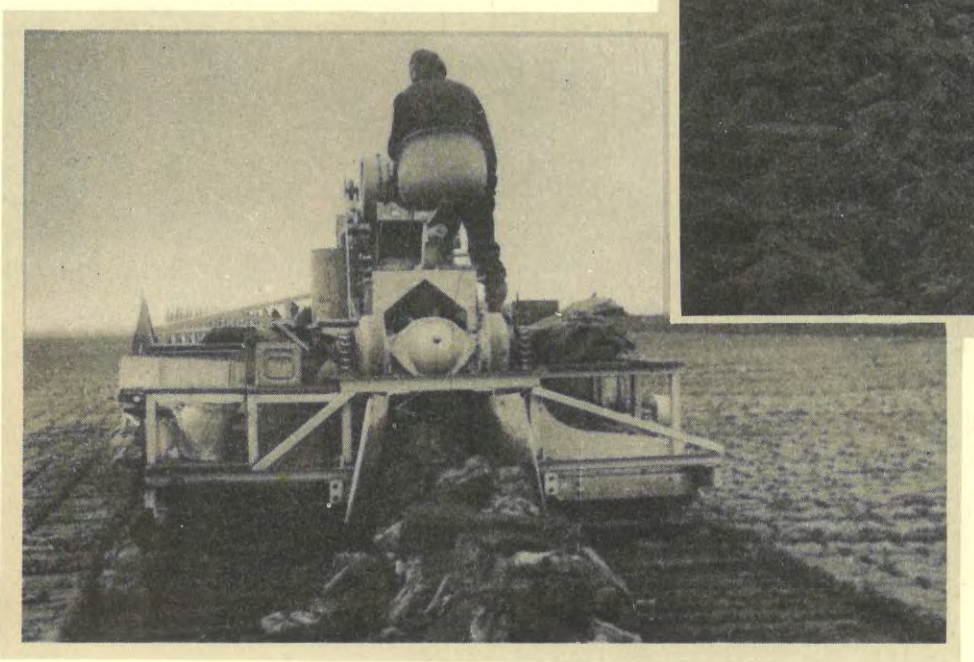
SOD PEAT LOADING MACHINE

THE LOADER FILLS WAGONS OF SIXTEEN CUBIC METRE CAPACITY FROM A CLAMPED RICK OF TURF FOR DELIVERY TO CONSUMERS OR POWER STATION

SOD PEAT WINDROW TURNER

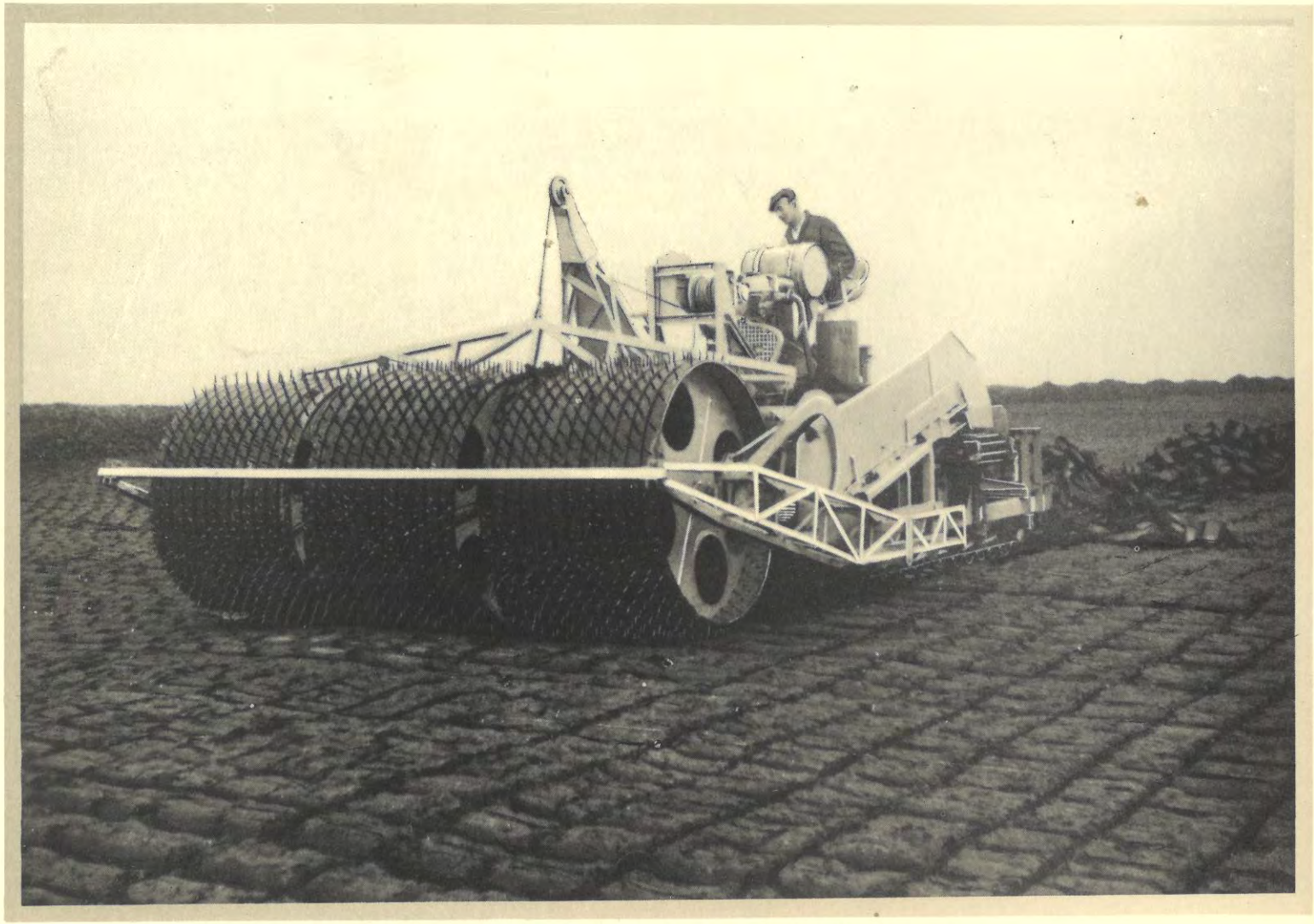
THE WINDROWS REQUIRE TO BE TURNED AFTER A PERIOD SO THAT THE SODS AT THE BOTTOM OF THE ORIGINAL WINDROW CAN BE EXPOSED. THE WINDROWS ARE TURNED AND RE-MADE THREE METRES AWAY FROM THE ORIGINAL POSITION, LEAVING THE PEAT IN POSITION READY FOR COLLECTION





SOD PEAT WINDROWER *(Rear)*

THE PEAT IS DISCHARGED AT THE REAR AND FORMED INTO A CONTINUOUS WIND-ROW, IN WHICH IT GRADUALLY DRIES



SOD PEAT WINDROWER *(Front)*

THIS IS THE LATEST IMPROVEMENT IN SOD PEAT MECHANISATION. THE DRYING PEAT IS PICKED UP ON PINS AND FED ON TO A CHUTE DELIVERING AT THE REAR OF THE MACHINE. THIS MACHINE WILL REDUCE THE AMOUNT OF MANUAL FOOTING REQUIRED ON EACH CROP

SOD PEAT AUTOMATIC COLLECTOR

THIS NEWLY DEVELOPED MACHINE COMPLETES THE LAST PHASE OF FULLY MECHANISED PRODUCTION—
LIFTING THE WINDROWS POSITIONED BY THE PREVIOUS MACHINES AND CONVEYING THEM TO THE RICK

SOD PEAT BAGGER SPREADER WITH CUTTING DISCS

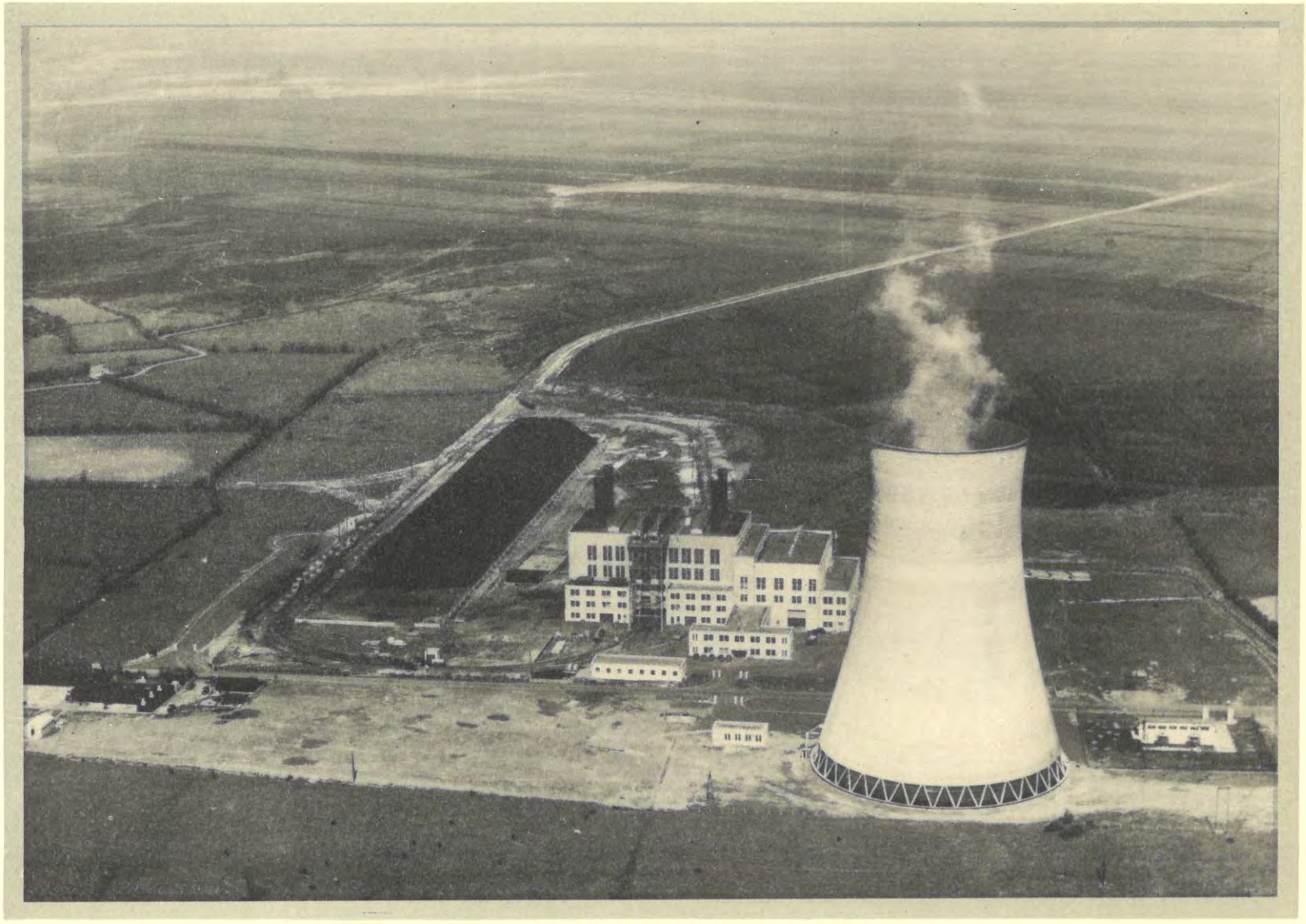
THE SPREADER ARM IS MOUNTED ON CATERPILLARS AND ROLLERS AND MOVES FORWARD WITH THE BAGGER. THE MACERATED PEAT IS FED OUT ALONG THE ARM AND IS DEPOSITED IN CONTINUOUS ROWS ON THE GROUND WHERE IT IS CUT BY THE DISCS

SOD PEAT BAGGER

FULLY-AUTOMATIC EXCAVATOR CUTTING A TWO METRE WIDTH OF BANK THREE METRES DEEP. THE TURF IS SUBSEQUENTLY MACERATED AND FED ON TO THE FIFTY-FOUR METRE SPREADER ARM OF THE MACHINE AS A CONTINUOUS SOD

SOD PEAT BOG IN PRODUCTION

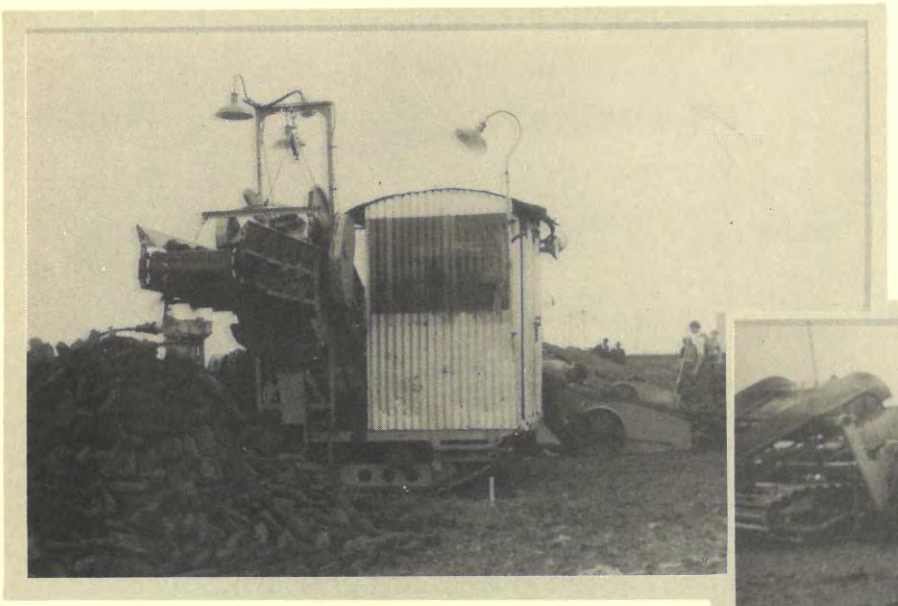
CUTTING TRENCHES, SUB DRAINS, CROSS DRAINS AND RAILWAYS
SHOWING TYPICAL LAYOUT FOR SOD PEAT PRODUCTION



SOD PEAT FUELLED POWER STATION

ALLENWOOD POWER STATION, CO. KILDARE WITH A DESIGNED CONSUMPTION OF ONE HUNDRED AND EIGHTY THOUSAND TONS OF PEAT PER ANNUM AND AN OUTPUT OF ONE HUNDRED AND THIRTY-FIVE MILLION UNITS OF ELECTRICITY. IT IS NOW ESTIMATED THAT THE STATION CAN USE AND PRODUCE AT LEAST FIFTY PER CENT MORE

THIS POWER STATION IS OWNED AND OPERATED BY THE ELECTRICITY SUPPLY BOARD

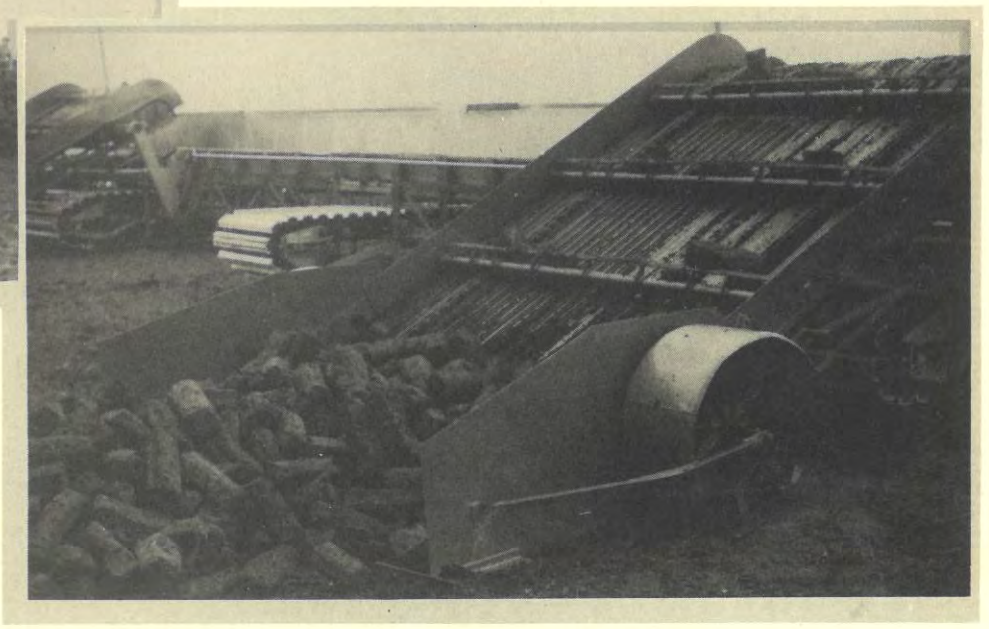


ELEVATOR OF AUTOMATIC
SOD COLLECTOR

PARALLEL TO THE CUTTING TRENCH, THE AIR-DRIED PEAT IS FORMED INTO A RICK ALONGSIDE WHICH TEMPORARY TRACK IS LAID TO MAKE DELIVERIES TO THE RAILHEAD

WINDROW ELEVATOR OF
AUTOMATIC SOD COLLECTOR

THE WINDROWS ARE LIFTED FROM THE GROUND ON TO THE STEEL-PLATE CONVEYOR OF THE SOD COLLECTOR WHICH FEEDS THE ELEVATOR



Ceapaḋ agus rinneaḋ an leaḃrán
so imḊaile Áṫa Cliaṫ ḟaoi ċomarṫa
na dTrí gConneal. In Éirinn a rinn-
eaḋ a ḃṫuil ann de ṗlátaí de ṗáipéar
agus de ḋubaċ. ⁊ Dia dár gcabair.
1954

Sé príom-ċúir foillríċe an leabráin seo, é a scaipeaḋ i measg daoine i dtíortaċa ċar leas.

Fágtar le h-uḋaċt ag Muinntir na h-Éireann anoir í, mar annál ar ḋéantaiṙí Bord na Móna, cómluċt Gaeḋalaċ a ṙáṫann í féin i gceirt teicniúil Gaeḋalaċ sheirialta.

bord na móna

Appendix 4-11
Environmental & Operational Control Procedures for the Protection of Surface Water

Bord na Mona Energy Ltd.

Environmental and Operational Procedures for the Protection of Surface Water

Prepared by

BORD NA MÓNA
Naturally Driven

Bord na Móna Environmental and Operational Procedures for Protection of Surface Water

Title	SOP Ref	Rev	Purpose
Bund Maintenance & Integrity Procedure	BM&IP	4	Procedure for the maintenance and integrity testing of bund structures
Communication Procedure	CP	3	Effective communication of environmental issues.
Environmental Complaints Procedure	ECP	3	To ensure all environmental complaints are dealt with effectively.
Composite Sampler Service procedure	VSD		Procedure for servicing of Composite Samplers
Environmental Management Plan (Draft)		1	To specify the method in which emissions and energy usage will be reduced or eliminated over a specified period of time.
Dust Complaint Procedure			Procedure to deal with all complaints relating to emissions air and land
Environmental Communications	VSD		Procedure for external and internal environmental communications
Environmental Training Procedure		4	Procedure for training of operatives in good environmental work practices.
Gas Oil Loading Procedure	VSD	1	Procedure for external delivery, internal loading and dispensing of gas oil.
General ERP	VSD		General Emergency Preparedness and Response
Litter Action Plan			Prevention and control of litter arising from Bord na Mona's activities and from unauthorised dumping on and around its property.
Local Authority Contact Info			Local Authority contact information relating to IPC Incidents
Programme for Public Information			To define how Bord na Mona Peat manages the communication of Environmental information concerning the facility with external parties.
Restoration and Aftercare Procedure	RAP	3	Procedure to address Condition 10, regarding the Restoration & Aftercare requirements of IPC Licence P0499-01 to P0507-01
Service Level Agreement (between AES and BnM)			Document setting out the waste management services provided by AES to Bord Na Móna Peat including the communication lines, responsibilities and response times.
Waste Management Procedure		Rev 1	To define the correct procedure to be followed when requesting a waste collection service from AES regarding removal of all wastes from all sites within the Feedstock group.
Bog Maintenance Flowchart	SOP: FS-BM-01		Flowchart for Bog maintenance
Bog Maintenance Plan	SOP: FS-BM-02	2	SOP for Bog Maintenance Plans to include ditching, piping, pumps, open drains, silt ponds, timber extraction, pile field levelling, screw levelling and headland preparation.
Drainage Planning and Implementation	SOP: FS-BM-03	2	SOP for preparation and implementation of Bog Drainage Plans
Ditching	SOP: FS-BM-04	2	SOP for ditching work as required in Bog Drainage Plan.
Piping and Re-Piping	SOP: FS-BM-05	2	SOP for piping and re-piping work as required in Bog Drainage Plan.
Open Outfalls	SOP: FS-BM-06	2	SOP for opening of outfalls as required in Bog Drainage Plan.
Silt Pond Cleaning	SOP: FS-BM-07	3	SOP for cleaning of Silt Ponds as set out in Bog Maintenance Plan.
Timber Extraction	SOP: FS-BM-08	2	SOP for clearing of Timber as set out in Bog Maintenance Plan.
Headland Levelling	SOP: FS-BM-09	2	SOP for levelling of headlands as set out in Bog Maintenance Plan.
Screw Levelling	SOP: FS-BM-10	2	SOP for use of screw leveller as set out in Bog Maintenance Plan.
Pile Field Lowering	SOP: FS-BM-11	3	SOP for lowering of pile field greater than 1m above adjoining field as set out in Bog Maintenance Plan.
Production Flowchart	SOP: FS-PR-01	2	Flowchart for Peat Production

Bord na Móna Environmental and Operational Procedures for Protection of Surface Water

Title	SOP Ref	Rev	Purpose
General Milled Peat Production	SOP: FS-PR-02	2	SOP to describe the general arrangements for the production of milled peat in Bord na Móna Energy.
Milling	SOP: FS-PR-03	1	SOP for milling of peat (Light or new triple miller)
Offset Milling	SOP: FS-PR-04	2	SOP for offset milling of peat to be carried out at start of production or max every fourth harvest.
Harrowing	SOP: FS-PR-05	2	SOP for harrowing of milled peat
Ridging	SOP: FS-PR-06	2	SOP for ridging of harrowed peat.
Pile Rolling	SOP: FS-PR-07	1	SOP for rolling of piles to shape pile profile to be carried out at a minimum every fourth harvest.
Peco Harvesting	SOP: FS-PR-08	4	SOP for harvesting of peat into stockpiles for rail loading and haulage
Haku Harvesting	SOP: FS-PR-09	2	SOP for harvesting of peat into stockpiles for haku trailer loading and haulage.
Preparation of Production Charts	SOP: FS-PR-10	2	SOP for general arrangements for deciding on the Production Chart for each milled peat area
Updating Production Plan	SOP: FS-PR-11	1	SOP for the updating of production charts and starting new stockpiles.
Stockpile Inventory	SOP: FS-PR-12	1	SOP for annual peat stock check.
Headland Harvesting	SOP: FS-PR-13	Draft	SOP for harvesting peat from headlands
Stockpile Survey with Trimble Tablet	SOP: FS-PR-14	1	SOP for survey of stockpile with Trimble Yuma 2 Tablet.
Ridge Sampling	SOP: FS-PR-15	3	SOP for the sampling of ridges during production.
End of Production Season Procedure	SOP: FS-PR-16	Draft	SOP describing end of production Season activities
Document Control	Procedure 001	7	The purpose of this procedure is to describe the arrangements in Bord na Móna Peat Division for document control.
Record Control	Procedure 002	3	Procedure is to describe the arrangements in Bord na Móna Peat Division for record control.
Internal Audit	Procedure 003	4	Procedure is to describe the arrangements in Bord na Móna Peat Division for internal audits.
Hort Bogs - General	SOP: FS-HO-01	2	The purpose of this procedure is to describe the differences (from standard peat division requirements) in the operation and maintenance of horticultural bogs.
Hort Bogs - Bog Maintenance	SOP: FS-HO-02	1	The purpose of this procedure is to describe the differences (from standard Feedstock requirements) in the maintenance of horticultural bogs.
Hort Bogs - Bog Housekeeping	SOP: FS-HO-03	1	The purpose of this procedure is to describe the differences (from standard Feedstock requirements) in the housekeeping of horticultural bogs.
Bog Maintenance Compliance Check List			Bog operations and maintenance check list for peat production activities.
Scheduling Flowchart	SOP: FS-SC-01	2	Scheduling flowchart for stockpile sampling and loading
Develop Moisture Targets	SOP: FS-SC-02	2	Flowchart to establish and circulate moisture targets
Peat loading	SOP: FS-SC-06	2	Procedure for loading peat from a stockpile into a wagon/lorry.
Rail Bed Creation	SOP: FS-SC-10	1	Flow chart for creation of rail bed adjacent to stockpile.
Stock Protection Flowchart	SOP: FS-SP-01	4	Flowchart for polycovering and subsequent stipping of peat stockpiles.
Polythene Ordering	SOP: FS-SP-03	2	Procedure to describe the methodology used to determine the polythene to be ordered for stock protection each year.

Bord na Móna Environmental and Operational Procedures for Protection of Surface Water

Title	SOP Ref	Rev	Purpose
Polythene Distribution	SOP: FS-SP-04	4	Procedure to describe the arrangements for distributing polythene to the production areas.
Covering Haku Piles	SOP: FS-SP-05	2	Procedure for covering of haku piles with polythene
Covering Peco Piles	SOP: FS-SP-06	2	Procedure for covering of peco piles with polythene
Stripping Haku Stockpiles	SOP: FS-SP-07	2	Procedure for stripping polythene from haku piles
Stripping Peco stockpiles	SOP: FS-SP-08	2	Procedure for stripping polythene from peco piles
Covering Piles during Production	SOP: FS-SP-09	3	Procedure for covering full piles during production.
Management of Heating Peat	SOP: FS-SP-10	1	Procedure for management of heating peat stockpiles

Bund Maintenance & Integrity Procedure

1. Purpose

The purpose of this procedure is to provide for the efficient, maintenance and integrity testing of bund structures, in accordance with conditions 9.1.6, 9.1.10 and Schedule 3 of the Bord na Mona Energy Ltd IPC Licence's. P0499-01 – P0507-01.

2. Scope

The scope of this procedure covers all Bund Structures in the Bord na Mona Energy Group.

3. Responsibility

The implementation of Bund Maintenance and Bund Integrity testing is the responsibility of the Environmental Co-ordinator or an individual appointed by the Resource Manager.

4. Bund Maintenance Procedure

4.1 The level equivalent to 10% of the bund volume should be highlighted on the internal bund wall.

4.2 All bunds must be inspected weekly in accordance with condition 9.1.10, with the level of rainwater noted and any evidence of leaking valves, nozzles, pipes and tanks.

4.3 On inspection of this weekly workshop inspection sheet, if a bund is noted as containing in excess of 10% of the bund volume, its contents must be pumped out as soon as is practicable.

4.4 The contents must be discharged through the adjacent oil interceptor.

4.5 Firstly a small amount of water, enough to retrieve a sample should be pumped. The sample should be retrieved from the discharge point of the interceptor.

4.6 This sample should be analyzed for COD. If results are within Bord na Mona trigger levels of 100mg/litre pumping can recommence until the bund is emptied.

4.7 Should the trigger level be exceeded then oil dispersal products such as absorbent mats and pillows should be deployed in both the bund and adjacent interceptor.

4.8 Sampling should then be carried out again as per 4.3 and 4.4 above.

4.9 If COD trigger levels are still being exceeded then a specialist contractor will be required to evacuate and clean down the bund. Prices for this should be sought through Paul Curtis AES via stores, stating the volume and location of the bund to be cleaned

5. Bund Integrity Initiation Procedure

5.1 On inspection of the Bund Master list, the Coordinator will identify bunds which are due for integrity testing as per condition 9.1.6. (every 2 years)

5.2 Bunds which are overdue in relation to testing must be prioritized.

5.3 Once a particular bund is identified as requiring an integrity test. The Co-coordinator must contact Technical Services Boora (05793/45907), who will arrange to carry out the test.

5.4 The bund which is scheduled for testing must be clear of debris and filled with water, to accommodate the test. A barrel of water must also be made available to the test Engineer and sited adjacent to the bund.

5.5 Once testing is complete, the bund must be emptied, through the oil-interceptor, at a rate not in excess of the oil-interceptor capacity.

5.6 A signed copy of the test results are to be retained on file.

5.7 Bunds which fail the integrity test should be repaired without delay and retested, following the above procedure.

_____ **Procedure: CP**

Resource Manager

Page: 1 of 2

Date:_____ **Rev: 3**

Communications Procedure

1. **Purpose**
   The purpose of this procedure is to ensure that the company will take all the necessary steps to communicate environmental issues effectively.

2. **Scope**
   The scope of this procedure covers all communications both internal and external regarding incidents requiring reporting under Condition 4 of the IPPC Licence.

3. **Responsibility**
   It is the responsibility of the Licence Holder to ensure all external and internal communications are managed in accordance with this procedure

4. **Procedure**

External Communications

4.1.1. All written communications and reports sent to the EPA and other regulatory bodies by the Licence Holder or his deputy, will be through the EPA Communications Portal Eden/Alder.

All correspondence from the EPA will be communicated, where necessary, to relevant local management for appropriate action.

4.1.2 The Licence Holder or his deputy will also deal with all verbal and electronic requests for environmental information from any source.

4.1.3 In the event of an environmental incident the company Emergency Response Procedure will be activated and the designated person will contact the following parties, if the incidents come under their remit, and provide them with the relevant information.

- EPA
- Local Authority
- NPWS

- Fire Authorities
- Garda
- Fisheries Board
- Bord na Mona Health & Safety Department

4.1.5 All complaints from the public, staff and from regulatory bodies will be handled in accordance with the company Environmental Complaints Procedure.

4.3.2 The company will retain and update a file at reception (Ref: Programme for Public Information) which will contain the following Company documents.

- IPPC Licence
- Environmental Policy
- AER

4.4 Internal Communications

4.3.1 The Licence Holder will provide details on the Company's environmental performance as per the Communications Plan.

4.4.2 The Environmental Co-ordinator will retain all records on internal and external communications.

BORD NA MÓNA

BORD NA MÓNA ENERGY LIMITED

Procedure: ECP

_____
Resource Manager

Page: 1

Date:_____ **Rev: 3**

Environmental Complaints Procedure

Purpose: To ensure all environmental complaints are dealt with effectively.

Scope: External and internal environmental complaints.

Responsibility: Licence Holder or his/her environmental deputy

References: EPA Communications Portal Eden/Alder

Procedure:

1. All environmental complaints with regard to the activities of the company are recorded, investigated and actioned if deemed necessary, or feasible, by the Licence Holder or his /her environmental deputy.

2. The Licence Holder or his/her environmental deputy will ensure that all environmental complaints written and verbal, from internal and external sources, are recorded on the EPA Communications Portal Eden/Alder.

3. Each *Environmental Complaint* will be completed with information detailing the name and address of the complainant, the nature of the complaints and the time and date of the receipt of the complaint.

4. If further corrective action is required, the Licence Holder or his/her deputy will communicate corrective action via the EPA Communications Portal.

5. All complaints will be logged on the internal Peat Compliance Log and remain until they are closed out. Ref. G:\Feedstock\Compliance

Composite Sampler Service Procedure

PROCEDURE

Sampler Service

Remove Sampler cover and leave programme running

Remove top of sampler cover and secure ring removed

Extract the 7 x 2 litre composite samples from the sampler

NB: The bottle number previous to the number being filled on arrival is the full range analysis sample bottle.

Rinse/clean all of the 2 litre composite sample bottles and return to sampler

Secure Ring and replace cover on the sampler

Before leaving the site, check the velocity probe in the pipe for debris & scum build up

Check the suction head for accumulated dirt/peat

Under no circumstances is the sampler to be turned off in times of Little /No flow

Sampling Method

A cap is placed on the composite sample and it is gently agitated to provide a representative sample

Rinse the plastic sample bottle before filling from the 2 litre composite bottle

NB: Where a sample volume is below the required volumes, the flow should be reduced to provide sufficient volume in the next week

A minimum of 500mls in a plastic container is required for the daily composite samples for Total Solids and Total Suspended Solids analysis

A minimum of 1 litre of sample in a plastic container is required for the full suite of analysis with 1 100ml bottle required for Ammonia

NB: If no sample has been collected for the day receiving the full suite of analysis, then a grab sample should be taken.

Labelling & Chain of Custody

Each sample bottle for transportation to Newbridge is labeled

IPC No:
Sample ID: (Composite sample SW1)
Client: (Bord na Mona Energy Ltd (Boora, Mountdillon, ect)
Sampling Date & Time: It is important to log each sample over a 24 hour period, eg 24/25-11-2011 etc. This will allow for the 24 hour COD requirement

Complete a Chain of Custody form

NB: As the programme is running continuously, the day previous to what is displayed on the screen will always be the seventh day sample, regardless of its number.

Samples must be delivered to the laboratory ASAP after sampling, and always within 24 hrs of taking the samples

NOTE: To change either the **flow between sampling** setting or the **sample volume** setting, please follow the step by step guide posted in the sampler box. For any other changes to the settings please ring 086 / 6182424 for advice while attending the sampler.

Date:_____ **Rev: 1**

Environmental Management Plan

1. ***Purpose***

The purpose of the environmental management programme is to specify the method in which emissions and energy usage will be reduced or eliminated over a specified period of time.

The EMP will be prepared by the Environmental Management Systems team and will be reported on and up-dated annually to account for yearly improvements resulting from the phased introduction of the objectives and targets programme

2. Scope

All operations shall be assessed and all practicable options for the use of cleaner technology and the reduction and minimisation of waste shall be reviewed in accordance with the licence.

3. Procedure

Emissions to Atmosphere (cdn. 5.3)

- Train all personnel as per the Environmental Training Procedure
- Provide shelter belts if required
- Erect wind socks if required
- Deploy hydraulic harrows at dust sensitive locations
- Details of any CI projects with link

Emissions to Water (cdn. 6.2)

- Train all personnel as per the Environmental Training Procedure
- Details of any CI projects with link

Waste Management (cdn. 7.3)

- Details of any CI projects with link
- Continue to follow Waste Management Procedure XXX

Water Protection (cdn. 9.1.2)

- Details of any CI projects with link
- Implement Silt Pond upgrade programme
- Review production footprint and assess current Silt Pond adequacy

4. Reporting

4.1 Report progress annually in the AER

1. Responsibility

The implementation of this Procedure is the responsibility of the Resource Manager or his/her deputy.

2. Waste Collection Procedure

4.1 All non-hazardous and hazardous waste collection services are as per the SLA.

4.2 On a monthly basis, stores to provide the relevant IPC Licence Coordinator with a copy of all waste receipts for the Waste Management file.

4.3 On an quarterly basis, AES to provide each stores and the IPC Licence Coordinator with a quarterly report as per the SLA.

3. Litter Action Plan

5.1 Refer to Bord na Mona Group Litter Action Plan at XXX

4. Poly Recycling Procedure

6.1 Once the pile has been stripped, all rolls should be gathered and brought straight to the dedicated hardstand for collection.

6.2 At the hard stand, stack the rolls neatly within easy reach of a truck with grab arm.

6.3 Once 40 to fifty rolls have been gathered at the hardstand, notify your IPPC Coordinator, who will schedule a collection dedicated collection at this location or will make up a load from this location.

IPC Licence P05499-01 to P0507-01.

Reporting Requirements to the EPA. June 2018.

Complaints Procedure

12.3 The licensee shall record all complaints of an environmental nature related to the operation of the activity. Each such record shall give details of the date and time of the complaint, the name of the complainant and give details of the nature of the complaint.
A record shall also be kept of the response made in the case of each complaint. The licensee shall submit a report to the Agency, during the month following such complaints, giving details of any complaints which arise. A summary of the number and nature of complaints received shall be included in the AER.

Action:

This covers all complaints relating to emissions air and land which can occur as follows:

- Complaints regarding dust on adjoining lands or property, received direct to the area.
- Complaints to the local works office
- Complaints to the Environmental Department
- Complaints received via the BNM web, Newbridge, post or email.

Procedure:

1. Compliance Officer and Area Leader to telephone or visit the complainant, enquiring and recording the nature of the complaint.
2. Compliance Officer to complete the attached Complaint Form and submit the details via the Alder portal in the month following the month of receipt of the complaint.
3. Compliance Officer to communicate the complaint to the relevant Operations Leader, meet on site and agree on any corrective actions that can be implemented to reduce the migration of the dust from the operations, on the attached Investigation Report form.

   The licence requirements are as follows and include some additions possible solutions:

   - Regular ridging of headland peat that may be contributing to the dust nuisance
   - Regular ridging of machine passes.
   - Grassing of machine pass ways to reduce loose peat
   - Alternative routes through machine passes
   - Installation of a wind sock to advise on wind direction.
   - Installation of a dust gauge
   - Planting of tree screening/wind breaks
   - Avoidance of the activity during windy weather in the direction of the sensitive property
   - Relocation of haku piles
   - Checking that belt seals and cowls are in place
   - Checking on good operations practice.
   - Availability of hydraulic harrows.
   - Slow travel speeds along dusty headlands, Tool box talks with operators/slow down signs.
   - Structural screens.
   - Relocation of teacentre/welfare facilities to reduce idle travel

4. Complete the Resolution section of the Complaint form based on the results of the investigation and proposed corrective actions
5. Update the resolution to the EPA via Eden.
6. Implement the corrective action and report on progress to the licence holder.

Environmental Communications

Procedure

External

All written communications and reports to be communicated via Eden/Aider

Depending on nature of communication – refer to XXXX Doc

1. EPA – Any incident (Oil Spill/Fire Etc), Exceedance of an emission limit or Trigger level.
2. Fisheries – Oil spills affecting rivers/outfalls.
3. Local Authority – Oil spills affecting rivers/outfalls and fires involving emergency services.
4. National Parks and Wildlife Service – Any incident reported to the EPA that impacts on a SAC, NHA, Natura 2000 site.

Communication from members of the Public?

Refer to Procedure XXX Programme for Public Information

Internal

Reference to internal communications available through the Communications Plan

Environmental Co-ordinator to retain all records on internal and external communications

Date:_____ **Rev: 4**

Environmental Training Procedure

1. Purpose

The purpose of this procedure is to provide for the protection of the environment by training all operatives in good environmental work practices. This will be achieved by identifying and training all personnel in accordance with condition 2.5.1 of the Bord na Mona Energy Ltd IPC Licence's P0499-01 to P0507-01.

2. Scope

The scope of this procedure covers all operatives involved in the production, transportation of peat and all other personnel involved in the craft and technical backup of same.

3. Responsibility

Human Resources and Group Training Department are responsible for identifying new and existing personnel for Environmental Induction training. It is the responsibility of local management to ensure this is carried out.

4 Procedure

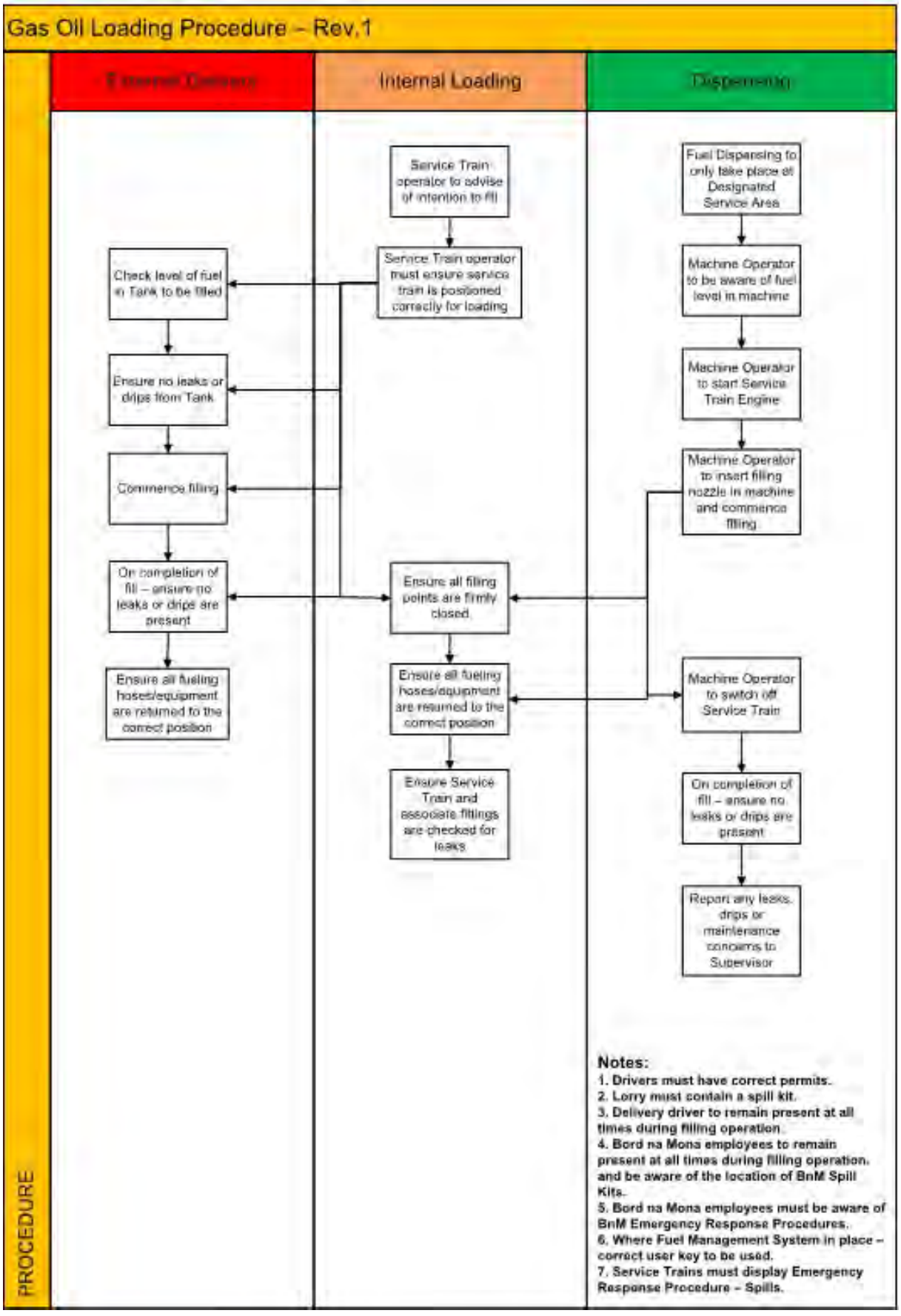
4.1 All relevant operatives to receive in house training, dealing with their responsibilities in maintaining an IPC Licence.

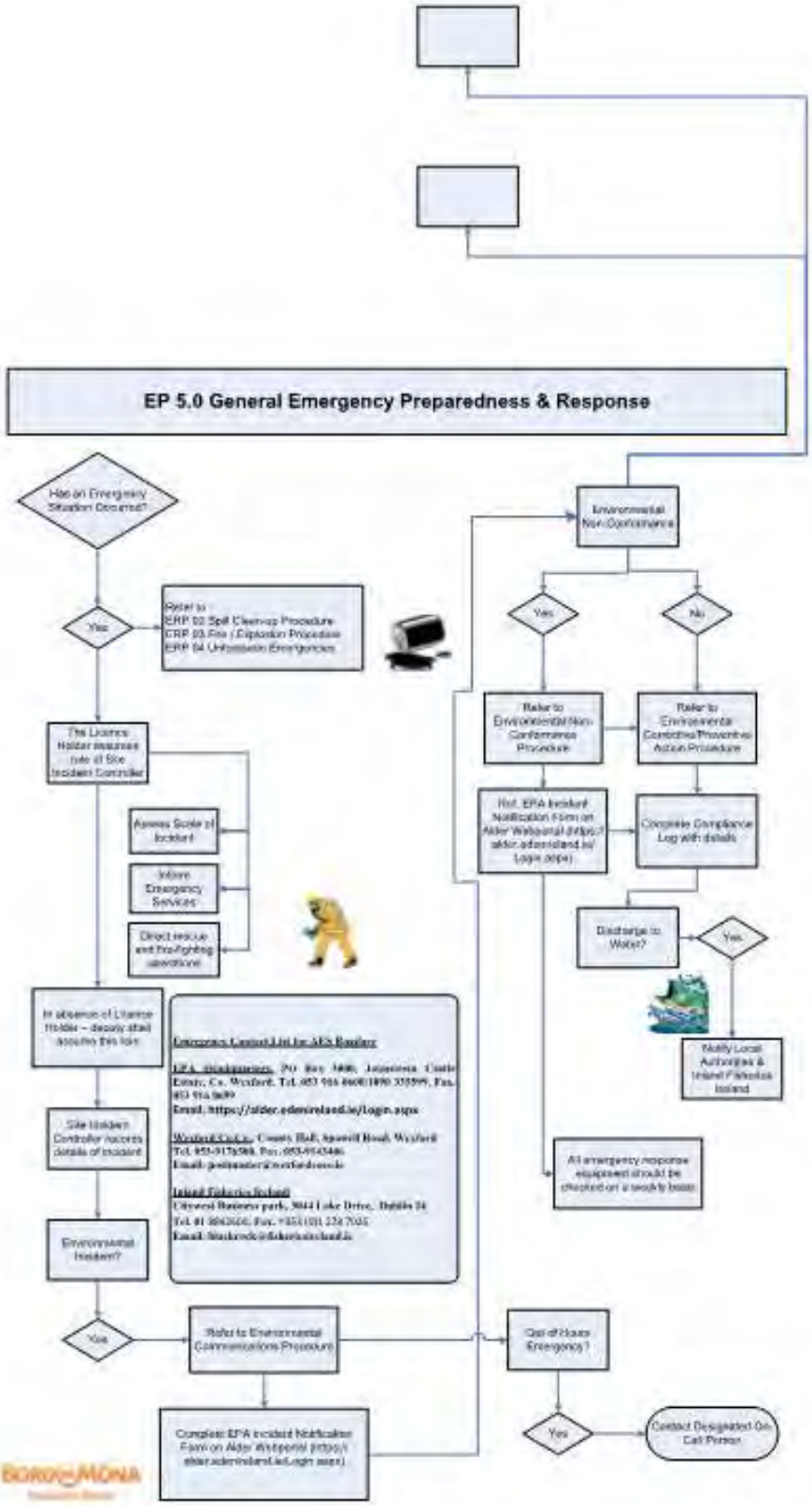
4.2 All relevant personnel to be informed of all monitoring locations at their facility.

4.3 All personnel to be informed of any relevant legislation involving environmental matters.

4.4 All trainees to complete a training assessment form, a record of which will be maintained on Oracle and retained on site.

4.5 The training procedure will be reviewed as per Group Training Department policy.


Gas Oil Loading Procedure – Rev.1
External Delivery
Internal Loading
Dispensing
PROCEDURE
Service Train operator to advise of intention to fill
Service Train operator must ensure service train is positioned correctly for loading
Check level of fuel in Tank to be filled
Ensure no leaks or drips from Tank
Commence filling
On completion of fill – ensure no leaks or drips are present
Ensure all fueling hoses/equipment are returned to the correct position
Ensure all filling points are firmly closed
Ensure all fueling hoses/equipment are returned to the correct position
Ensure Service Train and associate fittings are checked for leaks
Fuel Dispensing to only take place at Designated Service Area
Machine Operator to be aware of fuel level in machine
Machine Operator to start Service Train Engine
Machine Operator to insert filling nozzle in machine and commence filling
Machine Operator to switch off Service Train
On completion of fill – ensure no leaks or drips are present
Report any leaks, drips or maintenance concerns to Supervisor
Notes:
1. Drivers must have correct permits.
2. Lorry must contain a spill kit.
3. Delivery driver to remain present at all times during filling operation.
4. Bord na Mona employees to remain present at all times during filling operation, and be aware of the location of BnM Spill Kits.
5. Bord na Mona employees must be aware of BnM Emergency Response Procedures.
6. Where Fuel Management System in place – correct user key to be used.
7. Service Trains must display Emergency Response Procedure – Spills.


EP 5.0 General Emergency Preparedness & Response
Has an Emergency Situation Occurred?
Yes
Refer to
ERP 02 Spill Clean-up Procedure
ERP 03 Fire / Explosion Procedure
ERP 04 Unforeseen Emergencies
The Licence Holder assumes role of Site Incident Controller
Assess Scale of Incident
Inform Emergency Services
Direct rescue and Fire-fighting operations
In absence of Licence Holder – deputy shall assume the role
Site Incident Controller records details of incident
Environmental Incident?
Yes
Refer to Environmental Communications Procedure
Complete EPA Incident Notification Form on Alder Webportal (https://alder.edenireland.ie/Login.aspx)
Emergency Contact List for ARA Ranges
EPA Headquarters, PO Box 3000, Johnstown Castle Estate, Co. Wexford. Tel. 053 916 0600/1890 335599, Fax. 053 916 0699
Email: https://alder.edenireland.ie/login.aspx
Wexford Co.Co., County Hall, Spawell Road, Wexford
Tel. 053-9178500, Fax. 053-9142446
Email: pollmaster@wexfordcoco.ie
Inland Fisheries Ireland
Citywest Business park, 3044 Lake Drive, Dublin 24
Tel. 01 8842600, Fax. +353 (0)1 224 7005
Email: Bankrobe@fisheriesireland.ie
Environmental Non-Conformance
Yes
No
Refer to Environmental Non-Conformance Procedure
Refer to Environmental Corrective/Preventive Action Procedure
Ref. EPA Incident Notification Form on Alder Webportal (https://alder.edenireland.ie/Login.aspx)
Complete Compliance Log with details
Discharge to Water?
Yes
Notify Local Authorities & Inland Fisheries Ireland
All emergency response equipment should be checked on a weekly basis
Out of Hours Emergency?
Yes
Contact Designated On-Call Person
BORD NA MÓNA

Bord na Mona Group
Litter Action Plan

Preamble

Bord na Mona Group operates four main businesses:

- Energy

Peat extraction for power generation/solid fuel and horticultural applications.

- Fuels

Manufacture of solid fuels/Sales and Distribution.

- Horticulture

Manufacture/Distribution of growing media products.

- Environmental

Design, manufacture and installation of filtration products for water/air. It also provides Environmental Consultancy and Laboratory Services.

The company has multiple locations and extensive land holdings (circa. 80,000 Ha). It's various bogs and factories are subject to licensing by the Environmental Protection Agency. (IPC Licence's 499 – 507).

Under these licence's, Bord na Mona is obliged to document and operate specific waste management procedures and does so diligently and successfully.

However, there are situations where waste materials can become litter and set out hereunder are the company's plans for dealing with this material, some considerable proportion of which is not generated by the company itself (unauthorised dumping by members of the public)

Litter Action Plan

Objective

Focus on the prevention and control of litter arising from Bord na Mona's activities and that arising from unauthorised dumping on and around its property. It also focuses on the good housekeeping of its buildings and land.

The relevant sections of the Litter Pollution Act 1997, that are relevant to Bord na Mona's activities are sections 3 (Prohibitions relating to litter) and 6 (Duty of occupiers etc. regarding littering).

Scope

The scope of this plan covers all lands and premises owned by Bord na Mona.

Responsibility

The implementation of the Litter Action Plan is the responsibility of the General Manager and/or his/her deputies at each location.

Relevant Documentation

Governments *Litter Action Plan* 2001
Litter Pollution Act, 1997 (Sections 3 & 6)
Integrated Pollution Control Licences.
Waste Management Regulations 1998

Key Action

The key action in the Government Litter Action Plan, relevant to Bord na Mona is set out below:

- *"Consistent with the emphasis in the Forum report on the public sector leading anti-litter action by example, public authorities will be asked to develop litter action plans for their own organisations"*

Action Items

1. Bog Areas (Loose Polythene & other litter)

Ensure of the immediate collection of polythene and other litter
A litter watch will be included in the fortnightly inspections and recorded as part of the requirements of the IPC Licence.

2. Premises.

All premises will operate a daily clean-up regime. Litter bins, if not already provided will be placed at appropriate locations on the site.
A painting programme will be maintained for all buildings.

3. Scrap machines.

A programme of dismantling and recycling scrap machines will be put in place. It will take the form of a quarterly inspection of all redundant machines, where items for scrapping/recycling will be highlighted for dismantling and removed to an appropriate metal recycler.

4. Unauthorised Dumping.

   a) Any incidents of littering and illegal dumping by members of the public on Bord na Mona property or public access roads to the bog, will be reported to the General Manager and/or Environmental Co-ordinator.

   b) The Litter warden for the area will be contacted, and the details passed on.(see attached list of wardens.

   c) Arrangements will be made to meet with the Litter Warden, at the location of the illegal dumping.

   d) If illegal dumping continues to be a problem at this location, the erection of signs, etc will be discussed with the Local Authority.

   e) All incidents of littering/unauthorised dumping will be recorded as part of the Bord na Mona's IPC Licence's. These inspections occur on a fortnightly basis as part of the works inspections/monitoring.

   f) "Hot Spots" for illegal dumping will be observed/monitored during the day to day operations and reported to the Local Authority.

Training & Awareness

This action plan will be circulated to all relevant personnel and will form part of the Annual Environmental Training Programme.
This document will be reviewed annually and updated as necessary.

Local Authority Litter Wardens:

County	Director of Services	Litter Wardens
Laois Co Council Áras An Chontae Portlaoise **Co Laois** 057 8664000	• Kieran Kehoe	• John Rogers 0502 64000/087 9473159 (*Western region*) • John Ging 0502 64000/086 7988312 (*Central region*) • Emily Doyle (*Eastern region*)
Offaly Co Council Aras an Chontae Charleville Rd Tullamore **Co Offaly** 057 9346800	• Sean Murray	• Michael Malone 0506 46800 (*Ferbane/Tullamore area*) • Padraic Minnock (*Birr/Ferbane area*) • Paul Fogarty (*Tullamore area*)
Kildare Co Council St Mary's Naas **Co Kildare**	• Joe Boland	• Noel Geoghan 086 2848563 • Peter Mahoney • Pat Conway

045 980200		• Philip Baxter 086 8285577
Westmeath Co. Council Administrative Offices Co. Buildings Mullingar **Co Westmeath** 044 9332000	• David Hogan	• Larry Murphy *(Mullingar area)* • Olive Manning (*Mullingar area*) • Lorraine Derwin (*Athlone area*)
North Tipperary County Council, The Courthouse, Nenagh, **Co Tipperary (North Riding)** 067 44500	• Jimmy Harney	• Thomas Sheehan 087 4194540 • Francis Casey (*Littleton area*)
South Tipperary County Council Main Office South Tipperary Co Council, Co. Hall, Emmet Street, Clonmel **Co Tipperary (South Riding)** 052 6134455	• Jimmy Harney	• Matthew Peters 087 9192097 • Anthony Wynne 087 9192096
Aras an Chontae Castlebar, **Co Mayo** 094 9024444	• Martin Keating	• Gary Smith 087 2318746 • Josephine Armstrong 087 9192839
Courthouse, Roscommon **Co Roscommon** 0906 637100	• Majella Hunt	• Annette Donlon 0903 37100 (*Athlone/Roscommon/Castlerea area*) • Danny McHuge (*Boyle/Ballangare/Strokestown area*)
Aras an Chontae, Great Water St, Longford **Co Longford** 043 3346231	• Jack Killgallen	• Declan Murtagh (*North region*) • Brigid Devine (*South region*) • Padriac McGee (*Town area*)
Galway County	• Jim Cullen	• Patrick Roche

Council PO Box 27, County Hall, Prospect Hill, Galway **Co Galway** 091 509000		091 509302 • David Kelly 091 509302

Local Authority Contact Info

Relating to IPC Incidents

Local Authorities

Roscommon: Kieran Madden – 0906637185 – environment@roscommoncoco.ie

Meath: environment@meathcoco.ie

Westmeath: environment@westmeathcoco.ie

Longford: environment@longfordcoco.ie

Kildare: environ@kildarecoco.ie (Note: environ in address)

Galway: adolan@galwaycoco.ie / environment@galwaycoco.ie

Laois: Environmental Protection Section 057 8664000 / environmentadmin@laoiscoco.ie

Tipperary: Mark for the attention of Environment section and send to customerservises@tipperarycoco.ie

Inland Fisheries Ireland

For all the upper Shannon areas, covering from Athlone to north Leitrim, Cavan, Meath (from Oldcastle and the upper Inny) Inny catchment, Mullingar lakes area, Lough Ree and River Suck areas the contact person is Jane Gilleran Jane.gilleran@fisheriesireland.ie (087 6878568)

For the lower Shannon covering Offaly (Brosna system, Little Brosna, Tullamore, Camcor, Nenagh, Lough Derg catchments (among others outside the areas you mention), the contact is Michael Fitzsimons michael.fitzsimons@fisheriesireland.ie (087 2473708). In Michaels absence please contact Lorraine O Donnell on Lorraine.odonnell@fisheriesireland.ie (087 9285892)

Awaiting remainder ?

National Parks and Wildlife

nature.conservation@chg.gov.ie

The above should be included in correspondence to the Agency in relation to the following.

1. **EPA** – Any incident (Oil Spill/Fire Etc), Exceedance of an emission limit or Trigger level.
2. **Fisheries** – Oil spills affecting rivers/outfalls.
3. **Local Authority** – Oil spills affecting rivers/outfalls and fires involving emergency services.
4. **National Parks and Wildlife Service** – Any Incident reported to the EPA that impacts on a SAC, NHA, Natura 2000 site.

PROGRAMME FOR PUBLIC INFORMATION

Purpose: To define how Bord na Mona Peat manages the communication of Environmental information concerning the facility with external parties.

Scope: This procedure applies to ALL Bord na Mona Peat IPC Licences.

References: Data Protection Act 1988 with 2003 amendment
IPC Licence Condition 2.7, 2.7.1

Procedure:

1. All external, out-going communication of environmental issues, unless specifically outlined below, must be approved by the Licence Holder. If the Licence Holder is unavailable, then the Environmental Co-ordinator may approve the communication.

2. Certain environmental information, as detailed below, will be available to external parties. Only 1 copy of each document is available for view at any time.

3. It is recommended that visitors should phone or write in advance, as this will facilitate the company to arrange for the necessary staff and documents to be available. However, a prior appointment by any member of the public is not necessary.

4. Viewing time is restricted to normal office hours (8.00am to 3.30pm Mon to Thur, 8.00am to 2.30 Friday).
   No more than 1 hour of staff time is available for assistance of queries per day.

5. Visitors may ask for the Site Manager. They are requested to sign in at reception, giving their name, address, and reason for their visit.

6. Access is restricted to the Meeting Room, and the information will be brought to this designated room for viewing. The original documents are not to be removed, altered or damaged in any way.

7. A copy of the following files will be kept in Document Control and are available to the public as outlined above:

   - IPC licence
   - Annual Environmental Reports
   - Environmental Monitoring Reports
   - Environmental Management System

8. Every effort shall be made to keep the files up-to-date. The information provided will comply with legal requirements and the requirements of the IPC licence, but confidential and commercially sensitive information will be restricted and Bord na Mona Peat must comply with the Data Protection Act 1988 with 2003 amendment.

_____
Resource Manager

Date:_____

Restoration & Aftercare Plan

1. Purpose

The purpose of this procedure is to address Condition 10, regarding the Restoration & Aftercare requirements of IPC Licence P0499-01 to P0507-01

2. Scope

The scope of this procedure is contained in the Bord na Mona Ecology Department's Restoration & Aftercare Rehabilitation draft plans.

3. Responsibility

The implementation of the Restoration & Aftercare plan is the responsibility of the Ecology Department in association with the Environmental Department, Works Management and in consultation with the Land Management Department.

4. Procedure

4.1 Please refer to the Bord na Mona Ecology Department's Restoration & Aftercare Rehabilitation draft plans.

4.2 This plan is to be reviewed on an annual basis.

Service Level Agreement (SLA)

For the provision of a fully Managed Waste Collection, Recycling and Disposal Service

Between

AES Bord Na Móna

and

Bord Na Móna Peat

Table of Contents

1. Objectives and Scope 3
2. SLA Duration and Review 4
3. Customer Service Responsibilities 5
   3.1 Services provided by AES to Bord Na Móna Peat: 5
   3.2 Equipment Service Requests: 6
   3.3 Out of Office Hours Service Requests: ..... **Error! Bookmark not defined.**
   3.4 Additional Service Requests by Bord Na Móna Peat: 7
4. Invoicing and Credit Control: 7
5. Reporting: 8
6. Service Queries or Complaints: 9
7. Issue Prioritisation: 9
8. Performance Review: 9
9. Supporting Responsibilities: 10
10. Agreement: 14

1. Objectives and Scope

This document represents a Service Level Agreement ("SLA") between Advanced Environmental Solutions (Ireland) Limited (AES) and Bord Na Móna Peat; setting out the waste management services provided by AES to Bord Na Móna Peat, the communication lines, responsibilities and response times associated with providing that service.

.

This SLA:

- Serves as a reference document
- Is a service SLA which is an agreement between the following:
  - AES
  - Bord Na Móna Peat

  Is required to clarify the service expectations of Bord Na Móna Peat and determine the services requirements for AES.
- Defines the key service targets and responsibilities of all parties.
- Defines the communication for queries or complaints.
- Reflects the responsibilities of stakeholders and all parties to the agreement.

2. SLA Duration and Review

This SLA is valid throughout the duration of the current waste management contract between Bord Na Móna Peat and AES.

The AES Account Manager, Paul Curtis, is responsible for maintaining this SLA which will be reviewed at least once per year. The Account Manager, Paul Curtis, will also discuss, document and agree any requested changes to this SLA before any such changes may be made to the SLA.

3. Customer Service Responsibilities

This section sets out the specific service detail, responsibilities and timelines for completion of tasks.

The AES Customer Services Team is responsible for the following:

- Administering sales orders and day-to-day invoicing
- Produce Monthly Waste Reports
- Changes to Scheduled Services

The AES Customer Sales and Account Management Team is responsible for the following:

- Monitor the progress of delivery and service implementation
- Respond to additional sales enquiries outside the contract scope
- Address customers' Head Office queries
- Attend regular review meetings

For all Customer Service queries please contact:
Central Accounts Newbridge
045 439042 centralaccounts@aesirl.ie

Paul Curtis – Account Manager for Bord Na Móna Peat
087 0508582 pcurtis@aesirl.ie

The AES Sales Support for the Bord Na Móna Peat contract is managed from the AES Head Office, Newbridge which is operational from 8.30am to 5.30 pm Monday to Friday.

The Newbridge office is available to assist with the following:

1. Service requests
2. Equipment requests and repairs
3. Service complaints

3.1 Services provided by AES to Bord Na Móna Peat:

The Service Request Document- ie Advice Note Number is attached as an appendix (Appendix 1) to this SLA. This is a dynamic document and may be subject to change over the Term of this Contract as agreed by Bord Na Móna Peat and AES. However, additional service requests outside the scope of the Schedule of Services are charged at the applicable rates and agreed by Bord Na Móna Peat and AES.

The metal process will remain the same for any metal collected in skips & roll on's that price is based on the current market value of the previous month in Ireland. If sites have larger quantities and rather than use skips there is a better price to be had when the metal is collected in bulk by artic & grab but that will be up to each BNM site to manage that. The order is placed the same way they just request artic & grab. Again for this to work we need to be lifting around 15 ton. The monthly metals report can be circulated to the email addresses below if the price can't be inserted into the report, the rate will be included in on the email.

3.2 Equipment Service Requests:

The Schedule of Services & Equipment may be subject to change over the Term of this Contract as agreed by Bord Na Móna Peat.

Equipment Breakdown and Repair

AES Ireland Limited maintain a regular equipment maintenance programme. Maintenance of the Equipment (see Equipment Schedule) will be completed on a six monthly basis. This service will include the replacement of all defective parts, oil changes, etc. for all equipment.

Should Bord Na Móna Peat require an emergency repair please phone the AES Head Office, Newbridge on 045 439066; informing the attendant of a Level 1 Issue as per the Issue Prioritisation Table in section 7 of this SLA document.

Repair Procedure

Calls for repairs of equipment should be made to the AES Head Office, Newbridge as per the above but should be placed with a Priority Level 1 as per the above. Priority 1 issues received during normal working hours will be responded to immediately and an engineer will be contacted within the hour. Once we have an understanding of the issue with the equipment, the engineer will determine the on-site response time. Depending upon the nature of the service requirement, an engineer may:

- Come on site to repair the equipment
- Have the equipment removed from site to repair the equipment

AES will keep Bord Na Móna Peat staff fully informed of the issue resolution and the progress of any resulting repair work.

Costs

Equipment that is under rental from AES (Ireland) Ltd will be serviced under the same scheduled service and a service report will be issued to the Bord Na Móna Peat for this equipment. All scheduled and emergency call outs for the equipment owned by AES will not incur a charge to Bord Na Móna Peat. If the reason for the cause of equipment malfunction is discovered to be misuse or incorrect treatment of the equipment by Bord Na Móna Peat staff, a charge for the repair will apply.

3.3 Additional Service Requests by Bord Na Móna Peat

All Standard Service requests will be logged manually into a call book, which will detail date, time of request, equipment type, location and waste type.

AES will offer Bord Na Móna Peat a 3 day turnaround for Skip Delivery, Exchanges and Collections. All Haz Waste and Weee collections to be completed within 5 working days.

If a service is required urgently then Bord Na Móna Peat shall indicate that at the time of request.

Copy of collection/advice note, containing at least:

- Date
- BNM peat request number
- Type of waste
- Weight
- Signature

on skip collection/exchange to be e-mailed to the original requestor within 48hrs

Additional sales requests should be directed to AES Account Manager, Paul Curtis, who will respond with relevant pricing and service information.

3.4 KPIs agreed between AES and Bord Na Móna Peat

In order to track/monitor the quality of the service provision the following monthly KPIs to be established by AES:

1. Turnaroud time from placement of the request to container/skip delivery (criteria: number of skips delivered/exchanged within 3 days as per agreement and outside of the 3 days)
2. Turnaroud time from placement of the request to container/skip delivery (criteria: number of skips delivered/exchanged within 5 days as per agreement and outside of the 5 days for Haz Waste and WEE collections)
3. Number of the delivery notes e-mailed to the original requestor vs number of requests placed
4. Number of reports (waste report and metal report) e-mailed on time as per agreement

Any additional KPIs if required to be discussed between two parties prior establishment

4. Invoicing and Credit Control:

The AES Finance Department are responsible for the following tasks:

1. Monthly Invoice
2. Invoice queries
3. Account queries
4. Supply of service dockets, weighbridge dockets, etc, upon request

Invoices will be issued each month for the previous month's service. AES credit terms are strictly 30 days from date of invoice.

Reporting:

A monthly waste report along with a Metal Monthly report will be provided by the 15th of the month. The Reports are to be circulated to the following:-

Report Title	Email Details	Frequency
Bord Na Móna Peat Monthly Waste Report	○ DGMstore@bnm.ie ○ BWMstore@bnm.ie ○ MDMstore@bnm.ie ○ LTMstore@bnm.ie ○ Nikolas.Sezonovs@bnm.ie	Monthly
Bord Na Móna Peat monthly Metal report	○ DGMstore@bnm.ie ○ BWMstore@bnm.ie ○ MDMstore@bnm.ie ○ LTMstore@bnm.ie ○ Nikolas.Sezonovs@bnm.ie	Monthly

Traceability

Wheelie Bins: Utilising chip and pin technology and weighing systems on our own collection vehicles, AES is able to capture details (including unique bin identification number, weights and time of service) for wheelie bins directly serviced. These figures will be provided in the monthly reports and invoices.

Skips and Wheelie Bins: The details of waste streams collected by skips, and containers will be provided via the details recorded on the weighbridge dockets. Service collection dockets and weighbridge dockets are matched using collection reference numbers and the waste types, weights, and collection details are reported to Bord Na Móna Peat through the monthly reports and invoices.

Waste collection details from services provided by our sub-contractor companies will be determined by dockets and invoices provided to AES by each sub-contracting company. AES will provide these service details to Bord Na Móna Peat through the monthly reports and invoices.

5. Service Queries or Complaints:

Communication of all service issues must be made to the following:

Issue type:	Communicated by:	Communicated to:	Communication Method:
All	Bord Na Móna Peat	Central Accounts	centralaccounts@aesirl.ie
			045 439042

In order to better assist all our customers, AES have developed a prioritisation list by which to determine the level of importance for all concerned. Please familiarise yourself with the below prioritisation table so your particular issue can be dealt with in an appropriate manner.

Communication of Priority 1 issues must be made by phone and email.

Communication of Priority 2-4 issues may be made by email.

6. Issue Prioritization:

Priority type	Description:
Priority 1	Priority 1 issues have a high impact on the levels of customer service, cause high call volumes and need to be addressed immediately but can be resolved within the effected department (e.g. equipment breakdown).
Priority 2	Priority 2 issues have a significant impact on the service offered (e.g. non collection of a customer's bin).
Priority 3	Priority 3 issues are low service impact routine queries (e.g. invoice queries).
Priority 4	Priority 4 issues have little or no impact on the level of customer services offered (e.g. request for tax certificates).

Note: *The status of issues may change if the issue is not resolved adequately when reported, e.g. repeated non collection of a paid bin may change the status of the issue from a Priority 2 to a Priority 1.*

Escalation:

Issues may be escalated as follows

Role:	Issue type:	Timing:
Paul Curtis – Account Manager	Unresolved Priority 1	1 hour
Paul Curtis – Account Manager	Unresolved Priority 2 issues	5 hours
Paul Curtis – Account Manager	Unresolved Priority 3 issues	2 days
Paul Curtis – Account Manager	Unresolved Priority 4 issues	3 days

7. Performance Review:

Service and Equipment

The regular review meetings between Bord Na Móna Peat and AES will be structured in such a manner as to accomplish the following:

- Review service levels
- Review and/or benchmark recycling progress
- Propose additional recycling initiatives
- Update on upcoming legislation
- Review charges and savings

Review meetings should be once a month for the first three months and quarterly thereafter.

Paul Curtis can be contacted with regard to any of the above issues.

Charges

The Charges will be subject to a review after the first year of the Contract.

8. Supporting Responsibilities:

Environmental

AES will endeavour to ensure that all materials disposed by Bord Na Móna Peat will be treated in line with all appropriate environmental legislation and best practise. As a rule, AES maintain operations in line with the waste hierarchy and utilise landfill as a last resort for otherwise unrecoverable materials.

The Environmental Department ensure that the treatment of various waste streams is compliant with all relevant legislation. They will also ensure that all AES facilities and sub-contract facilities maintain appropriate licences & permits for all waste activities undertaken on behalf of the customer.

The Environmental Department will provide the following functions:

- Ensure provision of service is compliant with all relevant environmental legislation.
- Carry out environmental audits of suppliers and waste outlet facilities.
- Arrange for customer site audits when requested.
- Provide general support on environmental queries.
- Inform AES and customers of any new and/or upcoming environmental legislation.

Charlotte Green (045 439 464) is responsible for all environment functions.

Health and Safety

AES shall ensure that all reasonable steps are taken to ensure the safety of all people and property within the areas covered by the contract. AES maintain a Safety Policy and regularly update our Safety Statement.

The Health & Safety staff ensure services are operated according to health and safety legislation and provide the following functions:

- Carry out appropriate safety audits and risk assessments of customer facilities, especially where machinery and/or equipment will be in operation.
- Ensure all customer staff are trained in the use of machinery and/or equipment.
- Record and track incidents and accidents to appropriate levels.

Garrett Leech will be responsible for all Health, Safety and Quality functions.

Quality Systems

AES has implemented an Integrated Management System Manual incorporating ISO 14001 and OHSAS 18001. In addition, AES has identified the requirements of ISO 9001 and has begun the process for applying for this quality standard across the AES Group.

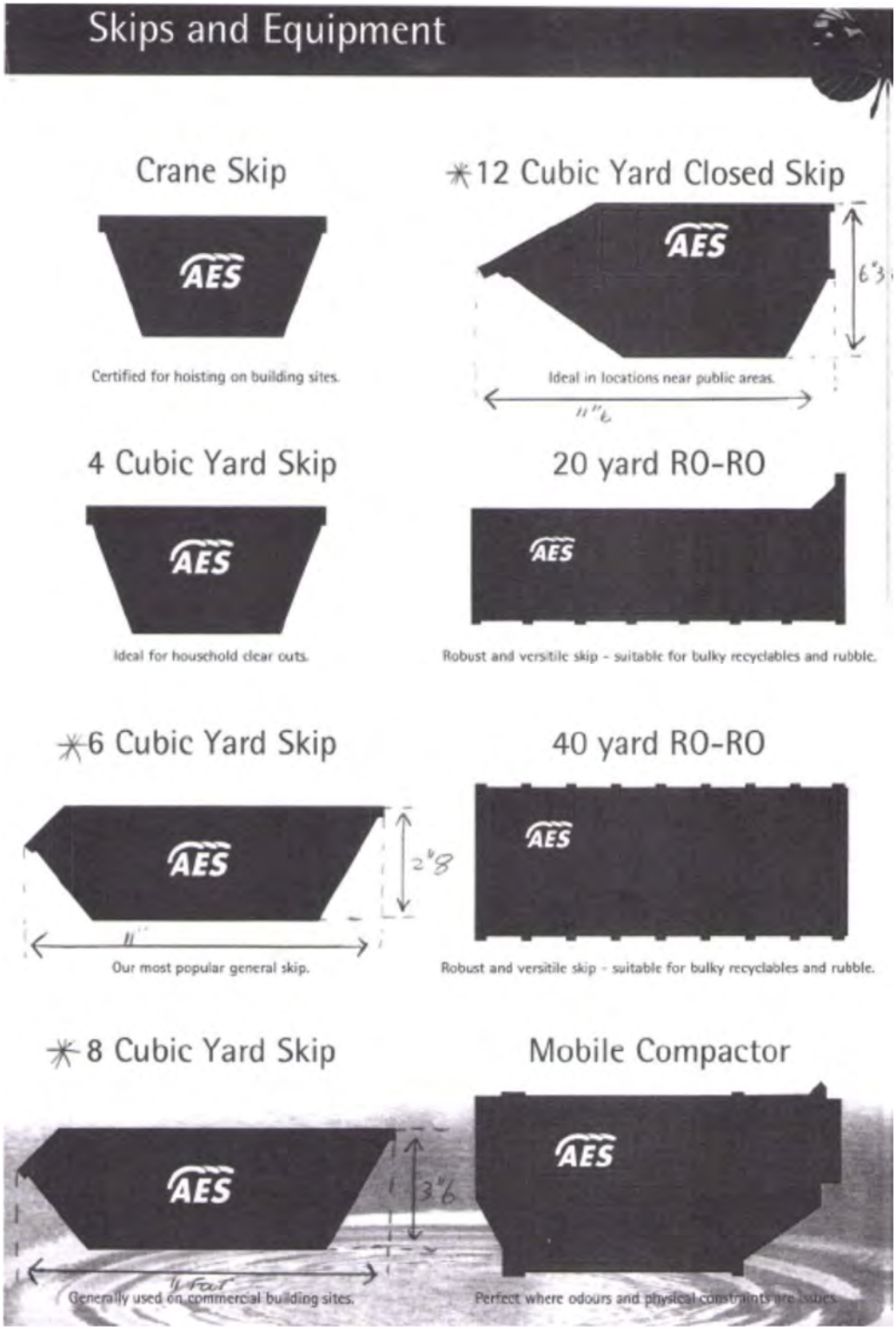
The Quality staff will provide the following functions

- Ensure services are carried out according to AES quality standards and quality management systems.
- Carry out audits of AES's services to ensure compliance with quality management systems.
- Maintain and update AES's quality management manual.

APPENDIX 1

BORD NA MONA REQUEST FORM

BORD NA MONA BLACKWATER WASTE COLLECTION/DELIVERY REQUEST FORM (VER.0.1) IPPC Licence P0502-01			
BNM ADVICE NOTE NO: (HAVE TO BE QUOTED ON ALL DOCUMENTATION)	W21/113		
WORKS NAME	W21 BLACKWATER		
CONTAINER TYPE	Skip	QUANTITY	1
WASTE MATERIAL	Steel	COLLECTION Y/N	YES
SIZE/TYPE	12 Cu. Yd. Lift-On OPEN	EXCHANGE Y/N	NO
LOCATION/SITE DELIVERY ADDRESS	Clonfert Workshop 03 / Clonfert, Eyrecourt, Co Galway		
CONTACT NAME/ NUMBER	Tom Rigney / 087 9924101		
DATE REQUIRED	05/04/2017		
DATE ORDERED	04/04/2017		
REQUESTOR NAME	Brendan Sweeney / 087 7655059		
BILL TO ADDRESS/CONTACT DETAILS	Bord na Móna. Blackwater, Shannonbridge, Co. Offaly. Ireland., Tel: 090-9674420, 090-9674440, Fax: 090-9674424 Brendan.Sweeney@bnm.ie, Ann.Bennett@bnm.ie		


Skips and Equipment
Crane Skip
Certified for hoisting on building sites.
12 Cubic Yard Closed Skip
Ideal in locations near public areas.
4 Cubic Yard Skip
Ideal for household clear outs.
20 yard RO-RO
Robust and versitile skip - suitable for bulky recyclables and rubble.
6 Cubic Yard Skip
Our most popular general skip.
40 yard RO-RO
Robust and versitile skip - suitable for bulky recyclables and rubble.
8 Cubic Yard Skip
Generally used on commercial building sites.
Mobile Compactor
Perfect where odours and physical constraints are issues.

Date:_____ **Rev: 1**

Waste Management Procedure

1. Purpose

To define the correct procedure to be followed when requesting a waste collection service from AES regarding removal of all wastes from all sites within the Feedstock group.

2. Scope

The scope of this procedure covers all bogs in the Licence areas P0499-01 to P0507-01, and Waste Facilities WL0049-02 and 0199-02. It also covers the requirements of Condition 7 of these IPC licences and is detailed in Bord na Mona Peat/AES Service Level Agreement (SLA) located in xxxxx.

3. Responsibility

The implementation of this Procedure is the responsibility of the Resource Manager or his/her deputy.

4. Waste Collection Procedure

4.1 All non-hazardous and hazardous waste collection services are as per the SLA.

4.2 On a monthly basis, stores to provide the relevant IPC Licence Coordinator with a copy of all waste receipts for the Waste Management file.

4.3 On an quarterly basis, AES to provide each stores and the IPC Licence Coordinator with a quarterly report as per the SLA.

5. Litter Action Plan

5.1 Refer to Bord na Mona Group Litter Action Plan at XXX

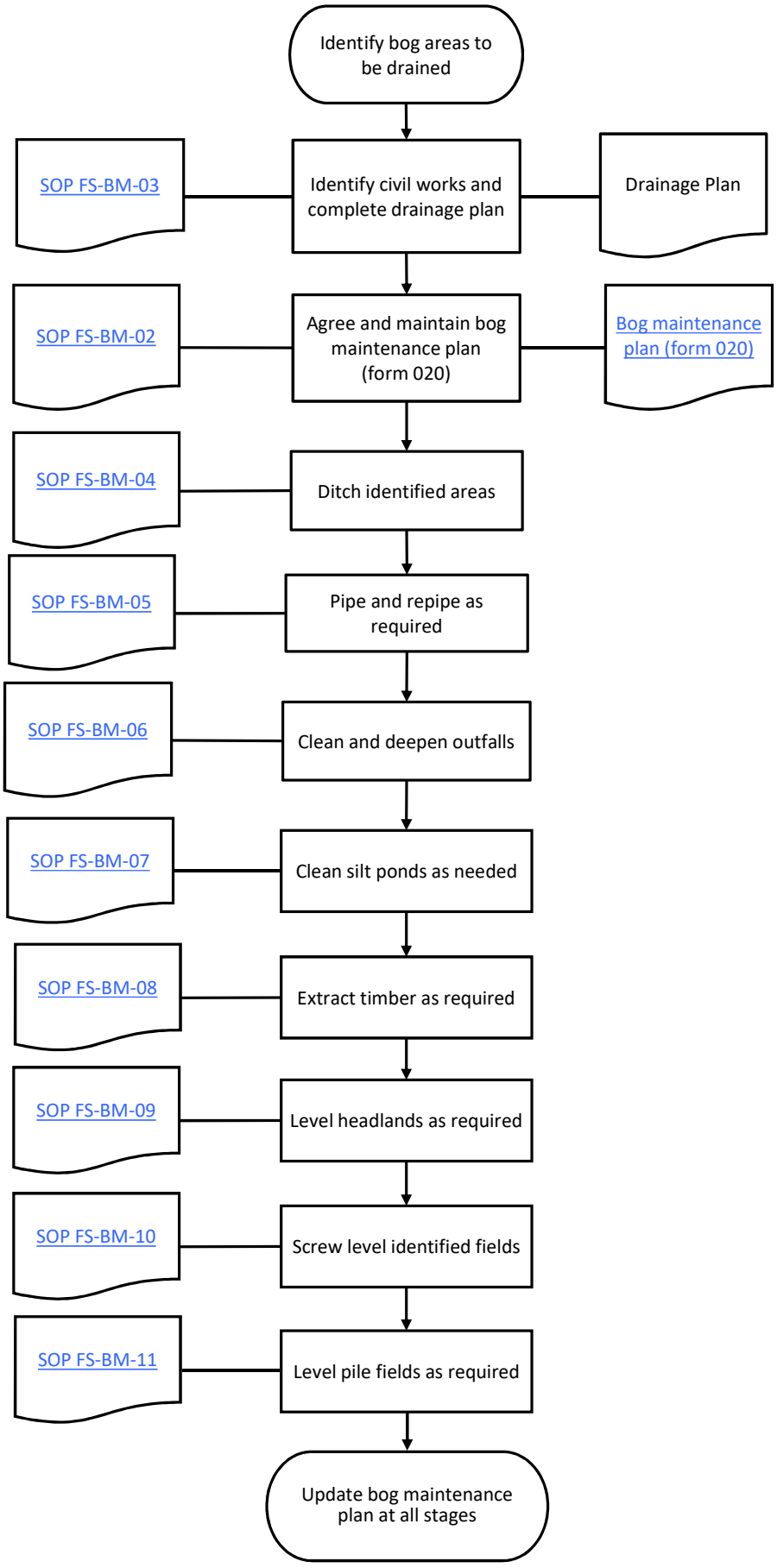
6. Poly Recycling Procedure

6.1 Once the pile has been stripped, all rolls should be gathered and brought straight to the dedicated hardstand for collection.

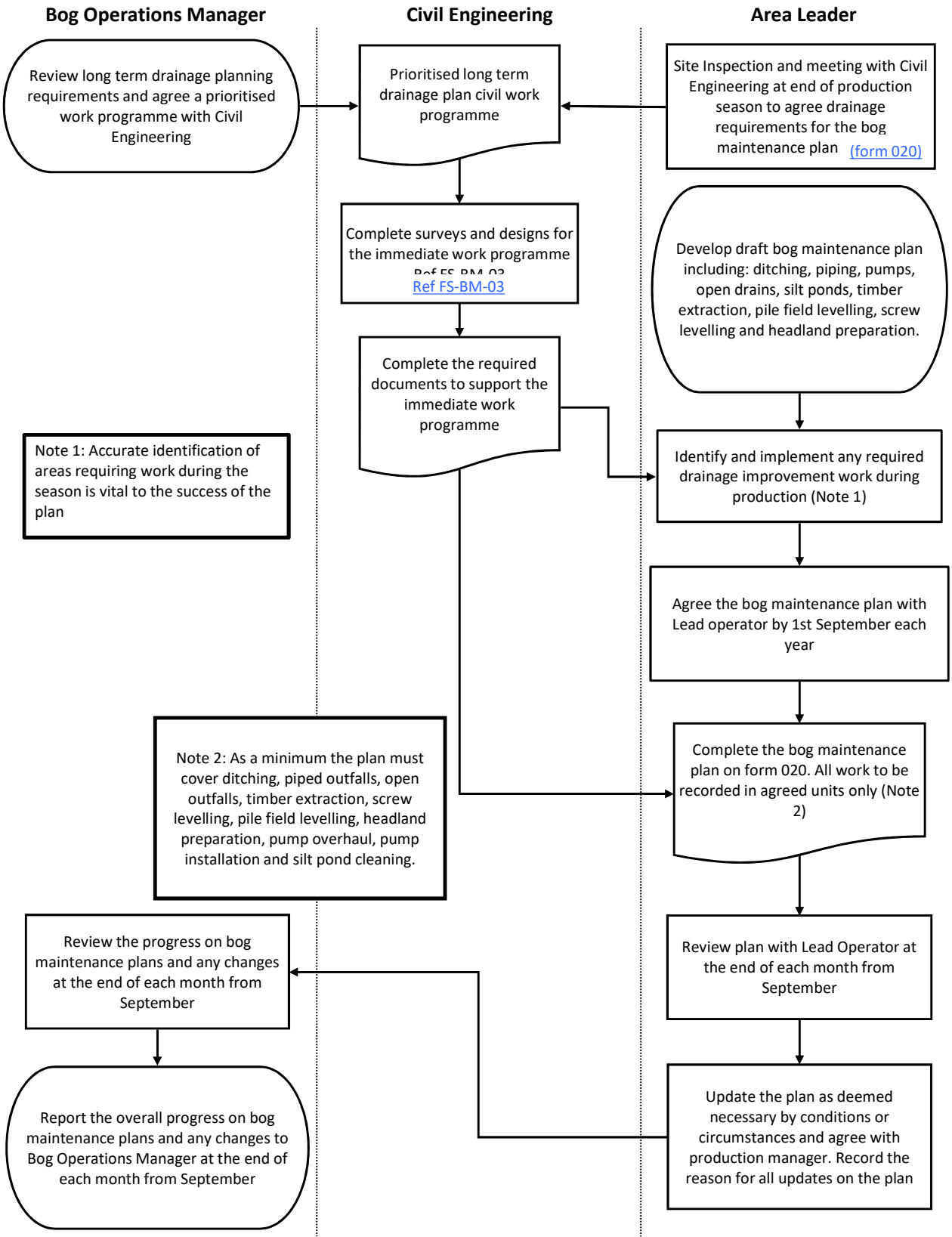
6.2 At the hard stand, stack the rolls neatly within easy reach of a truck with grab arm.

6.3 Once 40 to fifty rolls have been gathered at the hardstand, notify your IPPC Coordinator, who will schedule a collection dedicated collection at this location or will make up a load from this location.

BORD NA MÓNA Naturally Driven	SOP: FS-BM-01	Rev: 1
Title: Bog Maintenance Flowchart	Approved: PR	Date: 01/11/2012



BORD NA MÓNA Naturally Driven	SOP: FS-BM-02	Rev: 2
Title: Bog Maintenance Plan	Approved: JMcN	Date: 15/07/2016



Additional Notes:

It is vital to identify areas with timber problems during production and remove timber and repair the field where possible

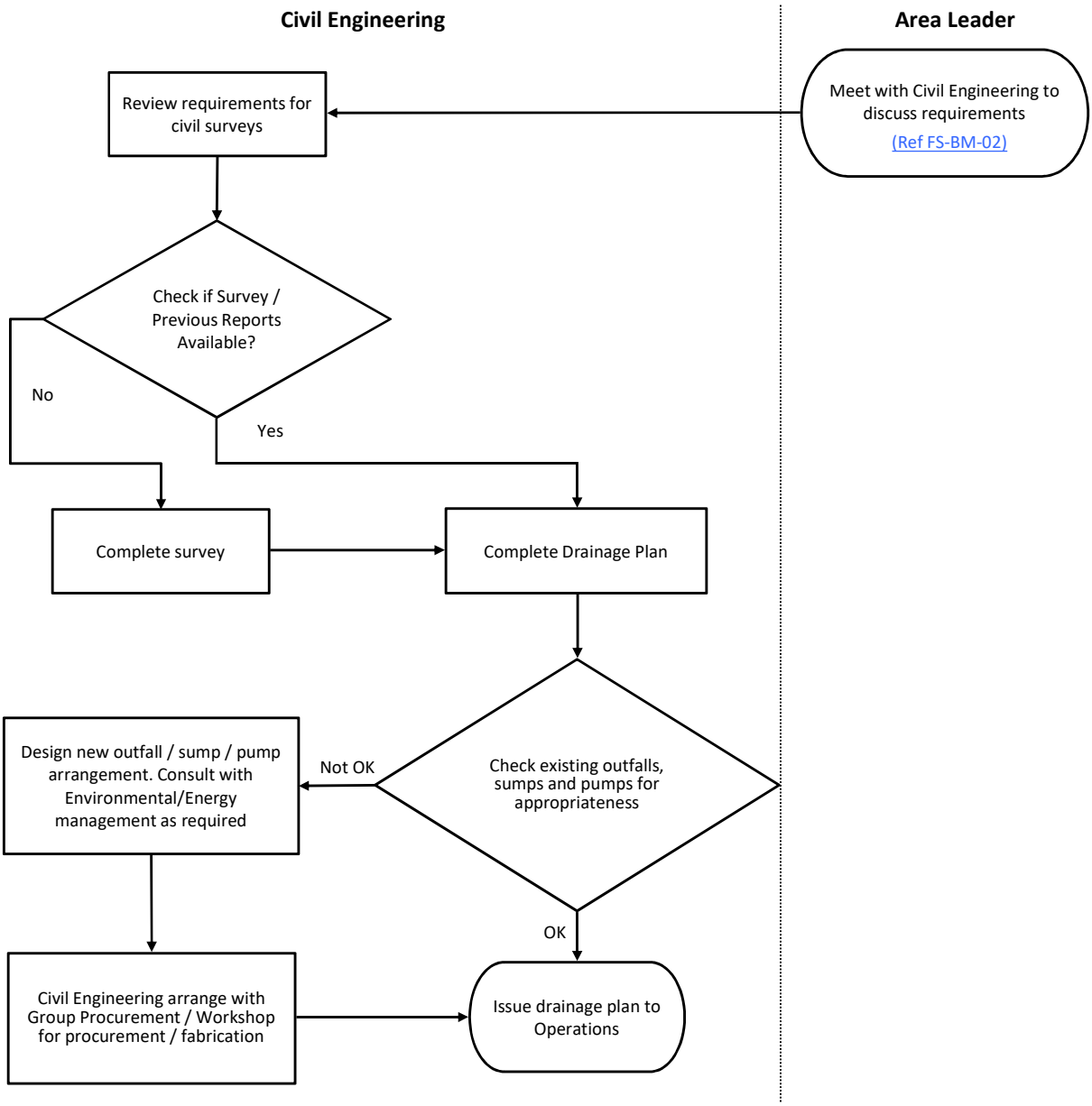
Headland levelling plan to be based on kilometers of headland in the area.

Base screw levelling plan on observations of field profiles during production.

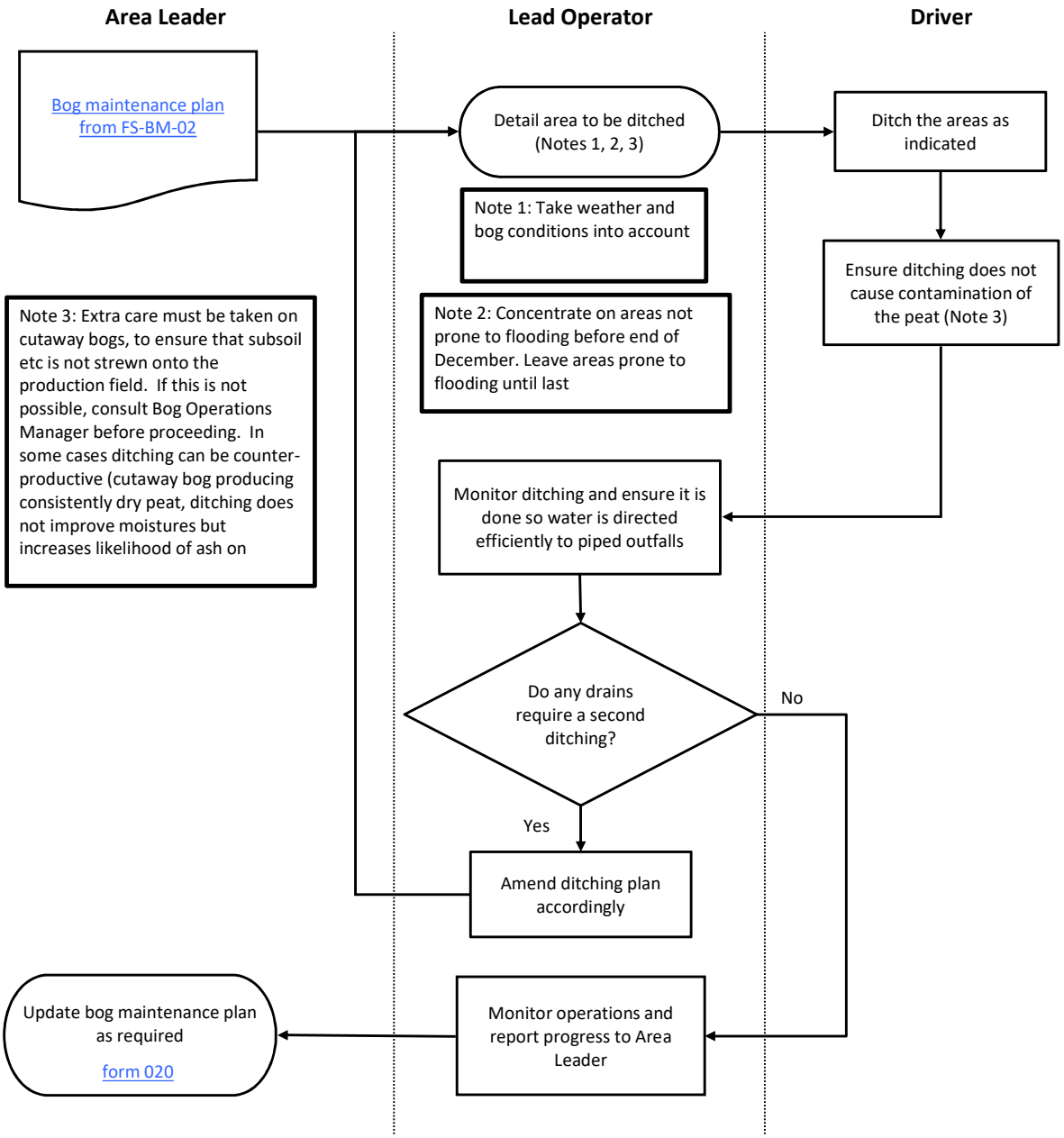
Pile field levelling plan to be based on height above adjoining field.

Any field greater than 1m above adjoining field must be levelled unless lowering the field puts the stock at risk from flooding.

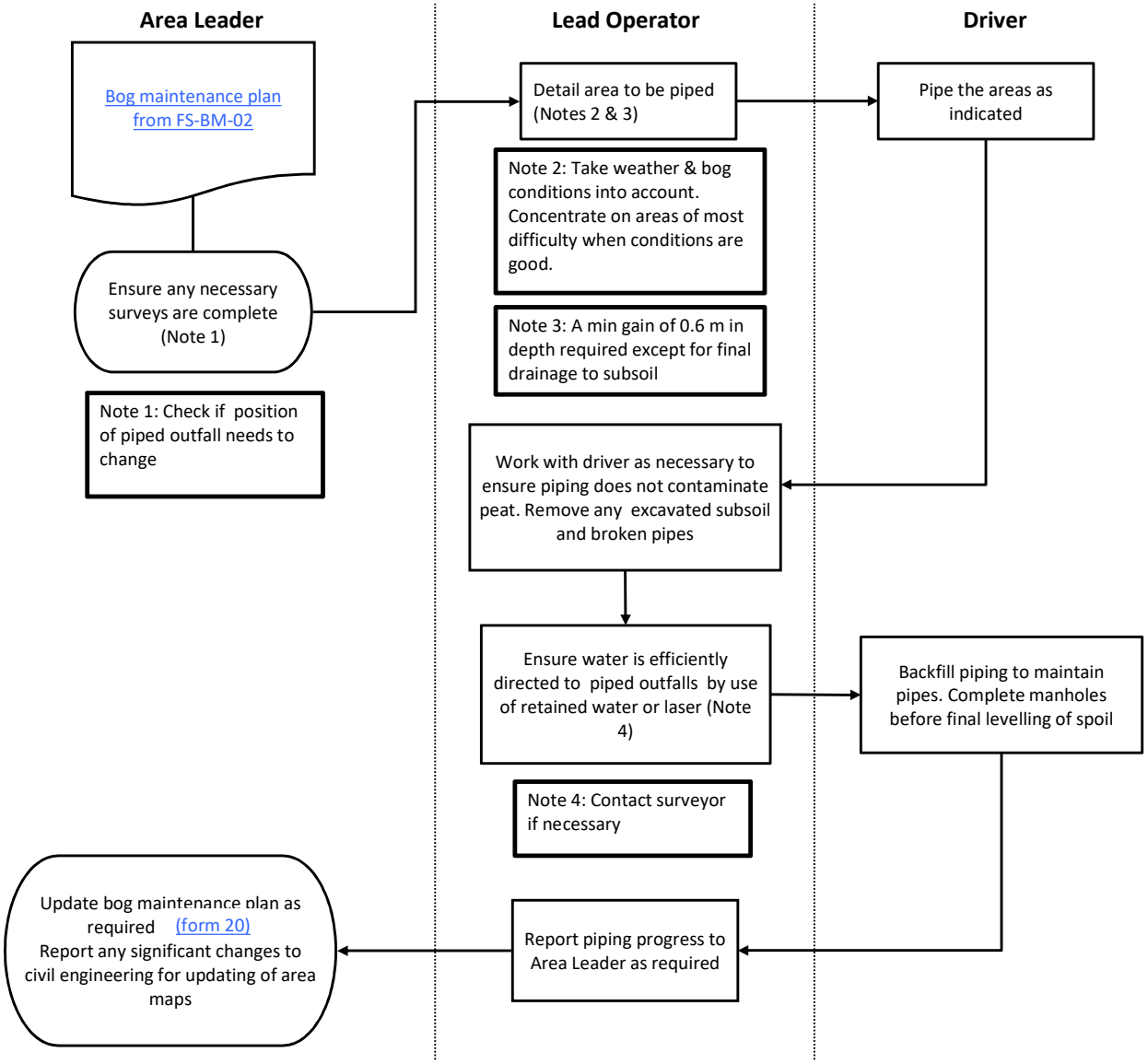
BORD NA MÓNA Naturally Driven	SOP: FS-BM-03	Rev: 2
Title: Drainage Planning & Implementation	Approved: JMcN	Date: 15/07/2016



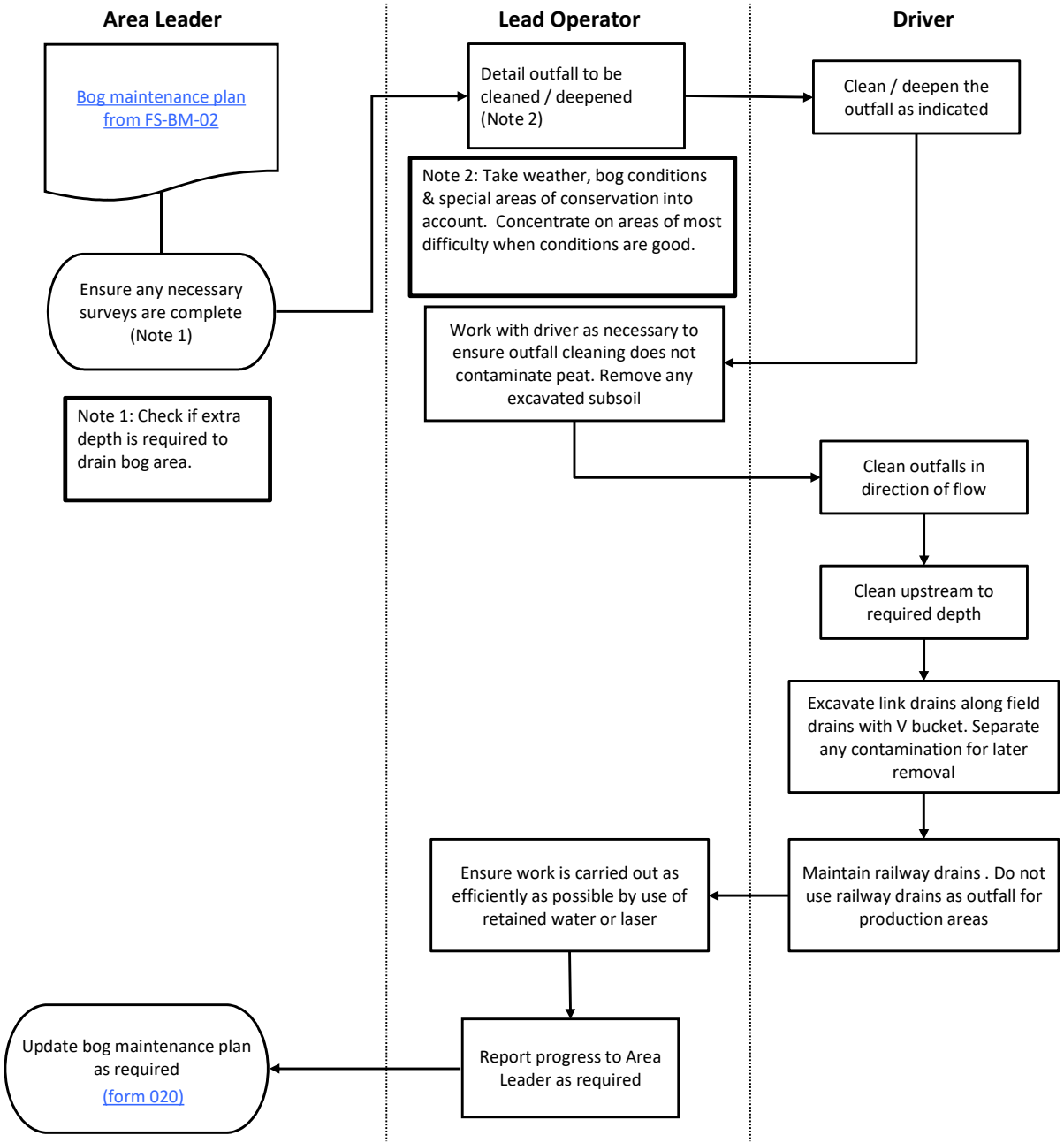
BORD NA MÓNA Naturally Driven	SOP: FS-BM-04	Rev: 2
Title: Ditching	Approved: JMcN	Date: 09/02/2016



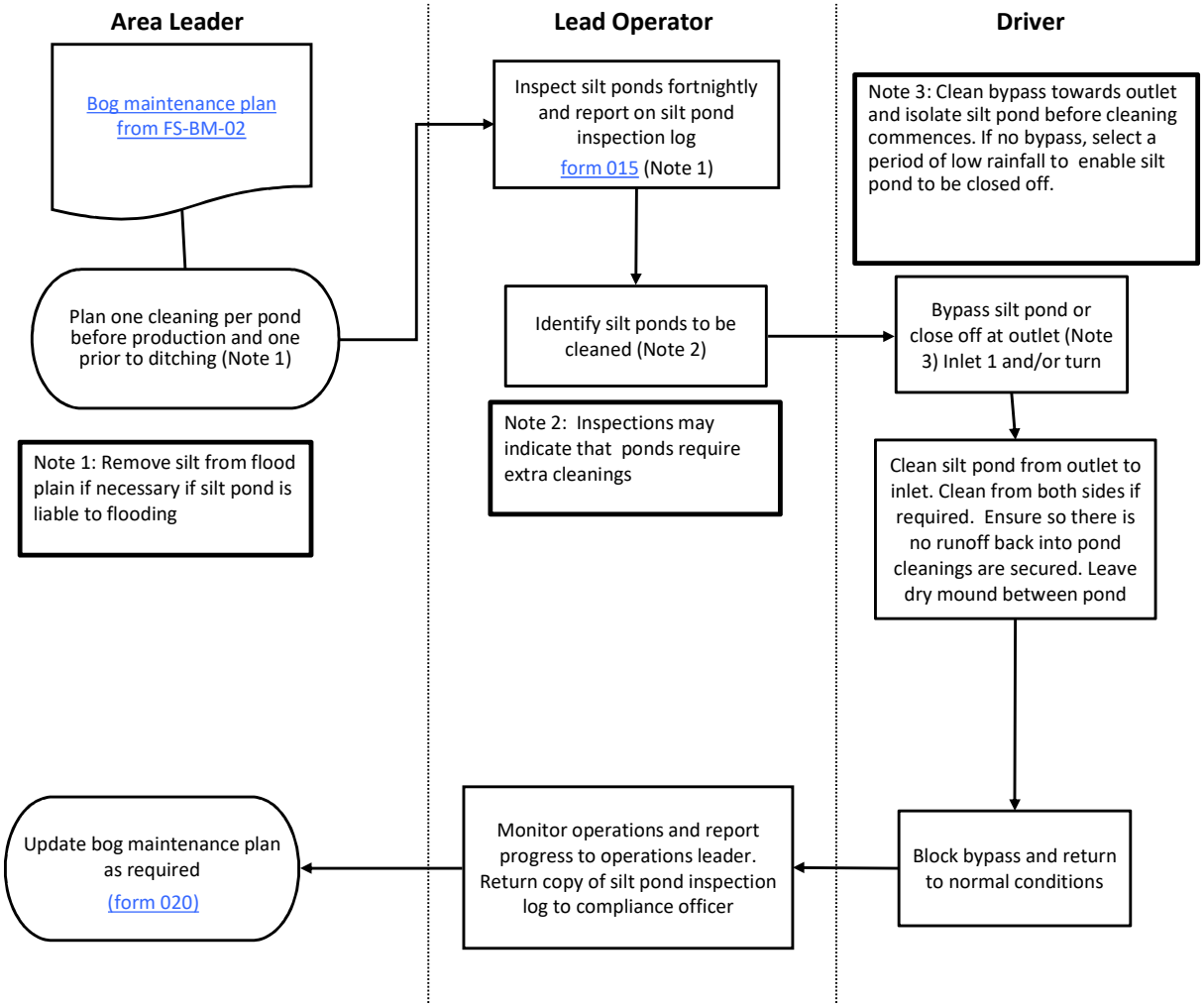
BORD NA MÓNA Naturally Driven	SOP: FS-BM-05	Rev: 2
Title: Piping & Repiping	Approved: JMcN	Date: 15/07/2016



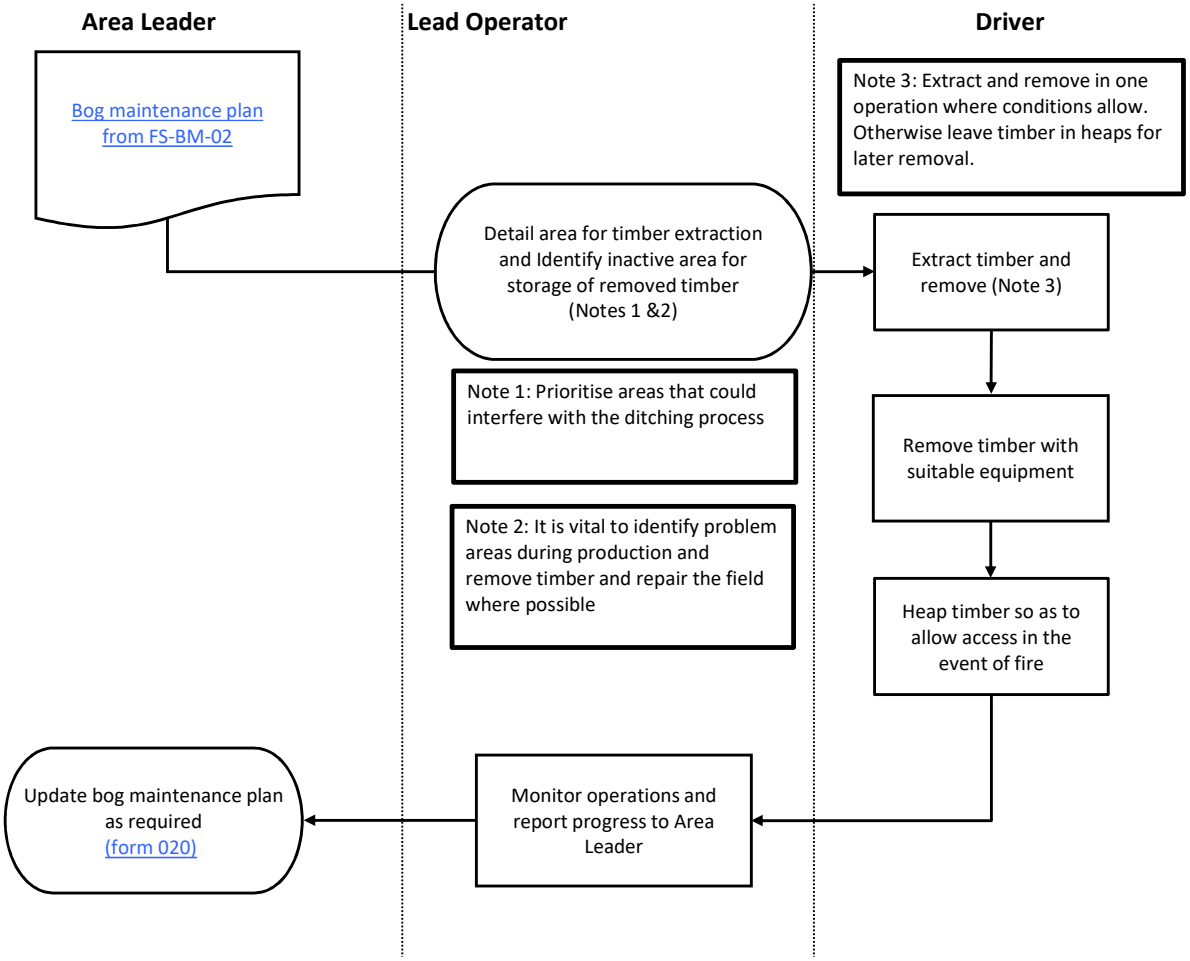
BORD NA MÓNA Naturally Driven	SOP: FS-BM-06	Rev: 2
Title: Open Outfall Procedure	Approved: JMcN	Date: 15/07/2016



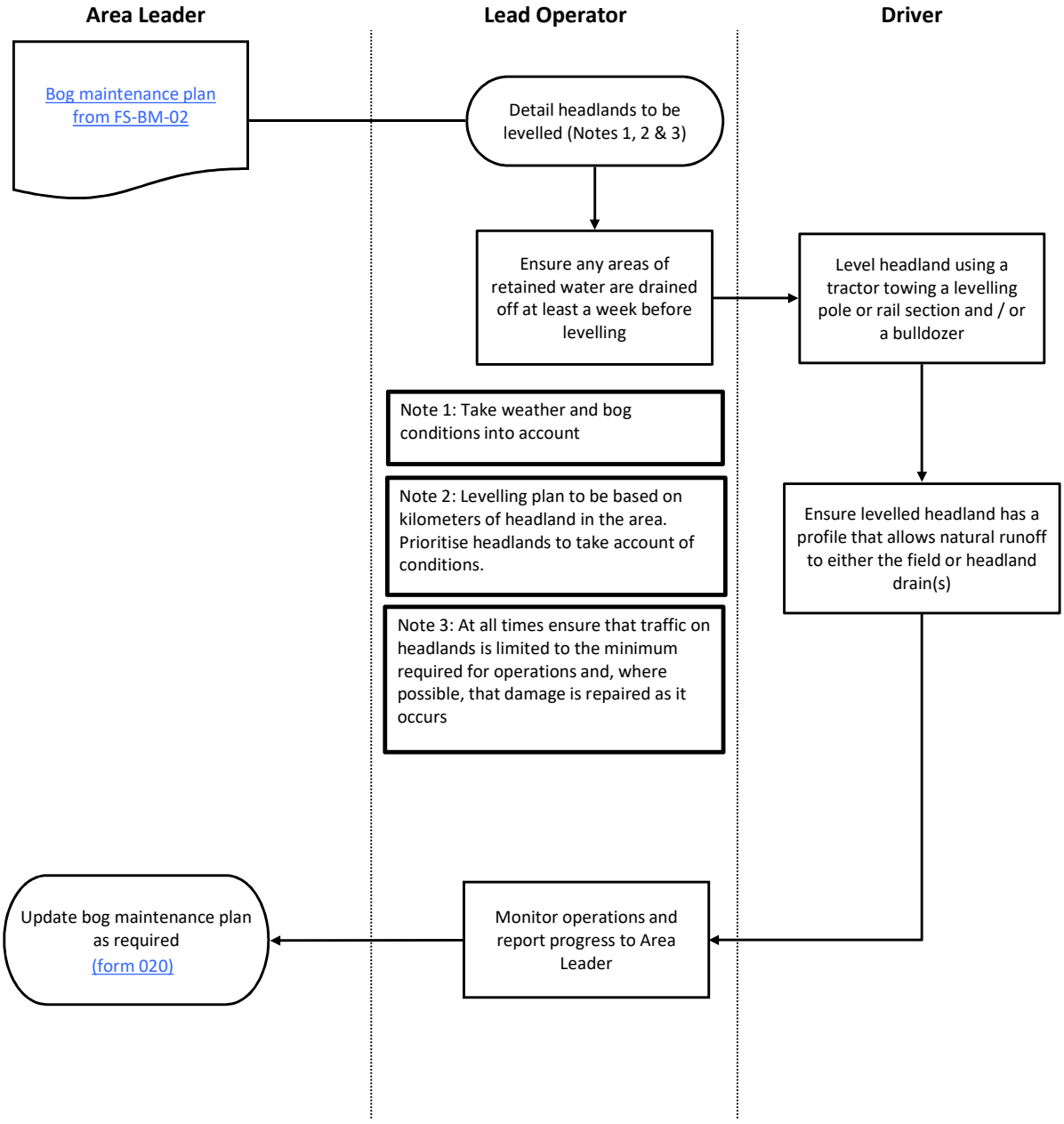
BORD NA MÓNA Naturally Driven	SOP: FS-BM-07	Rev: 3
Title: Silt Pond Cleaning	Approved: JMcN	Date: 15/07/2016



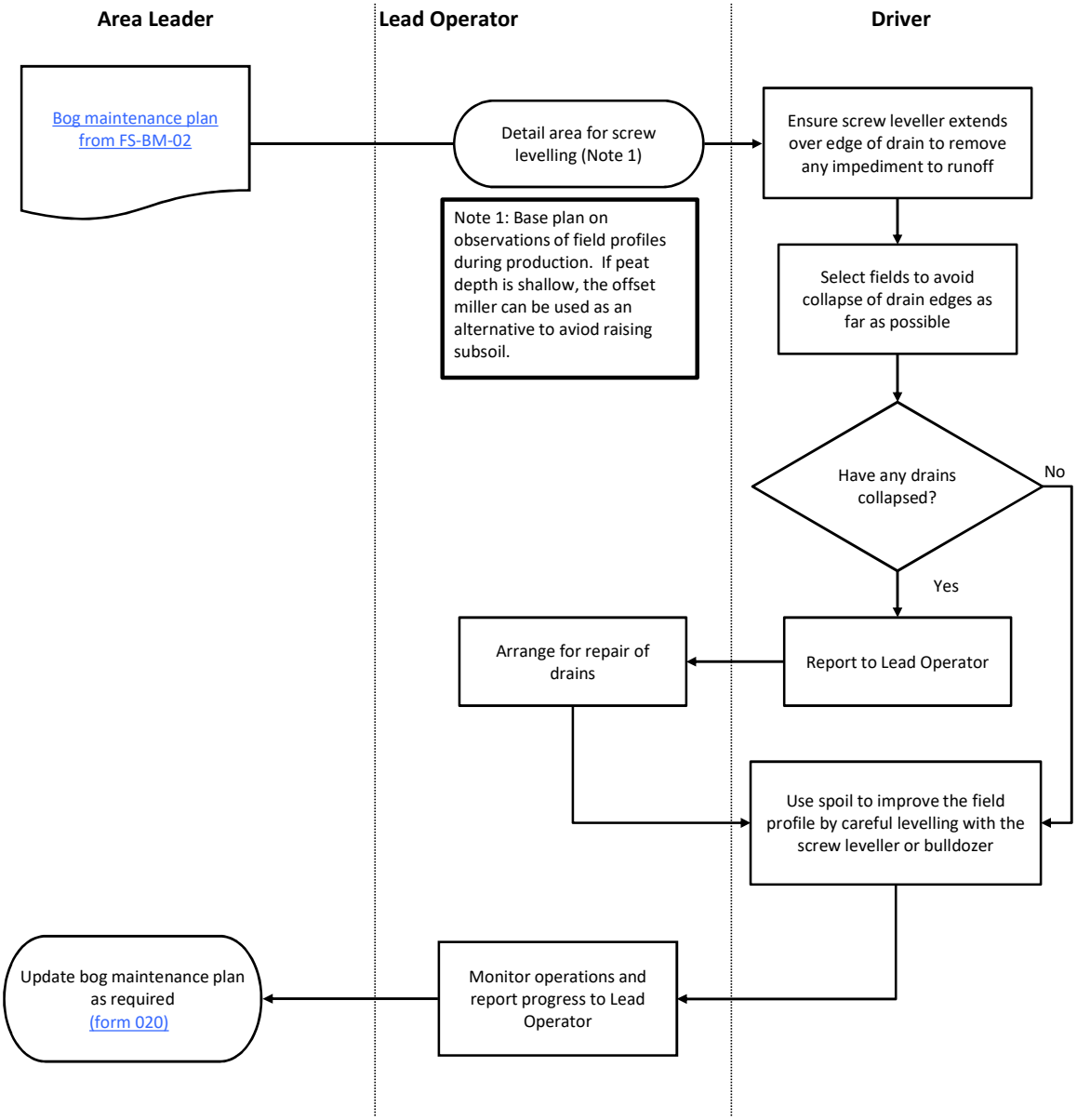
BORD NA MÓNA Naturally Driven	SOP: FS-BM-08	Rev: 2
Title: Timber Extraction	Approved: JMcN	Date: 15/07/2016



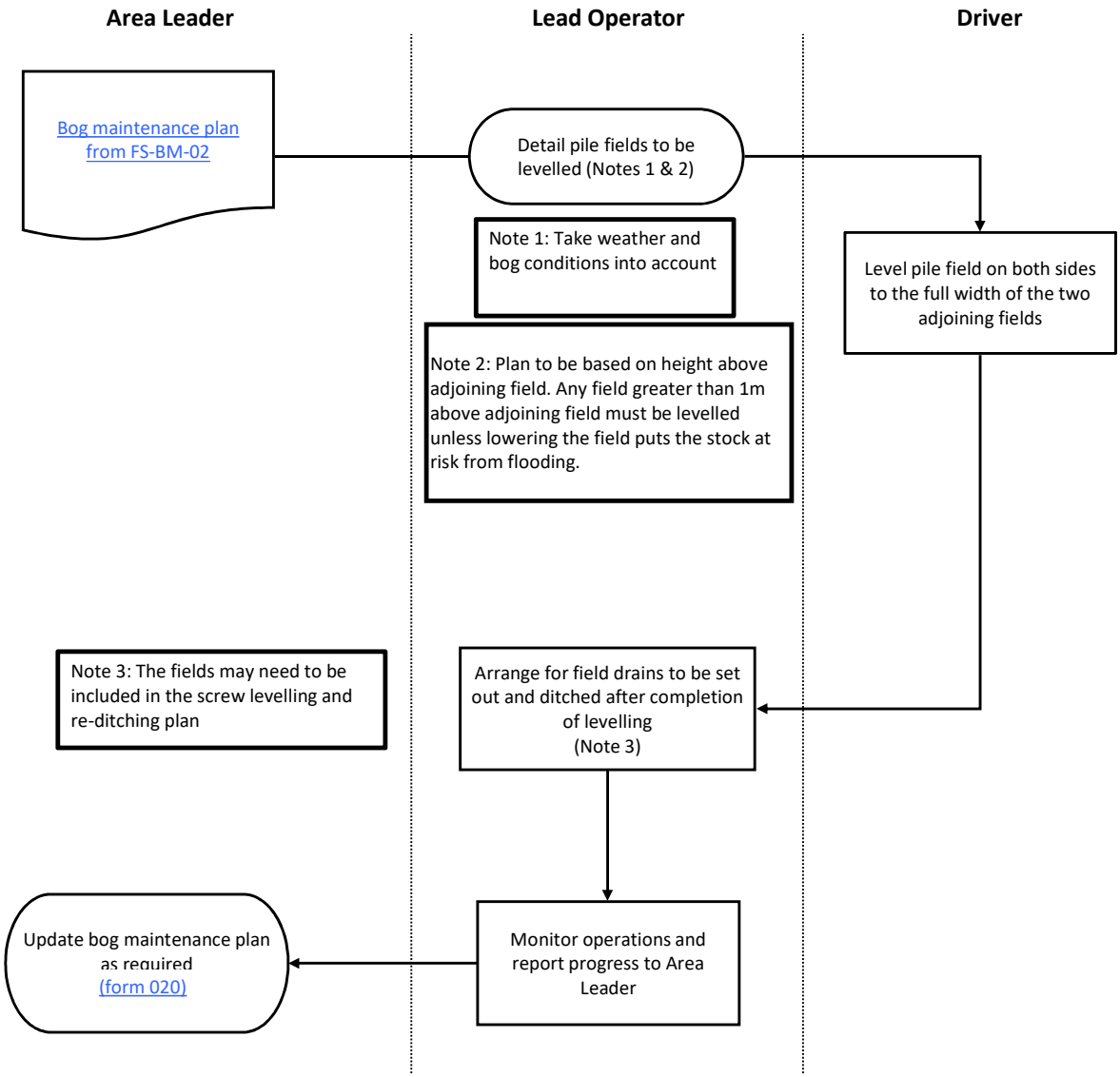
BORD NA MÓNA Naturally Driven	SOP: FS-BM-09	Rev: 2
Title: Headland Levelling	Approved: JMcN	Date: 15/07/2016



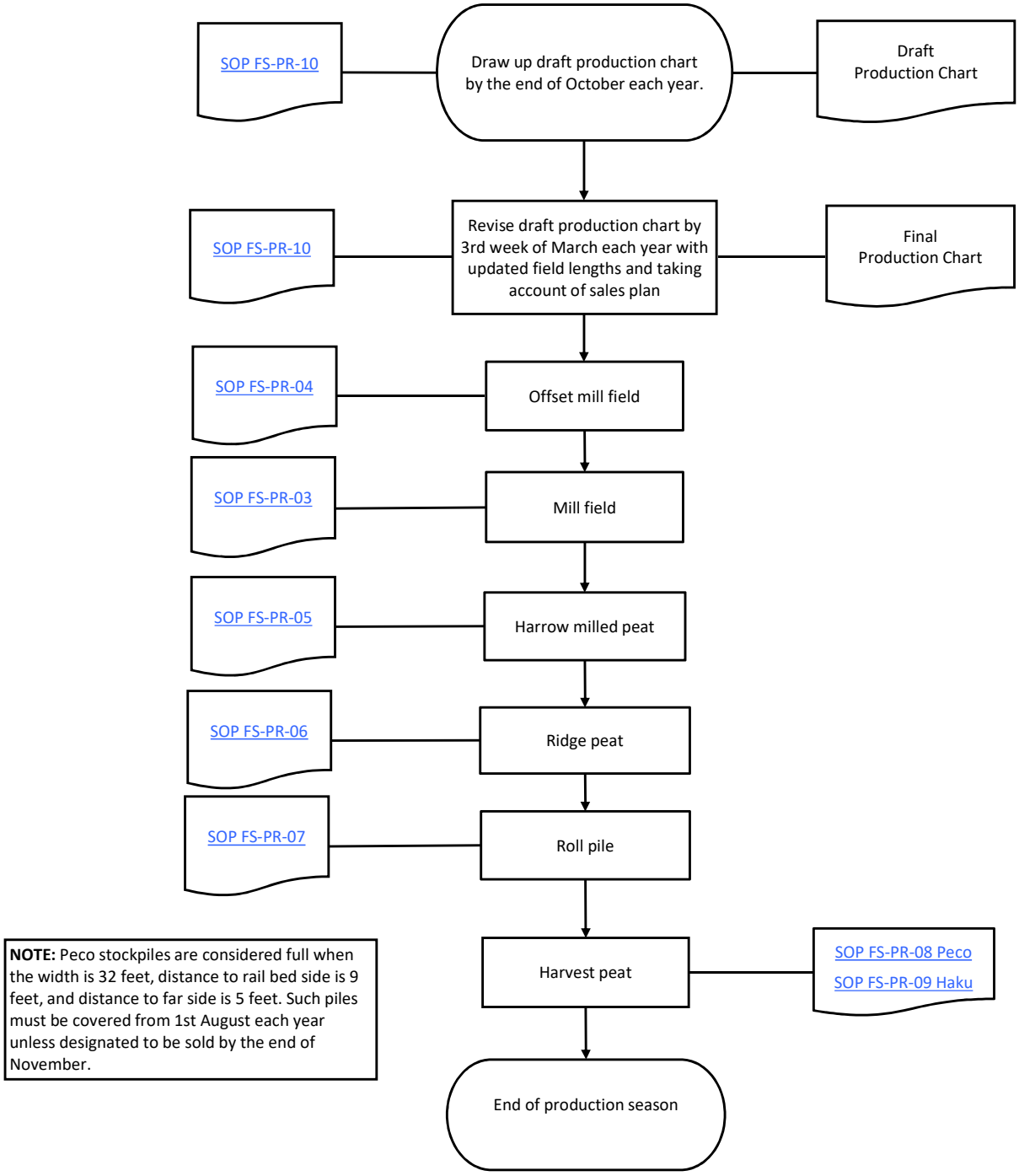
BORD NA MÓNA Naturally Driven	SOP: FS-BM-10	Rev: 2
Title: Screw Levelling	Approved: JMcN	Date: 18/05/2016



BORD NA MÓNA Naturally Driven	**SOP: FS-BM-11**	**Rev: 3**
Title: Pile Field Lowering	**Approved: JMcN**	**Date: 15/07/2016**



Bord na Móna Naturally Driven	SOP: FS-PR-01	Rev: 2
Title: Production Flowchart	**Approved: PR**	**Date: 08/06/2016**



NOTE: Peco stockpiles are considered full when the width is 32 feet, distance to rail bed side is 9 feet, and distance to far side is 5 feet. Such piles must be covered from 1st August each year unless designated to be sold by the end of November.

BORD NA MÓNA Naturally Driven	SOP: FS-PR-02	Rev: 2
Title: General Milled Peat Production	Approved: PR	Date: 26/07/2012

1) Purpose

The purpose of this procedure is to describe the general arrangements for production of milled peat in Bord na Móna Energy.

2) Scope

The scope of this procedure is Milled Peat Production within area of responsibility.

3) Responsibility

Bog Operations Manager, Team Leaders**,** Operations Leader, A.E.G. Team Leaders and Area Supervisor.

4) Related Documents

Fire Policy
Environmental Guidelines.
Operating Procedures.

5) Procedure

Operations Leaders in conjunction with Team Leader/Area Supervisor will check all covered piles before stripping for production and leave covered those covered with 12 or 13m polythene until agreed with the Transport Manager.

Operations Leaders will ensure that the production equipment is checked at start of season, with particular attention to guards and fire extinguishers; and Team Leader/Area Supervisor will ensure that daily checks take place as per maintenance/safety check list.

Operations Leaders will check that the production cycle of milling, harrowing, ridging, harvesting and pile rolling is operated as outlined in procedures; so as to maximize the production of dry milled peat.

Operations Leaders will check that accurate production returns are notified before 9.00am each morning to Feedstock finance department, and that production is recorded on the production return sheet: (ref form 016A/B/C).

Operational Leaders, in conjunction with Team Leader/Area Supervisor, will ensure that fire rollers, bulldozers with lights, and a ditcher are available during production, as required by Fire Policy.

Operations Leaders will check that Team Leaders/Area Supervisors ensure that machinery is blown down & washed at end of each day

Operational Leaders will check that Team Leaders/Area Supervisors ensure that production machines are parked after wash down with separation to prevent spread of fire.

Operational Leaders, in conjunction with Team Leader/Area Supervisor, will ensure that production activity stops when winds pose a fire hazard and/or an environmental risk, and that a close fire watch is kept on piles, machinery and surrounding scrub.

Operational Leaders, in conjunction with Team Leader/Area Supervisor, will check piles regularly and ensure production ceases when full. (i.e. at size requiring 13m polythene)

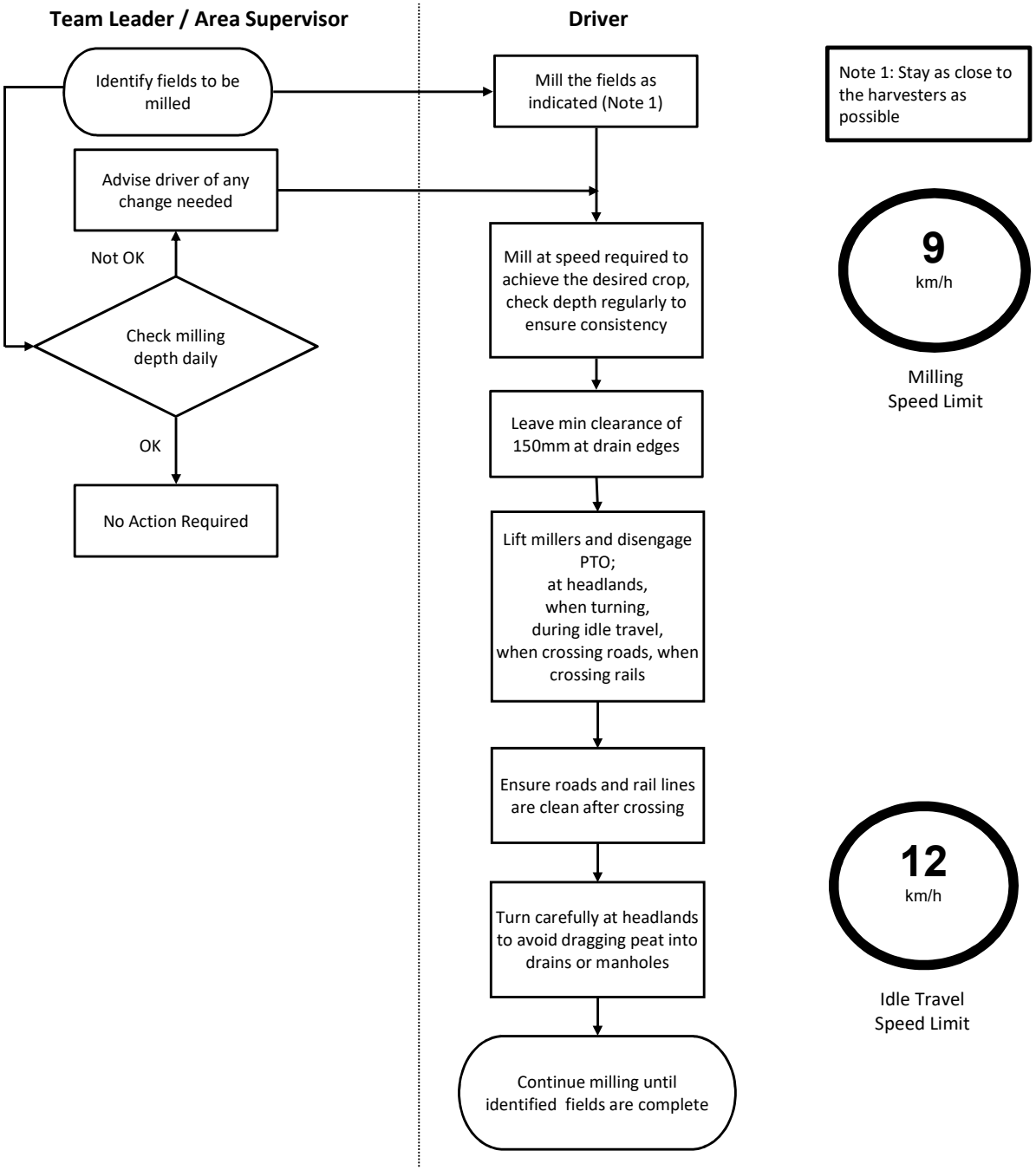
The Resource Manager in consultation with the Head of Feedstock, defines the end of the production season.

Operational Leaders will ensure that all machinery is properly blown down and washed down at end of season and is parked up as outlined in 'Production Machinery Lay-up Procedure'.

6) Records

Audit check lists; Production Returns, Covering Plan.

BORD NA MÓNA Naturally Driven	SOP: FS-PR-03	Rev: 1
Title: Milling (Light or new triple miller)	Approved: PR	Date: 26/07/2012



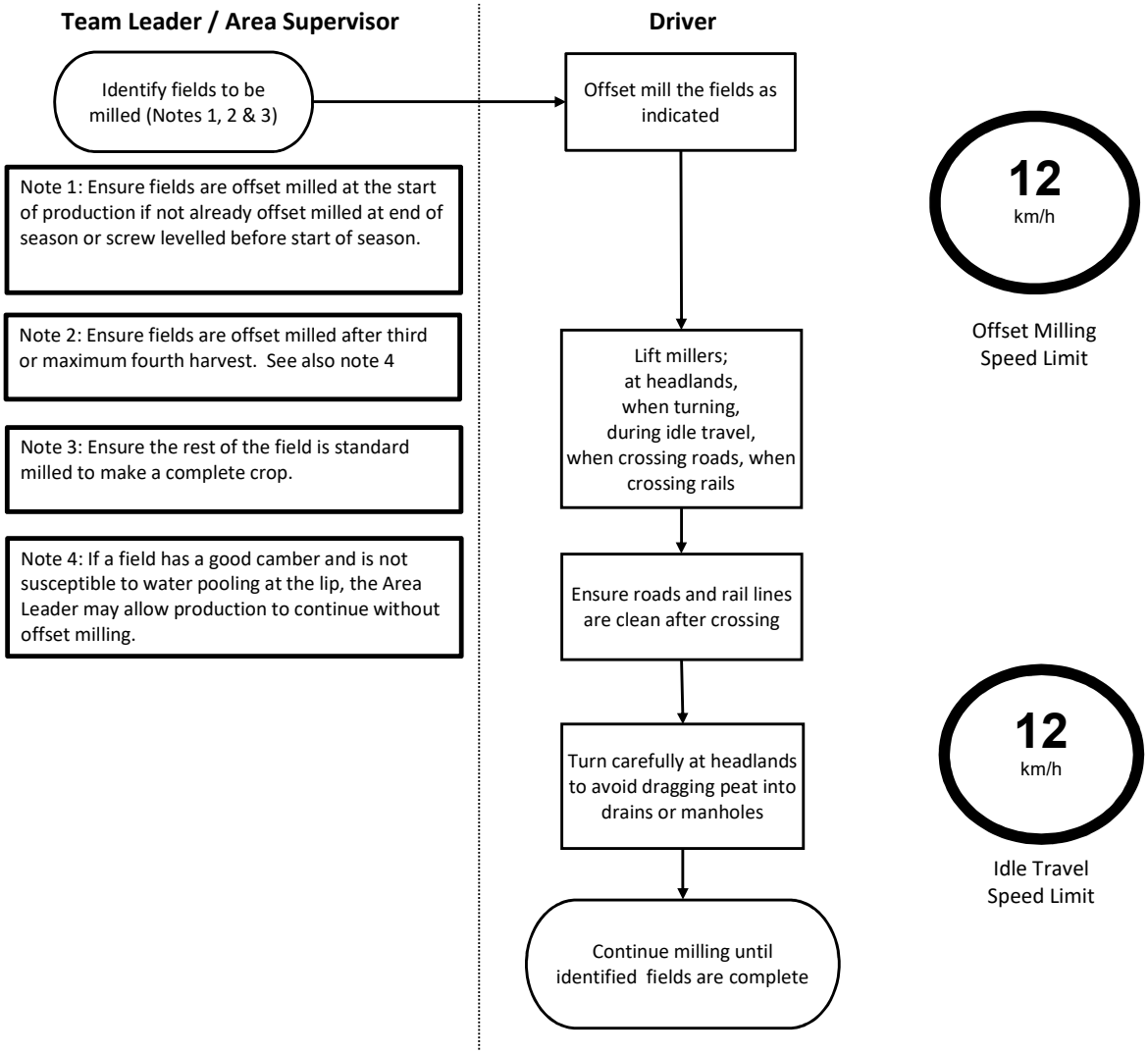
Additional notes

Ensure that machinery is blown down & washed at end of each day

Ensure that production machines are parked after wash down with separation to prevent spread of fire.

Ensure that daily maintenance/safety checks are carried out, with particular attention to guards and fire extinguishers

BORD NA MÓNA Naturally Driven	SOP: FS-PR-04	Rev: 2
Title: Milling (Offset Miller)	**Approved: JMcN**	**Date: 06/11/2015**



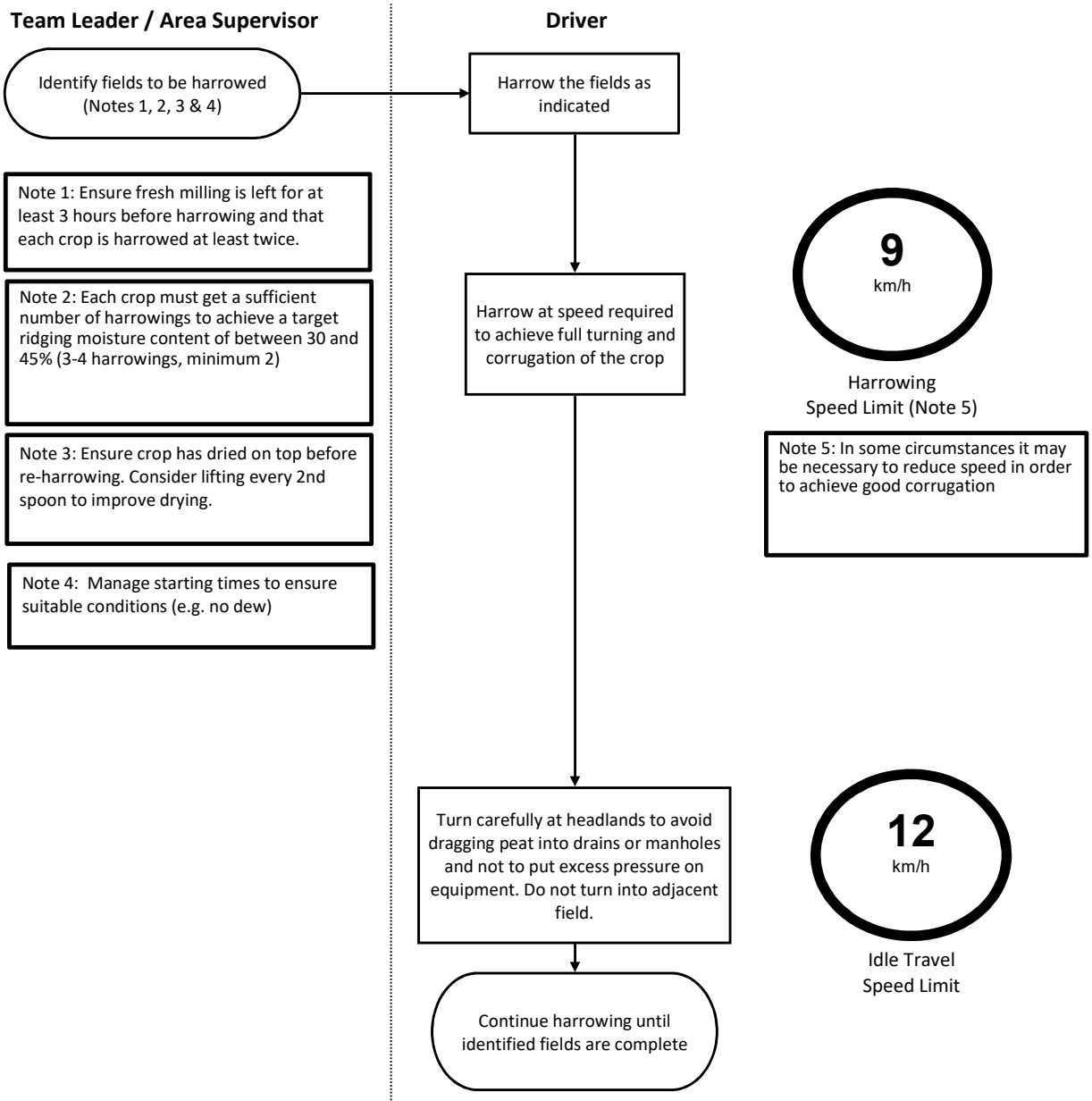
Additional notes

Ensure that machinery is blown down & washed at end of each day

Ensure that production machines are parked after wash down with separation to prevent spread of fire.

Ensure that daily maintenance/safety checks are carried out, with particular attention to guards and fire extinguishers

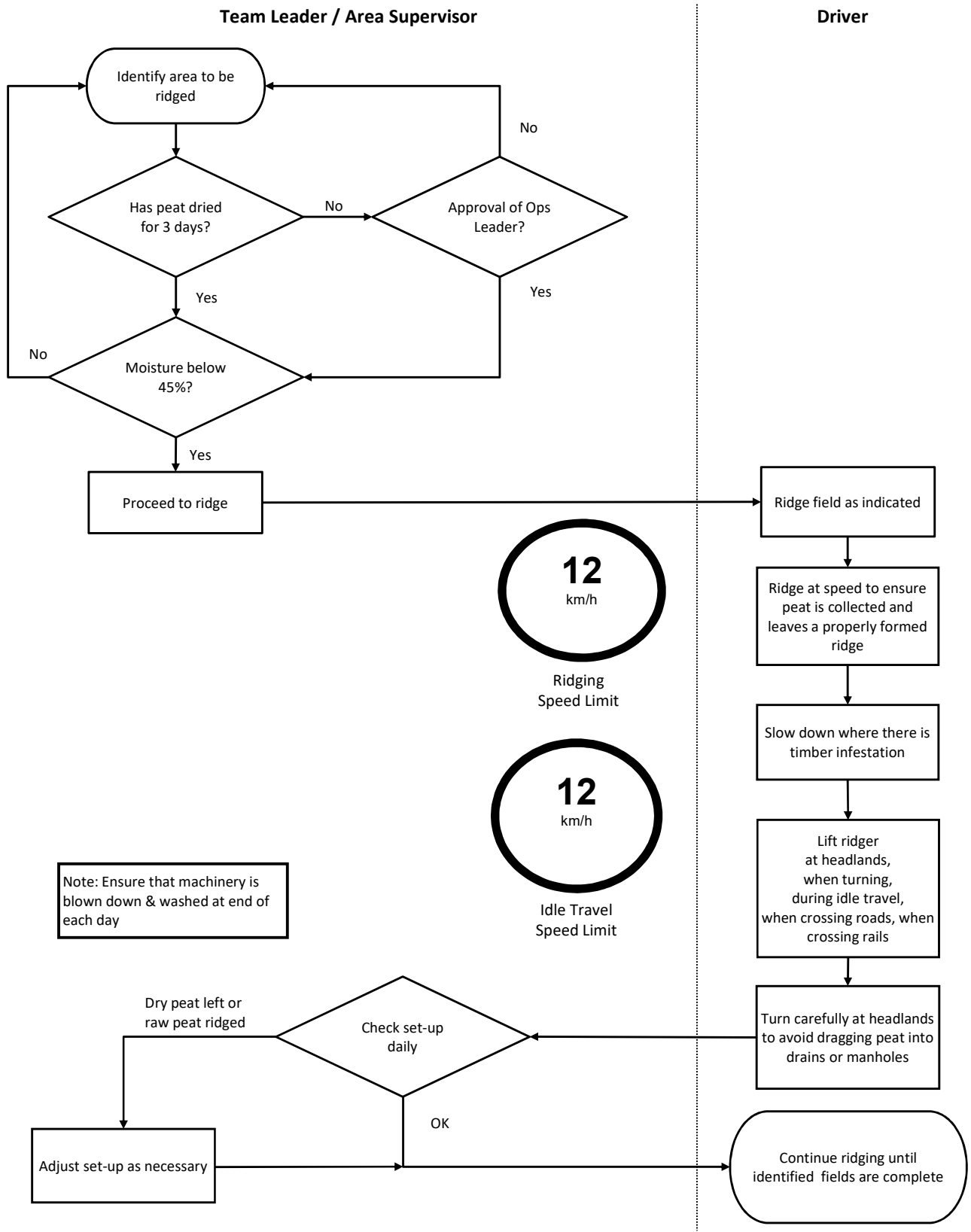
BORD NA MÓNA	SOP: FS-PR-05	Rev: 2
Title: Harrowing	Approved: PR	Date: 26/07/2012



Additional notes

Ensure that machinery is blown down & washed at end of each day
Ensure that production machines are parked after wash down with separation to prevent spread of fire.
Ensure that daily maintenance/safety checks are carried out, with particular attention to guards and fire extinguishers
Lift hydraulic spoons during idle travel, and when crossing roads or rails
Lift standard (non-hydraulic) spoons when crossing roads
Detatch conventional harrows during idle travel.
Maintain slow speeds along headlands.
Routes should be optimised to reduce excess travel to reduce dust.

BORD NA MÓNA Naturally Driven	SOP: FS-PR-06	Rev: 2
Title: Ridging	Approved: PR	Date: 26/07/2012



Additional notes

Ensure that machinery is blown down & washed at end of each day

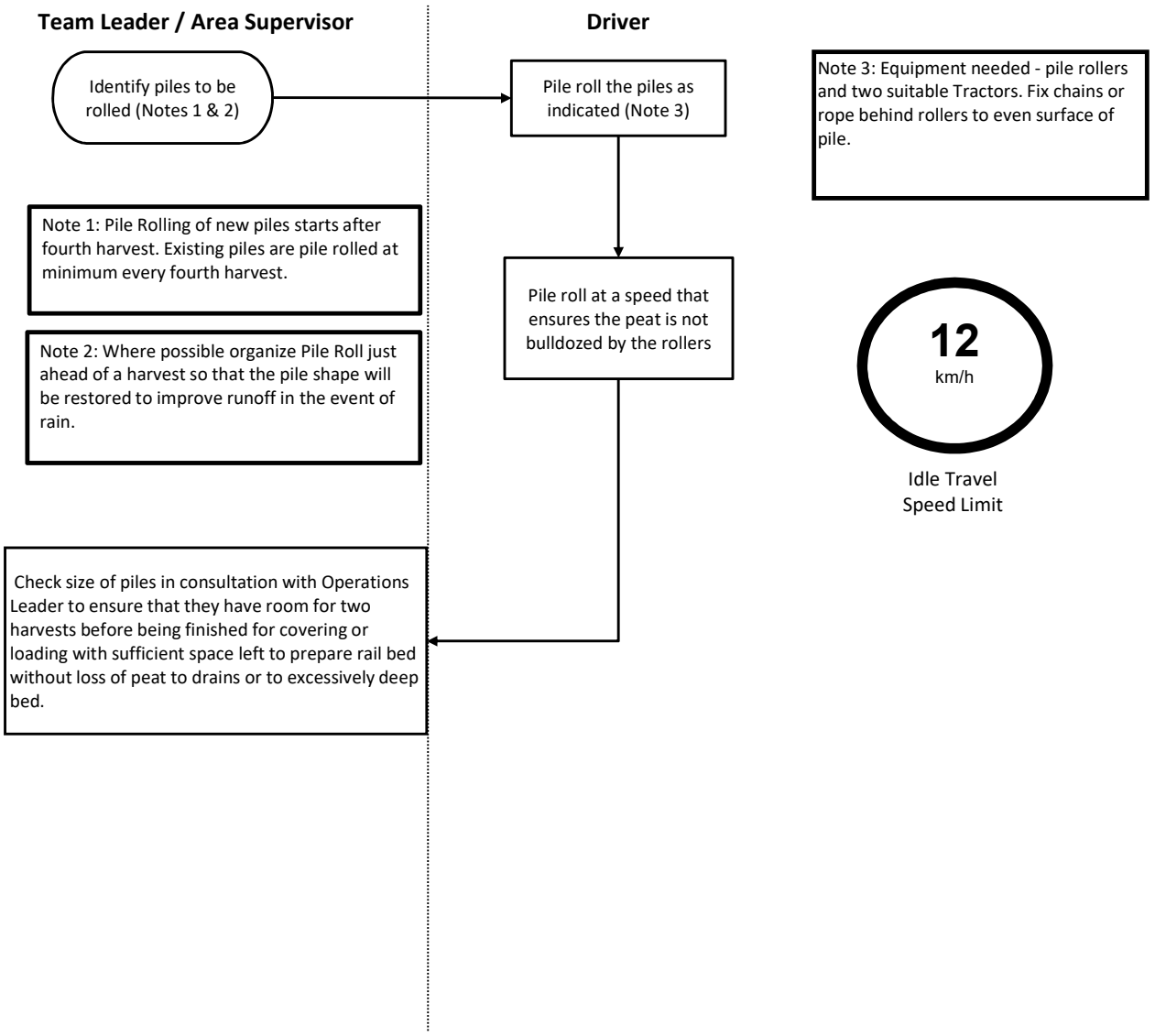
Ensure that production machines are parked after wash down with separation to prevent spread of fire.

Ensure that daily maintenance/safety checks are carried out, with particular attention to guards and fire extinguishers

Lift the blades of the ridger well in advance of leaving the field to avoid pulling peat onto the headland.

Routes to be optimised to avoid excess travel in all areas.

BORD NA MÓNA Naturally Driven	SOP: FS-PR-07	Rev: 1
Title: Pile Rolling	**Approved: PR**	**Date: 26/07/2012**



Additional notes

Ensure that machinery is blown down & washed at end of each day

Ensure that production machines are parked after wash down with separation to prevent spread of fire.

Ensure that daily maintenance/safety checks are carried out, with particular attention to guards and fire extinguishers

BORD NA MÓNA Naturally Driven	SOP: FS-PR-08	Rev: 4
Title: Peco Harvesting	Approved: JMcN	Date: 14/07/2016

Lead Operator

Identify fields to be harvested (Notes 2 and 3)

Note 2: Check set-up of harvester and adjust as required to ensure all peat is picked cleanly and no raw bog is harvested.

Note 3: After the first harvest of a new stockpile, the stockpile location must be verified to ensure agreement with the Production Chart and map. If an error is identified, consult the Operations Leader, who will determine whether to move the stockpile or to amend the Production Chart.

Driver

Harvest the fields as indicated (Note 1)

Note 1: Ensure harvesters have a clear space of at least 100m between machines

Harvest at a speed that ensures all peat is collected, particularly on final lifts

Keep jib low to ground to minimise wind loss

Keep jib as close to the pile as is safe on final lifts. Adjust cowl to ensure pile is formed with one peak

On piles within five crops of being full, offset final lifts to within 5 ft of drain opposite side to be railed. This maximises pile capacity and leaves room for rail bed on optimum side

A full pile should not have a width of more than 34ft, that is within 9ft of the drain on the Rail Bed side

Stop belt at headlands to avoid dragging peat into drains or manholes

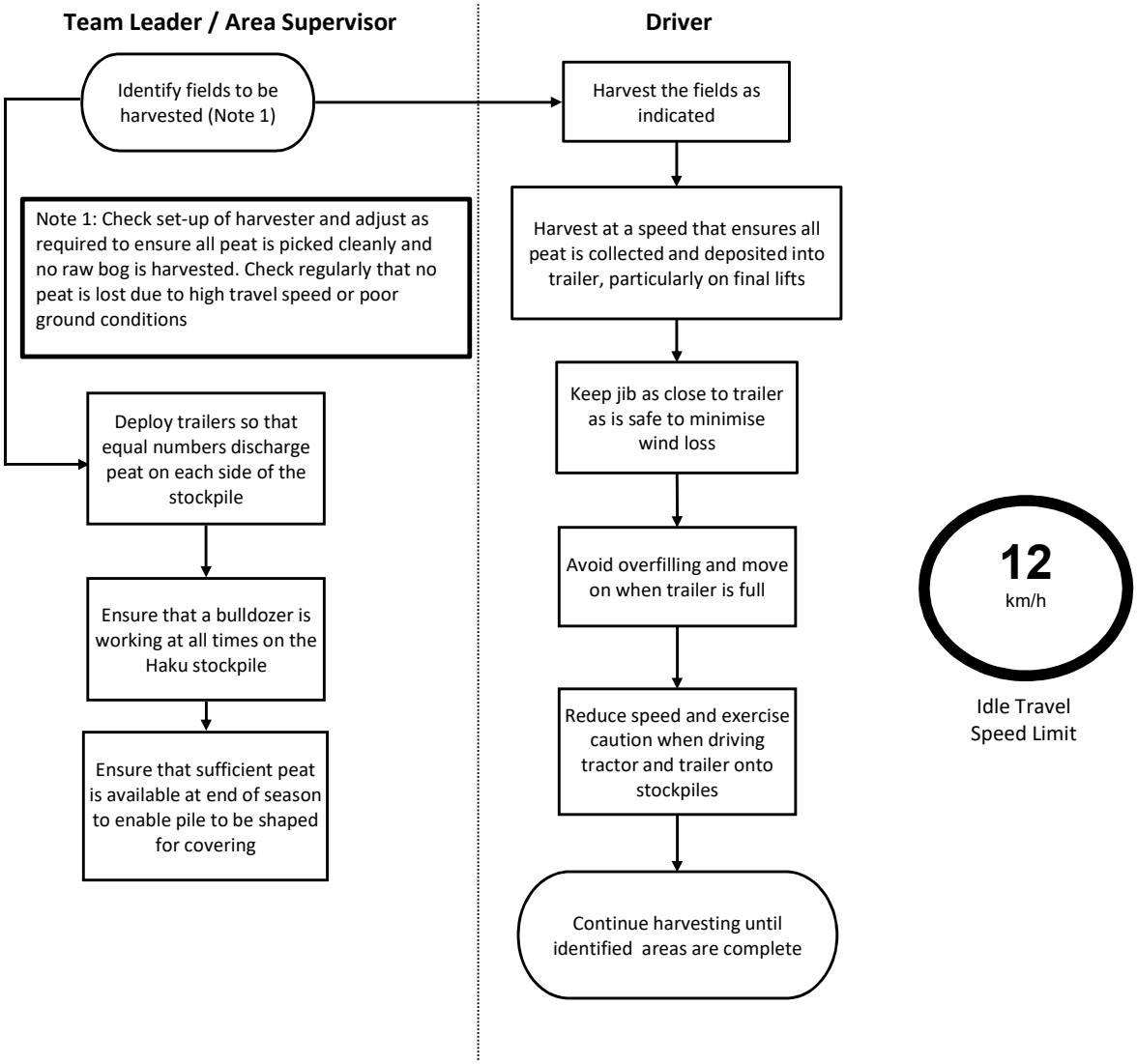
Clean belt on final lift by reversing down pile

Idle Travel Speed Limit

Additional notes

Ensure that machinery is blown down & washed at end of each day
Ensure that production machines are parked after wash down with separation to prevent spread of fire.
Ensure that daily maintenance/safety checks are carried out, with particular attention to guards and fire extinguishers
Routes to be optimised to avoid excess travel in all areas.
Discharge belt prior to exiting production field.
Ensure rubber belt seats are in place.

BORD NA MÓNA	SOP: FS-PR-09	Rev: 2
Title: Haku Harvesting	Approved: PR	Date: 26/07/2012



Additional notes

Ensure that machinery is blown down & washed at end of each day
Ensure that production machines are parked after wash down with separation to prevent spread of fire.
Ensure that daily maintenance/safety checks are carried out, with particular attention to guards and fire extinguishers
Routes to be optimised to avoid excess travelling in all areas
Discharge belt prior to exiting production field.

BORD NA MÓNA Naturally Driven	SOP: FS-PR-10	Rev: 2
Title: Preparation of Production Charts	**Approved: JM**	**Date: 19/11/2014**

1) Purpose

The purpose of this procedure is to describe the general arrangements for deciding on the Production Chart for each milled peat area in Bord na Móna Feedstock Operations.

2) Scope

The scope of this procedure is Milled Peat Production within area of responsibility.

3) Responsibility

The Resource Manager is primarily responsible for this procedure, with input from the Assistant Resource Manager, Civil Data, Operations Leader, A.E.G. Team Leaders and Area Supervisor.

4) Related Documents

Operating Procedures
Production Chart / Production Return form form 016 A/B/C

5) Procedure

During September the Transport Manager will ensure that the Short Term Loading Plan(s) relevant for the works are up to date and include all stockpiles which are scheduled for sale up to the end of December.

During September the Transport Manager will provide the planned sales (tonnes from 12 Month Loading Plan) from each area in the period January to the end of March to the relevant Operations Leaders.

At the end of September each year, Civil Data will issue a map of each bog area to the works. The map will show; all individual production fields including field ID, production length, all existing stock piles including stock in tonnes and tonnes per meter. The map will highlight stockpiles which are scheduled for sale up to the end of December and covered piles.

For each area the Operations Leader, with the Team Leaders, will review and mark up the map. The objective will be to maximise the number of fields per stockpile as far as possible. The review will consider kilos to be removed because of contamination or drainage and these will be marked up on the map. This must be complete before the end of the third week in October.

Where there is an opportunity to increase fields per pile (or any other improvement) by selling particular piles, the Transport Manager will be asked to sell these piles between January and March. A list of these piles will be supplied to the relevant Transport Manager at the end of October **(form 029)**.

Over the Winter period, Civil Data obtain accurate measurements of production fields where the field length is changing. This information along with the map and the draft production chart is inputted into the GIS system.

By the end of February, Civil Data issue for each area an updated map and production chart which includes the official field lengths, updated stockpiles and stock and updated piles scheduled to be sold over the six week period from the beginning of March.

For each area, the Operations Leader, with the Team Leaders, will review the map, and modify the draft production chart based on the updated information including the field lengths provided by Civil Data. This must be complete before the end of the second week in March.

The plan is then reviewed by the Resource Manager and/or the Assistant Resource Manager, and a final production chart is created by the end of the third week in March.

A copy of the final production chart is sent to the Finance Department and Civil Data.

6) Records

Production charts (draft and final)

BORD NA MÓNA	SOP: FS-PR-11	Rev: 1
Title: Updating Production Charts	Approved: PR	Date: 27/02/2013

1) Purpose

The purpose of this procedure is to describe the arrangements for updating Production Charts and starting new stockpiles in Bord na Móna Feedstock Operations.

2) Scope

The scope of this procedure is Milled Peat Production within area of responsibility.

3) Responsibility

The Operations Leaders is primarily responsible for this procedure, with input from the Team Leaders and Area Supervisors, and approval from the Assistant Resource Manager or Resource Manager.

4) Related Documents

Operating Procedures
Production Chart / Production return form form 016 A/B/C

5) Procedure

Updating Production Charts

The Team Leader / Area Supervisor is responsible for anticipating the requirement to update the production chart. This must be done at least 10 days before the change is due to take effect.

The Team Leader / Area Supervisor must meet with his Operations Leader to agree the proposed change(s), including the starting of any new stockpiles.

The Operations Leader amends the production chart with the proposed change(s).

The Operations Leader must obtain the approval of the Assistant Resource Manager before implementing the change(s). Where the change is approved, the revision level of the plan is identified through the date. Where appropriate, and in particular where the early sale of a pile will improve bog layout, the Assistant Resource Manager should consult with the Transport Manager and arrange for that sale.

A copy of the amended plan will be e-mailed to Civil Data, the Transport Manager, and Feedstock Finance.

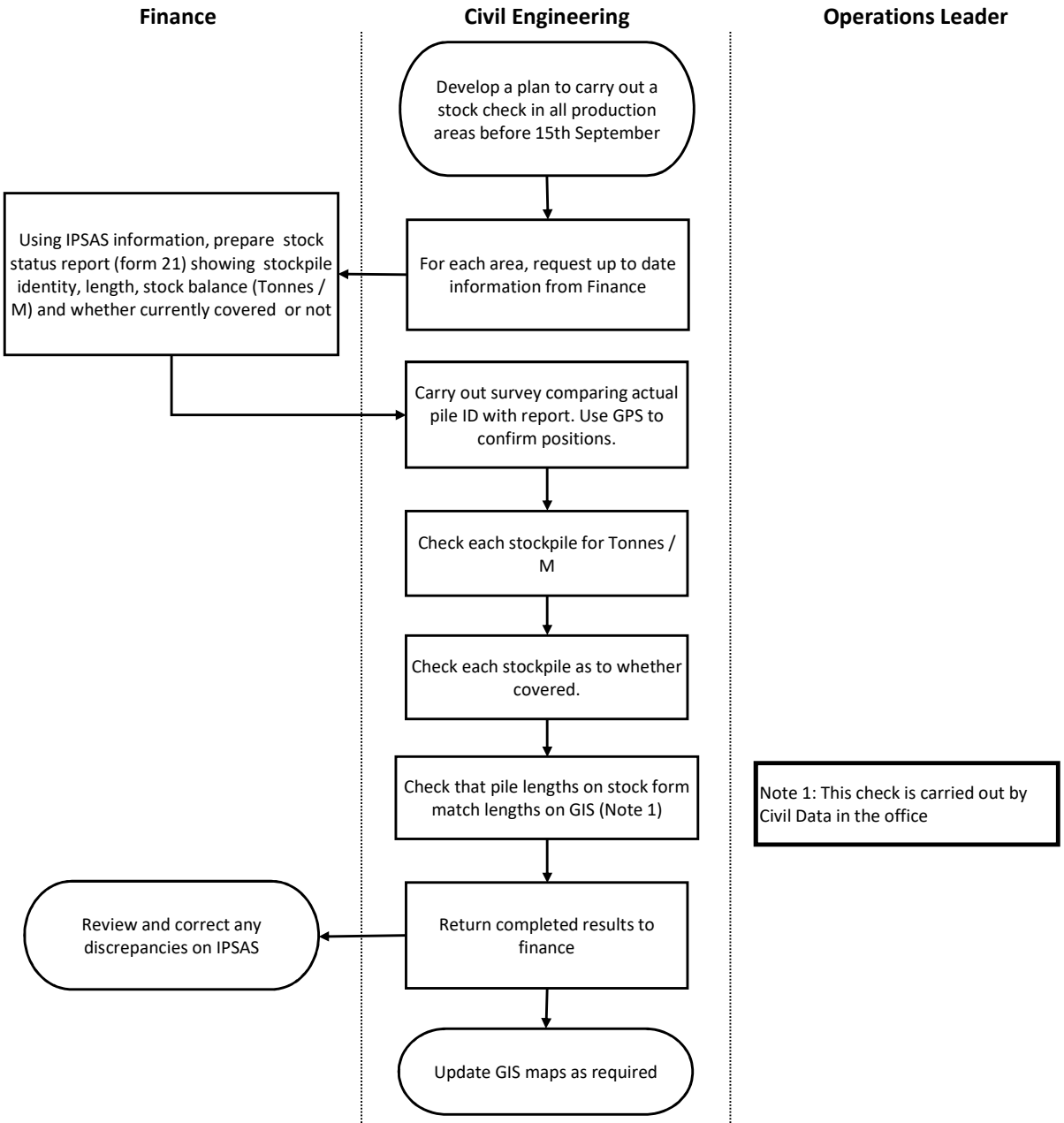
A hard copy of the amended production return form 16A/B/C will be distributed to the Team Leader / Area Supervisor.

6) Records

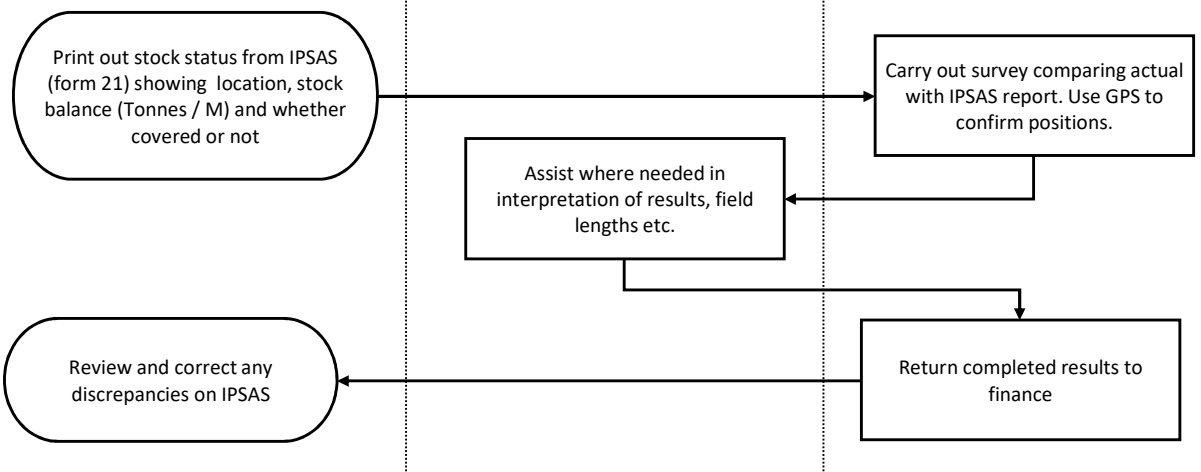
IPSAS records

BORD NA MÓNA	SOP: FS-PR-12	Rev: 1
Title: Stockpile Inventory	Approved: PR	Date: 27/02/2013

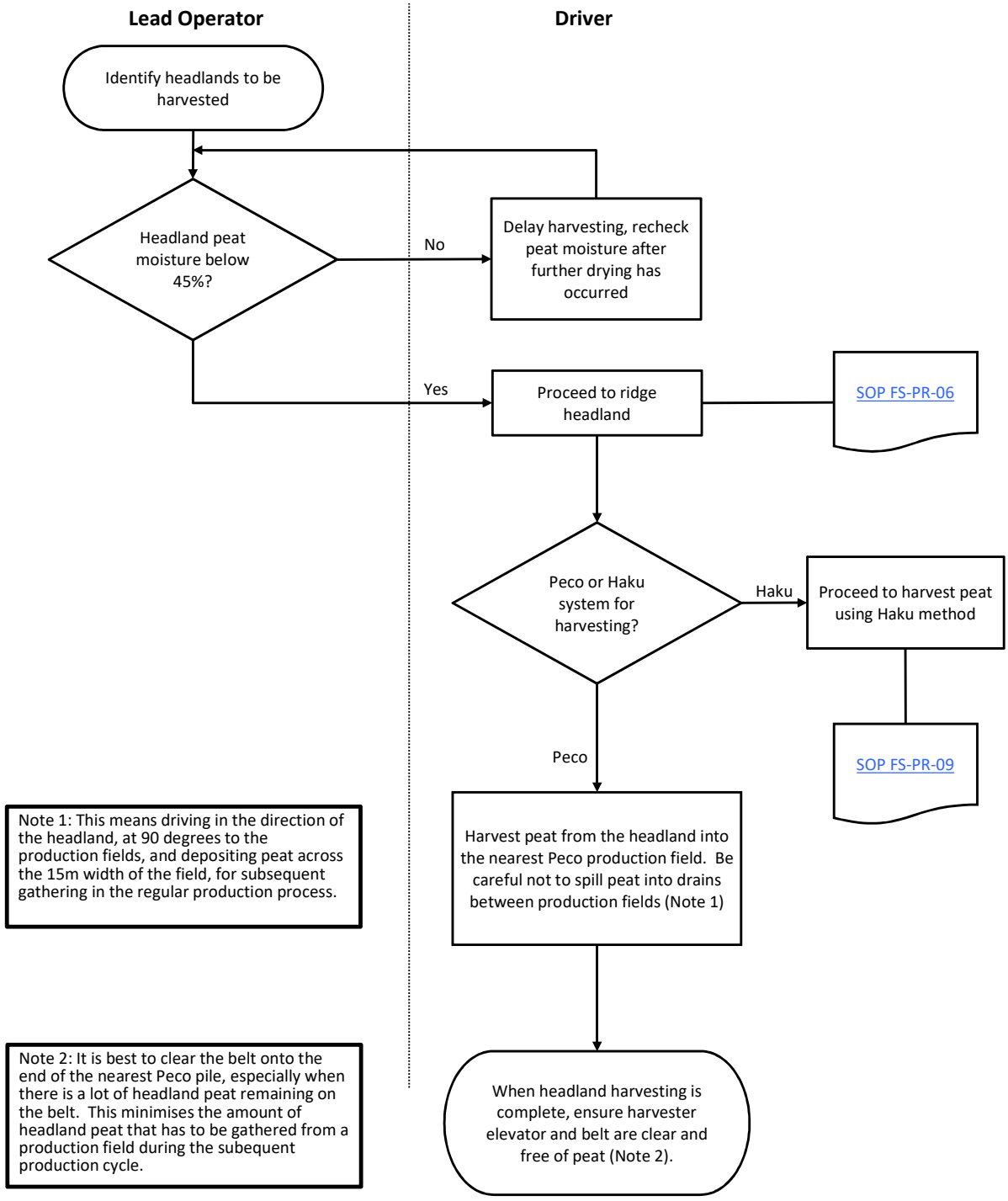
1) First Stock Check



2) March Stock Check



BORD NA MÓNA Naturally Driven	SOP: FS-PR-13	Rev: Draft
Title: Headland Harvesting	Approved: JMcN	Date: 12/05/2016



Additional notes

Ensure that machinery is blown down & washed at end of each day

Ensure that production machines are parked after wash down with separation to prevent spread of fire.

Ensure that daily maintenance/safety checks are carried out, with particular attention to guards and fire extinguishers

BORD NA MÓNA Naturally Driven	SOP: FS-PR-14	Rev: 1
Title: Stockpile Survey with Trimble Yuma 2 Tablet	**Approved: JMcN**	**Date: 09/06/2016**

1) Purpose
The purpose of this procedure is to describe how to conduct a stockpile survey using the Trimble Yuma 2 (stockpile survey) tablets

2) Scope
The scope of this procedure is Milled Peat Production within area of responsibility.

3) Responsibility
Civil Data, Head of Bog Operations, Bog Operations Managers, Bog Operations Area Leaders

4) Related Documents
IPSAS Stockpile reports

5) Procedure
1. Switch on the tablet (green button at bottom right of device) and if prompted, input the password (password is BOORA, all capitals)

2. In most cases the tablet will default open to the maps application. If the desktop screen appears, select the ArcPad 10 (maps) application

3. The tablet may take a minute or two to locate the user, A "no fix error" message will appear until the position is located.

4. Go to the end of a stockpile, and tap the satellite icon (top left of the screen):

5. An attribute box/pop-up window will appear, press the dark green **OK** button

6. Repeat steps 4 and 5 for every survey location

7. If the tablet goes into "sleep mode", tap the screen with the stylus to power back up the screen

8. All survey results are automatically saved. Once the survey has been complete, turn off the tablet, recharge its battery using the charger provided, and contact Civil Data or the Quality Manager for instructions to return the tablet

9. Civil data will download the survey results. Where data is missing or incomplete, Civil Data will liaise with the relevant user and seek an extra survey. Civil data will cross check stock pile chart names and actual ground locations. Results will then be issued to Peat Division management.

6) Records
IPSAS Stockpile reports, Civil Data GIS database

BORD NA MÓNA Naturally Driven	SOP: FS-PR-15	Rev: 3
Title: Ridge Sampling	Approved: JMcN	Date: 03/08/2016

1) Purpose

The purpose of this procedure is to describe the arrangements for ridge sampling by the Area Leaders during production.

2) Scope

The scope of this procedure is Milled Peat Production within area of responsibility.

3) Responsibility

The Bog Operations Area Leader is responsible for this procedure.

4) Related Documents

Operating Procedures

Daily Key Production Check Sheet form 22/23

5) Procedure

Each day when ridging is taking place, the Area Leader must sample two ridges. These ridges can be from any of his areas, but the Area Leader must ensure that all of his areas are sampled roughly equally in any one week*. The Area Leader should decide (based on his knowledge of the area), whether a single sample, or a blended sample, is required.

**For example, Area Leader 1 has three production areas. On production day 1, he samples one ridge in area 1 and one ridge in area 2; on production day 2, he samples one ridge in area 3 and one ridge in area 1; on production day 3 he samples one ridge in area 2 and one ridge in area 3.*

Samples must be a minimum of 500g, and must be stored in sealed and labelled plastic bag.

The Area Leader must ensure that the samples are tested for moisture content (either in the lab, or using an Ohaus monitor), and results are recorded on form 22/23

6) Records

Form 22

BORD NA MÓNA Naturally Driven	SOP: FS-PR-16	Rev: Draft
Title: End of Production Season Procedure	**Approved: EMcD**	**Date: 14/10/2016**

1) Purpose

The purpose of this procedure is to describe end of Production Season activities

2) Scope
The scope of this procedure is Milled Peat Production within area of responsibility.

3) Responsibility
Head of Bog Operations, Bog Operations Managers, Bog Operations Area Leaders and Compliance Department.

4) Related Documents
IPC Licences

5) Procedure
1. To minimise silt runoff, ensure:
a) Flood prone production fields are cleared of milled peat or else recompacted
b) Other production fields that have been milled have been ridged.
c) ALL loose peat on headlands is ridged up to a location on the headland margins, secured against washing into drains.

2. Wrap all stripped polythene and deposit at hard stand/designated collection area for removal

3. Ensure all barrels and grease drums are returned to the bunded lock up.

4. Gather up and dispose of waste in the skip or bin provided

5. Gather up any remaining polybrane and store for reuse or removal

6. Gather up and stockpile any scrap rail or metal for collection by waste contractor

7. Ensure tractors and machinery are parked in deisgnated areas, set apart to minimise risk of fire damage

8. Ensure tea centres, compounds, bunded storage and machinery are locked and secured.

9. Where primary sepric tanks are used, check tank level and arrange sludge disposal if necessary

6) Records
Bog Maintenance form 020

BORD NA MÓNA Naturally Driven	Procedure: 001	Rev: 7
Title: Document Control	**Approved: JM**	**Date: 26/10/2016**

1) Purpose

The purpose of this procedure is to describe the arrangements in Bord na Móna Peat Division for document control.

2) Scope

The scope of this procedure is as follows:

a) The documents associated with the Quality Management System, Environmental Management System and the Energy Management System
b) Customer specifications
c) Engineering drawings
d) Safety Data Sheets

3) Related Documents

Bord na Móna Peat Quality Management System (QMS) documents
Bord na Móna Peat Energy Management System (EnMS) documents
Bord na Móna Peat Environmental Management System (EMS) documents

Customer specifications
Engineering drawings
Safety Data Sheets

4) Procedure

The QMS, EMS and the EnMS are electronic. All QMS, EMS and EnMS documents are password controlled so that they can only be amended by the responsible person or a designated deputy. Copies of documents may be printed off at any time for training or review purposes. These are defined as uncontrolled copies, and must be destroyed after use. Where there is limited access to the IT system, the Area Leader may retain a paper version of relevant SOPs, but is responsible for their updating. Whenever SOPs are updated, the Quality Manager will send an updated version to all Managers and Area Leaders, who will then update any paper copies held.

All QMS, EMS and EnMS documents, including amendments to same, are approved by the responsible person, depending on the nature and level of the document. Records of approval can be by signature, or by email or other traceable electronic method. In order to maintain consistent best practice, changes to SOPs must be approved by the Heads of Environment/H&S, Supply Chain, Bog Operations, and/or Asset Management, as appropriate. This is done by sending an email for comment to the relevant approver with a copy of the draft amended SOP(s) attached. Approval is assumed in the absence of any comment by the date stated in the email. This method of approval may also be used for other QMS/EMS/EnMS documents at the discretion of the Quality Manager. As far as possible, copies of superseded Quality manual, Environmental manual and Energy manual chapters, procedures, flowcharts and SOPs are retained in an archive file within the PQMS Shared drive.

Customer specifications are built into contracts. The master copies are maintained by Bord na Móna Legal in Newbridge.

Engineering drawings are the responsibility of Technical Services, who issue updated drawings to the workshop. The workshop may retain marked copies of obsolete drawings for reference in connection with older machinery still in use. Safety data sheets are obtained by Procurement as part of the tendering process. Suppliers are held responsible for informing Procurement of any changes. Copies of relevant safety data sheets are available in stores, and copies are updated by Procurement after any change.

If Bord na Móna personnel need to refer to any statutory or regulatory document, they are required to check the latest version on line. There is therefore no need to retain paper copies of such documents.

5) Records

Evidence of approval (electronic)
Archive files

Revision Index			
Revision	Date	Description of change	Approved
1	01/12/2012	First release	PR
2	02/12/2013	Added reference to form 24	JM
3	17/10/2014	Amended approval arrangements and added safety data sheets	JM
4	27/04/2016	Added reference to retention of obsolete drawings	JM
5	21/07/2016	Change to job titles, organisation name, removed ref to controlled copies	JM
6	18/08/2016	Inclusion of Energy Management System	JM
7	26/10/2016	Inclusion of paper copy control by Area Leaders	JM
8	12/01/2018	Integration of Environmental System	SG

BORD NA MÓNA Naturally Driven	**Procedure: 002**	**Rev: 3**
Title: Record Control	**Approved: JM**	**Date: 18/08/2016**

1) Purpose

The purpose of this procedure is to describe the arrangements in Bord na Móna Peat Division for record control.

2) Scope

The scope of this procedure is as follows:

- Records required by the Bord na Móna Peat Division Quality system and Energy system.
- Additional Records required by the business.

3) Procedure

Records maintained by the organisation, and their locations and retention periods, are defined in the table below.

Record	Paper / Electronic	Location	Retention period
Management review	E	Quality files	5 years
Personnel files (competence)	P/E	General office	Length of service + 2 years
Inspection and test results	P/E	Relevant works	5 years
Sales documents	P/E	General office	7 years
Supplier / subcontractor ratings	E	System	3 years
Corrective action requests	P/E	Quality files	3 years
Corrective action log	E	System	3 years
Calibration records	P/E	Quality files	5 years
Internal audit reports	P/E	Quality files	3 years
Internal audit schedules	E	Quality files	3 years
Non-conforming product records	P/E	General office	3 years
Concession requests	P/E	Quality files	3 years
Concession log	E	System	3 years
Purchase orders	E	System	7 years
Energy audits, NCs	E	Energy files	7 years
Energy Management Reviews	E	Energy files	7 years

The person responsible for retaining each of the above records must ensure that they are kept in such a way that they remain legible, identifiable and retrievable.

A full system back-up is carried out daily by the IT department in Bord na Móna head office.

At the end of the specified retention period, the responsible person may dispose of those records. They may be retained longer at the disposition of the responsible person.

Revision Index			
Revision	Date	Description of change	Approved
1	01/12/2012	First release	PR

-	12/09/2014	Reviewed	JM
2	21/07/2016	Change to org name, amended Paper/Electronic Records, record retention	JM
3	18/08/2016	Inclusion of ref to Energy Management System	JM

BORD NA MÓNA Naturally Driven	Procedure: 003	Rev: 4
Title: Internal Audit	Approved: JM	Date: 18/08/2016

1) Purpose

The purpose of this procedure is to describe the arrangements in Bord na Móna Peat Division for internal audits.

2) Scope

The scope of this procedure is the requirements of the Bord na Móna Peat Division Quality Management System and Energy Management System.

3) Related Documents

Internal audit schedule form 009.
Internal audit checklist form 006.
Internal audit form 007.
Multi-pillar audit form 031

4) Procedure

The Bord na Móna Peat Quality Manager is responsible for drawing up the QMS audit schedule (form 009) and the EnMS audit schedule form EMF 07. This is done at least annually. The results of previous audits, and the importance of the process(es) being audited are taken into account when drawing up the schedules. The schedules cover all areas of the organisation, and all clauses of the Bord na Móna Peat Division Quality manual and Energy manual.

Audits may be carried out using a pre-prepared checklist (form 006), by following a specific procedure or work instruction, or by tracing a particular product item through the entire product realization process. Multi-pillar audits are carried out using form 031. Audits must be carried out by competent auditors, and auditors must not audit any area for which they are directly responsible.

All non-conformities identified during internal audits are followed up with the arrangements in procedure 005. Ensuring timely response and the verification of actions taken is done through the corrective action process and follow up audits.

The results of internal audits are summarised at least annually by the Quality Manager as an input to the management review process.

Each section of the Quality manual, the Energy manual, each quality procedure, and each energy procedure, is reviewed at least once per year by the Quality Manager to ensure its continued accuracy and relevance. Records of these reviews are kept in the associated indexes.

5) Records

Internal audit reports
Completed internal audit schedules

Completed corrective action requests

Revision Index			
Revision	Date	Description of change	Approved
1	01/12/2012	First release	PR
-	12/09/2014	Reviewed	JM
2	21/07/2016	Change to job titles, organisation name	JM
3	02/08/2016	Ref to multi pillar audit – tracking system	JM
4	18/08/2016	Inclusion of energy Management System	JM

BORD NA MÓNA Naturally Driven	SOP: FS-HO-01	Rev: 2
Title: Hort Bogs - General	Approved: PMcK	Date: 28/07/2016

1) Purpose
The purpose of this procedure is to describe the differences (from standard Peat Division requirements) in the operation and maintenance of horticultural bogs

2) Scope
The scope of this procedure is Peat Division Horticultural team within area of responsibility.

3) Responsibility

Hort Customer Delivery Manager, Hort Area Leaders, Hort Lead Operators

4) Related Documents
FS-HO-02
FS-HO-03
FS-HO-04
FS-HO-05

5) Definitions
There are four outlets for peat from horticultural bogs. These are RHP; Professional; Non-professional; and fuel.

Professional - Low density, low weed content peat that has been designated for sale to the professional market

RHP - Professional Grade horticultural peat that has been approved by an RHP auditor as suitable for sale to RHP market.

Non-professional grade horticultural peat - Intermediate density and weed content, suitable for the non-professional market

Fuel from horticultural bogs - Any peat that does not meet the above standards may be sold as fuel, provided it meets the density and moisture requirements. For any other peat, refer to the non-conformance Procedure 004.

6) Procedure

Additional requirements for bog maintenance and operations on Horticultural bogs include the following:
1. Additional requirements for bog maintenance include: Identification of a buffer zone, identification of RHP zones; and maintenance of boundaries. Ref FS-HO-02.
2. All weeds and debris (including scrap polythene, concrete pipes, etc), must be removed and disposed of off-site. This must be carried out year round, reference FS-HO-03
3. Weeds and density must be controlled as per procedure FS-HO-04
4. The temperature of stockpiled horticultural peat must be monitored and reported as per procedure FS-HO-05

7) Records
Records required are described in the relevant procedures

BORD NA MÓNA	SOP: FS-HO-02	Rev: 1
Title: Hort Bogs - Bog Maintenance	Approved: SG	Date: 23/07/2014

1) Purpose

The purpose of this procedure is to describe the differences (from standard Feedstock requirements) in the maintenance of horticultural bogs

2) Scope

The scope of this procedure is Feedstock Horticultural team within area of responsibility. This procedure is in force throughout the year, including in the production season

3) Responsibility

Hort Resource Manager, Assistant Resource Manager**,** Operations Leader, A.E.G. Team Leaders and Area Supervisor.

4) Related Documents

FS-HO-01
RHP Module 560 - Peat Horticulture

5) Procedure

Identification of a buffer zone. Buffer zones are in place to delineate RHP from non-RHP areas. The extent of these buffer zones is 10m, or as described in RHP Module 560 - Peat Horticulture

Identification of RHP Zones: RHP zones are to be clearly identified on maps located in the relevant bog areas, and by using RHP-approved markers on the ground.

Maintenance of Boundaries: Boundaries of RHP bogs are to be maintained with buffer zones to minimise risk of transfer of seed/weeds, and to minimise risk of debris contamination. Boundaries must be maintained in such a way as to prevent the transfer of extraneous material into RHP areas.

BORD NA MÓNA	SOP: FS-HO-03	Rev: 1
Title: Hort Bogs - Bog Housekeeping	**Approved: SG**	**Date: 23/07/2014**

1) Purpose
The purpose of this procedure is to describe the differences (from standard Feedstock requirements) in the housekeeping of horticultural bogs

2) Scope
The scope of this procedure is Feedstock Horticultural team within area of responsibility.

3) Responsibility
Hort Resource Manager, Assistant Resource Manager**,** Operations Leader, A.E.G. Team Leaders and Area Supervisor.

4) Related Documents
FS-HO-01
RHP Module 560 - Peat Horticulture
Form 26

5) Procedure
Operations procedures should be conducted in such a manner as to minimise contamination by viable weeds. This particularly applies to buffer zones, where precautions should be taken to avoid dragging weeds and other debris by moving plant.

The Team Leader/Area Supervisor should check the Horticultural site paying particular to any possible issues with weeds, contamination, and any other debris. This should be carried out at least weekly during the production season, and at least monthly during the non-production season.

Particular note is to be paid to Rushes, Sheep's Sorrel, P Moorgrass, and R Willowherb. For further information, see the Bord na Móna/RHP poster on display in relevant tea centres.

The Team Leader/Area Supervisor should check for

- weed growing on the site and in the surroundings (buffer zone)
- stones
- wood
- liquids such as fuel, oil, etc
- concrete pipes
- other waste

If weed or pollutants are found, the Team Leader/Area Supervisor ensures that the weeds or pollutants are removed and the area is cleaned

Where weed is found the supervisor must ensure that any products, tools or facilities which were in contact are cleaned.

A record of the check is maintained on the Housekeeping check list (Form 026)

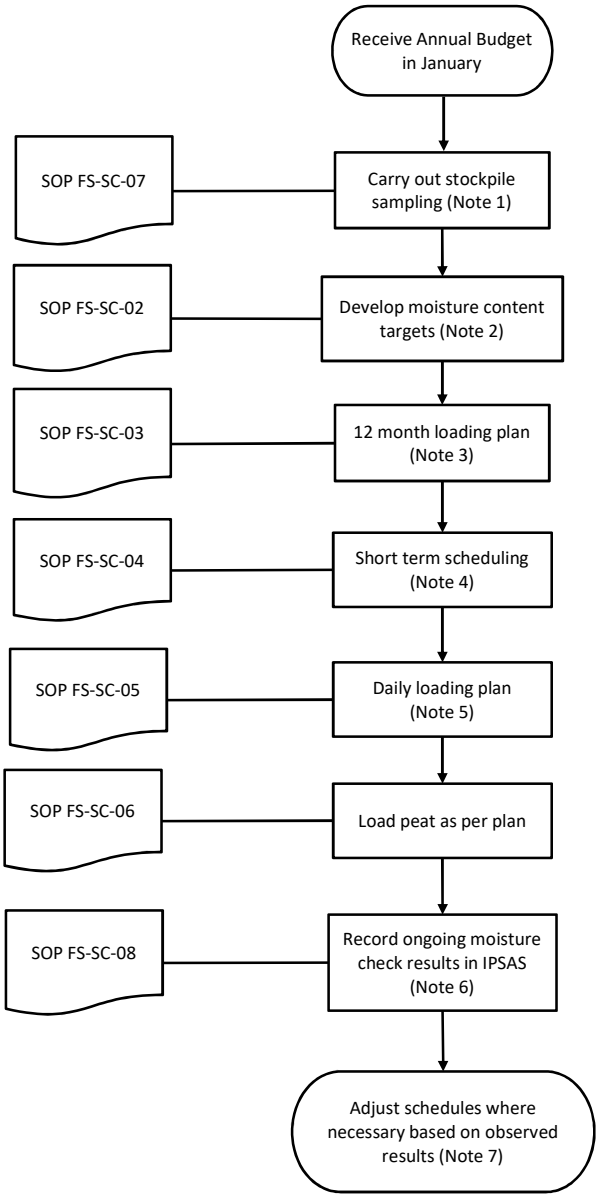
Note the use of herbicides is not permitted

BORD NA MÓNA
Naturally Driven

Bog Operations Compliance Check List

								Compliant											
										v		v		v		v			
Compliance Description	**Owner/Responsibility**	**Reporting to**	**Saved to**	**Form/Record/SOP**	**Frequency**	**Evidence**	**Comments**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Ensure Rail Plan is followed	Eamonn Mulhall - Ignatius Kelly - Kevin Harte			FS-SC-10	Weekly			yes	yes	yes	yes	yes	yes	yes	yes				
Ensure Stockpiles are opened/cut/railed according to rail plan	Level 5			FS-SC-10	Weekly														
Inspect Silt Pond	Level 5			FS-BM-07	Fortnightly														
Complete Bog Maintenance Report for previous month	Level 5				(Nov-May)														
Report Bog Maintenance Plan for previous month	Eamonn Mulhall - Ignatius Kelly - Kevin Harte	John McNiff		FS-BM-02	Monthly														
Work off Bog Maintenance Plan - complete previous month's work programme	Level 5			FS-BM-02	Monthly														
Approve and issue production charts	Eamonn Mulhall - Ignatius Kelly - Kevin Harte			FS-BM-02	March														
Complete stockpile location check	Level 5	Finance		FS-PR-12	March														
Complete Polythene order form	Eamonn Mulhall - Ignatius Kelly - Kevin Harte	Materials Manager		FS-SP-03 and Form 18	April														
Complete Pre-Production checks	Level 5	John McNiff		FS-PR-01	April														
Complete Key Production checks	Level 5	John McNiff		FS-PR-01 and Form 22/23	Apr-Sep														
Report Key Production checks	Eamonn Mulhall - Ignatius Kelly - Kevin Harte	John McNiff		FS-PR-01 and Form 22/23	Apr-Sep														
Ensure stores has a stock of 13m rolls for early covering	Level 5			FS-SP-01	May														
Receive form 19 from Supply Chain	Eamonn Mulhall - Ignatius Kelly - Kevin Harte	Level 5 Bog Ops			July														
On non-Harvesting days, cover full stockpiles	Level 5			FS-PR-01 / FS-SP-09 and Form 19	Aug-Sep														
Plan Covering Programme	Eamonn Mulhall - Ignatius Kelly - Kevin Harte			FS-PR-01 and Form 19	September														
When end of season is called, cover all piles	Level 5			FS-PR-01 and Form 19	September														
Complete post-production stock check	Level 5			FS-PR-01	September														
Agree Bog Maintenance plans	Eamonn Mulhall - Ignatius Kelly - Kevin Harte			FS-BM-02	September														
Cover all piles	Level 5			FS-SP-05 / FS-SP-06 and Form 19	October														
Inform Supply Chain of any piles needing to be sold (eg. Heating peat)	Eamonn Mulhall - Ignatius Kelly - Kevin Harte	Supply Chain		FS-SP-10	October														
Return unused polythene to stores	Level 5			FS-SP-03 / FS-SP-04	October														
Report Bog Maintenance Plan for Management Review	Eamonn Mulhall - Ignatius Kelly - Kevin Harte	John McNiff			May														
Process performance for Management Review (incl. summary of form 23 issues)	Eamonn Mulhall - Ignatius Kelly - Kevin Harte	John McNiff		Form 23	Nov														
<Add additional key business activity.>																			
<Add additional key business activity.>																			
<Add additional key business activity.>																			

BORD NA MÓNA Naturally Driven	SOP: FS-SC-01	Rev: 2
Title: Scheduling Flowchart	**Approved: PR**	**Date: 29/07/2014**



Note 1: Stockpile sampling will be carried out on all stockpiles with greater than 2 tonnes per meter at the end of each production season

Note 2: Management determine tonnes and moisture requirements by month for each customer

Note 3: Monthly schedule to be agreed by area and customer

Note 4: Information from customers and from stock are used to develop plans for stripping and laying of rails

Note 5: Information from stockpiles and expected lorry movements are used to design a delivery schedule which meets the quality targets.

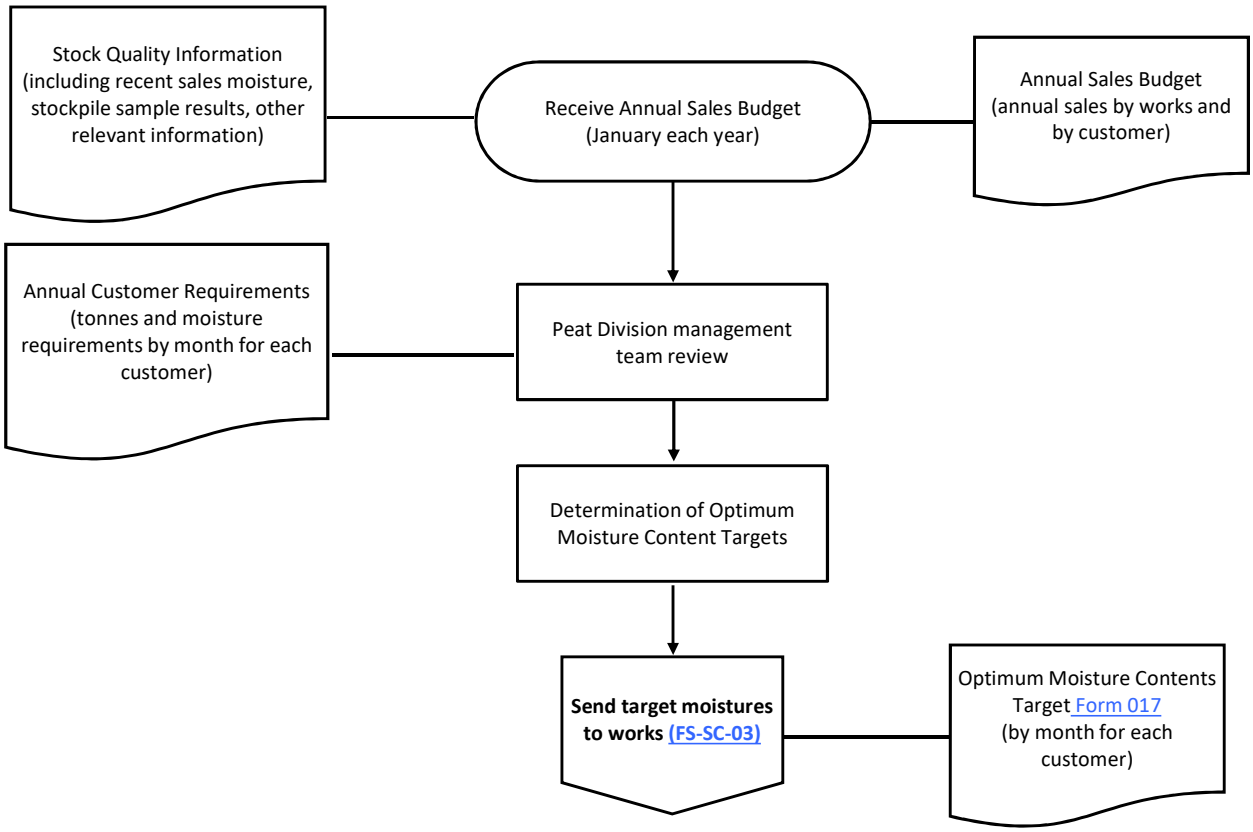
For power stations the "Daily Loading Planner" spreadsheet is used.

For briquette factories the "Blend Loading Planner" spreadsheet is used.

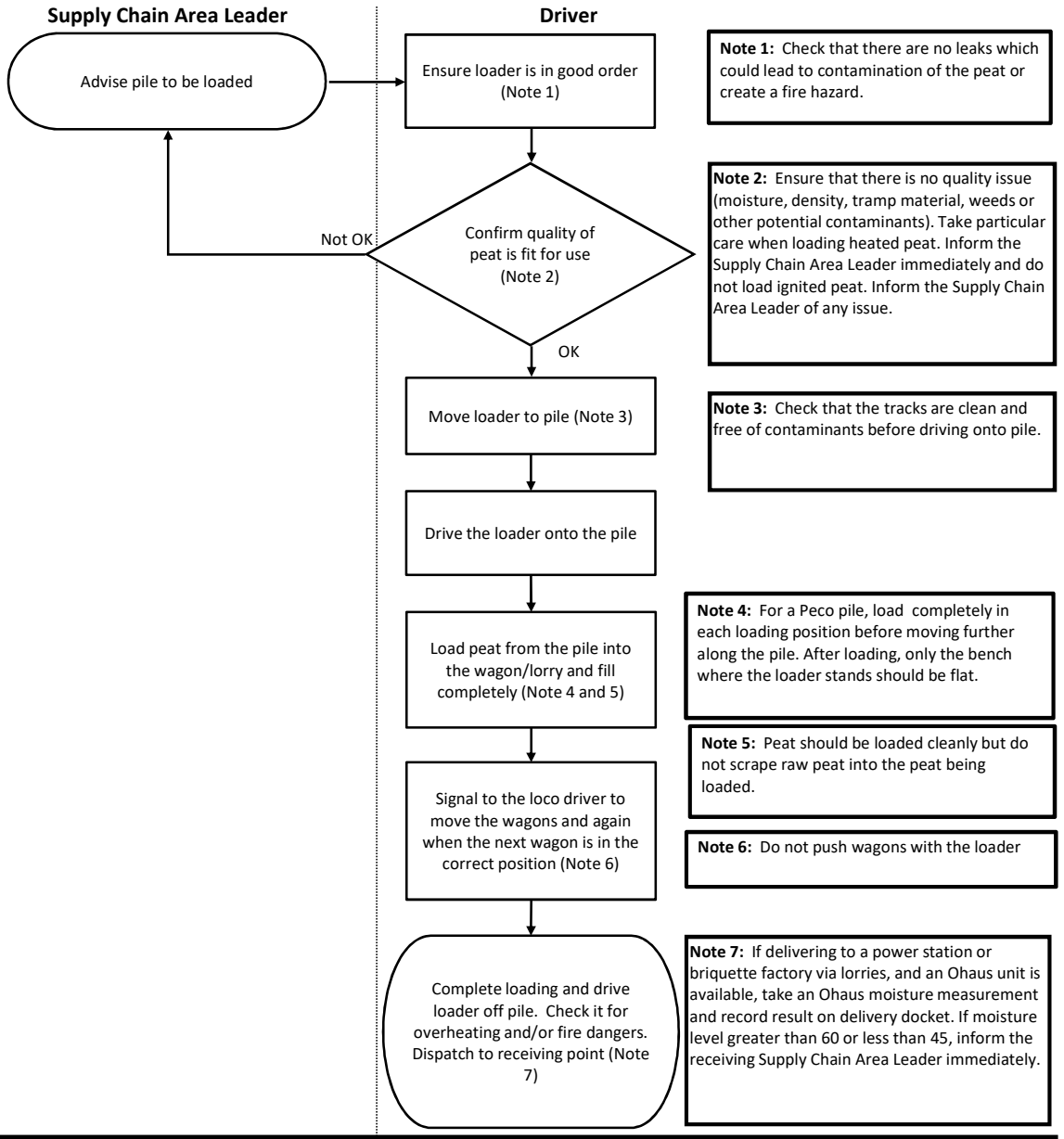
Note 6: Ohaus measurements must be taken at all points of deli very of rakes. Where there is no auto sampler, take a 1 litre sample from a depth of 2 feet into the centre wagon.

Note 7: Moisture control (General) - There are 3 sources of information regarding moisture content of peat.
Information on stockpiles in IPSAS comes from a number of sources, including stockpile sampling, and ongoing lab and Ohaus testing. This information can be used to develop the 12 month loading plan and the short term schedule.
The daily Ohaus measurements are carried out as peat is delivered in rakes, and as lorries are loaded at the bog area loading points. This information is used to develop the daily loading plans, and to adjust those plans as necessary when results differ significantly from those expected.
The on-line moisture probes in the ESB Power Stations are used to monitor the current moisture content of the primary and secondary batches. The information from these probes is used to make immediate decisions on adjustments to the delivery sequences of rakes and lorries in order to avoid moisture penalties. Where on-line moisture probes are available in other locations, they may be used to control the daily moisture content to achieve the agreed customer target.

BORD NA MÓNA Naturally Driven	SOP: FS-SC-02	Rev: 2
Title: Develop Moisture Targets	**Approved: JM**	**Date: 18/07/2016**



BORD NA MÓNA Naturally Driven	SOP: FS-SC-06	Rev: 2
Title: Peat Loading	**Approved: JM**	**Date: 20/07/2016**



General Notes: Where there is only a single operator, the driver should load 2 wagons and then using the loco, position the rake to load any balance of that pile section into the next wagons before starting to load from the next section. After completion of loading the rake, only the bench for the loader should be flat.

When loading from the far "opening" end of a new pile reverse the rake(s) down as far as possible to the opening end of the stockpile. (Where possible, sufficient rail should be laid to accommodate one full rake). Begin loading at the end of the pile, taking the full depth of the pile as far as possible. When the wagons within reach are loaded, the digger "tops" the pile moving along as the wagons are filled until the rake(s) are loaded. The digger is then moved back to the end of the pile and is parked off the pile to reduce the risk of fire. This process is repeated until the pile is fully opened (which should take no more than 4 double rakes.) This exposes the flattened section to getting wet, so loading this section must be prioritised.

When loading lorries move the loader along the bench to the next position to load the next portion of the trailer. Fill a walking floor trailer or tautliner along its full length but take care not to overfill as the cover has to be pulled over the load.

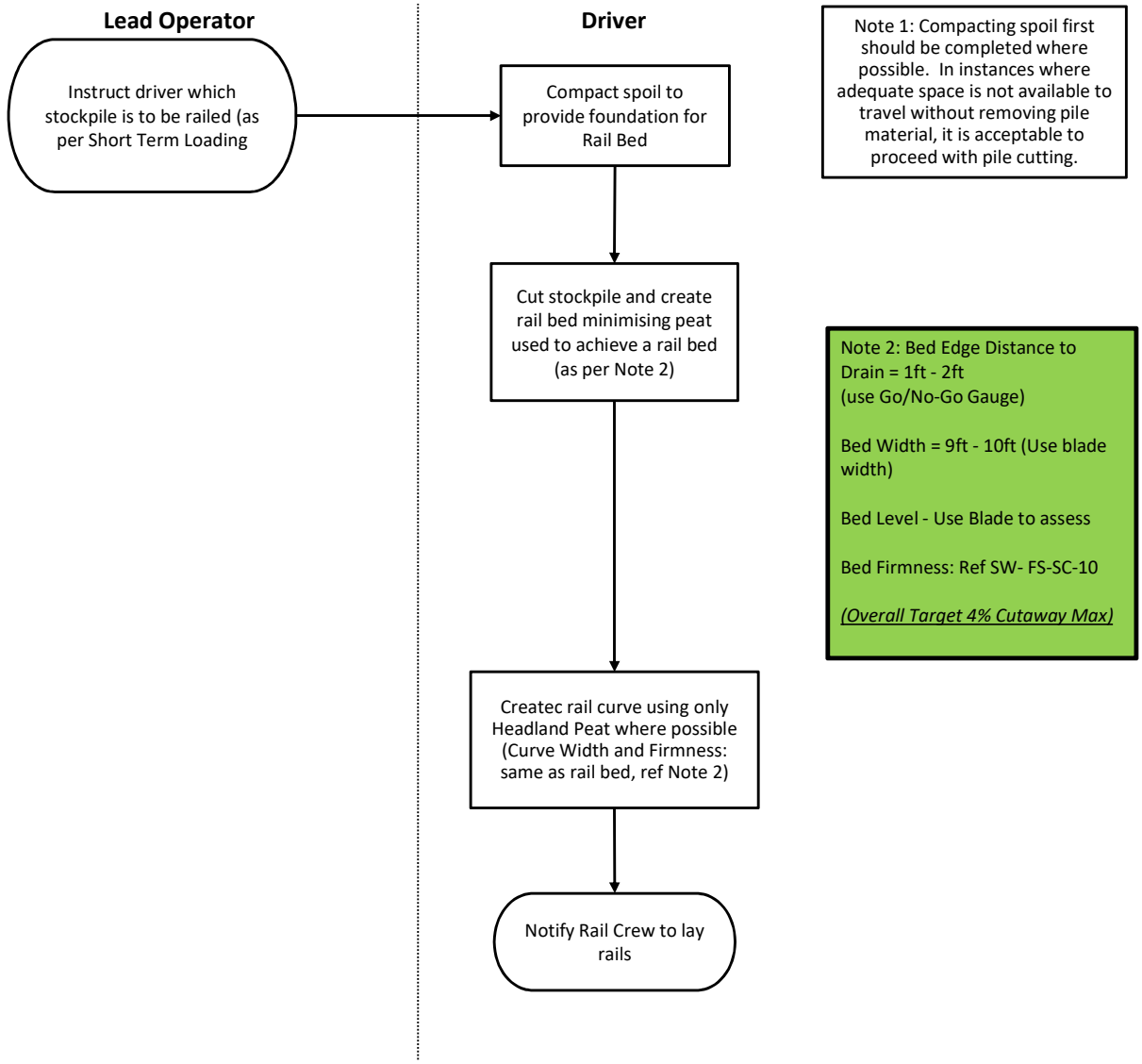
Fill a tipper trailer to approx 2/3 full then press down the peat in the trailer using the bucket to apply about 2 tonnes of pressure taking care not to hit cross ties. Top up the load and press again then top off and prepare the load for covering.

Take care when loading that no peat spills onto railways, roads or into drains.

If loading for sale for Horticulture, carry out a density measure of a representative sample of the peat which was loaded so that the volume loaded can be accurately calculated. Remember that the customer will check this.

All servicing of loading machines must be done with the machine off the pile and on the ground to prevent contamination of peat in the pile.

BORD NA MÓNA Naturally Driven	SOP: FS-SC-10	Rev: 1
Title: Rail Bed Creation	Approved: JMcN	Date: 14/07/2016



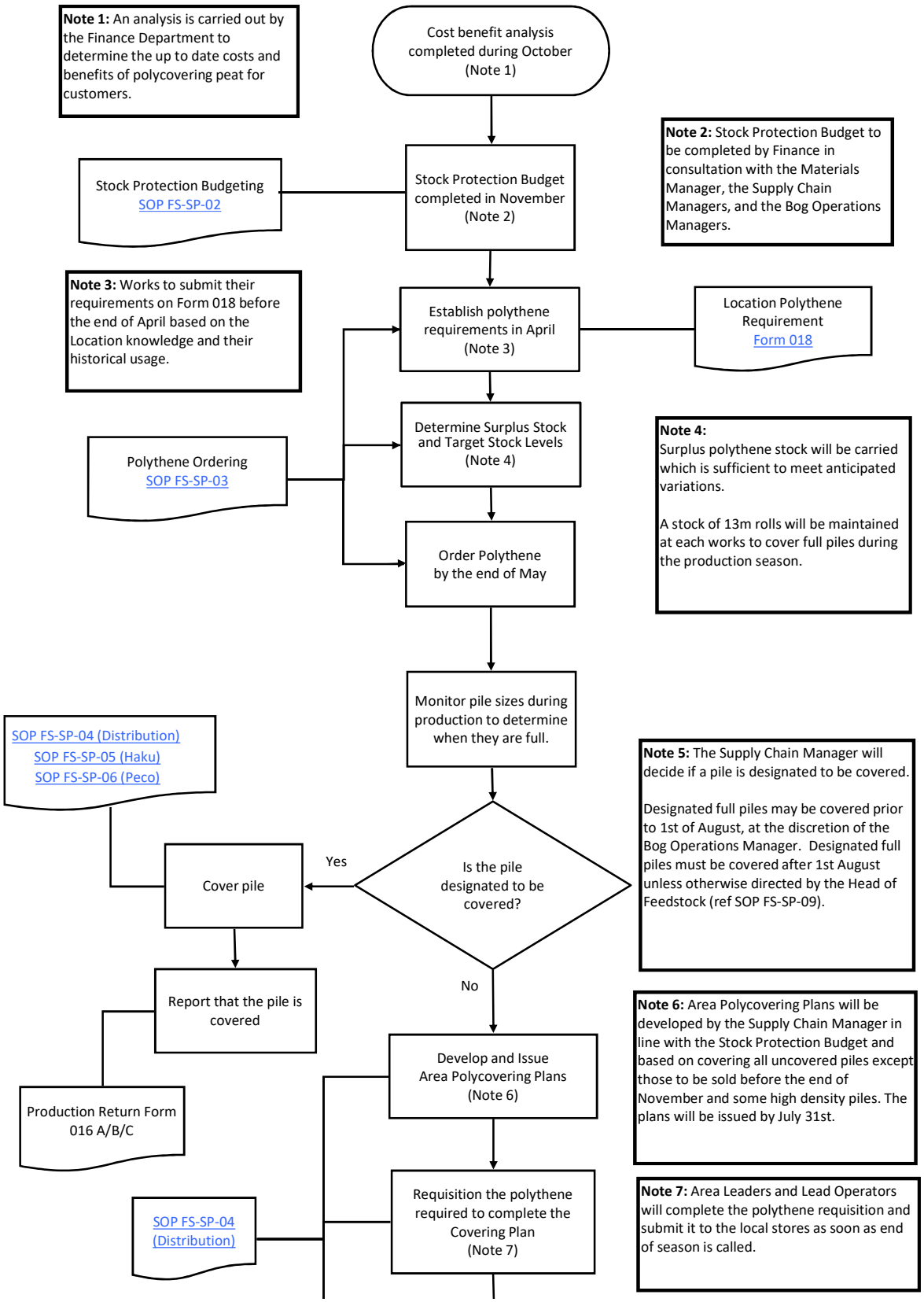
Additional notes

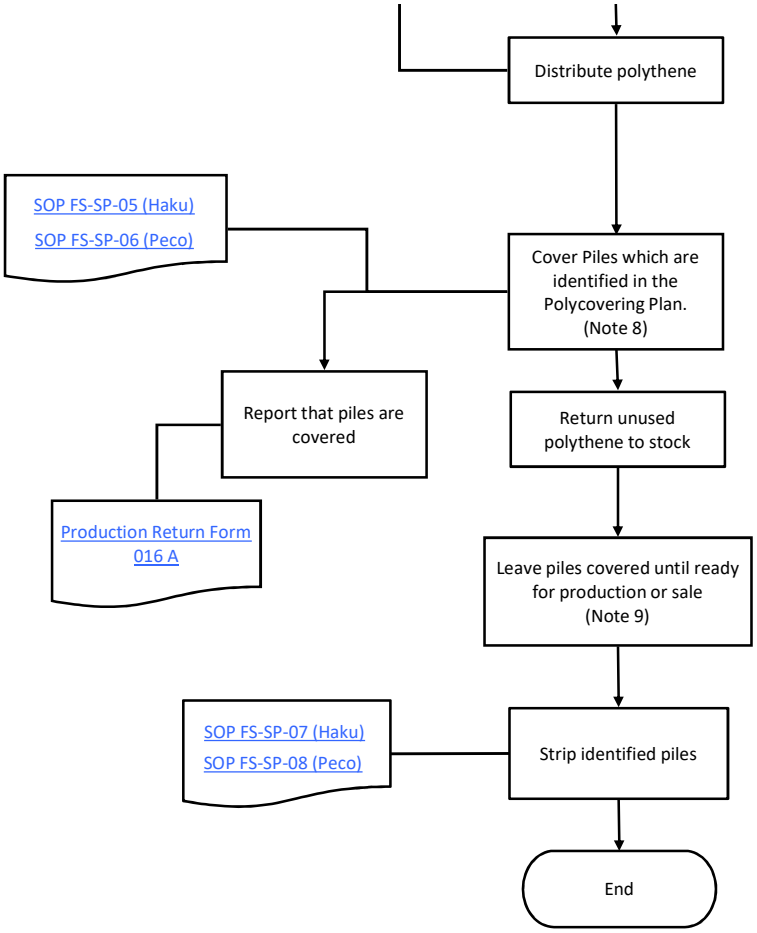
Ensure that machinery is blown down & washed at end of each day

Ensure that production machines are parked after wash down with separation to prevent spread of fire.

Ensure that daily maintenance/safety checks are carried out, with particular attention to guards and fire extinguishers

BORD NA MÓNA Naturally Driven	SOP: FS-SP-01	Rev: 4
Title: Stock Protection Flowchart	**Approved: JMcN**	**Date: 15/07/2016**





Note 8:
The Head of Bog Operations in consultation with the Head of Peat Divsion will issue the instruction to commence covering piles.

The Bog Operations Manager in consultation with the Head of Peat Division defines the end of the production season, at which point all uncovered piles which are planned to be covered must be covered.

In the event that it becomes clear that not all stock will be covered, priority must be given to low density stockpiles and full piles.

Note 9: Stripping for production should not be started until authorised by the Bog Operations Manager.

Stripping for sale should not be started until authorised by the Supply Chain Manager and no earlier than 14 days prior to commencing selling.

BORD NA MÓNA Naturally Driven	SOP: FS-SP-03	Rev: 2
Title: Polythene Ordering	Approved: JMcN	Date: 15/07/2016

1) Purpose

The purpose of this procedure is to describe the methodology used to determine the polythene to be ordered for stock protection each year.

Because of the procurement lead-time required for polythene sheet purchase and distribution it is necessary to carry out an estimation exercise each year before the 31st of May. This is done in order to have stocks in place for the covering programme which takes place from August each year.

2) Scope

This procedure covers all milled peat production areas throughout the Bord na Móna Feedstock bog network.

3) Responsibility

The following functions are responsible for elements of the Polythene Ordering process:

Materials Manager
Bog Operations Manager
Finance Department

4) Related Documents

Annual production budget for the financial year in question
Annual polythene budget
Works Polythene Requirements Form 018

5) Procedure

Works (determination of requirements)

Polythene requirements are to be determined before the end of April each year in order to facilitate timely issue of purchase orders by the Materials Manager.

1. The Materials Manager issues form 018 to each Location including the estimated cost of each roll type.

2. Each Location uses its local knowledge and historical data to complete form 018. This will include:
- The width of roll
- The length of roll
- The number of rolls
- The total estimated order value based on the estimated costs, should be equal to their budgeted expenditure

3. Each Bog Operations Manager will submit his completed Form 018 to the Materials Manager by the end of April.

Materials Manager (ordering from suppliers)

1. Review the completed Form 018 from each Location, and calculate the total requirements.

2. Determine the targeted stock levels (targeted stock levels are the stock levels after all polythene is purchased and none has been used) for each type of roll based on the total requirements plus a sufficient stock surplus to meet unplanned requirements. The appropriate level of stock surplus for each roll type will be agreed by the Materials Manager with the Finance Department and the Bog Operations Managers each year.

3. Determine the current stock levels of each type of roll.

4. Calculate the amount of polythene to be ordered. For each type of roll this will be the targeted stock level minus the current stock level.

5. Place orders with approved suppliers before the end of May.

BORD NA MÓNA Naturally Driven	SOP: FS-SP-04	Rev: 4
Title: Polythene Distribution	Approved: JMcN	Date: 15/07/2016

1) Purpose

The purpose of this procedure is to describe the arrangements for distributing polythene to the production areas. It aims to ensure all materials issues are recorded and charged to the correct bog area, whilst minimising the level of post season material returns.

2) Scope

This procedure covers all polythene distributed through the Bord na Móna Peat Division stores network.

3) Responsibility

The following functions are responsible for elements of the Polythene Distribution process:

The local stores team
Materials Manager
Bog Operations Manager
Lead Operator
Area Leader

4) Related Documents

Material requisition
Polycovering Plan Form 019

5) Procedure

1. The local stores team will receipt, inspect, store and detail on the inventory management system all new season polythene as per the materials receipt process.

2. The Materials Manager must arrange to have a stock of 13m rolls available at all works to facilitate earlier covering of full piles. Some of this will be distributed to production areas to facilitate early covering and the required requisitions will be provided by the Bog operations Manager.

3. When any pile is designated as full by the Area Leader, he will contact the Supply Chain Manager and determine if the pile is designated for covering.

4. If the pile is designated for covering, the Lead Operator will organise to have the pile covered using the area's polythene. If additional polythene is required, the Lead Operator will send a requisition to the local stores.

5. The Supply Chain Manager, with the approval of the Bog Operations Manager, determines which piles are to be covered taking into account piles scheduled to be sold before the end of November, and piles which are already covered. From this, the piles to be covered will be determined.

6. The Supply Chain Manager will input the piles to be covered on the form 019 for each area and have them issued to the relevant Area Leaders by **July 31st.**

7. The Area Leader and Lead Operator will complete the form 019 for the area. This will include; roll width, roll length, and number of rolls for each pile which is being covered. The Area Leader will submit the completed form to the local stores team as soon as end of season is called.

8. The local stores team will record and arrange delivery of all requirements; ensuring accurate records detailing each movement are updated through the inventory management system. All material costs will be charged to the relevant bog area at point of issue.

9. Should additional polythene be required by an area above their original order, authorisation from the relevant Bog Operations Manager will be required.

10. Where there is a shortage of a particular type of polythene, the Bog Operations Manager will work with counterparts in other Locations to manage inter-Location stocks. Where suitable polythene is not available, 13m rolls can either be used as is, or cut to the desired width.

11. Whilst the level of materials returns to stores should be minimised, the required collection of any unused reels from individual bog area to be advised to the local stores team by the relevant Area Leader as soon as the covering operation in the area has concluded.

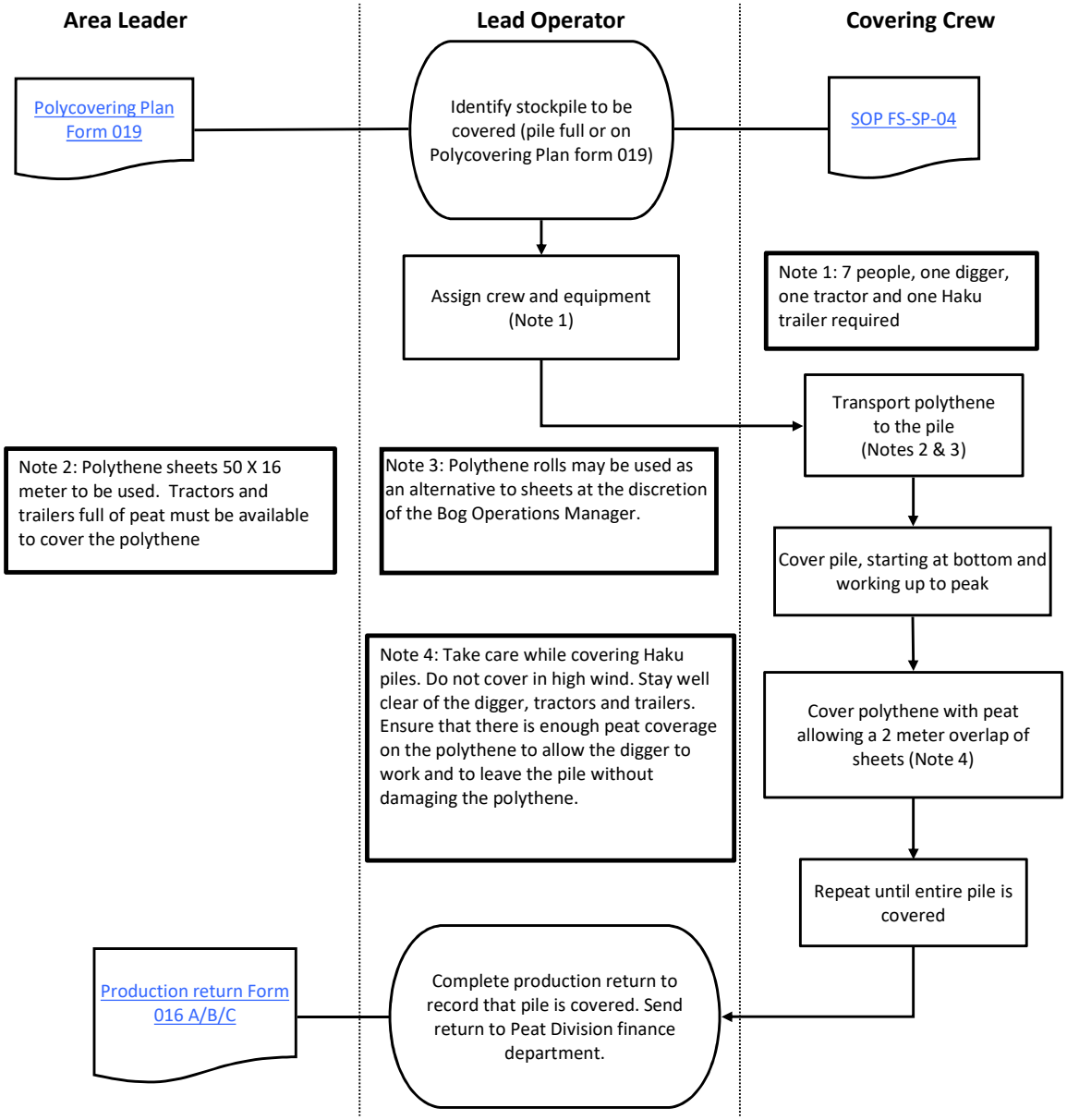
12. The local stores team must ensure any unused polythene is properly secured, and reinstated on the inventory management system by **October 31st** at the latest.

13. The Materials Manager must ensure that all surplus material from the current season is colour coded and positioned appropriately to allow FIFO distribution of such stock for the following season.

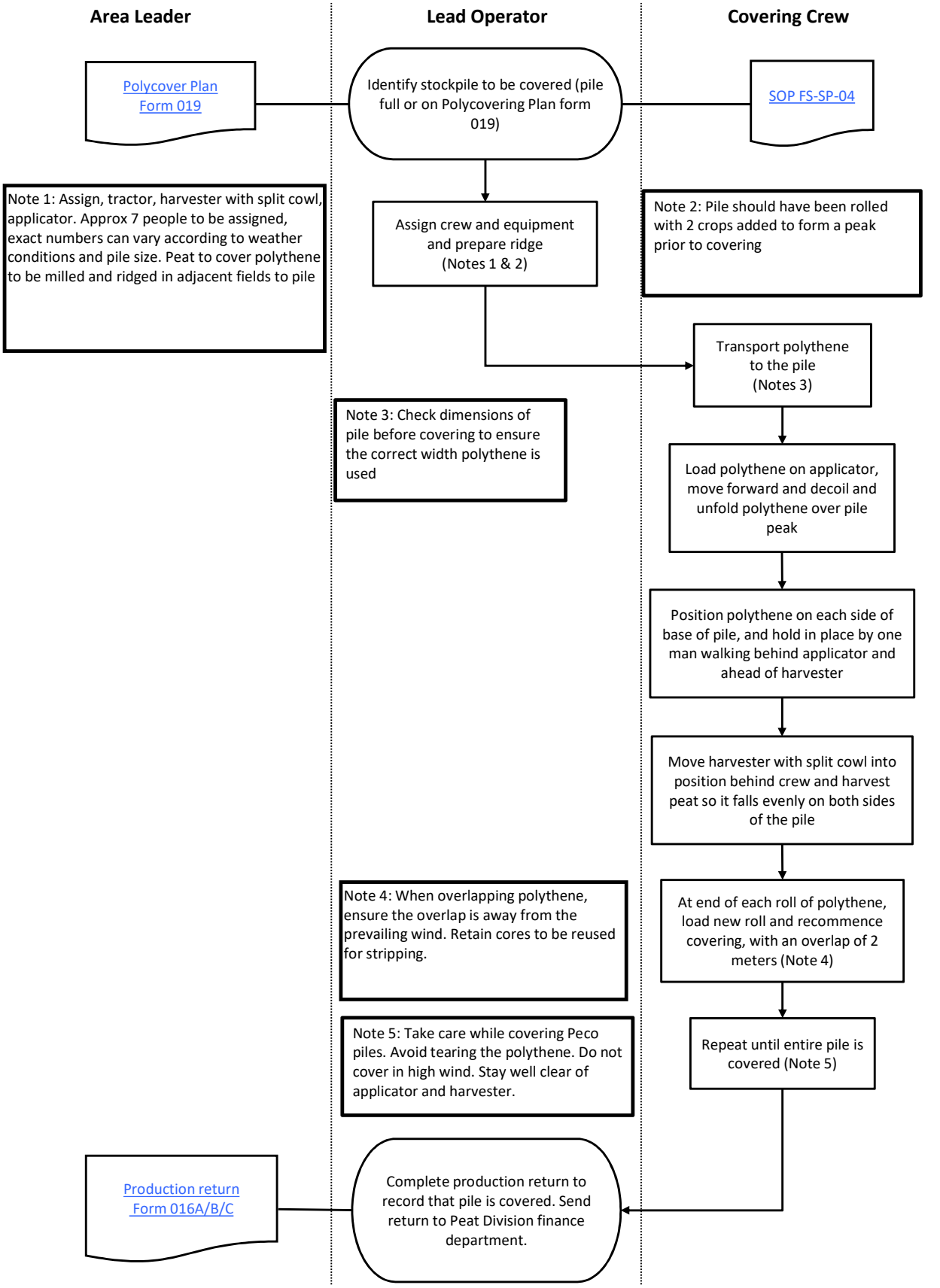
6) Records

Material requisitions

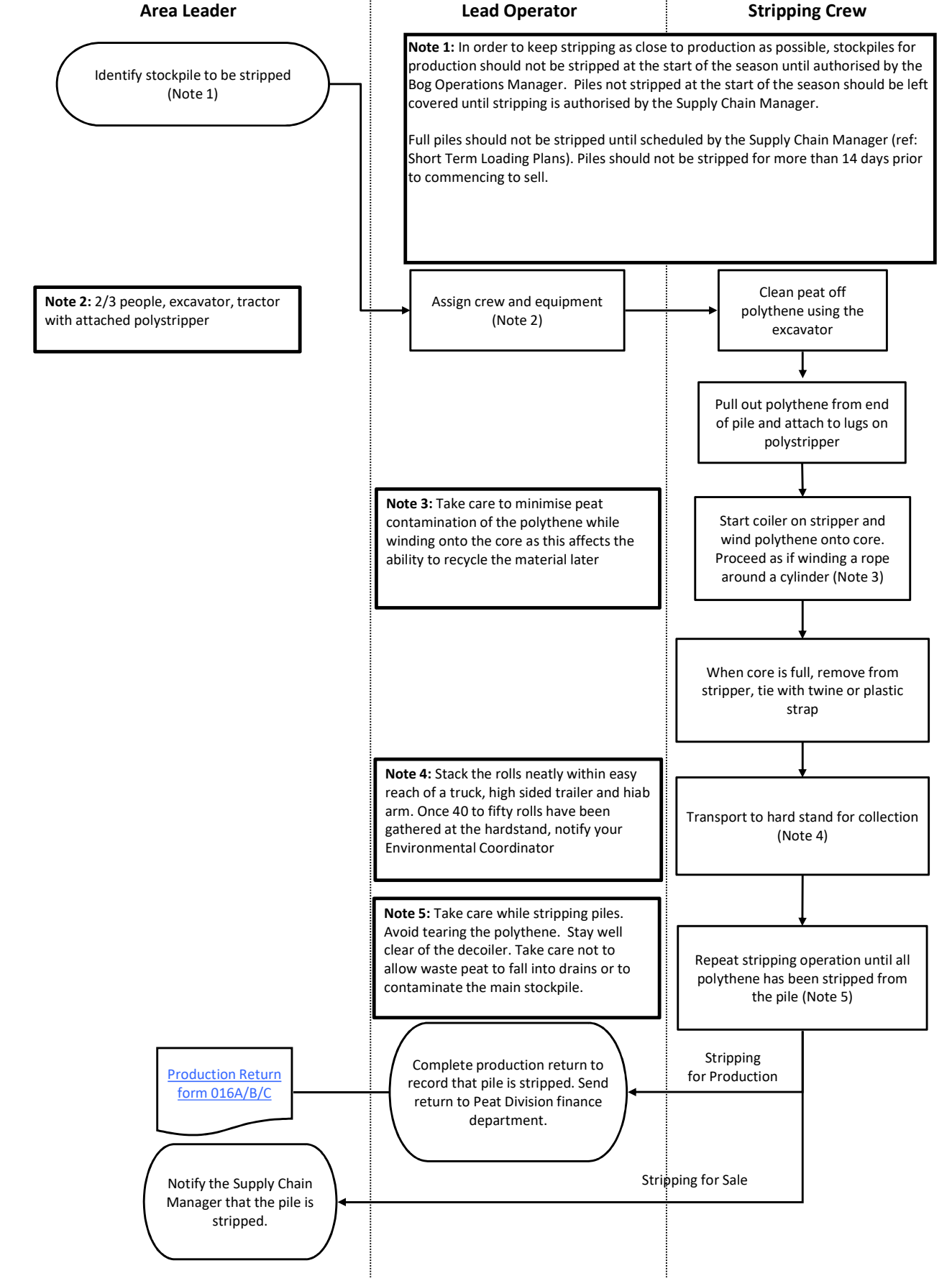
BORD NA MÓNA Naturally Driven	SOP: FS-SP-05	Rev: 2
Title: Covering Haku Stockpiles	Approved: JMcN	Date: 15/07/2016



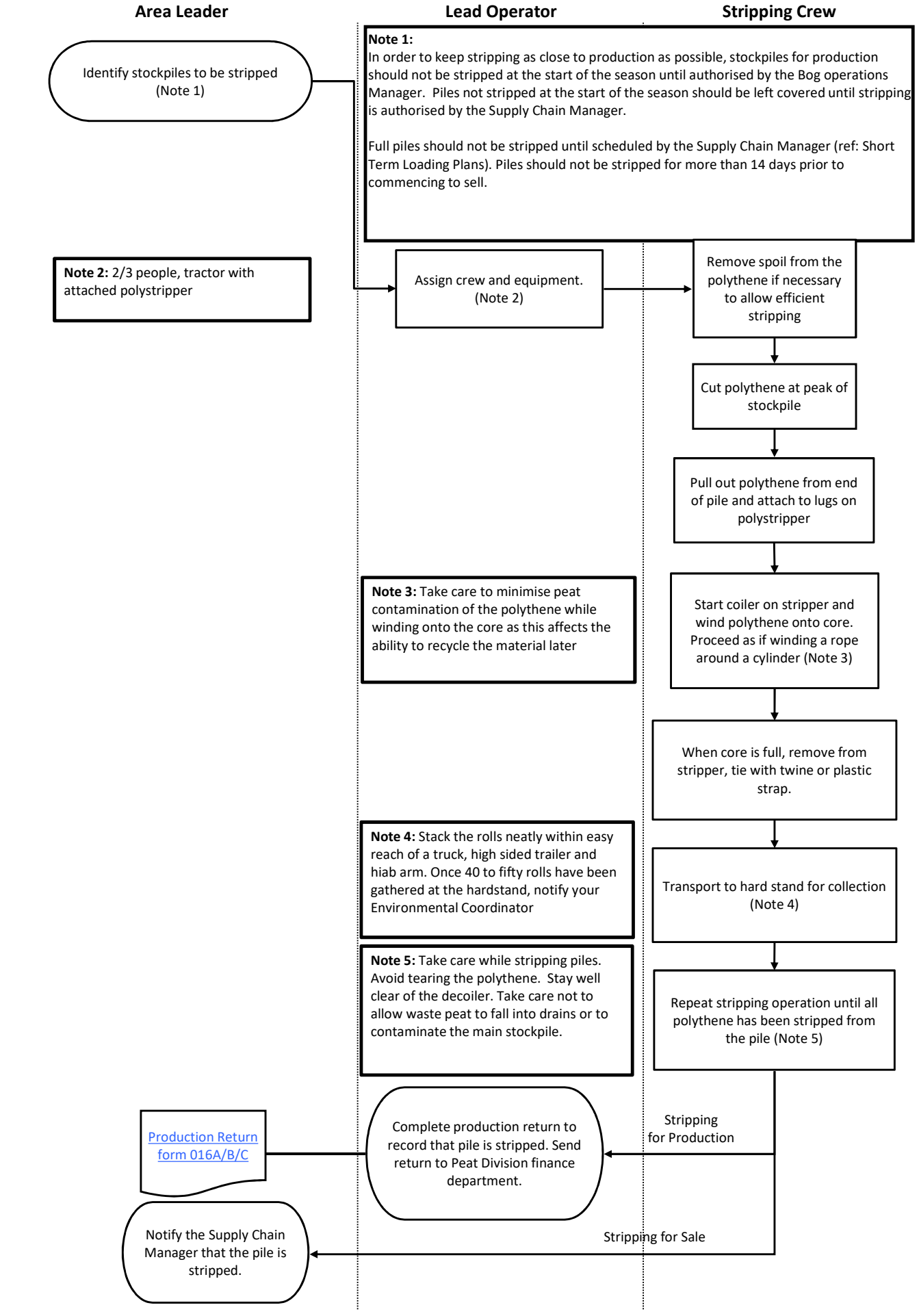
BORD NA MÓNA Naturally Driven	SOP: FS-SP-06	Rev: 2
Title: Covering Peco Stockpiles	Approved: JMcN	Date: 15/07/2016



BORD NA MÓNA Naturally Driven	SOP: FS-SP-07	Rev: 2
Title: Stripping Haku Stockpiles	**Approved: JMcN**	**Date: 15/07/2016**



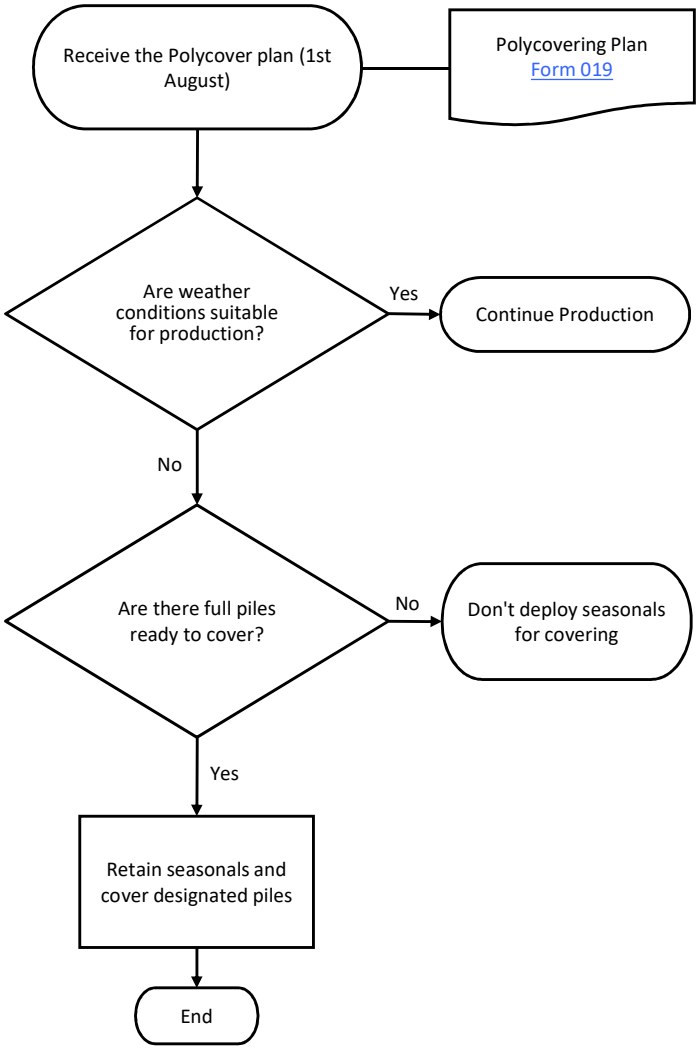
BORD NA MÓNA Naturally Driven	SOP: FS-SP-08	Rev: 2
Title: Stripping Peco Stockpiles	Approved: JMcN	Date: 15/07/2016



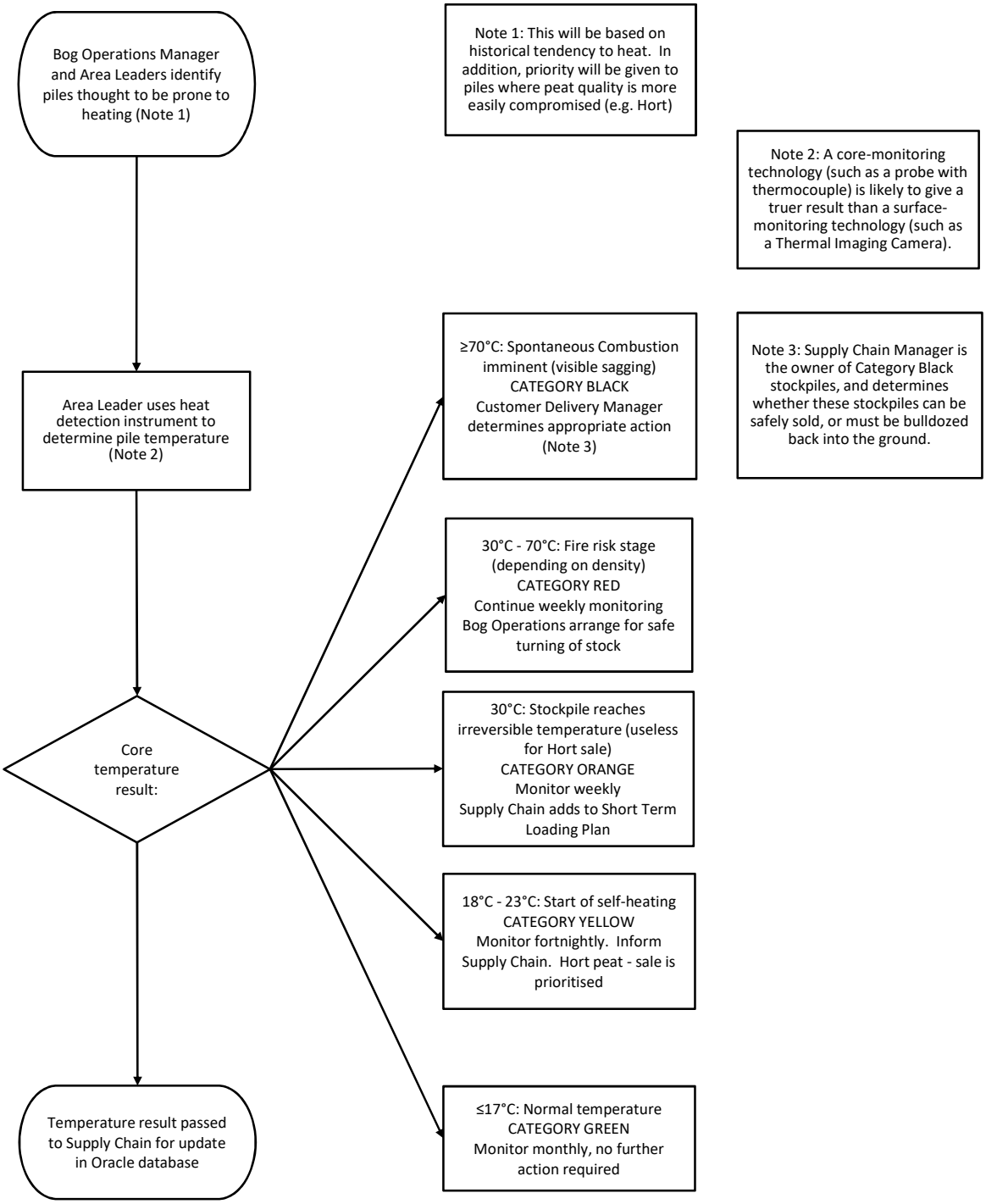
BORD NA MÓNA Naturally Driven	SOP: FS-SP-09	Rev: 3
Title: Covering Piles during Production	**Approved: JMcN**	**Date: 10/4/2018**

Note 1: This SOP comes into force after 1st August each year in all Locations. It is Bord na Móna (Peat Division) policy to cover full piles from 15th August or at 80% production.

Note 2: Peco stockpiles are considered full when the width is 32 feet, distance to rail bed side is 9 feet, and distance to far side is 5 feet.



BORD NA MÓNA Naturally Driven	SOP: FS-SP-10	Rev: 1
Title: Management of Heating Peat	**Approved: JMcN**	**Date: 15/04/2016**



Additional notes

Beware of fire risk - dust from heating piles entering machinery air intake

Ensure that machinery is blown down & washed at end of each day

Ensure that production machines are parked after wash down with separation to prevent spread of fire.

Ensure that daily maintenance/safety checks are carried out, with particular attention to guards and fire extinguishers

Appendix 4-12

BnM Biodiversity Action Plan 2016-2021

BORD NA MÓNA
Naturally Driven

Biodiversity

Biodiversity Action Plan 2016-2021

Contents

Foreword by Mike Quinn, CEO Bord na Móna 1
Executive Summary 2

1.0 **Introduction** **4**
Bord na Móna Land and Property and Ecology 6
Bord na Móna and Bog Conservation in Ireland 7

2.0 **International, European and National Policy Relating to Biodiversity** **8**
Bord na Móna's contribution 13
A National Peatlands Strategy for Ireland 15

3.0 **Review of Biodiversity Action Plan 2010-15 Objectives and updated actions for 2016-2021** **16**

3.1 Objective 1 **17**
Carry out all works in line with best practice guidelines and relevant legislation across all Bord na Móna Bogs
Natural Capital, the economics of Nature and the Irish Forum on Natural Capital (IFNC) 21

3.2 Objective 2 **23**
Monitor biodiversity areas and identify and survey further biodiversity hotspots within Bord na Móna Bogs
Mapping the Bord na Móna bogs 27
Bord na Móna biodiversity areas and hotspots 31

3.3 Objective 3 **44**
Develop and Promote Best Practice in Terms of Rehabilitation for all Bord na Móna Bogs to Stabilise Former Peat Production Areas and Enhance Biodiversity
Rehabilitation and the Bord na Móna Bogs 50
Rehabilitation Trials 2010-2015 54
Understanding the GHG balance in restored and rehabilitated peatlands 58

3.4 Objective 4 **60**
Raise Awareness and Create a Greater Appreciation of the Biodiversity and Natural Heritage of Bord na Móna Cutaway Bogs and Associated Lands
Lough Boora Discovery Park – Bioblitz Uncovered 66
Community-Led Wetland Projects 68

3.5 Objective 5 **70**
Monitor the Progress of the Bord na Móna Biodiversity Action Plan

4.0 **Changing Landscapes and Changing Perspectives** **74**
Conclusion **75**

Appendices 76

This page:
Finnamore's Lake

Cover photos:
Main image: Bog cotton at Lough Boora
Second row: Bumble Bee on Knapweed; Marsh Fritillary; Damselfly.
Third row: Mute Swans with chicks; regenerating cutover bog.

Foreword

The Biodiversity Action Plan 2016-2021 is an essential component of Bord na Móna's sustainability strategy which stands on the three pillars of people, profit and planet. This means whenever we are developing or delivering business solutions we ensure they are supported by all three sustainability pillars.

In practical terms, our strategy means making sure that, wherever possible, we do things that sustain a healthy natural environment. This includes driving down our carbon footprint, investing in renewables, developing environmentally friendly goods and services as well as rehabilitating bogs and enhancing biodiversity. This environmental aspect to sustainability, where we respect the planet we inhabit, has been an increasingly vital third element to our policy for many, many years.

In October 2015, we announced a significant change for Bord na Móna. To ensure we have a sustainable business means that between now and 2030 Bord na Móna will be in a process of profound transition. During this period we will be managing the move away from energy peat operations, into other businesses and land uses across the energy peat bogs that are part of our ca. 80,000 hectare acre landholding. This will involve the single largest change of use of land in modern Irish history. It will also mean a sizable reduction in our carbon footprint and a very substantial bog rehabilitation programme. We are confident that the investment and rehabilitation programme will collectively yield considerable environmental dividends for the people of Ireland.

Bord na Móna is an iconic State owned company so we are undertaking this transition in a way aimed at benefitting everyone in Ireland. We have also always been a 'community company' so it is important for us that our local communities and our employees will experience the tangible benefits of the new environmental goods and services that we are now developing. Delivering these benefits is a huge body of work. Indeed anyone familiar with the ecology of bogs, will understand that it will require patient work, significant investment and expertise to build this future over the period 2030 and beyond. I am confident that Bord na Móna possesses the skills, commitment and determination to achieve this ambition.

The bogs of Ireland hold a special place in the hearts and souls of Irish people. We in Bord na Móna recognise the privileged position we hold as stewards of state-owned bogs and peatlands. Our intimate appreciation of the complex value of the bogs means we understand the need to carefully plan to ensure positive, sustainable outcomes for our bogs. I am pleased that the Biodiversity Action Plan 2016-2021 developed by our Ecology Team, in consultation with a wide range of stakeholders, provides a very robust roadmap to this exciting new future for our bogs.

Mike Quinn
CEO Bord na Móna
March 2016

Executive Summary

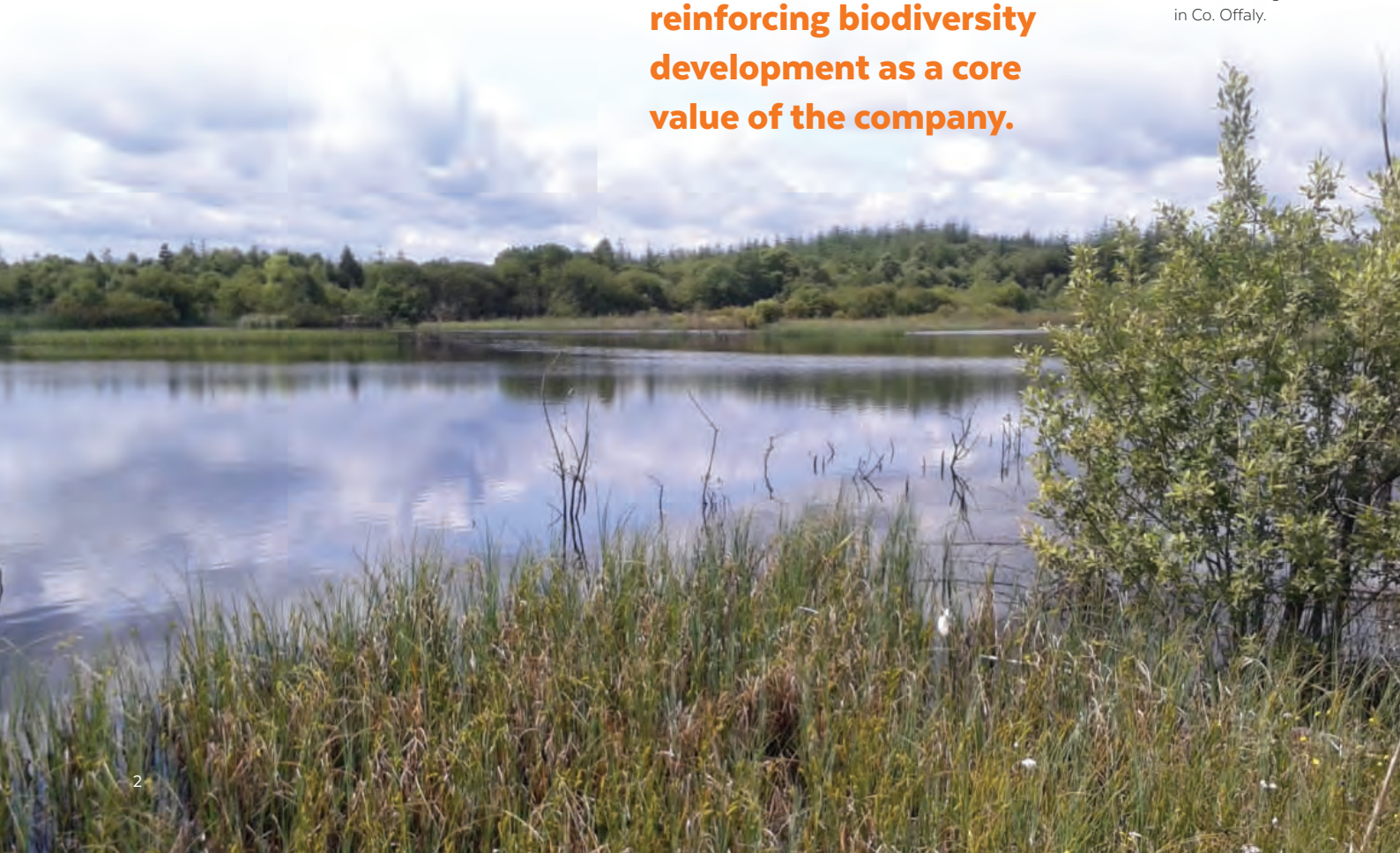
Bord na Móna launched its first Biodiversity Action Plan 2010-2015 in 2010, the first of its kind amongst corporate entities in Ireland, and is recognised as a significant initiative by Bord na Móna. This document outlines some of the successes and challenges of the 2010-2015 plan, and sets out the actions and KPIs for the Bord na Móna Biodiversity Action Plan 2016-2021.

The Bord na Móna Biodiversity Action Plan 2016-2021 builds on the foundation of the original core objectives and the actions set out in the 2010-2015 plan, reframing them in the current context and perspectives of peatland biodiversity management, restoration and conservation and also in the outlook for Bord na Móna as set out in the company's *Sustainability 2030* report launched in October 2015.

The company's *Strategic Framework for Future Use of Peatlands* sets out the range of current land uses active on the Bord na Móna landbank (approximately 80,000 hectares in total), the range of future uses that will be considered and the main factors influencing those uses. The framework highlights the most commercially viable after-uses for the cutaway bogs as including renewable energy projects (wind, solar, biomass), niche commercial opportunities, tourism and amenity, and biodiversity.

The Bord na Móna Biodiversity Action Plan 2010-2015 was developed under this framework by the Bord na Móna Ecology Team and comprised five core objectives underpinned by a range of actions. The objectives relate to policy and governance, understanding the baseline ecological condition of the Bord na Móna bogs, rehabilitating and restoring modified peatlands, communicating the value of biodiversity and raising awareness, and reviewing progress.

The Biodiversity Action Plan 2016-2021 will be integral to and strengthen our transition to sustainable and renewable businesses, reinforcing biodiversity development as a core value of the company.



Derryounce Lake near Portarlington in Co. Offaly.

Developments and Achievements 2010-2015

The complete outcomes of the 2010-2015 Plan are outlined in this document with some of the key features highlighted here:

- Biodiversity and ecology has been incorporated into the decision making processes and daily operations of the business units in Bord na Móna
- The baseline ecology work has significantly increased our knowledge and understanding of the Bord na Móna peatland resource
- Habitats and species with legal protection have been highlighted across the Bord na Móna bogs to ensure their preservation
- In the plan period, Bord na Móna has undertaken the restoration of over 1,000 hectares of raised bog habitat and begun the implementation of a range of rehabilitation works across cutaway bog areas
- In terms of rehabilitation and restoration, when we take account of previous work prior to 2010, more than 15% of the total area of land in Bord na Móna ownership has been rehabilitated and/or restored to date in line with International, EU and National 15% targets
- Increased knowledge as to the GHG balance of cutaway bog habitats (acidic and alkaline wetland)
- The level of awareness of the value of biodiversity has been significantly increased within the company and the communities bordering Bord na Móna lands

Key Action Areas 2016-2021

Building on continuing the actions outlined, and the success of the 2010-2015, the 2016-2021 plan maintains the core objectives and actions, while also incorporating new actions, relating to:

- Working with other State bodies to deliver on actions under the National Peatland Strategy
- Working with State nature conservation bodies and ENGOs under the *National Biodiversity Plan* to highlight biodiversity hotspots and work towards a sustainable network for nature in Ireland
- Promoting the concept of Natural Capital
- Developing a map of ecosystem goods and services for Bord na Móna lands
- Identifying information gaps in the baseline survey work to increase understanding of the biodiversity value of cutaway bogs and their future management
- Continuing with the long term rehabilitation of the cutaway bogs
- Adding to the restored raised bog network under the Bord na Móna Raised Bog Restoration programme
- Control and monitoring of invasive species
- Assimilation of the outcomes relating to rehabilitation and restoration on Bord na Móna bog areas to develop best practice guidelines that can be translated to a range of peatland types
- Supporting and working to develop GHG emission factors for Bord na Móna bog areas
- Promoting awareness and education of biodiversity on Bord na Móna bog areas through working with schools and communities
- Organisation of activities such as Bioblitz to encourage people to interact with and record biodiversity on Bord na Móna bog areas
- Prioritising actions and developing metrics to track progress over the course of the 2016-2021 plan

1.0

Introduction

Bord na Móna launched its first Biodiversity Action Plan in 2010. The plan covered a six year period spanning from 2010 to 2015. The development and promotion of the plan was the first of its kind amongst corporate entities in Ireland and is recognised as a significant initiative by Bord na Móna.

The 2010-2015 Biodiversity Action Plan set out in a comprehensive way why biodiversity is important to Bord na Móna and how it intends to build on the wealth of peatland management, rehabilitation, restoration and conservation that it has built up since its establishment in the 1940s.

...builds

on the foundation of the original core objectives and the actions set out in the 2010-2015 plan

Lough Boora Discovery Park Visitor Centre, officially opened in 2014.

The objectives and actions core to the Biodiversity Action Plan 2010-2015 were outlined under five key areas:

Objective 1

Policy and governance

Objective 2

Understanding the current baseline ecological condition of the Bord na Móna bog areas and the biodiversity present

Objective 3

Developing methods to rehabilitate and restore peatland areas in the post-production use phase

Objective 4

Engaging with the full range of stakeholders in relation to the management of biodiversity on Bord na Móna bogs and promoting awareness of the importance of biodiversity

Objective 5

Providing a mechanism whereby the delivery and progress of the objectives outlined within the Biodiversity Action Plan could be reviewed and assessed on an annual basis.

Each objective in the Bord na Móna Biodiversity Action Plan 2010-2015 was supported by a suite of actions and key performance indicators (KPIs) and for the greater part, all of the actions outlined in the 2010-2015 Biodiversity Action Plan have been acted upon, implemented and/or are in development. Over the course of the plan, priorities and focus changed as would be expected, but the key aspects of the plan remained relevant and continue to be relevant.

The Bord na Móna Biodiversity Action Plan 2016-2021 builds on the foundation of the original core objectives and the actions set out in the 2010-2015 plan, reframing them in the current context and perspectives of peatland biodiversity management, restoration and conservation and also in the outlook for Bord na Móna as set out in the company's *Sustainability 2030* report launched in October 2015. This document outlines some of the successes and challenges of the 2010-2015 plan, and sets out the actions and KPIs for the Bord na Móna Biodiversity Action Plan 2016-2021. While the actions build on the Bord na Móna experience to date, they are also ultimately a product of the views of the wider community as part of the engagement process carried out over the past six years, and particularly during the drafting of this Plan over the course of 2015.

Bord na Móna Land and Property and Ecology

Bord na Móna business units and structure

Bord na Móna is a large and diverse company with a central core of shared services that support each of the business units within the company. The main business units are Peat (all aspects of peat production for energy and horticulture), Horticulture (supply of horticultural peat and associated products such as green compost to the professional and retail markets), Powergen (electricity generation in power stations, wind farms and other renewable electricity developments), Biomass (sourcing and supply), Fuels (sales and development of low smoke and biomass fuels, distribution of briquettes, coal etc.), and Resource Recovery/AES (waste management). In association with these businesses there are a number of support services such as Finance, IT, Engineering, Procurement, Human Resources, Marketing and Communications and Business Transformation. One of the main support units is Land and Property which has a number of sub-units including the Board and Company Secretariat, Legal, Internal Audit, Commercial Land and Property, Land Title and Acquisition and Ecology.

Developing a Strategic Framework for Future Use of Peatlands

In 2011, the company published a framework that set out the range of current land uses active on the Bord na Móna landbank (approximately 80,000 hectares in total), the range of future uses that will be considered and the main factors influencing those uses. The *Strategic Framework for Future Use of Peatlands* recognises the limited agricultural and forestry potential and highlights the most commercially viable after-uses for the cutaway bogs as including renewable energy projects (wind, solar, biomass), niche commercial opportunities, tourism and amenity, and biodiversity. The framework essentially provides the context within which future developments by the company are considered. The framework is currently being reviewed and updated (2016), and it is expected that those uses identified previously will remain the core future uses.

The Bord na Móna Biodiversity Action Plan 2010-2015 was developed under this framework and the Bord na Móna Biodiversity Action Plan 2016-2021 must also be considered within the context of the *Strategic Framework for Future Use of Cutaway Bogs*. The strategic framework clearly highlights that biodiversity will be one of a number of the land-uses for the Bord na Móna bogs into the future. In practice, a number of land-uses can co-exist on any given bog area as evidenced by the wind farm developments at Oweninny and Mountlucas. At both of these locations where the wind farm footprints are relatively small within the total area of the sites, other commercial developments, as well as biodiversity and amenity are also land-uses at ground level. Tourism and amenity are recognised as having significant potential for the Bord na Móna bogs into the future as evidenced by the great success of the Lough Boora Discovery Park and the range of community led wetland projects and walking and cycle tracks developing across Ireland.

For more about the Bord na Móna amenity and tourism developments please visit our website **www.bordnamona.ie**

Bord na Móna Ecology

The responsibility for delivery of the Bord na Móna Biodiversity Action Plan 2016-2021 lies with the Bord na Móna Ecology Team. The Ecology Team was established in 2009 following the adoption of a formal corporate objective relating to biodiversity. This corporate objective is *"to promote the role of Bord na Móna in enhancing biodiversity and to create awareness of the values of cutaway bogs through wise-use management for biodiversity and carbon"*.

Since its establishment, the role of the Ecology Team and the services provided to the various businesses within the wider company, have become integral to the day to day business of Bord na Móna. Where required, the company also engages external ecological consultancy services and expertise, for example in relation to independent reviews for planning applications.

For more about the Bord na Móna Ecology Team please visit our website **www.bordnamona.ie**

Tom Barry and others in exhibition room, 1950s.

Bord na Móna and Bog Conservation in Ireland

Bord na Móna was established in the 1940s from its precursor The Turf Development Board with a mission to develop the peatlands of Ireland primarily as an indigenous fuel resource. Largely concentrated in the midlands of Ireland, the bogs were industrially developed for turf in the early years, and subsequently for milled peat from the 1950s onwards. The milled peat method took bog development to a scale not experienced before in Ireland, and work in the main focused on the largest, most extensive bog areas such as the Bog of Allen complex in Kildare, the Clonsast and Derrygreenagh Bogs in East Offaly, the Boora and Blackwater complexes in West Offaly and East Galway, the Mountdillon Bog complex in Longford/Roscommon along the River Shannon and the Littleton Bogs in North Tipperary. These areas still continue to be the main focus of peat production. Former production areas include the Oweninny Works in North West Mayo.

From the days of the preceding Turf Development Board in the 1930s, up until the 1960s, the focus of the company was firmly set on peat production, providing not only an indigenous fuel resource but creating great socio-economic benefit particularly in the Midlands region. At the same time, the cutaway bogs as they emerged from production were viewed primarily with an interest in creating highly productive agricultural lands to enrich the midlands – a vision that was not found to be feasible except in focal minority areas where sub-soils and conditions favoured production of 'good land'.

In the early 1970s one of Bord na Móna's staff Mr. Tom Barry (1915-1996), Peatland Environmental Officer, recognised and advocated the need to conserve and protect the best remaining examples of bogs for future generations. Tom championed the conservation of bogs in Ireland both on the national and the international stages. He identified the best remaining examples of bogs and persuaded the Board and Management of Bord na Móna to set aside a number of bog areas for conservation. Pollardstown Fen and a suite of other well-known sites were purchased by the company purely for the purpose of conservation. These areas are preserved today because of Tom Barry's vision and foresight. Following on from those bogs put forward by the company for conservation in the 1970s, a further series of bogs followed in the 1980s and 1990s, including Clara Bog, All Saint's Bog, Mongan Bog and Bellacorick Flush. These are now in the ownership and management of the National Parks and Wildlife Service, An Taisce and others. A number of additional sites, for example Killaun Bog near Birr in County Offaly and Abbeyleix Bog in County Laois, remain in Bord na Móna's ownership but are managed for biodiversity by the local communities.

Bord na Móna's commitment to bog conservation was founded on the knowledge of Tom Barry. Today that commitment is being followed through and built upon as evidenced by the investment in the previous and current Biodiversity Action Plans and the work of the Ecology Team.

For more on the heritage of Bord na Móna see the company's community website: **www.heartland.ie**

Common Blue butterfly, Lullybeg Reserve. Photo: Jesmond Harding BCI.

2.0

International, European and National Policy Relating to Biodiversity

Since the writing of the initial Biodiversity Action Plan in 2010, there has been a number of changes and developments in terms of national, European and global biodiversity targets and policies. The main policy updates and the way in which Bord na Móna has responded are outlined here:

The Convention on Biodiversity

New Strategic Plan for the Convention 2011-2020 – *Living in Harmony with Nature*

In October 2010 the 10th Conference of the Parties to the United Nations Convention on Biodiversity (CBD) in Nagoya, Japan adopted the new strategic plan for the period 2011 to 2020. The theme of the strategic plan is *Living in Harmony with Nature*. All countries and partners who are signed up to the CBD (this includes Ireland and the European Union) were tasked with updating their own national plans according to the targets set out in the CBD strategic plan. The plan has a long-term vision for 2050, as well as a mission for 2020.

Living in Harmony with Nature – the vision and mission

The Strategic Plan is comprised of a shared vision, a mission, strategic goals and 20 ambitious yet achievable targets, collectively known as the Aichi Targets. The Strategic Plan serves as a flexible framework for the establishment of national and regional targets and it promotes the coherent and effective implementation of the three objectives of the Convention on Biological Diversity (CBD).

www.cbd.int

The CBD Vision: "By 2050, biodiversity is valued, conserved and restored and wisely used, maintaining ecosystem services, sustaining a healthy planet and delivering benefits essential for all people".

THE MISSION of the CBD Strategic Plan is to ensure a coherent implementation of the Convention on Biological Diversity and achievement of its three objectives by taking "effective and urgent action to halt the loss of biodiversity to ensure that, by 2020, ecosystems are resilient and continue to provide essential services, thereby securing the planet's variety of life and contributing to human well-being and poverty eradication. To ensure this, pressures on biodiversity are reduced, ecosystems are restored, biological resources are sustainably used and benefits arising out of utilization of genetic resources are shared in a fair and equitable manner; adequate financial resources are provided, capacities are enhanced, biodiversity issues and values mainstreamed, appropriate policies are effectively implemented, and decision-making is based on sound science and the precautionary approach."

The CBD Mission has 20 headline targets for 2020, organised under five Strategic Goals which identify the different aspects of approaching the issue of biodiversity loss. These are:

- **Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society**
- **Reduce the direct pressures on biodiversity and promote sustainable use**
- **Improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity**
- **Enhance the benefits to all from biodiversity and ecosystem services**
- **Enhance implementation through participatory planning, knowledge management and capacity building**

The goals and targets provide a framework for the establishment of national targets. The United Nations has also decided, in order to further drive progress, to designate the period 2011-2020 as the UN Decade on Biodiversity.

For more information see: **www.cbd.int/doc/strategic-plan/2011-2020/Aichi-Targets-EN.pdf**

The key targets of the CBD plan have been incorporated into the EU Biodiversity Action Plan and Ireland's National Biodiversity Plan (2011-2016). These include:

- **At least halve and, where feasible, bring close to zero the rate of loss of natural habitats, including forests**
- **Establish a conservation target of 17% of terrestrial and inland water areas and 10% of marine and coastal areas**
- **Restore at least 15% of degraded areas through conservation and restoration activities**
- **Make special efforts to reduce the pressures faced by coral reefs**

By 2050

biodiversity is valued, conserved and restored and wisely used, maintaining ecosystem services, sustaining a healthy planet and delivering benefits essential for all people

The cutaway bogs are home to a number of bird species including (above left) Wheatear and Lapwing (above right).

The EU Biodiversity Strategy to 2020

In May 2011, the European Commission adopted a new strategy to halt the loss of biodiversity and ecosystem services in the EU by 2020. The strategy is in line with the global commitments made in Nagoya in October 2010, in the context of the Convention on Biological Diversity (outlined previously).

EU Vision and Headline Target

The EU has articulated its long-term vision as

"by 2050 EU Biodiversity and the ecosystem services it provides – its natural capital – are protected, valued and appropriately restored for biodiversity's intrinsic value and for their essential contribution to human well-being and economic prosperity, and so that catastrophic changes caused by the loss of biodiversity are avoided".

The EU has also published its Headline Target for progress by 2020 as *"to halt the loss of biodiversity and the degradation of ecosystems in the EU by 2020, restore them in so far as feasible, while stepping up the EU contribution to averting global biodiversity loss"*. The EU Commission published, in 2011, a communication on the new EU Biodiversity Strategy, entitled *"Our life insurance, our natural capital: an EU biodiversity strategy to 2020"*. This Communication identifies 6 main targets (supported by 20 actions):

Full implementation of the nature directives (Habitats and Birds)
Maintain and restore ecosystems and their services
Increase the contribution of agriculture and forestry to maintaining and enhancing biodiversity
Ensure the sustainable use of fisheries resources
Combat invasive alien species
Help avert global biodiversity loss

For more information see: **www.eur-lex.europa.eu**

It is the role of individual countries to develop national plans for biodiversity, but they must reflect the targets set out in the EU Biodiversity Strategy. The key aspects for delivering targets on biodiversity are the Directives relating to Habitats, Birds, Water, Marine and EIA.

Ireland's National Biodiversity Plan
Actions for Biodiversity 2011–2016

As a member of the European Union, Ireland contributes to the work of conserving biodiversity in the entire territory of the 27 Member States. Since Ireland's policies and legislation on biodiversity are strongly influenced by the EU, this Plan addresses not just national but also wider European issues. Ireland's National Biodiversity Plan has been developed in line with the EU and International Biodiversity strategies and policies. The 2011-2016 plan builds on the initial plan developed for 2002-2006 and is set out in terms of an overall vision and overarching target, underpinned by strategic objectives and actions.

Ireland's Vision:

"That biodiversity and ecosystems in Ireland are conserved and restored, delivering benefits essential for all sectors of society and that Ireland contributes to efforts to halt the loss of biodiversity and the degradation of ecosystems in the EU and globally".

The Overarching Target of the plan, based on the actions which follow is: *"That biodiversity loss and degradation of ecosystems are reduced by 2016 and progress is made towards substantial recovery by 2020".*

The measures that Ireland will take in the overall strategy are presented in a series of objectives as follows:

- **To mainstream biodiversity in the decision-making process across all sectors**
- **To substantially strengthen the knowledge base for conservation, management and sustainable use of biodiversity**
- **To increase awareness and appreciation of biodiversity and ecosystems services**
- **To conserve and restore biodiversity and ecosystem services in the wider countryside**
- **To conserve and restore biodiversity and ecosystem services in the marine environment**
- **To expand and improve on the management of protected areas and legally protected species**
- **To substantially strengthen the effectiveness of international governance for biodiversity and ecosystem services**

The National Biodiversity Plan is currently being prepared for review and update (2016).

For more information see: **www.npws.ie**

Cloonshannagh raised bog remnant (bog restored in 2014).

Bord na Móna surveyors Tommy Higgins and Ray Carroll working on Paul's Lough Bog (bog restored 2014).

Conserve and restore

biodiversity and ecosystems in the wider countryside

Ireland's National Biodiversity Plan 2011-2016

Bord na Móna's contribution

In terms of Bord na Móna's input to the National Biodiversity Plan (2011-2016), the company was part of the initial consultations carried out in 2008 and continued to input to the plan up to its final publication in 2011. The key specific inputs were in relation to Objective 4, Target 10 and its component actions:

Objective 4: To conserve and restore biodiversity and ecosystems in the wider countryside

Target 10: Continued rehabilitation or restoration of biodiversity elements

Actions

10.1	**Identify areas of biodiversity value, or biodiversity hotspots, within Bord na Móna lands by 2015**
10.2	**Continue ecological surveys, preparation of habitat maps and planning of rehabilitation for all Bord na Móna bog areas**
10.3	**Continue to develop a network of biodiversity areas within Bord na Móna sites**

Indicators and outcomes

Number of habitat maps and rehabilitation plans for all Bord na Móna bog areas

To date, Bord na Móna has delivered on each of the actions and will work with the National Parks and Wildlife Service to build on these actions for the next national biodiversity plan which is currently in development (2016).

Kilberry Wetlands, created in 2013 on cutaway bog.

Other aspects of the National Biodiversity Plan (2011-2016) have also been incorporated into the day to day business activity in Bord na Móna such as:

1. **Biodiversity and ecology**
   Biodiversity and ecology has been incorporated into the decision making processes and daily operations of the main business units in Bord na Móna

2. **Baseline ecology work**
   The baseline ecology work has significantly increased our knowledge and understanding of the Bord na Móna peatland resource

3. **Habitats and species**
   Habitats and species with legal protection have been highlighted across the Bord na Móna bogs to ensure their preservation

4. **Restoration and rehabilitation**
   In the plan period, Bord na Móna has undertaken the restoration of over 1,000 hectares of raised bog habitat and begun the implementation of a range of rehabilitation works across cutaway bog areas

5. **More than 15% rehabilitated and/or restored**
   In terms of rehabilitation and restoration, when we take account of previous work prior to 2010, more than 15% of the total area of land in Bord na Móna ownership has been rehabilitated and/or restored to date in line with International, EU and National 15% targets

6. **Increased knowledge**
   Increased knowledge as to the GHG balance of cutaway bog habitats (acidic and alkaline wetland)

7. **The value of biodiversity**
   The level of awareness of the value of biodiversity has been significantly increased within the company and the communities bordering Bord na Móna lands

8. **Biodiversity Action Plan**
   Bord na Móna has developed its second Biodiversity Action Plan building on the work achieved to date

Each of these aspects is highlighted in the company's

Sustainability 2030

report (2015) and will continue to be developed over the course of the Biodiversity Action Plan 2016-2021.

A National Peatlands Strategy for Ireland

Another significant policy development in relation to Irish peatlands in general is the development of the National Peatland Strategy. In April 2011 the Irish government decided to draw up a national strategy on peatlands conservation and management. It was developed in consultation with bog owners and other stakeholders, to deal with long-term issues including: turf cutting, land management and development, restoration, conservation, tourism potential, carbon accounting and community participation in managing the resource. The government also established a Peatlands Council to assist it in drawing up the strategy and to advise it on issues related to the management of peatlands.

Drafting of the strategy was led by the Department of Arts, Heritage and the Gaeltacht in conjunction with the Peatlands Council (which consists of the relevant Public Bodies). The Peatlands Council also assisted in preparing a succession of drafts, and two rounds of public consultation were held. The strategy, entitled *Managing Ireland's Peatlands* will be published in due course. The main sections of the strategy deal with traditional and changing views of Irish peatlands; principles, policies and actions in managing peatlands; and an implementation structure for the strategy. The actions relating to Bord na Móna include promotion of the use of biomass for power generation, development of guidelines and approaches to responsible peatland management in general and due regard to after-use, rehabilitation and restoration of cutaway bogs.

Bord na Móna made a number of submissions during the course of the strategy development and the company is represented on the Peatlands Council and the Peatlands Strategy Implementation Group. The Strategy represents a new approach to peatland management in Ireland, considering the full range of peatland types and uses.

For more information see: **www.npws.ie**

The Strategy represents

a new approach

to peatland management in Ireland, considering the full range of peatland types and uses.

Bord na Móna wetland areas are important sites for breeding wetland birds.

Governance.

3.0 Review of Biodiversity Action Plan 2010-2015 Objectives and updated actions for 2016-2021

3.1 Objective 1

Carry out all works in line with best practice guidelines and relevant legislation across all Bord na Móna Bogs

This objective underpins all of the other objectives outlined in the Bord na Móna Biodiversity Action Plan. Bord na Móna is a diverse company and in relation to the environment, there are a number of legislative regulatory mechanisms that Bord na Móna adheres to.

The primary regulation mechanism relating to the environment and in particular peat harvesting activities is Integrated Pollution Control (IPC) licensing. IPC licensing is granted, implemented and monitored for compliance by the EPA. It is noted however that at the time of writing (March 2016) the regulation of peat harvesting activities is under review by the Department of Environment and Local Government.

There are also a number of areas regulated under Waste Licensing (such as Srahmore Peat Deposition Area and Associated facilities, Drehid Landfill, Kilberry Composting Facility) and conditions related to planning under the Planning and Development Act (such as Mountlucas and Bruckana Wind Farms). Compliance with regulatory mechanisms is reviewed and monitored by the EPA and the relevant planning authorities.

In the period 2010-2015 a number of research projects that focused on developing best practice for management and regulation of activities on peatlands were completed. This included the EPA BOGLAND project (results published in 2011) and a suite of Greenhouse Gas monitoring projects. These projects informed the development of policy documents relating to peatlands. One of the more significant developments in the area of policy has been the development of the *National Peatlands Strategy*. Another area which has grown is the integration of the concepts of *Natural Capital* and *Ecosystem Goods and Services*. Bord na Móna participated in and contributed to all of these projects and policy documents and initiatives and will continue to contribute to their implementation.

Key Performance Indicators

Some of the key performance indicators in the period 2010-2015 were:

- Founding member of the *Irish Forum on Natural Capital* and member of the IFNC steering committee (2014 to present)
- Member of the EU *Business and Biodiversity (B@B) platform* (2015 to present) and the Irish business network *Business in the Community* (BITC)
- Direct input to the *National Peatland Strategy* and members of the Peatlands Council and Peatland Strategy Implementation Group (PSIG)
- Direct ongoing involvement in the *National Raised Bog Scientific Review* Steering Committee (2012 to present)
- Direct input to the development of the *National Biodiversity Action Plan* 2011-2016
- Participation in BirdWatch Ireland *Action Plans for Raised Bog Birds 2011-2020* and *Upland Birds 2011-2020* and support for the development of BirdWatch Ireland *Bird Sensitivity Map for Wind Farm Developments* (2015)
- Direct input to the *National Pollinator Plan* co-ordinated by the National Biodiversity Data Centre (launched in September 2015)
- Direct input of Ecology Team to planning applications for a range of Bord na Móna developments including Oweninny, Mountlucas and Bruckana wind farms (design and mitigation)
- Facilitation of discussions and development of the International Peatland Society *Strategy on Responsible Peatland Management*
- Direct input to the BOGLAND project (vegetation survey and qualitative assessment of BOGLAND project sites)
- Compliance with IPC licensing and regulation

Art and biodiversity meet at Lough Boora Discovery Park.

Building on this work the following actions can be outlined for the period 2016-2021. ***Note**: New Actions to the Biodiversity Action Plan 2016–2021 plan period are highlighted in green shading throughout.*

Actions

Ensure organisational awareness of changes and developments
in relevant policies and strategies, in particular those arising from the outcome of the *National Peatland Strategy* and the *Irish Forum on Natural Capital*

Further encourage best practice within Bord na Móna
in terms of all aspects of the environment, from ongoing operations to future developments. This will require continued awareness of relevant environmental legislation: including EIA and SEA Directives, Habitats and Birds Directives, Water Framework Directive and other such instruments of Irish legislation such as Planning and Development Act 2010

Ensure responsible environmental management
in terms of operational aspects of all Bord na Móna businesses through continuation of best practice in terms of IPC Licensing (and future regulatory mechanisms as they are developed in coming years) and other similar instruments such as Waste Licenses and Waste Permits

These actions will require ongoing work including:

Continue to deliver on actions set out in the *National Peatland Strategy*
through working on the *Peatland Strategy Implementation Group* and the *National Raised Bog Scientific Review* steering committee

Work with the *Irish Forum on Natural Capital*
to promote accounting of ecosystem goods and services as part of an EU wide approach

Develop a natural capital accounting system for Bord na Móna

Continue to work with business and biodiversity initiatives
such as the EU B@B and Business in the Community to promote good practices in relation to biodiversity at corporate levels

Continue to work with other initiatives
such as the *National Biodiversity Action Plan* (currently under review) to ensure integrated planning for Bord na Móna biodiversity focus areas

Ensure responsible environmental management in terms of operational aspects of all Bord na Móna businesses

Track developments in national and international policies
relating to biodiversity and peatlands in general; interact with relevant bodies and interest groups to share knowledge and contribute to policy development

Provide input to any planning applications for developments within Bord na Móna bogs
by contributing data and/or providing advice on best practice in terms of rehabilitation, biodiversity management and conservation

Contribute updates on rehabilitation and biodiversity projects
to Annual Environmental Reports on IPC Licenses to the EPA

Above left: Basil thyme growing next to the railway line at Ballycon Bog.

Above: The cutaway bogs are home to a wide diversity of spiders and other creepy crawlies.

Key Indicators of Success

The key indicators of success of these actions will be:

Awareness and compliance with relevant legislation and policy documents into daily operations

Increased awareness of the value of peatlands nationally and the benefits of investing in peatland natural capital as part of Bord na Móna's ongoing contributions in terms of restoration and rehabilitation

Good design and planning of proposed developments followed by implementation for Bord na Móna bogs in terms of biodiversity

Facilitation of ongoing core businesses and other proposed projects through continued responsible management and compliance with environmental regulatory mechanisms, present and future

Bord na Móna Ecology Team talking to delegates of the Natural Capital Conference in April 2014 about the value of peatlands.

Natural Capital, the economics of Nature and the Irish Forum on Natural Capital (IFNC)

Natural Capital: An Introduction

Natural capital is the world's stocks of physical and biological resources, including air, water, minerals, soils, fossil fuels and all living things. These stocks work together to deliver ecosystem goods and services that in turn provide benefits to society. These benefits include harvestable products like food, materials and fuel, clean water for people to drink and for industry to use, purified air to breathe, the natural decomposition of wastes, the conservation and recycling of essential nutrients like nitrogen and phosphorus, medicine, pest control, pollination, flood and drought regulation and beautiful places to visit. These services matter to people because they give us things we need. But because they are 'free', we don't value them in the same way we value things we have to pay for.

Natural Capital Accounting: Making Nature Count

A rapidly-evolving method for addressing the economic invisibility of nature is 'natural capital accounting'. This involves attributing a measurable value to our natural capital in economic terms (such as euros or dollars) and/or in ecological terms (such as the number of species in an area). Natural capital accounting is something that all EU member States have to do by 2020 (Source: EU Biodiversity Strategy to 2020), and in Ireland the process is already underway through the Mapping and Assessment of Ecosystem Services (MAES) project.

The Irish Forum on Natural Capital

The Irish Forum on Natural Capital (IFNC) brings together a diverse range of organisations and individuals from academic, public, private and NGO sectors who are interested in the development and application of the natural capital agenda in Ireland. The Forum is structured as a broad representative group, led by a Steering Committee and administered by a Secretariat.

The IFNC emerged through the work of the Natural Capital Committee, a voluntary group that came together to organise Ireland's Hidden Wealth – the first national conference on natural capital, held at the National Botanic Gardens, Dublin, in April 2014. Further meetings and workshops were held in 2015 for members to input to the work plan for the forum.

The IFNC vision is *"for an Ireland in which natural capital and ecosystem goods and services are valued, protected and restored".*

The IFNC mission is, *"through the collaboration and leadership of our diverse members, to help to value, protect and restore Ireland's natural capital and ecosystem services. We will do this by supporting the adoption of natural capital concepts in public policy and corporate strategy, promoting informed public and private sector decision-making and assisting in the establishment of a national natural capital accounting standard".*

Bord na Móna is one of the founding members of the Natural Capital movement in Ireland and sits on the steering committee of the IFNC. The key actions relating to Natural Capital listed in this plan are:

- Develop a natural capital accounting system for Bord na Móna - to be based on the protocol currently being developed by the Natural Capital Coalition
- Develop a map of the ecosystem goods and services of Bord na Móna lands
- Continue to work as part of the Irish Forum on Natural Capital steering committee

For more information see: **www.naturalcapitalireland.com** and **www.naturalcapitalcoalition.org**

Understand.

3.2

Objective 2

Monitor biodiversity areas and identify and survey further biodiversity hotspots within Bord na Móna Bogs

Bord na Móna is a major land owner in Ireland, with a significant area of peatland making up the most of the 80,000 ha in its stewardship. Understanding the ecological status of those peatland areas is critical to informing how these lands can be rehabilitated into the future.

One of the key objectives of the original Biodiversity Action Plan 2010-2015 was to establish a baseline of the ecological condition of the full extent of the Bord na Móna peatland area. This has been successfully completed and habitat maps of each of the bog areas have been drawn up using GIS. By combining the basic habitat information with extra information such as LiDAR (a remote sensing technique that illustrates contours in an area) data, aerial photography and peat depth data from GPR (Ground Penetrating Radar), it is possible to get an indication of how each bog area will develop upon cessation of peat production and rehabilitation. Based on all of the information available, the Ecology Team has developed predictive maps, incorporating the necessary rehabilitation measures (targeted drain blocking etc.) which outline how each of the bog areas will be stabilised post peat production. Each bog is unique in terms of hydrological regime (gravity or pumped drain), peat depth and type and other influencing factors from adjoining lands which will result in its own particular future. The data has also been used to identify core biodiversity areas and/or hotspots. The work of the Ecology Team on the baseline ecological condition of the bogs has become an essential tool in managing the Bord na Móna Bogs and it will be maintained and updated as part of ongoing operations.

Key Performance Indicators

Some of the key performance indicators in the period 2010-2015 were:

- Publication and launch of the Bord na Móna Biodiversity Action Plan 2010-2015 (left) in November 2010
- Development of a comprehensive habitat classification system for the Bord na Móna bogs to account for the variability in cutaway habitats (pioneer to complex habitats)
- Habitat mapping for the full range of Bord na Móna bogs – including a general ecology report for each site in conjunction with a species list and mapping
- Development of predictive habitat maps (following from current habitat maps) to indicate the potential extent of wetland, woodland and open habitats (grassland, heathland etc.) on cutaway areas post peat production and rehabilitation phases
- Identification of core biodiversity areas for habitats and species
- Development of an indicative biodiversity map based on data collated has been developed and is accessible to all businesses in Bord na Móna
- Input to the Bord na Móna *Strategic Framework for Future Use of Peatlands*
- Direct input to the MAES (*Mapping and Assessment of Ecosystems and their Services*) project for Ireland
- Identification of Raised Bog areas with active raised bog habitat and sites with good potential for restoration
- Identification and survey of important focal points for wintering and breeding birds, particularly those of conservation interest such as Whooper Swan, Red Grouse, Lapwing, Curlew and Hen Harrier
- Identification of important focal points for other species of conservation interest such as Marsh Fritillary and White-Clawed Crayfish
- Identification, survey and targeted management of areas identified as problematic in terms of invasive species such as Japanese Knotweed
- Sharing of species data with the *National Biodiversity Data Centre* and other interest groups
- Monitoring of biodiversity hotspots to assess status of habitats and species

The National Peatlands Council visited the restored Cuckoo Hill Bog in July 2013.

Building on this work the following actions can be outlined for the period 2016-2021.

Actions

Update the baseline habitat survey of all Bord na Móna bogs

Support and develop surveys
to update the knowledge base where required – particularly for species and habitats of conservation interest

Monitor existing and identify additional areas
to be managed primarily for biodiversity into the future taking into consideration targeted habitat (primarily woodland and wetland) and species management, as well as management for pollinators

Strengthen and enhance the network of biodiversity areas
that connect with other recognised areas of high biodiversity value outside of the Bord na Móna bogs and explore the potential for wildlife/green infrastructure corridors

Develop a map of the ecosystem goods and services of Bord na Móna bogs

Monitor existing and identify additional areas to be managed
primarily for the eradication and control of invasive species now into the future

These actions will require ongoing work including:

Continue the baseline ecology survey
initiated in 2009; adding extra layers of data from targeted surveys and ongoing updates

Maintain the GIS database of habitat maps
and continue to update predictive mapping as peat production continues and cutaway areas develop

Continue the baseline ecology survey... adding extra layers of data.

Input to the Bord na Móna *Strategic Framework for Future Use of Peatlands*
(to be reviewed 2016) to identify suitable areas to be zoned for biodiversity now and in the future

Carry out targeted surveys in appropriate areas for species of conservation interest
– for example butterfly and other invertebrate surveys at high biodiversity value sites; continue to work with groups such as Butterfly Conservation Ireland to inform targeted management for butterflies, moths and other invertebrates

Explore how volunteers and citizen science, and new technologies
such as the use of unmanned aerial vehicles (UAVs) and remote sensing methods, can be incorporated into the monitoring of Bord na Móna bogs

Re-assess the information gaps for future surveys
of cutaway bog and other habitats for breeding waders, similar to the survey of Bord na Móna bog areas for breeding Curlew initiated in 2014-15

Support the BirdWatch Ireland breeding wader 5-year monitoring survey
at Boora and other established annual surveys of Bord na Móna bogs such as the International Swan Census and I-WeBS counts at Boora

Above left: Rosebay willow herb and funnel-spider webs (above right) are commonly seen on the cutaway bogs.

Above centre: *Sphagnum squarrosum* on cutaway bog at Derryclure.

Carry out a synthesis of ecology data gathered to date
including ecology data collated by other parties relating to Bord na Móna bogs to determine current and possible future patterns in habitat and species distribution, considering also the potential impacts of climate change

Where Bord na Móna bogs are adjacent to nature conservation designated areas and/or undesignated areas of high biodiversity value
(such as *Coillte* Biodiversity Areas) work with relevant bodies to connect and mutually enhance adjoining areas

Work with national initiatives to develop Green Infrastructure

Develop a map of the ecosystem goods and services of Bord na Móna bogs
to be based on current methods used in EU MAES project

Continue to monitor and implement control measures for invasive species,
working with local authorities and nature conservation groups

Key Indicators of Success

The key indicators of success of these actions will be:

Publication of the Bord na Móna Biodiversity Action Plan (following consultation with relevant bodies and interest groups); to be launched and distributed in 2016

Updated baseline ecology survey for all bogs

A current and relevant biodiversity knowledge base from which to plan for biodiversity management and conservation across the wider Bord na Móna bogs

Database and distribution maps of species of conservation interest as well as invasive species on Bord na Móna bogs; continue to share these with the National Biodiversity Data Centre

A map of potential biodiversity networks using GIS to link up Bord na Móna bogs with other high value biodiversity areas

A map of the ecosystem goods and services of Bord na Móna bogs

A zoning map of Bord na Móna bogs showing core areas of biodiversity interest with potential for biodiversity management in line with zoning for other potential uses

Long-term monitoring of habitats and species within biodiversity areas, including invasive species

Mapping the Bord na Móna bogs

In 2009, Bord na Móna commenced the development of a habitat classification system for the industrial cutaway and modified bogs of Ireland. While there is a recognised habitat classification system in use in Ireland, this system assigns all habitats on cutover/cutaway bog to PB4 Cutover Bog (Fossitt 2000). While this classification is useful for relatively small areas of cutover on the margins of larger intact peatland complexes it does not account for the huge variability and diversity in habitat across the 80,000 ha of Bord na Móna bogs. In response to this the Ecology Team developed a classification system (based on established systems) that would reflect the variability in habitats and different successional phases on the Bord na Móna bogs.

Above: Ballycon Bog,showing wetland and woodland areas. Above right: Birch woodland at Turraun.

The baseline habitat survey itself was a significant undertaking and by 2012 all bog areas had the initial survey completed. Since then the maps have been updated on an ongoing basis (2013, 2014 and 2015) to reflect changes and developments in the cutaway bog areas in particular. The results of the baseline survey can be described under a number of main categories of land-use, within which there are a number of habitats. A general overview of the habitats and characteristics is presented in the table in Appendix II.

ACTIVE PRODUCTION AREAS: this currently accounts for up to 55% of the bog area owned by Bord na Móna and is the active footprint of peat production plus associated transport and access facilities, workshops and hardstand areas. The main habitats are bare peat, bare ground and built habitats. Hotspots for biodiversity in this category are the active railway lines which are home to a diversity of grassland species and rare plant species such as Blue Fleabane and Basil Thyme (both of which form part of the 'weed' flora recorded).

CUTAWAY BOG AREAS: this category currently accounts for up to 30% of the total Bord na Móna bog area and can comprise scattered sections that are out of production located amongst large parcels and/or more extensive cutaway areas such as those around Boora and the Oweninny bogs. These areas range from species-poor to species-diverse depending largely on the drainage and length of time out of peat production. The habitats can range from pioneer (wet/dry) to more complex such as diverse poor fen and rich fen habitats to established birch woodland cover. The biodiversity value is also variable as species poor areas with some cover of bare peat can be ideal habitat for feeding wintering Whooper Swans and breeding Lapwing, while more mature wetland habitats have a rich flora and are ideal for roosting Whooper Swans, breeding Teal and reed-bed habitat. Species rich grassland and wetland habitats are generally hotspots for a range of invertebrate species. This category also includes areas in other after-uses such as areas planted by Coillte, and other commercial developments.

BOG REMNANTS AND MARGINAL AREAS: this category accounts for up to 12% of the bog area and largely comprises areas of bog remnant (i.e. degraded raised bog with supporting habitats as well as some patches of active raised bog on larger bog remnants such as Cloonshannagh, Mostrim and Clynan) together with patches of birch woodland and cutover bog on the margins of larger active peat production areas. These areas can be of variable biodiversity value and viability, with the larger areas acting as refugia for peatland species (flora and fauna) and considered to form a significant component of the Bord na Móna biodiversity network. These remnants and margins can be local biodiversity hotspots for species of conservation interest such as breeding Curlew and *Sphagnum pulchrum* on bog remnants, Marsh Fritillary butterfly and the plants Alder Buckthorn (on cutover edges) and Basil Thyme (on marginal ground).

DRAINED RAISED BOGS: during the baseline survey a number of bog areas (<3% of total bog area) never developed fully for peat production were identified as being of high conservation value nationally. Some of these bogs still retained active raised bog habitat and all showed good potential for restoration of active and degraded raised bog habitat. These bogs now form the core of the Bord na Móna Raised Bog Restoration programme which has effected the restoration of over 1,000 ha of raised bog across the Irish Midlands. Most of these sites are now being considered for designation as SAC or NHA as part of the National Raised Bog Conservation review while some are relatively small and considered as bog remnants of local ecological importance. It is planned to continue this work on similar areas in coming years.

Below left: Bog pool, Ballydangan Bog. Below right: Drain blocking at Knock Bog.

Derries
2000
Derries Bog near Pollagh in Co. Offaly: aerial photo showing that bare peat dominates.

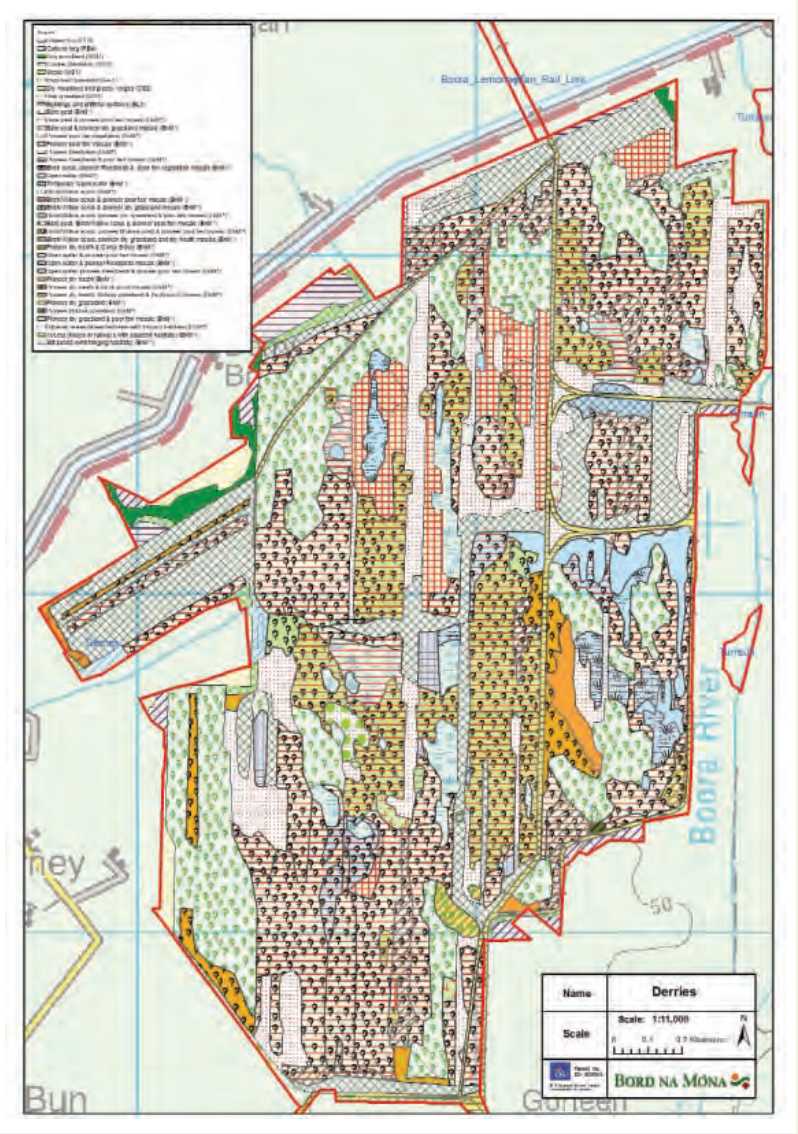
Derries
2011
Aerial photo showing that as peat production decreases, vegetation increases. With targeted rehabilitation the cutaway is stabilised and biodiversity increases.

The Bord na Móna bogs dataset

An important aspect of the baseline habitat survey was to create a GIS database to illustrate the extent of the habitats present on each site and across the full range of the bogs. For each bog area there is a current habitat map and a land use map showing the basic uses within each bog production unit (access, watercourses etc.). Following from the habitats maps, and using Lidar data which reflects topography and surface levels, indicative maps were developed to illustrate how each bog area may develop post peat production and rehabilitation. Species distribution maps are also a work in progress and updated as new records are taken. All mapping data is available to review by request.

Maps used: OSI and Bing
Ordnance Survey Ireland Permit No. EN 0035616
© Ordnance Survey Ireland Government of Ireland.
© Bing Maps Microsoft Corporation

For each bog area there is a current habitat map and a land use map showing the basic uses



Derries Habitat Map (right)

2013

Key changes to note from 2009 map: Reduced bare peat, increased vegetation cover, dominant habitats are birch/wetland mosaic.

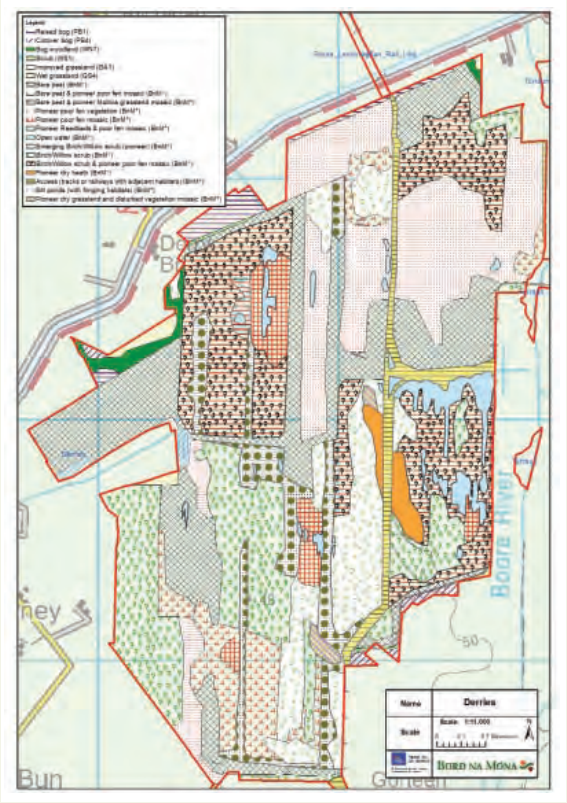
Derries Habitat Map (below)

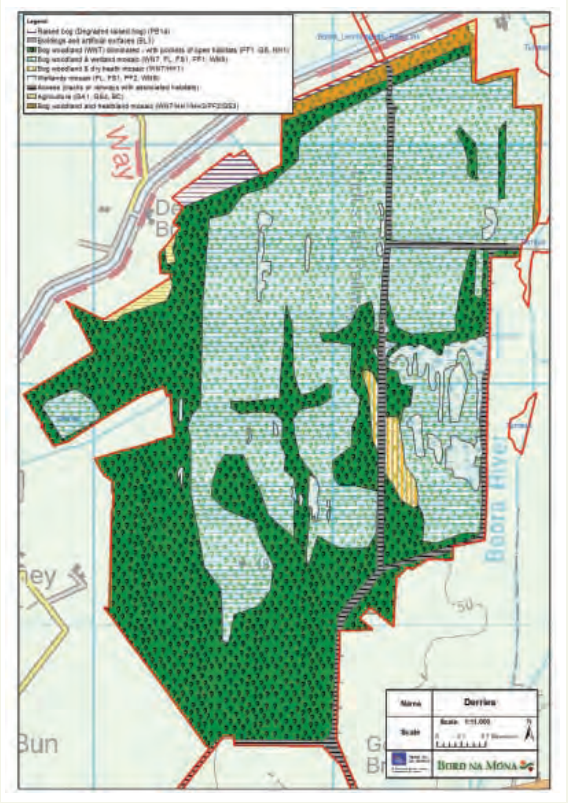
2009

Derries Habitat Map (below right)

Future

It is predicted that birch/wetland mosaic will develop further, dominating the site.





Habitat creation and management on cutaway bogs

The baseline habitat survey has resulted in a significant body of data which outlines the range of habitats present on each bog as well as an informed projection as to how sites will develop post peat production and rehabilitation. While there are a number of habitats developing, it is likely that in the future the main habitats emerging on the cutaway bogs will comprise wetland and woodland types, in a mosaic pattern across each site overlain with a mix of activities such as amenity and renewables. These cutaway areas will be fringed by existing bog remnants, birch woodland and grassland habitats, the majority of sites being linked by the extensive Bord na Móna rail link.

Wetland Habitats

Up to 50% of the Bord na Móna bogs will revert to wetland habitats post rehabilitation. These wetlands will predominantly be peatland habitats given that there will be a layer of peat remaining in the majority of sites. The wetland areas will form a mosaic with other habitats such as scrub and wet woodland, often with small patches of wet grassland and heathland intermittent, reflecting the heterogeneity within any given site.

In the future the main habitats emerging on the cutaway bogs will comprise wetland and woodland types, in a mosaic pattern across each site

The main aim of rehabilitation will be to rewet former production areas as much as possible without impacting on adjoining lands to maximise the benefits for biodiversity and carbon. Where fen peat remains, this will result in the development of fen habitats. Fens are influenced by groundwater and by their nature, are peat-forming, representing the precursor of ombrotrophic or rain fed peatlands such as bogs. The dominant fen type will be poor fen mixed with reed-swamp and tall herb vegetation, such as at Ballycon Bog.

Within these areas there is some open water but this will not be extensive in the future. Fens will become extensive in those areas that are currently pumped for peat production. There are some patches of rich fen habitat emerging, such as at Lullymore Wetlands, although this habitat is limited in the extent recorded to date.

Where ombrotrophic conditions (acidic peat) remains, rewetting of these areas will result in the development of bog habitats. These will range from wet heathland to 'embryonic' bog habitats – that is, habitats that comprise peat forming vegetation. They will have a number of vegetative features similar to raised bog habitats but lacking the structure and classic hydrological and vegetative character, which is likely to re-develop in the long-term.

Woodland Habitats

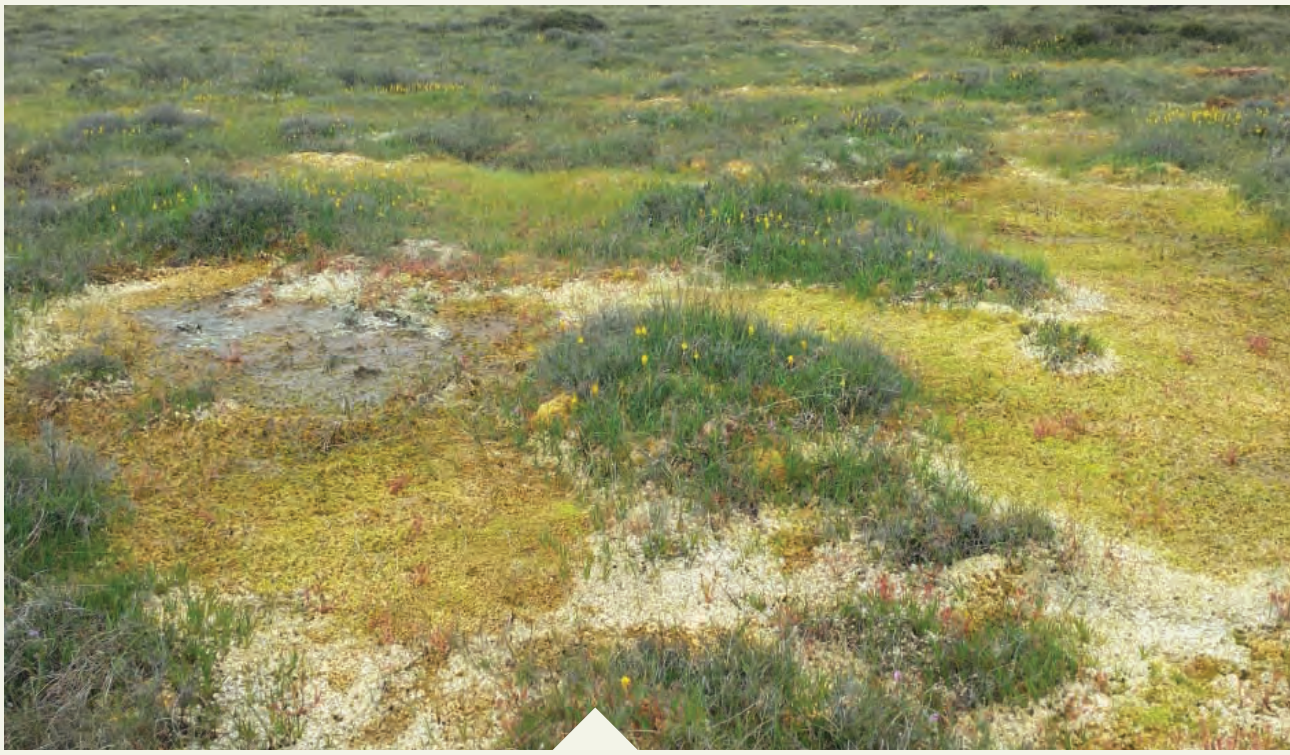
The remaining 50% or so of the Bord na Móna bogs will revert to scrub/woodland habitats. Again, these areas will be largely underlain by peat soils and will be dominated by birch in the main, with patches of willow and pine emerging. The woodland areas will vary from site to site, forming mosaics with wetland areas and patches of other less abundant habitats such as grassland and heath.

The development of these woodlands will vary, determined by the local conditions. Where wet peat soils remain, the birch exhibits patchy growth and the ground flora is dominated by wetland species. Dry birch areas are generally denser in growth and develop a closed canopy, such as at Turraun. Their long-term development will be monitored.

The future management of these woodland habitats will be of national importance, particularly given the scarcity of native woodland in the Irish countryside. Bord na Móna has already undertaken two Native Woodland Scheme projects under the guidance of Woodlands of Ireland and the Forest Service, and there is significant potential to add to these areas. While scattered areas of the Bord na Móna cutaway bog areas have also been planted by Coillte in the past with a view to commercial development of these stands, these areas are deemed largely commercially unviable. Management of these Coillte stands in will also contribute to the national native woodland resource in the future.

Woodland/wetland mosaics will dominate the cutaway bogs into the future.

Bord na Móna biodiversity areas and hotspots



Regenerating active raised bog on restored Bord na Móna bog.

Over the course of the baseline habitat survey and as a result of the ongoing rehabilitation of cutaway bog areas since the 1990s, a number of areas of high biodiversity value have been identified. These can be categorised as:

Raised bog areas with potential for restoration

This includes a range of raised bog areas including those prioritised for restoration under the Bord na Móna Raised Bog Restoration programme 2009-present. The first site restored was Abbeyleix Bog and this was very much a collaborative project with the local community and others including the National Parks and Wildlife Service, the Irish Peatland Conservation Council (IPCC) and Laois County Council. Following from that initial project the Bord na Móna Raised Bog Restoration programme has focused on clusters of raised bog sites with clear potential for restoration in East Galway and Roscommon.

The main conservation interest on these sites is the potential to create conditions favourable for the re-establishment of *active* raised bog habitat, a priority habitat listed under the EU Habitats Directive, by means of drain blocking and rewetting. During the baseline survey, these areas were identified with restoration potential for *active* raised bog habitat as well as having other features of biodiversity interest and nature conservation value such as use by Red Grouse, Curlew, rare plant species etc. It was subsequently agreed by all in Bord na Móna that these sites should be restored. In the interim, the National Parks and Wildlife Service has reviewed the condition of the bogs and selected the majority of the Bord na Móna sites for designation as SAC and/or NHA habitats.

The future of these bog areas will be determined by changes in climate, but for now they are clearly earmarked for biodiversity within the Bord na Móna network. The sites are monitored using the standard ecotope monitoring method employed by the National Parks and Wildlife Service.

An example of the ecotope mapping work for Abbeyleix Bog is shown overleaf.

An example of the ecotope mapping work for Abbeyleix Bog is shown here to demonstrate how conditions can respond to drain blocking over a relatively short period of time (five years).

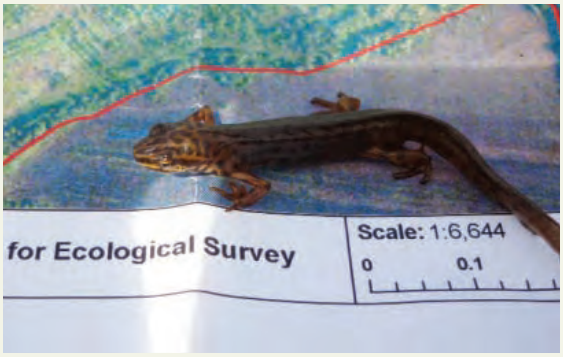
Abbeyleix Ecotope Map (right)

2014

Key changes to note from 2009 map: the area of sub-central ecotope (orange) which is characterised by increased cover of *Sphagnum* species, has increased on both sides of the bog.

Abbeyleix Ecotope Map (below)

2009



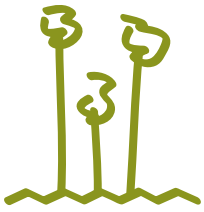
A curious newt helping out with the survey work.

Legend

- Raised bog PB1 - Facebank ecotope
- Raised bog PB1 - Marginal ecotope
- Raised bog PB1 - Marginal ecotope with sub-marginal patches
- Raised bog PB1 - Sub-marginal ecotope
- Raised bog PB1 - Sub-central ecotope
- Raised bog PB1 - Inactive flush
- Raised bog PB1 - Sub-central ecotope with Sub-marginal patches
- Raised bog PB1 - Facebank/marginal mosaic

Bord na Móna Raised Bog Restoration programme 2009 to present

	Year of Restoration	Name	County	Comment	High bog area ha	Total site area ha
1	2015 -ongoing	Knock Bog (Ballydangan North)	RO	Also contains small wetland areas with fen and transition mire	129	187
2	2015	Mostrim Bog remnant	LO		41	41
3	2015	Cranberry Lough Bog	RO	Also contains small lough and associated fen habitat	76	98
4	2014	Cloonshannagh Bog remnant	RO		36	36
5	2014	Paul's Lough Bog	GY		118	132
6	2014	Lenareagh Bog	GY		90	112
7	2013	Ballydangan Bog	RO	Leased to Moore Gun Club; Red Grouse project; breeding Curlew present	215	240
8	2012	Moyarwood Bog	GY	Marsh Fritillary site	171	197
9	2011	Cuckoo Hill Bog	RO	Also contains regenerating lagg zone/ secondary fen habitats	60	145
10	2009	Abbeyleix Bog	LS	Leased to local community; important lagg zone habitat	104	190
Total restored to date					**1040**	**1378**
11	2016+	Clera Island Bog	RO		157	179
12		Killeglan Bog cluster	RO	Red Grouse present	334	440
13		Clonwhelan Bog	LO/WH	Part-leased to local gun club	132	162
14		Glenlough Bog	LO/WH		262	329
15		Cornaveagh Bog remnant	RO		21	21
Earmarked for restoration 2016+					**906**	**1131**
Total (overall)					**1946**	**2509**



the future

of these bog areas will be determined by changes in climate, but for now they are clearly earmarked for biodiversity within the Bord na Móna network.

Rehabilitated cutaway bog areas with high biodiversity value

Since the 1990s, Bord na Móna has been actively carrying out research into rehabilitation of cutaway bogs for the purposes of promoting biodiversity. This has resulted in an extensive network of cutaway bog with a range of established habitats. These cutaway bog areas illustrate how former peat production areas can be rehabilitated with a combination of natural regeneration and targeted rehabilitation to return relatively quickly to species diverse areas.

The network of rehabilitated bog areas to date includes the Lough Boora Discovery Parklands complex of bogs (c.2,500 ha cutaway bog habitats – wetland, woodland, grassland, heathland, riparian etc.), the Oweninny bog complex (~6,500 ha rehabilitated acidic cutaway with regenerating peat-forming habitats), Ballycon wetland rehabilitated in 2006 (~240 ha, fen and birch woodland habitats) and Lullymore wetland (~250 ha, rich fen and birch woodland habitat).

Further areas added to this network in the period 2010-2015 include Kilberry wetlands, Bunahinly rewetted bog and Derrycashel and Cavemount wetlands. Each of these areas are outlined in the following tables and presented on the accompanying map (pages 40 and 41).

Bord na Móna cutaway bog rehabilitation 2010-2015

	Bog Name	**County**	**Target Habitats**	**Rehabilitation/ Management**	**Comments**	**Year**	**Area** ha
1	Corlea cutaway – Wetlands Heritage Ireland	LD	Poor fen, scrub, wetland	Wetland creation, amenity	Lease agreement in development with local community	ongoing	16
2	Cavemount	OY	Poor fen, scrub	Fertiliser treatment	Rehabilitation of bare peat areas	2015	47
3	Cavemount	OY	Wetland	Wetland creation, outfall blocking, Overflow management	Hydrological management	2015	9
4	Lullymore	KE	Wetland, poor fen, scrub, woodland	Outfall blocking and maintenance	Wetland enhancement	2015	< 1
5	Clooniff	RN	Wetland	Berm creation, vegetation translocation	Coolumper Reedbed trial	2015	< 1
6	Mountlucas Windfarm	OY	Wetland, poor fen, scrub, grassland	Wetland creation, overflow management, re-profiling, gravel pit rehabilitation	Rehabilitation of windfarm area	2015	26
7	Bruckana Windfarm	TY	Wetland, poor fen	Wetland creation, overflow management	Rehabilitation of windfarm area	2015	14
8	Srahmore	MO	Poor fen, embryonic *Sphagnum* vegetation	Hydrological management, deep peat re-vegetation, *Sphagnum* inoculation	Rehabilitation of peat deposition area	2010-2015	34

Bord na Móna cutaway bog rehabilitation 2010-2015

	Bog Name	County	Target Habitats	Rehabilitation/ Management	Comments	Year	Area ha
9	Lullymore	KE	Wetland, poor fen, scrub, woodland	Wetland creation, drainage re-alignment	Lease agreement with Lullymore Heritage & Discovery Centre; includes 3 ha of broad-leaved woodland on mineral island	2014-2015	17
10	Rathvilla Gravel Pit (Cloncreen)	OY	Grassland, open water, scrub	Re-profiling, retention of important ecological features	Gravel quarry rehabilitation	2014-2015	9
11	Lough Boora Visitor Centre	OY	Building, Amenity	Construction	Building, landscaping	2014	2
12	Derryhinch	OY	Poor fen, scrub	Tree planting, fertiliser application	Buffer zone along motorway	2014	5
4	Lullymore	KE	Poor fen, scrub	Fertiliser treatment	Rehabilitation of bare peat areas	2014	13
13	Mountlucas	OY	Poor fen, scrub	Fertiliser treatment	Rehabilitation of bare peat areas	2014	5
14	Derrycashel	RN	Wetland, poor fen	Berm construction, outfall blocking	Wetland creation	2014	56
15	Cloonroosk Bog	OY/KE	Raised bog	Field-drain blocking	Restoration of bog remnant	2014	56
16	Ballivor	WM	Poor fen, *Sphagnum*-dominated vegetation	Wetland creation, drain-blocking	Old sod peat cutaway; embryonic peat-forming *Sphagnum*-dominated area	2014	9
17	Kilberry	KE	Wetland, poor fen, scrub	Field-drain blocking, outfall blocking	Wetland creation	2013-2014	38
18	Ballycon	OY	Poor fen, scrub	Fertiliser treatment	Regenerating bare peat headland (former travel path)	2013	7
19	Boora	OY	Heath	Heather seeding	Heather brash trial	2013	<1
18	Ballycon	OY	Heath	Heather seeding	Heather brash trial	2013	<1
20	Erenagh	RN	Wetland, poor fen	Wetland creation, berm construction, hydrological management	Wetland creation	2013	1
21	Drumman	OY	Poor fen	Grass seed nursery crop	Nursery crop trial	2013	1
17	Kilberry	KE	Poor fen, Embryonic peat-forming *Sphagnum*-dominated vegetation	*Sphagnum* plot inoculation	Kilberry *Sphagnum* trial	2012-2013	2
21	Drumman	OY	Poor fen, scrub	Fertiliser treatment	Regenerating bare peat areas	2012	14

Bord na Móna cutaway bog rehabilitation 2010-2015

	Bog Name	County	Target Habitats	Rehabilitation/ Management	Comments	Year	Area ha
22	Drinagh	OY	Wetland, poor fen	Landscaping, wetland creation, scrub removal	Drinagh breeding wader habitat trial	2010-2011	31
23	Bunahinly	OY	Regenerating raised bog	Field drains blocked	Deep peat cutaway rehab trial	2010	2
24	Kilmacshane	GY	Poor fen	Fertiliser & nursery crop trials	Kilmacshane fertiliser and nursery crop trials	2010	1
21	Drumman	OY	Poor fen, scrub	Fertiliser, lime & nursery crop trials	Drumman fertiliser and nursery crop trials	2010	12
25	Lullybeg	KE	Grassland, poor fen, scrub	Conservation management, scrub control	BCI Management agreement; diverse grassland; Marsh Fritillary site	2010-ongoing	9
Sub-total (rehabilitation 2010-2015)							**436**

Pre 2009

	Bog Name	County	Target Habitats	Rehabilitation/ Management	Comments	Year	Area ha
	Lough Boora Discovery Park	**OY**	**Outlined below**	**Mixed (outlined below)**	**Developed as a complex of several sites, paths and trackways around Boora (listed below are sub-sites)**	**1990s -ongoing**	**Total: 2,257**
26	Loch Clochan and wetlands (LBDP)	OY	Lake, wetland, poor fen, grassland, scrub	Lake creation, amenity development, angling, wetland creation	Area developed for local amenity; lease agreement with local fishing club	1990s	45
27	Finnamores Wetlands (LBDP)	OY	Lake, wetland, poor fen, grassland, scrub	Lake creation, amenity development, landscaping, wetland creation	Area developed for local amenity; lease agreement with local fishing club; Rich floral diversity	1990s	37
28	Lough Boora Lakes (LBDP)	OY	Lake, grassland, scrub	Lake creation, landscaping, amenity	Area developed for local amenity, angling	1990s	30
29	Leabeg wetlands (LBDP)	OY	Wetland, poor fen, scrub	Wetland creation, amenity, outfall blocking	Area developed for local amenity, important waterbird area	1990s	70
30	Tumduff wetlands (LBDP)	OY	Wetland, poor fen, scrub	Wetland enhancement, amenity, outfall blocking, managing outflows	Area developed for local amenity; cutaway bog regenerating since 1990s; diverse range of habitats, used by Whooper Swans	1990s	104
31	Drinagh Lake and wetlands (LBDP)	OY	Lake, wetland, scrub	Wetland creation, outfall blocking, managing outflows	Diverse mosaic of dry and wetland habitats important waterbird area	1990s	236

Pre 2009

	Bog Name	County	Target Habitats	Rehabilitation/ Management	Comments	Year	Area ha
32	Derries wetlands (LBDP)	OY	Wetland, poor fen, scrub	Wetland creation, outfall blocking, managing outflows, amenity	Diverse mosaic of dry and wetland habitats cycle-track	1990s-ongoing	171
33	Turraun (LBDP)	OY	Lake, wetland, woodland, grassland, heath	Wetland creation, outfall blocking, amenity, path maintenance	Diverse mosaic of dry and wetland habitats; diverse flora and fauna, cycle-track development	1990s - ongoing	176
34	Clongawney (LBDP)	OY	Lake, wetland	Lake creation, outfall blocking	Acidic lake; colonising naturally	1990s	44
35	South Boora wetlands (LBDP)	OY	Wetland	Wetland creation, outfall blocking	Developing wetland area	1990s	23
	Various (LBDP)	OY	Conifer plantation, other broad-leaved plantation,	Conifer & broad-leaved plantation on cutaway, amenity	Plantations associated with LBDP	1980 - 1990s - ongoing	772
36	Sculpture Park & Amenity trails (LBDP)	OY	Amenity, cultural	Landscaping	Sculpture Park; cycle-track development	1990s-ongoing	53
37	Blackwater	OY	Wetland	Wetland creation, berm construction, drain-blocking	Important waterbird area	1990s	24
38	Blackwater	OY	Lake, wetland, grassland	Lake creation, amenity	Area developed for local amenity	1990s	15
39	Doire Bhile	TP	Lake, wetland, poor fen, grassland, scrub	Lake creation, amenity development, angling lake, walkway, wetland creation	Lease agreement with local community; Marsh Fritillary site	1990s	42
40	Derryounce	OY	Lake, wetland, poor fen, scrub, embryonic peat-forming *Sphagnum* vegetation	Lake creation, wetland creation, angling lake, walkway	Lease agreement with local community; Managed as fishery	1990s - ongoing	32
1	Corlea Trackway Visitor Centre	LD	Degraded raised and cutover bog	Bunding of bog remnant,lagoon creation, amenity	Managed as part of preservation of wooden track-way at Corlea Centre	1990s	16
41	Clonfinlough (Blackwater)	OY	Wetland, rich fen, scrub	Wetland creation, berm construction, drain blocking	Adjacent to Finlough SAC area	1990s	33
42	Lismanny	GY	Raised bog	Amenity	Lease agreement with local community; boardwalk; local BnM biodiversity area	1990s	15
43	Killaun	OY	Cutover bog, fen, woodland	Amenity	Lease agreement with local community; boardwalk; local BnM biodiversity area	1990s	8

Pre 2009

	Bog Name	County	Target Habitats	Rehabilitation/ Management	Comments	Year	Area ha
44	Oweninny	MO	Acidic wetland, poor fen, embryonic peat-forming vegetation	Mixed	Mixed use; Bellacorick windfarm	2001 - 2003	6,500
45	O'Boyle's Bog	MO	Blanket bog	Deep-peat drain blocking	Regenerating blanket bog adjoining Knockmoyle-Sheskin Nature Reserve	2003	350
9	Lullymore	OY	Wetland, poor fen, scrub, woodland	Wetland enhancement, outfall blocking	Regenerating cutaway bog, *Cladium* fen development	2006	70
46	Ballycon wetlands	OY	Wetland, poor fen, scrub	Wetland enhancement, berm construction, drain blocking, outfall management	Important waterbird site; site utilised by Whooper Swans	2006	226
47	Turraun	OY	Woodland	Tree planting (Oak & Scot's Pine)	Native Woodland Scheme	2008	5
48	Clongawney	OY	Woodland	Tree planting (Oak & Scot's Pine)	Native Woodland Scheme	2008	5
49	Derraghan woodland	LD	Birch woodland	Naturally developing cutaway woodland	Local biodiversity area	/	84
Sub-total (pre-2009)							**9,682**

Woodland remnants zoned for biodiversity

	Bog Name	County	Target Habitats	Rehabilitation/ Management	Comments	Year	Area ha
50	Derries woodlands, Clongawney Bog	OY	Oak-Ash-Hazel woodland	Mature woodland	Mature woodland on glacial mounds surrounded by cutaway; local biodiversity area	/	6
51	Derrylesk Island woodland – Mountlucas Bog	OY	Oak-Ash-Hazel woodland	Naturally developing woodland	Mineral island surrounded by cutaway bog; local biodiversity area	/	19
52	Derrynabroune Island	TY	Oak-Ash-Hazel woodland	Naturally developing woodland	Mineral island surrounded by cutaway bog; local biodiversity area; archaeological site	/	3
53	Derryarogue Island	LD	Calcareous grassland, scrub, woodland	Naturally developing woodland	Mineral island surrounded by cutaway bog; local biodiversity area	/	12
Sub-total (woodland remnants)							**40**

Raised bog remnants zoned for biodiversity

	Bog Name	County	Target Habitats	Rehabilitation/ Management	Comments	Year	Area ha
54	Cloneragh Bog	LS	Raised bog remnant	/	Undeveloped raised bog remnant; breeding Curlew site	/	43
55	Derryhogan Bog	TY	Raised bog remnant, peat-forming *Sphagnum*-dominated vegetation	/	Breeding Curlew site; local biodiversity area	/	75
56	Cloncannon Bog Remnant (Ticknevin)	OY	Raised bog	/	Undeveloped raised bog remnant; local biodiversity area	/	40
57	Clonavoe Bog Remnant (Clonsast Bulge)	OY	Raised bog	/	Undeveloped raised bog remnant; local biodiversity area	/	61
58	Bracklin Bog Remnant	WH	Raised bog	/	Undeveloped raised bog remnant; local biodiversity area	/	19
Sub-total (raised bog remnants zoned for biodiversity)							**238**

Designated for nature conservation

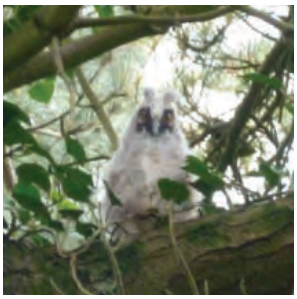
	Overlap with other SAC, SPA, NHA sites		Various	No management	Overlap along rivers, bogs, canal etc.	/	**821**
Sub-total (designated for nature conservation)							**821**

Forestry development on cutaway (commercial stands and trials)

	Conifer plantation			Tree-planting, forestry development	Leased to Coillte, other conifer plantation	/	3,269
	Other forestry plantation			Tree-planting, forestry development	Biomass trials, BOGFOR trials	/	139
Sub-total (forestry)							**3,408**

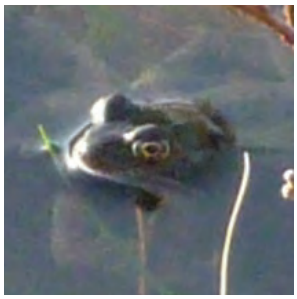
Overall Total	**14,625**

Irish Hare



Long-eared Owl chick

Bumble Bee on Heather



Common Frog

Bord na Móna Bog Restoration and Rehabilitation Sites

These cutaway bog areas illustrate how former peat production areas can be rehabilitated with a combination of natural regeneration and targeted rehabilitation to return relatively quickly to species diverse areas.

Above left: Marsh Helleborine.
Above right: Reed.
Right: Meadow Brown Butterfly.

ROSCOMMON
LONGFORD
WESTMEATH
OFFALY
LAOIS
GALWAY
TIPPERARY
Legend
Bog Restoration Site
Rehabilitation Site

Hotspots for species

Because of the extensive environmental variability presented by the Bord na Móna bog areas, there is a huge diversity of species to be found. A full list of species of conservation concern recorded on Bord na Móna bog areas to date is presented in Appendix IV.

A few of these species are highlighted below to demonstrate the importance of the Bord na Móna sites to their national populations. The species have been recorded often on discrete areas of bog that have been identified as valuable for species of conservation interest such as Littleton Bog for breeding Curlew (an area of regenerating cutaway), Lullymore and Clongawney Bogs for Marsh Fritillary (marginal areas of regenerating cutaway), as well as a number of Hen Harrier roosting sites (regenerating cutaway and bog remnants). In some cases the areas are relatively small, or they are areas with ongoing activity. These areas are managed in conjunction with the National Parks and Wildlife Service, local community groups and ENGOs. Specific site detail and information for species of conservation concern is not presented here.

> **“ Because of the extensive environmental variability presented by the Bord na Móna bog areas, there is a huge diversity of species to be found ”**

Marsh Fritillary

Marsh Fritillary (*Euphydryas aurinia*) is considered threatened/vulnerable in many countries including Ireland. This butterfly species relies heavily on wet grassland sites where the presence of the main food plant devil’s bit scabious is essential as this is the only food plant of the larvae (caterpillars). Habitat loss has led to the decline in this species. Bord na Móna Ecology continues to identify new sites in order that appropriate habitat management can take place. Butterfly Conservation Ireland in collaboration with Bord na Móna manage an important site for this species on a cutaway bog in Co. Kildare. A further area in Kildare was transferred in the early 2000s to, and is now managed by the IPCC. The Bord na Móna bog areas currently monitored for Marsh Fritillary include Lullymore (Co. Kildare), Carrickhill (Co. Laois), Doire Bhile (Littleton, Co. Tipperary), Moyarwood (Co. Galway), Clongawney (Co. Offaly). A local community group at Ballivor Bog (Co Meath) recorded a new site for Marsh Fritillary in 2015.

Otter

The Otter (*Lutra lutra*) is one of Ireland’s iconic wetland mammal species. They spend much of their life in and around waterbodies such as lakes, ponds, rivers and our coastline, where they eat a variety of fish. They will also eat birds’ eggs. Otter has declined across most of Europe, however their numbers appear to have remained stable in Ireland. The Otter is a shy creature and is rarely seen, however they leave distinctive signs that they have visited a site in the form of footprints and spraints (droppings). Silt ponds, streams, drainage channels and wetlands in Bord na Móna bogs are attractive for Otter and there has been widespread recording of this species across the Bord na Móna estate.

Serrated wintergreen

In February 2015 serrated wintergreen (*Orthilia secunda*) was first observed in Ballydangan Bog, Co. Roscommon during the annual Biodiversity Action Plan review day field trip. Up until recently, this species was thought to be extinct on raised bog habitats across the Republic of Ireland, with only two small populations remaining in Co. Fermanagh. This plant is approximately 65cm tall and flowers in the summertime, with all of the flowers located on one side of the flower stem. Serrated wintergreen are semi-parasitic and rely on root interactions with mycorrhizal fungi in order to exist in the harsh environment of the bog. Bord na Móna restoration work in Ballydangan Bog was completed in 2013 and the site is home to the Ballydangan Bog Red Grouse Project. The discovery of serrated wintergreen highlights the importance of these restoration programmes in this bog and other similar bogs.

Lapwing

Lapwing (*Vanellus vanellus*) is a species that has undergone a severe reduction in numbers in recent times and is now Red Listed as a breeding species in Ireland. They are a ground nesting bird and select open sites with low vegetation. Several Bord na Móna rehabilitated sites (such as Drinagh Bog) are used as breeding sites for Lapwing and specific rehabilitation techniques aimed at making cutaway bogs more attractive to Lapwing and other waders are in development. It is important that their breeding sites are open, without trees and scrub and that the surrounding areas contain habitats with an abundance of insects, which both the adults and chicks eat. Ballycon, Lullymore, Cavemount. Blackwater and the Lough Boora complex are all important Bord na Móna sites for breeding Lapwing.

Curlew

Curlew (*Numenius arquata*) was once a widespread breeding species, when its haunting call was heard all over Ireland. In recent years a decline of almost 80% has been observed in the Irish breeding population. Curlew are ground nesting birds and favour wetland sites for nesting, they eat insects which they extract from the soil using their long, curved beak. Bord na Móna has a number of sites where the breeding success of Curlew is monitored in a joint project with BirdWatch Ireland which commenced in 2015. These include Ballydangan Bog (Co. Roscommon), Derryhogan Bog (part of Littleton Bog, Co. Tipperary), Blackriver Bog (Co. Kildare) and Cloneragh Bog (Co. Laois). Each of these sites in being monitored for breeding Curlew and future management measures will be developed and implemented under the continued guidance of BirdWatch Ireland as part of the rehabilitation planning for the sites.

Groundwork.

3.3

Objective 3

Develop and Promote Best Practice in Terms of Rehabilitation for all Bord na Móna Bogs to Stabilise Former Peat Production Areas and Enhance Biodiversity

Almost all peatlands in Ireland have been modified to some degree and require some level of management to prevent further degradation and/or improve and enhance their condition. There is a growing recognition that investment in restoration and rehabilitation of peatlands can have enormous benefits for society both in terms of social and natural capital.

As part of Condition 10 of IPC Licensing Bord na Móna is required to develop rehabilitation plans for all the bogs areas within the licensed areas. While it is not possible to develop final rehabilitation plans for bog areas that are still in peat production as the final drainage plan and peat depths are not yet known, in the interim, using Lidar data and peat resource data we can develop draft rehabilitation plans based on the expected future character of the bog. Final rehabilitation plans have been developed for bog areas that were never in full production and currently being restored, such as the Derrydoo Woodlough Bog cluster in Galway. And also for bog areas that are completely out of production such as the Oweninny Bog complex in Mayo.

Trials and research into best practice inform the rehabilitation measures and a number of rehabilitation measures have been tested over the period 2010-2015.

Key Performance Indicators

Some of the key performance indicators in the period 2010-2015 were:

Draft rehabilitation plans detailed and lodged with the EPA for all bog areas. Each (draft) plan outlines the starting point (current baseline condition), sets clear aims and objectives to stabilise and rehabilitate the area, the necessary rehabilitation work based on best practice and research to date, a timeframe for completion, and the outcome of consultations with statutory and other relevant bodies to date

Final rehabilitation plans developed and implemented (completed or ongoing) for the Oweninny Bogs complex (Mayo, 2005 to 2013), Abbeyleix Bog (Laois, 2009), the Derrydoo-Woodlough bog cluster in East Galway (2012-2015) and the Clonboley Bog cluster in South Roscommon (2009 to present)

Field trials to determine effective approaches to biodiversity enhancement established at a number of bogs

Aspects of rehabilitation plans being trialled where possible such as in Boora Bog (Offaly – 1990s to present), Ballycon Bog (Offaly - 2006 to present), Mountlucas Bog (Offaly – 2014) and Templetuohy (Bruckana) Bog (Tipperary 2015; area under wind farm development footprint) (a complete list of areas rehabilitated is outlined in the previous section under Table X)

Field trials to determine effective and efficient approaches to biodiversity enhancement on cutaway bogs established at a number of bogs; these include drain-blocking, seeding (native and nursery species), fertiliser, reed transplant and seeding, and heather brash spreading trials

A *Sphagnum* inoculation field trial established at Kilberry Bog (2012)

An area of cutaway in Drinagh bog (31.2 ha) was developed to enhance breeding success of waders with a focus on Lapwing (2010).

Large scale rehabilitation trials established on Kilberry bog (rewetting – 38 ha in 2013) and Drumman (fertiliser and seeding approx. 30ha in 2010, 2011)

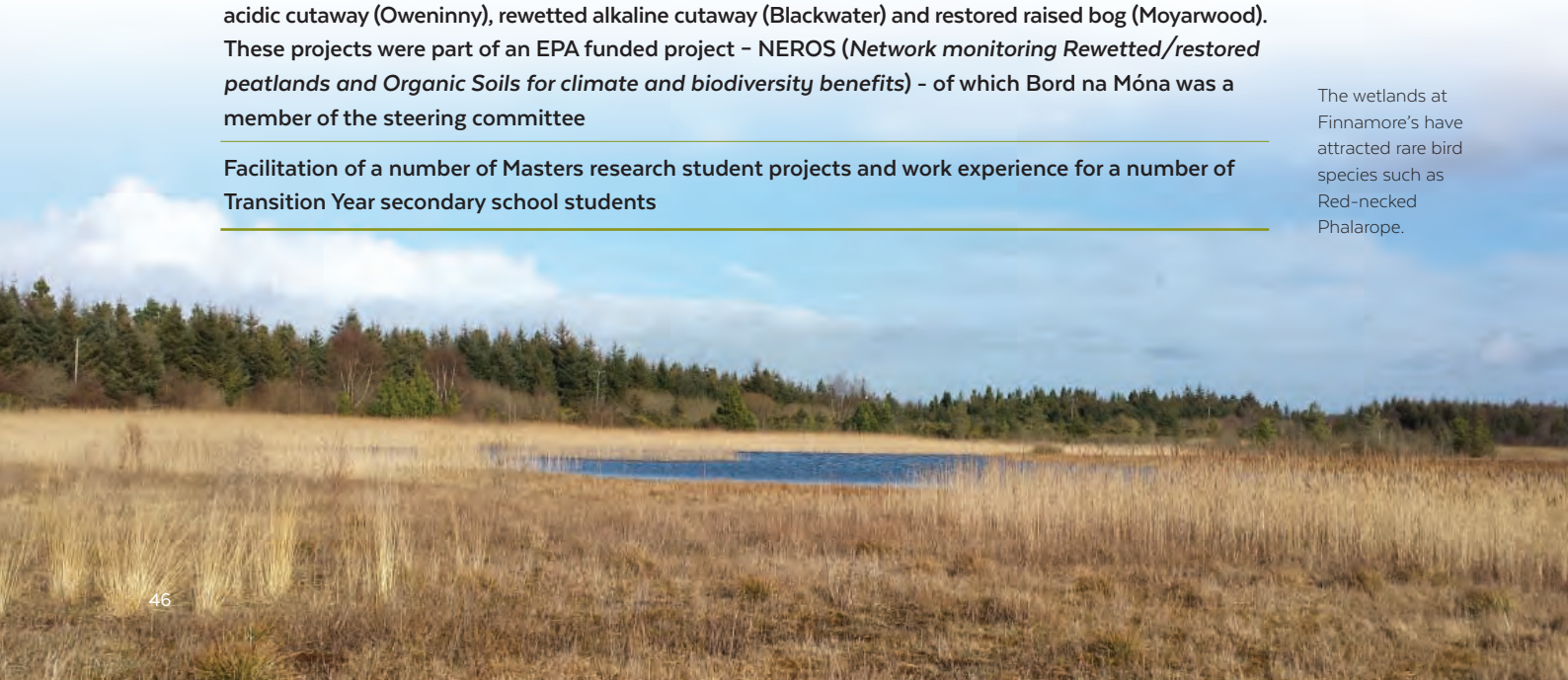
Targeted rehabilitation was carried out in parts of Derrycashel Bog (rewetting of ca. 20 ha in 2014)

Rehabilitation of the Srahmore Peat Deposition and Associated Facilities near completion

Restoration of raised bog areas identified during the baseline survey - to date 1,000 ha of raised bog has been restored (2009 to present)

Three Greenhouse Gas monitoring projects were established and funded by Bord na Móna on rewetted acidic cutaway (Oweninny), rewetted alkaline cutaway (Blackwater) and restored raised bog (Moyarwood). These projects were part of an EPA funded project – NEROS (*Network monitoring Rewetted/restored peatlands and Organic Soils for climate and biodiversity benefits*) - of which Bord na Móna was a member of the steering committee

Facilitation of a number of Masters research student projects and work experience for a number of Transition Year secondary school students



The wetlands at Finnamore's have attracted rare bird species such as Red-necked Phalarope.

Building on this work the following actions can be outlined for the period 2016-2021.

Actions

Continue to update draft rehabilitation plans for all bog areas,
with a view to final plans being developed and implementation in line with areas of cutaway bog available

Establish further rehabilitation field trials
and build on existing knowledge in relation to habitat management and GHG emissions

Continue to implement the Bord na Móna Raised Bog Restoration programme

Finalise rehabilitation of the Srahmore PDA in Co. Mayo

Develop habitat and species management guidelines
to be based on rehabilitation and restoration work carried out on Bord na Móna bogs which can be translated to other peatland areas

These actions will require ongoing work including:

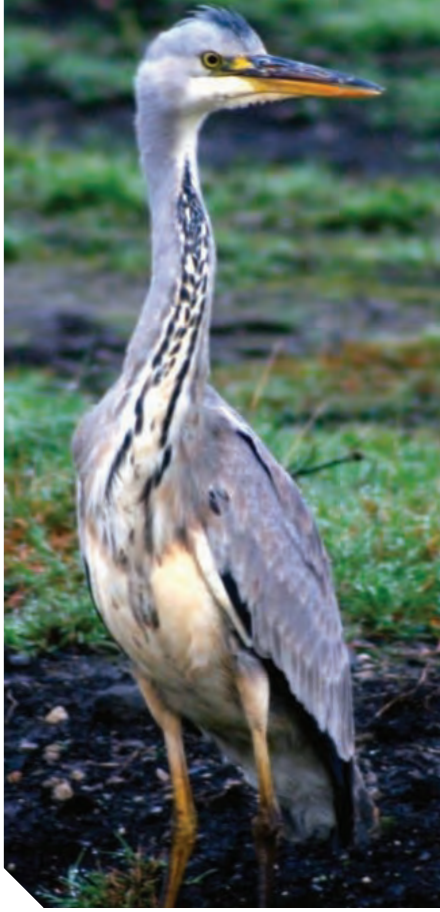
Update draft rehabilitation plans bi-annually
to reflect updates in baseline survey and/or other targeted surveys, as well as changes in peat harvesting projections/requirements and/or different land uses proposed

Consider the rehabilitation plans in the context of adjoining land-uses,
hydrology including ground water dependant terrestrial ecosystems (GWDTESs), national policies such as the National Landscape Strategy and relevant EU Directives including Habitats, Birds, EIA and Water Framework Directives

Finalise rehabilitation plans in consultation with statutory and non-statutory consultees
and carry out implementation as areas come available; carry out Appropriate Assessment screening for completed rehabilitation plans in accordance with EPA licensing requirements

Establish further rehabilitation trials on cutaway bog areas:
trials outlined for 2016-2021 include an additional *Sphagnum* inoculation trial, different establishment methods for reed and other peatland species and controlled water run-off (sluice control); establish trials specifically for targeted species and habitat management; support biomass trials as well as other potential commercial trials on appropriate cutaway bog areas

Continue to investigate the potential for breeding wader habitat
across Bord na Móna cutaway bogs, continuing to focus on the Drinagh trial site



Above left:
Fly Agaric Mushroom.
Centre: Hawkbit and Common Centaury.
Above right:
Grey Heron.

Develop habitat management measures particularly for Curlew,
building on the results of the 2015 and 2016 breeding Curlew survey

Selection of additional research trial sites and establishment of trials
to determine effectiveness of other potential management options for rehabilitation; facilitation of potential funding sources such as EU LIFE, LEADER and other research grants; communicate with potential project partners such as BirdWatch Ireland, Irish Peatland Conservation Council, Butterfly Conservation Ireland, National Parks and Wildlife Service, Inland Fisheries, and second and third level education and research institutions

Continue to monitor GHG emissions from restored raised bog
at Moyarwood Bog (Derrydoo Woodlough complex) up to 2018

Support and work to develop GHG monitoring projects
on woodland habitats developing on cutaway bog

Work with the research team in Trinity College Dublin
on the EPA funded project *"A framework for the restoration of Irish peatlands"* and continue to work with National Parks and Wildlife Service on the restoration practices for the NATURA 2000 raised bog network; this will include hydrological assessment of rehabilitation measures and options for cutaway bog areas

Continue restoration work in Clonboley and Killeglan Bog cluster;
continue with restoration work in other bogs and bog remnants identified as high conservation sites

Monitor rehabilitation in Srahmore PDA
and implement final rehabilitation phases

Following on from all of the rehabilitation and restoration work,
assimilate the data and outcomes to inform best practice guidelines for cutaway bogs and associated peatland habitats; promote the ecosystem services approach in relation to trials, rehabilitation and restoration projects

Key Indicators of Success

The key indicators of success of these actions will be:

Acceptance of rehabilitation plans on submission to EPA
and other consultees

Implementation and completion of rehabilitation plans
where possible and monitoring programme established

Successful establishment of further research trials and projects
showcasing a range of rehabilitation and management options for species and habitat management and/or conservation within Bord na Móna bogs; increased area of raised bog restoration

Established projects and successful funding applications
for a range of projects with relevant project partners

inform best practice guidelines for cutaway bogs and... promote the ecosystem services approach

Increased knowledge of GHG balance of cutaway bogs and restored bogs

Habitat and species management guidelines
for Bord na Móna bogs to be based on outcome of all rehabilitation trials and monitoring

Launch of Abbeyleix boardwalk in 2014. This community-inspired project is nationally and internationally renowned.

Increased knowledge
of GHG balance of cutaway bogs and restored bogs

Rehabilitation and the Bord na Móna Bogs

IPC License Condition 10

The rehabilitation planning process within Bord na Móna has developed considerably over the last ten years to address the complexity of the process itself and the changing nature of the bogs as peat production continues. Condition 10 of each of the nine Bord na Móna IPC licenses relates to decommissioning and permanent rehabilitation of all bog areas. The main features of the process and how each aspect of Condition 10 has been addressed is outlined in the following sections.

It is important to recognise that peat production is an ongoing and long-term activity and will continue at a number of Bord na Móna bog areas for several years to come. During this time, the bog drainage and physical character will also change. Until then broad rehabilitation outlines can be drawn under draft rehabilitation plans, with definitive plans not being developed until peat production is within 1-2 years of cessation date. In the lead in time, there are (at minimum) annual updates with all Peat Production Managers in licensed bog areas and an ongoing baseline survey and continued research into rehabilitation methods and outcomes.

In 2013, the Ecology Team submitted draft rehabilitation plans for each of the Bord na Móna bogs. Following updates to the baseline survey and further rehabilitation trials, the plans were updated in 2015. The plans will continue to be reviewed on a bi-annual basis. The main elements required for rehabilitation post peat production are stabilisation of former bare peat areas largely attained through natural processes of revegetation which may require enhancement by targeted management such as fertiliser/seeding; surface manipulation and/or hydrological management (drain/outfall blocking). These basic features are outlined in the Bord na Móna *Biodiversity Action Plan 2010-2015* with an update on trials and methods presented here.

Extensive research has also been carried out on potential commercial development of the cutaway bogs (agriculture, forestry, renewable energy (biomass, wind farms etc.) and eco-tourism). The outcome of this work is outlined in a number of publications including the recent Bord na Móna *Biodiversity Action Plan 2010-2015* and the Bord na Móna *Strategic Framework for Future Use of Peatlands* document (currently being updated, 2016).

Terminology

It should be noted that the terms relating to restoration, rehabilitation and after-use can be defined as follows:

RESTORATION: the process of assisting the recovery of an ecosystem that has been degraded, damaged or destroyed. www.ser.org

REHABILITATION: refers to the primary objective of environmental stabilisation of the former peat production areas or cutaway bogs. This usually involves some form of management to ensure the revegetation of former peat production fields and/or habitat creation/enhancement (as outlined in Bord na Móna Biodiversity Action Plan 2010-2015). It may also include reclamation for agriculture and/or forestry, and/or amenity use.

REHABILITATION PLAN: outlines the current baseline condition of the bog on cessation of peat production and the proposed work plan, time frame and costing of work required to implement appropriate rehabilitation and monitor its effectiveness. The development and implementation of a rehabilitation plan for each bog area is an assurance that when Bord na Móna withdraws from industrial peat production at any site that it will do so in an environmentally responsible way. The rehabilitation plan will take consideration of other potential after-uses (such as renewable energy projects) that are proposed for any given bog area.

CRITERIA FOR SUCCESS OF REHABILITATION UNDER CONDITION 10 OF IPPC LICENSING: following cessation of peat production the main criteria are stabilisation of the former peat production areas (generally comprising bare peat fields and associated travel and transport and drainage infrastructure) and mitigation of silt run-off.
These basic criteria are largely achieved by natural processes of revegetation with targeted rehabilitation work identified and implemented where required. While each cutaway bog area is rehabilitated in a manner appropriate to the environmental conditions of the site, the general rehabilitation approach is to facilitate the rewetting of cutaway where possible. Not all cutaway areas will have the capacity to be re-wetted due to environmental conditions on the site (some of the cutaway will be naturally dry and develop woodland in the future), and land-use in adjoining areas. All rehabilitation measures will have a positive impact on biodiversity in general, with some areas becoming habitat and species hotspots according to local characteristics.

OTHER AFTER-USES: In practice a number of after-uses may be proposed for rehabilitated peat production areas. These after-uses would generally require some form of manipulation of the site for a proposed commercial development (such as the Drehid Landfill Facility on Timahoe South Bog; the Mountlucas Wind Farm development); development of a biodiversity area for targeted species or habitats (such as at Drinagh) or an amenity area such as Lough Boora Discovery Park (walkways, cycle-paths etc.). In reality, all sites will comprise a mix of after-uses given the scale and potential of the bogs in relation to mixed use and multiple benefits, as in the case of the Oweninny Bog Group.

A number of after-uses have already been developed on parts of the Bord na Móna bogs. These include:

Coniferous Forestry:
areas leased to Coillte for forestry (up to 4,000ha across the land holdings); trial areas established in 2010/2012 at Killinagh and Derrybrennan (Allen Group)

Aggregates:
Derryarkin Sand and Gravel project, Co Westmeath (leased to Roadstone) (Derrygreenagh Group)

Resource Recovery:
Drehid Landfill, Composting Plant and Landfill Gas Generating Unit, (Timahoe South Bog) Co. Kildare (Allen Group)

Composting:
Kilberry Composting Facility, Kilberry Bog, Co. Kildare (Kilberry Group)

Waste:
Ash repositories for: EPL – Cloncreen, Co. Offaly (Allen Group); WOP – Area 3, Blackwater Bog, Co. Offaly. (Blackwater Group); LRP – Derraghan Bog, Co. Longford (Mountdillon Group)

Peat Deposition:
Srahmore Peat Deposition Area and associated facilities, Oweninny Bogs, Co. Mayo (Oweninny Group)

Niche commercial opportunities:
biomass trials (1980s-2000s); aquaculture trials (2014-2016)

Wind Farms:
Mountlucas Wind Farm, Co. Offaly (Allen); Bruckana Wind Farm, County Tipperary (Littleton); Oweninny Wind Farm, Co. Mayo (Oweninny)

Amenity:
Lough Boora Discovery Park, Co. Offaly (Boora); Loch Doire Bhile, Littleton (Littleton); Derryounce Walkway, Portarlington (Derrygreenagh); Mountlucas Wind Farm walkways

Biodiversity:
for example all bog areas restored under the Bord na Móna Raised Bog Restoration programme (2009-present), Lullymore wetlands and Butterfly Conservation Ireland site; parts of the Oweninny Bog Group and Mountlucas Wind Farm sites

Any proposed after-uses implemented to date are generally covered by specific planning and mitigation conditions and/or appropriate licenses, such as the Srahmore Peat Deposition Area (part of the Oweninny Bog Group) which is covered by Waste Licence W199-2. *The Strategic Framework for Future Use of Peatlands* (2011) sets out the range of after-uses that may be considered on any bog area and the general requirements relating to each option.

All rehabilitation measures will have a positive impact on biodiversity in general, with some areas becoming habitat and species hotspots according to local characteristics.

Triggers for Final Rehabilitation Plans and Implementation

Each Bord na Móna IPC licensed area reports on progress of cutaway rehabilitation and potential future work as part of the Annual Environmental Reports (AERs) for each licensed area. This is carried out annually. Since completion of the baseline ecological work under the Biodiversity Action Plan 2010-2015 draft rehabilitation plans have been developed for all Bord na Móna sites and will be reviewed bi-annually. In terms of finalising rehabilitation plans a series of triggers can be outlined as follows:

1. **Isolated areas of cutaway bog emerge but are dispersed within larger production areas**
Even though extensive peat extraction is ongoing, at this stage a general impression of what conditions will remain on cessation of peat extraction can be attained and possible rehabilitation and after-uses identified (preliminary outline of after-uses noted). At this point a draft rehabilitation plan can be developed, outlining main features that will be assessed. Annual reviews to identify newly cutaway bog areas are carried out each January and those areas are updated on a map on the Bord na Móna GIS system (Land-Use Maps).

2. **The final peat drainage infrastructure is installed**
and a decision is taken on the timeframe for cessation of peat production within the bog unit, i.e. what further depth of peat will be extracted, what acreage of bog will be required to meet market demands, etc. Generally at this stage the operations in the bog would be winding down and/or a realistic time-plan established for closure of the bog unit. At this stage the draft rehabilitation plan will be reviewed and activated for the cutaway bog, ideally incorporating time frames, cost estimates and realistic objectives. Consultation with interested parties is conducted. This phase is represented in a number of bog areas such as the Oweninny Bogs (2003) and sites never developed fully for peat production such as Abbeyleix Bog (2009), Derrydoo-Woodlough Bog cluster (2013), and the Clonboley Bog cluster (2015).

3. **Hydrologically isolatable units of bog are available**
Rehabilitation can now commence within discrete areas of cutaway bog. For example, the Boora Parklands complex and Lullymore Bog (part of the Allen Ballydermot cluster of bogs).

4. **The entire bog out of peat production**
Only at this point can the complete rehabilitation plan be implemented, as well as decommissioning procedures for workshops and workstations. For example, the Oweninny Bog Group.

These stages and triggers will continue to apply as peat production continues in all licensed areas for all bog units in Bord na Móna ownership. Within this framework, the most appropriate rehabilitation and/or after-use is based on the most up to date research and trials conducted and the conditions required for each potential after-use, while taking all primary and secondary factors into consideration.

Ballycon wetland (rehabilitated in 2006).

Case Study: Oweninny Bog Group (1950s to 2015)

Peat production in the Oweninny Bog Group began in the 1950s, supplying milled peat to the ESB peat-fired station adjoining the production areas at Bellacorick in North West Mayo. Bord na Móna developed two distinct bog areas – one at Bellacorick and one adjacent to Bangor Erris – which collectively covered 6,500 hectares of blanket bog. When the decision was reached to close the ESB power station in 2005, this led to the development of the Oweninny Bogs Rehabilitation Plan (2003). The plan was based on research on the emerging cutaway blanket bog carried out between 1996 and 2001 and the establishment of a number of site specific rehabilitation trials between 2001 and 2003.

Spreading *Sphagnum* on the Srahmore PDA in Co. Mayo.

A number of mixed uses – wind energy, peat deposition and storage, nature conservation, amenity, turf cutting, blanket bog restoration, GHG monitoring - have been developed successfully for the Oweninny Bog Group

A draft rehabilitation plan was circulated to consultees in 2001, with the final agreed plan in 2003. Implementation of the rehabilitation plan was carried out between 2003 and 2005, once the final drainage plan and site conditions were established. This involved an extensive programme of drain blocking and other targeted rehabilitation, carried out by the former peat production staff using the appropriate machinery.

In tandem with the rehabilitation, planning permission for an extensive wind farm was granted for the site in 2003, complementing the existing wind farm which had been built on the Bellacorick site in 1992, with a further planning application under review by the planning authorities. Furthermore, the Srahmore Peat Deposition Area and Associated Facilities was established in 2004/5 on 65 ha of the Bangor site to accommodate the spread and stabilisation of 450,000 tonnes of peat from the nearby Bellanaboy Gas Terminal site. Other more recent developments include GHG monitoring from the rehabilitated cutaway (2008-2013), the lease of 1,000 ha of the Bangor bogs to the National Parks and Wildlife Service in 2010 for the purpose of Red Grouse management, and ongoing projects with the local communities in relation to amenity use (walkway developments) of the sites.

Because of the scale of the site a number of mixed uses – wind energy, peat deposition and storage, nature conservation, amenity, turf cutting, blanket bog restoration, GHG monitoring - have been proposed and developed successfully together for the Oweninny Bog Group. The Ecology Team continues to monitor the rehabilitation outcomes at the site.

Rehabilitation Trials 2010-2015

A range of rehabilitation measures have been trialled on the cutaway bogs in the period 2010-2015. In most cases the aim has been to accelerate revegetation in areas slow to colonise, although there have been species specific measures also carried out. Some of the trials are outlined here in detail.

Drinagh: rehabilitation of cutaway bogs for breeding waders

Bord na Móna and BirdWatch Ireland established a trial area in 2010 on Drinagh Bog (Boora complex) in County Offaly with a view to developing management techniques for breeding waders on cutaway bog in Ireland. These techniques have been used in other countries in wet grassland and other wetland habitats.

The main objectives of this trial project were to investigate rehabilitation techniques to enhance the value of cutaway bog in the midlands for breeding waders and wintering water-birds, and where possible, to increase breeding wader numbers.

The main rehabilitation techniques included:

Re-profiling of drains and drain margins:
Bord na Móna production bog is generally laid out in a series of long fields 15 m wide, separated by drains of < 1 m wide. When production ceases, drains with vertical edges that are sometimes quite deep (< 1.5m) are still present. These drains can act as a physical barrier to unfledged chicks. Re-profiling the edges of fields and infilling drains allows chicks to move from dry areas down to wetland vegetation to forage without difficulty.

Scrub removal:
Maintenance of open areas and the management of scrub encroachment is also required to benefit these ground nesting bird species as they avoid any areas with emergent scrub, preferring open areas with lower incidence of predatory species such as Grey Crow.

Wetland enhancement by drain blocking:
The introduction of wetland habitats provides valuable foraging areas for wader chicks. Raising water-levels can also have the additional impact of limiting scrub re-growth, controlling scrub encroachment and maintaining large open areas.

The main work of scrub clearance, re-profiling and drain blocking was carried out over 30 ha between 2010 and 2011. The site has been monitored annually since. Rehabilitation management has had a significant initial visual impact on the overall landscape of the trial area, creating a large open landscape comprising a mosaic of emergent wetland vegetation, drier exposed bare peat areas and some open water. Drain-blocking has also been successful and water-levels are generally higher, with larger areas being inundated for longer periods of time. This is in contrast to the previous landscape with scattered scrub and fields with high margins.

RESULTS 2011: A total of 10 wader pairs were recorded in the trial area in 2011 compared to 2 pairs in 2010, prior to any rehabilitation management. Nearly all of the waders were recorded within the area cleared of scrub in 2010. The breeding wader population in 2011 comprised of Lapwing (4 pairs) (following numbers indicate pairs), Snipe (3), Redshank (2) and Ringed Plover (1). This compares to 2010 when the same area had Lapwing (1 pair) and Snipe (1 pair).

RESULTS 2014: The 2014 survey found that the new wetland area was still providing important bird habitat. Twenty-Eight breeding bird species were recorded in the wetland including six Red-listed Birds of Conservation Concern in Ireland (BoCCI) species, Meadow Pipit (6 territories); Black-headed Gull (5), Tufted Duck (2); Lapwing (2); Redshank (1) and Woodcock (1) were recorded, and a further five Amber-listed BoCCI species: Snipe (6 territories); Little Grebe (4); Water Rail (4); Skylark (5) and Robin (12).

The new wetland habitats developing in Drinagh are most important for a range of species of conservation concern including breeding waders and other water-bird species such as Little Grebe and Water Rail. However, factors such as predation are preventing breeding wader numbers from increasing since 2011.

The wetland area also attracts a range of wintering bird species with species recorded in the past few years including Whooper Swan, Greylag Goose, Teal, Mallard, Lapwing, Golden Plover, Tufted Duck, Merlin and Hen Harrier.

Drumman Bog: rehabilitation of cutaway bogs for colonisation of bare peat

During the baseline survey it was noted that while natural colonisation progresses relatively quickly on cutaway bog once peat production ceases, some sites are slow to revegetate and can remain bare. A number of trials were carried out on Drumman Bog (Derrygreenagh complex) in County Offaly to investigate measures to enhance vegetation.

The main rehabilitation techniques included:

Application of fertiliser to bare peat:
This involved applying fertiliser to bare peat and establishing whether this was sufficient to kick-start seed germination and plant establishment.

Seeding bare beat with nurse species:
Species such as Trticale are used as nurse species to promote revegetation, dying back as native plants establish.

Seeding bare peat with wetland/biomass crops:
Reed canary grass is a known biomass crop and wetland species, and if established could provide a similar nurse crop function for other wetland species to establish.

The work on each trial was carried out in 2010 and monitored annually. Based on the work to date, it was concluded that a once off low-level fertiliser application to bare peat is sufficient to kick-start revegetation. This approach has been applied successfully on a number of sites now, with the focus on travel paths that tend to dry out in summer periods and areas generally slow to revegetate.

The use of a nurse species was successful for stabilisation of bare peat but it is generally accepted that nutrient levels (such as phosphorus) is the main limiting factor. The trial areas continue to be monitored. Since establishment of the trials there has been ongoing pioneer habitat succession with birch colonisation leading to scrub development in places of former bare peat areas.

This trial has formed the basis for further targeted rehabilitation work on Ballycon Bog (2013), Lullymore (2014) and Cavemount (2015).

Kilmacshane Bog: rehabilitation of cutaway bog and establishment of wetland species

Kilmacshane Bog contains large areas of former production bog that are subject to the seasonal fluctuations of the River Shannon. The trial areas selected within Kilmacshane Bog are representative of the future cutaway bogs along the Shannon corridor that will be prone to seasonal inundation. The site is sufficiently dry during the growing season but wet during the winter months. A number of trials have been instigated here with the main aim of establishing vegetation cover on bare peat.

Three main trials were used here:

Crop trials (2010):
Crop trials were developed using the "nurse crop" principle where a crop is sown and fertilised in order to provide shelter for more naturalised vegetation to become established. Reed Canary Grass and Triticale were both selected as the nurse crops and received a once off application of fertiliser similar to the work in Drumman.

Reed trials (2013):
Reed trials where reed seed (reedmace, *Typha latifolia* and common reed *Phragmites australis*) was collected from established wetlands offsite and stored before being sown at the correct time of year.

Seed trials (2013):
Seed was collected along the high water mark on established wetland sites and then spread on the cutaway bog. The seed mix comprised many wetland species including sedges, reed and rushes.

Results have been mixed to date with vegetation becoming established on former areas of bare peat. The crop trials worked best with the nurse crops allowing the establishment of wetland vegetation species including marsh arrow grass, mint and bulbous rush. The reed trials have not established widespread vegetation cover, possibly due to the site drying out during the summer months and/or seed viability. Issues that have been highlighted include control of the water levels to allow more water to stay on site during drier periods, grazers such as Irish hare have also had an impact on the developing vegetation. It should be noted that Kilmacshane Bog is host to large numbers of Whooper Swans in the winter months with the highest numbers in Ireland recorded from the bog in the winter period 2014/2015.

These trials have provided a great deal of information in relation to developing vegetation in difficult environmental conditions and they will continue to be monitored into the future.

Kilberry Bog:
Sphagnum farming

There has been significant interest in recent years in a number of countries in farming *Sphagnum* to produce sustainable growing media for horticulture and other applications such as *Sphagnum* inoculation during bog restoration to increase diversity, re-establish peat bog vegetation and enhance restoration outcomes. A wide range of research has been carried out in several countries including Canada, Germany, UK and Estonia.

Sphagnum can be grown in suitable environmental conditions in degraded peatlands such as cutaway peatlands using paludiculture methods (production under wet conditions) as shown in Canada and Germany. With this in mind, the Bord na Móna Ecology Team established a trial at Kilberry Bog in County Kildare with the Bord na Móna Innovation Team to investigate the ability of different *Sphagnum* species to colonise and grow in suitable Bord na Móna deeper remnant peat cutaway.

Two different *Sphagnum* growth trials were set up in 2012 and 2013. Both trials implemented similar techniques as used in Canada and Germany to inoculate *Sphagnum* on cutaway bog. This involved site preparation (re-wetting), *Sphagnum* collection from a donor site, spreading *Sphagnum* fragments on the trial site and spreading straw mulch over the *Sphagnum* fragments to help water retention and protection of fragments from desiccation during colonisation. Care was taken to attempt to mimic the conditions of pioneer *Sphagnum*-dominated communities that have developed naturally in Bord na Móna cutaway thorough site selection.

The 2012 trial was set up with 24 5 m x 5 m plots in total. Five different *Sphagnum* species (*S. capillifolium, S. papillosum, S. magellanicum, S. subnitens* and *S. cuspidatum*) were used (and one blank plot). In addition there were 2 treatments, plots with straw and plots without straw. Fourteen plots were set up in 2013 (2.5m x 2.5m in size) testing 6 species (*S. capillifolium, S. subnitens, S. magellanicum, S. papillosum, S. cuspidatum* and *S. palustre*) with one blank and one replication ((6 + 1) x 2). All plots were covered in straw mulch.

Inundation during summer 2012 eventually destroyed half (12) of the original plots set up in 2012. Growth and establishment in the remaining 2012 plots has been relatively slow and only half of the plots with straw established some *Sphagnum* cover. The overall *Sphagnum* cover has also been quite low (generally < 1% with 2 plots reaching about 5% in 2015). Other vegetation has been colonising the plots (Bog Cotton, Rushes, weeds from the straw etc.) and some plots are now quite well vegetated (50-80% vegetation cover). Only 1 out of 12 plots in 2013 did not have some *Sphagnum* colonisation in 2015. However, general percentage *Sphagnum* cover values were relatively low (< 1% - 4%) in 2015. One plot (*S. palustre*) was the exception with relatively good colonisation and growth after the first year (10% cover) and continued relatively high cover in 2015 (~20% cover).

Summer inundation in 2012 and winter inundation in 2012/13 and 2013/14 has probably been the biggest constraint hindering the initial establishment of plots. Inundation acted by washing away the inoculating fragments of *Sphagnum* and the protective straw mulch. Relatively dry and hot periods such as in summer 2013 have also meant that the water levels dropped significantly, which is likely to have had a negative impact on colonisation and growth, although some *Sphagnum* has been able to survive and grow. Other environmental constraints to *Sphagnum* establishment at this site include the environmental characteristics of the residual peat. The average pH of the ground-water in the dip-wells was 6.0 in the initial dipwells and 5.3 in the newer dipwells with the average electrical conductivity being 104 µS. Sites with higher pH tend to be suited to development of poor fen and other habitats.

It would seem that the residual peat at the site in Kilberry is somewhat too decomposed and has a relatively high pH indicating that it is not optimally suited for raised bog *Sphagnum* restoration. The relatively high pH and conductivity is likely to be due in part to influence of the underlying limestone-based gravel sub-soils and the exposed fen peats. The site at Kilberry reflects the type of environmental conditions and constraints that would be found at some other potential deeper peat Bord na Móna cutaway sites. However, these sites have relatively variable remnant peat depths and environmental characteristics due to site variability, intensity of peat production etc.

Further trials will be established using a different sites in the period 2016-2021.

Understanding the GHG balance in restored and rehabilitated peatlands

Peatlands are globally important in terms of greenhouse gas (GHG) emissions as it is estimated that they comprise up to 30% of the total global soil carbon pool*. As peatlands develop, the build-up of plant and animal remains creates a store of carbon in a waterlogged and anoxic environment. Because of this waterlogged condition, there is limited scope for microbes to break down the peat and release carbon dioxide.

When peatlands are drained, carbon is released mainly in the form of carbon dioxide and is also lost as dissolved organic carbon (DOC). This is also true for Irish peatlands and the role of managing Ireland's peatlands has been highlighted in the National Peatlands Strategy (2015) as being important for future carbon accounting at a national level.

Most of the Bord na Móna bogs have been drained at some point. Where possible Bord na Móna is restoring raised bogs to peat forming conditions – stopping further release of carbon dioxide and in time restoring the carbon sequestration function of the bog. Bord na Móna is also funding research into determining the rate at which this switch occurs, and a project monitoring GHG emissions from a restored bog (Moyarwood in East Galway) was established in 2013, and is expected to continue to 2018.

Two GHG monitoring projects have also been carried out to inform rehabilitation measures on cutaway bogs – one in the rehabilitated Oweninny Bogs and one in a rehabilitated cutaway bog in Blackwater Bog (West Offaly). Both studies show that rewetting of the cutaway and establishment of wetland habitats such as poor fen and reed bed, reduces carbon dioxide emissions and leads in time to carbon sequestration.

Each of the studies has informed national carbon accounting measures carried out by the EPA, and Bord na Móna's Carbon Working Group established in 2009, tracks policy developments and accounting approaches in consultation with the EPA Climate Action team.

Monitoring GHG at Blackwater reed bed (2011-2015).

Dr David Wilson monitoring GHG at Moyarwood Bog, (bog restored 2012).

The key actions relating to GHG monitoring listed in this plan are:

*__Continue to monitor GHG emissions__ from restored raised bog at Moyarwood Bog (Derrydoo Woodlough complex) up to 2018

*__Support and develop GHG monitoring projects__ on woodland habitats developing on cutaway bog

*__Work with the research team in Trinity College Dublin__ on the current EPA funded project "A framework for the restoration of Irish peatlands" and continue to work with National Parks and Wildlife Service on the restoration practices for the NATURA 2000 raised bog network; this will include hydrological assessment of rehabilitation measures and options for cutaway bog areas

*The total amount of carbon stored in global peatlands and in global soils are both subject to considerable uncertainty and wide ranges of estimates. Estimates of soil carbon range up to 3,000 Gt C, but most recent estimates are in the range 1500-2000 Gt C. Estimates of carbon in peatlands stretch up to 600 Gt C, but International Peatland Society and Wetlands International figures are probably in the range 400-450 Gt C.

Peatlands are globally important in terms of greenhouse gas (GHG) emissions as it is estimated that they comprise up to 30% of the total global soil carbon pool

Conversation.

3.4

Objective 4

Raise Awareness and Create a Greater Appreciation of the Biodiversity and Natural Heritage of Bord na Móna Cutaway Bogs and Associated Lands

A considerable part of the Bord na Móna Biodiversity Action Plan 2010-2015 has focussed on communication and creating awareness of the value of biodiversity, and the benefits of rehabilitation and restoration of the Bord na Móna bogs. This work will continue under the next planning phase and ranges from local to international levels.

The work to date of the Ecology Team and in particular the interaction with the wider Bord na Móna community has demonstrated the significant role that biodiversity and rehabilitation plays in our day to day business.

This interaction ranges from regular updates to senior management, peat operations managers and regular contributions to the employee magazine and company intranet.

Key Performance Indicators

Some of the key performance indicators in the period 2010-2015 were:

NATIONAL

Organisation of annual Biodiversity Action Plan review days incorporating presentations and field trips to rehabilitated sites (November 2011 Ballinasloe and Cuckoo Hill Bog; January 2013 Lough Boora Discovery Park; December 2013 Tullamore and Mountlucas wind farm; February 2015 Athlone and Ballydangan Bog)

Input to Irish Peatland Society annual events (Abbeyleix Bog 2009, *Peatlands – a new conversation* 2015) and other national conferences (such as *Natural Capital – Ireland's Hidden Wealth* 2014, *Environment Ireland* 2014)

Key Performance Indicators (continued)

Organisation and co-ordination of Lough Boora Bioblitz 2012 and associated biodiversity events over a 24 hour period (May 2012); support of Abbeyleix Bioblitz 2013

Development of a leaflet about the Bord na Móna Raised Bog Restoration programme outlining how the bogs are restored and the extent of the sites (2015)

Input to national media focusing on biodiversity projects – print (Bord na Móna *Source* magazine for employees, *Irish Times*, *Independent*, regional newspapers), radio (*Mooney Goes Wild*, regional and local stations) and television (Nationwide, Eco-Eye, RTÉ news, TG4 news)

Circulation of Bord na Móna Biodiversity Action Plan 2010-2015 to statutory and non-statutory consultees and to local and regional libraries; development of Bord na Móna Biodiversity webpages as part of the company website.

delivery of ecology training programme to peat production managers and those involved in bog operations

Input to Heritage Plans – national and county levels - through active participation on heritage fora; input and participation in other groups such as Woodlands of Ireland, Chartered Institute of Ecology and Environmental Management (CIEEM), etc.

Development of signage for selected biodiversity area (ongoing)

Direct ecological input to development of Lough Boora Discovery Park centre and provision of website material

INTERNAL

Co-ordination and delivery of an annual ecology training programme to Bord na Móna peat production managers and those involved in bog operations

Regular contributed articles to company magazine *Source*, input to annual and sustainability reports and online company intranet

INTERNATIONAL

Presentations about Bord na Móna Biodiversity Action Plan at seminars and workshops at international levels (includes International Peat Congress 2012 in Stockholm, IPS Annual Assemblies Finland 2010, Quebec 2011, Netherlands 2013, Riga 2014; Society of Ecological Restoration meetings France 2010, Finland 2014 and UK 2015, IUCN Peatlands event Inverness 2014)

Contributions to Food and Agriculture Organisation of the United Nations (FAO) and IUCN UK Peatland project publications on peatland restoration and biodiversity

COMMUNITY

Presentations and field trips with primary, secondary and third level education classes.

Organisation of biodiversity walks and talks for Biodiversity weeks 2010-2015, Heritage weeks 2010-2015, Offaly Naturalists' Field-club, Dublin Naturalists' Field-club and a range of other communications at local level

Development of Lullymore wetlands in association with Lullymore Heritage and Discovery Park, Co. Kildare

Co-ordination and chairing of Abbeyleix Bog Technical Advisory Group (TAG)

Member of Ballydangan Red Grouse project stakeholders group (South Roscommon) – sponsorship of project as well as ongoing practical assistance

Working with special interest groups such as Butterfly Conservation Ireland, Wetlands Heritage Ireland and community groups such as local game clubs to facilitate access to Bord na Móna bogs and develop partnership agreements

Member of the Community Wetlands Forum (2015 to present)

Building on this work the following actions can be outlined for the period 2016-2021.

Actions

Develop and promote a biodiversity awareness-raising campaign within Bord na Móna
and to the wider public of the biodiversity value of the Bord na Móna bogs

Identify and promote further accessible sites of biodiversity conservation interest
on Bord na Móna bogs

Promote increased participation in the conservation of our natural heritage
by supporting community-led biodiversity projects such as the Lullymore Heritage and Discovery Park, Ballydangan Red Grouse project, Wetlands Heritage Ireland, Abbeyleix Bog project and/or other walkways/amenity projects

Consult with relevant bodies and interested parties on a regular basis
to communicate updates in the biodiversity work programme and also to identify potential partnership projects within the Bord na Móna bog and adjacent lands

These actions will require ongoing work including:

Promote community engagement
in relation to the full range of Bord na Móna's business activities, highlighting biodiversity and eco-tourism aspects

Continue to organise an annual seminar and/or workshop with a field trip
to present updates on the Bord na Móna biodiversity work programme outlined in the Biodiversity Action plan to relevant bodies and interested parties

Circulate the next Biodiversity Action Plan 2016-2021
to all relevant bodies and interested parties; make an electronic copy available on-line

Re-develop the Bord na Móna website biodiversity pages
with an overview of all projects carried out to date with information and details on access to sites

Develop a Bord na Móna Biodiversity Facebook page
to share photos and updates on survey and rehabilitation work

Work with other agencies to develop fact sheets and best practice guidelines
based on the biodiversity of the Bord na Móna bogs, but also with a view to the wider national biodiversity resource

As new biodiversity sites are identified, establish appropriate signage
at biodiversity areas with information on biodiversity features, management and projects at each site

Promote Bord na Móna policy of wildlife conservation/protection
on Bord na Móna bog areas

Butterfly orchid

Bee orchid

Fragrant orchid

Spotted orchid

Facilitate areas where people can **access** the Bord na Móna bogs

Walking trail at Lough Boora Discovery Park.

Participate in Heritage fora organised by local authorities
and other biodiversity working groups for the counties within which Bord na Móna operates

Contribute articles to local and national media;
participate and present in workshops and conferences relating to heritage, biodiversity and other areas of relevance

Contribute biodiversity related articles to Bord na Móna media,
such as the company magazine (*Source*) and the intranet; arrange biodiversity awareness days and training opportunities in the form of workshops for bog operatives and managers; develop a biodiversity factsheet for all Bord na Móna employees

Organise field trips and workshops for the public

Continue to engage with relevant bodies and interested parties including:
Government Departments, National Parks and Wildlife Service, National Biodiversity Data Centre, Environmental Protection Agency, Fishery Boards, County Councils, Coillte, Irish Farmer's Association, Heritage Council, BirdWatch Ireland, Irish Peatland Conservation Council, Butterfly Conservation Ireland, Irish Peatland Society and Woodlands of Ireland, and other NGO's, local and national media, research and educational institutions (primary, secondary and third level) as well as the local landowners and communities that live in close proximity to the bogs

Interact with local communities and schools to identify potential local needs
and projects in terms of amenity, education and/or biodiversity areas

Organise field trips and workshops for the public in conjunction with
established Biodiversity and Heritage programmes; explore the development of a Bord na Móna Bioblitz event annually to highlight biodiversity in different bog areas

Facilitate areas where people can access the Bord na Móna bogs
and selected biodiversity areas, such as Lough Boora Discovery Park and other walkways initiatives

Develop a primary schools biodiversity education system
promoting awareness of biodiversity across Ireland which will include biodiversity on Bord na Móna lands (PILOT running Jan – June 2016, with further roll-out to 150 schools in Sept 2016 and building over a 5 year period)

Work with the An Taisce Green Schools initiative
This will involve corporate sponsorship of the Biodiversity section of the first Green Schools Expo in February 2016, as well as providing peatland biodiversity expertise at the expo for schools (general peatland biodiversity information and careers advice)

Key Indicators of Success

The key indicators of success of these actions will be:

Increased awareness of biodiversity within Bord na Móna and in the wider local and national community

Archive of biodiversity related articles submitted to all relevant media to be included on Bord na Móna biodiversity website

An established and mapped network of selected biodiversity areas and walking and/or cycling routes with signage and relevant printed information about Bord na Móna and biodiversity

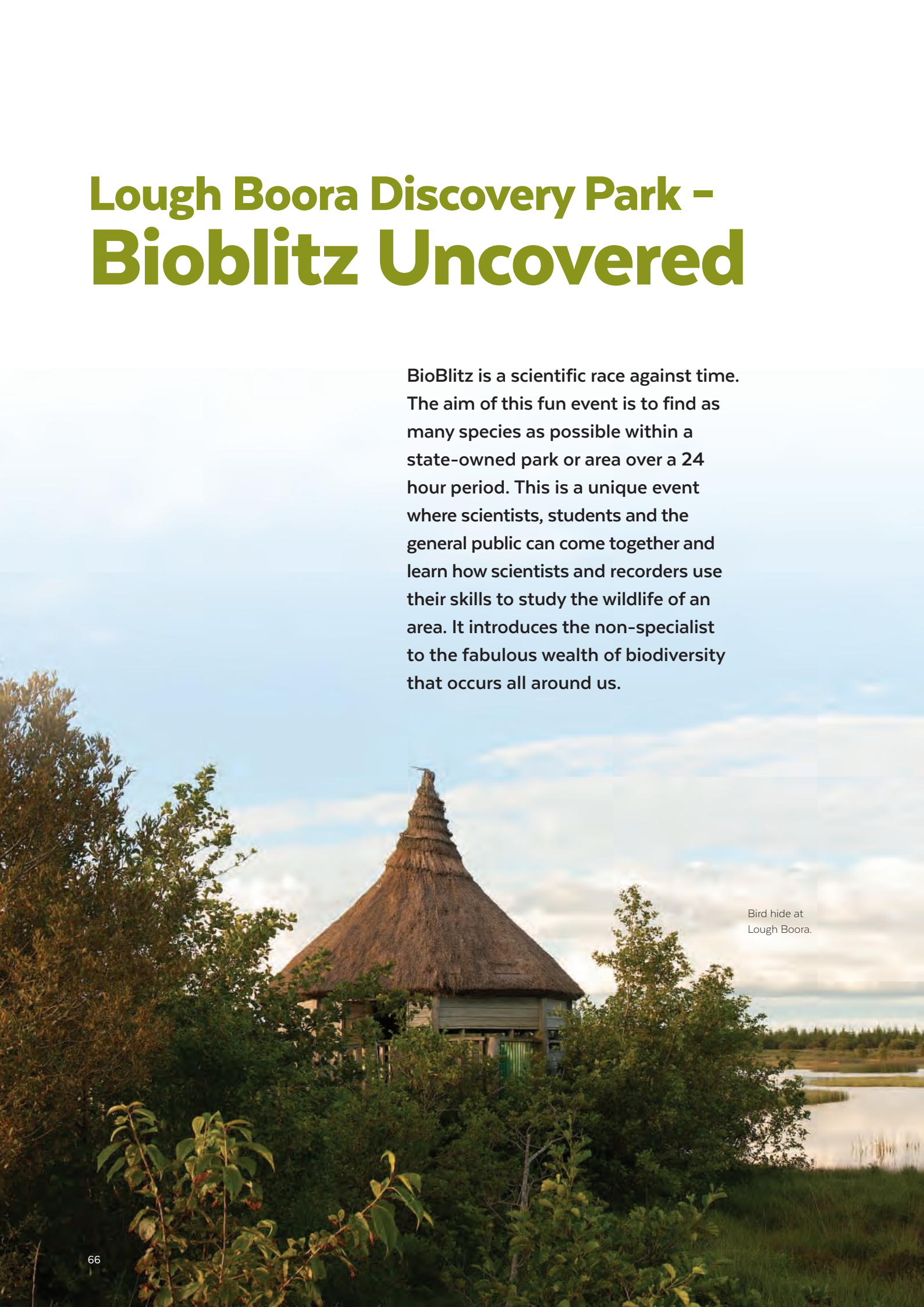
Increased access and visits to selected Bord na Móna biodiversity areas

Biodiversity awareness projects established with local schools and communities and/or other interest groups

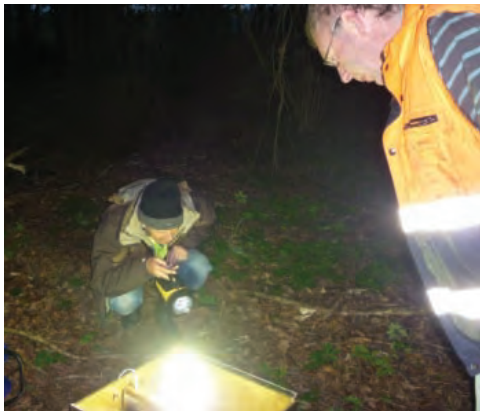
Ongoing consultation with relevant bodies and interested parties

Lough Boora Discovery Park – Bioblitz Uncovered

BioBlitz is a scientific race against time. The aim of this fun event is to find as many species as possible within a state-owned park or area over a 24 hour period. This is a unique event where scientists, students and the general public can come together and learn how scientists and recorders use their skills to study the wildlife of an area. It introduces the non-specialist to the fabulous wealth of biodiversity that occurs all around us.



Bird hide at Lough Boora.



The Lough Boora BioBlitz 2012 was a great success with many more species recorded than had been expected, with a huge turnout of professional scientists and high public participation. Nine hundred and forty species were recorded on the day, including 334 vascular plant species which was more than any other BioBlitz 2012 site. The success of the event was largely due first and foremost to the biodiversity of the rehabilitated cutaway but also to the close collaboration and hard work of a number of organisations including Bord na Móna staff from a range of businesses, the National Biodiversity Data Centre, Offaly County Council, National Parks and Wildlife Service, Coillte, Bat Conservation Ireland, Butterfly Conservation Ireland, Moths Ireland, BirdWatch Ireland, BSBI, Irish Wildlife Trust, Inland Fisheries Ireland, staff and members of NUI Galway and a number of independent ecologists.

Some of the public events over the 24 hour period included a Bat Walk on the Friday night, a Dawn Chorus led by BirdWatch Ireland, a mammal identification workshop, a moth capture demonstration, a display of aquatic creatures by Inland Fisheries Ireland and a schools wildlife art competition for primary school students local to the area.

For more information see:
www.bioblitz2012.biodiversityireland.ie

Following the success of the 2012 Bioblitz, and a similar event held on Abbeyleix Bog in 2013, Bord na Móna will explore the development of a Bord na Móna Bioblitz event annually to highlight biodiversity in different bog areas

Nine hundred and forty species were recorded on the day, including 334 vascular plant species which was more than any other BioBlitz 2012 site.

Community-Led Wetland Projects

Local communities living on the edges of the Bord na Móna bogs are the inspiration for a range of projects and initiatives. In the period 2010-2015, a number of community-led biodiversity and wetland projects have come to fore and Bord na Móna has provided support where possible. Projects such as the work of Wetlands Heritage Ireland and the Abbeyleix Bog Conservation Project have been significant developments and continue to develop with time.

Wetlands Heritage Ireland is led by the local Keenagh community in County Longford and their interest is largely focussed on the area around the Corlea Trackway Interpretive Centre. Bord na Móna is working with the group to develop further educational and experiential facilities around the existing centre and these will progress in the period 2016-2021. This community project is aligned with the Mid Shannon Wilderness project currently being developed by Longford County Council and partners.

Abbeyleix Bog Conservation project in County Laois is led by local Abbeyleix community representatives. After completion of a comprehensive drain blocking programme in 2009, Bord na Móna leased the site to the local community and continues to provide support to the community through chairing of the bog Technical Advisory Group in conjunction with staff from the National Parks and Wildlife Service, Laois County Council and IPCC. The project is viewed nationally as a best practice case study for the future successful management of bog conservation and restoration sites in Ireland.

Two projects with potential for development between 2016 and 2021 are the Ballivor Bog project in County Meath (bog conservation and amenity) and the new IRD Duhallow (Barna Bog – Hen Harrier conservation) project in County Kerry.

Lullymore Wetlands

Lullymore Heritage and Discovery Park is a community run project near Rathangan in County Kildare. The Park was officially launched in 1993 and tells the story of Lullymore and the bog which surrounds it through guided tours, interactive displays and exhibits. The story moves from bog formation to the arrival of Mesolithic settlers, to early Christian times through to the Irish Famine and Rebellion period, and also to the development and heritage of Bord na Móna and the boglands.

Since 2010, the Ecology Team has worked with the local Bord na Móna staff to develop a wetland area to provide a local educational resource for the group allowing them to tell their story and expand their tourism and amenity offering to national and international groups alike. This has resulted in a partnership project whereby a rehabilitated wetland and a typical Bord na Móna railway track has been laid and is now operated by the local staff. The site also supports a café and an indoor play area that encourages school children and parents to visit throughout the year.
www.lullymoreheritagepark.com

The Lullymore wetlands area itself is a larger area and is developing great interest locally and nationally from environmental groups such as Kildare BirdWatch Ireland branch and Butterfly Conservation Ireland (BCI). Part of the site is managed specifically for butterflies by BCI and is now established as a nationally significant site for butterflies and moths. Bord na Móna has zoned the site for biodiversity and it will continue to be monitored to document and inform future management.

Above: "Charlie's Boardwalk" at Lullymore.
Photo courtesy of Lullymore Heritage & Discovery Park.

Ballydangan Red Grouse Project

Red setters are used to count Red Grouse numbers on Ballydangan Bog.

Ballydangan Bog in County Roscommon is a midlands raised bog owned by Bord na Móna and is one of the sites included in the company's Raised Bog Restoration Programme (2009-present). Drainage ditches were installed on the 218 ha site in the early 1980s in preparation for industrial peat production, but no further work carried out as the bog was deemed surplus to requirements.

While Red Grouse numbers have remained stable since the project began, three pairs of Eurasian Curlew *(Numenius arquata)* have successfully bred on the site.

In 2009 the local community groups living around the bog became aware that the local population of Red Grouse (*Lagopus lagopus hibernicus*) centred on Ballydangan Bog and neighbouring bog areas had dramatically declined and was on the brink of a local extinction. The Ballydangan Red Grouse project was established in 2009 and started with the local community leasing Ballydangan Bog from Bord na Móna. Following on from the production of a Red Grouse Management Plan the Department of Social Protection employed four full time local staff to facilitate the work which includes predator control, heather cutting and habitat management.

In September 2013 Bord na Móna began restoring the raised bog habitat, in tandem with the community efforts to maintain the local Grouse population. This involved a comprehensive drain blocking programme to rewet the site and over 3,744 peat dams were installed. The aim of the restoration work is to raise the water levels and facilitate the development of *active* raised bog areas. The rewetting will also improve the overall habitat for typical peatland bird species including the Red Grouse.

While Red Grouse numbers have remained stable since the project began, three pairs of Eurasian Curlew (*Numenius arquata*) have successfully bred on the site. Translocation efforts to relocate Red Grouse birds from a stable population in another county to Ballydangan were attempted in 2014 and 2015 with little success to date.

Below: Ballydangan Bog is frequently used by local schools.

Measurement.

3.3

Objective 5

Monitor the Progress of the Bord na Móna Biodiversity Action Plan

One of the many highlights for the Ecology Team over the course of delivering on the Bord na Móna Biodiversity Action Plan 2010-2015 has been the annual review days. From humble beginnings in the Tullamore Court Hotel at the launch of the plan by the late Éamon de Buitléar (1930-2013) in November 2010, the annual review days now attract academics, scientists, planners, practitioners, consultant ecologists, local community members and Bord na Móna employees from a range of interests.

Each day presented an opportunity to present the work of that year and to outline the course of work for the coming year, with the participation of consultees and interested parties.

The Biodiversity Action Plan 2016-2021 covers a six-year period that will be updated in 2021. In terms of monitoring the outputs of the plan this will be carried out in a similar way – with an annual review and an update of the Biodiversity Action Plan in the period 2020 to 2021 for the next planning phase. As with any plan over a six year period, at varying times aspects within the plan will be prioritised, coming to the fore while also new aspects are identified. This reflects the importance of the annual review to ensure that new perspectives, new approaches and new concerns – locally, nationally and internationally - are incorporated into the plan.

Key Performance Indicators

Some of the key performance indicators in the period 2010-2015 were:

To date, all of the actions outlined in the Bord na Móna Biodiversity Action Plan 2010-2015 were acted upon and implemented, or are currently in development and carried over into the next planning phase

Organisation of the annual Biodiversity Action Plan review days provided an opportunity for a wide range of consultees to query the ongoing activities and the progress being made against each of the objectives. This allowed for the Ecology Team to amend and/or adjust focus as views and perspectives change

A rigorous process has been adopted for the development of the 2016-2021 plan including internal, external and public consultation phases to ensure all relevant opinions and experience are considered

Building on this work the following actions can be outlined for the period 2016-2021.

Actions

Evaluate compliance by Bord na Móna with relevant legislation and development of biodiversity policy

Evaluate outcome of actions relating to ecology baseline survey and other surveys

Evaluate outcome of actions relating to rehabilitation plans,
trials and implementation of rehabilitation plans

Evaluate the outcome of actions relating to the awareness raising objective

Evaluate the process of developing the next Biodiversity Action Plan
and integrate lessons learned from each planning cycle

The Biodiversity Action Plan Review Day in 2015 involved a number of workshops centred on the new plan for 2016-2021.

Measurement and monitoring the progress of the Biodiversity Action Plan:

Each action of the Bord na Móna Biodiversity Action Plan is underpinned by indicators of success and these will be used to measure the effectiveness of the work and indicate how new objectives and actions can be added to the next Biodiversity Action Plan(s).

The key indicators of success outlined for each of the four objectives will be measured by answering a number of questions such as: Were each of the stated actions carried out? How were they carried out? What was the outcome? Has there been advancement in expertise in terms of knowledge base, management practice and effectiveness of work carried out? Is there an increased awareness of biodiversity in Bord na Móna? Are the biodiversity web-pages being accessed by the public? Are people visiting the selected visitor access biodiversity areas?

Were each of the stated actions carried out? How were they carried out? What was the outcome?

*Develop specific targets, timeframes and metrics of success for each action where possible (based on temporal, qualitative and quantitative measures), and present at each annual Biodiversity Action Plan review day; consider an interim review of the progress halfway through the set timeline of the Biodiversity Action Plan 2016-2021

Review objectives and actions annually to reflect the increasing knowledge database and other trends in best practice and policy, re-prioritising as necessary.

Provide annual updates to relevant bodies and interest groups by means of seminars and workshops

*Commission an independent review of the delivery of the Objectives and Actions prior to the development of the next Biodiversity Action Plan 2022-2027

Key Indicators of Success

The key indicators of success of these actions will be:

A clear overview of the outcome of the Biodiversity Action Plan 2016-2021

An updated Biodiversity Action Plan for the period 2022-2027 with clear and measurable objectives building on the success of the Biodiversity Action Plan 2016-2021

Proven expertise in effectively carrying out rehabilitation work and managing Bord na Mona with best outputs for biodiversity

Site visits form an enjoyable part of the review days.
Photo courtesy of Irish Peatland Conservation Council.

4.0

Changing Landscapes and Changing Perspectives

In October 2015 Bord na Móna took a significant step in outlining its vision for a sustainable and profitable business for 2030. This vision is built upon changing perspectives and a continually changing landscape in terms of priorities and targets. A sustainable business is built by recognising equally the three pillars of sustainability – people, planet and profit.

From its initial development over 80 years ago, Bord na Móna has been a major driver of social and economic development in the midlands of Ireland and indeed the west of Ireland. The move to sustainable business now means that Bord na Móna is determined to further build on its longstanding support for communities. At the local community level it will be the un-tethered vision of communities living on the edges of the bog that will ignite the inspiration and creativity for the local attractions – spaces like the Lough Boora Discovery Park in County Offaly and other community led wetland projects. These projects and initiatives require sustained energy and commitment from Bord na Móna working closely at the same time with the communities involved.

A sense of what is already happening in terms of biodiversity is reflected in the numbers of species – 940 in total – recorded at the Lough Boora Bioblitz event in 2012. As well as that the huge popularity of the Lough Boora Discovery Park - where annual visitor numbers are now approximately 100,000 – reflects the widespread appreciation of that biodiversity and the space that the cutaway bogs provide. In terms of the ecosystem goods and services provided by just this one area, we are only beginning to understand how to value this rich natural capital and judge how we can continue to do so in areas where the returns support the necessary investment. Bord na Móna can set the standard in terms of how nature and economy can sustain each other, keeping local communities vibrant, but also keeping the species and habitats upon which we rely at sustainable population levels. Initiatives like the Natural Capital Coalition, the EU Business and Biodiversity platform, and Business in the Community play a role in leading businesses to value biodiversity and ensuring it is part of their annual accounting systems. Inclusive decision making, innovation in sustainable commercial activity and constantly endeavouring to increase our positive ecological footprint will be key to any sustainable business.

With all the knowledge and experience built up since the 1990s, the company is now a major driver in terms of peatland rehabilitation and restoration, and in valuing natural capital. As the company switches progressively to renewable energy, the need for the intensive and industrial production of peat will steadily decline. This will result in a significant land use change in Ireland, in both local and national terms. As soon as peat production stops in an area, natural processes coupled with targeted rehabilitation and informed management, work to transform the former bare peat to a rich tapestry of habitats. These areas can progress relatively quickly towards valuable assets for Ireland with multiple potential uses – habitats for species marginalised in the Irish landscape today, carbon stores and sinks to help reduce and offset national carbon emissions, space for renewable energy projects and niche commercial opportunities, rich cultural landscapes for artists and observers to be inspired and to create, and a platform for amenity and tourism facilities for people to enjoy these new landscapes. The Green Infrastructure will provide a lifeline for many critically endangered and vulnerable habitats and species, and provide mutual benefits for the people using these wonderfully biodiverse areas.

Each of these aspects of rehabilitation and management of the Bord na Móna bogs – ensuring environmental stabilisation of former peat production areas, creating self-sustaining habitats for viable species populations, connecting habitat and species networks, enhancing biodiversity, understanding the GHG implications for different habitats – will be addressed over the course of this biodiversity action plan.

Conclusion

The Biodiversity Action Plan 2010–2015 was a pioneering plan that delivered a number of key actions for Bord na Móna and biodiversity. The plan has been a key driver in determining the use of Bord na Móna's lands, and has succeeded in promoting and enhancing biodiversity while also creating awareness of the importance of this core value.

The Biodiversity Action Plan 2016–2021 builds on these significant achievements, and in the context of Bord na Móna's *Sustainability 2030* report, expands on our overall vision for biodiversity and related areas including natural capital, eco-tourism and greenhouse gas management. Part of this future will involve the integration of these activities with commercial and community use of the land within an overall strategic framework. This overall approach reflects the importance of the three pillars of sustainability - people, planet and profit - and Bord na Móna's role as stewards of the assets entrusted to it by the State.

Bord na Móna is fully committed to a sustainable approach to land use and will continue to work, with all its stakeholders, to deliver its strategic aims in accordance with this Plan.

The Biodiversity Action Plan 2016-2021 expands on our overall vision for biodiversity and related areas including natural capital, eco-tourism and greenhouse gas management.

Walking on the bog: Ballydangan Bog field trip (2014).
Photo courtesy of Irish Peatland Conservation Council.

Appendix I

List of Consulting Organisations

A

Abbeyleix Bog Community Group

An Taisce

B

Ballydangan Red Grouse Project

Barrow Trust

Bat Conservation Ireland

BCI: Butterfly Conservation Ireland

Bord na Móna: internal

BSBI: Botanical Society of the British Isles

Burren Beo Trust

BWI: BirdWatch Ireland

C

CELT

CIEEM: Chartered Institute of Ecology and Environmental Management

Coillte: Irish Forest company, semi-state company

Consultant Ecologists

Consultants: EACS, Earthy Matters, McCarthy Keville O'Sullivan, RPS, Tobins and others.

Countryside Alliance

Crossmolina Community Group

D

Dublin City Council

Dublin Naturalist's Field Club

E

EPA: Environmental Protection Agency

EU DG Environment

UN FAO

F

Forest Service

G

GET: Golden Eagle Trust

Girley Bog Group

Government Departments: Agriculture, Arts Heritage and Gaeltacht, Social Protection

H

Heritage Council: Local Heritage Officers

I

IFNC: Irsih Natural Capital Forum

Inland Fisheries Ireland

IMCG: International Mire Conservation Group

IPCC: Irish Peatland Conservation Council

IPS: International Peat Society

Irish Grey Partridge Conservation Trust

Irish Red Grouse Association

Irish Rural Link

IUCN

IWT: Irish Wildlife Trust

IT: GMIT, Limerick, Sligo, Waterford

K

Kildare Regional Gun Club

Kilteevan Community Council

L

Lanesborough Community

Local authorities (Councilors & Planners)

Lullymore Heritage and Discovery Park

M

Meath Westmeath Bog Group

Moore Gun Club

Mote Park Conservation Group

N

NARGC: National and Regional Gun Club

National Universities of Ireland: DCU, UCC, UCD, UCG, TCD, Maynooth

NBDC: National Biodiversity Data Centre

NBG: National Botanic Gardens

Newtowncashel Community Group

North Midlands Wilderness Park

NPBR: Irish National Platform for Biodiversity Research

NPWS: National Parks and Wildlife Service (Regional and Scientific staff)

Q

Queens University Belfast

T

Taghmaconnell Community Group

Teagasc

V

Vincent Wildlife Trust

W

WHI: Wetlands Heritage Ireland

Wetlands International

Wetlands Survey Ireland

WI: Waterways Ireland

Woodlands of Ireland

Others:

Monica de Bath
Artist

David Bellamy
Environmentalist

Michael Casey
Sculptor

John Feehan
Author and Environmentalist

Dick Warner
Journalist and Environmentalist

Paddy Woodworth
Author and Journalist

Appendix II

An Overview of the Bord na Móna Habitat Classification

General Pioneer Community	Pioneer Community	BnM Habitat Code	Nearest Phytosociological Syntaxa	Fossitt 2000 Classification	
	Bare peat (0-50% cover)	BP		Spoil and bare ground	ED2
Embryonic bog	Pioneer *Eriophorum angustifolium* community (acidic) *	PBa	Oxycocco-Sphagnetea	Bog	PB
	Sphagnum cuspidatum-Eriophorum angustifolium community*	PBb	Oxycocco-Sphagnetea	Bog	PB
	Embryonic bog community (somewhat more diverse and developed) *	PBc	Calluno-Sphagnion	Bog	PB
Poor fen	Pioneer *Campylopus* dominated community	pCamp	Caricion curto-nigrae	Poor fen	PF2
	Pioneer *Juncus effusus* community	pJeff	Caricion curto-nigrae	Poor fen	PF2
	Pioneer *Eriophorum angustifolium* community (poor fen)	pEang	Caricion curto-nigrae	Poor fen	PF2
	Pioneer *Juncus bulbosus* community	pJbulb	Caricion curto-nigrae	Poor fen	PF2
	Pioneer *Triglochin palustris* community	pTrig	Caricion curto-nigrae	Poor fen	PF2
	Pioneer *Juncus* with *Sphagnum**	pJunc	Sphagneto-Juncetum	Poor fen	PF2
Rich fen	Pioneer rich fen community with *Schoenus nigricans* (rudimentary rich fen)	Pschon	Caricetalia davallianae	Rich fen	PF1
	Pioneer *Carex viridula*/brown moss community (rich fen)	pVir	Caricetalia davallianae	Rich fen	PF1
	Pioneer *Cladium* community	pCladium	Caricion davallianae	Rich fen	PF1
Emergent wetland communities	*Carex rostrata* community (poor fen)	pRos	Cariculion rostratae	Poor fen	PF1
	Carex paniculata community	pPan	Caricetum paniculatae	Reed and large sedge swamps	FS1
	Phragmites australis community*	pPhrag	Scirpo-Phragmitetum	Reed and large sedge swamps	FS1
	Typha community*	pTyp	Typhetum latifoliae	Reed and large sedge swamps	FS1
	Schoenoplectus community	pSch	Scirpo-Phragmitetum	Reed and large sedge swamps	FS1
Open water/aquatic	Permanent pools and lakes	OW	Isoeto-Litorelletea	Dystrophic lakes	FL1
	Permanent pools and lakes	OW	Isoeto-Litorelletea	Acid-oligotrophic lakes	FL2
	Charaphytes	pChar	Charetea	Limestone/Marl lakes	FL3
	Temporary open water	tOW			
Woodland and scrub	Emergent *Betula*-dominated community (A)	eBir	Salici-Betuletum pubescentis	Scrub	WS1
	Open *Betula*-dominated community (B)	oBir	Salici-Betuletum pubescentis	Scrub	WS1
	Closed *Betula* scrub community (C)	cBir	Salici-Betuletum pubescentis	Scrub	WS1
	Ulex-dominated community	eGor		Scrub	WS1
	Betula-Salix woodland	BirWD	Salici-Betuletum pubescentis	Bog woodland	WN7

General Pioneer Community	Pioneer Community	BnM Habitat Code	Nearest Phytosociological Syntaxa	Fossitt 2000 Classification	
Heathland	Dry *Calluna* community	dHeath	Calluno-Ulicetalia	Dry heath	HH1
	Wet Heath community	wHeath	Narthecio-Ericetum	Wet Heath	HH3
	Dense *Pteridum*	dPter	Rhamno-Prunetea	Dense Bracken	HD1
Grassland	Dry calcareous grassland	gCal	Centaureo-Cynosuretum	Dry calcareous and neutral grassland	GS1
	Antoxanhthum-Holcus-Equisetum community	gAn-H-Eq	No close affinities to Irish syntaxa	Dry calcareous and neutral grassland	GS
	Dactylis-Arrhenatherum community	gDact-Arr	Arrhenatheritum elatioris	Dry meadows and grassy verges	GS2
	Molinia caerula-dominated community	gMol	Junco conglomerati-Molinion	Wet grassland	GS4
	Marsh - *Filipendula* and other tall herbs	Mar	Filipendulion ulmariae	Marsh	GM1
Disturbed	*Tussiligo*-dominated community (vegetation > 50%)	DisCF	Tussilaginetum	Recolonising bare ground	ED3
	Epilobium-dominated community (vegetation > 50%)	DisWil	Tussilaginetum	Recolonising bare ground	ED3
General	Riparian areas (streams or drains with associated edge habitats)	Rip			FW2/4
	Access (tracks or railways with associated edge habitats)	Acc			BL3

*indicates potentially peat forming habitat

Appendix III

Supporting documents

Bord na Móna. 2010. *Bord na Móna Biodiversity Action Plan 2010-2015.* Brosna Press, Ferbane.

Bord na Móna. 2011. *Strategic Framework for the Future Use of Peatlands.* Bord na Móna.

Clark, D. and Rieley, J. 2010. *Strategy for responsible peatland management.* International Peat Society, Finland.

NPWS. 2011. *Actions for biodiversity 2011-2016. Ireland's national biodiversity plan.* Department of Arts, Heritage and the Gaeltacht.

NPWS. 2015. *National Peatland Strategy.* www.npws.ie

Recent studies and reports 2012-2015

Biosphere Environmental Services. 2014. *Bord na Móna Breeding Bird Survey 2013. Ballivor Bog Group.* Unpublished report to Bord na Móna.

Biosphere Environmental Services. 2014. *Bord na Móna Wintering Bird Survey 2013/14. Ballivor Bog Group.* Unpublished report to Bord na Móna.

Biosphere Environmental Services. 2014. *Bord na Móna Winter Bird Survey 2013-14. Ballydermot and Derrrygreenagh Bog Group.* Unpublished report Bord na Móna.

Biosphere Environmental Services. 2014. *Bord na Móna Summer Breeding Bird Survey 2013. Ballydermot and Derrrygreenagh Bog Group.* Unpublished report Bord na Móna.

Bord na Móna. 2014. Blocking Drains in Irish raised bogs. The Bord na Móna Raised Bog Restoration Project. In: *Global Peatland Restoration demonstrating SUCCESS.* (Cris, R., Buckmaster, S., Bain, C. and Reed, M. eds.) IUCN UK National Committee Peatland Programme, Edinburgh. www.iucn-uk peatlandprogramme.org

Copland, A. 2011. *Birds on Cutaway Peatlands: Baseline Breeding Bird Population Survey.* Project report 2011. Unpublished report for Bord na Móna. BirdWatch Ireland, Co. Wicklow.

Copland, A. 2012. *Birds on Cutaway Peatlands: 2012 Breeding Bird Survey. Project report 2012.* Unpublished report for Bord na Móna. BirdWatch Ireland, Co. Wicklow.

Copland, A. 2015. *Assessment of environmental and community opportunities for three cutaway peatland sites in the Lough Boora Discovery Park: Drinagh, The Derries and Turraun.* Cutaways for Communities: Conservation, Recreation, Education. Unpublished report prepared for Offaly Local Development Company in association with Bord na Móna.

Copland, A.S., Fallon, D., McCorry, M. and Farrell, C. 2013. Breeding waders on cutaway peatlands in Co. Offaly. *6th Irish Ornithological Research Conference, UCC, 23th November 2013.* www.ucc.ie/en/media/conferences/corc2013/CORC2013BookOfAbstracts.pdf

Copland, A.S., McCorry, M., Fallon, D. and Farrell, C. 2013. Response of bird populations to conservation management for breeding waders on cutaway peatlands. *6th Irish Ornithological Research Conference, UCC, 23th November 2013.*

Copland, A.S., McCorry, M., Fallon, D. and Farrell, C. 2013. Broad-scale habitat preferences of summer bird communities in cutaway peatlands. *6th Irish Ornithological Research Conference, UCC, 23th November 2013.*

Copland, A.S., McCorry, M., Fallon, D., Farrell, C. and Egan, T. Fine-scale habitat use by breeding birds in cutaway peatlands. *6th Irish Ornithological Research Conference, UCC, 23th November 2013.*

Copland, A., Farrell, C. and McCorry, M. 2011. Breeding bird populations on the Oweninny cutaway peatlands, County Mayo. *Irish Birds*, 9: 197-208.

Copland, A. and Gallagher C. 2014. *Bird Territory Mapping at Drinagh: Monitoring Impacts of Habitat Management.* Unpublished report for Bord na Móna. BirdWatch Ireland, Co. Wicklow.

Fallon, D. 2013. *Vegetation succession post rehabilitation of an industrial cutaway Atlantic blanket bog.* Unpublished MSc thesis, Sligo IT.

Fallon, D., McCorry, M., Farrell, C. and Moran, J. 2012. Ten years in rehab – what have we learned in Mayo? *Proceedings of the 14th International Peat Congress, Stockholm 2012.* IPS Finland.

Farrell, C.A. 2012. Delivering on promises: the Bord na Móna Biodiversity Action Plan 2012-2015. *Proceedings of the 14th International Peat Congress, Stockholm 2012.* IPS Finland.

Fernandez, F., Connolly K., Crowley W., Denyer J., Duff K. and Smith G. 2014. *Raised Bog Monitoring and Assessment Survey 2013.* Irish Wildlife Manuals, No. 81. National Parks and Wildlife Service, Department of Arts, Heritage and Gaeltacht, Dublin, Ireland.

Fernandez, F., Crowley W. and Wilson S. 2012. *Raised Bog Monitoring Survey.* National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin.

Foss, P.J and Crushell, P. 2014. *Kildare wetland survey.* Unpublished report. Kildare County Council.

Heery, S. 2012. *Birds in Central Ireland.* Fifth Mid-Shannon Bird Report. 2008-2011. BirdWatch Ireland.

Inis Environmental Consultants. 2015. *Garryduff Bog, Winter Bird Survey Final Report.* Unpublished report for Bord na Móna.

Inis Environmental Consultants. 2015. *Mammal Survey Final Report.* Unpublished report for Bord na Móna.

Kearney Consultants. 2013. *Feasibility Study to Portarlington Community Development Association Ltd. On the viability of developing Derryounce Lakes and Walkways as a Community Tourism Business.* Unpublished report prepared for PCDA Ltd.

Kingston, N. 2012 *Checklist of protected and rare species in Ireland.* Unpublished National Parks and Wildlife Service Report.

Lovatt, J. and Madden, B. 2012. Impact of the severe winter on Skylark *Alauda arvensis*, Wren *Troglodytes troglodytes*, Stonechat *Saxicola torquatus* and Meadow Pipit *Anthus pratensis* populations at Bellacorick cutaway bog, Co. Mayo. *Irish Birds* Vol 9: 505-507.

Malachy Walsh and Partners 2015. *Ornithology Report. Winter ornithological survey for Lot No.1: Mountdillon, Derryarogue, Derryadd, Derraghan (Winter 2014/15).* Unpublished report for Bord na Móna.

McCorry, M., Copland, A., Egan, T., Fallon, D. and Farrell, C. 2012. Developing habitat management techniques to enhance the value of Bord na Móna cutaway raised bogs in Ireland for breeding waders. *Proceedings of the 14th International Peat Congress, Stockholm 2012.* IPS Finland.

McCorry, M. and Farrell, C. 2014. The Bord na Móna restoration programme. In: *Towards Climate-Responsible Peatlands Management. Mitigation of Climate Change in Agriculture Series 9.* (Riccardo Biancalani and Armine Avagyan eds.), Food and Agriculture Organization of the United Nations (FAO). www.fao.org/3/a-i4029e.pdf.

National Biodiversity Data Centre. 2015. *All-Ireland Pollinator Plan 2015-2020.* National Biodiversity Data Centre Series No. 3, Waterford.

NPWS. 2014. *Review of the raised bog Natural Heritage Area network.* Department of Arts, Heritage and the Gaeltacht.

NPWS. 2014. *National SAC raised bog management plan. Draft for consultation.* 16/01/2014. Department of Arts, Heritage and the Gaeltacht.
www.npws.ie

RPS. 2012. *Habitats and Wildlife Survey report, Coolronan Bog, Ballivor.* Unpublished report to Meath Partnership.

Ryle. T. 2014. *Abbeyleix Bog Conservation Management Plan 2015-2020.* Unpublished report prepared for The Abbeyleix Bog Project.

Scallan, D. 2009. *Red Grouse Conservation Plan for Ballydangan Bog, County Roscommon for 2010-2015.* Unpublished report for Roscommon Regional Game Council.

Scallan, D. 2015. *Ballydangan Bog Red Grouse Project, Final report 2014.* Unpublished report

Wetland Surveys Ireland. 2012. *Baseline Avifaunal Assessment of Garryhinch Bog.* Unpublished report for Bord na Móna.

Wilson, D., Renou-Wilson, F., Farrell, C., and Muller, C. 2012. Prime real estate for climate change mitigation: rewetted industrial cutaway peatlands in North West Ireland. *Proceedings of the 14th International Peat Congress, Stockholm 2012.* IPS Finland.

Wilson, D., Renou-Wilson, F., Farrell, C., Bullock, C. and Muller, C. 2012. *Carbon Restore – the potential of restored Irish peatlands for carbon uptake and storage; CCRP Report.* EPA Wexford.

Wilson, D., Farrell, C., A, Muller, C., Hepp, S. and Renou-Wilson, F. 2013. Rewetted industrial cutaway peatlands in western Ireland: prime location for climate change mitigation? *Mires and Peat,* 11, Article 01, 1-22. www.mires-and-peat.net

Woodlands of Ireland. 2015. *A Native Woodland Strategy for Ireland 2015-2020.* Draft. Unpublished report prepared by Woodlands of Ireland.

Cutaway Bog Studies

Barron, S., Egan, T., Feighery, T., Fleming, E., Healy, K., O'Boyle, D., O'Hora, A. and O'Riordan, P. 1994. *Lough Boora Parklands Pre-feasibility study by Boora Enterprise Group*. Brosna Press, Ferbane, Ireland.

Canny, S. 1992. *Bord na Móna's role in peatland conservation.* Bord na Móna Planning and Development of Wetlands Seminar 1992, Tullamore. Unpublished document.

Copland, A. 2010a. *Birds on Cutaway Peatlands at Boora, Co. Offaly.* Internal report, Bord na Móna.

Copland, A. 2010b. *Birds on Cutaway Peatlands at Oweninny Boglands, Co. Mayo.* Internal report, Bord na Móna.

Copland, A. 2011. *Birds on Cutaway Peatlands: Drumman, Derryarkin, Ballycon and South Timahoe Bogs.*

Egan, T. 1998. A pilot project for the utilisation of cutaway bogs in West Offaly. In: *Towards a conservation strategy for the bogs of Ireland* (eds G. O'Leary and F. Gormley), pp. 119-126. Irish Peatland Conservation Council, Dublin.

Egan, T. 2006. Bord na Móna Industrial Cutaway Boglands. In: *Peatland Utilisation and Research in Ireland* (ed. C.A. Farrell), pp. 30-36. Walsh Printers, Roscrea, Co. Tipperary.

Farrell, C.A. 2001. *An ecological study of intact and industrial cutaway Atlantic blanket bog at Bellacorick, Northwest Mayo.* Ph.D. thesis, University College Dublin.

Farrell, C.A. 2004. Post Industrial Management of a Peatland Site in County Mayo, West of Ireland: integrating peatland rehabilitation and sustainable energy production after-uses. *Wise Use of Peatlands. Proceedings of the 12th International Peat Congress Tampere, Finland.* (ed. J. Päivanen), pp. 356-364. IPS, Finland.

Farrell, C.A. 2006. *Peatland Utilisation and Research in Ireland.* Walsh Printers, Tipperary.

Farrell, C.A. 2006. Peatland restoration in Ireland: a review of current practices. In: *Peatland Utilisation and Research in Ireland* (ed. C.A. Farrell), pp. 30-36. Walsh Printers, Roscrea, Co. Tipperary.

Farrell, C.A. 2007. Restoration of Peatlands in Ireland. www.pole-tourbieres.org/docs/Lamoura_Farrell.pdf

Farrell, C.A. 2008. The biodiversity value and future management of degraded peatland habitats in Ireland. *Proceedings of the 13th International Peat Congress. Volumes I and II.* IPS, Finland.

Farrell, C.A. 2008. The Oweninny Bogland: post rehabilitation management challenges. *Proceedings of the 13th International Peat Congress. Volumes I and II.* IPS, Finland.

Farrell, C.A. 2009. Review of Peatland Restoration in Ireland. *Peatlands International* 1/2009.

Farrell, C.A. 2009 Killamuck Bog Restoration Project. *Peatlands International* 2/2009.

Farrell, C.A. 2010 Bord na Móna Biodiversity Action Plan. *Peatlands International* 1/2010.

Farrell, C. A. and Doyle, G. J. 1998. Rehabilitation of Atlantic blanket bog industrial cutaway at Bellacorick, Northwest Mayo, Ireland: *Towards a conservation strategy for the bogs of Ireland* (eds G. O'Leary and F. Gormley), pp. 103-110. Irish Peatland Conservation Council, Dublin.

Farrell, C.A. and Doyle, G.J. 2000. Rehabilitation of industrial cutaway Atlantic blanket bog, NW Mayo, Ireland. *Proceedings of the Quebec 2000 Wetlands Conference.* p. 222. MacKay, Quebec.

Farrell, C. A. and Doyle, G. J. 2003. Rehabilitation of Industrial Cutaway Atlantic Blanket Bog, NW Mayo, Ireland. *Wetlands Ecology and Management*, 11, 21-35.

Farrell, C.A. and Feehan, J. 2008. After wise use – the future of peatlands. *Proceedings of the 13th International Peat Congress. Volumes I and II.* IPS, Finland.

Feehan, J. 2004. *A Long-Lived Wilderness: The Future of the North Midlands Peatland Network* Department of Environmental Resource Management, UCD, Dublin.

Grand-Clement, E., Anderson, K., Smith, D., Angus, M., Luscombe, D., Gatis, N., Bray, L. and Brazier, R. 2015. New approaches to the restoration of shallow marginal peatlands. *Journal of Environmental Management* 161, 417-430.

Heery, S. and Finney, K. 1999. *Lough Boora Parklands. Habitat Survey and Conservation Evaluation.* Unpublished Report to the Lough Boora Parklands Group. Heritage Council, Ireland.

Herbert, I. 2008. *The large biodiversity plot project – Mount Dillon cutaway complex.* Facilitators Report for the Pilot Study, NPWS and BNM Internal Report

Higgins, T. 2005. *Lake Creation on Cutaway Peatlands in Ireland.* Non-Technical Report based on PhD research. NUI Galway. Bord na Móna.

Higgins, T., Kenny, T. and Colleran E. 2007. Plankton communities of artificial lakes created on Irish cutaway peatlands. *Biology and Environment: Proceedings of the Royal Irish Academy, vol. 107b, no. 2, 77-85.*

Higgins, T., Colleran, E. and Raine, R. 2006. Transition from P- to N-limited phytoplankton growth in an artificial lake on flooded cutaway peatland in Ireland. *Applied Vegetation Science 9: 223-230, 2006.*

Kavanagh, B. 1998. Cutaway Bogs: A new landscape for birdlife. In: *The Future Use of Cutaway Bogs*, pp. 34-44. Brosna Press, Ferbane, Ireland.

Lally, H., Gormally, M., Higgins, T. and Colleran, E. 2012. Evaluating Different Wetland Creation Approaches for Irish Cutaway Peatlands Using Water Chemical Analysis. *Wetlands 32:129-136.*

McDonagh, E. 1997. *Drain-blocking by machine on Raised Bogs.* Internal Report, Dúchas, Ireland.

McNally, G. 2008. *50 years of research endeavour on the future use of Irish industrial cutaways.* Internal report, Bord na Móna.

Meehan Tully & Associates Ltd. and Archaeological Development Services Ltd. 2011. *Wetlands Heritage – Longford Feasibility Study. Consolidated Report 2011.* Unpublished Report for Longford Historical Society.

O'Connor, A. and Reynolds, J. 2000. Aquatic macro invertebrate colonisation of artificial water bodies on cutaway oceanic raised bog in Ireland. *Quebec 2000: Millennium Wetland Event – programme and abstracts*, p. 171. Elizabeth MacKay Publishers, Quebec.

Renou-Wilson, F. and Farrell, C.A. (2008). Peatland vulnerability to energy-related climate change policy in Ireland: the case of wind farms. *Mires and Peat 4*, (2008/2009), Article 8.

Rochefort L., Quinty F., Campeau S., Johnson K. and Malterer, T. 2003. North American approach to the restoration of *Sphagnum* dominated peatlands. *Wetlands Ecology and Management* 11: 3-20.

Rowlands, R. and Feehan, J. 2000a. The ecological future of industrially milled cutaway peatlands in Ireland. *Aspects of Applied Biology*, 58, 263-270.

Rowlands, R. and Feehan, J. 2000b. Maximising the ecological potential of industrial cutaway peatlands in Ireland. *Quebec 2000: Millennium Wetland Event – programme and abstracts*, p. 258. Elizabeth MacKay Publishers, Quebec.

Trodd, W. and Murray, D.A. 2000. The chironomidae of Turraun Nature Reserve and their association with *Ophrydium versatile*. *Quebec 2000: Millennium Wetland Event - programme and abstracts*, p. 185.

Trodd, W. 2003. *Assessment of aquatic habitats in Turraun Nature Reserve for restoration management and use of Chironomidae (diptera: insecta) as indicators of water quality.* Unpublished PhD thesis, University College Dublin.

Relevant papers that are included in After wise use – the future of peatlands (Proceedings of the 13th International Peat Congress, Farrell and Feehan 2008) are outlined below. These can be sourced online at the IPS website: www.peatsociety.org

Buckley, K. 2008. *Cutaway bog vs. Rural Environmental Protection Scheme – on cost benefit, could cutaway deliver more for biodiversity?*

Collier, M.J., Feehan, J. and Scott, M. 2008. *Social and community dimensions in cutaway peatland policy.*

Copland, A., Bayliss, J., Power, E and Finney, K. 2008. *Breeding waders on cutaway peatlands in County Offaly.*

Egan, T. 2008. *The Lough Boora Parklands project on cutaway bogland in West Offaly Ireland: regional ecological, economic and social benefits*

Farrell, C.A. 2008. *The Oweninny Bogland: post rehabilitation management challenges.*

Farrell, C.A. 2008. *The biodiversity value and future management of degraded peatland habitats in Ireland.*

Lally, H., Higgins, T., Colleran, E. and Gormally, M. 2008. *Lakes: a new concept for wildlife conservation on Irish cutaway peatlands.*

Rehabilitation plans

Bord na Móna. 2002. *Cutaway bog rehabilitation: Condition 10 Integrated Pollution Control Licence. Management guidelines for the planning and implementation of cutaway bog rehabilitation in accordance with Condition 10 of IPC Licences Nos. 500-507.* IPC licence application, Bord na Móna.

Bord na Móna. 2002. *Rehabilitation of industrial cutaway bog, North-west Mayo.* Internal Report, Bord na Móna.

Bord na Móna. 2003. *Cutaway Bog Rehabilitation.* Report for public consultation in relation to Condition 10 of IPC Licence Ref. No. 505, Bord na Móna.

Bord na Móna. 2005. *Rehabilitation Plan for the Srahmore Peat Deposition Area and Associated Facilities.* Report for public consultation in relation to Condition 9 of Waste Licence Ref. No. WL199-1, Bord na Móna.

Bord na Móna. 2011. *Rehabilitation Plan for the Srahmore Peat Deposition Area and Associated Facilities.* Report for public consultation in relation to Condition 10 of Waste Licence Ref. No. WL199-2, Bord na Móna.

Bord na Móna. 2012. *Abbeyleix Rehabilitation Plan.* Unpublished report. Bord na Móna.

Bord na Móna. 2012. *Derrydoo Woodlough Rehabilitation Plan.* Unpublished report. Bord na Móna.

Bord na Móna. 2014. *Rathvilla Gravel Pit Rehabilitation Plan.* Unpublished report. Bord na Móna.

Bord na Móna. 2015. *Clonboley Rehabilitation Plan.* Unpublished report. Bord na Móna.

General Habitats/Species/Peatlands

BirdWatch Ireland. 2010. *Action Plan for Upland Birds in Ireland 2011-2020. BirdWatch Ireland's Group Action Plans for Irish Birds.* BirdWatch Ireland, Kilcoole, Co. Wicklow

BirdWatch Ireland. 2011. *Action Plan for Raised Bog Birds in Ireland 2011-2020. BirdWatch Ireland's Group Action Plans for Irish Birds.* BirdWatch Ireland, Kilcoole, Co. Wicklow

Butterfly Conservation Ireland. 2009, 2010, 2011, 2012, 2013, 2014, 2015. *Annual Butterfly Report.* BCI.

Carroll, J., Anderson, P., Caporn, S., Eades, P., O'Reilly C. and Bonn, A. 2009. *Sphagnum in the Peak District. Current Status and Potential for Restoration.* Moors for the Future Report No 16. Moors for the Future Partnership.

Comhar Sustainable Development Council. 2010. *Creating Green Infrastructure for Ireland. Enhancing Natural Capital for Human Well Being.* Comhar Sustainable Development Council.

Cross, J.R. 1990. *The Raised Bogs of Ireland: their Ecology, Status and Conservation.* Unpublished report, Minister of State, Department of Finance.

Cross, J.R. 2005. The Potential Natural Vegetation of Ireland. *Proceedings of the Royal Irish Academy*, 106B, 65-116.

Crowe, O. 2005. *Ireland's Wetlands and their Waterbirds: Status and Distribution.* BirdWatch Ireland, Co. Wicklow.

Curtis, T.G.F. and McGough, H.N. 1988. *The Irish Red Data Book 1: Vascular Plants.* Stationery Office, Dublin. 4.

Davies, M. 2006. *Nature After Minerals – How mineral site restoration can benefit people and wildlife: the report.* The RSPB

Eades P., Bardsley, L., Giles, N., and Crofts, A. 2003. *The Wetland Restoration Manual.* The Wildlife Trusts, Newark.

Feehan, J. and O'Donovan, G. 1996. *The Bogs of Ireland: An Introduction to the Natural, Cultural and Industrial Heritage of Irish Peatlands.* The Environmental Institute, UCD.

Feehan, J. 2014. *The landscape of Clonmacnoise, Co. Offaly, Ireland.* Offaly County Council.

Fossitt, J. 2000. *A Guide to the Habitats in Ireland.* The Heritage Council.

Fitzgerald, P. 2006. Energy peat in Ireland. In: *Peatland Utilisation and Research in Ireland* (ed. C.A. Farrell), pp. 20-23. Walsh Printers, Roscrea, Co. Tipperary.

Foss, P. 1998. National overview of the peatland resource in Ireland. In: *Towards a conservation strategy for the bogs of Ireland* (eds G. O'Leary and F. Gormley), pp. 3-20. Irish Peatland Conservation Council, Dublin.

Foss, P. and Crushell P. 1998. *County Kildare wetland survey. 2014.* A report for Kildare County Council and The Heritage Council.

Gaudig, G., Fengler, F., Krebs, M., Prager, A., Schulz, J., Wichmann, S., Joosten, H. 2014. *Sphagnum* farming in Germany – a review of progress. *Mires and Peat,* Volume 13 (2013/14), Article 08, 1–11. www.mires-and-peat.net. ISSN 1819.

Hammond, R. F. 1984. The classification of Irish peats as surveyed by the National Survey of Ireland. *Proc. 7th Int. Peat Congress, Dublin,* pp. 168-187.

Hinde, S., Rosenburgh, A., Wright, N., Buckler, M. and Caporn, S. 2010. *Sphagnum re-introduction project: A report on research into the re-introduction of Sphagnum mosses to degraded moorland.* Moors for the Future Research Report 18. Moors For The Future Partnership.

Hurley, C. 2005. *Bog of Allen habitat and heritage survey.* Irish Peatland Conservation Council.

Joosten, H. and Clarke, D. 2002. *Wise Use of mires and peatlands – Background and Principles including a framework for Decision-making.* I.M.C.G. – I.P.S., Jyväskylä, Finland.

Joosten, H. 2009. *The Global Peatland CO2 Picture. Peatland status and emissions in all countries of the world.* Wetlands International, Ede, 2009. www.wetlands.org

Konvalinkováa, P. and Prach, K. 2014. Environmental factors determining spontaneous recovery of industrially mined peat bogs: A multi-site analysis. *Ecological Engineering,* 69 (2014), 38–45.

Malone, S. and O'Connell, C. 2009. *Irish Peatland Conservation Action Plan 2020 – halting the loss of peatland biodiversity.* Irish Peatland Conservation Council, Lullymore, Co. Kildare.

MacGowan, F.L. 2000. *The influence of anthropogenic activity on the vegetation of Atlantic blanket bog in the west of Ireland.* Ph.D. thesis, University College Dublin.

McBride, A., Diack, I., Droy, N., Hamill, B., Jones, P., Schutten, J., Skinner, A. and Street, M. 2011. *The Fen Management Handbook,* Scottish Natural Heritage, Perth.

Moore, J.J. 1968. A classification of the bogs and wet heaths of northern Europe (Oxycocco-Sphagnetea Br.-Bl. et Tx. 1943). In: *Pflanzensoziologie Systematik* (ed. R. Tüxen), pp. 306-320. Junk, Den Haag.

National Red Grouse Steering Committee. 2013. *Red Grouse Species Action Plan.* National Parks and Wildlife Service, Dublin.

NPWS. 2013. *The Status of EU Protected Habitats and Species in Ireland.* Habitat Assessments Volume 2. Version 1.1. Unpublished Report, National Parks and Wildlife Services. Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

NPWS. 2013. *The Status of EU Protected Habitats and Species in Ireland.* Species Assessments Volume 3, Version 1.0. Unpublished Report, National Parks and Wildlife Services. Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

O'Connell, C.A. 2006. The IPCC Lodge Bog Conservation Plan. In: *Peatland Utilisation and Research in Ireland* (ed. C.A. Farrell), pp. 43-49. Walsh Printers, Roscrea, Co. Tipperary.

O'Connell, M. 1981. The phytosociology and ecology of Scragh Bog, Co. Westmeath. *New Phytologist,* 87, 139- 187.

Ó Corcora, T. 2011. *Lodge Bog Management Plan 2011-2016.* Irish Peatland Conservation Council.

Regan, E.C., Nelson, B., Aldwell, B., Bertrand, C., Bond, K., Harding, J., Nash, D., Nixon, D., and Wilson, C.J. 2010. *Ireland Red List No. 4 – Butterflies.* National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Ireland.

Renou-Wilson, F., Keane, M., McNally, G., O'Sullivan, J. and Farrell, E.P. 2008. *Developing a forest resource on industrial cutaway peatland. The BOGFOR programme.* COFORD, Dublin.

Renou-Wilson F., Bolger T., Bullock C., Convery F., Curry J. P., Ward S., Wilson D. and Müller C. 2011. *BOGLAND - Sustainable Management of Peatlands in Ireland.* STRIVE Report No 75 prepared for the Environmental Protection Agency. Johnstown Castle, Co. Wexford.

Scharlemann, J., Tanner, E., Hiederer, R. and Kapos, V. 2014. Global soil carbon: understanding and managing the largest terrestrial carbon pool, *Carbon Management,* 5:1, 81-91, DOI: 10.4155/cmt.13.77

Schouten, M.G.C. 2002. *Conservation and Restoration of Raised Bogs: Geological, Hydrological and Ecological Studies.* Dúchas - The Heritage Service of the Department of the Environment and Local Government, Ireland; Staatsbosbeheer, the Netherlands; Geological Survey of Ireland; Dublin.

Smith, G.F., O'Donoghue, P., O'Hora, K. and Delaney, D. 2011. *Best Practise For Habitat Survey and Mapping.* The Heritage Council.

Triisberg, T., Karofeld, E., Liira, J., Orru, M., Ramst, R. and Paal, J. 2014. Microtopography and the Properties of Residual Peat Are Convenient Indicators for Restoration Planning of Abandoned Extracted Peatlands. *Restoration Ecology* Vol. 22, No. 1, pp. 31–39 31.

Woziwoda, B. and Kopec, D. 2014. Afforestation or natural succession? Looking for the best way to manage abandoned cut-over peatlands for biodiversity conservation. *Ecological Engineering* 63 (2014) 143– 152.

Appendix IV

Habitats and species of nature conservation value recorded from Bord na Móna sites

Table 1.
List of EU Habitats Directive Annex I habitats that have been found on Bord na Móna property.

Most habitats are found in cSACs/pNHAs already recognised for their conservation value and have already been listed as qualifying interests for these conservation sites (part owned by Bord na Móna)

Habitat	Fossitt Code	National	International	Examples
* Active Raised bogs (7110)	PB1	ECHR	EU HD Annex I	Clera Island Bog in Co. Roscommon (Clonboley Group); Townparks Bog (Daingean Bog NHA).
Degraded raised bogs still capable of regeneration (7120)	PB1	ECHR	EU HD Annex I	Clera Island bog in Co. Roscommon (Clonboley Group); Killamuck Bog (Abbeyleix Bog), Co. Laois.
Blanket Bog (*if active bog) (7130)	PB3	ECHR	EU HD Annex I	O'Boyle's Bog (Co. Mayo)
Depressions of the peat substrates of the Rhynchosporion (7150)	PB1	ECHR	EU HD Annex I	Several sites within bog remnants to margins of production areas.
*Calcareous fens with *Cladium mariscus* and species of the Caricion davallianae (7210)	PF1	ECHR	EU HD Annex I	Overlap with Fin Lough cSAC (Co. Offaly)
*Alkaline fens (7230)	PF1	ECHR	EU HD Annex I	Overlap with Fin Lough cSAC (Co. Offaly); some regeneration at Lullymore Bog, Co. Kildare
Transition mires and quaking bogs (7140)	PF3	ECHR	EU HD Annex I	Cranberry Lough bog (Cranberry Lough pNHA, Co. Roscommon)
*Bog woodland (91D0)	WN7	ECHR	EU HD Annex I	Clera Island Bog in Co. Roscommon (Clonboley Group)
*Petrifying springs with tufa formation (Cratoneurion) (7220)	FP1	ECHR	EU HD Annex I	Derryarogue Island in Co. Roscommon (Mountdillon Works)
Atlantic salt meadows (*Glauco-Puccinellietalia*) (1330)	CM1/CM2	ECHR	EU HD Annex I	Margins of Bangor-Ballycroy (Tullaghan Bay NHA, Co. Mayo)
Mediterranean salt meadows (*Juncetalia maritimi*) (1410)	CM2/CM2	ECHR	EU HD Annex I	Margins of Bangor-Ballycroy (Tullaghan Bay NHA, Co. Mayo)
Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometea) (*important orchid sites) (6210)	GS1	ECHR	EU HD Annex I	Likely to be present at Derryarogue Island in Co. Roscommon (Mountdillon Works)
* Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-padion, Alnion incarne, Salicion albae) (91E0)	WN4	ECHR	EU HD Annex I	Potential to be present on some riparian zones (not recorded yet)
European dry heaths (4030)	HH1	ECHR	EU HD Annex I	Present on some bog remnants

* Priority habitat - habitat types in danger of disappearance and whose natural range mainly falls within the territory of the European Union (Commission of the European Communities 2003)

Table 2.
List of EU Habitats Directive Annex II species that have been found on Bord na Móna property to date.

Species	National	International	Details
Soprano Pipistrelle (*Pipistrellus pygmaeus*) 1	ECHR, RDB (LC) & WA	EU HD Annex IV & Bern (II)	Large bat roost at Bord na Móna works, Boora, (Co. Offaly), Activity noted at other locations.
Common Pipistrelle (*Pipistrellus pipistrellus*)	ECHR, RDB (LC) & WA	EU HD Annex IV & Bern (II)	Activity noted around Bord na Móna property (Co. Offaly).
Leislers Bat (*Nyctalus noctula*)	ECHR, RDB (NT) & WA	EU HD Annex IV & Bern (II)	Roost in the Derrygreenagh bog group with activity noted around other Bord na Móna properties (Co. Offaly).
Daubenton's Bat (*Myotis daubentonii*)	ECHR, RDB (NT) & WA	EU HD Annex IV & Bern (II)	Activity noted around Bord na Móna property (Co. Offaly).
Otter (*Lutra lutra*)	ECHR, RDB (NT) & WA	EU HD, Annexes II, IV & Bern (II)	Frequently seen within Lough Boora Parklands. Activity at several other sites, including Lullymore, Lullybeg, Mayo bogs and others.
Pine Marten (*Martes martes*)	ECHR, RDB (LC) & WA	EU HD, Annexes II, IV & Bern (II)	Signs recorded at most sites.
Irish Hare (*Lepus timidus hibernicus*)	ECHR, SAP, RDB (LC) & WA.	EU HB Annex V & Bern (II)	Frequent user of cutaway and production bog. Regularly seen.
Red Squirrel (*Sciurus vulgaris*)	RDB (NT) & WA	Bern (III)	Recorded at numerous sites in counties Roscommon, Galway, Offaly and Kildare.
Hedgehog (*Erinaceous europaeus*)	RDB (LC) & WA	Bern (II)	Observed in some midland cutaway sites (Likely to be regular user of the cutaway and production bog).
Badger (*Meles meles*)	RDB (LC) & WA	Bern (III)	Frequent user of cutaway, production bog and intact bogs. Signs regularly recorded.
Fallow Deer (*Dama dama*)	RDB (LC) & WA	Bern (III)	Frequent user of cutaway, production bog and intact bogs.
Red Deer (*Cervus elaphus*)	RDB (LC) & WA		Frequently recorded in the Oweninny area.
Amphibians and Reptiles			
Common Frog (*Rana temporaria*)	RDB (II) & WA	EU HD, Annex V & Bern (II)	Frequent user of cutaway bog. Regularly recorded.
Common Newt (*Triturus vulgaris*)	RDB (LC), WA		Recorded at Lough Boora Discovery Park (Turraun), Lullymore/Lullybeg
Viviparous Lizard (*Lacerta vivipara*)	RDB, WA		Recorded at Lough Boora Parklands, Mayo bogs and intact bogs in Roscommon and Galway.
Invertebrates			
Marsh Fritillary (*Euphydryas aurinia*)	RS, VU	EU HD, Annex I	Butterfly species is using part of Lullybeg (Co. Kildare). Site managed by Butterfly Conservation Ireland, also located on a number of other sites across the midlands.
Large Heath (*Coenonympha tullia*)	RS, VU	EU HD, Annex I	Butterfly species using some areas of remnant raised bog.
Dingy Skipper (*Erynnis tages*)	RS, NT	EU HD, Annex I	Butterfly species using some cutaway sites, such as in Lough Boora Discovery Park.
White-clawed Crayfish (*Austropotamobius pallipes*)		EU HD, Annex II	Observed in watercourses in cutaway peatlands and watercourses adjacent to intact peatlands.
Fish			
Brook lamprey (*Lampetra planeri*)	RDB (LC)	EU HD, Annex II	Found in watercourses adjacent to bogs in some midland sites.
European Eel (*Anguilla Anguilla*)	RDB (CR)	OSPAR[7]	Found in some streams and lakes.

Species	National	International	Details
Plants			
Basil thyme (*Acinos arvensis*)	FPO RDB (VU)		Plant of eskers in midlands. Found at the Long Derries cSAC, Co. Offaly.
Blue Fleabane (*Erigeron acer*)	RDB (VU)		Plant of eskers in midlands. Recently recorded on disturbed glacial till and along railway embankments at cutaway bog sites in Co. Offaly.
Marsh Saxifrage (*Saxifraga hirculus*)	FPO RDB (EN)		Plant of wet bogs in west of Ireland. Recorded at Bellacorick Iron Flush (site owned by An Taisce).
Serrated Wintergreen (*Orthilia secunda*)	RDB (E)		Only known population remaining in the Republic of Ireland at Ballydangan Bog, Co Roscommon.
Alder Buckthorn (*Frangula alnus*)	RDB (R)		Plant of the edges of remnant raised bog, also found on some cutaway sites.
Bryophytes			*To be updated as ecology survey proceeds.*

Table 3.
List of Bird species that have been found on Bord na Móna property to date.

Common name	Latin name	Breeding [1]	Wintering	EU BRq Annex I	BoCCI	Notes [2]
Mute Swan	*Cygnus olor*	Y	Y		Amber	Regular breeder on larger wetlands
Bewick's Swan	*Cygnus columbianus*		Y	Y	Red	Recorded; now very rare
Whooper Swan	*Cygnus cygnus*		Y	Y	Amber	Internationally and nationally important numbers occasionally counted on Blackwater bogs (Galway/Offaly) and in Boora Parklands and associated bogs such as Lullymore and Ballycon (Offaly)
Bean Goose	*Anser fabilis*		Y			Rare winter visitor
Pink-footed Goose	*Anser brachyrhynchus*		Y			Occasional winter visitor
Greenland White-fronted Goose	*Anser albifrons flavirostris*		Y	Y	Amber	Occasional winter visitor
Greylag Goose	*Anser anser*	Y	Y		Amber	Feral breeding population around Boora; genuine wild birds regularly with wintering Whooper Swans
Canada Goose	*Branta canadensis*		Y			Occasional winter visitor
Barnacle Goose	*Branta leucopsis*		Y	Y	Amber	Occasional winter visitor
Shelduck	*Tadorna tadorna*		Y		Amber	Rare winter visitor
Wigeon	*Anas penelope*		Y		Red	Regular winter visitor
Gadwall	*Anas strepera*		Y		Amber	Occasional winter visitor
Teal	*Anas crecca*	Y	Y		Amber	Nationally important wintering numbers have been counted at Blackwater, Co. Offaly; scarce and localised breeder
Green-winged Teal	*Anas crecca carolinensis*					Vagrant – one Blackwater record
Mallard	*Anas platyrhynchos*	Y	Y			Nationally important wintering numbers occasionally recorded at Boora Parklands, Co. Offaly [3]. Common regular breeder.
Pintail	*Anas acuta*		Y		Red	Nationally important wintering numbers have been counted at Blackwater, Co. Offaly [3]
Garganey	*Anas querquedula*				Amber	Rare passage migrant
Shoveler	*Anas clypeata*	S	Y		Red	Regular winter visitor; possible breeder
Pochard	*Aythya ferina*		Y		Red	Regular winter visitor
Tufted Duck	*Aythya fuligula*	Y	Y		Red	Regular, localised breeder; regular winter visitor
Scaup	*Aythya marila*		Y		Amber	Scarce winter visitor

Common name	Latin name	Breeding [1]	Wintering	EU BRq Annex I	BoCCI	Notes [2]
Long-tailed Duck	*Clangula hyemalis*				Red	Rare visitor
Goldeneye	*Bucephala clangula*		Y		Red	Scarce winter visitor
Smew	*Mergus albellus*			Y		Vagrant – one Leabeg record
Red-breasted Merganser	*Mergus serrator*					Scarce visitor
Red Grouse	*Lagopus lagopus hibernicus*	Y	Y		Red	Resident breeder on intact bog remnants
Grey Partridge	*Perdix perdix*	Y	Y		Red	Resident breeder at Boora
Quail	*Coturnix coturnix*	S			Red	Scarce summer visitor; not annual, but possible breeder
Pheasant	*Phasianus colchicus*	Y	Y			Common resident
Great Northern Diver	*Gavia immer*				Amber	Scarce winter visitor
Red-throated Diver	*Gavia stellata*				Amber	Scarce winter visitor
Leach's Storm Petrel	*Oceanodroma leucorhoa*				Red	Rare Vagrant (one record from Boora)
Cormorant	*Phalacrocorax carbo*	Y	Y		Amber	Regular visitor; non-breeding
Little Egret	*Egretta garzetta*		Y			Regular visitor; non-breeding
Grey Heron	*Ardea cinerea*	Y	Y			Resident breeder
Little Grebe	*Tachybaptus ruficollis*	Y	Y		Amber	Nationally important numbers occasionally recorded at Boora Parklands, Co. Offaly. Regular breeder confirmed
Great Crested Grebe	*Podiceps cristatus*	Y	Y		Amber	Localised but regular breeder
White-tailed Eagle	*Haliaaeetus albicilla*		Y		Red	Rare winter visitor
Red Kite	*Milvus milvus*				Amber	Scarce visitor
Black Kite	*Milvus migrans*					Rare Vagrant (one record from Tumduff)
Marsh Harrier	*Circus aeruginosus*			Y	Amber	Scarce passage migrant. Several birds have over-wintered at Boora Parklands in the past 10 years [6]
Hen Harrier	*Circus cyaneus*	Y	Y	Y	Amber	Regularly recorded throughout the year, included regular winter roosts. Breeding confirmed in C. Mayo.
Montagu's Harrier	*Cicus pygargus*					Rare Vagrant (one record from Tumduff)
Sparrowhawk	*Accipiter nisus*	Y	Y		Amber	Widespread resident breeder
Goshawk	*Accipiter gentilis*				Amber	Rare Visitor
Buzzard	*Buteo buteo*	Y	Y			Widespread resident breeder
Osprey	*Pandion haliaetus*			Y		Rare passage migrant
Kestrel	*Falco tinnunculus*	Y	Y		Amber	Widespread resident breeder
Hobby	*Falco subbuteo*					Rare visitor
Red-footed Falcon	*Falco vespertinus*					Rare Vagrant (one record at Timahoe)
Merlin	*Falco columbarius*	S	Y	Y	Amber	Scarce but regular winter visitor; breeding in some sites suspected
Peregrine Falcon	*Falco peregrines*	S	Y	Y		Regular visitor; breeding suspected
Water Rail	*Rallus aquaticus*	Y	Y			Localised but regular breeder
Moorhen	*Gallinula chloropus*	Y	Y			Widespread resident breeder
Coot	*Fulica atra*	Y	Y		Amber	Scarce, but possible breeder
Common Crane	*Grus grus*			Y		Vagrant – recorded at Leabeg and Ballycon
Black-winged Stilt	*Himantopus himantopus*					Rare Vagrant (one record from Finnamores)
Oystercatcher	*Haematopus ostralegus*		Y		Amber	Scarce winter visitor
Ringed Plover	*Charadrius hiaticula*	Y	Y		Amber	Localised but regular breeder
Golden Plover	*Pluvialis apricaria*	S	Y	Y (breeding)	Red	Nationally important wintering numbers occasionally recorded at Boora Parklands, Co. Offaly; breeding suspected in Co. Mayo
American Golden Plover	*Pluvialis dominica*					Vagrant – one Blackwater record
Grey Plover	*Pluvialis squatarola*		Y		Amber	Rare winter visitor
Lapwing	*Vanellus vanellus*	Y	Y		Red	Nationally important wintering numbers occasionally recorded at Boora Parklands, Co. Offaly [3]. Also recorded at Lullymore (breeding). Localised but regular breeder

Common name	Latin name	Breeding [1]	Wintering	EU BRq Annex I	BoCCI	Notes [2]
Knot	*Calidris canutus*				Amber	Scarce passage migrant
Sanderling	*Calidris alba*					Scarce passage migrant
Little Stint	*Calidris minuta*					Scarce passage migrant
Temminck's Stint	*Calidris ferruginea*					Vagrant – one Turraun record
Dunlin	*Calidris alpine*	S	Y	Y (Breeding population)	Red	Regular passage migrant and scarce winter visitor; breeding possible in Co. Mayo
White-rumped Sandpiper	*Calidris fuscicollis*					Rare vagrant (one record from Boora Lake)
Long-billed Dowitcher	*Limnodromus scolopaceus*					Rare vagrant (one record from Boora Lake)
Ruff	*Philomachus pugna*		Y	Y	Amber	Scarce passage migrant and winter visitor
Jack Snipe	*Lymnocryptes minimus*		Y		Amber	Scarce winter visitor
Snipe	*Gallinago gallinago*	Y	Y		Amber	Widespread resident breeder reinforced by migratory winter visitors
Woodcock	*Scolopax rusticola*	Y	Y		Red	Localised but regular breeder; winter visitor
Black-tailed Godwit	*Limosa limosa*		Y	Y	Amber	Scarce passage migrant and winter visitor
Whimbrel	*Numenius phaeopus*					Passage migrant
Curlew	*Numenius arquata*	Y	Y		Red	Scarce and localised breeder; regular winter visitor
Common Sandpiper	*Actitis hypoleucos*	Y	Y		Amber	Localised but regular breeder
Green Sandpiper	*Tringa ochropus*		Y			Passage migrant
Spotted Redshank	*Tringa erythropus*		Y		Amber	Passage migrant
Greenshank	*Tringa nebularia*		Y			Passage migrant
Redshank	*Tringa totanus*	Y	Y		Red	Localised but regular breeder
Lesser Yellowlegs	*Tringa flavipes*					Rare Vagrant (two records at Clongawny)
Red-necked Phalarope	*Phalaropus lobatus*			Y	Red	Very rare but possible breeder
Grey Phalarope	*Phalaropus fulicarius*					Vagrant – one Derries record
Black-headed Gull	*Larus ridibundus*	Y	Y		Red	Regular but localised breeder; occasional winter visitor
Common Gull	*Larus canus*	Y	Y		Amber	Very scarce breeder.
Lesser Black-backed Gull	*Larus fuscus*		Y		Amber	Occasional, non-breeding visitor
Herring Gull	*Larus argentatus*		Y		Red	Occasional, non-breeding visitor
Great Black-backed Gull	*Larus marinus*		Y		Amber	Occasional, non-breeding visitor
Kittiwake	*Rissa tridactyla*				Amber	Rare visitor
Black Tern	*Chlidonias niger*					Rare Vagrant (one record from Drinagh)
Arctic Tern	*Sterna paradisaea*				Amber	Rare visitor
Common Tern	*Sterna hirundo*				Amber	Occasional, non-breeding visitor
Stock Dove	*Columba oenas*	Y	Y		Amber	Scarce and localised resident breeder
Wood Pigeon	*Columba palumbus*	Y				Common and widespread resident
Collared Dove	*Streptopelia decaocto*					Resident
Cuckoo	*Cuculus canorus*	Y				Localised but regular breeder
Barn Owl	*Tyto alba*	Y			Red	Scarce and localised resident; breeding possible
Snowy Owl	*Bubo scandiacus*					Vagrant – one Clonbonny record
Long-eared Owl	*Asio otus*	Y	Y			Localised but regular breeder
Short-eared Owl	*Asio flammeus*		Y	Y	Amber	Scarce winter visitor
Swift	*Apus apus*				Amber	Summer visitor; breeding possible
Kingfisher	*Alcedo atthis*	S	Y	Y	Amber	Occasionally recorded on cutaway sites (Turraun, Ballycon, Lullymore in Co. Offaly, Drumman, Co. Westmeath & Milkernagh, Co. Longford)
Magpie	*Pica pica*	Y	Y			Common and widespread resident
Jay	*Garrulus glandarius*	Y	Y			Recorded
Jackdaw	*Corvus monedula*	Y	Y			Common and widespread resident
Rook	*Corvus frugilegus*	Y	Y			Common and widespread resident
Hooded Crow	*Corvus corone cornix*	Y	Y			Common and widespread resident

Common name	Latin name	Breeding [1]	Wintering	EU BRq Annex I	BoCCI	Notes [2]
Raven	*Corvus corax*	Y	Y			Common and widespread resident
Goldcrest	*Regulus regulus*	Y	Y		Amber	Common and widespread resident
Blue Tit	*Parus caeruleus*	Y	Y			Common and widespread resident
Great Tit	*Parus major*	Y	Y			Common and widespread resident
Coal Tit	*Parus ater*	Y	Y			Common and widespread resident
Skylark	*Alauda arvensis*	Y	Y		Amber	Common and widespread resident
Sand Martin	*Riparia riparia*	S			Amber	Common and widespread summer visitor; large migratory roosts in reedbeds
Swallow	*Hirundo rustica*	Y			Amber	Common and widespread summer visitor
House Martin	*Delichon urbica*	Y			Amber	Common and widespread summer visitor
Long-tailed Tit	*Aegithalos caudatus*	Y	Y			Common and widespread resident
Chiffchaff	*Phylloscopus collybita*	Y	Y			Common and widespread summer visitor; occasional winter visitor
Willow Warbler	*Phylloscopus trochilus*	Y				Common and widespread summer visitor
Blackcap	*Sylvia atricapilla*	Y	Y			Common and widespread summer visitor; occasional winter visitor
Whitethroat	*Sylvia communis*	Y				Common and widespread summer visitor
Grasshopper Warbler	*Locustella naevia*	Y			Amber	Localised but regular breeder
Sedge Warbler	*Acrocephalus schoenobaenus*	Y				Common and widespread summer visitor
Treecreeper	*Certhia familiaris*	Y	Y			Common and widespread resident
Wren	*Troglodytes troglodytes*	Y	Y			Common and widespread resident
Starling	*Sturnus vulgaris*	Y	Y		Amber	Common and widespread resident
Blackbird	*Turdus merula*	Y	Y			Common and widespread resident
Fieldfare	*Turdus pilaris*		Y			Common winter visitor
Song Thrush	*Turdus philomelos*	Y	Y			Common and widespread resident
Redwing	*Turdus iliacus*		Y			Common winter visitor
Mistle Thrush	*Turdus viscivorus*	Y	Y		Amber	Common and widespread resident
Spotted Flycatcher	*Muscicapa striata*	Y			Amber	Common and widespread summer visitor
Robin	*Erithacus rubecula*	Y	Y		Amber	Common and widespread resident
Whinchat	*Saxicola rubetra*	Y			Red	Very rare summer visitor
Stonechat	*Saxicola torquata*	Y	Y		Amber	Common and widespread resident
Wheatear	*Oenanthe oenanthe*	Y			Amber	Regular passage migrant; very rare breeder
Dunnock	*Prunella modularis*	Y	Y			Common and widespread resident
House Sparrow	*Passer domesticus*	Y	Y		Amber	Common and widespread resident
Grey Wagtail	*Motacilla cinerea*	Y	Y		Red	Common and widespread resident
Pied Wagtail	*Motacilla alba*	Y	Y			Common and widespread resident
White Wagtail	*Motacilla alba ssp. alba*					Scarce passage migrant
Meadow Pipit	*Anthus pratensis*	Y	Y		Red	Common and widespread resident
Chaffinch	*Fringilla coelebs*	Y	Y			Common and widespread resident
Brambling	*Fringilla montifringilla*		Y			Scarce winter visitor
Greenfinch	*Carduelis chloris*	Y	Y		Amber	Common and widespread resident
Goldfinch	*Carduelis chloris*	Y	Y			Common and widespread resident
Linnet	*Carduelis cannabina*	Y	Y		Amber	Common and widespread resident
Redpoll	*Carduelis flammea*	Y	Y			Common and widespread resident
Crossbill	*Loxia curvirostra*	Y	Y			Scarce resident and winter visitor
Bullfinch	*Pyrrhula pyrrhula*	Y	Y			Common and widespread resident
Yellowhammer	*Emberiza citrinella*	Y	Y		Red	Scarce resident
Reed Bunting	*Emberiza schoeniclus*	Y	Y			Common and widespread resident

[1] Y indicates breeding confirmed, S indicates breeding probable.

[2] List compiled using records from Crowe (2005), Copland (2010a,b), Heery (2009) and internal Bord na Móna records. List likely to expand in future as more records are accumulated.

[3] Data from Crowe (2005).

[4] Data from Copland (2010a).

[5] Data from Copland (2010b) (Mayo).

[6] Data from Heery (2009).

[7] OSPAR Convention for the protection of the marine environment of the North-east Atlantic [1992]

Notes

Back cover photos:
Main image:
Whooper Swans.
Bottom row:
Lapwing eggs and nest; Devil's- Bit Scabious; Great Sundew and Lesser Bladderwort in bog pool.

Species-rich grassland in the Sculpture Park at Lough Boora.

BORD NA MÓNA
Naturally Driven

Biodiversity

www.bordnamona.ie

Brosna Press Creative Design and Print 090 6454327
Printed on PEFC certified paper. Derived from controlled, well-managed and sustainable forests.

Appendix 4-13

BnM Silt Control Study No. 1,1983 BnM Silt Comittee Report, 1984

Chief Civil Engineer : H.O. Manager : Ballivor.

GH/JK DH/AK. Silt Control 9th May, 1984.

Below are figures for numbers of excavator hours spent at present and estimates of future excavator requirements as requested by the General Operations Manager.

In 1983/84 210 Hymac hours were spent in installing our first silt ponds.

The following is a table of expected numbers of Hymac's required at Ballivor works for silt control in the next few years.

Year.	Pond Excavation	Pond Maintenance	Total
1984/'85.	0.11 Hymac Year	0.08 Hymac Year	0.19 Hymac Yr
1985/'86.	0.14 " "	0.30 " "	0.44 " "
1986/'87.	0.10 " "	0.60 " "	0.70 " "
1987/'88.	0.00 " "	0.81 " "	0.81 " "

Manager.

Meamram

Bord na Móna

Don Manager Ballivor | On General Operations Manager

Do Cas.	Ar dtas.	Ábhar	Data
Luaitear an uimhir tagartha		Re: Silt Control	16/4/'84

I attach a copy of report on the silt control meeting held at Derrygreenagh on 4th April 1984. You should submit the following information to the Chief Engineer:-

(a) The annual number of excavator hours (specifying excavator type) spent at present on silt control at your works.

(b) The expected annual number of excavator hours which would be required in complying with Board Policy in this regard i.e. all effluents flowing through silt traps of standard size.

General Operations Manager

GH/JK
ENC.

c.c. Chief Engineer

BORD NA MÓNA
BAILE IOMHAIR.
DATE REC'D. 25 APR 1984
FOR ATTENTION

Meeting on Silt Control held at
Derrygreenagh on 4th April 1984

Present:

Chairman - Mr. S. Grogan - General Operations Manager

Mr. H. Flood - Chief Engineer
Mr. B. Keville - Manager, Mech. Eng. Services
Mr. J. Welsby - Head Civil Works
Mr. G. Hannon - Civil Works

Mr. J. Doyle - Group Manager West
Mr. H. Hickland - " " East
Mr. J. Hughes - " " Briquett
Mr. P. Hughes - Manager Blackwater
Mr. E. Moore - " Derryfadda
Mr. M. Kelly - " Derrygreenag
Mr. S. McCabe - " Littleton
Mr. T. Quinn - " Mountdillor
Mr. L. Concannon - " Oweninny
Mr. D. Wynne - Prod. Eng. Boora

Mr. P. Coffey - Scientific Officer

Mr. C. O Gogain - Manager Lullymore was unavoidably absent

Acceptable Standards of Effluent:

Legal interpretations of the 1977 Water Pollution Act and the various Fisheries Acts suggest that Bord na Mona is not legally obliged to treat bog run-off. These interpretations have not been tested in court nor have they been widely publicised.

Notwithstanding the question of our Statutory obligation, Works should meet their responsibilities towards the provision of acceptable bog effluents in accordance with Board Policy. To comply with this policy all bog and factory effluents should be directed through silt traps before discharge to external waterways.

In attempting to set reasonable standards it is to be noted that there are no clear-cut standards which might be imposed on us in the absence of our "exemption". This vague situation is made more so by the virtual autonomy of individual local authorities in this respect. However, a precedent has been set by An Bord Pleanala's decision in the case of the licencing of effluent discharge from Littleton Briquette Factory when an upper limit of 100 mg/l suspended solids concentration was set. Although the legalities regarding obligation to treat bog effluent and briquette factory effluent may be dissimilar the waste involved is similar. It would, therefore, seem reasonable to assume that a target value of 100 mg/l in the case of bog effluent would satisfy potential complainants whose complaints are based on genuine dissatisfaction with the present standard of our effluents.

Method of Achieving Standards:

No single method of silt trapping (i.e. pond cleaned by excavator; pond initially constructed by excavator and cleaned by pumping; or lagoon) will provide a solution at every outfall to be treated.

Where an area of land exists which seems particularly suited to the provision of a lagoon the area should be examined (i.e. contours, capacity, embankment material availability, land acquisition, pumping, seepage, safety etc.) and the cost of its provision and maintenance compared with that of orthodox silt ponds.

A system for emptying of ponds by pumping should be fully developed and tested on a project basis. The costing of the pumping method as outlined in the Silt Control Study - December 1983 should be viewed as an estimated cost for a proposed but as yet untried system (ref. Silt Control Study Dec. 1983 - Chapter 3 paragraph 4).

Cost of Silt Control

Bearing in mind: (a) the absence of statutory obligation

(b) that untreated similar effluents attract differing degre s of complaint.

(c) the autonomy of bodies responsible for enforcement of regulations.

expenditure to provide less than 100 mg/l suspended solids concentration at all outfalls may be unwarranted except where we are discharging into spawning rivers which are particularly sensitive to siltation, e.g. the Cladiagh (Monettia) and the Shiven (Derryfadda).

In the absence of complaint it might be assumed that an effluent is acceptable. Priority given to individual outfalls could be based on the acceptability of their effluents measured by the number and degree of complaints. Control of expenditure consistent with producing an acceptable standard of effluent is the responsibility of works management.

N.B.

At present, total expenditure on silt is not readily quantifiable and as a starting point in increasing the efficiency of expenditure, budgetary separation of all silt-related costs is essential.

Design of Silt Ponds

Ponds should be provided in accordance with the recommendations outlined in the Silt Control Study - December 1983.

i.e. Sludge Capacity = 525 cu. ft./nett acre

Top Width = 27 ft.

Min. depth below water level = 3 ft. 6 ins.

Length = 1.8 yds./nett acre of catchment.

Pond inlets and outlets should be at the same level. A wall of undisturbed material should be left across the full width of the pond at an approximate distance of two thirds the length of the pond from the inlet. The top width of this wall to be 6 to 12 inches below the water surface level.

On the above basis machine requirements are estimated at:

1 Hymac/1800 nett acres for maintenance

1 Hymac/3600 nett acres for initial excavation.

GH/CH
16.4.1984

Meamram

Bord na Móna

Don Manager: Coolnasun | Ón Chief Engineer (Civil Division)

Do Tag.	Ar dTag.	Ábhar	Dáta
	HCF/SG	SILT CONTROL	5.1.1984

Luaitear an uimhir tagartha

As you are aware the Board has been engaged for several years in the development of a system of silt control involving the construction and maintenance of a large number of silt traps in order to reduce to an acceptable level the silt content of effluent discharged from our bogs and factories.

Silt control has now become an essential and an integral part of our drainage designs and while considerable progress has been made, the system is by no means perfect and we must continue to seek improvements in both the economics and the effectiveness of silt reduction.

The attached study, complied by Mr. Hannon, Civil Works, Head Office, considers the question in some depth and attempts to evaluate the costs involved in various possible methods of controlling silt discharge.

I will be glad to receive any suggestions you may wish to make.

E. C. Hamb

Chief Engineer
(Civil Division)

BORD na MÓNA
COOLNASUN
DATE REC'D. 6 JAN 1984
FOR ATTENTION

BORD NA MONA

CIVIL ENGINEERING DIVISION

BORD na mÓna
COOLNASUN
DATE REC'D. -6 JAN1984
FOR ATTENTION

Silt Control Study

No. 1

G. Hannon,
Civil Works Section,
Head Office.

December 1983.

BORD NA MÓNA
COOLNASUN
DATE RECD. 06 JAN 1984
FOR ATTENTION

INTRODUCTION

The objective of this report is to establish a framework for rationalisation of silt control and thereby provide a sound basis for discussion prior to making firm decisions.

It attempts also to highlight the areas where policy decisions are needed.

Comments and criticisms would be appreciated.

I N D E X

Introduction

Chapter

1 Quantity and Relevant Characteristics of Suspended Solids and Settled Sludge.

2 Design of Settlement Systems - General.

3 Possible Silt Control Systems Description and Comparison.

4 Comparison of Expenditure Present system - visualised systems.

5 Conclusions and Recommendations

Appendices

Figures

Graphs.

CHAPTER 1

Quantity and Relevent Characteristics of Suspended Solids and Settled Sludge

1.1 This chapter deals with the quantity and characteristics of suspended peat solids and peat sludge relevant to silt control.

This will show:-

1. The scale of the silt control operation required to produce effluent of acceptable suspended solids concentration. *Ref Appendix I.

2. The basic principles of producing acceptable effluent, common to all feasible methods of silt control.

1.2 Quantity of Suspended Solids and Settled Sludge

Before any investigation or comparison as to the feasibility of solving the silt problem it is of course essential to estimate the quantity of silt to be dealt with.

In trying to assess finitely the capacity requirement of any type of trapping system it is imperative to be able to relate:-

1. Runoff and Rainfall.
2. Runoff and suspended solids concentration.

/.....

1.3 The problem of identifying these relationships under realistic conditions in the case of milled peat bogs are many, the main ones being:-

1. The runoff factor for other land conditions is generally quoted as a single number ranging between zero and unity. The runoff factor for milled peat bogs will have a range of values depending on the bog condition.

2. The suspended solids concentration of the runoff will be effected by machine activity especially ditching and the degree to which the concentration is effected will depend on the intensity of the machine activity and period over which it is carried out relative to sampling time.

1.4 Electronic equipment to continuously monitor flow and associated suspended solids concentration upstream and down-stream of pond system at specified intervals has been installed at settlement ponds at Culliagh (Blackwater Works) June 1983.

Examination of the results plotted by the flow monitoring device has verified the fact that the runoff factor is more complex than the normal land runoff factor, the former being a function of bog conditions and rainfall as distinct from the more optimistically hoped for dependence of runoff on rainfall with identifiable distortions due to machine activity, bog condition etc.

/.....

It is to be noted, however, that the rainfall for June, July and August (1983) was low. This meant in effect that water flowing to drains from the water table accounted for a much larger percentage of runoff flow than is normal and hence aided in rendering the distortions due to machine activity and bog conditions unidentifiable.

The suspended solids concentrations recorded were also generally very low and when compared with normal suspended solids concentrations previously recorded are not found to be truly representative.

1.5 To summarise: Testing so far has established:

1. Concentration of suspended solids varies with flow but not directly, generally when flow rate is high the suspended solids concentration is high, the converse being true also.

2. Runoff factor is not readily determinable. The effects of bog condition on runoff factor is much greater than appreciated.

1.6 The following points should be considered at this stage

1. The runoff 'equation' (as distinct from factor) will involve a large number of parameters.

2. The use of the runoff equation to determine the sludge capacity requirement of a silt trapping system would require accurate forward planning of ditching and other machine activities which would introduce many non finite elements and estimates of very doubtful reliability.

/.....

3. The ultimate aim at this point is to relate quantity of suspended solids inflowing to trapping system to volume required for their storage. This introduces an even more illusive parameter i.e. the moisture content of settled sludge.

The points listed above are confirmed by the mathematical model and associated graph. *Ref. Appendix 2.

1.7 It is justifiable to conclude from the latter that when considering the question of sludge capacity required, neither a finite answer nor the answer's parish can be found by theoretical methods, since the variables involved can be identified but defy analysis.

The only value of the theoretical model in this case is to provide a structure for analysis of observed results.

1.8 As a result of the above conclusions we must rely heavily on experience. In this we are fortunate in that silt pond behaviour as observed by Blackwater staff suggests.

1. 1 acre produces approximately 525 ft^3 of sludge 4 times per year.

2. Ponds may fill within as little as a fortnight after ditching.

To state somewhat differently ponds require cleaning once every 4 months on average and once after ditching i.e. 4 times yearly.

/.....

1.9 This result may be extended to all silt trapping systems and stated generally as follows:-

<u>1 acre produces 525 ft^3 of sludge 4 times yearly</u>

The result above is used throughout the remainder of this report as the basis for silt pond/lagoon sizing.

1.10 On examination of this estimate for sludge capacity calculations *(Ref. Appendix 3) show that the equivalent of approximately 152,000 tonnes of peat at 55% moisture content are lost every year from milled peat areas.

1.11 <u>Characteristics of suspended solids and settled sludge relevant to silt control</u>

The following facts were established by the Laboratoire Central D'Hydraulique de France:-

1. Significant settling of peat solids from suspension occurs only when mean velocity of flow is less than 0.15 to 0.17 m/s.

2. Specific gravity of dry suspendable peat particles is in the range 1.02 to 1.04.

3. Peat sludge has no measurable cohesion and resistance to current results only from interlocking of peat fibres and not from any initial rigidity or from the viscosity of the deposits such as can be noticed in silty sediments.

/.....

1.12 The points above have many implications, the most important of which are:- *Ref. Appendix 4.

1. To allow peat solids to settle from suspension during normal flow conditions we require:-

   Ratio cross sectional area of flow in trapping system to cross sectional area flow in outfall = 8.0 minimum.

2. To allow peat solids to settle from suspension during periods of heavy flow we require:-

   Ratio cross sectional area of flow in trapping system to cross sectional area flow in outfall = 13 minimum.

3. From examples 1 and 2 when channel established through surface of sludge in trapping system, no settlement is taking place.

4. A 25 ft. wide pond with depth of flow 6 inches can at most cater for an outfall with a cross sectional area of 1.5 m^2 during normal flow conditions.

5. To install an efficient trapping system on a large outfall or small river of dimension 8 ft. wide with 1 ft. depth of flow during normal flow conditions, the minimum width requirement for the trapping system is 66 ft. (therefore it is inefficient if not pointless to install 27 ft. wide ponds on small rivers or large outfalls.

/.....

6. Since cohesion negligible settled sludge can only be protected from resuspension by maintaining quiescent conditions more specifically by protecting settled sludge from flooding from downstrean and heavy flows from upstream.

7. It is incorrect to compare the estimate of silt sludge produced 525 ft^3/acre/ 3 months with the quantity of silt which settles on river banks, farmers drains etc. where no trapping systems exist since the settling conditions are not ideal and therefore it can be said that the silt which settles on river banks etc. is only a small fraction of the actual settleable suspended solids in our outfalls.

/.....

CHAPTER 2

DESIGN OF TRAPPING SYSTEMS - GENERAL

2.1 This chapter deals generally with the efficient design of trapping systems.

2.2 Those involved in the location and design of treatment systems for outfalls discharging to external receiving waters are confronted by many faits accomplis adversely effecting their efforts or at least restricting their choices.

2.3 The major constraint is imposed by the fact that drainage systems are already in existance prior to consideration of silt control systems. The former generally involved getting water off the bog as quickly and as easily as possible.

2.4 Any system of silt trapping depends to a large extent on general ground level in the area of the outfall. Very often the general ground level is not suitable and is rarely ideal. Particular difficulty in choosing a silt trapping location arises where lands are susceptible to flooding.

2.5 In brief the designer often finds himself inhibited by:-

1. The efforts of his predecessor regarding drainage systems and a tendency to arrange production areas to follow the bog edge as closely as possible.

2. The efforts of his contemporary engaged in production whose immediate objective is to maximise production and minimise production costs.

/.....

2.6 At this stage some general design principles which are common to all forms of silt trapping system will be considered.

2.7 Given that the designer often finds himself in an undesirable situation due to the already existing outfall system it would be non practical to recommend generally the alteration of the bog drainage system to suit the desires of those involved in the installation of silt trapping systems as the work involved would be cost prohibitive and in many cases technically impossible.

It may be possible, however, in certain cases to rearrange drainage systems. This possibility should be examined when individual outfalls are being examined e.g. Bloomhill - Blackwater Works.

2.8 Bearing in mind that our efforts are aimed at treating bog drainage waters the temptation to treat intermediate receiving waters should be avoided if at all possible. * Ref. 1.12.

2.9 In some cases silt trapping systems have been located below flood level. Bearing in mind the ease with which settled silt may be disturbed *Ref. 1.12 it can be said that any system which is to be located below flood level must be protected by an embankment or other protection device e.g. one-way valve. **Ref. Appendix 5. Failing this approach it might well be better from the silt control point of view to neglect the installation of a trapping system rather than to install an 'unprotected' system. The reasoning being as follows: On an unprotected outfall, water with high suspended solids concentration discharges to receiving waters. However, to install a trapping system which collects peat silt and subsequently allows the silt to be discharged in bulk during periods of flooding is a step in the wrong direction.

/.....

2.11 The ease with which settled silt can be re-suspended and washed out of a trapping system must not be underestimated, e.g. Blackwater Works - Clonfert Bridge - Agricultural land damaged due to washing out of ponds by flood back up.

2.12 Bypassing of trapping system during periods of heavy rainfall involves the allowed discharge of untreated bog drainage water to receiving waters. Due to the ease with which deposited silt may be resuspended and washed out by heavy flows the work done by a silt trapping system since its previous cleaning may be completely undone. This said, we may conclude that bypassing during periods of heavy rainfall is the lesser of two evils (e.g. Blackwater Works - Clonascra Bog - ponds which were approaching full August 12th 1983 - empty August 20th 1983 following heavy rainfall August 15th 1983).

2.13 There are five methods of providing bypasses to be considered. *Ref. Appendix 6. The most practical method involves bypassing using a weir or pipe, the invert level of which is the same as that of the pipe at inlet to trapping system. During normal flow conditions (flows which allow settled silt to remain out of suspension) the pipe or weir would be closed; During periods of heavy flow the pipe forming inlet to trapping system would be closed and the bypass pipe opened.

2.14 Distribution of flow over complete settling system area:- Present practice involves feeding ponds directly from outfalls by means of open channel or piping. The flow therefore, in the initial stages of the pond is changing from outfall velocity to velocity at full pond cross sectional area. This has a number of adverse effects:-

/.....

(a) The settling area is not used to full advantage since flow velocity not below critical 'settling velocity' of 0.15 m/s in initial stages of pond.

(b) Wash out due to runoff encouraged.

(c) Channelling rendering pond ineffective is encouraged.

2.15 If the excavation of settlement ponds is to be continued the following modification should be considered.

By allowing walls running the full width of the pond to remain unexcavated the advantages would be as follows:- *Ref. Appendix 7.

(a) Channelling would be discouraged.

(b) In the event of disturbance due to high velocities caused by heavy flows shelter would be provided for settled particles below the top level of wall since velocity increase would mainly be above this level.

(c) In the event of ponds being cleaned by sludge pump these walls would simplify double pumping if such were necessary.

2.16 If weirs are to be used for purposes outlined in 2.15 they should run full width of pond and hence force water to <u>flow over</u> them. Walls which stop short will not be effective since if velocity increased at depth the effect of the wall is negatived.

/.....

2.17 Cleaning of Ponds by (a) Excavators (b) Pumping and (c) Others

(a) Present practice involves the use of excavators in cleaning ponds (generally hymac/dragline).

For any Works with its full compliment of silt ponds the main requirements are as follows:-

Due to large number of ponds at different locations requiring frequent cleaning and the nature of the material to be handled excavators are required which are fast moving, fast working and non violent. This said it is clear that the dragline excavator (being the most slow moving, violent and unreliable of the Board's excavators) is far from being the ideal machine for the task.

Hence, if the excavation of silt ponds is to be continued all future ponds should be excavated in accordance with the capabilities of the standard hymac under the prevailing ground conditions.
*Ref. Appendix 8.

Many ponds exist whose widths are excessive for cleaning by hymac. Bearing in mind the backlog of proposed ponds to be excavated, no attempt should be made at present to alter these ponds so as to render them independent of dragline maintenance as this would be premature Lilly Guilding.

Recycling of silt accumulated in ponds and subsequently emptied by excavators has two major problems which make it impracticable.

(i) Practice among excavator drivers is to continue digging until subsoil is excavated, hence, the excavated material contains subsoil.

(ii) No economic method of moving excavated material to production fields exists.

(b) The sludge pump presently under development while not fully tested may well prove to be the most economic longterm approach to the problem. The system may be briefly described as follows. A pump, incorporating an agitator and powered by a tractor, pumps agitated sludge from pond to production field or waste ground. The sludge filled drains are subsequently ditched and the sludge is left to dry. The system is as yet in the development stage.

(c) Work carried out in England on sewage involving the formation of cylindrical blocks has met with much success and praise. We are presently examining the applicability of this method to our particular problem.

2.18 Silt Pond Cross Section

The factors effecting design are as follows.

(a) Capabilities of hymac
(b) Capabilities of sludge pump
(c) Nature of bog regarding excavation
(d) Maximisation of volume available for sludge retention.
(e) Reduction of flow velocity.

Present practice involves digging ponds of almost vertical side slopes to an overall depth of approximately 7 feet so as to provide 3.5 ft. depth below invert level inlet. While excavation to a depth of 7 ft. may seem excessive in bog conditions it must be remembered that the effective depth should be measured between water surface and general ground level i.e. approx. 3.5 ft. and hence stability is not critical *(Ref. Appendix 8) therefore the use of 1 : 1 side slopes is unwarranted along with being capacity reducing.

CHAPTER 3

Possible Silt Control System Description and Comparison

3.1 Many different silt trapping systems have been discussed and written about individually.

This chapter describes and compares these systems.

3.2 The various approaches visualised may be divided into three main categories:-

A. Systems involving excavation and maintenance of settlement ponds only.

B. Systems involving provision and maintenance of lagoons only.

C. Composites of A, B.

/.....

3.3 Expanding:

A	A1	Excavate ponds - clean by excavator - Rehandle spoil when dumping of new spoil becomes a problem.
	A2	Excavate ponds - clean using sludge pump, pumping sludge to production area - ditch drains as required.
	A3	Excavate ponds - clean using sludge pump to waste ground.
B	B1	Construct lagoon - full bog lifespan capacity - abandon when full.
	B2	Construct lagoon - partial bog lifespan - abandon when full and repeat.
C	C1	Excavate ponds - gravity fed - form embankments from spoil to retain remaining year's sludge.

3.4 Comparison of the various systems is complicated by the following:

1. Undefined present and future commitment with regard to expenditure on silt control.

2. Some of the methods to be compared are as yet untested or being tested.

The following realistic assumption will be made to allow comparison aimed at identifying the optimal solution:-

/.....

The optimal economic solution based on criterion of treating all outfalls so as to produce effluent of acceptable suspended solids concentration will remain the optimal solution following compromise between

1. Board policy's definition of 'reasonable expenditure'.

2. Expenditure required to produce effluent of acceptable suspended solids concentration.

3.5 In attempting to identify the optimal solution it is essential to compare like with like.

3.6 If at this stage one considers in detail the conditions prevailing at each outfall location the problem becomes indeterminate to a very high degree.

3.7 Bearing in mind the variation in nature and cost of land and often times inability to acquire the exact amount of land required without surplus the costing of land for silt ponds will be ignored during the comparison. The cost of land area required for 'lagoons' over and above the area of land required for silt ponds will be considered. The costing of this land will involve the use of an 'average cost' value. Error incurred due to surplus land will be regarded as insignificant due to the large areas required.

3.8 In the comparison stage the amount of excavation already carried out will not be considered. This is justified by the fact that existing ponds are full and hence require cleaning and spoil removal roughly equivalent to initial excavation.

/.....

3.9 The order of optimality for catchment sizes of 100, 300 and 600 acres (i.e. small, medium, large catchments) will be sought. This in turn will be applied to the outfall system at a particular Works to calculate the minimum overall cost of silt control at that Works.

3.10 The patterns of expenditure for each system applied to small, medium and large catchment sizes (i.e. 100, 300 and 600 acres) are tabulated in the following pages. The associated graphs shows a comparison between the pattern of expenditure of each system for each catchment size over a period including initialisation and subsequent 20 years.

3.11 The initialisation period is as yet undefined. For graphical purposes it is represented as one year but the implications of a longer initialisation period may be easily calculated.

/.....

3.12 For Calculations and Assumptions relating to Costing reference the following appendices:-

Appendix No.	
9	Number of years before spoil rehandling essential (A1, C1).
10	Hymac hours required for pond cleaning, spoil rehandling and initial excavation (A1, A2, A3, C1).
11	Sludge pump hours required/acre/ year (A2, A3).
12	Ratio Hymac hours to sludge pump hours required for maintenance.
13	Area over which spoil to be spread and ditching hours required (A2, A3).
14	Quantity of peat recycled by sludge pumping (A2)
15	Area required for lagoon - general (B1, B2, C1).
16	Number of years spoil to produce embankment to serve remaining lifespan (C1).
17	Lagoon construction (B1, B2).
18	Initial cost adjustment for cases in which flood embankments necessary (A1, A2, A3, C1).
19	Cost of machine hours (A1,A2,A3, B1, B2, C1). Cost of land Profit per tonne of peat
20	Cost of pump installation and maintenance.

The following abreviations are used:

Hymac Hours ..... HHrs
Sludge Pump Hours . SPHrs
Ditcher Hours ..... DHrs.

/.....

3.13 METHOD A1 Excavate ponds - clean by excavator. Rehandle spoil when dumping of new spoil becomes a problem.

Year		Catchment (Acres)		
		100	300	600
Initialisation	Excavate (HHrs)	78	234	468
1	Cleaning (HHrs)	156	468	936
2	do.	156	468	936
3	do.	156	468	936
4	do.	156	468	936
5	do.	156	468	936
	Rehandle (HHrs)	130	390	780
6	Cleaning	156	468	936
7	do.	156	468	936
8	do.	156	468	936
9	do.	156	468	936
10	do.	156	468	936
	Rehandling (HHrs)	130	390	780
11	Cleaning	156	468	936
12	do.	156	468	936
13	do.	156	468	936
14	do.	156	468	936
15	do.	156	468	936
	Rehandling (HHrs)	130	390	780
16	Cleaning	156	468	936
17	do.	156	468	936
18	do.	156	468	936
19	do.	156	468	936
20	do.	156	468	936

Allowance made in cost comparison for cases in which flood embankments necessary.

/.....

3.14 METHOD A2

Excavate ponds - clean using sludge pump. Pump sludge to production area - ditch drains as required.

Year		Catchment (Acres)		
		100	300	600
Initialisation	Excavate	78	234	468
1	Sludge Pump (SPHrs)	74	222	444
	Ditching (DHrs)	135	405	810
	*Tonnes Produce (T)	190.5	571.5	1143
2				
3				
4				
5				
6				
7				
8				
9				
10	(As per year 1)			
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				

*Tonnes Produce @ 55% M.C.

Allowance made in cost comparison for cases in which flood embankments necessary.

3.15 METHOD A3 Excavate Ponds - clean using sludge pump to waste ground.

Year		Catchment (Acres) 100	300	600
Initialisation	Excavate (MHrs)	78	234	468
	Acquire Area Spreading ft^2	210,000	630,000	1,260,000
	Acres	4.82	14.46	28.93
1	Sludge Pumping	74	222	444
2				
3				
4				
5				
6				
7				
8				
9				
10	AS PER YEAR 1			
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				

3.16 METHOD B1 Construct Lagoon - full bog lifespan capacity - abandon when full.

Year		Catchment (Acres) 100	300	600
Initialisation	Construct Embankment (HHrs)	922	1,596	2,257
	Install Pump (IR£)	25,000	32,000	47,000
	Acquisition/ Designation ft^2	403,128	1, 097,592	2,105,832
1	Pump Maintenance	1,000	2,000	4,500
2		"	"	
3		"		
4		"		
5		"		
6		"		
7		"		
8		"		
9		As Per Year 1		
10		"		
11		"		
12		"		
13		"		
14		"		
15		"		
16		"		
17		"		
18		"		
19		"		
20		1,000	2,000	4,500

*Test for Optimality Required - Irrespective of silt control; pump may be necessary for drainage purposes.

3.17 METHOD B2 Construct Lagoon - partial bog lifespan capacity* - Abandon when full - repeat

*Partial Bog Lifespan = 5 years

Year		Catchment (Acres)		
		100	300	600
Initialisation	Construct Embankment (HHrs)	460	797	1127
	Install Pump (IR£	25000	32000	47000
	Acquisition/ Designation (ft^2)	44064	76296	107848
	(Acres)	1.01	1.75	2.47
1	Pump Power (IR£)	1000	2000	4500
2				
3				
4				
5	Pump Power (IR£)	1000	2000	4500
	Construct Embankment (HHrs)	460	797	1127
	Reposition Pump (£)	4000	7000	10000
	Acquisition (ft^2)	44064	76296	107848
	(Acres)	1.01	1.75	2.47
6	Pump Power (£)	1000	2000	4500
7	do.			
8	do.			
9	do			
10	As per year 5			
11	Pump Power (IR£)	1000	2000	4500
12	do.			
13	do.			
14	do.			
15	As per year 5			
16	Pump Power (IR£)	1000	2000	4500
17	do.			
18	do.			
19	do.			
20	do.			

3.18 METHOD B2 Construct Lagoon - Partial Bog Lifespan Capacity* - Abandon when full.

*Partial Bog Lifespan = 10 years.

Year		Catchment (Acres)		
		100	300	600
Initialisation	Construct Embankment (HHrs)	640	1128	1596
	Install Pump (IR£)	25000	32000	47000
	Acquisition/Designation (ft^2)	166200	422848	782592
	(acres)	3.81	9.71	17.96
1	Pump Power	1000	2000	4500
2	do.			
3	do.			
4	do.			
5	do.			
6	do.			
7	do.			
8	do.			
9	do.			
10	Pump Power (IR£)	1000	2000	4500
	Construct Embankment (HHrs)	640	1128	1556
	Reposition Pump	4000	7000	10000
	Acquisition/ Designation (ft^2)	166200	422848	782592
	(Acres)	3.81	9.71	17.96
11	Pump Power (IR£)	1000	2000	4500
12	do.			
13	do.			
14	do.			
15	do.			
16	do.			
17	do.			
18	do.			
19	do.			
20	do.			

3.19 METHOD C1

Year		Catchment (Acres) 100	300	600
Initilis-ation	Excavate (HHrs)	78	234	468
1	Cleaning (HHrs)	156	468	936
2	do.	156	468	936
3	do.	156	468	936
4	do.	156	468	936
5	do.	156	468	936
	Rehandle Forming Emb. HHrs.	260	780	1560
6	Cleaning	156	468	936
7	do.	156	468	936
8	do.	156	468	936
	Complete Emb. Install Pump (IR£)		464 32000	928 47000
9	Cleaning	156	2000	4500
10	Cleaning	156	2000	4500
	Rehandle Forming Emb. HHrs	260		
11	Cleaning	156	2000	4500
12	Cleaning	156	2000	4500
	Complete Emb. Install Pump (IR£)	102 25000		
13		1000	2000	4500
14		1000	2000	4500
15		1000	2000	4500
16		1000	2000	4500
17		1000	2000	4500
18		1000	2000	4500
19		1000	2000	4500
20		1000	2000	4500

*Allowance made in cost comparison for cases in which flood embankments necessary.

3.20

METHOD A1
CATCHMENT = 100 ACRES

Year	HHrs	Cost HHrs	Total Annual Expenditure	Cumulative Expenditure
* Initil-isation	78	1799.0	1799.0	1799
**	345	7955.0	7955.0	
1	182	4196.0	4196.0	5995
2	182	4196.0	4196.0	10191
3	182	4196.0	4196.0	14387
4	182	4196.0	4196.0	18583
5	182	4196.0	4196.0	22779
6	182	4196.0	4196.0	26975
7	182	4196.0	4196.0	31171
8	182	4196.0	4196.0	35367
9	182	4196.0	4196.0	39563
10	182	4196.0	4196.0	43759
11	182	4196.0	4196.0	47955
12	182	4196.0	4196.0	52151
13	182	4196.0	4196.0	56347
14	182	4196.0	4196.0	60543
15	182	4196.0	4196.0	64739
16	156	3597.0	3597.0	68336
17	156	3597.0	3597.0	71933
18	156	3597.0	3597.0	75530
19	156	3597.0	3597.0	79127
20	156	3597.0	3597.0	82724

*Flood Embankments not necessary

**Flood Embankments necessary

3.21

METHOD A1
CATCHMENT 300

Year	HHrs	Cost HHrs	Total Annual Expenditure	Cumulative Expenditure
* Initilis-ation	234	5,396	5,396	5,396
**	692	15,957	15,957	
1	546	12,590	12,590	17,986
2	546	12,590	12,590	30,576
3	546	12,590	12,590	43,166
4	546	12,590	12,590	55,756
5	546	12,590	12,590	68,346
6	546	12,590	12,590	80,936
7	546	12,590	12,590	93,526
8	546	12,590	12,590	106,116
9	546	12,590	12,590	118,706
10	546	12,590	12,590	131,296
11	546	12,590	12,590	143,886
12	546	12,590	12,590	156,476
13	546	12,590	12,590	169,066
14	546	12,590	12,590	181,656
15	546	12.590	12,590	194,246
16	468	10,792.0	10,792	205,038
17	468	10,792.0	10,792	215,830
18	468	10,792.0	10,792	226,622
19	468	10,792.0	10,792	237,414
20	468	10,792.0	10,792	248,206

* Flood Embankment not required.

** Flood Embankment required.

3.22

METHOD A1
CATCHMENT 600 ACRES

	Year	MHrs	Cost MHrs	Total Annual Expenditure	Cumulative Expenditure
*	Initilis -ation	468	10,792.0	10,792.0	10,792
**		1028	23,705.0	23,705.0	
	1	1092	23,705.0	23,705.0	34,497
	2	1092	23,705.0	23,705.0	58,202
	3	1092	23,705.0	23,705.0	81,907
	4	1092	23,705.0	23,705.0	105,612
	5	1092	23,705.0	23,705.0	129,317
	6	1092	23,705.0	23,705.0	153,022
	7	1092	23,705.0	23,705.0	176,727
	8	1092	23,705.0	23,705.0	200,432
	9	1092	23,705.0	23,705.0	224,137
	10	1092	23,705.0	23,705.0	247,842
	11	1092	23,705.0	23,705.0	271,547
	12	1092	23,705.0	23,705.0	295,252
	13	1092	23,705.0	23,705.0	318,957
	14	1092	23,705.0	23,705.0	342,662
	15	1092	23,705.0	23,705.0	366,367
	16	936	21,584	21,584.0	387,951
	17	936	21,584	21,584.0	409,535
	18	936	21,584	21,584.0	431,119
	19	936	21,584	21,584.0	452,703
	20	936	21,584	21,584.0	474,287

*Flood Embankment not required.

**Flood Embankment required.

3.23

METHOD A2
CATCHMENT 100 ACRES

	Year	HHrs	Cost HHrs	SPHrs	Cost SPHrs	DHrs	Cost DHrs	Recycling (T)	Cost Recycling	Total Annual Expend.	Cumulative Expend.
*	Init.	78	1798							1798	1798
**		345	7955							7955	
	1			74	2803	135	2241	190.5	- 571	4473	6271
	2			74	2803	135	2241	190.5	- 571	4473	10744
	3			74	2803	135	2241	190.5	- 571	4473	15217
	4			74	2803	135	2241	190.5	- 571	4473	19690
	5			74	2803	135	2241	190.5	- 571	4473	24163
	6			74	2803	135	2241	190.5	- 571	4473	28636
	7			74	2803	135	2241	190.5	- 571	4473	33109
	8			74	2803	135	2241	190.5	- 571	4473	37582
	9			74	2803	135	2241	190.5	- 571	4473	42055
	10			74	2803	135	2241	190.5	- 571	4473	46528
	11			74	2803	135	2241	190.5	- 571	4473	51001
	12			74	2803	135	2241	190.5	- 571	4473	55474
	13			74	2803	135	2241	190.5	- 571	4473	59947
	14			74	2803	135	2241	190.5	- 571	4473	64420
	15			74	2803	135	2241	190.5	- 571	4473	68893
	16			74	2803	135	2241	190.5	- 571	4473	73366
	17			74	2803	135	2241	190.5	- 571	4473	**77839**
	18			74	2803	135	2241	190.5	- 571	4473	**82312**
	19			74	2803	135	2241	190.5	- 571	4473	86785
	20			74	2803	135	2241	190.5	- 571	4473	91258

*Flood Embankment not required

**Flood Embankment required.

3.24

METHOD A2
CATCHMENT = 300 ACRES

	Year	HHrs	Cost HHrs	SPHrs	Cost SPHrs	DHrs	Cost DHrs	Recycl. (T)	Cost Recycle	Total Annual Expend.	Cumul-ative Expend.
*	Init.	234	5396							5396	5396
**		692	15957							15957	
	1			222	8409	405	6723	571	- 1713	13419	18815
	2			222	8409	405	6723	571	- 1713	13419	32234
	3			222	8409	405	6723	571	- 1713	13419	45653
	4			222	8409	405	6723	571	- 1713	13419	59072
	5			222	8409	405	6723	571	- 1713	13419	72491
	6			222	8409	405	6723	571	- 1713	13419	85910
	7			222	8409	405	6723	571	- 1713	13419	99329
	8			222	8409	405	6723	571	- 1713	13419	112748
	9			222	8409	405	6723	571	- 1713	13419	126167
	10			222	8409	405	6723	571	- 1713	13419	139586
	11			222	8409	405	6723	571	- 1713	13419	153005
	12			222	8409	405	6723	571	- 1713	13419	166424
	13			222	8409	405	6723	571	- 1713	13419	179843
	14			222	8409	405	6723	571	- 1713	13419	193262
	15			222	8409	405	6723	571	- 1713	13419	206681
	16			222	8409	405	6723	571	- 1713	13419	220100
	17			222	8409	405	6723	571	- 1713	13419	233519
	18			222	8409	405	6723	571	- 1713	13419	246938
	19			222	8409	405	6723	571	- 1713	13419	260357
	20			222	8409	405	6723	571	- 1713	13419	273776

* Flood Embankment not required.

** Flood Embankment required.

3.25

METHOD A2
CATCHMENT = 600 ACRES

	Year	HHrs	Cost HHrs	SPHrs	Cost SPHrs	DHrs	Cost DHrs	Recycle (T)	Cost Recycle	Total Annual Expend.	Cumulative Expend.
*	Init.	468	10792							10792	10792
**		1028	23705							23705	
	1			444	16818	810	13446	1143	- 3429	26835	37627
	2			444	16818	810	13446	1143	- 3429	26835	64462
	3			444	16818	810	13446	1143	- 3429	26835	91297
	4			444	16818	810	13446	1143	- 3429	26835	118132
	5			444	16818	810	13446	1143	- 3429	26835	144967
	6			444	16818	810	13446	1143	- 3429	26835	171802
	7			444	16818	810	13446	1143	- 3429	26835	198637
	8			444	16818	810	13446	1143	- 3429	26835	225472
	9			444	16818	810	13446	1143	- 3429	26835	252307
	10			444	16818	810	13446	1143	- 3429	26835	279142
	11			444	16818	810	13446	1143	- 3429	26835	305977
	12			444	16818	810	13446	1143	- 3429	26835	332812
	13			444	16818	810	13446	1143	- 3429	26835	359647
	14			444	16818	810	13446	1143	- 3429	26835	386482
	15			444	16818	810	13446	1143	- 3429	26835	413317
	16			444	16818	810	13446	1143	- 3429	26835	440152
	17			444	16818	810	13446	1143	- 3429	26835	466987
	18			444	16818	810	13446	1143	- 3429	26835	493822
	19			444	16818	810	13446	1143	- 3429	26835	520657
	20			444	16818	810	13446	1143	- 3429	26835	547492

* Flood Embankment not required.

** Flood Embankment required.

3.26

METHOD A3
CATCHMENT = 100 ACRES

	Year	HHrs	Cost HHrs	SPHrs	Cost SPHrs	Area Spread		Cost Area	Total Annual Expend.	Cumul-ative Expend.
						ft^2	Acres			
*	Init.	78	1798			210000	4.82	7230	9028	9028
**		345	7955			210000	4.82	7230	15185	
	1			74	2803				2803	11831
	2			74	2803				2803	14634
	3			74	2803				2803	17437
	4			74	2803				2803	20240
	5			74	2803				2803	23043
	6			74	2803				2803	25846
	7			74	2803				2803	28649
	8			74	2803				2803	31452
	9			74	2803				2803	34255
	10			74	2803				2803	37058
	11			74	2803				2803	39861
	12			74	2803				2803	42664
	13			74	2803				2803	45467
	14			74	2803				2803	48270
	15			74	2803				2803	51073
	16			74	2803				2803	53876
	17			74	2803				2803	56679
	18			74	2803				2803	59482
	19			74	2803				2803	62285
	20			74	2803				2803	65088

3.27

METHOD A3
CATCHMENT = 300 ACRES

	Year	HHrs	Cost HHrs	SPHrs	Cost SPHrs	Area Spread ft^2	Area Spread Acres	Cost Area	Total Annual Expend.	Cumulative Expend.
*	Init.	234	5396			630000	14.46	21690	27086	27086
**		692	15957			630000	14.46	21690	37647	
	1			222	8409				8409	35495
	2			222	8409				8409	43904
	3			222	8409				8409	52313
	4			222	8409				8409	60722
	5			222	8409				8409	69131
	6			222	8409				8409	77540
	7			222	8409				8409	85949
	8			222	8409				8409	94358
	9			222	8409				8409	102767
	10			222	8409				8409	111176
	11			222	8409				8409	119585
	12			222	8409				8409	127994
	13			222	8409				8409	136403
	14			222	8409				8409	144812
	15			222	8409				8409	153221
	16			222	8409				8409	161630
	17			222	8409				8409	170039
	18			222	8409				8409	178448
	19			222	8409				8409	186857
	20			222	8409				8409	195266

3.28

METHOD A3
CATCHMENT = 600 ACRES

	Year	HHrs	Cost HHrs	SPHrs	Cost HHrs	Area Spread		Cost Area	Total Annual Expend.	Cumul-ative Expend.
						ft^2	Acres			
*	Init	468	10792			1260000	28.93	43395	54187	54187
**		1028	23705			1260000	28.93	43395	67100	
	1			444	16818				16818	71005
	2			444	16818				16818	87823
	3			444	16818				16818	104641
	4			444	16818				16818	121459
	5			444	16818				16818	138277
	6			444	16818				16818	155095
	7			444	16818				16818	171913
	8			444	16818				16818	188731
	9			444	16818				16818	205549
	10			444	16818				16818	222367
	11			444	16818				16818	239185
	12			444	16818				16818	256003
	13			444	16818				16818	272821
	14			444	16818				16818	289639
	15			444	16818				16818	306457
	16			444	16818				16818	323275
	17			444	16818				16818	340093
	18			444	16818				16818	356911
	19			444	16818				16818	373729
	20			444	16818				16818	390547

3.29

METHOD B1
CATCHMENT = 100 ACRES

Year	HHrs	Cost HHrs	Install Pump	Pump Maint.	Area Required		Cost Area	Total Annual Cost	Cumulative Cost
					ft^2	Acres			
Init.	922	21261	25000		403128	9.25	13875	60136	60136
1				1000				1000	61136
2				1000				1000	62136
3				1000				1000	63136
4				1000				1000	64136
5				1000				1000	65136
6				1000				1000	66136
7				1000				1000	67136
8				1000				1000	68136
9				1000				1000	69136
10				1000				1000	70136
11				1000				1000	71136
12				1000				1000	72136
13				1000				1000	73136
14				1000				1000	74136
15				1000				1000	75136
16				1000				1000	76136
17				1000				1000	77136
18				1000				1000	78136
19				1000				1000	79136
20									80136

3.30

METHOD B1
CATCHMENT = 300 ACRES

Year	HHrs	Cost HHrs	Install Pump	Pump Maint.	Area Required		Cost Area	Total Annual Expend.	Cumul-ative Expend.
					ft^2	Acres			
Init.	1596	36803	32000		1097592	25.20	37800	99603	99603
1				2000				2000	101603
2				2000				2000	103603
3				2000				2000	105603
4				2000				2000	107603
5				2000				2000	109603
6				2000				2000	111603
7				2000				2000	113603
8				2000				2000	115603
9				2000				2000	117603
10				2000				2000	119603
11				2000				2000	121603
12				2000				2000	123603
13				2000				2000	125603
14				2000				2000	127603
15				2000				2000	129603
16				2000				2000	131603
17				2000				2000	133603
18				2000				2000	135603
19				2000				2000	137603
20				2000				2000	139603

3.31

METHOD B1
CATCHMENT = 600 ACRES

Year	HHrs	Cost HHrs	Install Pump	Pump Maint.	Area Required		Cost Area	Total Annual Expend.	Cumulative Expend.
					ft^2	Acres			
Init.	2257	52046	47000		2105832	48.34	72510	149556	149556
1				4500				4500	154056
2				4500				4500	158556
3				4500				4500	163056
4				4500				4500	167556
5				4500				4500	172056
6				4500				4500	176556
7				4500				4500	181056
8				4500				4500	185556
9				4500				4500	190056
10				4500				4500	194556
11				4500				4500	199056
12				4500				4500	203556
13				4500				4500	208056
14				4500				4500	212556
15				4500				4500	217056
16				4500				4500	221556
17				4500				4500	226056
18				4500				4500	230556
19				4500				4500	235056
20				4500				4500	239556

3.32

METHOD B2 - 5 YEAR LIFESPAN
CATCHMENT = 100 ACRES

Year	HHrs	Cost HHrs	Instal Pump	Pump Maint.	Area Required		Cost Area	Total Annual Expend.	Cumul-ative Expend.
					ft^2	Acres			
Init.	460	10607	25000		44064	1.01	1515	37122	37122
1	92	2121		1000	44064	1.01	1515	4636	41758
2	92	2121		1000				3121	44879
3	92	2121		1000				3121	48000
4	92	2121		1000				3121	51121
5	92	2121		1000				3121	54242
6	92	2121	4000	1000	44064	1.01	1515	8636	62878
7	92	2121		1000				3121	65999
8	92	2121		1000				3121	69120
9	92	2121		1000				3121	72241
10	92	2121		1000				3121	75362
11	92	2121	4000	1000	44064	1.01	1515	8636	83998
12	92	2121		1000				3121	87119
13	92	2121		1000				3121	90240
14	92	2121		1000				3121	93361
15	92	2121		1000				3121	96482
16			4000	1000				5000	101482
17				1000				1000	102482
18				1000				1000	103482
19				1000				1000	104482
20				1000				1000	105482

3.33 METHOD B2 - 5 YEAR LIFESPAN
CATCHMENT = 300 ACRES

Year	HHrs	Cost HHrs	Install Pump	Pump Maint.	Area Required		Cost Area	Total Annual Expend.	Cumulative Expend.
					ft^2	Acres			
Init.	797	18378	32000		76296	1.75	2625	53003	53003
1	159	3666		2000	76296	1.75	2625	8291	61294
2	159	3666		2000				5666	66960
3	159	3666		2000				5666	72626
4	159	3666		2000				5666	78292
5	159	3666		2000				5666	83958
6	159	3666	7000	2000	76296	1.75	2625	15291	99249
7	159	3666		2000				5666	104915
8	159	3666		2000				5666	110581
9	159	3666		2000				5666	116247
10	159	3666		2000				5666	121913
11	159	3666	7000	2000	76296	1.75	2625	15291	137204
12	159	3666		2000				5666	142870
13	159	3666		2000				5666	148536
14	159	3666		2000				5666	154202
15	159	3666		2000				5666	159868
16			7000	2000				9000	168868
17				2000				2000	170868
18				2000				2000	172868
19				2000				2000	174868
20				2000				2000	176868

3.34 METHOD B2 - 5 YEAR LIFESPAN
CATCHMENT = 600 ACRES

Year	HHrs	Cost HHrs	Install Pump	Pump Maint.	Area Required		Cost Area	Total Annual Cost	Cumulative Cost
					ft^2	Acres			
Init.	1127	25988	47000		107848	2.47	3705	76693	76693
1	225	5188		4500	107848	2.47	3705	13393	90086
2	225	5188		4500				9688	99774
3	225	5188		4500				9688	109462
4	225	5188		4500				9688	119150
5	225	5188		4500				9688	128838
6	225	5188	10000	4500	107848	2.47	3705	23393	152231
7	225	5188		4500				9688	161919
8	225	5188		4500				9688	171607
9	225	5188		4500				9688	181295
10	225	5188		4500				9688	190983
11	225	5188	10000	4500	107848	2.47	3705	23393	214376
12	225	5188		4500				9688	224064
13	225	5188		4500				9688	233752
14	225	5188		4500				9688	243440
15	225	5188		4500				9688	253128
16			10000	4500				14500	267628
17				4500				4500	272128
18				4500				4500	276628
19				4500				4500	281128
20				4500				4500	285628

3.35

METHOD B2 - 10 YEAR LIFESPAN
CATCHMENT = 100 ACRES

Year	HHrs	Cost HHrs	Install Pump	Pump Maint.	Area Required		Cost Area	Total Annual Expend.	Cumulative Expend.
					ft.^{2}	Acres			
Init	640	14758	25000		166200	3.81	5715	45473	45473
1	64	1475		1000	166200	3.81	5715	8190	53663
2	64	1475		1000				2475	56138
3	64	1475		1000				2475	58613
4	64	1475		1000				2475	61088
5	64	1475		1000				2475	63563
6	64	1475		1000				2475	66038
7	64	1475		1000				2475	68513
8	64	1475		1000				2475	70988
9	64	1475		1000				2475	73463
10	64	1475	4000	1000				6475	79938
11				1000				1000	80938
12				1000				1000	81938
13				1000				1000	82938
14				1000				1000	83938
15				1000				1000	84938
16				1000				1000	85938
17				1000				1000	86938
18				1000				1000	87938
19				1000				1000	88938
20				1000				1000	89938

3.36

METHOD B2 - 10 YEAR LIFESPAN
CATCHMENT = 300 ACRES

Year	HHrs	Cost HHrs	Install Pump	Pump Maint.	Area Required		Cost Area	Total Annual Expend.	Cumul-ative Expend.
					ft^2	Acres			
Init	1128	26011	32000		422848	9.71	14565	72 576	72576
1	113	2605		2000	422848	9.71	14565	19170	91746
2	113	2605		2000				4605	96351
3	113	2605		2000				4605	100956
4	113	2605		2000				4605	105561
5	113	2605		2000				4605	110166
6	113	2605		2000				4605	114771
7	113	2605		2000				4605	119376
8	113	2605		2000				4605	123981
9	113	2605		2000				4605	128586
10	113	2605	7000	2000				11605	140191
11				2000				2000	142191
12				2000				2000	144191
13				2000				2000	146191
14				2000				2000	148191
15				2000				2000	150191
16				2000				2000	152191
17				2000				2000	154191
18				2000				2000	156191
19				2000				2000	158191
20				2000				2000	160191

3.37 METHOD B2 - 10 YEAR LIFESPAN
CATCHMENT = 600 ACRES

Year	HHrs	Cost HHrs	Install Pump	Pump Maint.	Area Required		Cost Area	Total Annual Expend.	Cumulative Expend.
					ft^2	Acres			
Init	1596	36803	47000		782592	17.96	26940	110743	110743
1	160	3689		4500	782592	17.96	26940	35129	145872
2	160	3689		4500				8189	154061.
3	160	3689		4500				8189	162250
4	160	3689		4500				8189	170439
5	160	3689		4500				8189	178628
6	160	3689		4500				8189	186817
7	160	3689		4500				8189	195006
8	160	3689		4500				8189	203195
9	160	3689		4500				8189	211384
10	160	3689	10000	4500				18189	229573
11				4500				4500	234073
12				4500				4500	234073
13				4500				4500	243073
14				4500				4500	247573
15				4500				4500	252073
16				4500				4500	256573
17				4500				4500	261073
18				4500				4500	265573
19				4500				4500	270073
20				4500				4500	274573

3.38

METHOD C1
CATCHMENT = 100 ACRES

	Year	HHrs	Cost HHrs	HHrs Rehandle	Cost HHrs	Install Pump	Total Annual Expend.	Cumul-ative Expend.
*	Init	78	1798				1798	1798
**		345	7955				7955	
	1	156	3597	52	1199		4796	6594
	2	156	3597	52	1199		4796	11390
	3	156	3597	52	1199		4796	16186
	4	156	3597	52	1199		4796	20982
	5	156	3597	52	1199		4796	25778
	6	156	3597	52	1199		4796	30574
	7	156	3597	52	1199		4796	35370
	8	156	3597	52	1199		4796	40166
	9	156	3597	52	1199		4796	44962
	10	156	3597	52	1199		4796	49758
	11	156	3597	52	1199	25000	29796	84350
	12					1000	1000	85350
	13					1000	1000	86350
	14					1000	1000	87350
	15					1000	1000	88350
	16					1000	1000	89350
	17					1000	1000	90350
	18					1000	1000	91350
	19					1000	1000	92350
	20					1000	1000	93350

*Flood Embankment not required.

**Flood Embankment required - not included in Cumulative Cost.

3.39 METHOD C1
CATCHMENT = 300 ACRES

	Year	HHrs	Cost HHrs	HHrs Rehandle	Cost HHrs	Install Pump	Total Annual Expend.	Cumul-ative Expend.
*	Init	234	5396				5396	5396
**		692	15957				15957	
	1	468	10792	156	3597		14389	19786
	2	468	10792	156	3597		14389	34175
	3	468	10792	156	3597		14389	48564
	4	468	10792	156	3597		14389	62953
	5	468	10792	156	3597		14389	77342
	6	468	10792	156	3597		14389	91731
	7	468	10792	156	3597		14389	106120
	8	468	10792	156	3597	32000	46389	152509
	9					2000	2000	154509
	10					2000	2000	156509
	11					2000	2000	158509
	12					2000	2000	160509
	13					2000	2000	162509
	14					2000	2000	164509
	15					2000	2000	166509
	16					2000	2000	168509
	17					2000	2000	170509
	18					2000	2000	172509
	19					2000	2000	174509
	20					2000	2000	176509

*Flood Embankment not required.

**Flood Embankment required - not included in cumulative cost.

3.40 METHOD C1
CATCHMENT = 600 ACRES

	Year	MHrs	Cost MHrs	HHrs Rehandle	Cost HHrs	Pump Install	Total Annual Expend.	Cumul-ative Expend.
*	Init	468	10792				10792	10792
**		1028	23705				23705	
	1	936	21584	312	7194		28778	39570
	2	936	21584	312	7194		28778	68348
	3	936	21584	312	7194		28778	97126
	4	936	21584	312	7194		28778	125904
	5	936	21584	312	7194		28778	154682
	6	936	21584	312	7194		28778	183460
	7	936	21584	312	7194		28778	212238
	8	936	21584	312	7194	47000	75778	288016
	9					4500	4500	292516
	10					4500	4500	297016
	11					4500	4500	301516
	12					4500	4500	306016
	13					4500	4500	310516
	14					4500	4500	315016
	15					4500	4500	319516
	16					4500	4500	324016
	17					4500	4500	328516
	18					4500	4500	333016
	19					4500	4500	337516
	20					4500	4500	342016

*Flood Embankment not required.

**Flood Embankment required -
not included in cumulative cost.

3.41 For Graphical Representation of Cumulative Expenditure versus year for systems A1, A2, A3, B1, B2, C1

Reference Graphs 2, 3 and 4.

3.42 Due to undefined initialisation period identification of the optimal solution based on both initial capital cost and subsequent expenditure is not possible.

For the moment therefore the following definitions of optimality are considered.

1. Optimal Solution = Solution incurring lowest total cost (i.e. sum of expenditure during initialisation and subsequent 20 years).

2. Optimal Solution = Solution incurring lowest initial capital cost.

3.43 <u>By Definition 1</u>*

Optimal Solution	100 acre catchment	-	A3
" "	300 acre catchment	-	B1
" "	600 acre catchment	-	B1

<u>By Definition 2*</u>

Optimal Solution	100 acre catchment	-	A1
" "	300 acre catchment	-	C1
" "	600 acre catchment	-	C1

*Ref. Graph 2, 3 and 4.

3.44 EXAMPLE:

Application of Optimal Solutions based on definition 1 to Outfall System at Blackwater Works

Catchment sizes ranging between taken as "100 acres"	1 - 200 acres
Catchment sizes ranging between taken as "300 acres"	201 - 450 acres
Catchment sizes ranging between taken as "600 acres"	451 - 1000 acres

For Blackwater Works (excluding Cornafulla, Drumlosh)

No. 100 acre catchment areas	= 36
No. 300 acre catchment areas	= 14
No. 600 acre catchment areas	= 10

For the moment it will be assumed that optimal solutions are technically possible at each location. Adjustments will be introduced later to take account of necessity at some locations for flood embankments.

3.45 Optimal Solution = Solution incurring lowest total cost

Year	A3		B1		B1		Total Annual	Cumulative
	1 No. 100 acre	36 No. 100 acre	1 No. 300 acre	14 No. 300 acre	1 No. 600 acre	10 No. 600 acre		
Init	9,028	325,008	99,603	1,394,442	149,556	1,495,560	3,215,010	3,215,010
1	15,185	546,660	2,000	28,000	4,500	45,000	619,660	3,834,670
2	2,803	100,908	2,000	28,000	4,500	45,000	173,908	4,008,578
3	2,803	100,908	2,000	28,000	4,500	45,000	173,908	4,182,486
4	2,803	100,908	2,000	28,000	4,500	45,000	173,908	4,356,394
5	2,803	100,908	2,000	28,000	4,500	45,000	173,908	4,530,302
6	2,803	100,908	2,000	28,000	4,500	45,000	173,908	4,704,210
7	2,803	100,908	2,000	28,000	4,500	45,000	173,908	4,878,118
8	2,803	100,908	2,000	28,000	4,500	45,000	173,908	5,052,026
9	2,803	100,908	2,000	28,000	4,500	45,000	173,908	5,225,934
10	2,803	100,908	2,000	28,000	4,500	45,000	173,908	5,399,842
11	2,803	100,908	2,000	28,000	4,500	45,000	173,908	5,573,750
12	2,803	100,908	2,000	28,000	4,500	45,000	173,908	5,747,658
13	2,803	100,908	2,000	28,000	4,500	45,000	173,908	5,921,566
14	2,803	100,908	2,000	28,000	4,500	45,000	173,908	6,095,474
15	2,803	100,908	2,000	28,000	4,500	45,000	173,908	6,269,382
16	2,803	100,908	2,000	28,000	4,500	45,000	173,908	6,643,290
17	2,803	100,908	2,000	28,000	4,500	45,000	173,908	6,827,198
18	2,803	100,908	2,000	28,000	4,500	45,000	173,908	7,001,106
19	2,803	100,908	2,000	28,000	4,500	45,000	173,908	7,175,014
20	2,803	100,908	2,000	28,000	4,500	45,000	173,908	7,348,922

3.46 Optimal Solution = Solution incurring lowest capital cost

	A1		C1		C1		Total Annual	Cumulative
	1 no. 100 acre	36 no. 100 acre	1 no. 300 acre	14 no. 300 acre	1 no. 600 acre	10 no. 600 acre		
* Init	1799	64764	5396	75544	10792	107920	248228	248228
**	7955	286380	15957	223398	23705	237050	746828	
1	4196	151056	14389	201446	28778	287780	640282	888510
2	4196	151056	14389	201446	28778	287780	640282	1528792
3	4196	151056	14389	201446	28778	287780	640282	2169074
4	4196	151056	14389	201446	28778	287780	640282	2809356
5	4196	151056	14389	201446	28778	287780	640282	3449638
6	4196	151056	14389	201446	28778	287780	640282	4089920
7	4196	151056	14389	201446	28778	287780	640282	4730202
8	4196	151056	46389	649446	75778	757780	1558282	6288484
9	4196	151056	2000	28000	4500	45000	224056	6512540
10	4196	151056	2000	28000	4500	45000	224056	6736596
11	4196	151056	2000	28000	4500	45000	224056	6960652
12	4196	151056	2000	28000	4500	45000	224056	7184708
13	4196	151056	2000	28000	4500	45000	224056	7408764
14	4196	151056	2000	28000	4500	45000	224056	7632820
15	4196	151056	2000	28000	4500	45000	224056	7856876
16	3597	129492	2000	28000	4500	45000	202492	8059368
17	3597	129492	2000	28000	4500	45000	202492	8261860
18	3597	129492	2000	28000	4500	45000	202492	8464352
19	3597	129492	2000	28000	4500	45000	202492	8666844
20	3597	129492	2000	28000	4500	45000	202492	8869336

CHAPTER 4

Comparison of Expenditure on Present System with Expenditure on Visualised Systems

4.1 In the previous chapters the various visualised systems of silt control have been costed and the optimal solution identified for small, medium and large catchment sizes. The question still remains, however, as to whether the most economical of the visualised systems remains economical when compared to the present system. To facilitate this comparison the present system must be costed.

4.2 Costing of Present System

Present expenditure in the area of silt control may be viewed under three main headings:-

a. Expenditure on installation and maintenance of silt control systems.

b. Expenditure on 'clean up operations' i.e. to placate farmers.

c. Compensation to farmers, sports clubs etc.

d. Cost of damaged public relations*

4.3 It is possible to record relatively clearly expenditure on excavation and maintenance of silt ponds.

Similarly it would be relatively easy to record expenditure in the form of compensation.

Expenditure on 'clean up' operations however, which represents a major fraction of the total expenditure on silt control is not readily identifiable since due to the present subhead system expenditure, in this area loses identity

*Cost of damaged public relations not considered as it is outside scope of this report.

amid expenditure on drainage. Any such work is a direct consequence of the inefficiencies of our approach to silt control and as such should be regarded as expenditure on silt control.

4.4 Rather than trying to assess finitely the amount of expenditure presently incurred due to silt control the following approach may be adopted:

The present system is optimal if the amount of expenditure presently incurred is less than the expenditure which would be incurred if the most economic of the visualised systems were adopted; bearing in mind the difference in efficiency.

4.5 Example:

Blackwater Works

Period June to September 1983

Total no. of Hymac hours to silt control (maintenance only)	approx.	= 640	HHrs
Expected total no. of Hymac hours for 1 year		= 2,560	HHrs
Equivalent annual expenditure		= £59,033	
Lowest possible annual expenditure to maintain system which produces acceptable suspended solids concentrations at all outfalls*		=£640,282	

4.6 From this it follows that if more than £580,000 is spent annually in the present system by way of compensation etc. (i.e. expenditure on silt control excluding silt pond maintenance expenditure) that the present system is non optimal. This is clearly not the case and hence it is reasonable to conclude that the present system is optimal.

*Ref. 3.46

4.7 It should be noted however that the comparison above compares (a) visualised system which is designed to produce acceptable suspended solids effluent to all outfall locations with (b) present system which is not 100% efficient.

4.8 At this point it is necessary to distinguish between two definitions of silt control.

1.	Rational/ Preventative	To produce effluent of acceptable suspended solids concentrations at all outfalls.
2.	Corrective	To rely for the most part on siltation 'cleanup operations' where complaints are received or anticipated.

4.9 Due to the present budgetary system arrangements expenditure on silt control effectively raises production costs. If it is intended to rationalise silt control it will be essential to introduce some form of budgetary separation. Evidence of the latter is already available from the low degree of priority which Works Managers (find it possible to) afford silt control. This low degree of priority is in turn reflected in the shortage (oftentimes virtual absence) of machinery available for silt control.

CHAPTER 5

Conclusions and Recommendations

Conclusions:

1. When considering the question of sludge capacity required neither a finite answer nor the answers parish can be derived by theoretical methods based on monitoring since the variables involved while identifiable defy analysis (ref. 1.2 - 1.7 inc.)

2. Silt trapping systems which allow for accumulation of 525 ft^3 of sludge/acre 4 times per year function satisfactorily (ref. 1.8 - 1.9 inc.).

3. The quantity of suspended solids to be dealt with in attempting to produce effluent of acceptable suspended solids concentration is generally underestimated.

   The amount of silt giving rise to complaints from external individuals and bodies represents only a small fraction of the overall suspended solids discharged via our outfalls.

   Unfortunately to prevent this small proportion from giving rise to complaints it would be necessary to trap almost all suspended solids (ref. 1.12.7).

4. The equivalent of approx. 152,000 tonnes of milled peat at 55% M.C. is discharged annually from milled peat production areas in the form of suspended solids (ref. 1.10).

5. The ease with which settled peat solids may be put back into suspension is generally underestimated (ref. 1.11).

6. The installation of trapping systems which are not protected against heavy flows from upstream and/or flooding from down-stream is futile. Protection may be afforded by means of by-passing, valves, embankments etc. (ref. 1.11; 1.12; 2.9, 2.10; 2.11; 2.12; 2.13).

7. When flow through a trapping system is in the form of a narrow channel no settlement of suspended solids is taking place (ref. 1.12.2).

8. It is grossly inefficient to install settlement ponds on large outfalls or rivers (ref. 1.12.5).

9. It is generally cost prohibitive and/or technically impossible to rearrange existing bog drainage systems.

10. The dragline is not suitable for silt pond maintenance (ref. 2.17). The hymac is suitable for silt pond maintenance (ref. 2.17).

11. The recycling of sludge removed from silt trapping systems by excavator is non practicable (ref. 2.17).

12. The use of 1 to 1 side slopes to silt pond is unwarranted (ref. 2.18).

13. The existance of "walls" would be highly beneficial as regards efficiency and quiescent conditions (ref. 2.14; 2.15).

14. The present system involving reliance to a large extent on cleanup operations and compensation costs less than any rationalised method of producing acceptable effluent at all outfall locations.

The above statement does not take account of costs incurred by damaged public relations or responsibility toward protection of the environment.

15. The optimal rationalised system has been identified. In the light of paragraph 2 of conclusion 14 it is outside the scope of this report to identify the overall optimal solution (ref. 4.1-4.9 inc.).

16. To adopt a rationalised approach the following points must be clarified.

    (a) identification of the overall optimal solution

    (b) Finite cost of the present system (ref. 4.1-4.9 inc.).

17. The present budgetary system does not facilitate

    (a) Accurate costing of the present system

    (b) Rationalised approach (ref. 4.9).

18. The maintenance of silt ponds by sludge pumping may prove to be more economical than the present method. The system is as yet untried.

Recommendations

1. Trapping systems should be designed on the basis of 525 ft.^{3} of sludge accumulating four times per year (ref. conclusion 2).

2. Trapping systems should not be installed unless adequate protection to ensure against resuspension of the settled particles and regular maintenance can be provided (ref. conclusion 5 and 6).

3. Future trapping systems should be modified in accordance with 2.15 (ref. conclusions 7 and 13).

4. In general settlement ponds should not be installed on large outfalls or rivers (ref. conclusion 8).

5. Trapping system designs based on overall re-arrangement of outfall systems should not be entertained. Consideration should, however, be given to localised re-arrangement of outfall system when individual outfalls are being considered for silt removal (ref. conclusion 9).

6. The practice of providing trapping systems, the dimensions of which are based on capabilities of the dragline excavator rather than the hymac, should be discontinued.

7. As an essential starting point for the rationalisation of silt control, consideration should be given to conclusions 14, 15, 16 and 17.

8. Development of the sludge pump should be continued.

9. Prior to a rationalised plan for a Works being discussed and decided upon, no. 7 above should be complied with.

APPENDIX 1

Acceptable Suspended Solids Concentration

Following the 1977 Water Pollution Act threshold values for maximum allowable suspended solids concentration are left by and large to the discretion of the local authorities involved.

The "Eight Report of the Royal Commission on Water and Sewage" (1912) recommended that "maximum suspended solids concentration" be regarded as 30 ppm (in the case of peat solids = 30 mg/l) assuming an outfall to receiving water flow rate ratio of 1 : 8.

Although the situation is not clarified, it is reasonable to assume that suspended solids concentrations of the order of 100 mg/l should be deemed acceptable by the authorities since the outfall to receiving water flow rate ratio in our case is rarely less than 1 : 25.

The outlet suspended solids concentration of functioning silt ponds rarely exceeds 100 mg/l and is often considerably less.

The retention time required to provide acceptable effluent is less critical than the lifespan requirement when the length and volume of silt ponds is being considered.

Our legal obligation to treat drainage waters with high suspended solids concentration is presently being investigated in the light of the 1977 Water Pollution Act and the 1946 Turf Development Act.

APPENDIX 2

Mathematical Expression for Lifespan of Trapping System

Trapping System = Settlement Pond, Say

Parameter	Symbol	Units
Top Width Pond	W	m
Overall Depth Pond	D	m
Effective Depth Pond	H	m
Length of Pond	L	m
Relative Density Dry Solids	g	-
% Suspended Solids which settle	100 E	-
Annual Average Rainfall	R	mm/yr
Run off Equation	X	-
Area Catchment	A	acres
Average M.C. settled sludge	M	-
Inflow to Pond	Qi	m^3/hr
Lifespan Pond	C	days

$$Qi = \left(\frac{R}{(24 \times 365.25)\ (10^3)}\right) \left(\frac{A \times 0.00405}{10^{-6}}\right) \left(\frac{X}{1}\right)$$

$$= RAX\ (4.62012 * 10^{-4})$$

Weight solids inflowing to pond in 1 hour

$$= (RAX)\ (4.62012 \times 10^{-4})\ (S_1 \times 10^3)\ mg$$

Volume of solids inflowing to pond in 1 hour =

$$\left(\frac{RAX}{1}\right) \left(\frac{S_1}{g}\right) \left(\frac{4.62012 * 10^{-10}}{1}\right) \quad m^3/hr$$

Volume sludge formed in 1 hour =

$$\left(\frac{RAX\ S_1}{(1-m)\ (g)}\right) \left(\frac{e}{1}\right) \left(\frac{4.62012 * 10^{-10}}{1}\right) \quad m^3$$

Volume available for sludge deposition =

$$(\ (W-2D + H)\ *\ (H.L.)\ )$$

$$\text{Lifespan} = C = \frac{\text{vol. available for sludge deposition}}{\text{vol. required for sludge deposition per unit time.}}$$

$$C = \frac{\left((W-2D+H)\ (H.L.) \right)}{\left(\frac{RAX\ S_1}{(1-m^{-1})}\right)\ (e)\ (g)\ \left(\frac{4.62012 * 10^{-10}}{1}\right)\ \left(\frac{24}{1}\right)} \text{ days}$$

Demonstration of sensitivity of capacity to moisture content sludge.

Assume 1. Runoff equation (X) can be evaluated and has value 0.7.

2. $W = 8$; $D = 3$; $H = 2$; $g = 1.5$;
$S_1 = 800$ mg/l $A = 100$; $e = 0.85$;
$R = 1320$ mm/yr*; $C = 120$; m, L variable.

R = Average yearly rainfall calculated by assuming monthly rainfall equal to average monthly rainfall based on wettest three months of year (value above for November, December, January at Ahascragh, Co. Galway - Derryfadda.

General Equation Derived above:-

$$C = \frac{(W-2D+H)\ (H.L)}{\left(\frac{RAX\ s.\ e}{(1-m)\ g}\right)\ \left(\frac{4.62012 * 10^{-10}}{1}\right)\ \left(\frac{24}{1}\right)} \text{ days}$$

For values listed above.

$$120 = \frac{(8-2(3)+2)\ (2 * L)}{\left(\frac{(1320)\ (100)\ (0.7)\ (800)\ (0.85)}{(1-m)\ (1-5)}\right)\ \left(\frac{4.62012*10^{-10}}{}\right)\ \left(\frac{24}{1}\right)}$$

L =

Values of L for various values of m

m	(1-m)	L
0.81	0.19	
0.83	0.17	
0.85	0.15	
0.87	0.13	
0.89	0.11	
0.91	0.09	
0.93	0.07	
0.95	0.05	
0.97	0.03	
0.99	0.01	

Ref. Graph 1

L (Pond Length)

Vs m (Moisture Content)

APPENDIX 3

Estimated Peat Losses

525 ft^3/acre/3 months

i.e. 2100 ft^3/acre/year at 95% moisture content

$= \frac{2100}{20}$ ft^3/ at 0% moisutre content

$= \frac{100}{45} \left(\frac{2100}{20}\right)$ ft^3 at 55% moisutre content.

Density of peat at 55% M.C. = 18 lbs/ft^3 i.e. 2204 lbs = IT.

Therefore $\left(\frac{100}{45}\right) \left(\frac{2100}{20}\right) \left(\frac{18}{2204}\right)$ = 1.905 tonnes/acre/year

Total milled peat production area = 80,000 acres.

Therefore (80,000) * (1.905) = 152,000 T milled peat at 55% M.C. lost every year.

Assuming average lifespan for all milled peat bogs = 20 years

Total losses = 152,000 * 20

= 3,040,000 tonnes at 55% M.C. from all milled peat areas in 20 years.

APPENDIX 4

Implications of Findings of Laboratoire Central D'Hydraulique de France

Continutity Equation

(Flow Rate) = (cross sectional) * (Mean Flow)
(Area Flow) (Velocity)

Normal flow conditions : Mean Velocity flow O/F = 1.25 m/s
Heavy flow conditions : Mean Velocity flow O/F = 2.00 m/s
Hence: for normal conditions and efficiency:

$$\frac{\text{Cross Sectional Area Flow Trapping System}}{\text{Cross Sectional Area Flow O/F}} = \frac{1.25}{0.15} = 8.3$$

For Heavy Flow Conditions and Efficiency

$$\frac{\text{Cross Sectional Area Flow Trapping System}}{\text{Cross Sectional Area Flow O/F}} = \frac{2.00}{0.15} = 13.3$$

For 25 ft. wide pond with depth of flow = 6 inches
i.e. cross sectional area flow pond = 12.5 ft^2.

During normal conditions and efficiency

$$\text{max. cross sectional area flow O/F} = \frac{12.5}{8.3} = 1.5\ ft^2$$

For large O/F or small river with flow
Dimensions 8 ft * 1 ft. trapping system with
flow depth = 1 ft efficient only when

$$\text{Width of flow in trapping system} = 8\ \frac{(1.25)}{(0.15)} = 66\ ft.$$

APPENDIX 5

Protection of Silt Ponds from Flooding

Ref. Figure 1:

In the case of the unprotected system settled peat particles are resuspended and settle on surrounding land. The problem may be solved by providing flood embankments with pond outlet piped underneath and fitted with a simple flap valve. The rise in water level upstream of the embankment is caused solely by runoff. No additional flooding is caused upstream of the embankment since if hydrostatic pressure upstream of the embankment becomes greater than the hydrostatic pressure downstream a flow will take place through valve until hydrostatic pressures balance. Any resuspension and subsequent settling of peat particles takes place within the area surrounded by embankment. A valve in the form of a hinged lid would suffice requiring virtually no maintenance.

APPENDIX 6

Bypassing

There are five methods to be considered:-

1. Surge storage - I.L. storage inlet = I.L. pond inlet
2. " " - I.L. storage inlet I.L. pond inlet
3. Bypassing - I.L. Bypass inlet I.L. pond inlet
4. Bypassing - I.L. Bypass inlet I.L. pond inlet
5. Bypassing - Small diam. pond inlet pipe to restrict heavy flows by causing backup.

Considering 1 and 2 : Storage capacity required excessive. Solutions 1 and 2 impracticable.

Considering 3 : During normal conditions the flow would be via the pipe with the lower I.L. and hence through trapping system. During periods of heavy rainfall the flow would be partly through the pipe with lower I.L. and partly through the pipe with the higher invert level.

This system is not suitable because
(a) during periods of heavy flow the cross sectional area of flow passing through pond inlet pipe may be equal to cross sectional area flow during normal conditions but head and consequently velocity is greater and hence danger of resuspending settled peat particles not reduced to degree required.

(b) The relative invert levels involved would be critical. The very nature of the bog does not lend itself to this type of technology.

Considering 4: This method would involve the installation of a bypass pipe/weir the invert level of which would be equal to that of the pond inlet pipe. During normal flow conditions the bypass weir/pipe would be shut off. During heavy rainfall the bypass weir/pipe would be open and the inlet pipe to pond shut. This method although not automatic is practicable.

Considering 5: The use of small diameter pipes under bog conditions is not practical due to blockages.

APPENDIX 7

Provision of Walls in Silt Ponds

Fig. 2 (a) shows the effect on the velocity pattern through pond due to presence of wall. It can be clearly seen that the presence of a wall at the inlet is of advantage in producing uniform flow velocity across the full width of pond while not interfering with the flow rate and consequently providing greater pond efficiency and off-setting the onset of channeling.

Fig. 2 (b) shows how quiescent conditions may be maintained during high flow conditions due to presence of walls.

Fig. 2 (c) shows how cleaning of pond by pumping can be achieved in cases where part of the pond is out of reach (pump capability wise) of area onto which sludge is to be pumped.

APPENDIX 8

Stability of Silt Pond Excavation

Fig. 3 (a) shows the result of excessive excavating and reason for failure.

Fig. 3 (b) shows stability diagram for the case of a water or sludge filled pond.

It should be noted that if flow through pond is stopped during cleaning and pond completely emptied (sludge and water) that failure may result.

APPENDIX 9

Number of years before silt pond spoil rehandling essential

Max. allowable cross sectional area spoil = A

$A = 45 * 6 = 270\ ft^2$

Vol Sludge to be removed from pond/year/acre

$= 525 * 4 = 2100\ ft^3$

Moisture Content Sludge = 95%

Specific Gravity Dry Peat Particles = 1.0

Vol. spoil at 0% M.C. accumulating/year/acre = $2100 * (1-0.95)$

$= 105\ ft^3$ @ 10% M.C.

Moisture Content Spoil = 70%

Vol. spoil @ 70% M.C. accumulated/year/acre = $105 * \frac{(100)}{(30)}$

$= 350\ ft^3$ @ 70% M.C.

Length available for deposition of spoil/acre = $\frac{(150)}{(25)} * 2$

Cross sectional area spoil @ 70% M.C./year/acre = $\frac{350}{12} * 2$

$= 58.32\ ft^2$

therefore number of years before spoil rehandling essential = $\frac{270}{58.32}$

= 4.6 years

say 5 years.

Vol. of spoil and length over which it is to be distributed vary linearly with catchment size.

i.e. TIME AT WHICH SPOIL REHANDLING ESSENTIAL IS SAME FOR ALL CATCHMENT AREAS = 5 YEARS.

APPENDIX 10

Hymac Hours (HHrs) Required for Pond Cleaning, Spoil Rehandling and Initial Excavation

Rate of Excavation 30 ft^3/min. @ 75% efficiency
= 1350 ft^3/hr.

Time to clean 100 acre pond/year = $\frac{(525)\ (100)\ (4)}{(1350)}$

= 156 HHrs

Time to rehandle spoil - 100 acre pond/year = $\frac{(100)\ (350)}{1350}$

= 25.92 HHrs/year
= 130 HHrs/5 years

Time for initial excavation 100 acre pond assuming overall depth = 7 ft. = $\frac{(525)\ (2)\ (100)}{1350}$

= 78 HHrs.

APPENDIX 11

Sludge Pump Hours (SPHrs) Required/Acre/Year

Quantity to be pumped/acre/year = $(525)^4$

= 2100 ft^3

Spec. Pumping Rate = 780 IMPG.P.M. @ Total Head = 50 ft.

Pumping Rate = 780 G.P.M. @ 50% Efficiency

= 7,511 ft^3/hr. @ 50% Efficiency

= 3,756 ft^3/hr.

Time to clean 100 acre pond/year = $\frac{(525)\ (4)\ (100)}{3,756}$

= 74 SPHrs

APPENDIX 12

Ratio Hymac Hours - Sludge Pump Hours Required for Maintenance

Hymac Cleaning Rate = 1350 ft^3/Hr.

Sludge Pump Cleaning Rate = 3756 ft^3/Hr.

$$\text{Ratio} = \frac{3756}{1350} = 2.78$$

APPENDIX 13

Area over which spoil from sludge pump to be spread

Ditching Hours Required

Vol. sludge produced per acre/year = (525) (4)
= 2100 ft^3

Initial depth sludge after pumping = 3 ins.

Area covered by sludge from one acre/cleaning $= \frac{(2100)}{(4)} (4)$

= 2100 ft^2

If area for sludge spreading square : 2100 ft^2 = 46 * 46 ft.
Area in which ditching necessary after pond cleaning
- 100 acre catchment 460 * 460 ft.

Drains @ 45 ft. centres
Total length ditching/cleaning/100 acres = 460 * 11
= 5060 ft.

Ditching rate = 300 ft./Hr @ 50% efficiency
= 150 ft/Hr.
Ditching Hours (DHrs)/Cleaning/100 acres $= \frac{(5060)}{(150)}$
= 33.7 DHrs
Ditching Hours required/year/100 acres = 135 DHrs

Ratio spreading area to catchment area = $\frac{210,000}{4,356,000}$ = 4.8%

APPENDIX 14

Quantity of Peat Recycled by Sludge Pumping

Quantity of Sludge Pumped per 100 acres/year

$$= (100)\ (4)\ (525)\ ft^3 @ 95\%\ M.C.$$

$$= \frac{(100)\ (4)\ (525)\ ft^3 @ 0\%\ M.C.}{20}$$

$$= \frac{(100)}{(45)}\ \frac{(100)\ (4)\ (525)\ ft^3}{20} @ 55\%\ M.C.$$

$$= 23,333\ ft^3 @ 55\%\ M.C.$$

Density of peat @ 55% M.C. = 18 lbs/ft^3

(2204 lbs = 1 tonne)

$$23,333\ ft^3 @ 55\%\ M.C. = \left(\frac{18}{2204}\right)\ (23,333) = 190.5 \text{ tonnes}$$

i.e. 190.5 tonnes peat @ 55% M.C. from 100 acres/year.

APPENDIX 15

Area Required for Lagoon - General

Ref. Figure 5

For Cost comparison area required for Lagoon = Area required lagoon less area required for ponds

A = Surface area lagoon + Plan area embankment - area pond system.

$$= (S.A.) + (34).\ 1 - 6(25 + 60 + 90)*\text{Catchment Area}$$

Catchment Area = x

$$A = (S.A.) + (34)(1) - (1050)\ (x)$$

Area required for Lagoons to Method C1

$$\text{Area} = \begin{matrix}(\text{Surface}) \\ (\text{Area}\ )\end{matrix} + \begin{matrix}(\text{Emb.}\ ) \\ (\text{Length})\end{matrix}\ \begin{matrix}(34) \\ (\ )\end{matrix} - 1050\ x$$

100 acres:

$$S.A. = \frac{(8)\ (525)\ (4)\ (100)}{10} = 168{,}000$$

$$L = (\ S.A.\ )\ (4)$$
$$= (409.87)*\ (4)$$
$$= 1639$$
$$A = (168{,}000) + (1{,}639)\ (34) - (1050)\ (100)$$
$$= 223{,}726 - 105{,}000$$

Area required for lagoon area required for ponds

Therefore area to be acquired/designated = zero.

300 acres:

A = (S.A.) + L.34 - 1050 x

$$(S.A.) = \frac{(12)\ (525)\ (4)\ (300)}{10}$$

$$= 756,000$$

L = (756,000) (4)

= 3,477

A = (756,000) + (3,477) (34) - (1,050) (300)

= 874,218 - 315,000

Area required for Lagoon area required for ponds

Therefore area to be acquired/designated = zero

600 acres:

A = (S.A.) + L.34 - 1050 x

$$S.A. = \frac{(12)\ (525)\ (4)\ (600)}{10}$$

= 1,512,000

L = (1,512,000) (4)

L = 4918.0

A = 1,512,000 + (4,918) (34) - (1,050) (600)

A = 1,049,212

APPENDIX 16

Number of years spoil to produce embankment to serve remaining bog lifespan

Lifespan = 20 years

Catchment = x acres

No. years Spoil = y

Quantity of spoil available for embankment construction after y years from x acre catchment $= \frac{(350)\ (x)\ (y)}{1}$

Cross sectional area embankment $= 240\ ft^2$

Length embankment from x acres after y years constructed from available spoil $= \frac{350\ xy}{240}$

$= \frac{3}{2}\ xy$

If embankment square, capacity $= \left(\frac{\frac{3}{2}\ xy}{4}\right)^2 * 10$

Capacity required for (20-y) years = (20-y) (4) (525) (x)

= (2100) (20-y) (x)

Compatability: $(2100)\ (20-y)\ (x) = \left(\frac{3xy}{8}\right)^2 * 10$

$$42{,}000\ x - 2100\ yx = \frac{(9)\ (10)}{(64)}\ x^2\ y^2$$

$$9x^2\ y^2 + 13{,}440\ xy - 268{,}800\ x = 0.$$

For 100 acres:

$x = 100; \quad y = ?$

$9x^2y^2 + 13,440xy - 268,800x = 0$

$90,000y^2 + 1,344,000y - 26,880,000 = 0$

$90y^2 + 1,344y - 26,880 = 0$

$$y = \left(\frac{(-1344) \pm (1344)^2 + 4(90)(26,880)}{180} \right)$$

$$= \left(-\frac{1344 \pm 3388}{180} \right)$$

$$= 11.35$$

For 300 Acres:

$x = 300; \quad y = ?$

$9x^2y^2 + 13,440xy - 268,800x = 0$

$810,000y^2 + 4,032,000y - 80,640,000 = 0$

$810y^2 + 4032y - 80,640 = 0$

$$y = \left(\frac{-4032 \pm (4032)^2 + 4(810)(80,640)}{1620} \right.$$

$y = 7.79$

For 600 acres:

$9x^2y^2 + 13,440xy - 268,800x = 0$

$1620y^2 + 8064y - 161,280 = 0$

$$y = \left(\frac{-8064 \pm (8064)^2 + 4(1620)(161,280)}{3240} \right.$$

$y = 7.78$ years

Optimal year for completion of embankment:

100 acres	-	12th
300 acres	-	8th
600 acres	-	8th

Quantity Material:

100 acres - (100) (12) (350) = 420,000 ft^3
300 acres - (300) (8) (350) = 840,000 ft^3
600 acres - (600) (8) (350) =1,680,000 ft^3

Rate of Construction 675 ft^3/HHr.

Hymac Hours Required:

100 acres - $\frac{(420,000)}{(675)}$ = 622 HHrs

300 acres - $\frac{(840,000)}{(675)}$ = 1,244 HHrs

600 acres - $\frac{(1,680,000)}{(675)}$ = 2,488 HHrs

APPENDIX 17

Lagoon Construction:-

Cross sectional area embankment
= 24 * 10 = 240 ft^2

Embankment length = L

Vol. material to embankment = (240) (L) ft^3

Lagoon capacity for 100 acres/year = (100) (525) (4)
= 21,000 ft^3

Average height embankment = 10 ft.

Rate of construction = $\frac{1350}{2}$ = 675 ft^3/HHr

Bottom width embankment = 34 ft.

Top width embankment = 14 ft. (to facilitate hymac/dozers)

Area required = surface area + (L) (34) - area required
*Ref. 3.7 for ponds.

= S.A. + L.34 - 1050 Catchment Area.

Catch-ment (Acres)	Capac-ity (ft^3)	Surface Area (ft^3)	Square Dims. (ft x ft)	Embank. Length ft.	Embank. Material ft^3	Hymac Hours	Area (ft^2)	Area (Acres)	
100	1050000	105000	324 x 324	1296	311040	460	44064	1.01	5 year
300	3150000	315000	561 x 561	2244	538560	797	76296	1.75	
600	6300000	630000	793 x 793	3172	761280	1127	107848	2.47	Lagoon
100	2100000	210000	450 x 450	1800	432000	640	166200	3.81	10 year
300	6300000	630000	793 x 793	3172	761280	1128	422848	9.71	
600	12600000	1260000	1122 x1122	4488	1077120	1596	782592	17.96	Lagoon
100	4200000	420000	648 x 648	2592	622080	922	403128	9.25	20 year
300	12600000	1260000	1122 x1122	4488	1077120	1592	1097592	25.20	
600	25200000	2520000	1587 x1587	6348	1523520	2257	2105832	48.34	Lagoon

APPENDIX 18

Adjustment for Method A1, A2, A3, C1 for cases in which flood embankment necessary ref. Fig. ____.

Variation in Shannon at Blackwater Works approx. = 8½ ft.
Allowing 1½ ft. = difference G.G.L. to normal S.L. Shannon
Therefore 8 ft. high embankment gives 1 ft protection.

Cross sectional area embankment = 6 * 22 = 176 ft^2

If embankment to run three sides:-

for 100 acres - length = 1025 ft.
for 300 acres - length = 1755 ft.
for 600 acres - length = 2150 ft.

Volume material required and time to construct:-

100 acres - 1025 * 176 = 180,400 ft^3 -- 267 HHrs
300 " - 1755 * 176 = 308,880 ft^3 -- 458 HHrs
600 " - 2150 * 176 = 378,400 ft^3 -- 560 HHrs

APPENDIX 19

Cost Machine Hours

Hymac Hour:

Internal hireage rate Hymac	=	9.50
Cost of 1 man-hour	=	10.00
Cost of fuel (consumption @ 9 litres/hour)	=	3.56
Total cost 1 Hymac hour	=	23.06

Sludge Pump Hour:

Internal hireage rate pump	=	2.42
Internal hireage rate tractor	=	1.50
Cost of 3 man hours	=	30.00
Cost of fuel to tractor (consumption @ 10 litres/hour)	=	3.96
Total cost 1 sludge pump Hr		37.88

Ditcher Hour:

Internal hireage rate ditcher (Merri)	=	1.14
Internal hireage rate tractor	=	1.50
Cost of 1 man-hour	=	10.00
Cost of fuel to tractor	=	3.96
Total cost 1 ditcher hour		16.60

Land Purchase/acre approximate average = £1,500.00

Profit/Tonne Peat @ 55% M.C. approximately = £3.00

APPENDIX 20

Cost of Pump Installation and Maintenance

The following cost estimates for provision of pumps at treatment sites are based on most accurate figures available to date.

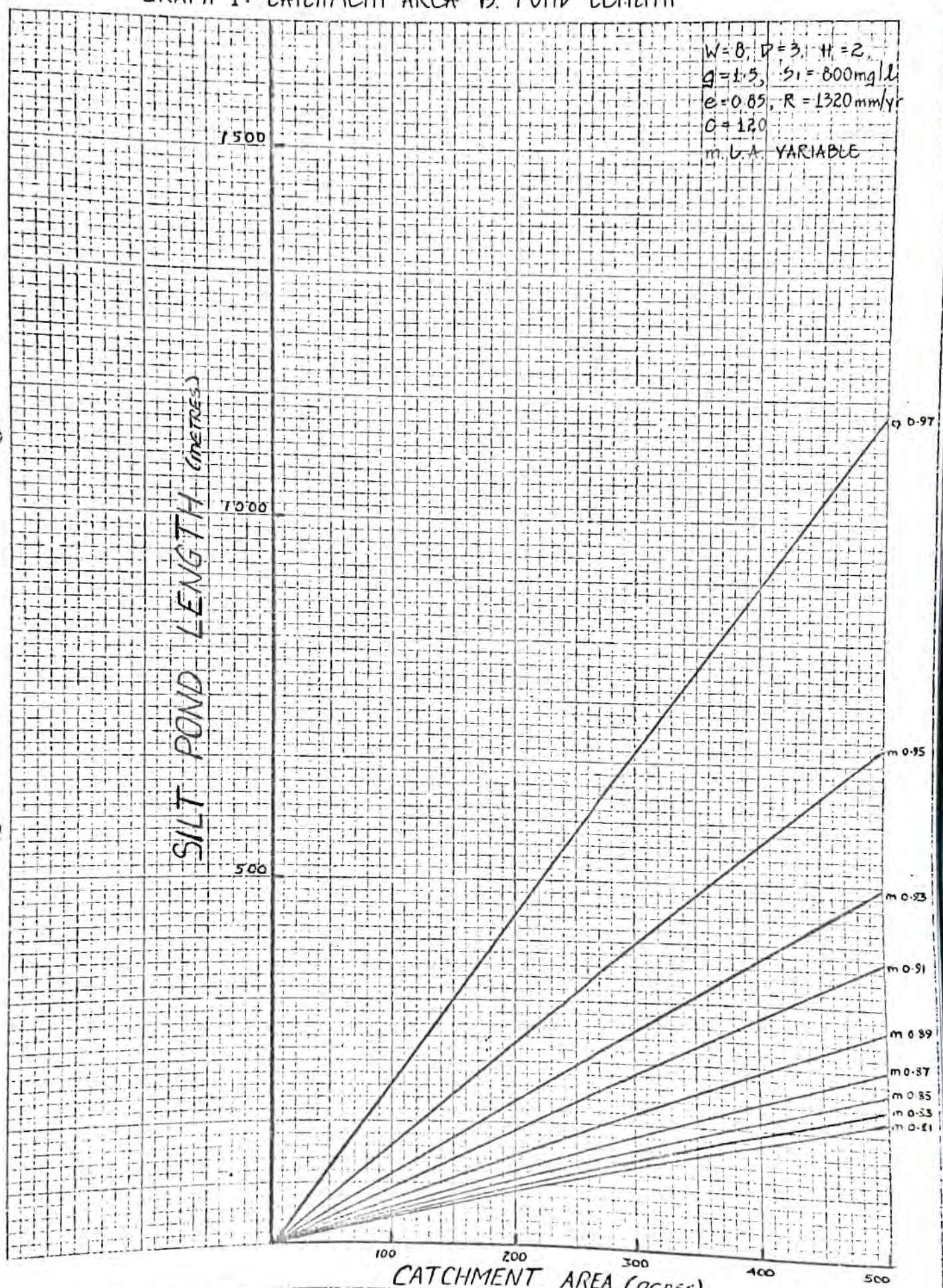
Inaccuracies may arise due to the following:

1. Pump may be necessary for bog drainage purposes now or at sometime in the future; the cost is attributed to silt control.

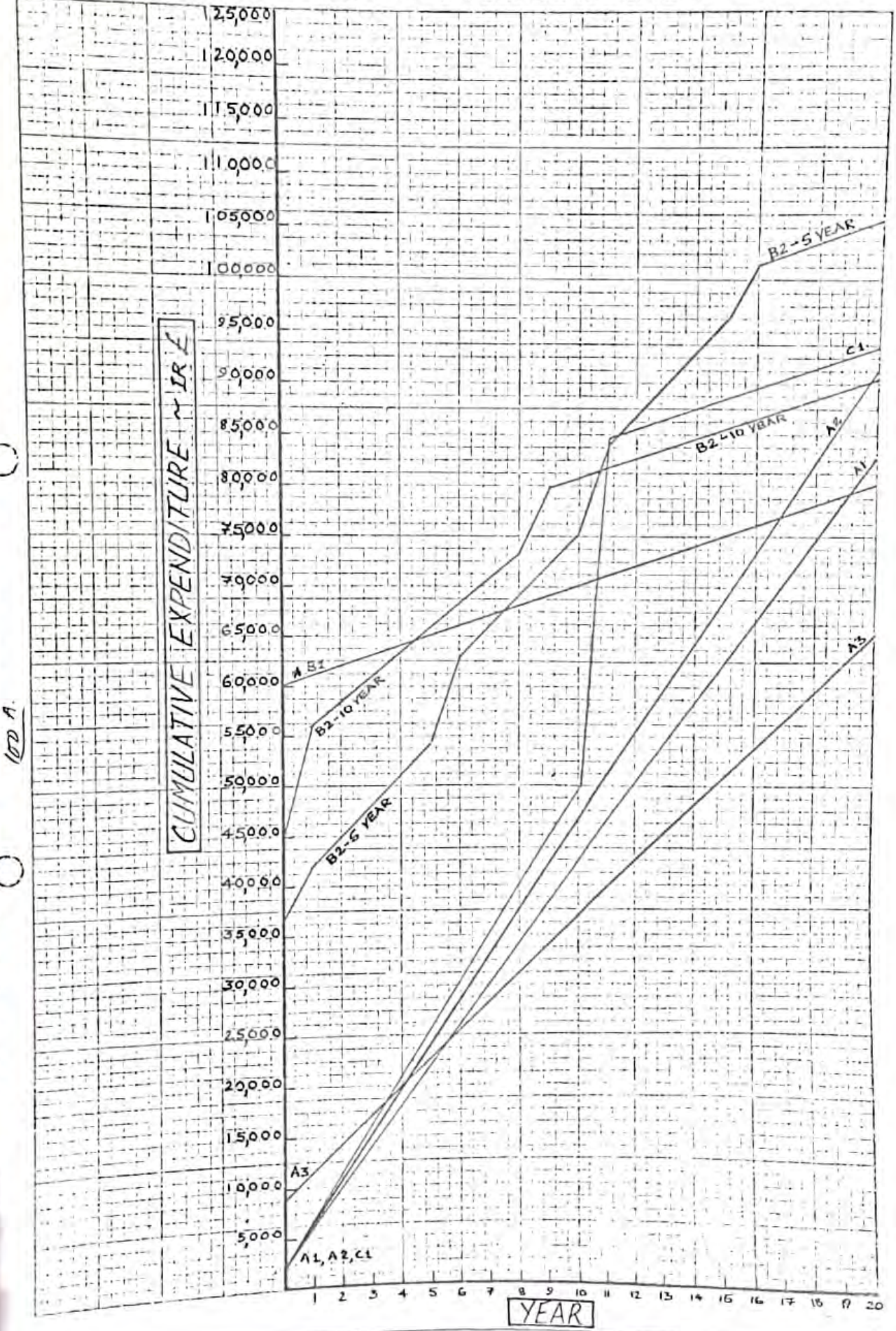
2. The distance over which power lines must be provided for each pump is taken as 1½ miles.

	Catchment (acres)		
	100	300	600
Power Line 1½ miles @ £10,000/mile	15,000	15,000	15,000
Pump Cost	6,000	10,000	22,000
Installation:			
Materials	2,000	3,500	5,000
Labour	2,000	3,500	5,000
Total :	£25,000	£32,000	£47,000
Repositioning	4,000	7,000	10,000
Power Units (P.A.)	1,000	2,000	4,500

GRAPH 1:- CATCHMENT AREA Vs. POND LENGTH

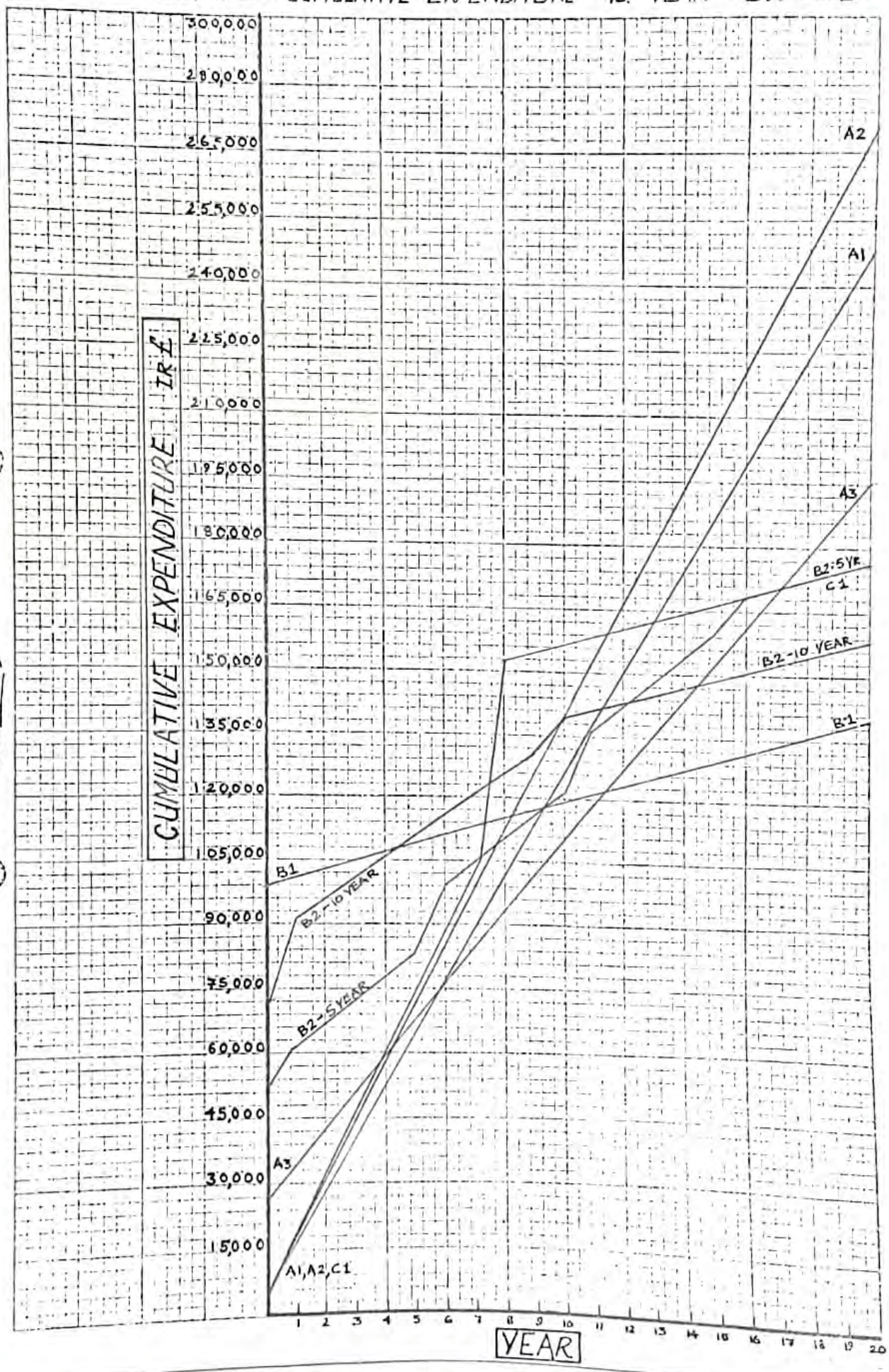


GRAPH 2:- CUMULATIVE EXPENDITURE Vs. YEAR ~ 100 ACRES



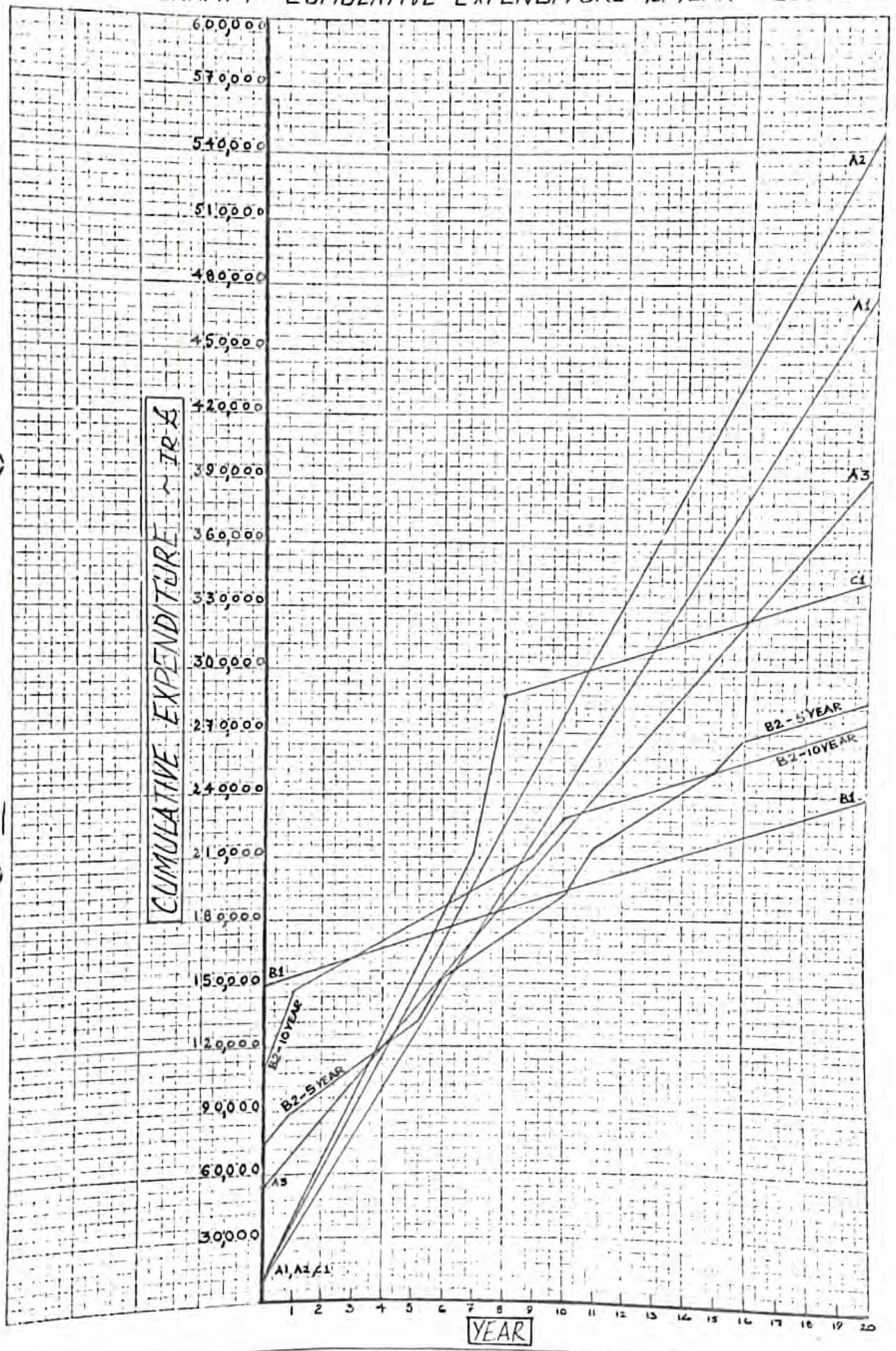
100 A.

GRAPH 3 :- CUMULATIVE EXPENDITURE Vs. YEAR ~ 300 ACRES



300 Acres

GRAPH 4 :- CUMULATIVE EXPENDITURE Vs. YEAR ~ 600 ACRES



GRAPH 5:- CUMULATIVE EXPENDITURE V6. YEAR ~ BLACKWATER WORKS
(EXC. CORNAFULLA, DRUMLOSH)

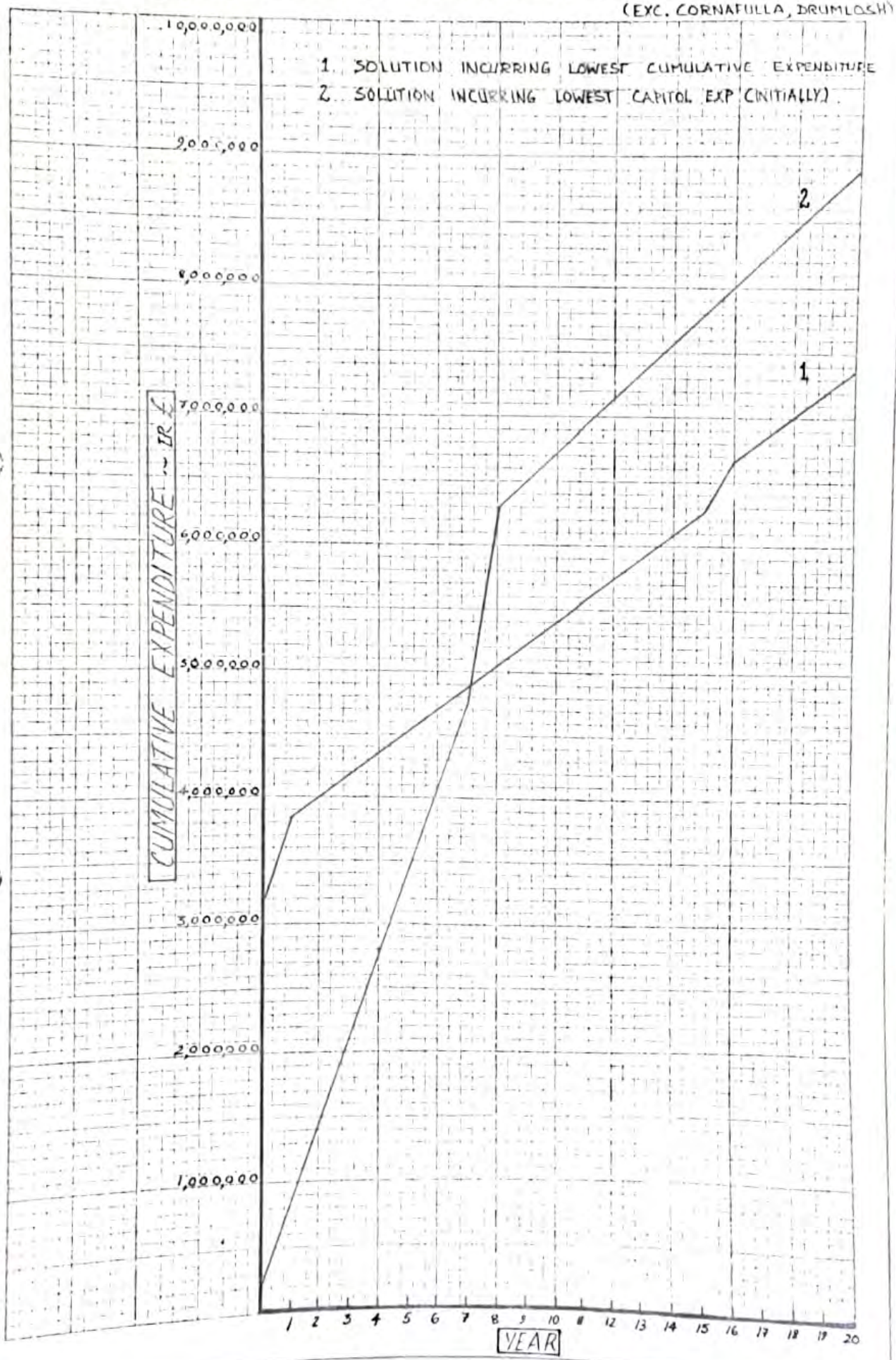


FIG. 1 PROTECTION OF TREATMENT SYSTEM FROM FLOODS

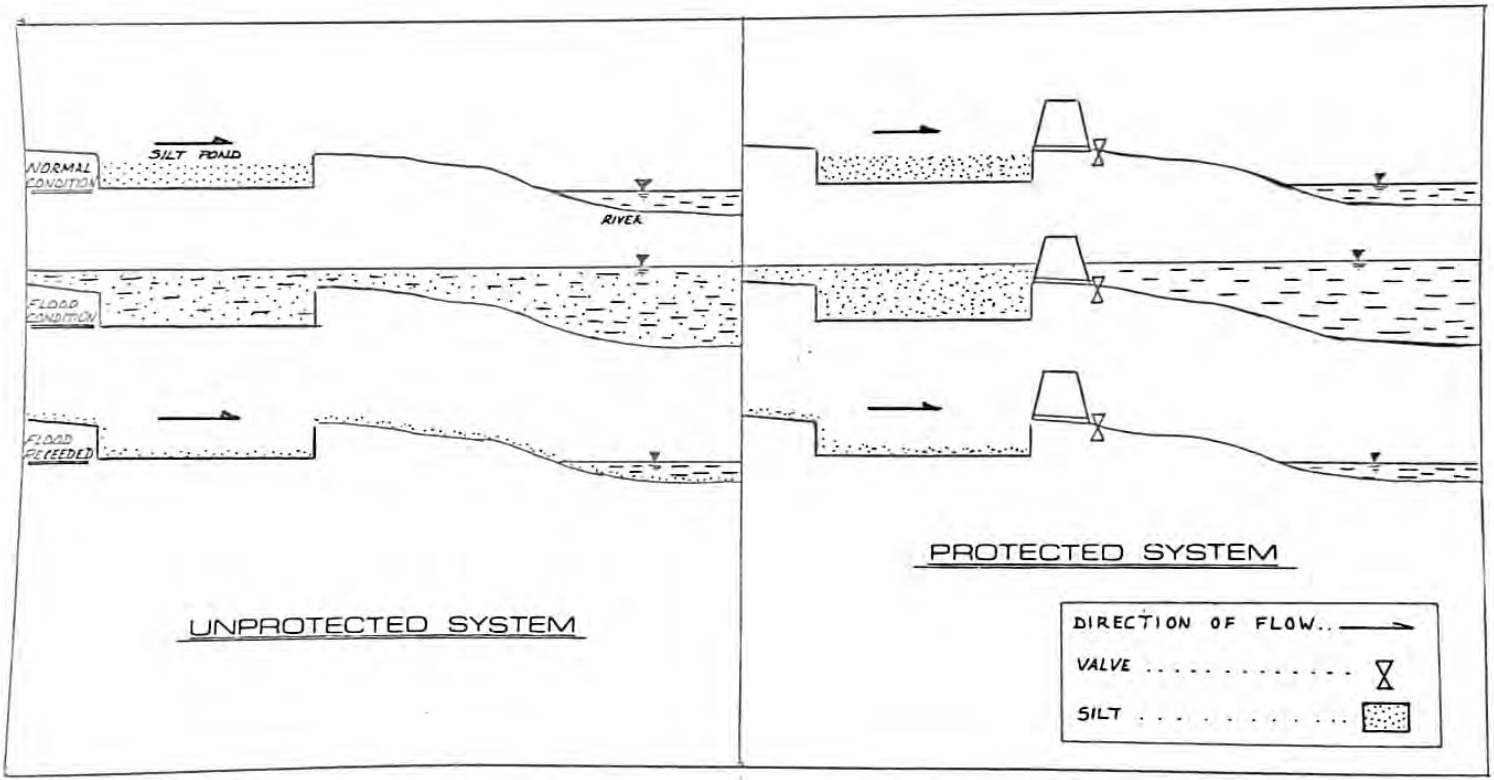


FIG. 2 PROVISION OF WALLS IN SILT PONDS

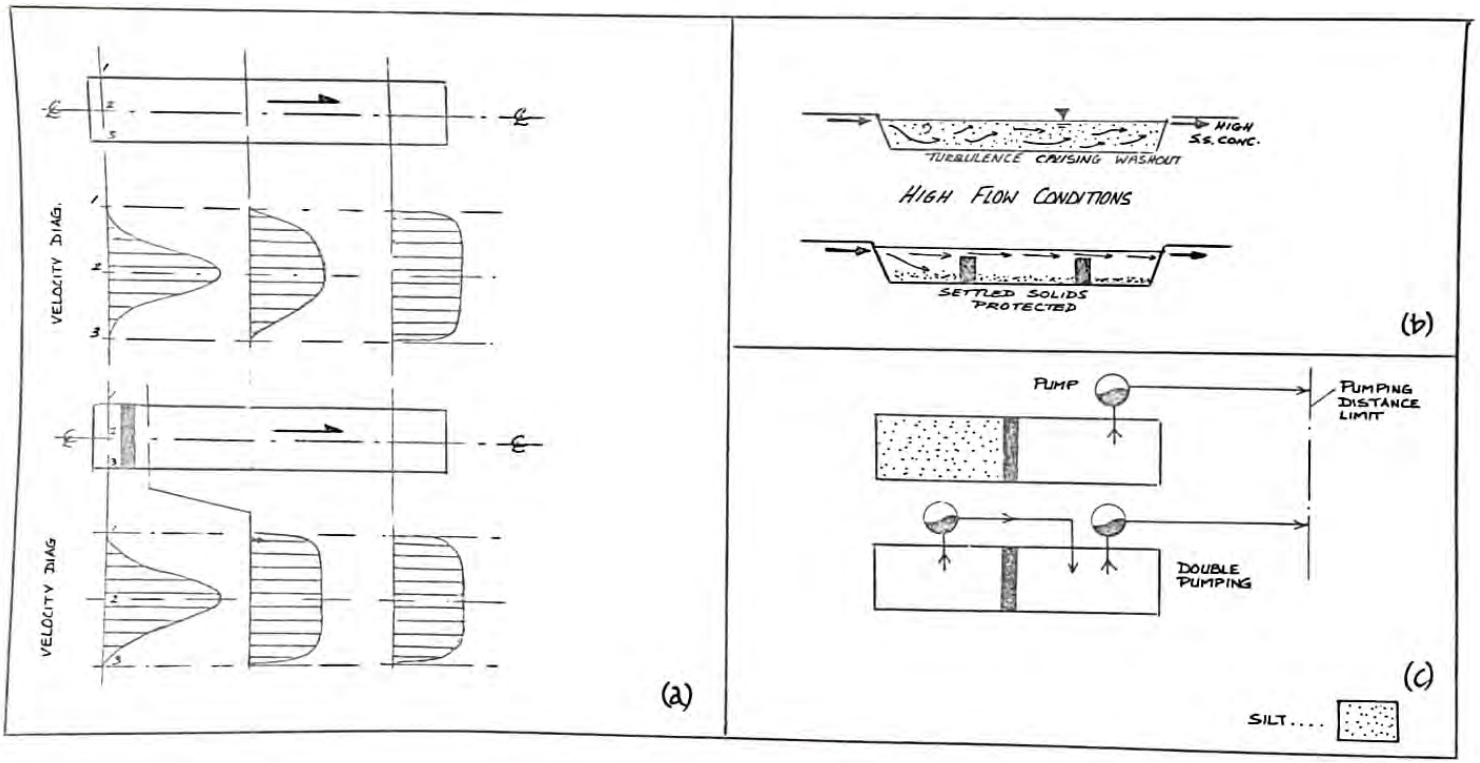


FIG. 3 STABILITY OF POND EXCAVATION

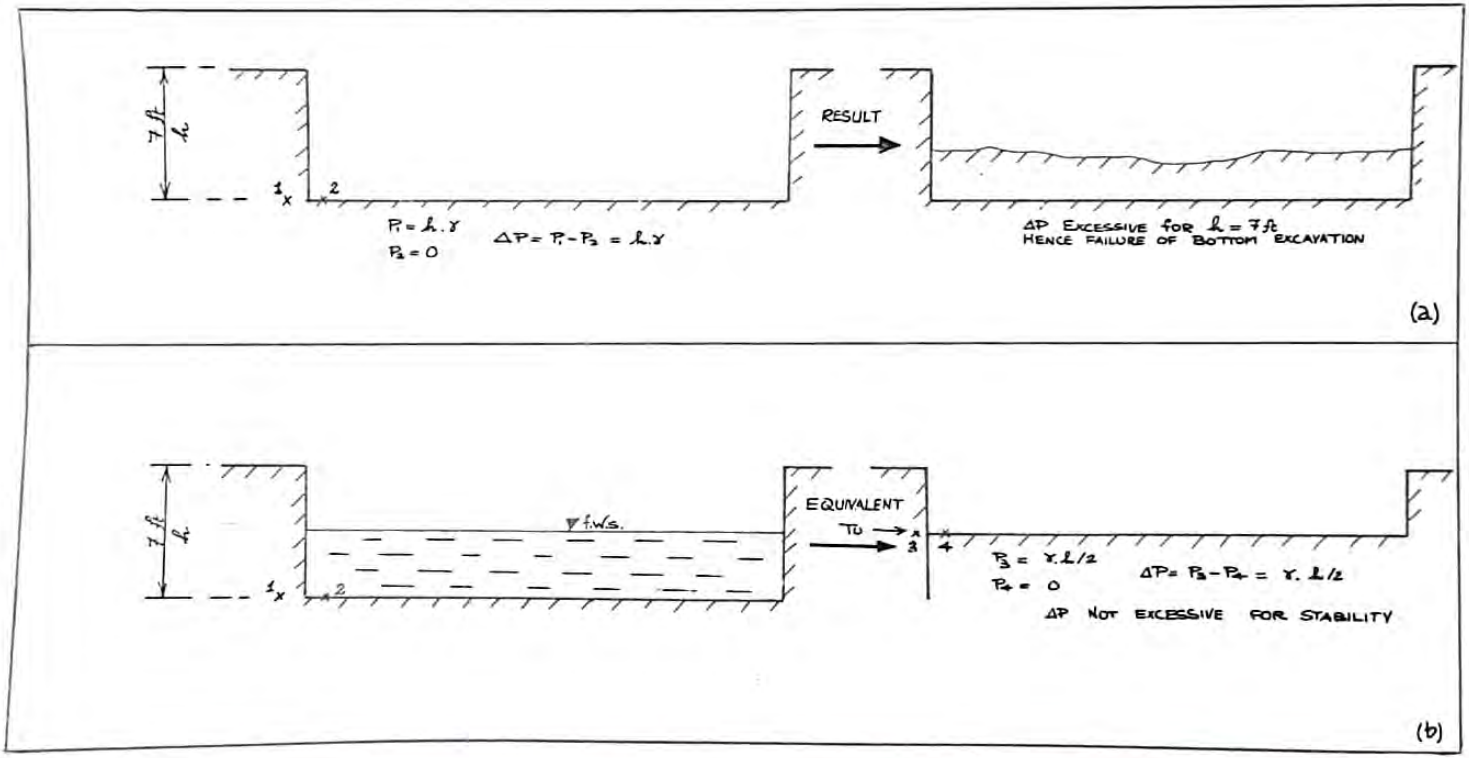
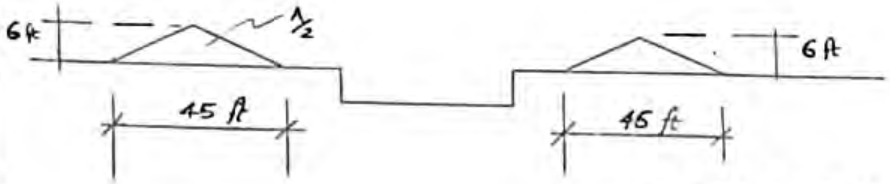


FIG. 4 MAX. ALLOWABLE X-SECTIONAL AREA SPOIL



$A = 6 \times 45 = 270\ ft^2$

CATCHMENT AREA = x acres

AREA abcd = $1050x\ ft^2$ = AREA REQUIRED FOR SILT POND

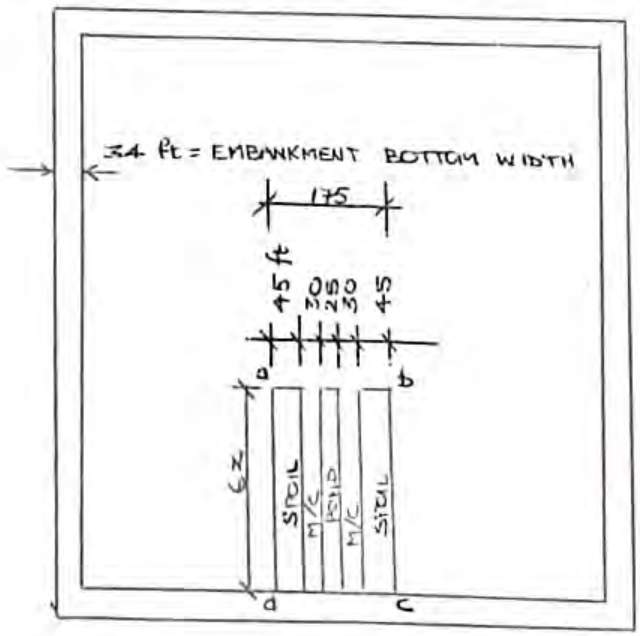


FIG. 5 AREA REQUIRED FOR LAGOON

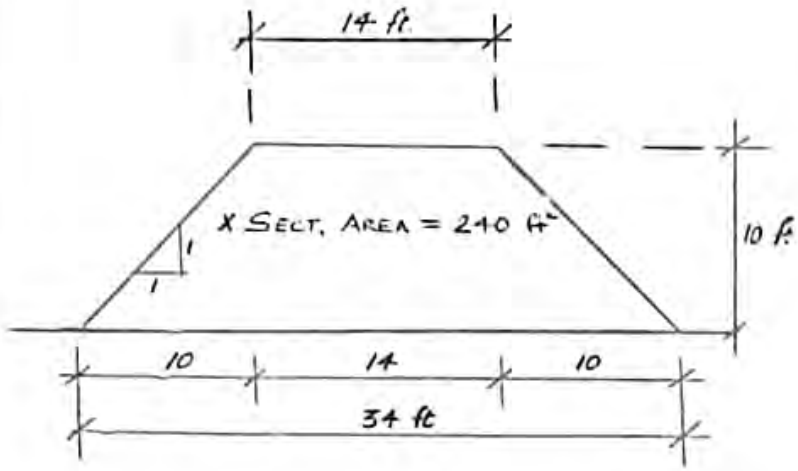


FIG. 6 CROSS SECTIONAL AREA – LAGOON EMBANKMENT

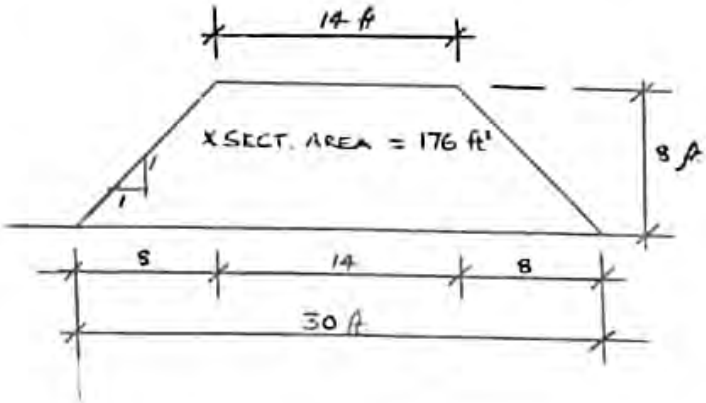


FIG. 7 CROSS SECTIONAL AREA – FLOOD EMBANKMENT

Appendix 4-14

Drainage Study with Particular Reference to Pumping, 1983

Meamram

Bord na Móna

Don..... Manager: Coolnagun | On..... Chief Engineer (Civil Division)

Do tag.	Ar dtag.	Abair	Data
	HCF/CO'K	Pumped Drainage	03.01.1984
Tuairgear an uimhir tagartha			

Heretofore, pumped drainage has been confined almost entirely to Sod Peat Bogs. However, in the coming years, pumping will be necessary on an ever increasing proportion of our Milled Peat Acreage. Consequently, it is important that works personnel be fully aware of, and participate in developments in this field.

I attach herewith a study of pumping compiled by Mr. O'Beirne, Civil Works, Head Office, and look forward to any comments or suggestions you may have to offer on the subject.

J. C. Hood

Chief Engineer (Civil Division)

Encls.

BORD NA MONA
Coolnagun
DATE REC'D. 6 JAN 1984
FOR ATTENTION

BORD NA MONA

CIVIL ENGINEERING DIVISION

Drainage Study with particular reference to Pumping

No. 1

D. O'Beirne,
Civil Works Section,
Head Office.

December 1983.

Drainage Study

The following study is a summary of the approach adopted to considering the problem of bog drainage, particularly where pumping is involved. It does not deal with everything considered in relation to drainage, but is, rather, an indication of the thinking, assumptions, conclusions and methods adopted to drainage design.

The ideas and assumptions are generally based on methods and values already in use. Information was obtained from reports (e.g. P.V. McGill's report), memos, catalogues etc. or from those dealing with drainage related aspects. The methods, values and assumptions used are by no means binding and can be changed if they are invalidated in the future. It is hoped that readers will correct any misconceptions they become aware of and endorse any assumptions if they know them to be valid.

A detailed look at Clooniff Bog in the Athlone Bogs (Blackwater Works) is included as an appendix. This is by way of giving an example of the type of method involved.

CONTENTS

		Page
Introduction		
Contents		
1. A Note on Bog Drainage		1
2. Method for Drainage Design		
Stage 1 :	Data Collection	3
Stage 2 :	Production and Shrinkage	5
Stage 3 :	Pumping and Excavations	7
Stage 4 :	Embankments, Silt, etc.	8
Stage 5 :	Costings and Decisions	8
3. Summary of Method Used		
Appendix A :	Note on Practical Considerations	12
Appendix B :	Worked Example	13
	Note on "Athlone Group of Bogs/Blackwater"	14
	Note on example considered	15
	Drainage Report : Clooniff Bog	16
	- Tables	21
	- Sub-Appendices	25

A NOTE ON BOG DRAINAGE

There are many complex aspects which have to be considered when dealing with bog drainage design. Although many bogs are similar in production terms it is not ideal to consider drainage aspects under the same categories. It is more appropriate to label bogs for drainage according to their major outfall system. There are two main types; those which drain directly into a major river and those which drain into a minor river/stream which flows into a major, but at a much lower level than the bog.

The former type of bog presents most problems. Flooding, pumping, drain patterns and embankments are major considerations usually, since the water level is at some time or always above the proposed final bog surface level. Examples of this type of bog are those which bank the Shannon or Suck (Blackwater - Garryduff, Clooniff, Cornaveagh, etc; Derryfadda; Mountdillon, etc.).

The second type of bog can usually be drained by gravity. However this does not mean that no drainage problems arise. Often the length of external outfall needing deepening may be too long and/or go through private land. In this case it is possible that the entire bog may require pumping. Usually, though, local pumping of basins within the bog are more likely to be the case. In some instances pumping may be used where it is not absolutely necessary. This may be to prevent problems associated with excavation of subsoil within the bog (e.g. Bracklin bog in Ballivor Group). Examples of this type of bog are Ballivor; Littleton; Templetuohy; Bellair; Monettia; etc.

The approach adopted to drainage is to consider each stage of drainage (initial, production and final) as seperate conditions; each depending on what has previously been done, with the ultimate drainage system being considered at each stage.

Most bogs have already undergone initial drainage which, in general, follows the bog floor contours in such a way as to minimize internal problems and maximize the available bog. For some bogs good drainage pattern and field layout drawings are available (e.g. Blackwater) whereas for other bogs, particularly newer ones, such drawings are not yet available. These drawings are invaluable in determining the drainage characteristics of the bog area.

Initial drainage patterns are carried through to the production period of the bog. Hence only ditching of existing drains and deepening of cross drains is required. As production progresses a stage may be reached where flooding occurs during the production season. This is the time when either pumping or excavation downstream of bog are needed (unless production is decreased or stopped). It is important to determine when this will occur so proper planning can evolve.

The expected life span of bog production is insignificant when compared with that of the land on which the bog lies. Where this is below flood level two basic alternatives exist. The bog can either be left to flood whereupon it has little or no agricultural use; or measures can be taken to prevent flooding. This would entail major arterial drainage downstream of bog or the construction of embankments. Letting the area flood could be put to practical use, for example, as a means of flood control of major rivers (e.g. Shannon) and this option should not be ruled out. However, it is probably desirable to put the land to some agricultural or other use. To this end, flood prevention will apply long after production has ceased; whether Bord na Mona retains possession of the land or not. It seems right therefore that drainage related design should cater for the case that 'usable' bog has been stripped, leaving a small cover, and the bog is still being drained to an appropriate degree. At this point the bog floor contours almost become the surface contours. The 'appropriate degree' of drainage will depend on what the land is to be used for in the future. This will determine the size of pumps, embankments, excavations of outfalls, etc. This aspect will be considered in more detail in the future so that realistic assumptions can be made.

So the three stages of drainage; initial, production and final; are all inter-related and cannot be realistically (or economically) considered in isolation. Some of the problems encountered are mentioned above (embankments; pumping, excavations; land use; etc.). There are many other related aspects which are not so obvious (e.g. silt control; lowering of water table; gradients for trains; construction methods; short term flood control etc.). All these considerations have to be kept in mind in all aspects of drainage design.

METHOD FOR DRAINAGE DESIGN

Stage 1

a. Look at bog surface and floor contour maps and, if necessary, any relevant cross-sections. Consult survey reports; particularly conclusions on drainage. An initial estimate of size and type of bog can be made and the pre-drainage depth can be determined. From the bottom contours the final level of bog surface can be ascertained.

b. Get details of internal outfalls, outfalls at edges of bogs, external outfalls and the river into which outfalls flow. Determine final drainage pattern using drainage plans/ field layout drawings and locate exact course of each outfall to be used. Find existing invert and water levels of external outfalls and the distance downstream available for excavation.

c. Evaluate maximum flood levels for Summer and Winter, and mean flows in rivers if possible. Get relevant details of catchments of external outfalls.

d. Check validity of surveys and water levels. (Often these are superceeded, e.g. O.P.W. drainage).

From the above we get:

1. Catchment area considered for drainage (not necessarily acquisition area). A planimeter is used to measure this. The boundary lines are got by interpreting bottom contour maps.

2. Find final surface level of bog at each point, after production stops. The worth of producing in isolated pockets (e.g. between two marl hills) should be evaluated roughly. For large pockets or basins a more accurate economic appraisal could be done but initially inspection should suffice.

3. Flood levels for Summer and Winter can be evaluated by assuming backwater condition from known levels downstream of bog or from directly available data. It would be possible to estimate a flood of a given return period for any bog using the 'flood studies' methods which might give a more realistic level but this would involve much data collection.

4. Final internal and external outfall levels can be found. A slope of 1:1500 to 1:2000 (depending on size) for external outfalls and 1:1000 for internal outfalls is assumed to be the minimum acceptable slope achievable. During production the slope of cross-drains will probably vary from, say, 1:500 to 1:2000 but this is more controllable as the depth of bog is reduced.

5. The average depth of bog available can be estimated, i.e. initial depth of bog.

Stage 2:

a. Different approaches are adopted within the Board to determine the expected 'life' of a bog. For good planning, and to avoid unnecessary spending, it is important to estimate how long a bog will last. Ideally this could be done by looking at the moisture content of the undrained peat and evaluating the shrinkage and production levels based on the density of the peat. However this would involve a massive data collection program and would still not be absolute. Hence it is better to estimate the shrinkage due to drainage. The progressive shrinkage must be used to estimate the bog surface level in any particular year. An overall shrinkage of 40% (approx) in depth is assume (roughly equivalent to a 4% reduction in moisture content). As much of this shrinkage probably occurs due to initial drainage it is correct to assume that the moisture content is reduced relatively more in this period than subsequently in each production year. But since initial drainage only goes down a certain depth, only the upper part of the bog is effectively drained. take a value of 40% shrinkage of the top 50% of the bog due to initial drainage (i.e. 20% overall).

When production commences the annual shrinkage rate decreases as better quality peat is reached. Hence it would not be uncommon for a reduction of up to 7 inches to occur in the first few years decreasing to 3 inches eventually.

A rational method to approach this is as follows:-

20% initial shrinkage (overall depth)
(3 in. + 40%) shrinkage per annum for top 25% of bog after initial shrinkage.
(3 in. + 30%) shrinkage per annum for next 50% of bog after initial shrinkage.
(3 in. + 25%) shrinkage per annum for next 25% of bog after initial shrinkage.

Whilst the above method yields a realistic average reduction each year it must be remembered that shrinkage varies from bog to bog and, indeed, field to field. This averages out at 40% reduction per year over the full life of the bog.

The value of 3 inches production is based on ¼ inch per harvest and 12 harvests per year. This yields a surface level estimate for any future year of production.

b. When the surface level of the bog, as evaluated by above method, corresponds to flood level this gives the number of years of production until pumping or excavation of external outfalls is required.

a. Knowing the area of catchment for each outfall the amount of water to be drained can be estimated. It is general practice to use a pump capacity value of 1.5 cubic ft./min./acre. This could possibly be evaluated more realistically for each bog either by direct measurement of by 'flood studies' methods.

b. The head (of water) difference between required final water level and existing flood level is calculated. From this the depth of excavation and/or pumping head can be evaluated.

c. Particular attention should be given to any external catchments draining through bog or into the same outfalls as the bog drains. An allowance of x cu. ft./min./ acre could be made depending on the size and type of catchment. Where large catchments (e.g. major tributaries of rivers) are involved the flow should not have to go through bog. If necessary the flow should be re-routed around bog. Obviously it is not desirable to have this flow through silt ponds so this is often done anyway.

d. If pumps are required then due consideration to the type and position of each pump is needed. In some bogs it may be better to have several smaller pumping installations pumping into one or more external outfalls. In other areas, particularly smaller bogs, it may be desirable to bring all drainage through one larger pump site. This is usually determined by the initial drainage plan though ultimately drains could be re-routed if required. If a pump is required within a bog then the optimum position should be used.

The type and method of pumping is important in that it can determine the operating costs of any pumping installation. The Spaans Screw Pump is widely used but may not be the most ideal in all cases. This type of pump allows, to an extent, for any inflow water level down to the base level of the screw so this is not a major problem. However, this system of pumping relies on a fixed outflow (downstream) level, and consequently a fixed head. Hence unnecessary head (and power use) exists when the full design flood is not the downstream condition. There are ways to overcome this but usually these involve extra capital costs. For example, a second, smaller, screw pump system could be installed for Summer floods; or an axial flow pump and flap valve system could be used. Ideally a pump with a variable upstream and a variable downstream head level would be suitable.

It might be worth investigating in detail various pumping systems and their merits for different types of bog drainage conditions.

e. Whether external catchments flow through bog or not a bypass of any pump site will be required. This is needed for two main reasons. Firstly, there is the danger that one or more pumps at any installation may be out of action and so full capacity drainage is not attainable. Secondly, depending on what size flood is catered for, it is possible that a greater flood will occur.

   Each pump site should, if possible, have a bypass to another pump site.

f. Power supply and consumption is a major determinant in estimating costs. The power required should be worked out in kW. The length of supply cables needed should then be estimated and costed. Alternatives such as wind power might be worth considering particularly in remote areas.

Stage 4:

a. Knowing the pumping requirements a more detailed examination of any embankments can be made. General practice is to allow an extra 2 ft. (600 mm) above maximum flood level for flood control embankments. This allows for surges and slight settlement not designed for otherwise. The extent and size of embankment required generally involves complex calculations based on good survey and field data along line of embankment.

b. Other aspects not already dealt with should be considered at this stage. These include silt control, construction problems, peat recovery problems, etc. Some of these will have to be dealt with earlier in the design process and this will depend on the particular bog.

Stage 5:

a. At this stage estimates can be done for any alternatives available. This is not a simple matter as it is based on price speculation of both costs (of pumps, excavations, etc.) and also on the value of peat (embankments etc.). From these estimates return periods can be worked out for any alternatives.

b. If the estimated costs are unrealistic or inappropriately high then the process can be repeated with a different set of parameters. At this stage a different 'design flood level' or design runoff figure could be adopted.

c. Finally part or all of any alternative proposed can be adopted for each bog area.

Note: The above five stage system for drainage design outlines the necessary thinking behind a bog drainage system. For particular areas, particular problems will arise and these may change basic concepts to some degree. However, in order to exercise proper budget control then a basic policy has to be adopted.

METHOD FOR DETERMINING DRAINAGE REQUIREMENTS

1. Choose boundary of area. Determine natural and developed drainage pattern and bog contour details.
   From this the required minimum drainage level and available fall, (using 1 ft. for every 1000 ft. in bog and 1 ft. for every 1500 ft. externally), can be evaluated.

2. Look at major external outfall (generally main river) and find water level details. Maximum flood and Summer flood levels are estimated. Mean and minimum Summer levels are also noted if known.

3. The average depth of bog is evaluated using top and bottom contours from original survey.

4. The depth of bog after initial drainage is calculated, i.e. 40% of top half of bog is assumed to shrink.

5. 'Years of Production' is estimated based on an average rate of 3 inches milling and x% shrinkage each year. A floor cover of 2 ft. is assumed.

6. The number of years until pumping is required is calculated for Summer and Winter floods.

7. The area of catchment considered for drainage, for each outfall, is determined.
   Allowance is made for any external catchment draining through bog.

8. The volume of water to be drained is estimated for each pump site considered. A value of 1.5 cu. ft./min./acre is used to determine design runoff.

9. The head difference between bog drainage level and outfall level is computed for maximum and 'Summer' floods.

10. The equivalent pump head (Spaans pump head) is determined.

11. Pump size is determined for any pumps required.

12. Power requirements are determined for pumping system.

Notes:

For final drainage a water level 2 ft. below surface level is assumed. As 2 ft. bog floor cover is allowed for then the final drainage level (minimum drainage level) is taken as the bog floor level.

Where a bog hasmore than one outfall each is considered as serving a separate catchment area. Hence each outfall location is a potential pump site if required. Where the outfalls flow into each other at some point downstream, outside the bog, an allowance is made.

Consideration is given to possible pump sites (or pump catchment areas) within bog. This might be to see if the number of years until pumping is required can be increased and hence the most economical arrangement can be determined.

The previously described method can be readily presented in tabular form and this makes comparison of different alternatives easier.
Subsequent cost estimates, bearing in mind practical considerations and feasibility, can becarried out to determine the most suitable pumping arrangement.

In considering pumping requirements particular attention is given to a memo derived from a discussion at Blackwater in August 1980 where the Spaans pump system was dealt with in detail. Some of the main points are listed below.

1. 1½ cu. ft./min./acre discharge is equivalent to 60% of one inch of rainfall falling in 24 hours.

2. Two pumps, a bypass to another pump location and an upstream reservoir (if possible) should be made available at each pump site.

3. Downstream flood level should be increased by 1 ft. to allow for "the future case of a flood (or whatever)".

4. Power requirements, costings and installation problems are mentioned.

5. A detailed method of computing Spaans pump head is given.

APPENDIX A

Note on practical considerations:

While it is important to devise a concise drainage plan for each bog for development and costing purposes it must be remembered that the span of any drainage plan can be up to 50 years for most Irish bogs. During the construction phases many problems will arise. A brief note on some problems envisaged at each construction phase is given below.

Initial: Maximum runoff occurs here, so many drains are required. This leads to high drain maintenance costs. Maximum surface movements occur in this phase so design grades for pipes and channels are difficult to maintain. Silt problems are great at this stage due to a large amount of outfalls.

Production: Drains tend to clog up with peat silt quite easily. Machines for drain maintenance and development are involved in other production situations. Cross drains tend to be laid down quickly and inaccurately so production is not interfered with. Manpower is not available to deal with many drainage problems. Intended design proposals often need to be changed or adapted to cope with remedial drainage problems.

Final: While other parties are involved here the cutaway bog is under Bord na Móna supervision for some time after peat is used up. If agriculture is involved then local drainage schemes may need to be thought up not envisaged in the original drainage plan. Minor gravel hills are a big problem here.

Note: Most of these and other problems can lead to very high interim costs. A chief objective of a drainage plan should be to minimize costs by choosing the most suitable scheme while keeping probable problems in mind.

APPENDIX B

Worked Example for Blackwater Group

Note on 'Athlone Group of Bogs/Blackwater'

Note on example

Drainage Report : Clooniff Bog

- Tables
- Sub-Appendices

Note on 'Athlone Group of Bogs/Blackwater'

(Feb. 1983)

The following report goes into some detail with regard to Clooniff Bog. This bog is one of the collective 'Athlone Group of Bogs' connected to Blackwater Works. This group lies along the West Bank of the Shannon between Shannonbridge and Athlone. The bogs in the group considered are (from South to North):

1. Cornaveagh
2. Clooniff
3. Cloonbeggaun
4. Coolumber
5. Cornafulla
6. Dromlosh
7. Carrickynaghton
(8. Creggan)

Although the report concentrates on just Clooniff, most of the findings and assumptions apply equally to some or all of the other bogs in the group because of their proximity to the Shannon.

The tables of the report relate only to Clooniff but similar tables for Cornaveagh,Coolumber and Cloonbeggaun can readily be produced since all the data is prepared.

This report is more detailed than would normally be the case. It is hoped that a brief description; the tables; a map and a conclusion would normally form the report.

Subsequently, details of embankments; exact pump sites; future land use etc. would have to be added and any changes (in method or data) would have to be included.

From the above one global report on each group of bogs (e.g. Athlone group; Derryfadda - Suck Group; etc.) could be established.

The tables etc. are mainly in imperial units of measurement. This is because contour maps, levels, etc. are also. It would be a simple matter to convert all values to metric if required.

NOTE

The report on Clooniff Bog is based on a drainage plan of 1977 (drawing S697). Since the calculations were done a more recent drainage plan (S988) based on existing outfall layout was sent to Head Office by Blackwater Works. This does not mean that the conclusions in the report are invalid but further work could be done based on the new drainage plan. As production progresses the layout may change and it is possible then an outfall layout as used in the report will become the case. Indeed it is probable that only one external outfall will be used when pumping is needed. No detailed calculations of pumping requirements have yet been carried out at Blackwater Works. A copy of the most recent outfall layout (December 1982) is included as an appendix to the report.

Drainage Report: Clooniff Bog - Athlone Group/Blackwater

February 1983

Clooniff Bog banks the west side of the River Shannon some 4 km north of Shannonbridge. It is not yet in production but should be within the next few seasons. It is proposed that it will, along with the other Athlone Group bogs, supply milled peat for Shannonbridge E.S.B Power Station.

The bog is divided into two distinct areas by a stream which acts as the only outfall for both bogs and flows into the Shannon. These areas are Clooniff 1 and Clooniff 2. Clooniff 1 being the larger area to the South of the stream (see Appendix**1b**).

Clooniff 1 covers an area of approximately 515 acres with an average depth of 22 ft. (6.7 m). Clooniff 2 covers an area of approximately 250 acres with an average depth of 20 ft. (6.1 m). These depths relate to the original survey before any Bord na Mona drainage had occurred. The contour maps show that the floor of each bog is quite uniform in level with only a relatively small ridge and a depression in Clooniff 1.

A field layout and drainage plan from Blackwater Works as of November 1975 is available (Drawing S697) and, assuming that the cross-drain system is laid as shown, this considers the bottom contours. Hence a suitable final drainage layout exists. As can be seen (Appendix**1b**) the bogs drain into a minor tributory of the Shannon which flows directly into the very nearby Shannon. It seems appropriate to collect all bog drainage to the one outfall point for each bog, as is the case. Water and flood levels used in calculations are taken as those estimated for the Shannon at this point. Before final decisions are made it would be worth contacting the O.P.W. to check if any previous or near-future remedial drainage works have invalidated these figures. When considering long term requirements, it might be more desirable to use proposed water levels for the Shannon. Shannon drainage is so uncertain, though, that using proposed levels might not give realistic results.

From these levels and the bog floor contours it is obvious that much of the bog is below max. flood level and, allowing for gravity drainage fall to Shannon, pumping will be required even when mean Summer flow exists in the Shannon.

There are many possible sites for pumps. The most obvious places are where the internal outfalls join the main external stream outfall. This is also the location of proposed silt ponds. These sites are 4 and 5, 4 being for Clooniff 1. (the site numbers relate to the overall drainage of the Athlone Group, 1, 2 and 3 being in Cornaveagh bog). Possible sites for pumps within bog are considered for Clooniff 1

only. These are 4a, 4b, 4c and 4d (see Appendix 1b). Clooniff 2 does not lend itself to this consideration because of the field layout.

As each of the main sites, 4 and 5, cater for quite a large area, it is not easy to state which part of the bog is likely, to require pumping first. Hence more than one set of 'minimum fall to pump site' are considered. The worst case will be the one which yields the least number of years until pumping is required.

The size of the external catchment served by the external outfall stream is not known. Hence no consideration has yet been given to gravity draining both bogs to stream and then using one pump installation to pump both bogs and external catchment. If external catchment is small then it might be worth considering this. (Flow measurements of stream upstream of bogs would determine this).

The following is the water level data, based on backwater estimates from Shannonbridge.

Maximum flood level	:	126.0'	O.D.
Mean Summer level	:	119.0'	O.D.
High Summer level (assumed)	:	121.0'	O.D.

An allowance of 1' above these levels is made. As can be seen in Appendix 1a the gravity fall (based on a 1:1500 slope) to the Shannon from just downstream of the main pump sites, is 0.7 ft. (Clooniff 2) and 1.7 ft. (Clooniff 1). If external catchment to stream is included then these heads have to be included - otherwise subtract from values in Appendix 1a. Hence

Max. flood level	:	127.0'	O.D.
Max. Summer level	:	121.0'	O.D.

Table 1 of this report gives required and available levels and the years of production before pumping is required for the various cases.

From this we see that Clooniff 1 needs pumping 11½ years after start of production and Clooniff 2 needs it after only 6½ years. This, of course, is if no flooding ever is to occur on bog. Obviously it is not desirable to totally prevent Winter flooding as this is costly and unnecessary in terms of bog production (ultimately complete drainage, Summer and Winter will probably be required).

Pumping in Summer will be required after 29 years in Clooniff 1 and after 24½ years in Clooniff 2. It might be decided to cater for some flow between max. flood and max. Summer flood (e.g. Average Winter/Spring flow). In this case pumping would be needed after 8 to 20 years depending on what water level was picked. This could readily be determined.

Note: As discussed earlier it would be feasible to put smaller pumps in Clooniff 1 (4a, b, c, d). This would mean that the Embankment (mentioned below) would have to be brought back onto bog and a section of the bog north of 4a, 4b, would be liable to flooding. Each of the 'in bog' pumps would be of much smaller capacity than the single installation at outfall (4). This would also mean that deep drains would not be needed to achieve the maximum 1 : 1000 slope as the length of drains to pumps would be reduced.

Note on Embankments: Obviously an embankment would be needed in the long term if flooding is to be prevented. This could be placed around the edge of the bog; in the bog as mentioned above; or along the bank of the Shannon. The latter case would require different pumping requirements than those computed here.

Having decided where to position the pumps and embankment the next step is to determine the area of catchment for each pump and the head against which the pump has to operate. From this the discharge and consequently pump size and power requirements can be evaluated.

Table 2 gives the computed values for pumping.

The static lift is based on water level using max. flood (from table 1) as downstream head and bog floor level less expected field drain drop as the upstream head. Obviously after production ceases it should be possible to achieve 1 : 1500 fall in surface drains.

The capacity is based on 1.5 cubic feet/min./acre, which is equivalent to 0.042 cubic metres/min./acre.

From Table 2 values, the exact size of pumps required can be evaluated. Depending on the pump type being used the pump head can be calculated and an ex-catalogue pump size to suit the capacity; allowing for two or more pumps at any location, can be picked.
The power requirements can then be estimated.

In the case of Clooniff, embankment systems have not been designed here so the type of pump is not obvious. Spaans' pumps are not necessarily the most appropriate since pumping through the embankment is not easy with this type of pump.

However, for the present, calculations for pump sites 4 and 5 using Spaans screw pumps, are done. Hence a comparison can be made with other areas (e.g. Suck Group) where this type of pump is already in use. Table 3 gives details.

As can be seen 2 no. 11 m^3 x 4.45 m lift pumps would be required for Clooniff 1 and 2 no. 5.5 m^3 x 4.91 m lift pumps for Clooniff 2.

These values are of the same order of other pumps in the Blackwater group.

Installation problems are not dealt with at this stage.

Costings:

At the time of writing of this report adequate information was not available for complete detailed costings. Establishing pumping costs is a major objective and this aspect will be dealt with in great detail subsequently.

Of course such items as embankments; timing of installations; power supply; etc. add substantially to drainage costs and each would demand particular attention to obtain optimum solutions. On this point, it would be worth considering alternatives such as wind power.

Based on the pump sizes in table 3, a rough cost estimate based on Spaan's pump costs can be done. For example a 10 m^3 by 4.3 m lift capacity pump costs approximately £10,300; and a 7 m^3 by 4.1 m capacity pump costs £8,500. One could estimate that the required pumps would cost £8,000 (pump site 5) and £11,000 (pump site 4) each. These prices refer to the pump units only and do not include power supply lines etc.

Conclusion:

This report has tried to give a preliminary judgment of the drainage requirements of Clooniff Bog(s). The amount of and time to commencement of pumping is tabulated for various possible pump sites. Further investigation, particularly with regard to embankments and exact pump location and type, is required. This bog is just one of the Athlone group and it should be considered in this global respect particularly where costings are concerned.

	A	B	C	D	E	F	G	H	I	J	
Area No.	Min Fall to Pump Ft.	Reqd Final Water Level Ft. OD.	Max. Flood Ft. OD.	Summer Flood Ft. OD.	Avg. Depth of Bog Ft.	Depth after Initial Drainage Ft.	Years of Production	Years to Winter Pumping	Years to Summer Pumping	Catchment Area Acres	
4.	6.5	122	127	121	22	17.6	47	18	36	515	
	6.0	122	127	121	22	17.6	47	19 ½	38	515	
	4.9	118	127	121	22	17.6	47	11 ½	29	515	*
4a.	2.4	118	127	121	24	19.2	52	23	41	150	
4a.	0.2	115	127	121	26	20.8	57	25	44	150	
4b.	2.5	118	127	121	23	18.4	50	20	39	140	*
4b.	2 9	120	127	121	22	17.6	47	23	41	140	
4c.	1.8	121	127	121	22	17.6	47	29	NEVER	85	
4d.	1.6	120	127	121	22	17.6	47	14	45 ½	70	
5	5.2	120	127	121	20	16	42	11	29	250	
	4.7	118	127	121	20	16	42	6 ½	24 ½	250	*

CLOONIFF BOG : PRODUCTION YEARS TO PUMPING

TABLE 1

	K				L	M		N		
Area No.	Required Water Level Ft. OD.	Pump Upstream Water Level Ft. OD.	Max. Flood Ft. OD	Summer Flood Ft. OD	Static Head (Max) Ft.	Static Head (Summer) Ft.	Drainage Catchment Area acres	Pump Capacity required ft^3/min	Pump Capacity required m^3/min	Remarks
4.	118	114.7	127	121	12.3	6.3	515	772.5	21.9	
4a	118	115.6	127	121	11.4	5.4	150	225	6.4	
4b.	118	115.5	127	121	11.5	5.5	140	210	5.9	
4c.	120	118.3	127	121	8.7	2.7	85	127.5	3.6	using these and 4 would reduce excavation
4d.	120	118.4	127	121	8.6	2.6	70	105	3.0	
5.	118	113.2	127	121	13.8	7.8	250	375	10.6	

CLOONIFF BOG : PUMP REQUIREMENTS

TABLE 2.

EXPLANATION OF DERIVATION OF PARAMETERS IN TABLES:

a. Min. fall to pump: based on slope of 1:1000 (ft.)

b. Final water level: from bottom contour map.

c. Max. flood: data.

d. Summer flood: data or estimate.

e. Avg. depth of bog: from contour maps and survey report.

f. Depth after initial drainage = e -(e/2 x 0.4).

g. Years of production = (f - 2)feet x (12)inches / (3+x?) inches per year.

h. Years to Winter pumping = (b + f) - a - c) x 12/(3+x)

i. Years to Summer pumping = (b + f) - a - d) x 12/(3+x)

j. Catchment area: data (planimeter). (acres)

k. Pump upstream water level: b-(max. relevant a).

l. Static head (max.) = c - k.

m. Static head (Summer) = d - k.

n. Pump capacity = (1.5 cubic feet/min.) byj.

p. Spaans Head = ℓ or m (in m) + 0.7 (approx.).

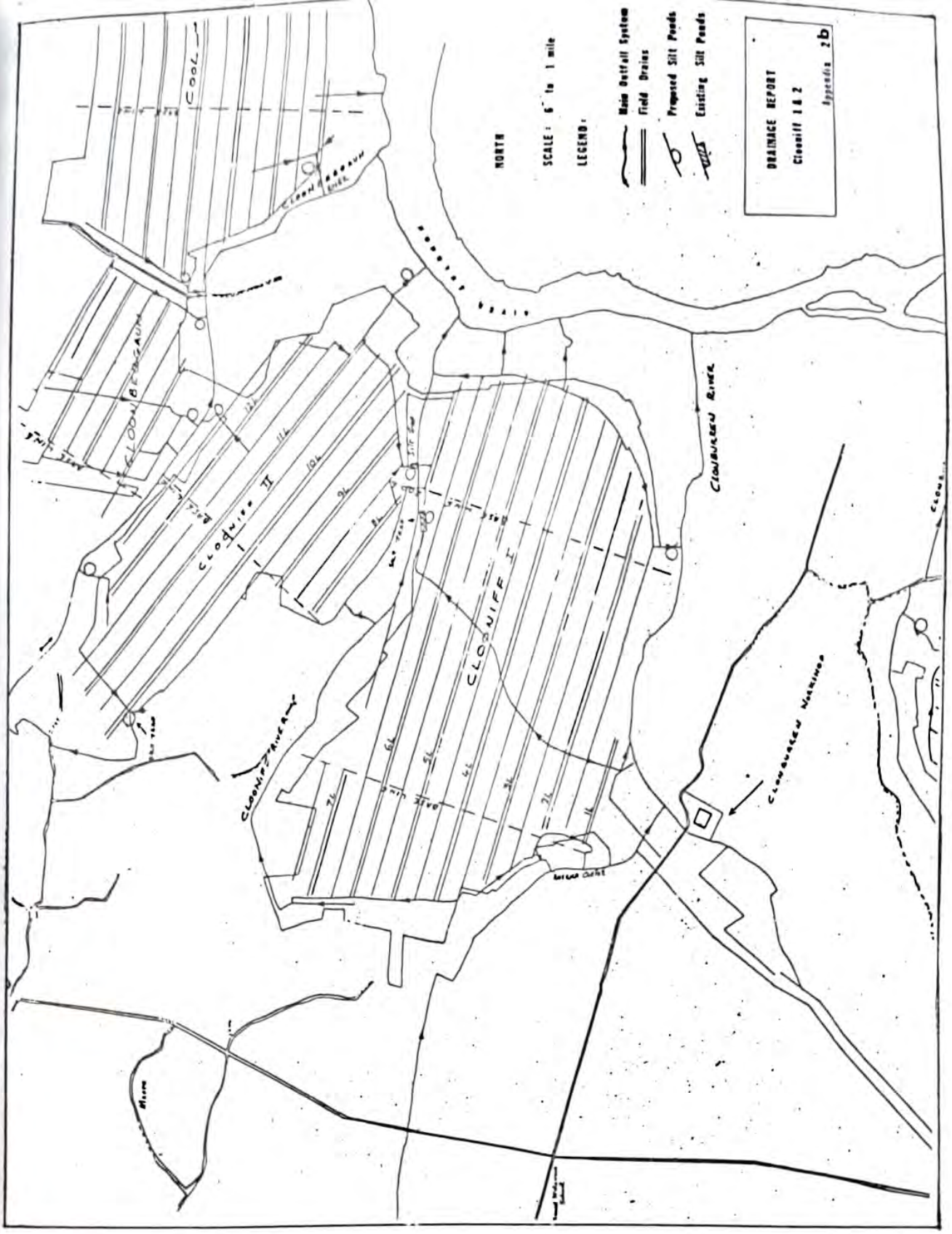
q. Pump size: 2 pumps x half (j) each approx. ($2 \times m^3$/min x lift (m))

r. Horse power of pump = q (one pump) ÷ 2. (hp)

s. kW each pump = 0.746 x r.

t. Total kW = 2 x s.

Scale reduced to 3" to 1 mile



Scale reduced to 3" to 1 mile

Appendix 4-15

Peco Harvester Tests, 1986

BORD NA MONA

RESEARCH & DEVELOPMENT

DROICHEAD NUA

CO. KILDARE

PEAT HARVESTER TESTS 1986

DECEMBER 1986

M. GILL
P. COFFEY

CONTENTS

	Page
Summary	1
Objectives	2
Design of Tests	3
Test Procedure	4
Field Work	6
Discussion and Results	9
Conclusions	18
Acknowledgements	19
Appendix	20

SUMMARY

The objectives of the project were to assess the performance and cost effectiveness of four harvesters at Cloncreen, Derrygreenagh.

The Peco Trailed Paddle Harvester was the best machine of the four tested.

This harvester had a high forward speed, excellent turning capacity, a high output performance and was very reliable.

Preliminary cost analysis showed that the Peco was the most cost effective machine.

The Type VI elevator performed next to the Peco followed by the Type VII elevator and the BnM Trailed unit.

1. OBJECTIVES

1.1 To evaluate the performance of four harvesters:-

(i) Type VI Elevator,

(ii) Type VII Elevator,

(iii) Peco Trailed Paddle. - Tractor Landini (14,500)

(iv) BnM Trailed Screw. - Tractor Landini (14,500) initially.
Ferguson (2720) finally.

The following criteria were used to evaluate the performance of each harvester:-

(a) Forward speed, k/h,

(b) Output, t/h @ 55% m.c.,

(c) Losses, t/km/lift @ 55% m.c.,

(d) Mechanical Reliability,

(e) Limitations,

(f) Cost Analysis

1.2 To identify the most efficient and cost effective harvester using the above criteria.

2. Experimental Design

2.1 Test Location and Layout

Derrygreenagh (i) Cloncreen
- Railway 2W
- Railway 8W

(ii) Ballycon

The design of the tests provided for evaluating the harvesters in poor/medium quality peat in Cloncreen and in good quality peat (peat quality greater than 250g/1 p.d.) in Ballycon. However, due to the poor weather encountered in June, July, August, it was decided that the Ballycon tests should be cancelled as the disruption to the harvesting operation and the corresponding production losses could not be countenanced in such a difficult year.

Two clear railways were selected for the tests. These railways were separated sufficiently in the production cycle so as to ensure that harvesting and testing would be done on different days. This plan was most efficient in the use of test equipment, tractors, and manpower.

The two railways selected were similar in peat density and bog condition - hence cross-comparisons could be made between machines being tested on different railways.

The standard of machines (Miller, Harrows, Ridgers, Harvesters) was most satisfactory and the drivers were helpful and co-operative.

The offset milling operation was not carried out during the period when tests were being conducted.

2.2 Layout of Plots

Five 150m plots were set out on each field on 2W and six plots were set out on 8W.

The plots were selected across all 10 fields with the view to achieving the same degree of contour, peat quality and bog condition, but it will be appreciated that due to the differences which occur between high fields and low fields, as well as the variability which occurs in peat across any railway, a high degree of uniformity is difficult to achieve.

2.3 Test Procedure

This is outlined in Fig. 1, page 5, and is similar to the procedure followed in the 1983 Harvester Tests.

The Type VI was tested against the Type VII on railway 2W and the Peco Trailed was tested against the BnM Trailed on railway 8W.

In order that cross-comparisons could be made between a harvester being tested on 2W with a harvester being tested on 8W, it was decided that the Type VII would be tested against the Peco Trailed on railway 8W on at least two harvests.

The test procedure was as follows:- on 2W harvest 1, the Type VI (Harvester A in Fig. 1) was tested on fields 1-5 while the Type VII (Harvester B) was tested on fields 6-10.

To obviate bias occurring in the tests due to differences in peat quality, ridge size, field condition, etc., between fields 1-5 and fields 6-10, the test harvesters were transposed on alternate harvests, i.e. on 2W harvest 2, the Type VI was tested on fields 6-10 while the Type VII was tested on fields 1-5.

The same test procedure was applied to the two trailed harvesters tested on railway 8W.

On 2W, harvest 1, the type VI lifted the ridge on field 1 and was returned to start on field 2 by idle travelling (or lifting) an adjacent production (non test) field; this procedure was repeated for lifts 2, 3, 4 and 5.

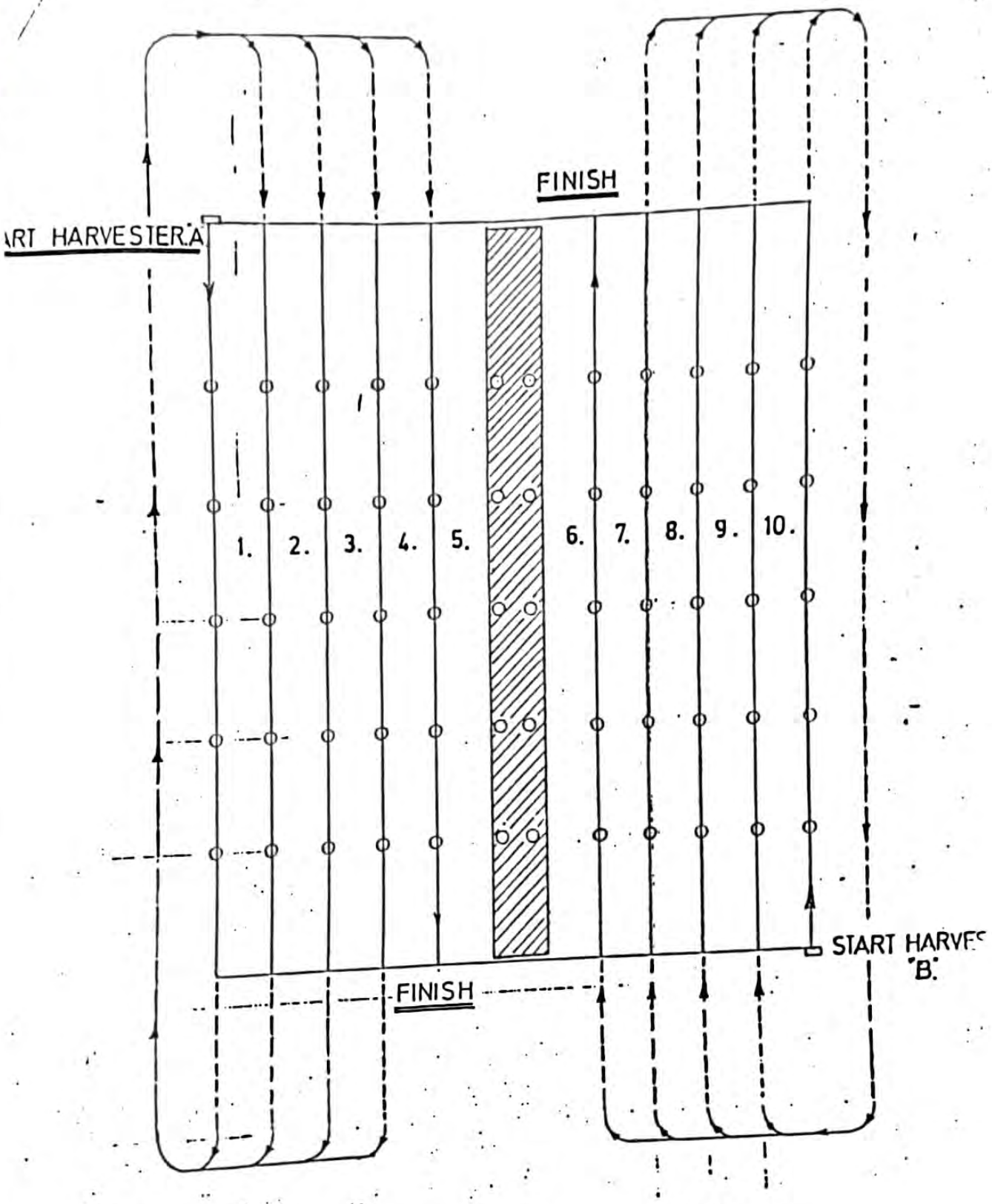
2.4. Work Study Measurements

Work Study personnel travelled in the cabs of the test harvesters during every test and drivers were required to drive their machines at optimum speed - that is, in accordance with standard work-study timing procedures.

The machines were timed through all 150m test plots to give the rate of travel in basic minutes per kilometer.

The turning ability of the four machines was measured to give rate of travel including turns in a standard 1km railway. Turning times measured were valid in assessing and comparing the turning performance of the four test machines,

Fig. 1.



TEST RAILWAY. LENGTH APPROX 1km.

HARVESTER "A" VERSUS HARVESTER "B"

SAMPLING POINTS – o.

but since the test procedure differed from the standard production harvesting operation, the times measured are not necessarily the same as that measured in the production situation.

3. FIELD WORK

3.1 Sampling Method

(i) Forward and turning speeds for the four test harvesters were measured by Work Study personnel.

(ii) Gross tonnage after milling was determined by selecting two strips across each field and estimating the tonnage per kilometre at 55% m.c. on the field. (A strip consisted of an imaginary 0.5m width extending across each field from drain to drain at a position selected within the plots for sampling).

Four samples were taken from each strip at 3m, 5m, from each drain edge using the $0.25m^2$ frame provided. All the peat within the frame was collected and weighed. The peat was returned to the area sampled and was mixed twice. A random sample of not less than 0.5L was taken and was placed in a plastic bag for moisture content determintion. Hence, four separate estimates of gross after milling tonnage on the field at 55% m.c. was determined per strip.

In order to preserve the validity of comparisons between two test harvesters on a given test railway (e.g. 2W) it was important that there was no real difference between the tonnage milled on fields 1-5 as compared to fields 6-10.

(iii) Ridge Size measurements were taken on plots 2 and 4 on railways 2W and 8W using the ridge divider frame (0.5m long). Two measurements were taken per plot and samples were taken for m.c. and b.d. determinations. From these data the tonnes per kilometre ridge @ 55% m.c. were calculated. These data were used to test if a significant difference existed between the quantity of peat in ridges on fields 1-5 as compared to the quantity on field 6-10 prior to harvesting.

(iv) Output of a test harvester was measured as follows:-

As the harvester travelled on field 1, plot 1, the peat which was transferred to field 2, plot 1 was collected in a specially designed bag, previously placed on the single ridge on field 2. The bag was weighed using the electronic gear fitted to the tractor attachment and a sample of 1.5L was taken from the bag for m.c. and b.d. determination. From these measurements the tonnage per kilometre lift at 55% m.c. was determined. The output was measured in each plot on fields 2, 3, 4, 5 and fields 7, 8, 9 and 10.

Final Lifts - Since the output measurements of final lifts could not be measured by this method as it would have entailed the placing of bags on stockpiles and subsequently weighing the bags (this would have been highly impractical), the following procedure was adopted. Prior to harvesting a test railway, sampling of the single ridge on fields 5 and 6 was carried out on selected plots 1-5 on 2W (and 1-6 on 8W). At each sampling point, a 0.5m length of ridge was separated by a special dividing frame and all the peat within the frame was collected and weighed and a sample was taken for m.c. The surplus peat was returned to the sampled area and the ridge was reformed.

The output for the final lift was determined by adding the 4th lift output to the weight of peat in the single ridge on field 5 and subtracting the losses measured on field 5 (see next section on measurement of losses).

The m.c. of the final lift was taken from the peat transferred to the stockpile.

(v) Losses - Prior to the harvesting operation, the locations to be sampled for harvester losses were selected and a band on either side of the ridge 1.5m wide and 2.0m long was swept clean of ridger losses. This was done so that harvester losses would be accurately determined.

Harvester losses were measured after the harvesting operation was completed, on all plots and on all test fields, where output measurements were carried out.

An $0.5m^2$ frame (0.5m x 1m) was used to collect the losses. The losses from a 0.5m length of lift were transferred to a plastic bin and weighed. The contents of the bin were mixed in the bin and a mimimum sample of 1.5L was taken at random from the mix for m.c. and b.d. determination.

3.2. Equipment

2; $0.5m^2$ frames (0.5m x 1m),
2; $0.25m^2$ frames (0.5m x 0.5m),
2; Plastic bins,
2; Sets of ridge dividers (0.5m long),
2; Sets of special weighing bags 0.75m x 3m and total volume $1.25m^3$,
Bags had metal frames with woven polypropylene fabric attached,
2; Tractors with special attachments for weighing the bags.

All above equipment designed and made by B. Carty, R&D.

2: Sets of weighing scales,
2; Sets of electronic weighing gear designed to weigh the bags.
Designed and fitted to tractor attachment with digital meters fitted in cabs by S. Kindregan and J. Dolan, R&D

3.3 Logistics

(Number of samples and tests per railway per harvest).

	RLY 2W	(RLY 8W)
After Milling	80 weighings	(120)
	80 m.c's	(120)
Ridge Size	40 weighings	(40)
	40 m.c.'s & B.D's	(40)
Harvester Output	40 weighings	(48)
	50 m.c.'s & B.D's	(60)
Losses	50 weighings	(60)
	50 m.c.'s & B.D's	(60)
Total per railway per harvest	170 weighings	(228)
	170 m.c's	(228)
	90 B.D.'s	(108)

3.4 Manpower

1 Engineer
2 Work Study
6 Assistants.

3.5 Other Equipment

2 tractors - complete with cabs and transport boxes for transporting personnel and samples.
1 Bog Hut.

3.6 Supporting Machines

Milling on 2W and 8W was done exclusively by the flexi miller.

4. DISCUSSION AND RESULTS

4.1 Statistical Analysis

The method used was the analysis of variance with two sources of variation. The SPSS statistical package wasn't able to handle ANOVA with three sources of variations as required in the project.

Statistical Analysis was done on:-

After milling tonnes per km @ 55% m.c. on fields 1-5 and fields 6-10,

Ridge sizes in tonnes per km ridge at 55% m.c., on fields 1-5 and fields 6-10.

All harvester speeds, output, and losses data

4.2 Design of Tests

The design of the tests was satisfactory.

Five full tests were done between the Type VI and Type VII harvesters. However, one of the tests (harvest 9) had to be eliminated from the final evaluation because there was a real difference in the quantity of peat on fields 1-5 as compared to fields 6-10, prior to harvesting.

One double test was done on railway 2W, harvest 7 using the Type VI harvester - this was done due to breakdown of the Type VII machine.

Two tests were completed between the Peco Trailed and BnM Trailed harvesters - (See sub-section 4.3 below).

Two tests were done in the comparison of the Peco Trailed and Type VII harvesters but one of these tests was eliminted (harvest 10) because there was a real difference between the quantities of peat on fields 1-5 as compared to 6-10, prior to harvesting.

Two double tests were done on railway 8W where the Peco Trailed was used to harvest the full railway (harvests 5, 9) - this was due to the non-availability of the BnM Trailed because of breakdown. Even though significant differences were found between quantities of peat on fields 1-5 as against fields 6-10 prior to harvesting (both harvest 5, 9) the average speed, output and losses were found per harvest and these data were used in the final evaluation.

4.3 Prototype Machines

The Bnm Trailed Screw Harvester was unsatisfactory as a test machine as it was unavailable for many of the tests and in some cases it wasn't sufficiently reliable to complete the five lifts necessary for a full test.

It is our opinion that, in future, such machines should be developed to the production stage before they are included in a full scale test against production machines.

4.4 Tests in Good Quality Peat

As stated earlier (2,1), the design of tests provided for the testing of the four harvesters on two railways of good quality peat in Ballycon. It had been agreed with the Manager, Derrygreenagh that when the tests in Cloncreen were completed the test machines would be transferred to two railways in Ballycon. However, due to the production difficulties experienced in 1986, it was decided that the tests on good quality peat should be cancelled.

The results of the harvester tests in 1986 are therefore valid for machines operating on poor to medium quality peat.

4.5 Forward Speed (B.mins/km)

Type VI and Type VII

There was no significant difference between the Type VI and Type VII through the test plots (i.e. excluding turns) on lifts 1 and 2, but the type VI was significantly faster on lifts 3, 4 and 5. (See Table 1, page 21).

However, analysis of forward speed, including turns (see table 2A below), showed the Type VII was significantly faster on lifts 1 and 2, there was no difference between the speeds of the two machines on lifts 3 and 4, but the Type VI was significantly faster on lift 5. (Also see table 2, page 21).

Table 2A. Average forward speed on lifts 1 to 5.

	Lift Number					
	1	2	3	4	5	Average
Type VI	11.17	11.36	11.74	12.39	13.19	11.97 B.mins/km
Type VII	9.69	10.14	11.52	13.83	18.26	12.69 B.mins/km

The above results show that the Type VII harvester is basically a faster machine during the early lifts but could not be driven to its optimum forward speed on litts 4 and 5 as the driver was constrained to a reduced belt pump pressure to avoid jamming of the conveyor belt. This problem was caused by increased friction between belt and jib on the heavier lifts. Examination of the early lift data shows that the type VII and Type VI are equally fast on straight forward speed but the Type VII is much faster when turning speed is included.

The overall results of the tests show there is no real difference between the average speeds of the Type VI and VII machines (11.97 versus 12.69 basic mins per km respectively). However, the Type VI was very much faster over the final lift (13.19 versus 18.26 B.min/km).

Peco Trailed Vs BnM Trailed

The Peco was significantly faster than the BnM harvester both in straight forward speed and when turning speeds were included (See Tables 3 and 4, page 22).

The slowness of the BnM Trailed Harvester is probably attributable to the fact that it is a heavier machine and also the spiral consumes more power than the paddle.

Peco Trailed Vs Type VII

The available data was limited due to the fact that harvest 10 was eliminated from the analysis. The one valid comparison of these two machines showed that the Peco and Type VII were equally fast on lifts 1 and 2 but in lifts 4 and 5 the Peco was by far the faster machine. (See Table 5 and 5A, page 23).

Peco Trailed Vs Type VI

Even though these machines were not compared on the same test railway the fact that the Type VII was tested on both 2W and 8W and showed no real difference in speed shows that bog characteristics were similar in the two railways. This provides a basis for comparing the speeds per lift of the peco and type VI machines. See table 6A below which shows that speeds of both machines are similar. (See also table 6, page 24).

Table 6A. Forward Speed (including turns)

	Lift Number					
	1	2	3	4	5	Average
Peco	10.09	10.15	11.94	11.94	12.79	11.38 B.mins/km
Type VI	11.19	11.31	11.86	12.37	13.39	12.02 B.mins/km

4.6 Output (t/h)

Type VI Vs Type VII (t/h)

There was no real difference between the output of these harvesters on lift 1 but the type VI had a higher output on lifts 4 and 5 (See Table 7 on page 25).

Peco Trailed Vs Bnm Trailed (t/h)

The output of the Peco Trailed Machine was equal, or superior, to the BnM on almost all lifts (See Table 8 on page 25).

Peco Trailed Vs Type VII (t/h)

Even though only one valid comparison is available, the results show no real difference between these machines on the early lifts, but there is a highly significant difference in favour of the Peco on lift 5. (See Table 9 on page 26).

Type VI Vs Peco (t/h)

As stated earlier in 4.5 the bog characteristics of the two railways were similar. Hence the outputs per lift of the two machines can be compared (see table 10A below).

Table 10A. Harvester Output (t/h)

	Lift Number					Average
	1	2	3	4	5	
Type VI	177	285	353	462	523	360 t/h
Peco	139	280	351	450	534	351 t/h

No significance tests were carried out on the above data but the figures show there is no real difference between the outputs of the type VI and Peco machines (see also table 10, page 26).

4.7 Losses t/km @ 55% m.c.

Type VI Vs Type VII

The type VI had lower losses than the Type VII. The averages are given below:- (See also Table 11, page 27).

	Av. Losses t/km @ 55% m.c.
Type VI	5.5
Type VII	8.2

Since both harvesters have elevator collectors this represents a very big difference in pick up efficiency.

It was observed during the tests that the losses from the Type VI were low, while those from the Type VII appeared to be much higher. The photographs fig. 2, page 30 show the high level of losses left by the Type VII which was largely due to poor sealing between the two side wings and the base of the elevator.

Peco Trailed Vs BnM Trailed

The Peco had lower losses than the BnM machine. The averages are given below (See also Table 12, page 27).

	Av. Losses t/km @ 55% m.c.
Peco	7.5
BnM	16.1

Since the BnM harvester is a prototype machine, it probably is not surprising that the losses are exceptionally high. Also it would have been expected that the screw collector would be less efficient than the Paddle.

The Peco Paddle had higher losses than the type VI harvester. In photograph fig. 3, page 31 it will be seen that there is a considerable space between one of the side wings and the paddle which resulted in a ridge of losses from this area - improved sealing would reduce losses. Also it will be seen in photograph fig. 4, page 32, that the belt sealing can be improved as there is a continuous loss of peat falling on the return belt and contributing to overall losses.

Type VI Vs Peco

Even though these machines were not tested on the same railway, it is interesting to compare the average losses per lift for both machines (See table 13A below) see also Table 13, page 28).

Table 13A.

	Losses t/km @ 55% m.c.				
	Lift Number				
	1	2	3	4	5
Type VI	4.6	4.4	5.8	5.9	5.3
Peco	9.2	6.0	7.4	9.5	7.7

It will be seen that the Type VI is by far the better machine on all lifts. However, as stated on the previous page, losses from the Peco can be reduced if the sealing is improved.

4.8 Performance

The performance of the four test harvesters is based on net output (including turns) and mechanical efficiency (i.e. mechanical hours over worked plus mechanical hours).

Performance of Harvesters

	Net output t/h (Av. of 5 litts)	Mech. Efficiency %	Performance Index t/h
Type VI	360	87	313
Peco	351	88	309
Type VII	287	78	224
BnM	221	70 *	155

* This figure is inaccurate as it doesn't represent all modifications to this prototype machine.

The above table shows there is no difference in the performance of the type VI and Peco harvesters while the type VII performed poorly by comparison.

4.9 Reliability

The mechanical performance of the four test machines is given, together with performance data from Boora and Blackwater of production machines:-

MACHINE PERFORMANCE

Machine	Worked		Mechanical		Performance (%)	
	Test m/cs	Boora/ B.water	Test m/cs	Boora/ B.water	Test m/cs	Boora/ B.water
VI	521	339	81	135	87	72
VII	453	322	131	194	78	62
Peco Trailed	557	544	76	96	88	85
BnM Trailed	55	343	24	141	70	71

The Peco trailed was marginally the best of the test machines and also performed best in the Boora/Blackwater returns.

4.10 Limitations

Peco

- Tracks, The plates used to bolt the swamp shoes onto the tractor tracks were of poor design resulting in breakage of shoes from the machine.

- Sharp turns, when turning sharply to the right, the roller on the machine frame occasionally caught the right hand track of the tractor causing swampshoes to be broken from the track.

- Belt Seal, Peat was lost due to inadequate sealing of the belt for a length of approximately 2m.

- Paddle Seal, There was a considerable space between the side-wing and paddle which resulted in a ridge of losses from this area.

Type VI - Very slow to turn.

Type VII

- Belt, In heavier litts the driver was constrained to drive at reduced speed to avoid jamming of the belt. This was due to excessive friction between the belt and seal.

- Castor wheel - The outside castor wheel occasionally twisted and was dragged along the bog resulting in field damage.

- Elevator Seal - There was a considerable space between the side-wings and the base of the elevator - this resulted in excessive losses from this area.

BnM Trailed Unit

- Bellhousing, The driver experienced great difficulty in controlling the level of the bellhousing. This resulted in losses which were excessively high in some places, to tearing raw bog in other parts of the field.

- Sinkage, This harvester was prone to sinkage.

4.11 Cost Analysis

Preliminary costings are presented for the four harvesters. However, variable costs are not available and would take considerable time to extract at the different works as harvesters are considered as a group rather than individual types.

In the absence of these data it has been assumed that fuel, labour and maintenance (including overhaul) costs are similar for the four harvesters. This assumption would appear to be biased against the Peco machine as the maintenance costs of this harvester would be expected to be significantly lower than the type VI and type VII as it is a far less complex machine.

The table below gives capital costs of the four machines which have been written off over a ten-year period. The speed and reliability of the type VI, VII and Peco machines have been taken as being the same (this is favourable towards the type VII as this was a less reliable machine).

The cost per hectare and per tonne per annum are presented:

COST ANALYSIS £

Capital Costs	Type VI	Type VII	Peco Trailed	BnM Trailed
Trailed Unit			42,800	34,000
Tractor			27,500	27,500
Cantone Tracks			10,500	10,500
Total	104,800	110,300	80,800	72,000
Cost/ha	55	57	42 (32)	90 (66)
Cost/t	0.30	0.31	0.23 (0.17)	0.49 (0.36)

Data in brackets exclude costings for 50% of tractor and cantone outlay.

The above table clearly shows that the Peco is the more cost effective machine. The Peco becomes even more attractive if half the cost of tractor and cantone tracks are apportioned to this machine on the basis that the tractor can be utilised on other work for half of each year.

5. Conclusions

5.1 The Peco Trailed Paddle Harvester was the best overall machine.

This harvester had a high forward speed, excellent turning capacity and had a high output performance. It was a very reliable machine (most problems were caused by cantone tracks) and was the most cost effective of the four harvesters tested.

Losses were relatively high but these can be reduced by improved sealing along the conveyor belt and in the area between the paddle and side-wing.

5.2 The Type VI elevator performed next best to the Peco Trailed unit.

This machine had a high forward speed but had a poor turning capacity. It had a high output performance and the lowest level of losses of the machines tested. The test harvester was very reliable but was much less cost effective than the Peco.

5.2 The Type VII elevator is a very fast machine with excellent turning capacity. It had more mechanical problems than the Peco or Type VI and the friction problem between the belt and jib affected its performance (speed and output) on the heavier litts.

Losses were relatively high but these could be reduced by improved sealing between the two side-wings and the base of the elevator. Preliminary cost analysis showed this machine to be marginally less cost effective than the Type VI harvester.

5.4 The BnM Trailed Screw performed very poorly in all respects. Such machines should be developed to a more advanced stage before they are included in field-scale tests.

Acknowledgements

The contribution made by personnel or groups listed below, in setting up the project, designing equipment, implementing the tests, analysing the samples, data analysis and report preparation, is much appreciated.

Derrygreenagh - Manager Mr. M. Kelly
- Mr. N. Hickey - Production Asst.
- Line Management
- Machine Drivers
- Field Sampling team

Work Study - S. O'Reilly
- S. Behan
- J. O'Riordan
- C. O'Reilly

R&D - B. Carty
- S. Kindregan
- J. Dolan
- J. McNiff
- Laboratory Staff
- A. Bracken
- S. McCormack

M. GILL

P.J. COFFEY

APPENDIX

Table No.			Page No
1	Forward Speeds	VI vs VII (Excl. turns)	21
2	Forward Speeds	VI vs VII (Incl. turns)	21
3	Forward Speeds	Peco vs BnM (Excl. turns)	22
4	Forward Speeds	Peco vs BnM (Incl. turns)	22
5	Forward Speeds	Peco vs VII (Excl. turns)	23
5A	Forward Speeds	Peco vs VII (Incl. turns)	23
6	Forward Speeds	Lifts 1-5 (Incl. turns)	24
7	Harvester Output	VI vs VII	25
8	Harvester Output	Peco vs BnM	25
9	Harvester Output	Peco vs VII	26
10	Harvester Output	Peco vs VI	26
11	Harvester Losses	VI vs VII	27
12	Harvester Losses	Peco vs BnM	27
13	Harvester Losses	VI vs Peco	28
14	Press Densities	2W vs 8W	29
Photographs :	Losses Type VII	(Fig. 2)	30
	Losses Peco	(Fig. 3)	31
	Losses Peco	(Fig. 4)	32

TABLE 1

FORWARD SPEEDS (EXCLUDING TURNS)

TYPE VI V TYPE VII (BMs/KM)

HARVEST		LIFT NUMBER					
		1	2	3	4	5	AVERAGE
8	VI	8.8	9.01	9.23	9.55	10.95	9.5
	VII	7.93	9.37	11.15	13.03	18.48	11.99
10	VI	8.55	8.77	9.71	10.67	10.61	9.66
	VII	8.49	9.41	9.87	13.19	17.25	11.64
11	VI	8.61	8.83	9.07	9.33	10.27	9.22
	VII	8.85	8.47	9.64	10.8	16.84	10.92
12	VI	8.56	8.67	8.77	9.85	10.76	9.32
	VII	8.88	8.71	10.83	13.69	15.88	11.6
AV.	VI	8.63	8.82	9.20	9.85	10.65	9.43
	VII	8.54	8.99	10.37	12.68	17.11	11.54
		NS	NS	S	HS	HS	

TABLE 2.

FORWARD SPEEDS (INCLUDING TURNS)

TYPE VI v TYPE VII (BMs/KM)

HARVEST		LIFT NUMBER					
		1	2	3	4	5	AVERAGE
8	VI	11.34	11.55	11.77	12.09	13.49	12.05
	VII	9.08	10.52	12.30	14.18	19.63	13.14
10	VI	11.09	11.31	12.25	13.21	13.15	12.21
	VII	9.64	10.56	11.02	14.34	18.40	12.79
11	VI	11.15	11.37	11.61	11.87	12.81	11.76
	VII	10.00	9.62	10.79	11.95	17.99	12.07
12	VI	11.10	11.21	11.31	12.39	13.30	11.86
	VII	10.03	9.86	11.98	14.84	17.03	12.75
AV.	VI	11.17	11.36	11.74	12.39	13.19	11.97
	VII	9.69	10.14	11.52	13.83	18.26	12.69
		HS	HS	NS	NS	HS	NS

TABLE 3.

FORWARD SPEEDS (EXCLUDING TURNS)

PECO TRAILED V BNM TRAILED (BMs/KM)

HARVEST		LIFT NUMBER					
		1	2	3	4	5	AVERAGE
4	P	8.44	8.43	10.95	10.63	10.93	9.87
	BNM	10.8	17.12	17.55	21.67	-	16.78
8	P	8.62	8.77	10.86	10.72	10.75	9.94
	BNM	17.75	18.53	22.42	27.63	30.83	23.43
AV	P	8.53	8.60	10.91	10.68	10.84	9.91
	BNM	14.28	17.83	19.98	24.65	30.83	21.51
		NS	HS	HS	HS	HS	

TABLE 4

FORWARD SPEEDS (INCLUDING TURNS)

PECO TRAILED V BNM TRAILED (BMs/KM)

HARVEST		LIFT NUMBER					
		1	2	3	4	5	AVERAGE
4	P	9.58	9.57	12.09	11.77	12.07	11.02
	BNM	12.39	18.71	19.14	23.26	-	18.38
8	P	9.76	9.91	12.01	11.91	11.89	11.10
	BNM	19.34	20.12	24.01	29.22	32.42	25.02
AV	P	9.67	9.74	12.05	11.84	11.98	11.06
	BNM	15.87	19.42	21.58	26.24	32.42	23.11
		HS	HS	HS	HS	HS	HS

TABLE 5

FORWARD SPEEDS (EXCLUDING TURNS)

PECO TRAILED v TYPE VII (BMs/KM)

HARVEST		LIFT NUMBER					
		1	2	3	4	5	AVERAGE
11	P	8.65	8.79	11.18	10.64	12.55	10.36
	VII	7.95	8.92	12.58	14.93	19.75	12.83
		HS	NS	S	HS	HS	

TABLE 5A

PECO-TRAILED V TYPE VII (BMs/KM) (INCLUDING TURNS)

HARVEST		LIFT NUMBER					
		1	2	3	4	5	AVERAGE
11	P	9.79	9.93	12.32	11.78	13.69	11.50
	VII	9.10	10.07	13.73	16.08	20.90	13.98
		NS	NS	S	HS	HS	

Table 6

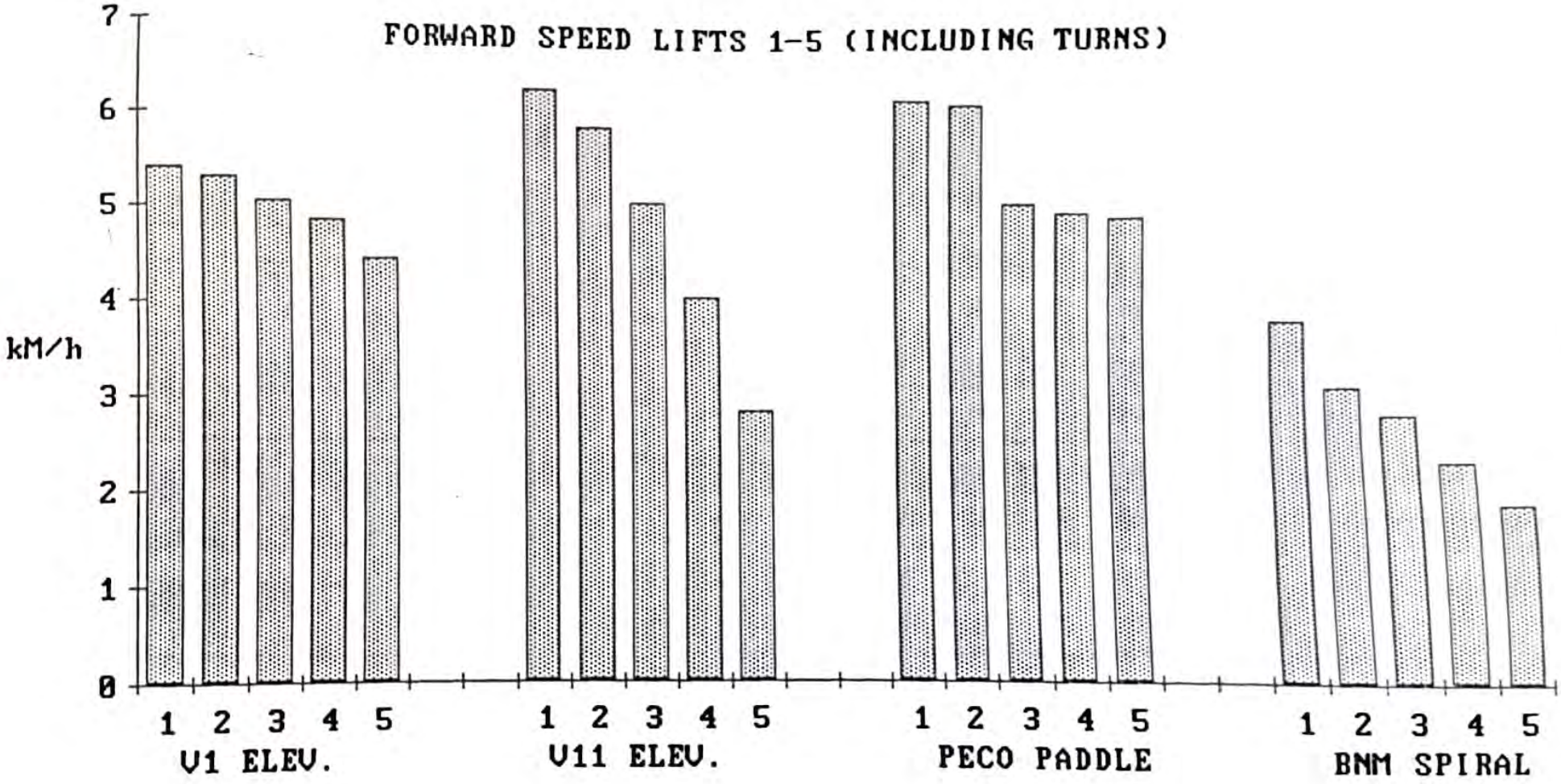

FORWARD SPEED LIFTS 1-5 (INCLUDING TURNS)
kM/h
7
6
5
4
3
2
1
0
1 2 3 4 5
V1 ELEV.
1 2 3 4 5
V11 ELEV.
1 2 3 4 5
PECO PADDLE
1 2 3 4 5
BNM SPIRAL

TABLE 7.

HARVESTER OUTPUT - T/H AT 55% M.C.

TYPE VI v TYPE VII

HARVEST		LIFT NUMBER					AVERAGE
		1	2	3	4	5	
8	VI	219 NS	326 NS	384 NS	393 NS	477 NS	360
	VII	267	210	271	413	322	300
10	VI	137 NS	284 NS	324 NS	429 HS	513 HS	337
	VII	165	241	273	313	276	254
11	VI	140 NS	217 NS	339 NS	464 NS	501 HS	332
	VII	159	247	373	396	374	310
12	VI	200 NS	349 S	440 HS	555 HS	608 HS	430
	VII	163	276	328	320	349	287
Av.	VI	174 NS	294 S	377 S	461 HS	525 HS	366
	VII	188	245	311	360	330	287

TABLE 8

HARVESTER OUTPUT - T/H AT 55% M.C.

PECO TRAILED v BNM TRAILED

HARVEST		LIFT NUMBER					AVERAGE
		1	2	3	4	5	
4	P	109 HS	257 NS	332 NS	520 HS	566	357
	BNM	220	213	271	284	-	247
8	P1	173 NS	340 NS	365 HS	468 HS	627	395
	BNM	103	172	208	245	250	196
Av	P	141 NS	299 HS	349 HS	499 HS	596 HS	376
	BNM	161	192	239	265	250	221

TABLE 9.

HARVESTER OUTPUT - T/H (INCLUDING TURNS)

PECO TRAILED V TYPE VII

HARVEST		LIFT NUMBER					AVERAGE
		1	2	3	4	5	
11	P	147 NS	257 NS	273 S	386 NS	476 S	310
	VII	130	290	314	441	383	312

TABLE 10

OUTPUT (T/H) (INCLUDING TURNS)

PECO V TYPE VI

HARVEST		LIFT NUMBER					AVERAGE
		1	2	3	4	5	
4	P	109	257	332	520	566	357
5	P	131	244	368	452	502	339
7	VI	139	209	295	446	476	313
	VI	225	327	335	487	560	387
8	P	173	340	365	468	627	395
	VI	219	326	384	393	477	360
9	P	136	291	418	422	498	353
10	VI	137	284	324	429	513	337
11	P	147	267	273	386	476	310
	VI	140	217	339	464	501	332
12	VI	200	349	440	555	608	430
Av.	P	139	280	351	450	534	351
	VI	177	285	353	462	523	360

TABLE 11.

- HARVESTER LOSSES (T/KM AT 55% M.C.)

TYPE VI v TYPE VII

HARVEST		LIFT NUMBER					
		1	2	3	4	5	AVERAGE
8	VI	5.3	4.4	9.2	9.2	5.3	6.2
	VII	12.4	8.4	7.7	9.4	11.2	9.8
10	VI	2.2	2.6	6.4	-	-	3.7
	VII	8.2	9.0	6.7	-	-	8.0
11	VI	3.5	4.8	6.7	4.9	6.6	5.3
	VII	5.0	5.8	12.2	15.2	4.8	8.7
12	VI	7.1	3.5	5.6	4.5	6.2	5.4
	VII	6.7	5.6	4.8	6.6	7.5	6.2
AV.	VI	4.5 HS	3.8 HS	6.4 NS	6.2 HS	6.0	5.5
	VII	8.1	7.2	8.0	10.4	7.8	8.2

TABLE 12

HARVESTER LOSSES - T/KM AT 55% M.C.

PECO TRAILED v BNM TRAILED

HARVEST		LIFT NUMBER					
		1	2	3	4	5	AVERAGE
4	P	-	5.4	7.9	9.0	8.4	8.4
	BNM	-	-	19.3	12.9	16.2	16.1
8	P	-	3.9	5.6	12.7	4.2	6.6
	BNM	-	12.3	13.9	21.8	16.2	16.1
AV.	P	-	4.6 HS	6.8 HS	10.8 NS	6.3 HS	7.5
	BNM	-	12.3	16.6	17.4	16.2	16.1

TABLE 13

HARVESTER LOSSES T/KM AT 55% MOISTURE CONTENT

TYPE VI v PECO TRAILED

HARVEST		LIFT NUMBER					
		1	2	3	4	5	AVERAGE
4	P	-	5.4	7.9	9.0	8.4	7.7
5	P	9.3	7.5	8.1	6.2	6.8	7.6
7	VI	4.7	5.0	5.5	4.0	2.9	4.4
	VI	4.5	6.3	3.9	7.1	5.6	5.5
8	VI	5.3	4.4	6.9	9.2	5.3	6.2
	P	-	3.9	5.6	12.7	4.2	6.6
9	P	11.5	7.6	8.0	12.9	11.1	10.2
10	VI	2.2	2.6	6.4	-	-	3.7
11	VI	3.5	4.8	6.7	4.9	6.6	5.3
	P	6.8	5.6	7.6	6.5	8.0	6.9
12	VI	7.1	3.5	5.6	4.5	6.2	5.4
Av.	VI	4.6	4.4	5.8	5.9	5.3	5.1
	P	9.2	6.0	7.4	9.5	7.7	7.8

TABLE 14

AVERAGE PRESS DENSITY (G/L) OF BOTH TEST RAILWAYS
(AVERAGES TAKEN OVER3 HARVESTS).

RAILWAY	FIELD										
	1	2	3	4	5	6	7	8	9	10	Av.
RLY 2W	226	221	220	208	204	197	188	184	188	214	205
RLY 8W	223	206	203	193	178	162	157	146	145	189	180

Appendix 4-16

Distribution and Nature of Ash Material in a Milled Peat Stockpile, 1982

BORD NA MONA
SCIENTIFIC OFFICE
DROICHEAD NUA
CO. KILDARE

SUBJECT: Distribution and Nature of Mineral "Ash" Material in a Milled Peat Stockpile .

P. J. COFFEY

SEPTEMBER, 1982.

BORD NA MONA
DATE RECD. -3 NOV 1982
FOR ATTENTION

DISTRIBUTION AND NATURE OF MINERAL 'ASH' MATERIAL IN A MILLED PEAT STOCKPILE

An investigation was carried out on a stockpile in Clonsast (TR 10 SW) to establish the following:-

a) The distribution of ash in the profile, that is, if the ash content of the peat was uniform throughout the profile or if there was a significantly higher ash content at the lower 'pile levels.

b) The nature of the mineral material which constitutes ash in milled peat. This was classified and investigated as follows:

(i) Pebbles - hard mineral material (i.e. stones) not breakable by hand.

(ii) Visible mineral material present as aggregates, grit or fines, the aggregates breakable by hand.

(iii) Non-visible inherent mineral material.

BORD NA MÓNA
COOLNAGUN
DATE REC'D. -3 NOV 1982
FOR ATTENTION

PROCEDURE

In discussions with the manager, Clonsast, it was decided that stockpile on TR 10 SW was typical of high ash 'piles as the ash ranged from 8.7% to 23.8%. See Table No. 9.

The history of production on this was:-

	1977	-	9 harvests
	1978	-	8 harvests
	1979	-	9 harvests
	1980	-	8 harvests
	1981	-	13 harvests
Total	Total	-	47 harvests

As the number of lifts per harvest was considerably less (ω3 fields) than a standard 11 field system, this 'pile was equivalent to ~14 harvests from an 11 field system.

Ditching was last done in the autumn of 1980 and was done each winter prior to that.

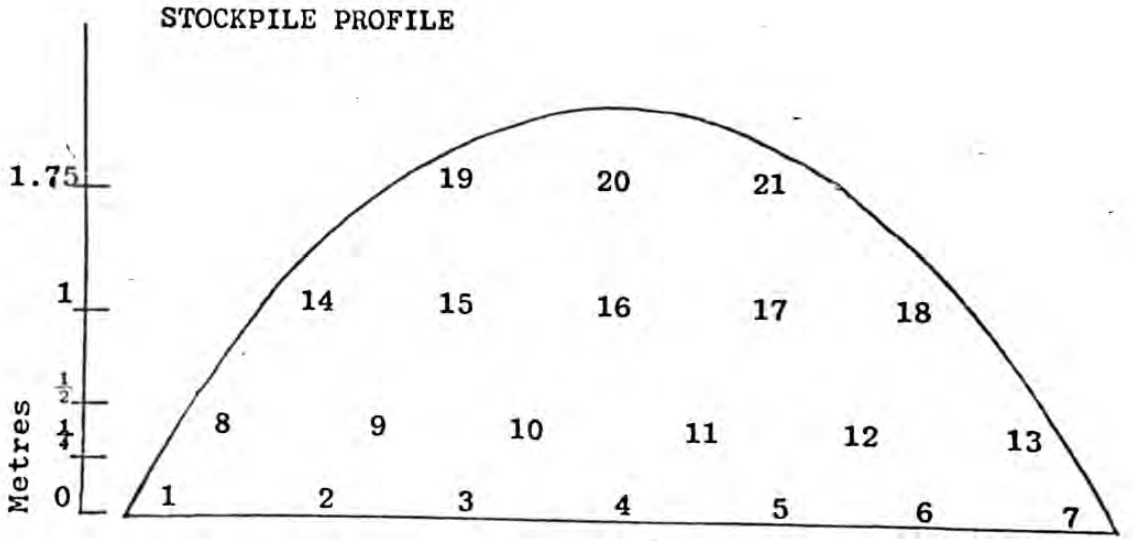
From the ash survey done on this pile at 25yd intervals (see Table 9) it was decided to open the 'pile by hymac at 2800S, 3025S, 2625S, that is, where the average ash contents were 9.8%; 15.6%; 17.9%. It was originally intended to investigate the 'pile at 3050S where the ash content was 23.8%, but as the 'pile was very small at this point it was not intensively sampled and point 3025S was selected instead.

It was decided to sample the two exposed 'pile profiles at each of the yardage points mentioned above, the

distance between the adjacent profiles was approx. 2 m. This provided a complete set of samples from each of 6 profiles.

Samples were taken as per the illustration below using a half cylindrical cowl

which was pushed into the profile at the sampling point and the peat within the cowl was taken as the sample. A total of 21 samples were taken from each profile. From the illustration below, it will be seen that 7 samples were taken from the base or lower $\frac{1}{4}$ m. of the 'pile; 6 were taken in the $\frac{1}{4}$ to $\frac{1}{2}$ m. level; 5 were taken at approx. 1 m. level and 3 from $1\frac{1}{2}$ - 1.75 m. level.



Sample locations shown 1 - 21 above.

ANALYSES

(a) Moisture content (%)

(b) Bulk density (g/l)

(c) Ash content - exclusive of pebbles. This includes inherent mineral material in the peat and visible mineral breakable material. See Tables1 - 7.

(d) Pebble content per litre of milled peat. Size, number and weight measurements taken. See Tables 1 - 7.

(e) Visible mineral material. Samples were classified as having zero, small, medium and large quantities of this present i.e. 0, 1, 2, 4 were the classification numbers used. See Tables 1 - 7.

DEFINITIONS

Ash Content

This includes inherent invisible mineral material in the peat and visible mineral aggregates, grit and fines. Pebbles are excluded in the ash result in tables 1 - 7.

Pebbles

Stones which were unbreakable by hand and were mainly of limestone composition.
Size varied from > 1½mm to < 63.5mm.

Visible mineral material

Aggregates (breakable by hand) grit or fines.
Sizes were approx. as follows:

Aggregates	<	25.4 mm
Grit	<	1.5 mm
Fines	<	850.0 microns (0.85mm)

Invisible mineral material

Defined as inherent mineral material in the peat.

DISCUSSION & RESULTS

Tables 1 - 6 give the results of Ash, Pebbles and Visible mineral contents for each of the 6 profiles.

1N, 1S represent the two adjacent profiles exposed at 2625 S.

2N, 2S represent the two profiles at 2800 S.

3N, 3S represent the profiles at 3025 S.

Table 7 gives a summary of results i.e. averages of ash, pebble and visible mineral material for the 6 profiles 1N to 3S.

Table 8 shows the distribution of pebble sizes.

Table 9 shows results of initial ash survey.

Table 10 gives general results.

ASH CONTENTS

Tables 1 - 6 show that the ash content was lowest at the base of the 'pile and highest at the middle or top. This may be explained by the fact that the later harvests in the stockpile (i.e. peat in the mid to top region of the 'pile) included a higher proportion of peat from the lower bog 0.5m stratum where the average ash content is approx. 9.0%. Also, ash contents in the 9.0% to 15.0% ash range and higher are due to a higher proportion of mineral sub-soil contamination due to ditching, milling etc. Tables no. 1 - 7 support this view.

PEBBLE CONTENT

Table 8 shows the distribution in the size of pebble - the highest number was found in the $\frac{1}{4}$" - $\frac{3}{8}$" interval. The average pebble diameter (excluding 6 stones which were > 1") was 0.9 cms (0.35"). The average pebble weight was 1.0g which gave a pebble density of approx. 2.6g/cc. The large stones gave a density of 2.7g/cc. Chemical tests and density Measurements confirm that these were mainly limestone material.

It will be seen from Tables 1 - 6 and Table 7 that the number of pebbles per litre of peat was lowest at the base and was highest at the middle and top of the stockpile. This was an unexpected finding as it was felt prior to this investigation, that the pebbles and stones would separate during the final lift operation when the peat is dropped onto the 'pile and that the greater number would be found at the 'pile base or the lower regions, but the contrary was the case. The larger numbers at the middle and top are the result of increased sub-soil contamination due to ditching and milling operations.

VISIBLE MINERAL MATERIAL

Tables 1 - 6 and Table 7 show that the base of the 'pile had the lowest level and the middle and top the highest level of material. There is a close correlation between the distribution of ash and visible mineral material from base to top of 'pile.

An examination of work done on bog profiles in Timahoe, Ballydermot, Clonsast etc. confirms that the following average ash contents are typical of undisturbed raised bog peats for the bog depths quoted.

< 2% ash:- ash content in the poorly decomposed upper stratum of raised bog.

2% - 5% ash:- ash content in the upper to middle region.

5% - 9% ash:- ash content in the middle to lower region.

9% ash:- ash content in the lower 0.5 metre stratum.

> 9.0% ash:- ash content in peat contaminated by sub-soil mineral material due mainly to ditching and milling operations. (this peat would be expected to include a high proportion of peat from the lower 0.5m bog stratum which has an ash content of 9.0%)
Therefore the following ranges are relevant:

Ash Content	Mineral Material
9.0%	Inherent in peat at lower 0.5 m.
11.3%	Includes the above, plus visible mineral material due to ditchings, millings, etc.
11.8%	Includes the above, plus pebbles < 25.4mm.
13.7%	Includes the above, plus stones > 25.4mm. i.e. includes all mineral material.

CONCLUSIONS

1. The total ash content was lowest at the base of the stockpile and was highest at the middle or top of the 'pile.
   The increase in ash in the later harvests is due to the increased quantities of sub-soil mineral material from ditching and milling operations which were harvested onto the stockpile.

2. A breakdown of the ash constituents, such as, inherent ash in the peat, visible mineral contamination and pebbles/stones contents are given together with the contribution each of these makes to the total ash content of milled peat.

Ash Content	Origin of Ash
9.0%	Inherent in peat 0.5m above sub-soil.
+ 2.3%	Sub-soil contamination in the form of breakable mineral material e.g. calcarious muds.
11.3%	
+ 0.5%	Further sub-soil contamination due to pebbles < 25.4 mm.
11.8%	
+ 1.9%	Additional sub-soil contamination due to pebbles > 25.4 mm.
13.7%	

It will be seen from the above that 9.0% ash is the average ash content of peat from the lower 0.5 m stratum without any sub-soil contamination.

A further 2.3% is due to sub-soil contamination due to breakable mineral material which can be in the form of aggregates, grit or fines.

An additional 2.4% ash is due to pebbles and stones.

Hence, uncontaminated lower bog stratum peat will have an ash content as high as 9.0% and sub-soil contamination due to breakable mineral material such as calcareous mud contributes as much to the total ash content (+ 2.3%) as do pebbles and stones (2.4%).

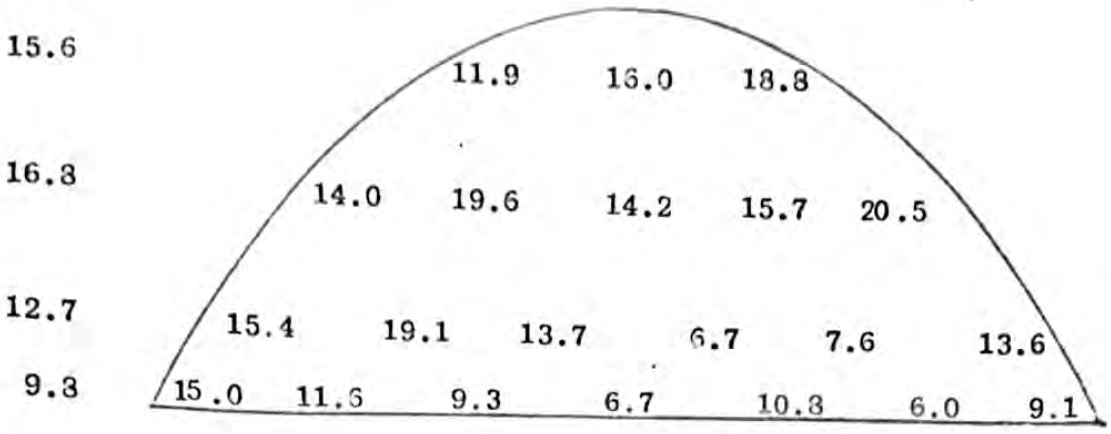
TABLE 1

IN

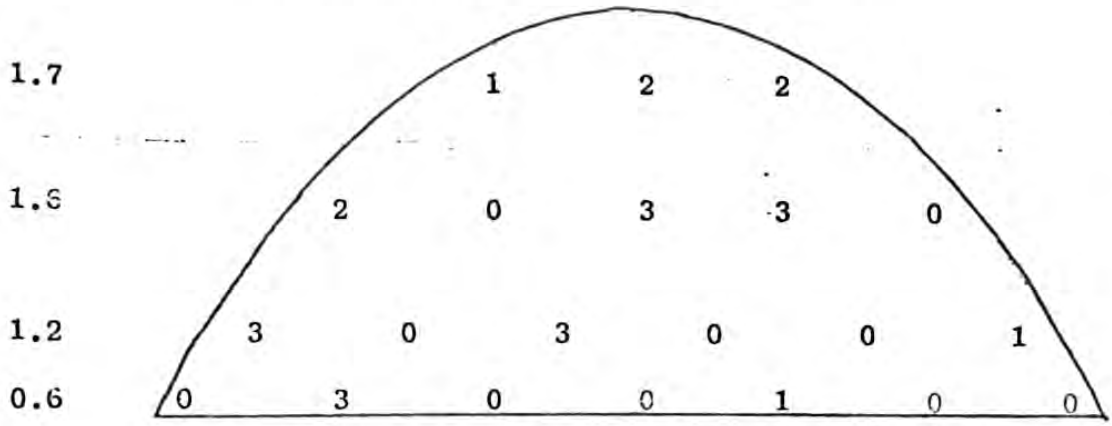
Average

Per Level

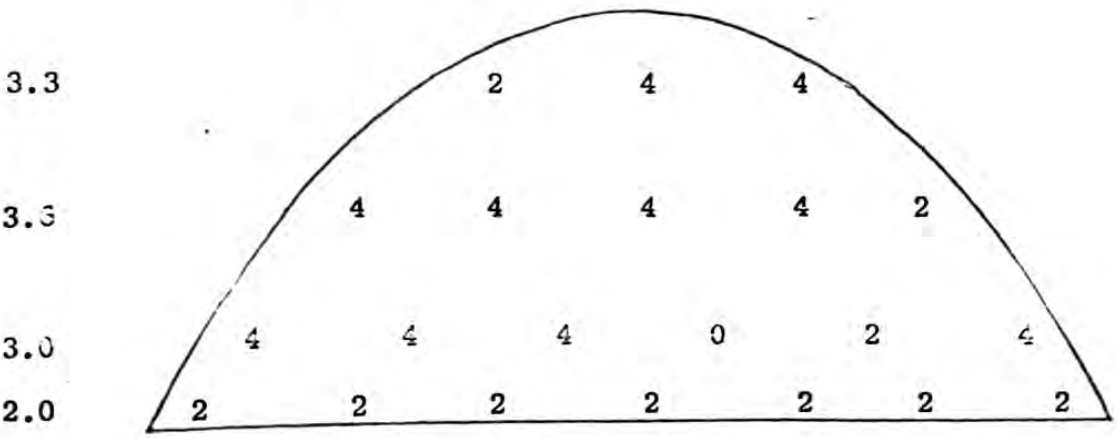
ASH (Exclusive of Pebbles)



PEBBLES (Number per Litre Peat)



MINERAL (Visible)



Legend for Visible Mineral Material/litre.

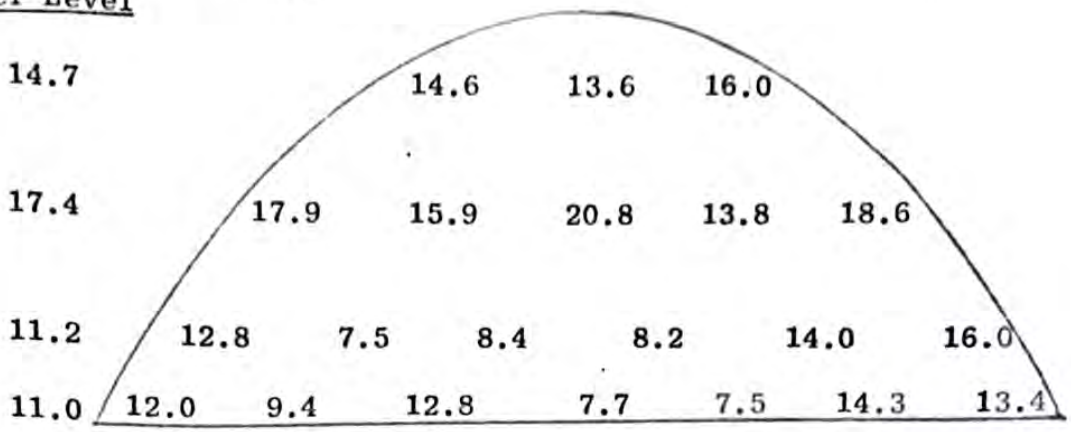
0 = zero in sample of 1 litre. I = small; 2 = medium; 4 = large

TABLE 2

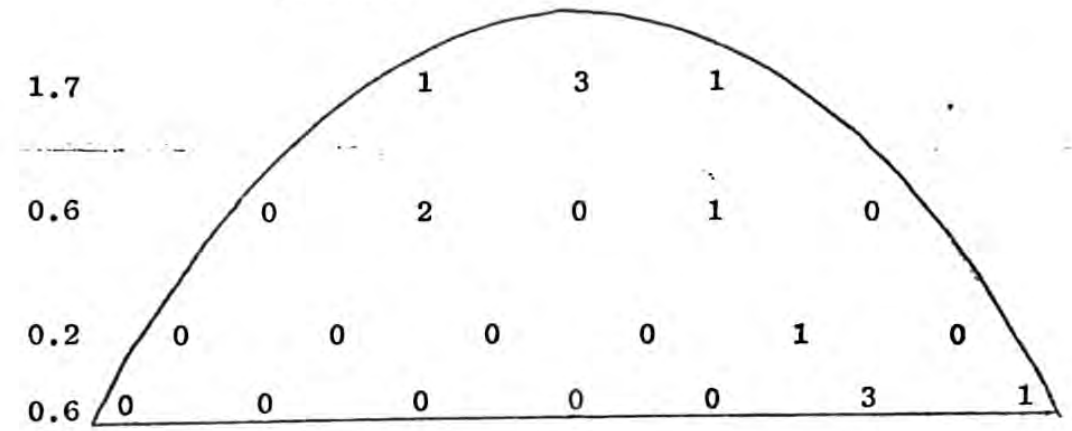
IS

Average Per Level

ASH



PEBBLES



MINERAL

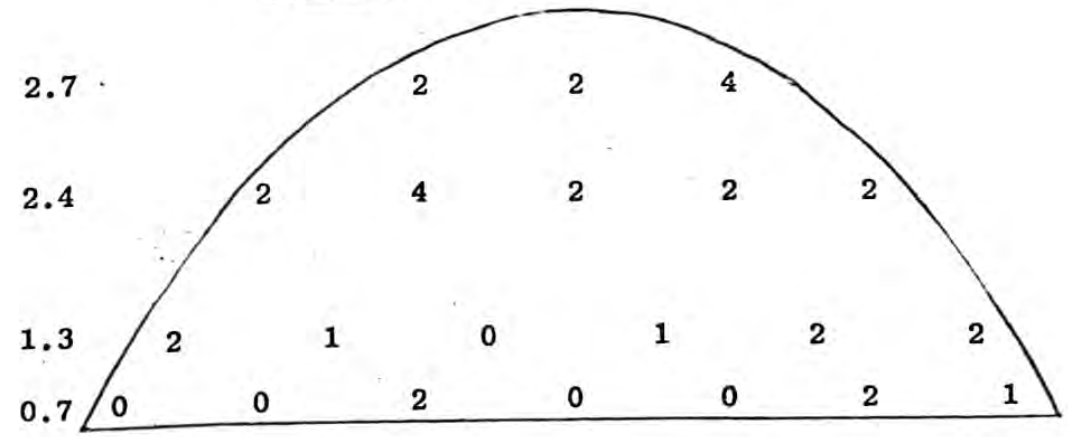


TABLE 3

2N

Average Per Level

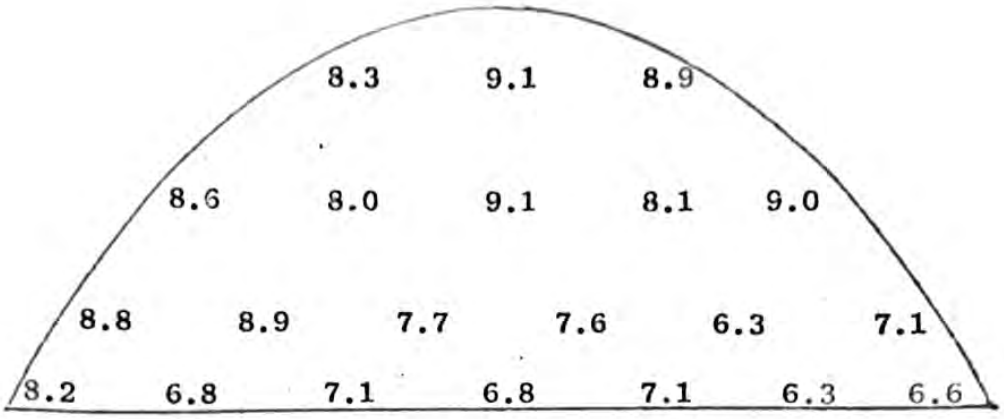
ASH

8.8

8.6

7.7

7.0



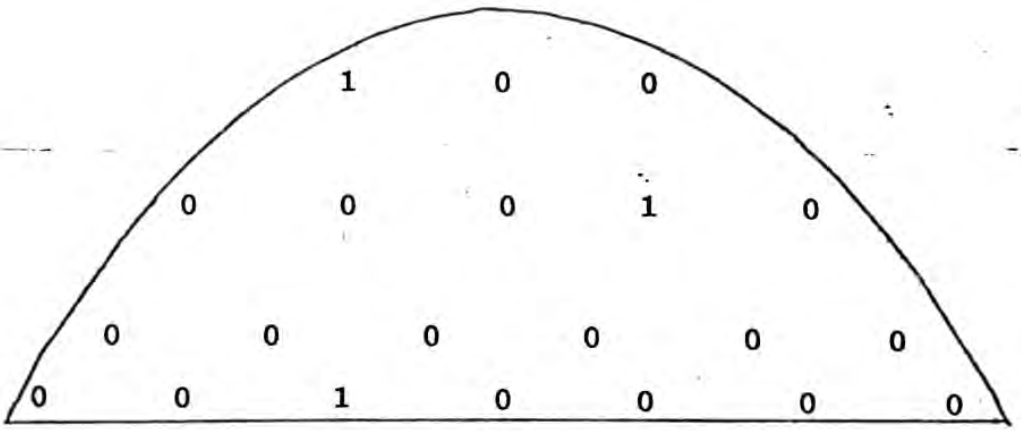
PEBBLES

0.3

0.2

0

0.1



MINERAL

1.3

2.4

1.5

0.3

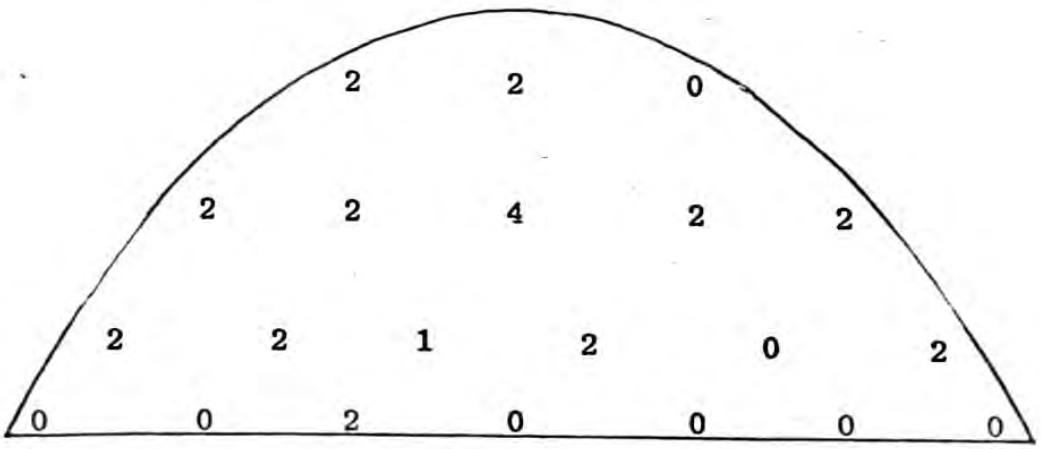


TABLE 4

2S

Average Per Level	ASH
8.6	6.6 11.5 7.7
8.6	6.9 9.8 10.2 8.3 7.8
7.5	7.2 6.3 7.1 6.7 9.4 8.2
6.5	7.0 6.6 6.4 7.2 5.3 6.3 6.8

	PEBBLES
0.3	0 1 0
0.2	0 0 1 0 0
0	0 0 0 0 0 0
0.1	0 0 0 0 0 1 0

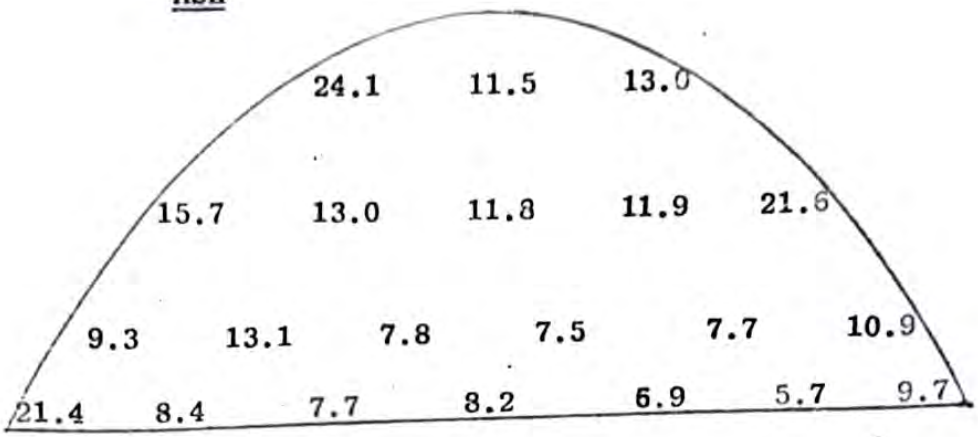
	MINERAL (Visible)
2.0	2 4 0
2.2	1 2 4 2 2
2.0	2 2 2 2 2 2
0.7	0 0 2 1 0 2 0

TABLE 5

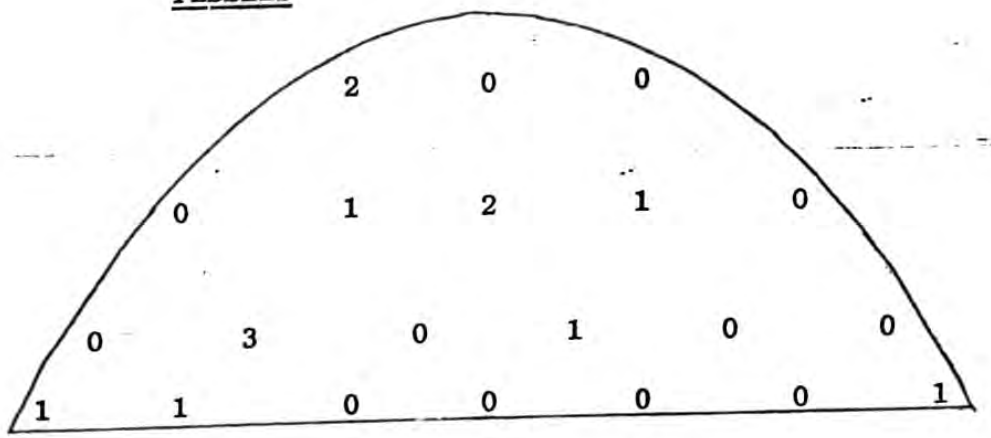
3N

Average Per Level

ASH



PEBBLES



MINERAL

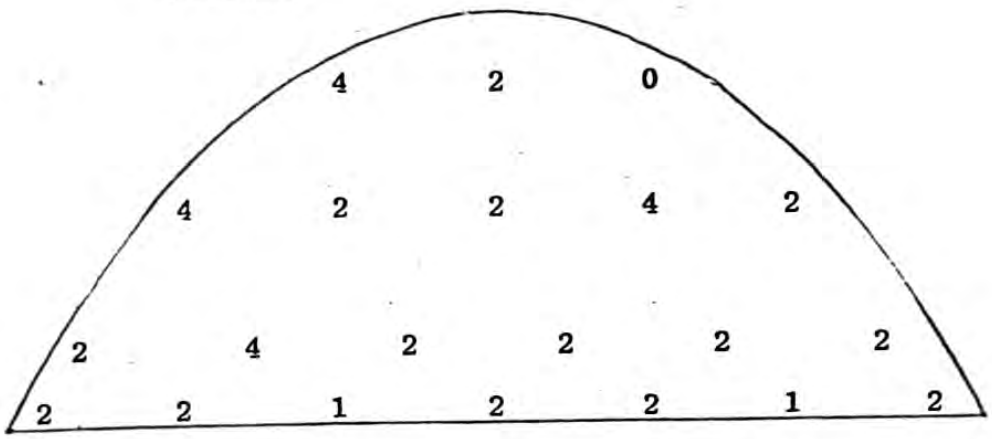
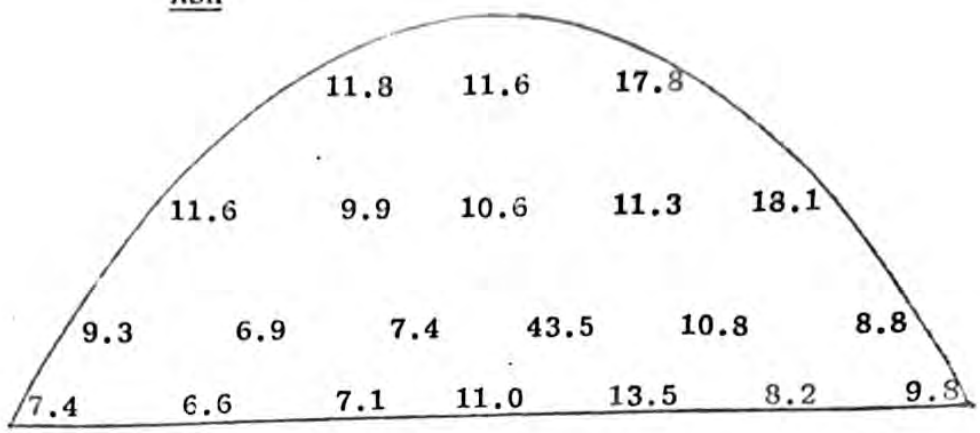


TABLE 6

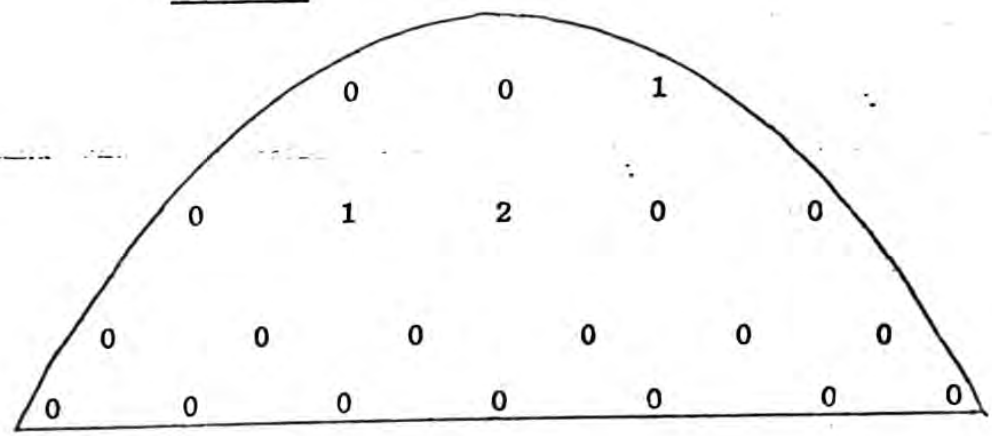
3S

Average Per Level

ASH



PEBBLES



MINERAL (Visible)

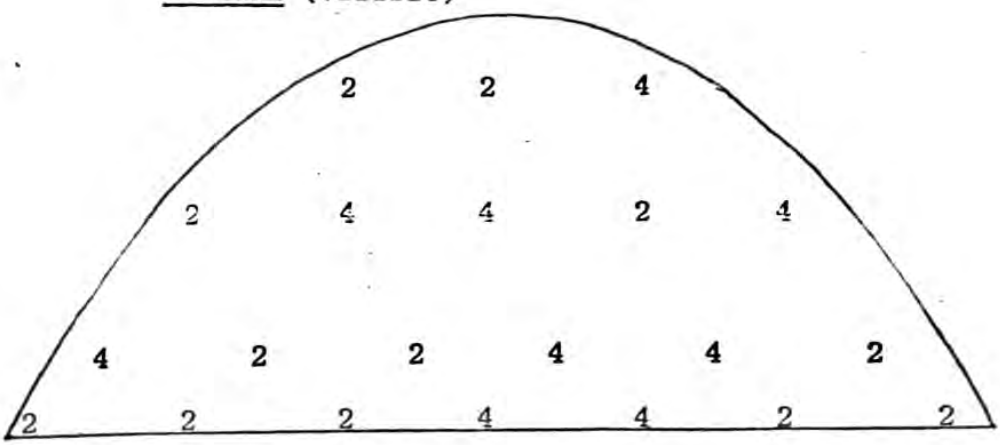


TABLE 7

SUMMARY OF RESULTS

AVERAGES AT PILE LEVELS

ASH

PILE LEVEL	PROFILE					
	IN	IS	2N	2S	3N	3S
TOP	15.6	14.7	8.8	8.6	16.2	13.7
MIDDLE	16.8	17.4	8.6	8.6	14.8	12.3
UPPER BASE	12.7	11.2	7.7	7.5	9.4	14.5
BASE	9.8	11.0	7.0	6.5	9.7	9.1

PEBBLES

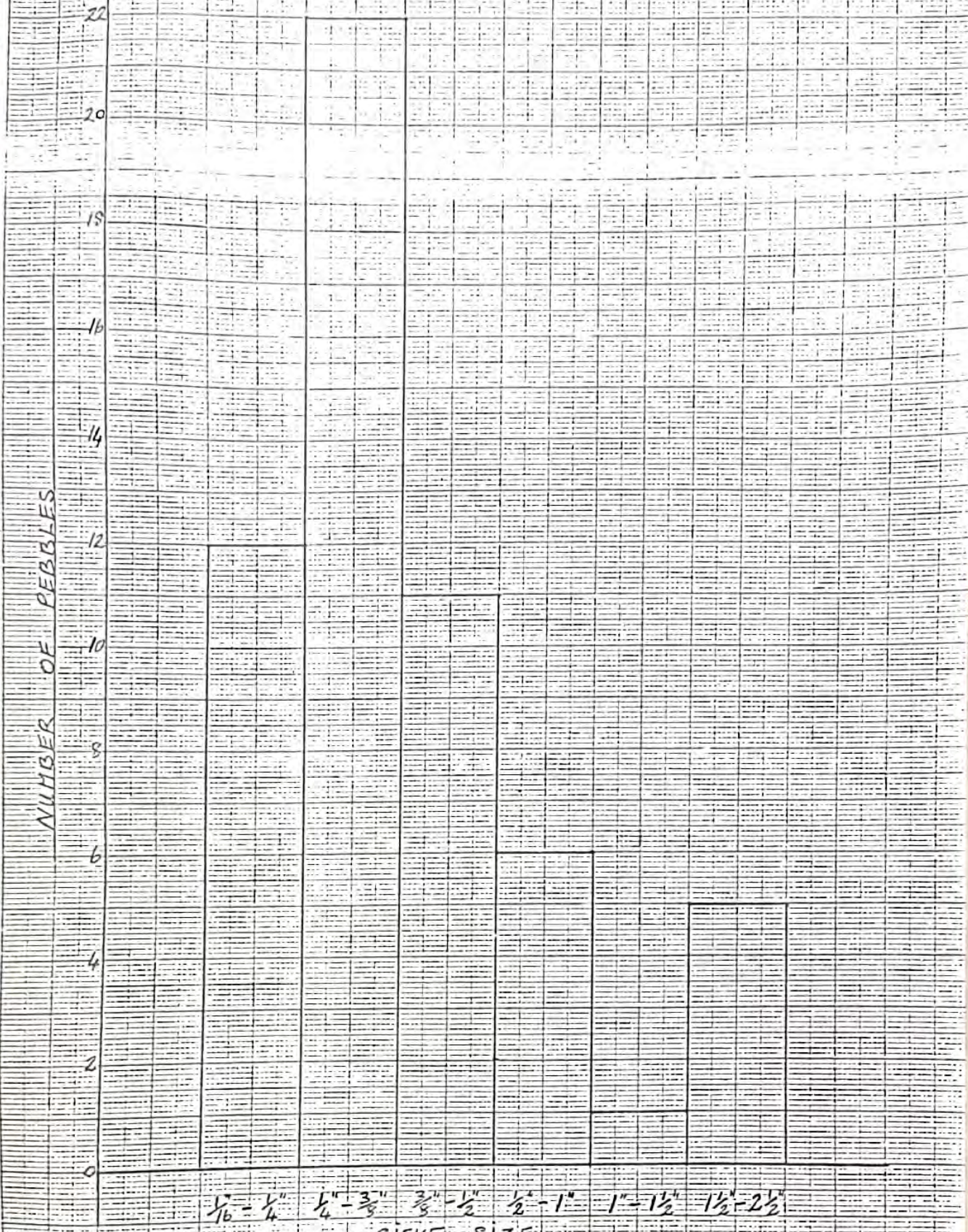
	IN	IS	2N	2S	3N	3S
TOP	1.7	1.7	0.3	0.3	0.7	0.3
MIDDLE	1.6	0.6	0.2	0.2	0.8	0.6
UPPER BASE	1.2	0.2	0	0	0.7	0
BASE	0.6	0.6	0.1	0.1	0.4	0

VISIBLE MINERAL

	IN	IS	2N	2S	3N	3S
TOP	3.3	2.7	1.3	2.0	2.0	2.7
MIDDLE	3.6	2.4	2.4	2.2	2.8	3.2
UPPER BASE	3.0	1.3	1.5	2.0	2.3	3.0
BASE	2.0	0.7	0.3	0.7	1.7	2.6

TABLE 8

DISTRIBUTION OF PEBBLE SIZES



SIEVE SIZE	>1/16 <1/4	>1/4" <3/8"	>3/8" <1/2"	>1/2" <1"	>1" <1 1/2"	>1 1/2" <2 1/2"
NO OF PEBBLES	12	22	11	6	1	5

MILLED PEAT ANALYSIS.

TABLE 9

FROM: Scientific Officer,
Droichead Nua,
Co.Kildare.

TO: Manager,
Clonsast,
Portarlington,
Co. Laois.

NO. OF SAMPLES: 22

NAME OF BOG:

DATE RECEIVED: 3.3.82.

AREA NO: T.R. 10. S.W.

Railway No.	Sample No.	M.C. %	A.C. %	B.D. g/l	P.D. g/l
2550^S		47.0	12.9	333	286
2575^S		60.5	13.7	384	294
2600^S		51.8	14.2	371	306
2625^S	2 Profiles Sampled	55.4	17.9	357	283
2650^S		56.4	18.8	389	309
2675^S		48.1	15.4	349	297
2700^S		35.3	12.3	318	307
2725^S		51.3	15.3	348	287
2750^S		56.0	14.0	393	314
2775^S		59.2	9.2	357	272
2800^S	2 Profiles Sampled	59.5	9.8	352	267
2825^S		60.3	9.2	330	245
2850^S		56.0	10.2	309	240
2875^S		57.5	8.7	344	266
2900^S		49.1	14.1	346	292
2925^S		57.7	17.1	356	276
2950^S		43.2	13.1	311	279
2975^S		57.7	11.9	357	277
3000^S		49.9	16.3	358	300
3025^S	2 Profiles Sampled	43.3	15.6	342	291
2050^S		46.1	23.8	365	317
3075^S		56.6	15.2	382	302
MEAN		52.9	14.0	352	287

TABLE 10

GENERAL RESULTS

Average ash content (excluding pebbles)	=	11.3%
Average M.C.	=	45.8%
Average bulk density (g/l)	=	372.7
Average anhydrous solids (g/l)	=	202.0
Total weight pebbles & stones	=	605.6g
Average wt. pebbles per litre	=	4.8g
Ash due to pebbles	=	2.4%
Wt. pebbles per m^3	=	4.8kg
Number pebbles per m^3	=	452
Ash due to pebbles 0.9cm diameter excluding stones $>$ 25.4mm	=	0.5%
Wt. stones $>$ 25.4mm	=	479.3g
Wt. pebbles $<$ 25.4mm	=	126.3g
Average wt. pebbles per litre	=	$\frac{126.3}{126}$ = 1.0g
Ash due to pebbles $\frac{1.0 \times 100}{202}$	=	0.5%
Hence ash excluding pebbles	=	11.3%
Ash plus 0.9cm pebbles	=	11.8%
Total ash including all pebbles and stones	=	13.7%

Appendix 4-17

Regional Administration in Relation to Milled Peat Operation 1988

BORDNAMÓNA

REGIONAL ADMINISTRATION IN RELATION TO MILLED PEAT OPERATIONS

A Feasibility Study

Circulation

Mr. P. Hughes

B. Ruttledge

_____

_____

_____

Prepared For

Task Force

Date

17th June 1988

CONTENTS

	Page
Introduction	1
Summary	2
Main Report	4
General Accounts	5
Costing	6
Workshop Administration	7
Stores	8
Secretarial	9
Works Assistant/Bog Records	10
Technical Assistant/Surveyors	11
Material Despatch Controller	12
Supervisors	13
Area Foremen	14
Bog Foremen	15
Production Assistants	16
Accountants	17
Managers	18
Conclusions	19
Recommendations	20
General Observations	21
Appendix A Works Structure to Region ...	22
Appendix B Current and Improved Works Structure	23

INTRODUCTION

This report was commissioned by the Task Force under the Chairmanship of Mr. Paddy Hughes.

The Terms of Reference were to conduct a Feasibility Study to ascertain the economies or other advantages which would accrue if the Administrative support function for Milled Peat was organised on a regional rather than a Works basis. The main framework of the report on Moss Peat Operations, was to form the basis for this study, with some further examination of the management structure to supervisor level. We have repeated for the convenience of readers, our findings in the moss peat study, where appropriate to this milled peat report.

The group members were -

Brendan Ruttledge (Chairman)
Brian Callagy
Brendan McEvoy
Oliver Molloy
John Cunningham (Secretary)

SUMMARY

The feasibility study was to ascertain economies or other advantages which might accrue if the administrative support function for Milled Peat was organised on a regional rather than a works basis.

Computerisation and fast and reliable methods of communication both verbal and physical would play very significant roles in administration, and the careful co-ordination of our internal road transport system with Fastrack and Courier Services would be essential.

Our findings in the previous study of Moss Peat were applied and were applicable in the Milled Peat Works with the exception of sales. Sales clerical work in milled peat bogs is minimal.

Our main comments are as follows -

- It would be impractical to move any of the existing functions, with their deficiencies, to a regional structure.
- Existing functions need to be reviewed and modernised as a matter of course.
- The present philosophy of servicing local needs through a main frame computer system is inappropriate.
- Computerisation plays the single most significant role if improvements or regionalisation is to take place.
- Some elements would then be more readily regionalised and some would by their nature remain at works.
- The absence of any continuous systems review has led to ad-hoc developments.
- We need to define the information we require from our systems and examine the present sources of this information with a view to improving recording methods.
- Cost benefit analysis of the workshop work measurement system (M.C.C.) needs to be undertaken.
- Each works needs a single authorative figure.
- Decisions should be made as close as possible to the workplace where they arise.
- Regional payment of wages, revolves around fast transmission of the information from works to region.

We examined other works areas not directly addressed in our previous report. In general it would seem that job titles have emerged over the years and minor accumulations of duties have been allocated to these title holders, e.g. Bog Records - Works Assistant and Technical Assistant/Surveyor

Our conclusion is that it is possible to regionalise some elements of the administrative support functions for Milled Peat.

Local Works improvements would reduce staff numbers from 259 to 183 or 28%.

Regionalisation would reduce this to 155 which is a further saving of 12%.

The overall reduction is 39%.

MAIN REPORT

The study commenced on 31st May 1988 and consisted of an examination of current computerisation developments of wages and costing systems, with Mr. Andy Boilson at Ballivor and discussions and analysis at Newbridge, of the five milled peat works at Boora, Derrygreenagh, Blackwater, Montdillon and Oweninny. Derryfadda was included with Blackwater.

Sales to the E.S.B. and Briquette Factories were included with the General Accounts function, where the clerical time involved is minimal.

All our other comments, in the Moss Peat report, remain valid and we again show under the various functions, the improvements that should be made in the existing works structure, and any further saving in personnel which would accrue from regionalisation, as compared with this improved works situation.

GENERAL ACCOUNTS FUNCTION

1. Introduction

The General Accounts function is administered by six Works Accountants. A total of seventeen clerical staff are employed in the five milled peat works at a cost of £186,000.

2. The total numbers employed at these five works are as follows -

Permanent	Seasonal	Total
1742	948	2690

Staff numbers in this area were examined on the basis set out in the Moss Peat Report.

Local Works improvements as outlined (See Appendix A) would reduce total numbers of clerical staff by seven (i.e. from 17 to 10).

In a regionalised structure a further four clerical staff would be saved (Appendix A).

The current plans of Management Services on wages payments, envisages an optical mark reader at each Works. Input would be transmitted to the Regional Office for final processing and pay cheques would be returned to the Works.

Verification of data on the sheet would now be done at Works level by the Foremen. Exceptions report checking would take place in the Regional Office.

It would be the responsibility of the Regional Accountant to audit works time sheets on a basis which would ensure that each man's pay was monitored twice per annum.

COSTING

1. Introduction

The costing function is administered by six Works Accountants,

Eight clerical staff are employed at a cost of £105,000.

2. Improvements in the works structure with computerisation would reduce this to five. This is a saving of three clerical staff.

If costing is regionalised we are of the opinion that a clerical staff of two would suffice. This assumes that the fully computerised micro system being developed in Ballivor at present is in place.

This would give a further saving of three clerical staff.

Workshops - Administration

1. Introduction

The milled peat workshops are presently administered by (5) Superintendents (7) Workshop Foremen, (33) Assistant Foremen, (23) Chargehands, (5) Workshop Planners, (20) Work Measurement Analysts and (13) Assistants. The total cost of this administration is IR£1,429,000 per annum.

2. It is proposed that a new position of Workshop Manager, be created which would incorporate the function of both the existing Mechanical Superintendant and Workshop Foreman and encompassing the enhanced role as envisaged in the main report. A number of Foremen would report to the Workshop Manager as detailed in Appendix A.

3. It is our opinion that supervision should be undertaken by Foremen with a minimum of 10 to 12 skilled men per Foreman. This figure would be regarded as conservative and in the longer term a figure of 20 must be the objective, with further systems improvements.

4. The existing mix of both Assistant Foreman and Chargehands in the supervisory role, and ensuing overlap of duties is considered to be inefficient.

   Non-working Chargehands should not be utilised.

   Where direct Foreman supervision is not warranted it may be necessary to appoint working Chargehands e.g. Lemonaghan (5 skilled) and Monettia (4 skilled). For the purpose of this study Chargehands are included with the skilled workforce. See Appendix A.

5. Appropriate systems for work measurement, unit costing, preventative maintenance etc. should be handled by a Regional Engineering Department in conjunction with the Workshop Managers. For this purpose a position is to be maintained at each works, and one in the region.

6. No significant changes appear in the regionalised situation over the improved works position.

STORES

1. Introduction

The Stores function is administered by six Works Accountants. Six Stores Supervisors, thirteen clerical staff, seven Storemen and twenty two Issuers are employed at a total cost of £500,000.

2. Improvements in the Works structure would reduce this to five Supervisors, ten Clerical staff, five Storemen and twenty Issuers. This would give a total saving of eight persons, i.e. one Stores Supervisor, three Clerical staff, two Storemen and two Issuers (See Appendix A).

This is based on the volume of orders, receipts and issues as compared with volume studied in the Moss Peat Report.

3. In a regional structure this would be administered by one Regional Stores Manager.

We would visualise significant improvements, by this office, in the efficient co-ordination of internal and external transport of material and the proper deployment of stores stocks in the milled peat area.

Clerical staff from the Works would move to the regional office but would be reduced to six.

One clerk in the region would be fully employed on Purchasing and Progress Chasing.

However, some minor element of local purchasing for real emergencies would exist at each local Works. Subsequent clearance by Local Order and Petty Cash payment by the Regional Office would give adequate latitude for these situations.

Each Works Stores would have a Supervisor. Some of the existing duties and responsibilities (e.g. ordering, progress chasing, payment certification) have been removed to the Region. This indicates a grade of supervisor at a point between current Supervisor and Storeman grades.

The number of Stores personnel required at Works to receive, check, issue and complete computer inputting of issues would total 25.

This total of 37 would be a further reduction of three persons. See comparative chart (Appendix A).

SECRETARIAL

1. Introduction

This function is administered by six Works Accountants. A total of nine secretarial staff are employed at a total cost of £87,000.

2. Works improvements would show five at the Works with some element of assistance from clerical staff. To achieve this reduction of four, all Works telephone exchange systems would need to be modernised.

3. Regionalisation would not change this local requirement of five, but would give rise to one extra Secretary, in the Regional Office.

WORKS ASSISTANT/BOG RECORDS KEEPER

1. Introduction

This function is administered by six Production Assistants. Five Works Assistants and four Bog Records Keepers are employed at a cost of £113,000.

2. The following is a brief description of their main duties.

Works Assistant	Bog Records Keeper
Sign on Seasonal Employees	Production and Sales Records, including Charting and Reports
Road Transport	Phone Communications
Supervise - Watchmen Groundsmen Canteen Operatives	Radio Communications
Liaise with H.O. and local bodies on visits etc.	Liaise between Bog employees and wages office
Supervise visitors	Absentee Records
Visit absent employees	Deputise for Works Assistant

Evaluation of these duties would indicate that some could be transferred to other areas, e.g. road transport to stores.

An amalgamation of these roles, with help from the secretarial or clerical staff when necessary would reduce personnel in this area from nine to five or a saving of four people.

3. The "Fleet Management" system and computerisation will take some duties away from this area (e.g. Log Sheets, Road Transport Records, Charting Stock Records etc.)

This function will not change in a regional structure.

TECHNICAL ASSISTANTS/SURVEYORS

1. Introduction

This function is administered by six Production Assistants. Six Technical Assistants and three Surveyors are employed at a cost of £113,000.

2 Their main duties are -

a. Liaise with Land Purchase Section.

b. Handle complaints from farmers and other landowners.

c. Organise silt control.

d. General survey duties

Other duties may include

A. Control Turf Bank Licences

B. Control Civil Works Maintenance

C. Control Plant operating on Silt Control

There seems no obvious reason why the work content cannot be handled by one person at each Works - a reduction of four.

3. A regional team of four Surveyors with no works presence would lead to a further saving.

MATERIAL DESPATCH CONTROLLER

1. Introduction

This function is administered by six Production Assistants. One Material Despatch Controller is employed at each of the four works, Boora, Blackwater, Derrygreenagh and Mountdillon at a cost of £60,000.

2. This Quality Control function must be located at each Works and no change can be envisaged.

SUPERVISORS

1. Introduction

This function is carried out by 166 Supervisors (see chart below) at a total cost of £2,000,000 approx.

Works	Supervisors	Employees	Average
Boora	38	206	5.4
Blackwater	41	199	4.8
Derrygreenagh	34	172	7.2
Mountdillon	29	184	6.3
Oweninny	24	122	5.1
Totals	166	883	5.3

The average no of employees per Supervisor is five and the average at peak employment of seasonals is eleven.

2. This appears a very low figure but certainly indicates a seasonal element in supervision.

AREA FOREMAN

1. Introduction

There are twenty five Area Foremen as follows -

Boora	....	6
Blackwater	....	5
Derrygreenagh	....	5
Mountdillon	....	5
Oweninny	....	4

2. This is unlikely to change

BOG FOREMEN

1. Introduction

There are currently five Bog Foremen at four milled peat works at a total cost of £86,000 approx. Oweninny does not have a Bog Foreman.

2. The function or role of this particular post is duplicated by the Production Assistant and should not exist.

3. The reduction of these locally to nil, would lead to direct reporting by each Area Foreman to the Production Assistant.

This would shorten the reporting line and give a saving of five persons.

PRODUCTION ASSISTANTS

1. Introduction

There are currently six Production Assistants at five Milled Peat Works.

2. Derryfadda area should be included with Blackwater and administered by the Production Assistant Blackwater, with one Area Foreman in Derryfadda.

3. We have made some general observations about this role which are summarised on page 21.

ACCOUNTANTS

1. Introduction

There are currently six Works Accountants at the five Milled Peat Works at a cost of £113,000.

2. Derryfadda area should be included into Blackwater - a reduction to five.

3. In a regional structure this function would be administered by one Accountant in the region or a saving of four persons.

4. There was no committee agreement on a job specification for the Regional Accountant other than a belief that his role would have a significant change in emphasis.

MANAGERS

1. Introduction

There are currently five Works Managers at the five milled peat at a cost of £140,000.

2. It is considered that the size of each Works leads to the necessity of an overall authority at local level.

3. We have made some general observations about this role which are summarised on Page 21.

CONCLUSIONS

- Rationalising the current works structures would lead to staff reductions -

Total Current Works Structure	....	257
Total Improved Works Structure	....	183
Total Regionalised Structure	....	155

- Wages payment can be regionalised with a saving of four persons.

- Workshop Administration cannot be regionalised.

- Stores could operate at regional level with some reporting difficulties. The staff saving would be three persons.

- Costing can operate at regional level but would have implications for local Management Services. There would be a saving of three persons.

- Regionalising the Accounts function would require one Regional Accountant with a saving of four persons.

- Regionalising the Work Measurement System would reduce manpower in this area by fourteen persons.

- The role of Surveyors at each works is not justified, with the decline in the Third Programme. A regional mobile team of Surveyors should be adequate to meet works requirements.

RECOMMENDATIONS

- Undertake rationalisation and improvements at works level.

- Systems reviews should be undertaken on a regular basis.

- A network of computers at Works level to cope with local requirements, with the compatability to integrate at works, region and main frame as required.

  There must be adequate back-up to sustain the system. Separate software development must be in parallel with the network development.

- The wages payment system must be fully computerised with automatic print-out of all routine statutory and other deductions and automation of bonus payments.

  The system and necessity of putting pay-cheques in envelopes should be re-examined.

- A separate study of purchasing is required to examine Head Office and local orders, and address the high level of local purchasing with a view to rationalisation.

- The methods used to transport information and materials inter-works needs to be examined for proper co-ordination and cost reduction.

- Automate fuel issuing system.

- The Workshop Mnager as proposed must have the ability to implement a more cost effective service.

- The back-up services to implement this programme must be provided i.e. computer facility and re-training of supervisory staff.

GENERAL OBSERVATIONS

- In a Milled Peat Regional Structure, the role of the Works Manager will change.

  The elements of this function which were in the main of a corporate rather than an operational nature, would be handled at a higher level if a region was in place.

  It is the Committees considered view, that the person in charge of the production operation, should have line authority at works level to ensure that all works operations are efficiently co-ordinated.

- Payment of employees each fortnight in an alternating week plan, would reduce clerical work-time by 50%.

- Inter-regional sharing of specialist services would be possible e.g. Management/Financial Accounting.

- Size and geographical locations play an important role in regionalisation.

- The implications of placing stores under workshop supervision should be examined.

- It is necessary to review the present demarcation on electrical work on machines on the bog, as the main electrical components are now exchange units and no element of safety is in question. A fuller examination may show that Electricians are required at the re-wiring stage only. Considerable benefits wold accrue in the regional situation if such a policy was adopted.

Appendix A

COMBINED MILLER PEAT WORKS ADMINISTRATION

	Turnout Works	Improved Works	Regional Structure
Manager	1	1	1
Accountant	1	1	1
Production Asst	1	1	1
Reg Foreman	1	add	add
Assistant			
Reg Foreman	20	20	20
Material			
Dump Clerk	1	1	1
Loading	1	1	1
Wages	1?	1?	1
Secretary	1	1	1
Works Asst ?			
Reg Records	1	1	1
Tech Asst ?			
Surveyor	1	1	1
STORES			
Stores Controller			1
Superintendent	1	1	1
Clerk(s)	1?	1?	1
Storemen	1		
Labour	3?	3?	3?
WORKSHOP			
Workshop Manager		1	1
Mech Engr	1		
Workshop Foreman	1	add	add
Asst W shop Foreman	1?		
Foreman		1?	1?
Workshop Chargehand	1?		
Workshop Planner	1	1	1
MOT mechanic	2?	2?	2
MOT mechanic	1?	1	1
OVERALL TOTAL	37?	38?	39?

	Boora		Derrygreenagh		Blackwater		Mountdillon		Oweninny	
	Current	Improved	Current	Improved	Current	Improved	Current	Improved	Current	Improved
Manager	1	1	1	1	1	1	1	1	1	1
Accountant	1	1	1	1	2	1	1	1	1	1
Production Asst.	1	1	1	1	2	1	1	1	1	1
Bog Foreman	1	nil	1	nil	1	nil	1	nil	1	nil
Asst. Bog Foreman	6	6	5	5	5	5	5	5	4	4
Material Despatch Clerk	1	1	1	1	1	1	1	1	-	-
Costing	2	1	2	1	2	1	1	1	1	1
Wages	3	2	4	2	4	2	3	2	3	2
Secretary	2	1	2	1	2	1	2	1	1	1
Works Asst./ Bog Records	2	1	2	1	2	1	2	1	1	1
Tech. Asst./ Surveyor	2	1	1	1	3	1	2	1	1	1
Stores										
Supervisor	1	1	1*	1	2	1	1	1	1	1
Clerical	3	2	3	2	3	2	2	2	2	2
Storeman	1	1	1	1	2	1	2	1	1	1
Issuer	4	4	5	4	5	4	4	4	4	4
Workshops										
Mech. Supt.	1	1	1	1	1	1	1	1	1	1
Workshop F'man	1	nil	1	nil	3	nil	1	nil	1	nil
Asst. W'shop F'man										
Foreman	nil	7	nil	8	nil	8	nil	7	nil	4
Chargehand	2	nil	6	nil	5	nil	8	nil	2	nil
Workshop Planner	1	1	1	1	1	1	1	1	1	1
MCC Analysts	4	4	4	4	5	5	4	4	3	3
MCC Assistant	2	1	2	1	4	1	3	1	2	1
OVERALL TOTAL	53	38	53	38	63	39	51	37	37	31
		-15		-15		-24		-14		-6

Appendix 4-18

Industrial Cutaway Bog Land-Use Studies (Clonsast), 1978

INDUSTRIAL CUTAWAY BOG LAND-USE STUDIES

(A Bord na Mona Series)

Cutaway Study No. 1, 1978

CLONSAST

SUMMARY

CLONSAST CUTAWAY STUDY - 1978

Objective

This study is a first exercise in the planning of the long term use of the cutaway bog following fuel peat production by Bord na Mona.

Abstract

All the known data on 2,325 hectares of Bord na Mona cutaway bog at Clonsast, Co. Offaly are co-ordinated. The fuel production life of the area with the resulting emergence pattern of the cutaway bog is calculated.

Research work conducted on the potential of this land is summarised as is the development work done by Bord na Mona to date. Using these facts various land use options are suggested and the financial and social implications examined.

From these conclusions a policy for development in the immediate future by Bord na Mona is recommended.

Background

Total peat area of the country is estimated at 1.29 million hectares. Bord na Mona is producing peat from 68,826 ha. The area under study is thus 3% of the total Bord na Mona area and 0.05% of the total peat area of the country.

Definition of Area

According to the 1936 survey the average depth of peat in the undrained Clonsast bog was 8 metres. Production of sod peat commenced in 1936 and is now beginning to decline.

Survey of the sod peat cutaway in 1977 showed that there is an average of 1.4 metres of peat remaining, varying from 0.5m to 4m consisting of a layer of top strippings over forest, fen or reed swamp peat. Survey of the subsoil highlighted three main types, glacial drift at the higher contour levels, glacial sand at a lower level and shell marl in the depressions.

It is now planned to harvest milled peat from the deeper areas of the sod peat cutaway. This will prolong the fuel life of the bog by 12 years and yield an extra 3.6 million tonnes of peat. The average depth of peat remaining will be 0.5 metres ranging from 0 - 2 metres. We estimate that 10% of the area will have 2 metres of peat after milling in areas ranging from 20 to 80 ha. It is calculated that 76 m.m. of this peat (mainly fen) will yield an annual output of 187 tonnes per ha. The area of milled peat cutaway available for development can be calculated as follows:

1978	109	hectares (already developed)
1985	334	"
1990	578	"
1995	978	"
2000	1333	"

Research

Research on the potential of milled peat cutaway bog has been going on for 20 years and concludes that grass is the best crop. It also recommends that for vegetables deeper peat is required due to the annual wastage. It has also been shown that forestry will do well on cutaway bog with minimum peat.

Development

In the study area Bord na Mona has developed 109 ha. of grassland which is used for the production of beef both from summer grazing and winter feeding of silage.

Cutaway areas other than Clonsast developed are 80 ha. at Derrygreenagh used for a beef breeding herd, 130 ha. at Oweninny, Co. Mayo (blanket bog) for sheep production, 15 ha. at Lullymore for beef production, 52 ha. at Boora for cereal production. Problems encountered to date are:

(a) timber (old forest trees and stumps) emerging through the grassland, (mainly in the deeper peat areas).

(b) uneven subsidence and shrinkage.

(c) cracking on drying out.

(d) poor trafficability and poaching in deeper peat areas.

These problems will be overcome by:

(a) Milling the deeper areas and extracting the timber.

(b) Using cereals as a first crop (3/4 years) so that all settling will be complete before grassing.

(c) watertable control to prevent drying out.

(d) Deep ploughing and subsoil mixing to give better water movement.

All these solutions are being tested.

Nutritional problems are confined to copper deficiency in the herbage mainly affecting breeding animals. Preventative measures by feeding supplementary copper are in operation. Vegetables growing on deep (2 metre) fen peat is in progress since 1970 with disappointing yields and quality. This will continue and every

effort made to overcome the production problems. Recent measurements indicate that there is a loss of 58 m.m. of peat annually with vegetable growing which must be compared with a loss of 76 m.m. per year in milled peat production.

Recent surveys have also shown that there is at present approximately 12,000 ha. in the Bord na Mona production area with peat depths of 2 metre or more (classified as the most suitable for vegetable production). This area will increase over the next 15 years. If the vegetable production problems are overcome and if market conditions change a large area can be taken out of fuel production and used for this purpose.

Land Use Planning

Considering the physical data of the 2,325 ha. of cutaway bog (milled peat cutaway with 0.5 m. of peat remaining) and the research findings and the experience gained by Bord na Mona to-date, the following are the options for the use of this land.

Option 1

Grassland	- 91%	2116 ha.
Road structure	- 4%	93 ha.
Shelter and amenity planting	- 5%	116 ha.

The grassland could be used for beef production by Bord na Mona as at present. If suitable, it could also be subdivided for private farming by sale or leasing in the long term.

Option 2

Grassland, commercial forestry and amenity use.

Grassland	- 60%	1395 ha.
Commercial forestry and lakes	- 36%	837 ha.
Roads	- 4%	93 ha.

The better areas of peat and subsoil would be sown to grass and the deeper and more difficult peat sections sown with forestry. Some of the major depressions could be flooded for lake areas.

Option 3

Grassland, arable and vegetable production, shelter and amenity use.

Grassland	- 61%	1418 ha.
Arable Cropping - 10% of total area plus the North Bog	- 20%	465 ha.
Roads	- 4%	93 ha.
Lakes, shelter and amenity planting	- 15%	349 ha.

This is a combination of all uses retaining the deeper peat areas for vegetable production.

Option 4

Commercial forestry only.

The main factor militating against this option is its low labour requirement and subsequent fall off in employment.

Option 5

Biomass production.

This option is the use of the area for short rotation forestry as a source of energy. This concept is being researched in 1978 in co-operation with An Foras Taluntais.

Peripheral Area

This area between the Bord na Mona bog and the main road boundaries is 1,854 hectares. It is divided up as follows:-

Mineral soil	-	770 ha.
Developed cutaway bog	-	500 "
Undeveloped	-	236 "
High bog	-	208 "
Forestry on peat	-	140 "

The peat areas are typically poorly drained and fragmented and should be developed in association with Bord na Mona cutaway in Clonsast.

Financial Implications

Cost of developing grassland is estimated at £887 per hectare.

Total capital costs up to the year 2000 for a system of cereals for four years, followed by grassland and beef production (employing one man per 40 hectares) would be:-

Development	£1.1 million	
Buildings, Machinery	1.0 "	
Total:	£2.2 "	
Production cost	£4.8 million	(or £345/ha. per annum)
Livestock purchases	2.3 "	
Total Sales	8.4 "	

This plan has an operating surplus each year but the difficulty would be to carry out the plan from our own resources or commercial borrowing due to high interest charges, mounting overdraft and the compounding of interest.

The Forestry option, while much less capital intensive, gives no return for 15 years and employs only 1 man per 400 hectares.

Social Implications

The Economic & Social Research Institute was retained by Bord na Mona to conduct a survey of employees at Clonsast and E.S.B. employees at Portarlington Power Station to determine the following:

(a) the characteristics of the workers

(b) the implications for the workforce of the run-down of fuel peat production

(c) the implications for the total employment in the catchment area of a run-down of operations

(d) to obtain the opinions of all workers as to how the cutaway bog should be utilised.

A total of 292 out of 375 Bord na Mona employees and 59 out of 119 E.S.B. employees were interviewed.

The report concludes that

(a) the surrounding area is very dependent on Bord na Mona and the E.S.B. for employment and income. Wages and salaries in 1977 were £1.5 million

(b) fewer workers than in peat production will be employed in farming the cutaway regardless of how it is worked or owned

(c) alternative employment must be provided, particularly for the younger generation in the area, by Bord na Mona in association with the E.S.B. and the I.D.A.

Particularly surprising was the small number of employees (9%) who are part-time farmers.

Conclusions

In the present situation production of energy from native resources is important and it is thus desirable to produce the maximum amount of fuel from our bogs. In the undrained state the bogs were of no use and fragmented. There is now an opportunity of producing good agricultural land from the cutaway bogs using optimum planning and management methods.

From research and development work to date, the options for its use are: grassland, vegetable production, forestry and amenity use.

Social and economic aspects need frequent review.

Programme

All emerging cutaway bog (which will have an average of 0.5 metres of peat) will be developed for grassland after an initial period in cereal production. The methods of developing and

utilising this grassland will be perfected in association with all interested parties. Further research will be carried out by An Foras Taluntais with a proper inter-organisational structure. The long term use of this land cannot yet be determined. No specific areas of deep peat will be retained for vegetable production in the foreseeable future but growing trials will continue.

INDUSTRIAL CUTAWAY BOG LAND-USE STUDIES

(A Bord na Mona Series)

Cutaway Study No. 1, 1978

CLONSAST

OBJECTIVE

This study is a first exercise in planning the long term use of the land left following fuel peat production by Bord na Mona.

ABSTRACT

In this report all the known information such as peat types and depth, sub peat mineral soil types, drainage pattern etc. on 2,325 hectares of Bord na Mona cutaway bog at Clonsast Works, Cushina, Co. Offaly is presented. The studies made to determine the fuel production life of the area with the resulting cutaway emergence pattern are described.

A summary is made of Research and Development work to date in developing Bord na Mona cutaway bog for agricultural purposes.

Using all this data various land use options are put forward and suggestions made as to how this land might be used in the future.

The financial and social implications of the change from fuel production to other uses are examined.

From the conclusions a policy for Bord na Mona development of this land in the immediate future is recommended.

INTRODUCTION

Background

In a survey conducted between 1810-14 it is recorded that there was then over 1.29 million hectares of peat covered land in Ireland or 15% of total area.

This was sub-divided as follows:-

0.65 million ha. mountain bog (50%)
0.34 million ha. blanket bog (26%)
0.30 million ha. raised bog (24%)

Harvesting of peat by hand has been practised in Ireland for generations but it is difficult to measure what quantity has or is being produced. It can be clearly seen that in the intervening years large areas have been harvested and some of the cutaways developed for various agricultural purposes.

The first State involvement in peat production began in 1936 with the setting up of the Turf Development Board. This Board was replaced by Bord na Mona in 1946 to facilitate the more extensive development of the country's peat resources. During the intervening thirty years the Board has purchased 68,826 ha. of virgin bog which it has drained, developed and worked for peat production in units ranging from 8,100 - 240 hectares. Up to 1977 Bord na Mona has produced a total of 75 million tonnes of peat. Output in 1976 was 5 million tonnes plus over 1 million cubic metres of moss peat, realising a sales revenue of £27 million and employing 5,385 people. Some 56% of this fuel output went into the generation of 25% of the nation's electricity and the remainder to the domestic fuel market as sod peat or briquettes. This output of peat fuel represents a saving on imported energy in the form of oil of £50 million in 1976.

While this contribution by Bord na Mona to national progress is substantial there is another and even greater contribution to be made in the development of the cutaway bogs when fuel production ceases.

Some trial development work is in progress at a number of locations. The first large area of worked-out bog will be at the Clonsast Works near Portarlington.

Clonsast Works

Clonsast bog is located five miles north of Portarlington and lies on 7° 9' West latitude and 53° 15' North longitude. Height above sea level varies between 64-76 metres. The average annual rainfall is 855 mm. and the average annual temperature is 48.4°F. The Clonsast group consists of Garryhinch, Derryounce, Derrylea, Clonsast main bog, North bog and the Bulge. The gross area involved is 4,343 hectares. This study is confined to the latter three bogs, namely, Clonsast main bog, North bog and the Bulge,

comprising an area of 2,325 hectares, which is approximately 3% of the total area that will become available from Bord na Mona operations over the next forty years and 0.05% of the total peatland area in the country.

Bog development commenced at Clonsast in 1936 with the acquisition by the Turf Development Board of about 1,619 hectares of virgin bog. Production was begun in 1939 with one cutting machine. Over the years the operation has been mechanised and employment which was running at 600 per annum in the 1950s is now down to 330.

Since 1939 Clonsast works has produced six million tonnes of sod peat. Over the past five years production and sales have been as follows - tonnes:-

	Production	E.S.B. Sales	Total Sales
1973/74	224,590	155,009	202,586
1974/75	219,281	162,276	226,333
1975/76	221,186	192,443	254,020
1976/77	177,089	170,000	226,300
1977/78	210,000	120,000	200,000

A 25 M.W. generating station was built at Portarlington by the E.S.B. in 1948 and during the early 1960s a further 12.5 M.W. was added. This power station employs almost 100 people and takes 60% of the Clonsast peat output. At present this generating station forms part of the E.S.B's. base load capacity and will continue to do so up to the early 1990s when it will be phased out.

Definition of Area

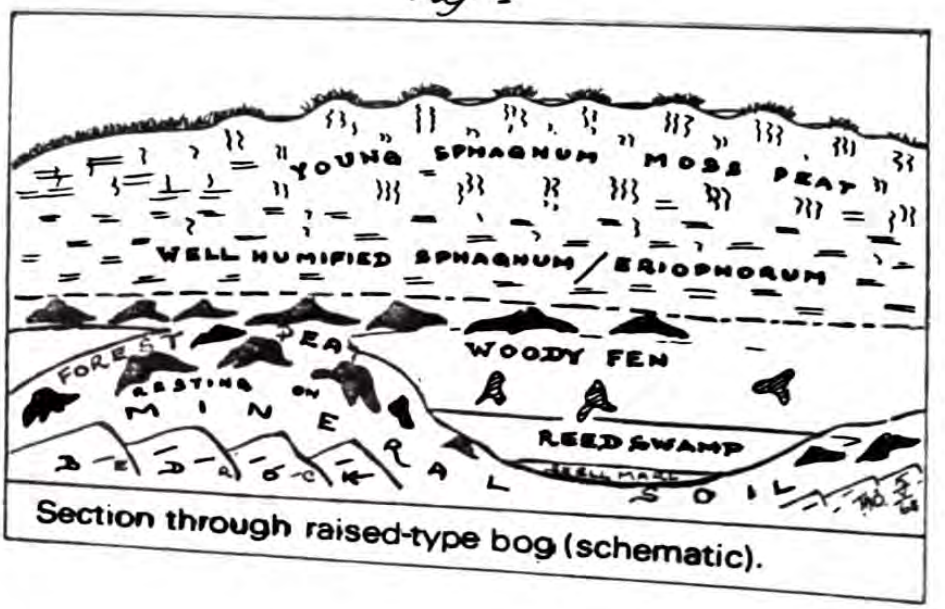
This is Hochmoor or raised-type bog typical of the Central Plain of Ireland. According to the 1936 survey the average depth was 8 metres undrained (10 metres maximum and 3.6 metres minimum). The average moisture content in Ireland of this type of bog is 96% before drainage.

Peat in general is an accumulation of organic residues originating under more or less water-saturated conditions through the incomplete decomposition of plant remains. The peat type varies with the plant species that formed it.

Raised bogs overlie layers of fen peat or forest peat of variable thickness. These developed from about 8000 B.C. in areas subject to prolonged waterlogging such as lake margins and river flood plains. Fen peat is mainly derived from plants such as reeds and sedges, which during their period of growth were more dependent on nutrient-rich groundwater than on rain water for their moisture supply. It frequently includes the fragmented remains of birch and alder. Fen peat comprised mainly of non-Sphagnum mosses and containing a significant proportion of wood fragments is frequently termed "woody fen". Due to their relatively high base content, fen peats are only marginally acid.

As fen peat gradually increased in thickness over about six thousand years the living vegetation on their surface became further removed from the influence of groundwater and more dependent on rain for its moisture supply. This resulted in a complete change in their flora to plants such as heather, bog cotton and Sphagnum mosses, which are more suited to the acid conditions prevailing. The partially decomposed remains of these and other plant species eventually resulted in the development of what are today termed "raised bogs".

Fig 1



Section through raised-type bog (schematic).

Fig 2

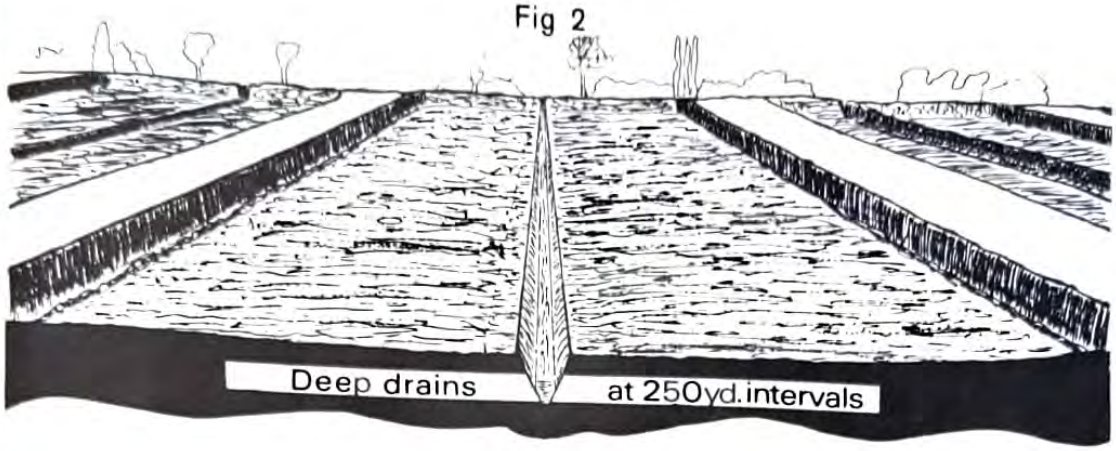
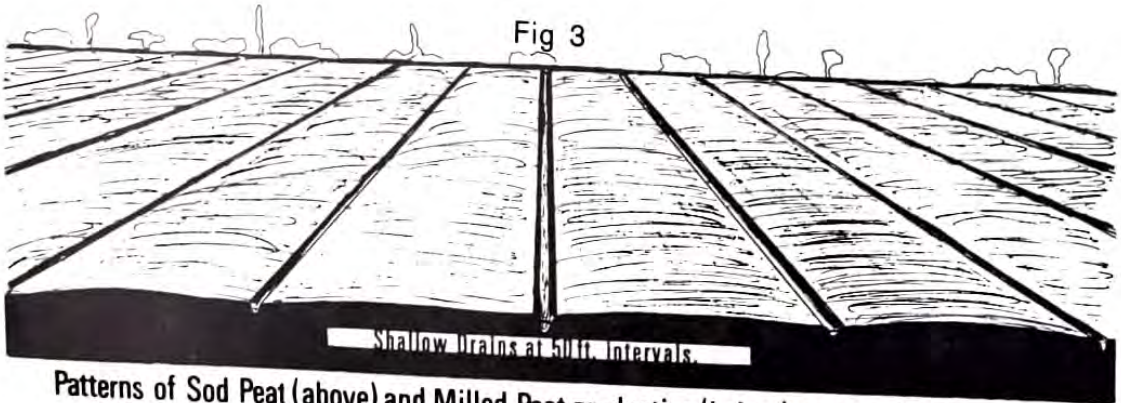


Fig 3



Patterns of Sod Peat (above) and Milled Peat production (below) compared. Schematic.

Throughout the study area bog peat proper consisting of younger and older Sphagnum and Eriophorum, spp. overlies forest peat consisting of forest debris found only on the higher levels of the floor. On slopes it overlies woody fen or forest peat. Over convexities in the floor it overlies reed swamp, with or without a woody fen layer at the transition level.

Sod Peat Production

Sod peat is produced by excavating two metre wide strips of bog along a drainage trench vertically to a maximum of four metres of the bog profile. The top half metre (Sphagnum moss) is first stripped and left on the cutaway. Initially the surface of the bog is used as a spreading and drying ground. As cutting proceeds the area of uncut bog decreases and the area of cutaway increases and is used for spreading and drying. Sod peat cutaway is thus required as a spreadground until the total bog is cut out. (Fig.2)

Sod Peat Cutaway

The sod peat cutaway, surveyed in 1964, was found to consist of a layer of top stripping, mainly young Sphagnum peat 25-50 mm. thick, lying on one or more of the other peat types which were undisturbed except where levelling operations, in preparation of the cutaway as spreadground for sod peat, had mixed the materials in the top 50 mm. or more (1).

The deeper stripping layers lay over the deep reed swamp; the least depth of stripping over the shallow forest peat on convexities and on high ground generally.

Correlations between peat types and depths were found as follows (undisturbed peat in cutaway):

(a) 0.3 - 0.5 m. of forest debris on all major convexities.

(b) 0.5 - 1.5 m. of woody fen peat, most often found on slopes (depths more variable than at the other levels).

(c) 1.5 - 3.0 m. of reed swamp in the major hollows.

(d) 3.0 m. plus as for (c) but with shell marl under the reed swamp.

These correlations were found to hold good over a total of 8100 hectares of machine sod peat cutaway subsequently surveyed in the Clonsast, Ballydermot, Timahoe and Mountdillon groups. They were, therefore, used as a basis for a 'natural regions' sub-division of all the surveyed bogs. This classification received further support later when it was found that there was a reasonably good correlation with subsoil variations also. The regions were lettered A, B, C and D (Map I).

Subsoils

The sub-peat mineral soils of Clonsast were investigated for Bord na Mona in 1961/64 (2). They were found to be as follows:-

S.1 - well developed relict soil, sandy loam to loam.

S.2 - moderately developed soil, loam.

S.3 - undeveloped soil, highly calcareous shallow silt loam over calcareous glacial drift, etc.

S.4 - undeveloped soil. Glacial clay, sand, gravel. Find sands and silty clays (calcareous).

S.5 - shell marl.

Cutaway Soil Maps

Recent discussions have produced agreement on the following simplification of the above nomenclature and classification of sub-peat mineral soils of Clonsast, - solely for the purpose of producing a more simple soils map to assist in our present study.

S.1 and S.2 soil types, being more or less weathered and matured soils, with some degree of decalcification towards their former surfaces, are coupled and termed WEATHERED SOILS.

S.3 and S.4, unweathered and immature soils materials, are together termed UNWEATHERED SOILS.

S.5 stands as before - SHELL MARL.

Map 2 carries the simplified notation of the mineral soils referred to above.

Data from the cutaway peat survey and from the mineral soils survey (simplified version) were then combined in Map 4 in order to show whatever correlations exist and to assist in sub-dividing the general area into possible planning regions.

It must be emphasised, however, that the boundaries between these regions are by no means firm. They may alter with the particular form of land use envisaged and with changing circumstances, e.g. eventual depths of peat remaining after fuel peat removal.

Peat Depth

During 1976/77 the area was surveyed for peat depth - excluding the portions of high bog which have still to be utilised for sod peat production. Map 6 shows these depths in detail and there is a much greater depth of peat on the cutaways of the North bog and Bulge than on the Clonsast main bog area. This is

because the former two areas had greater peat depths and came into production later. Analyses of the peat depths from the soundings taken are as follows:-

Peat Depth Range (metres)	Percentage of Area within depth range	Approx. Hectares within depth range (Peat Production Area)
Main Bog:		
0 - 0.5	12.06	173
0.5 - 1.5	32.73	470
1.5 - 3.0	31.53	452
3.0 and over	23.68	340
North Bog:		
0 - 0.5	Nil	Nil
0.5 - 1.5	5.3	10
1.5 - 3.0	16.7	33
3.0 and over	78.0	155
Bulge:		
0 - 0.5	4.8	16
0.5 - 1.5	4.8	16
1.5 - 3.0	16.7	61
3.0 and over	73.7	308

Average depth of peat on the cutaway within the study area is 1.4 metres.

As already explained this cutaway peat consists of a layer of Sphagnum strippings overlying either forest debris, woody fen or reed swamp peat. It was assumed that this would be the composition of cutaway bog available for development and on which development has been in progress since 1972.

Milled Peat Production

The term 'milled peat' is used to describe peat in crumb or powder form. It is produced over the entire working area by milling and drying a shallow layer of peat each harvest. In an average season twelve crops are harvested giving 187 tonnes per hectare. The boç is serviced by drains at 15.2 metre centres. With this system all the peat is harvested and there is no top stripping left on the cutaway as in sod peat production. (Fig.3)

Milling continues until the subsoil appears in the field drains. This occurs haphazardly due to the undulating nature of the subsoil. When a subsoil outcrop occurs in a production area milling must stop to avoid mixing stones, etc. with the peat which makes it unsuitable for burning. It is thus not possible to leave a uniform depth of residual peat. In practice an average of 0.5 metres is left with approximately 10% of the cutaway having depths of 2 metres or more over areas of 20-80 hectares. Milled peat cutaway bog is peculiar to Bord na Mona area and will not be found in any other peat areas of the country.

Trial milled peat harvesting of the deeper areas of sod peat cutaway were successfully conducted over the past three years at Clonsast. All sod peat cutaway with more than 0.5 metres of peat will now be used for milled peat production. The advantages of this for fuel production are obvious because harvesting can be undertaken immediately on a drained and developed area. The amount of harvestable peat will be discussed in the next chapter. Milling also aids cutaway development because:-

(a) it removes the old sod peat stripping which is not a good medium for agriculture

(b) it reduces the area of very deep peat (2-3 metres) which is also problematic for agriculture

(c) it disposes of timber (old forest trees and stumps) which occur in the lower layers of peat (described in Chapter II).

This cutaway bog available for development over the next twenty-three years is in the Main bog only and accounts for all fuel production area there. No cutaway will be available on either the North bog or the Bulge in that time span due to greater peat depth and it is estimated that milling will continue on those two areas for a further six years, i.e. until the year 2006.

While the areas becoming available for development over the next twenty years are substantial it must be remembered the emergence of these areas is haphazard and it will be many years before any large block of developed land will be available.

Drainage Pattern

Map 5 shows the flow pattern and final drainage plan now operating in the study area. No further drainage is necessary for fuel production and it must be assumed that this will be the drainage pattern for cutaway development. The eight pumping stations pinpointed are necessary to facilitate peat production at the lower contour levels. The area requiring pumping at present is estimated at a total of 405 ha. and for future development, unless this area is flooded for amenity purposes, these pumping stations must be maintained to keep a low water table level and allow agricultural operations.

It can be seen that there are three catchments in the area flowing into the three Barrow tributaries, namely, the Philipstown river to the north, the North river flowing through the Main bog and the Cushina river to the south. These three tributaries meet at Monasterevan and flow into the river Barrow. Levels to ordnance datumshow the break points on each trench together with levels at key points on all outfalls and pumps (entry and exit).

The permanent railway system is also shown on this map but it is visualised that this railway will have no part to play in the cutaway utilisation for which a system of roads will be constructed.

The red lines on Map 5 indicate the subsoil contours.

Peripheral Area

In the course of the study the peripheral area between the Bord na Mona bog and the main road boundaries was surveyed (Map 6). This area is 1,854 hectares consisting of:-

Mineral land	-	770 hectares
Developed cutaway	-	500
Undeveloped cutaway	-	236
Undeveloped high bog	-	208
Forestry (on peat)	-	140

As most of this area is serviced by the outfalls developed by Bord na Mona since 1939 it could be very easily drained and developed. The active 'facebanks' (for hand harvesting turf) numbered 131 from which an estimated 3,000 tonnes of turf was produced in 1977. There is also a private machine turf cutting

enterprise producing an estimated 2,500 tonnes per annum. On the peat area depth varies from 0.15 m. to 3.9 m. - averaging 1.4 m. (Map 6).

This peat area in private ownership should be developed and restructured in conjunction with the Bord na Mona cutaway bog and a land use plan be drawn up for the total area of 3,269 hectares of bogland excluding forestry.

Summary

From the foregoing it is now possible to define the nature of the cutaway bog in this study area.

It will consist of an average of 0.5 metres of peat of either forest debris, woody fen or reed swamp type, overlying one of the three types of sub peat soil - weathered relict soils, unweathered silty loams etc. or shell marl. Using these combinations it is possible, for planning purposes, to divide the Bord na Mona cutaway bog area into three regions, as in Map 4.

CHAPTER 3

RESEARCH AND DEVELOPMENT

Research

The first growing trials on cutaway bog were started in 1955 at Clonsast by the Department of Agriculture. Here for a period of six years investigations were carried out into the growing of grass, kale and potatoes.

Phosphate, potash and nitrogen were found to be essential for growth, but yields were generally low in the second and subsequent cropping years. Grass and potatoes were the most suitable. (3)

Research work also commenced at Lullymore in 1955 on milled peat cutaway and was continued by An Foras Taluntais from 1958. Preliminary results showed that grass was the only crop which grew satisfactorily on shallow peat and basal soil. It was also shown that arable cropping should be located on deeper peats and that Sphagnum peat in situ or as a waste product of sod peat harvesting and basal soil are unsatisfactory media for arable crops. (4)

From 1962 research on cutaway bog was confined to grassland for which Bord na Mona developed and allotted to An Foras Taluntais 32 ha. of milled peat cutaway and 10 ha. of sod peat cutaway at Lullymore and Timahoe respectively.

Until 1972 work was confined to beef production from grass (summer grazing). Results from 1968 showed that satisfactory liveweight gains could be obtained. This was verified over the following years when gains of 0.8 kg. per day were achieved. Mineral levels in both animal and herbage were monitored and no advantage was observed from feeding supplementary copper. (5)

In 1972 an agreed programme of research for four years was undertaken at Lullymore to observe the performance of breeding animals on cutaway bog and identify problems associated with minor element deficiencies and their effect on fertility. Parasitic behaviour on this land was also investigated. It was concluded that animal fertility was normal but severe copper deficiency was observed and a system of supplementary copper feeding was necessary. Parasitic (Strongolides) build-up was also associated with copper deficiency and required special treatment. (6)

Research on Vegetable Growing

1967/68 growing trials of vegetable crops on deep (2 m.) fen peat at Derrybrennan gave considerably higher yields than the national average. While the addition of high levels of major nutrients and of some minor ones, such as boron and copper, was necessary and while weed control was a problem it was concluded that deep fen peat had many advantages for horticultural production. (7)

Forestry

Results from trial plantings made on Trench 14 (within the study area) by the Forest and Wild Life Service of the Department of Lands in 1955 suggest that cutaway bog has a high potential for timber production. Yields of 25 cu. metres per hectare per annum have been recorded. (8) Recent examination has shown yields above national average for nine out of eleven species compared. Root development is satisfactory. On shallow peat roots of one species (Abies grandis) have penetrated into the calcarous subsoil. (9)

Development and Utilisation to date

Bord na Mona commenced the development of cutaway bog in 1972. The first development of 48 hectares took place on the study area. This consisted of two sod peat spreadgrounds 120 metres wide and 2.4 kilometres long, serviced by one of the 14 main drains which runs through the bog. Over the length of the developed area the depth of this drain varied between 1 and 4 metres and for most of its length it was cut into the mineral subsoil. The average depth of residual peat was 1.5 metres and this was typical of sod peat cutaway, consisting of a layer of Sphagnum stripping overlying forest peat to the north and fen peat in the remainder of the area. The mineral subsoil contained all three types already described, i.e. weathered glacial drift to the north, unweathered silty clay for about two-thirds of the area and a small portion in the centre overlying shell marl. The peat on the east side of the drain contained a large quantity of drain excavated subsoil.

All surface timber was extracted. The total area was levelled and graded to an approximate gradient of 1% towards the main drain. No intermediate tile drains were used.

The pH of the cutaway varied from 3.5 - 7.5, the higher figure being obtained where subsoil was more prevalent. Quantities of lime varying from 0 - 15 tonnes per hectare were applied to neutralise the acidity and raise the pH to an average level of 5.5. The other nutrients applied and the seed mixture used are given in Tables 1 and 2.

Grass establishment was excellent even on areas where sub peat mineral soil was exposed.

During 1973 the pasture was used both for summer grazing and for silage making. A satisfactory liveweight gain of .60 kg. per animal per day was obtained during the grazing season from June-October. The silage yield of 15 tonnes per acre was also satisfactory and there was no problem with mechanised operations.(10)

Accommodation for over-wintering 400 bullocks was built adjacent to the grass area. In the first winter silage mixed with barley and minerals was fed to 300 animals and a liveweight gain of .66 kilos per day was obtained.

The animal slurry was collected during the winter, stored in steel tanks and applied to the grass area in 1974.

Soil analyses (Table 3) demonstrate that while a very high initial application of nutrients is required to obtain the desirable fertility level subsequent applications are somewhat similar to those for mineral soil to maintain that level of fertility. The average annual application of nutrients is given in Table 4.

While the response to nitrogen application is very evident the deficiency of this element is quickly observed by the orange and green discoloration of the grass tips accompanied by a marked drop in yield.

The analyses of both herbage and silage (Tables 5, 6 and 7) indicate that good quality material can be grown on and ensiled from cutaway bog.

A point worth noting is the consistently low level of copper in both herbage and silage. This low level of copper is further complicated by an abnormally high level of molybdenum which can aggravate copper deficiency by making the copper that is present unavailable. However, animal performance in this unit does not seem to be affected by this imbalance of minor elements. This is borne out by the satisfactory levels of nutrients found in the samples of animal blood and liver analysed (Table 8).

To date a total of 120 ha. of grassland has been developed at Clonsast Works and is used for the production of beef by summer grazing and over-wintering. While most of this grassland is on cutaway bog some marginal areas on the periphery of the bog have been taken in and developed also.

Other Developments

Over the past five years the Board has developed other areas of cutaway bog as follows:

Derrygreenagh:

80 ha. of grassland established on milled peat cutaway bog. The peat depth on this area was approximately 0.7 metres of reed swamp overlying very porous glacial outwash gravels. This combination of peat and subsoil will not be encountered in the study area at Clonsast. The 80 ha. of grassland has been used for the maintenance of a single-suckling herd of 150 cows and the production of beef animals for finishing at Clonsast.

Oweninny:

130 ha. of grassland developed from milled peat cutaway. This is blanket type peat peculiar to the west of Ireland and will not be encountered in the study or any midland area. This grassland has been used for the maintenance of a flock of 1,000 ewes and the production of mid-summer lamb for three years.

There is some summer grazing with lightweight cattle which are later brought to Clonsast for finishing as beef. It was always envisaged that the development of cutaway bog in Mayo would be difficult due to the prevalent peat type and adverse climatic conditions. This has been borne out in practice and the performance of livestock in this area is still unsatisfactory.

Lullymore:

At this works an area of 15 ha. of milled peat cutaway bog has been developed as grassland and used in conjunction with 64 ha. of mineral soil for the production of beef and for cereal growing.

Boora:

52 ha. of milled peat cutaway has been developed at Boora and used for the production of wheat and barley over the past two years.

Blackwater:

12 ha. of marginal mineral soil has been used for growing wheat in the 1977 season.

In total the Board will be working in 1978:- 346 ha. grassland, 220 ha. cereals, 4 ha. vegetables. Some 52 ha. will also be planted for shelter and amenity.

Problems Encountered

Nutrition:

With the grazing and over-wintering of beef animals no major nutritional problems have been encountered. While we have recorded some erratic performances from time to time we are convinced that these are due to factors other than nutrition. Among the breeding animals at Derrygreenagh numerous cases of copper deficiency have been encountered and a system of copper supplementation is constantly practised. The copper level in animal tissue is continuously monitored in co-operation with An Foras Taluntais with a view to perfecting this supplementation programme. All analytical data from the sheep flock indicate that its nutrient and minor element status is satisfactory to date.

Parasites:

No parasite problems have arisen with beef animals, but as was found by other research (4), parasite infestation in combination with copper deficiency in the breeding herd has been difficult to control. A system of preventative treatment has been undertaken in association with research scientists of An Foras Taluntais and the Veterinary Research Laboratory of the Department of Agriculture. In the sheep flock, with the climatic conditions prevailing at Oweninny, parasite control is one of the major factors affecting production levels and an elaborate system of preventative treatment is in operation there. To date a build-up of infection has been prevented but further experience is required before an extension of this project will be undertaken.

Physical Problems

The physical problems encountered in utilising grass from established grassland on cutaway bog have been substantial over the past five years and can be summarised under the following headings:-

1. Timber Emergence

The degree of tree cover prior to bog formation varied throughout the country. The area under study was covered by a very dense forest and as a result the cutaway bog contains a high proportion of tree trunks and stumps of pine, oak and yew.

The area developed for grassland contains an average of 0.75 m. of peat varying from 12 mm - 3 metres. During development all visible timber was extracted, but due to subsidence in the intervening years the timber below the surface has emerged through the grassland and caused serious problems in utilising this grass. It has been a major hindrance to machine operation both in the application of fertilisers and in harvesting of grass and has necessitated timber extraction every year for the past three years. This extraction and pasture renewal has reduced output and made proper management difficult.

2. Uneven Subsidence

When cutaway bog is levelled, graded, drained and sown down to grass uneven subsidence immediately occurs due to the variations in peat depth and types particularly in the case of sod peat cutaway. This again makes mechanical operations difficult and reduces output.

3. Cracking

This phenomenon too is associated with the drying out process in developed cutaway bog and varies with the degree of drainage and also with the peat type. While cracking is not a major problem at Clonsast it has been very widespread at Derrygreenagh where reed swamp peat overlies a porous subsoil. Proper management has been difficult and we estimate that production has been reduced by over 50% on most of the area. It will be necessary to renew the grass on all this area in the coming years.

Again at Oweninny cracking is a problem but does not affect the management of sheep to the same extent.

It must be remembered that the past three summers have been exceptionally dry and have aggravated the three problems mentioned. It is not possible to say at this stage whether they will recur to the same extent in the future.

Solutions

(a) Milled Peat Production on the Sod Peat Cutaway

The taking of milled peat from sod peat cutaway at Clonsast will alleviate to some extent the timber emergence problem as most of this timber will be extracted in the milling process.

(b) Cereal Growing

To avoid uneven subsidence, and to some extent eventual cracking, cereals have been used as a first crop on the cutaway bog at Boora Works for two years. Our purpose in doing this was to ensure that all levelling and subsidence would be completed before permanent pasture is established. While the yield of these cereals and the quality of grain has been below average, the operation is having the desired effect and will be continued. It is now envisaged that in future cereals will be grown on all cutaway bog for a number of years before grass is sown.

(c) Watertable Control

It was always expected that the drainage of cutaway bog would be a problem but, from our experience over the last three years in particular, we are now of the opinion that certain areas may be over-drained and that watertable control may be necessary for future development. An area of 80 hectares of cutaway being developed at Boora will be used to test the feasibility of controlling the watertable level by pumping.

(d) Deep Ploughing and Subsoil Mixing

Deep ploughing and mixing the residual peat on the cutaway bog with the subsoil was tested in 1977. Twenty hectares was treated at Clonsast and a further 14 hectares at Derrygreenagh. Preliminary observations indicate it to be of benefit but further tests will be conducted in the coming year in association with the Soil Physics Dept. of An Foras Taluntais so that a full appraisal can be made. We expect this pulverisation of peat layers and subsoil will give deeper root penetration and better water conductivity and thus a reduction in drying out and cracking. It should also have the effect of reducing peat wastage and subsidence and allow more even settling.

4. Trafficability

Bog drainage is designed to cater for fuel harvesting over the major portion of the area. Due to the varying contour levels it is not possible to drain every portion fully and some areas of deep peat at lower contour levels will always have a high water-table. These pockets of peat (generally overlying shell marl) will always cause problems in cutaway development and must receive special attention. One such area has been developed at Clonsast and has been very difficult to manage due to poaching by livestock and difficulty in machine operations

Shelter

In our experience the provision of shelter is important for satisfactory animal performance and is deficient in our operations to date. We realise that shelter must be provided many years before actual cutaway development takes place and is of prime importance in any land use plan. Tree planting is also of prime importance from an amenity aspect in reducing the monotony of the landscape and providing a habitat for wild life.

Horticulture

Bord na Mona is investigating the potential of deep fen peat for horticultural production at Derrygreenagh since 1971. An area of 28 ha. was taken out of milled peat production and redeveloped for arable cropping. It had an average depth of 1.5 to 2.0 metres of woody fen and phragmite peat overlying a free draining gravel subsoil - a combination which is not found in the study area.

After grading, levelling and draining, nutrients were added to raise the fertility to the desired level.

In the intervening years a complete range of crops have been grown but yields have not been spectacular as can be seen from the following table.

Crop	Years Grown	Yield (Tonnes/Ha.)	Experimental Yields A.F.T.1967, 1968
Potatoes	6	26.65	47.5
Onions	4	41.40	72.5
Carrots	4	28.00	72.5
Carrots - early	3	11.75	43.7
Cauliflower	6	2.50	-
Calabrese	2	2.75	8.5
Celery	4	18.10	165.0
Barley	4	3.30	-

Not only are the yields disappointing but poor quality produce has been obtained with many crops.

The reasons given for this poor performance are many and varied, but the trial growings will continue in an effort to obtain better yields and quality so that the deeper areas of suitable peat left after fuel production may be utilised for this purpose. From figures available at present 10% of the cutaway bog will have 2 metres or more of peat remaining. This deep peat area could form a very substantial vegetable enterprise if production problems are solved and market conditions are favourable.

Overall Picture

From our surveys conducted on Bord na Mona sod peat cutaways in the late '60s and from calculations made on the milling process over the last 25 years we estimate that approximately 12,000 hectares of its production area at present has a depth of 2 m. of peat or more. As production increases (only 1/3rd of the peat deposits of the Bord na Mona bogs have as yet been exploited) this area with 2 m. of peat will increase for approximately another 15 years before it will begin to decrease, (Graph 1). It is obvious that at any time over the next 25 years a very large area of deep fen peat can be taken out of fuel production and retained for this purpose if required. Also assuming that Bord na Mona will develop 80,000 hectares of bog for fuel production it will have 80,000 hectares of cutaway peat and 10% of this will have a depth of 2 m. or more of peat. Therefore, 8,000 hectares of Bord na Mona cutaway peat will have peat depths suitable for vegetable production.

Peat Subsidence

It should be noted that the loss in depth under vegetable production since commencing in 1970 is 58 m.m. per year and for cost/benefit purposes must be compared with a loss in depth of 76 m.m. to produce 187 tonnes of milled peat per hectare per year. A worldwide comparison of peat loss under various croppings and over varying periods can be seen in Appendix 1.

Summary

Development work to date has been generally confined to shallower peat areas overlying the better subsoil types. Some experience has also been gained from small areas of deep peat overlying the more difficult subsoils both in the study area and elsewhere. However, at this stage it is our opinion that we have not yet created the perfect pasture or arable cropping programme from cutaway bog. The problems encountered have been highlighted and will be tackled and solved by further development.

Research to date does not allow us to be dogmatic as to the suitability of any particular area for any one specific land use. The broad recommendation is that grass is the most suitable crop for shallow peat and that for arable cropping and vegetable production greater peat depths are required. Our experience to date is in line with this conclusion.

CHAPTER 4

LAND USE PLANNING

From the preceding chapters on peat and subsoil type it is evident that the area under study is of a complex nature and is therefore unlikely to be suitable for any single form of land use.

For this reason we have to approach land use planning using a number of hypotheses, the validity of which remain to be proved.

Assuming that an average depth of 0.5 metres of peat will remain on the study area the following are the options in land use as we see them now:-

1. Total area sown to grassland, less 5% for shelter and amenity planning and 4% for roads.

2. Sowing down the more suitable peat and subsoil areas to grass and commercial forestry on other areas plus amenity planting to include the creation of lakes by flooding.

3. The shallow peat area sown down to grass, the deeper peat areas for arable and vegetable production, 10% for shelter and amenity planting and a further 10% of low-lying areas flooded for amenity.

4. Afforestation of the entire area.

5. Use of the total area for Biomass production that is short rotation forestry for fuel.

OPTION 1

(Grassland Only)

Here it is assumed that all areas will be equally suitable for development as grassland after an initial period of cereal production. Map 7 shows this plan with 5% tree planted and a further 4% allocated to roads and buildings. This gives a total pasture area of 2,000 hectares.

This area of grassland will be developed gradually over a period of 25-30 years as the cutaway emergence plan shows in Chapter 2. This would entail the retention of the eight existing pumping stations to maintain the low water level necessary for agricultural operations in the lower contour areas (Map 4, Region 3 and Region 2 North).

If, as at present, the grass were used by Bord na Mona for beef production by grazing and winter feeding, three centralised serving units would be sufficient. These units would include cattle housing, slurry storage, grain storage and processing, fertiliser and machinery storage.

The long term aim would be to maximise silage use for over-wintering and reduce summer grazing to a minimum. This would create an outlet locally for young cattle in the autumn and be complementary to local farming. It might also be possible to arrange contract winter feeding for part of the livestock of neighbouring farmers.

Possible alternatives within this system would be grass meal production - using peat-fired dryers, grass juice extraction (for protein production) prior to grass drying, or silage, slurry treatment with the addition of peat for the production of an organic fertiliser to be marketed in conjunction with moss peat, etc. These alternatives (subject to economic appraisal) would raise the employment level above that of a straightforward grass/beef production system estimated at 50 for this area, that is one man per 40 hectares.

A further alternative use for such grassland is private farming. This could be done on a short or long-term lease basis, without buildings, or by sub-division into economic holdings, with provision of farm buildings to selected qualified individuals. Such a suggested sub-division is indicated by the red numbers on Map 7, giving 36 farms of approximately 50 ha. each, plus an area to service the existing cattle unit (No. 24). This suggested sub-division is dependent on the assumption that we will create the land and conditions suitable for private farming.

OPTION 2

(Grassland, Commercial Forestry and Amenity Uses)

This option is shown in Map 8. All the better subsoil areas (Map 2) are used for grass production as are the poorer subsoil areas covered by the better type peat, i.e. forest debris and woody fen. Regions 1 and part of 2, (Map 4) are under grass. Commercial forestry would be established on the remaining deeper areas of reed swamp peat. Amenity and shelter planting would be established on the lower contour areas (Region 3) eliminating the need for pumps.

Under option 2 the area would be divided as follows:-

Commercial forestry, lakes and shelter belts	-	36% - 837 ha.
Roads and buildings	-	4% - 93 ha.
Net usable grassland	-	60% - 1395 ha.

The alternatives for the use of this grassland are as in Option 1. Similarly the long-term alternatives would be farming by Bord na Mona, or leasing or sale. The red numbers on Map 8 indicate how this grassland could be sub-divided into 21 individual farms of approximately 50 ha. each plus an area to service the existing cattle unit.

OPTION 3

(Grassland, Arable and Vegetable Production, Shelter and Amenity)

This option as shown in Map 9 entails the sowing of all shallow areas to grass and the retention of the deeper areas for arable cropping and vegetable production. As stated in Chapter 2 it will not be possible to mill all the area down to a depth of 0.5 m. and we visualise 10% of the area having 2 m. or more of residual peat. Most of this deep peat will be in the lower contour areas some or all of it requiring pumping to control the watertable level. At this stage we think this may be an advantage in avoiding moisture deficiency and fast subsidence. Some of these areas could be flooded for amenity use and also to facilitate irrigation, which we believe is necessary for successful vegetable growing on deep peat.

If present vegetable production and marketing problems are overcome consideration could be given to the preservation of all the deep peat in the North bog area (196 ha.) in conjunction with the other similar areas designated for this purpose. From the cutaway emergence pattern it is evident that the North bog will not be available for milling for another 20 years leaving ample time for this decision.

With this option the following could be the land use plan:-

Grassland	61%	-	1418 hectares
Roads and buildings	4%	-	93 hectares
Arable cropping (10% of total area plus the North bog)	20%	-	465 hectares
Lakes, shelter and amenity planting	15%	-	349 hectares

Peripheral Area

The breakdown of the peripheral area (1,854 hectares) between the Bord na Mona bog and main road boundaries is given in the last chapter and can be seen on Map 6. We would like to think that the peat sections (944 hectares) of this area could be drained, developed and restructured in conjunction with the development of the cutaway bog in the study area. The options for the use of this area would be similar to those listed under 1, 2 and 3. If the total area is suitable for grassland it would allow the creation of say 19 x 50 ha. farmlets well developed and conveniently laid out. Again some of the deeper peat would be suitable for arable and vegetable cropping when drained and some of the high bog would be suitable for milled peat production and forestry.

OPTION 4

(Commercial Forestry Only)

This is a straightforward land use plan for planting the total area as it becomes available with commercial forestry. Research has shown (Chapter 3) that yields higher than the national average could be obtained from forestry on cutaway bog.

By augmenting the commercial plantations with those ornamental species which grow best on the different peat types and depths and combining the planting with the flooding of the main depressions, the total area could become an important tourist attraction, for wild life, shooting, boating, fishing etc. The main factor militating against this option is its low labour requirement and subsequent fall of employment in the area.

OPTION 5

(Biomass - short rotation forestry)

There is much concern at present at the rate world energy reserves (coal, oil and peat) are being exhausted. For example the oil reserves which took 100 million years to form are to be used up in a single century. It is obvious that provision must be made for the future.

Peat is our main source of natural energy and this will be exhausted within another 40-50 years. It is thus more important than ever for us to provide for our future energy needs.

Formation of carbohydrates by photosynthesis in plants is one way of converting solar energy (which is largely under-utilised) into a combustible fuel. This process is now referred to as "Biomass" conversion. The theory is that by planting specially selected fast growing trees, cutting them every 3-5 years, allowing them to coppice (regrow) and cutting again 3-5 years later, a continuous fuel supply will be available. There are many unknown factors in the efficiency of this process but it may have possibilities for our future energy supply.

Plantings are in progress, in association with An Foras Taluntais, to test Biomass growth rate, output and harvesting techniques and the results of these will determine whether large scale plantings will be made on cutaway in the years ahead.

CHAPTER 5

FINANCIAL IMPLICATIONS

OPTION 1

This option assumes the development as grassland of the cutaway areas becoming available up to the year 2000.

The plan and cost projections are based on development work carried out to date.

CAPITAL COSTS

While development is geared to areas available from cutaway emergence, it is planned to proceed at a rate which makes the most efficient use of manpower and machines. For example, we have allowed for the purchase and employment of one bulldozer wholetime for the first nine years (until 1987) at which stage the workload justifies a second machine throughout the remaining years of this development cycle.

The plan provides for the establishment of a suitable road structure comprising eight miles of tarmac roads and nine miles of spur roads.

It also includes 48 hectares of shelter belts and 16 hectares of amenity planting which in conjunction with the 3 hectares already planted amount to 5% of the total area.

We have allowed for the necessary supply of power and water and for the initial costs of fencing, liming, fertilising and grassing.

The project requires the wholetime use of bulldozers, and hence, we have included in the development charge the repair and overhaul costs of these machines based on their working age and on historical maintenance costs of similar machines in Clonsast.

Direct overheads are related to projected labour on development; the charges for administration and technical services provided by the local Works are in line with the similar charge per hectare for farm production.

While our estimates as a whole seem higher than the development costs hitherto associated with grassland establishment they account for the range of capital outlay which a project of this type and scale entails. In a series of possible land use options the opportunity cost of capital employed must be highlighted and each option assessed on the total commitment of resources involved.

Total projected expenditure on developing this area is £1,146,540 analysed as follows:

	Total Cost	Cost per Ha.
	£	£
Materials	648,073	491.34
Wages	437,677	331.82
Overheads	60,790	46.09
Total	1,146,540	869.25

In addition to the foregoing outlay on development the following capital expenditure is required for beef and grain production.

	£
Plant and machinery	548,000
Buildings	491,500
	1,039,500

Total capital expenditure is £2,186,040.

PRODUCTION PLANS

The plan for developed areas is four years initially on cereal crops - first year under wheat followed by three years under barley, and then sown to grass.

Grass utilisation is based on a calf to beef system over a two-year cycle. In addition, where available grassland is not sufficient to justify a further cattle house at that stage we have provided for summer grazing of heavy store cattle in order to maximise the return from the grasslands.

PERFORMANCE STANDARDS

Expected standards are higher than what we have achieved so far but they are attainable targets which are necessary for the viability of this kind of enterprise.

Outputs on this scale are being achieved generally in the country and we are projecting them as realisable standards in our plan.

(1) Liveweight gains

	Average daily gain per head	Liveweight total per head
	Kg.	Kg.
Purchase (calf)		50
Summer 1	0.7	
Winter 1	0.5	
One year old		275
Summer 2	0.8	
Winter 2	0.85	
Sale (bullock)		575
Heavy stores - summer grazing	1.0	

The overall gains over the duration of the plan (1978-2000) average 853 Kg. per hectare.

(2) Livestocking rates

1 livestock unit per 0.6 hectare
Heavy stores - 1850 kg. per hectare on summer grazing.

(3) Mortality rates - calf to bullock

	Rate %
Up to 3 months	5.0
+ 3 months - 12 months	2.5
+ 1 year - 2 years	0.5

(4) Cereal Crops - grain yields

Wheat	4.45	tonnes per ha.
Barley	3.95	" " "

The plan provides for the use of our own grain in the barley soya compound produced in the grain complex.

PRODUCTION COSTS

Labour and material charges are based on current rates and likewise the revenue from sale of livestock and grain.

The costs from year to year are determined by the nature and range of the planned operations and are linked primarily with livestock numbers and crops.

The following is a summary of production costs (excluding cattle purchases) over the period:

	Total Cost	Cost per Ha.
	£	£
Materials	2,827,130	202.65
Wages	1,300,200	93.20
Overheads	633,150	45.38
Total	4,760,480	341.23

Note: There is no provision for rates in this projection but our present rateable valuations would likely be increased if we engage in large scale agriculture.

CATTLE TRADING

The plan provides for purchase of calves in the spring at £80 per head and sale after two years at £75 per 100 kg. live-weight.

	Total - £
Sales	7,425,070
Purchases	2,288,790
Net trading revenue	5,136,280

Allowing for the value of unsold stock the gain on trading over the period is £5,428,210 which is equivalent to £562 per hectare of grassland.

SALE OF CROPS

Gross return on cereal crops, allowing for retention of feeding barley required for compound mix, is £1,014,740.

Summary Cash Flow

	£'000	
Cattle sales	7,425	
Crop Sales	1,015	8,440
Capital expenses	2,186	
Production expenses	4,760	
Cattle purchases	2,289	9,235
Cash flow		(795)

The following schedule (No. 1) shows for each year and in total the projected revenue, expenditure, cash flow, finance required and interest charges.

These figures illustrate the impracticality of funding this plan from our own resources or from borrowing on commercial terms. The main militating factor is the high cost of servicing the investment because of the mounting overdraft and the compounding of the interest. Total interest charges at 9% p.a. amount to £3,515,240.

Projecting the position at year 2000 when development of this area is completed and working on beef production only the enterprise at present rates would yield a return of £90,800 per annum which allows for the average cost of plant replacement.

OPTIONS 2 AND 3

We have not costed these specifically for the following reasons:

1. We have strong reservations regarding the use of standards supplied by the Forestry and Wildlife Section to the more difficult cutaway areas. We have not got performance data for commercial forestry on reed swamp peat.

2. To date our performances in arable and vegetable production have not given commercially successful yields.

This area of peat agriculture needs further research and trial before we can plan production based on attainable outputs and quality necessary for its commercial viability and the constraints of the market.

In addition to these factors we would also have the problem of funding capital expenditure as outlined in Option 1 for utilisation and expansion of the grassland areas (about 60% of total area).

The funding difficulty would be accentuated by the absence of any return from forestry for the initial fifteen years.

OPTION 4

This plan refers to commercial forestry only. Schedule 2 attached shows the results of a pilot study of this area completed by Forestry Officials.

As no back-up figures were supplied we are unable to verify the authenticity of these figures on a basis which would provide comparability with our grassland study.

We have however doubts about some of the criteria used in arriving at the forestry results, particularly the high yield class (22) and a ½% p.a. wood price increase. We understand from Forestry that they too have reservations about this yield from one-half metre of peat.

OPTION 5

There are no available details on Biomass production on which we can make a commercial assessment.

As stated in Chapter 4 this is still in the experimental stage of development.

CHAPTER 6

SOCIAL IMPLICATIONS

The Economic and Social Research Institute was retained by Bord na Mona to conduct a comprehensive survey of Bord na Mona employees at Clonsast and the E.S.B. employees at Portarlington Power Station to determine the following:-

(a) the characteristics of the workers

(b) the implications for the work force of the run-down of fuel peat production operation

(c) the implications for the total employment in the catchment area of a run-down of operations

(d) to obtain the opinions of all workers as to how the cutaway bog should be utilised.

The remainder of this chapter is a brief summary of the E.S.R.I. report:

Since its establishment in 1946 the Clonsast Works have proved to be a major source of non-agricultural employment in the Portarlington area. However, over this period the average number of workers employed annually at the works has declined as is seen from the following table.

Employees at Clonsast Works classified by occupation in selected years since 1959/60 ≠

Year	Occupation				
	Administrative	Supervisory	Skilled	Semi and unskilled	Total
			No.		
1959/60	15	36	39	496	586
1965/66	11	31	56	366	464
1970/71	11	23	79	217	330
1976/77	17	18	68	216	319
Change in number 1959 - 1977 (%)	+2	-18	+29	-283	-267
	+(13.3)	-(50.0)	+(74.3)	-(57.1)	-(45.6)

≠ The figures for 1976/77 were supplied by Bord na Mona and the remainder were taken from Fell (1971). They do not include seasonal workers (mainly unskilled) whose numbers have declined substantially.

There are at present 319 full-time workers employed by Bord na Mona at Clonsast of whom about 70 are skilled workers, mainly fitters and electricians. A further 60/70 seasonal workers are employed in turf saving activities during the summer. In addition the E.S.B. employs 120 workers. Wages and salaries and local spending for other goods and services for 1976/77 was £1.5 million. Hence, when turf production ceases, economic activity in the area will be seriously affected unless alternative industries can be introduced either by the I.D.A. or through diversification policy by Bord na Mona.

The catchment area for Bord na Mona and E.S.B. workers extends over an area of about 58,400 hectares (230 sq. miles) but because it is covered by extensive deposits of bogland it is not a particularly good farming area and lacks features capable of attracting tourists.

The total population of all the region concerned in 1971 was about 17,000 people, of which the rural population was 8,000 and that of the towns about 9,000. Between 1966 and 1971 there was a 3% increase in the population of the region. The phasing out of Bord na Mona and E.S.B. operations would certainly have a serious effect on our future growth in population. Portarlington in particular would suffer very much.

The total number of Bord na Mona workers interviewed was 292 out of a total of 375 (including both seasonal and permanent employees) and in the Power Station interviews were conducted with 59 out of 119 employees. The remainder either refused to co-operate or were unavailable for interview throughout the survey period.

The overall response rate was 71%. In view of this high percentage we believe that the samples given give an accurate representation of the circumstances and views of the workers involved.

Occupation of Workers

The occupation of workers classified by age are given in Table 9. The first part of the Table shows that of the total interviewed 14.2% had administrative, clerical or supervisory posts; 23.1% were skilled manual; 33.9% were semi-skilled manual and 28% were unskilled workers. The second part of Table 9 shows that 7% of the workers interviewed were under 20 years of age; 31% were 50 years of age and over while 18% were over 55 years of age.

The E.S.B. workers are mainly in the middle age groups. None were under 20 years of age and only 10% were over 55 years of age.

The third section of Table 9 shows that 80% of the workers in the sample were full-time, about 2% were part-time and 18% were seasonal workers.

Marital Status, Relationship to Head of Household and the Size of Household

Table 10 shows the marital status of employees classified by occupation and relationship to head of household. As can be seen from the first section of this Table about 64% of all employees are married and 35% are single.

Education and Training of Employees

The percentage of employees classified by occupation, by age on completion of full-time education, and by type who are attending is shown in Table 11. The first section of this Table shows that 41% of the workers finished full-time education at 14 years of age or later, 16% finished at 15 years of age, another 16% at 16 years of age, 14% at 17 years and 11% at 18 years and over. In all about 87% of sample left full-time schooling between 14 and 17 years of age. The second section of Table 11 shows that over half the sample did not go beyond primary school.

Salaries and Wages

The total gross wage and salary for Bord na Mona and E.S.B. for workers residing in the Clonsast area for year ending 31st March 1977 was £1.5 million and when deductions such as P.A.Y.E., Social Welfare, Superannuation remain nett receipts of workers were £1.25 million. These are very substantial receipts for a rural area of this size.

Job Satisfaction

Over 90% of the employees were satisfied with their job arrangements to and from work and a similar number said that Bord na Mona and the E.S.B. were good firms to work for and that the hours worked were convenient. Almost equally high proportions stated that their present jobs were the only ones they could get if they wished to stay in the area and that they were very happy in their present jobs. A high proportion also stated that their work was interesting, that the pay was good and that they were given a chance to do the things they want.

Employees' plans for the Future

On this question 37% of the employees thought that Bord na Mona or the E.S.B. would provide other jobs in the Clonsast areas when present jobs ceased. A further 16% said that they would get jobs from Bord na Mona or E.S.B. elsewhere. The people who were most confident of obtaining other jobs with Bord na Mona or the E.S.B. in Clonsast were the semi-skilled and unskilled workers. Very few workers (3.7%) hoped to become full-time farmers when the present work ceased in the Clonsast area.

Experience of Farming

Some questions on farming experience were included in the questionnaire and the answers are given in Table 12. The first part of this Table shows that about 9% of the sample owned and operated farms, a further 1.4% operated rented land while 6% helped on family farm. Almost 84% of the sample did not work on farms at the time of the survey. The second part of this Table which gives the size of the farms operated, shows that 35% of operators worked on farms of less than 15 acres, 26% operated on 15-30 acre farms, 21% on 30-50 acre farms and 17.5% on farms of 50 acres and over. The third section of this Table shows that about 70% of all employees had some experience of farming.

Options as to best use of Cutaway Bog

About half the sample thought that root and vegetable crops would be most suited to cutaway bog, 11% favoured dairying and 17% thought that dry cattle rearing would be more suitable while only 6% spoke in favour of forestry.

Options varied widely as to the number of acres of cutaway bog with which to make an economic holding. Most thought that 50-100 acres would suffice but 4% felt that 200 acres would be needed while another 4% thought that less than 30 acres would do.

When questioned as to who should farm the cutaway bog about half the respondents said that Bord na Mona should farm it themselves. About 1/5 suggested that it should be farmed on a co-operative basis by Bord na Mona or E.S.B. employees, 1/6 thought that it should be divided into farmland and sold or let on a long-term basis to Bord na Mona or E.S.B. employees while 6% only were in favour of dividing it among local farmers.

When asked about selling or renting the cutaway bog to local farmers over 60% said that it would be a very bad idea. Giving reasons of this view about 1/3 said that the locals were not using their own holdings well and therefore, would not be expected to do otherwise with cutaway bog. About 1/5 said that local farmers lacked training and almost half thought they lacked the capital equipment required for such an operation.

About 60% of all the respondents said they would be prepared to become full-time farmers on cutaway bog and that their wives and family would be prepared to go along with the idea.

Those who said that they would be prepared to become full-time farmers on cutaway bog were asked to state the amount per acre they would be prepared to pay either to purchase or rent the land. Purchase prices ranged from £20 - £1,000 per acre, the average respondent being £205 per acre. Rental prices ranged mainly from £5 - £100 per acre, the average being £33 per acre.

Other Industries

When employees were asked to suggest other industries which might be set up in the Clonsast area if Bord na Mona and E.S.B. had wound down their operations about 1/5 of the workers thought that a grassmeal factory would be suitable. Another 1/5 thought that vegetable processing would be best while about 1/8 suggested engineering. The amount of employment which workers thought the different industries would give varied considerably among the different groups. About 7% thought that there would be jobs for less than 100 people, about 39% thought that over 300 could be employed.

Industrial Development Authority

The recent job creation performance of the cluster of towns incorporating the Clonsast region is of some interest. The ideal regional planning for the period 1973-1977 set a target of 750 nett new jobs. During 1973 and 1976 only 300 new jobs were actually created. A further 200 new jobs are expected in 1977 leaving a shortfall of 250 nett new jobs for the period as a whole.

The I.D.A. have taken this disappointing performance of 1973/77 period into account in setting up a job creating target of 750 new jobs for this cluster of towns in 1978/81 period. Special efforts are being devoted in job creating in this region in view of the fact that Bord na Mona and E.S.B. (the largest employers in the area) would be scaling down on their operations. Furthermore, it is hoped to persuade a large industry which will eventually employ over 1,000 workers to establish at Portarlington.

As part of the effort to create employment in the area the I.D.A. has stated that it is willing to co-operate with Bord na Mona in:

(a) supporting the development of new products suitable to the resources and skills available in the area through its Research and Development Programme.

(b) through its project identification programme the I.D.A. co-operating with the Board will help identify products which can be produced using the skills available in the area. It will provide financial support where appropriate towards the establishment of industry to produce such products.

(c) making services available in arranging joint ventures between the Board and another party and providing financial support to such ventures as appropriate.

(d) supporting the establishment of small industries in the area. This programme is particularly suitable for skilled employees to set up an industry of their own.

Conclusions by the E.S.R.I.

The Clonsast area is heavily dependent both directly and indirectly on the operations of Bord na Mona and the E.S.B. for the provision of employment and income. The survey results showed that even with phased closure of operations over a number of years large numbers of jobs would be lost. Furthermore, the survey showed that very few of the workers had income other than from their present jobs. Particularly surprising was the small number of workers who were engaged in part-time farming.

It seems clear that if the Clonsast area is not to suffer great economic and social costs following the cessation of operations by Bord na Mona and E.S.B. alternative employment would have to be found. Unfortunately the prospects for such alternative employment do not appear especially bright at present. Indeed, if alternative employment were available, it is likely that some workers (notably those in the older age groups possessing little or no skills) would find it difficult to obtain such employment. This situation is further exacerbated by the fact that large numbers of young, relatively well educated people are entering the local labour force for the first time. In addition to the direct effect on the Bord na Mona and E.S.B. workers and their family, the indirect effect of a closure on other persons in the area must be considered. The income earned by those working on the bog and those working in the Power Station is spent mainly in the Clonsast area, thereby generating further income and employment. Recipients of this secondary income would also suffer when the Bord na Mona and E.S.B. operations in the area cease. Given the heavy dependence in the area on Bord na Mona and E.S.B. it is not surprising that our survey showed that workers looked on these bodies to alleviate the difficulties that would arise when the bog finally is exhausted.

It is obvious that alternative employment must be provided in the Clonsast area. However, the economic feasibility of any venture needs to be thoroughly investigated as well as its technical feasibility. It is not enough to know that an enterprise can produce a particular item, one must also know that production is profitable and that the product will be a marketable one. It is also true that the method of organisation of any venture may influence its economical feasibility. Hence it is necessary to distinguish clearly between the potential value of a venture under the perfect conditions and the value likely to be realised under actual real world conditions.

We believe that considerabl fewer workers could be employed in farming the cutaway bog than are at present in Bord na Mona and the E.S.B. irrespective of the ownership or type of farming adopted. It might be possible to employ considerable numbers in ancillary processing industries but economic viability of such industries would have to be carefully assessed before any recommendation could be made.

CHAPTER 7

CONCLUSIONS

Fuel peat production is very important to the Irish economy in reducing energy imports, creating exports and gainfully employing people in rural areas. There is now a greater need than ever to produce as much energy as possible from native resources and it is thus desirable to produce as much peat as possible from our bogs.

Agriculture is vital to the Irish economy and every effort should be made for its expansion. The development of good agricultural land from Bord na Mona cutaway bog is thus a very important consideration, and the long-term use of this land will not be sacrificed for short-term fuel gain.

Research work which has been going on for over 20 years recommends that grass is the most suitable crop for cutaway bog and that for vegetable and arable cropping a greater depth of peat is required.

The development work by Bord na Mona since 1972 verifies this general finding but also highlights the necessity for further work for different combinations of peat and subsoil types before one can say what each area is best suited for.

Planning the long-term use of this land now, the options available to us are:-

Grassland

Arable and Vegetable production

Forestry

Biomass production

and the combination of all those with amenity areas for tourist attraction. The capital requirement for the development is substantial and must be planned in advance.

The social considerations in changing from labour intensive fuel production to other operations must get serious consideration. Alternative employment must be found within this area regardless of the long-term use or ownership of the lands.

Recommendations

The first decision to be made is what depth of peat should be left after fuel production. The development of the cutaway as grassland or for forestry allows maximum fuel to be extracted. If arable cropping and vegetable production are to be practised greater depths of peat are required. It has been shown that both fuel production and vegetable production use up the peat deposits at approximately the same rate. It is thus a question

of cost benefit between the two operations. It has been demonstrated that if our vegetable production problems are solved and if market conditions change in the future a decision can then be made to retain suitable areas of deep peat for this use. In the meantime fuel production should continue, leaving an average of 0.5 metres of peat and the resulting cutaway should be developed for agricultural purposes, mainly grassland. Amenity and shelter belt planting which has already begun should be accelerated.

More time and experience is required to solve our present problems. Further research will also be required into many aspects such as watertable control, deep ploughing etc. and An Foras Taluntais with a proper inter-organisational structure has a special position for this purpose. The place of cereals in the initial development of cutaway bog will have an important place and further work is necessary to maximise their yield and reduce disease. The economics of the development will need annual review.

Plans must now be implemented to safeguard the future of all existing employees of Bord na Mona and the E.S.B. in this area by the creation of alternative employment. New opportunities must be created for the younger generation.

Although the study area is no more than 3.0% of that accruing from Bord na Mona operations over the next forty to fifty years it is the first time in the history of the State that such an acreage of potentially good land can be properly planned and managed in the national interest from the start.

Development of this and all emerging cutaway bog should continue by Bord na Mona alongside further research and in co-operation with all interested parties so that the best long-term plan can be devised and implemented in good time.

TABLE 1

Initial Nutrients applied to cutaway bog

76.3 Kg. N per hectare
76.3 Kg. P per hectare
152.7 Kg. K per hectare
31.0 Kg. Cu SO_4 per hectare
3.25 Kg. Co per hectare

TABLE 2

Grass Seed Mixture Used

18.25 Kg./ha.		New Zealand Perennial Ryegrass
13.63	"	Sceempter Perennial Ryegrass
4.3	"	R.V.P. Ryegrass (Italian)
1.7	"	New Zealand White Clover

TABLE 3

	pH	%		p.p.m.				
		P	K	Cu.	Mo.	Mn.	Fe.	Zn.
Pre-development 1972	4.5	1	24	.75	2.5	280	270	1.3
September 1973	7.3	9	86	3.0	2.6	300	270	1.5
September 1977	6.5	7	74	2.6	2.6	310	240	1.6

TABLE 4

Average Annual application of nutrients (Kg/ha)

N	P	K
450	75	300

TABLE 9

Employees in the sample classified by occupation, employing organisation, age and whether full time, part-time or seasonal

	Occupation (BnM and ESB combined)						Sub-group totals	
	Non-Manual	Skld. Manual	Semi-Skld.	Un-Skld.	Total		BnM	ESB
	%	%	%	%	%	No.	%	%
Employing Organisation								
Bord na Mona	13.7	21.2	38.7	26.4	100.-	292	-	-
E.S.B.	16.9	32.3	10.2	40.7	100.-	59	-	-
All workers	14.2	23.1	33.9	28.8	100.-	351	83.2	16.8
Age groups								
15 - 19	2.0	16.0	0.0	10.9	7.1	25	8.6	0.0
20 - 29	16.0	43.2	14.3	16.8	21.9	77	22.9	16.9
30 - 39	14.0	17.3	19.3	19.8	18.2	64	14.7	35.6
40 - 49	22.0	11.1	27.7	21.8	21.4	75	20.9	23.7
50 - 54	20.0	1.2	19.3	12.9	13.4	47	13.4	13.6
55 and over	26.0	11.1	19.3	17.8	17.9	63	19.5	10.2
Total	100.0	100.-	100.-	100.-	100.-	351	100.-	100.-
Full-time, part-time or seasonal								
Full time	100.-	97.5	81.5	65.3	83.2	292	80.1	98.3
Part time	0.0	1.2	3.4	3.0	2.3	8	2.4	0.0
Seasonal	0.0	1.2	15.1	31.7	14.5	51	17.5	1.7
Total(Percentage)	100.-	100.-	100.-	100.-	100.-	-	100.-	100.-
Total (Number)	50	81	119	101	-	351	292	59
Bord na Mona	40	62	113	77	-	292	-	-
E.S.B.	10	19	6	24	-	59	-	-

APPENDIX 1

DEPTH LOSS IN MILLED PEAT PRODUCTION

Representative samples from the study area were analysed to determine the average depth of peat required to produce 187 tonnes of milled peat per hectare (Bord na Mona's average annual production from 12 harvests).

The following chart is a summary of the results.

Depth Metre	Moisture Content	Density	Peat Solids per litre (grams)	Yield at 55% m.c. Tonnes/hectare/ 25 mm.
0 - 0.15	79.18	.939	145.25	110.2
0.15 - 0.30	82.28	.936	165.53	93.4
0.30 - 0.45	84.53	.949	147.08	82.7
0.45 - 0.60	86.95	.953	125.24	70.0
0.60 - 0.75	89.08	.965	105.38	59.4
0.75 - 0.91	89.13	.987	107.60	60.7
0.91 - 1.06	90.30	.992	96.20	54.3
1.06 - 1.21	89.95	.992	99.70	56.2
1.21 - 1.37	90.10	.979	97.20	54.8
1.37 - 1.52	88.95	.994	109.70	61.9
1.52 - 1.67	88.00	1.008	114.90	64.8
1.67 - 1.82	88.80	1.013	113.50	64.0
Average	87.32	0.975	123.02	69.4

This shows that each 25 mm. of peat depth will yield 69.4 tonnes of milled peat per hectare. Thus to obtain the average output of 187 tonnes per hectare would require 68 mm. of depth in the study area. However, this is a nett figure and it is found in practice when losses etc. are taken into consideration that a depth of 76 mm. is required.

It is obvious that the lowest moisture contents and the highest yields per hectare are found in the shallow peat areas. The moisture content increases and the yield decreases as the peat becomes deeper, until the lower depths are reached which are influenced by subsoil drainage. When the results for bog moisture contents are plotted against calculated milled peat yields at 55% moisture content, the relevant regression line is shown on the graph. This enables yield from a bog area to be predicted when its mean moisture content level is known. It must be remembered that this average yield of 69.4 tonnes per hectare refers only to the area under study and is not an average for the total Board working area.

A comparison can be made here of the loss in peat depth under agriculture and horticulture in various parts of the world from the following chart.

RATE OF PEAT SUBSIDENCE UNDER CROPPING

Location	Original Depth Metre	Years in use	Subsidence mm/year
Holme Fen England	6.6	84	38
	6.6	22	110
	6.6	103	33
Everglades (grassland)	2.7	41	31
Everglades	3.3	20	71
	3.3	50	45
Michigan	-	5	42
Holland Marsh (Canada)	-	1	28
Ireland A.F.T. Lullymore (Grass)	0.50	7	21
B.N.M. Lullymore (Grass)	0.75	2	137
B.N.M. Derrygreenagh (Vegetables)	2.00	7	58
Russia	.46	46	4
	1.10	46	11
	2.10	46	25

REFERENCES

(1) T. A. Barry, Bord na Mona 1964.
(a) The cutover peats of Clonsast Main Bog 1964.
(b) The cutover peats of Clonsast East, Clonsast North and Derryounce bogs 1964.

(2) A Survey of Sub Peat Mineral Soils, Clonsast Bog, Co. Offaly - R. F. Hammond, July 1964.

(3) Role of Major Elements in nutrition of Potatoes, Kale and Grass on cutaway bog - E. Quinn, J. Mulqueen, A. J. Cole - 1962.

(4) Farm Research News, Vol. 9, No. 3 May/June 1968, 55 - 57, A. J. Cole.

(5) Effect of different stocking rates on summer production of store cattle on shallow cutover raised bogs.

(6) Unpublished data. Downey, Poole - An Foras Taluntais 1977.

(7) Suitability of Peat Soils for Production of Vegetables, J. C. Cassidy, 1969.

(8) 14th I.M.A.R.O. Congress, Munich - 1967. P.I Section 23 - N. O'Carroll

(9) Irish Forestry Vol. 32, No. 1 1975. Coniferous Growth and Rooting Patterns on Machine Sod Peat bog at Trench 14, Clonsast - M. L. Carey and T. A. Barry.

(10) International Peat Society Symposium of Commission III Israel 1975. "Development and Utilisation of cutaway bogs by Bord na Mona" - J. Healy.

------ooOoo------