KNOCKHARLEY LANDFILL LTD.

NATURA IMPACT STATEMENT FOR THE PROPOSED INFRASTRUCTURAL DEVELOPMENT AT KNOCKHARLEY LANDFILL

NOVEMBER 2018

Knockharley Landfill Ltd.
Kentstown, Navan, Co.Meath

FEHILY TIMONEY & COMPANY

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1 INTRODUCTION

This Natura Impact Statement as been prepared, so as to enable the competent authorities to carry out an Appropriate Assessment as required by Article 6(3) of Council Directive 92/43/EEC ("the Habitats Directive") and Part XAB, and section 177V of the Planning and Development Act 2000 to 2018, ("the 2000 Act"), respectively.

European Sites, as defined in the 2000 Act, comprise both Special Protection Areas (SPAs) for wild birds and Special Areas of Conservation (SACs)/candidate Special Areas of Conservation (cSACs) for habitats and other species, and are designated by Member States pursuant to the requirements of Council Directive 79/409/EEC, now Directive 2009/147/EU, on the conservation of wild birds ("the Birds Directive") and the Habitats Directive, respectively.

Article 6(3) of the Habitats Directive envisages a two-stage assessment process, which is implemented into Irish law (with some additional requirements) by the provisions of sections 177U and 177V of the 2000 Act. Screening for AA in accordance with section 177U is the first stage of the AA process ("Stage One"), in which the likelihood of there being a significant effect on a European site is assessed. In compliance with the aforementioned provisions of Article 6(3) of the Habitats Directive and section 177U of the 2000 Act, a screening for appropriate assessment of an application for consent for proposed development shall be carried out by the competent authority or authorities to assess whether, in view of best scientific knowledge, that proposed development, individually or in combination with another plan or project is likely to have a significant effect on a European site, in view of the site's conservation objectives. Having conducted a screening for appropriate assessment, the competent authority or authorities shall determine that an Appropriate Assessment of a proposed development is required if it cannot be excluded, on the basis of objective information, that the proposed development, individually or in combination with other plans or projects, will have a significant effect on a European site. Such an Appropriate Assessment, if required, must be carried out pursuant to the provisions of Article 6(3) of the Habitats Directive and section 177V of the 2000 Act.

There are four stages in an AA, as outlined in the European Commission Guidance document (2001). The following is a summary of these steps.

- Stage One - Screening: a screening for appropriate assessment of an application for consent for proposed development shall be carried out by the competent authority under Article 6(3) and section 177U to assess whether, in view of best scientific knowledge, that proposed development, individually or in combination with another plan or project is likely to have a significant effect on a European site, in view of the site's conservation objectives..
- Stage Two - Appropriate Assessment: in carrying out an appropriate assessment under Article 6(3) and section 177V, the competent authority is obliged to make a determination as to whether or not the proposed development would adversely affect the integrity of relevant European site or sites in view of its conservation objectives. Unless the appropriate assessment determination is that the proposed development will not adversely affect the integrity of any relevant European site, the Board may not take a decision giving consent for the proposed development unless it does so pursuant to Article 6(4) of the Habitats Directive.
- Stage Three - Assessment of Alternative Solutions: Should the Appropriate Assessment determine that there will be an adverse impact on a European site, this stage examines alternative ways of implementing the project that, where possible, avoid these adverse impacts.
- Stage Four - Assessment where no alternative solutions exist and where adverse impacts remain: Where imperative reasons of overriding public interest (IROPI) exist, an assessment to consider whether compensatory measures will or will not effectively offset the damage to the European site will be necessary. European case law highlights that consideration must be given to alternatives outside the project area in carrying out the IROPI test.

The findings of the Stage One Screening for Appropriate Assessment Report submitted with the application for development consent found that there was potential for significant effects on one European site only – namely, the special conservation interests of the River Nanny Estuary and Shore SPA.

Therefore, this Natura Impact Statement has been prepared to appraise whether or not there will be significant effects on the conservation interests of the SPA and whether or not there will be any adverse impacts on site integrity arising from the proposed development.

In Stage Two of the Appropriate Assessment process, the competent authorities will assess whether a proposed plan or project (which is not directly connected with or necessary to the management of the site) will adversely affect (either alone or in combination with other projects or plans) the integrity of a European Site with respect to the conservation objectives and the structure and function of the sites.

It should be stated that this document comprises a Natura Impact Statement [NIS] to assist in the Appropriate Assessment to be carried out by the competent authorities in order to evaluate the potential impact(s) of the proposed landfill development on the integrity of European sites in light of their conservation objectives. It should also be stated that there is no requirement to consider Stage Three or Stage Four in respect of the proposed development.

1.1 Legislative Requirements & Guidance

The basic requirements in European Union law for AA are set out in Article 6(3) the Habitats Directive, which states:

> *6(3) Any plan or project not directly connected with or necessary to the management of the site (Natura 2000 sites) but likely to have significant effect thereon, either individually or in combination with other plans or projects, shall be subject to Appropriate Assessment of its implications for the site in view of the sites conservation objectives.*
>
> *In the light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public.*

In addition, the Stage Two Appropriate Assessment must comply with the provisions of section 177V of the 2000 Act, which state, insofar as they are material to applications for development consent:

177V.— (1) An appropriate assessment carried out under this Part shall include a determination by the competent authority under Article 6.3 of the Habitats Directive as to whether or not a draft Land use plan or proposed development would adversely affect the integrity of a European site and an appropriate assessment shall be carried out by the competent authority, in each case where it has made a determination under section 177U(4) that an appropriate assessment is required, before:
(a) […]

(b) consent is given for the proposed development.

(2) In carrying out an appropriate assessment under subsection (1) the competent authority shall take into account each of the following matters:

(a) the Natura impact report or Natura impact statement, as appropriate;

(b) any supplemental information furnished in relation to any such report or statement;

(c) if appropriate, any additional information sought by the authority and furnished by the applicant in relation to a Natura impact statement;

(d) any additional information furnished to the competent authority at its request in relation to a Natura impact report;

(e) any information or advice obtained by the competent authority;

(f) if appropriate, any written submissions or observations made to the competent authority in relation to the application for consent for proposed development;

(g) any other relevant information.

(3) Notwithstanding any other provision of this Act, or, as appropriate, the Act of 2001, or the Roads Acts 1993 to 2007, a competent authority shall make a Land use plan or give consent for proposed development only after having determined that the Land use plan or proposed development shall not adversely affect the integrity of a European site.

(4) Subject to the other provisions of this Act, consent for proposed development may be given in relation to a proposed development where a competent authority has made modifications or attached conditions to the consent where the authority is satisfied to do so having determined that the proposed development would not adversely affect the integrity of the European site if it is carried out in accordance with the consent and the modifications or conditions attaching thereto.

(5) A competent authority shall give notice of its determination under subsection (1) in relation to a proposed development to the applicant for consent to the proposed development, giving reasons for the determination.

(6) A competent authority shall, as soon as may be after making the Land use plan or making a decision in relation to the application for consent for proposed development, make available for inspection by members of the public during office hours at the offices of the authority, and may also publish on the internet—

(a) any determination that it makes under subsection (1) as respects a Land use

plan and reasons for that determination, and

(b) any notice given by the authority under subsection (5).]

The nature and purpose of a Stage Two Appropriate Assessment process is well-established in both European Union and Irish law: before deciding to grant development consent, the competent authorities must conclude that the proposed development, by itself, or in combination with other plans or projects, would not adversely affect the integrity of the relevant European sites in view of the conservation objectives of those sites.

In terms of guidance documentation, in December 2009 '*Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities*' was published by the Department of the Environment, Heritage and Local Government (DoEHLG, 2009). This guidance document was prepared jointly by the NPWS and Planning Divisions of DoEHLG, with input from local authorities.

Previously, in 2001, the European Commission issued a guidance document, '*Assessment of Plans and Projects Significantly Affecting Natura 2000 Sites: Methodological Guidance on the Provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC*'. This report has also considered, where relevant, the content of the following documentation:

- *Managing Natura 2000 Sites: The Provisions of Article 6 of the 'Habitats Directive' 92/43/EEC*, European Commission, 2000 and 2018.
- *Assessment of plans and projects significantly affecting Natura 2000 sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC*, European Commission, November 2001
- *Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities*. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin 2009 (and 2010 Revision).
- *Nature and Biodiversity Cases: Ruling of the European Court of Justice.* Office for Official Publications for the European Communities, Luxembourg. European Commission, 2006.
- *Circular Letter SEA 1/08 and NPWS 1/08 – Appropriate Assessment of Land Use Plans.*

1.2 Relevant Planning History

The following outlines the planning history applicable to Knockharley Landfill to date:

1.2.1 Meath County Council Planning Reference: 01/5006

Permission was granted to Celtic Waste Ltd. for the development and operation of an engineered landfill and ancillary facilities at the Knockharley site on August 26th, 2002. The permission was subject to a condition that restricted the acceptance of waste for disposal at the facility to waste arising from the North East waste management region as defined by counties Meath, Louth, Cavan and Monaghan (Condition 2 (a)).

The quantities of waste accepted at the facility were restricted to 132,000 tonnes per annum until December 2007 and thereafter to a maximum of 88,000 tonnes per annum (Condition 2 (b)).

1.2.2 An Bord Pleanála Reference: PL17.125891

Upon appeal of 01/5006, An Bord Pleanála granted permission on appeal for a landfill with conditions specifying that only waste arising in the North East waste management region would be accepted and that the maximum rate of waste acceptance would be 132,000 tonnes per annum until December 2007 and 88,000 tpa thereafter.

1.2.3 Meath County Council Planning Reference: NA50453

In April 2006, Meath County Council refused permission to Greenstar Holdings Ltd. for a material change of use of maintenance building to offices, including a proposed new first floor within the existing building and for permission to omit condition no. 2(a) of 01/5006 which limits the waste to be accepted for disposal at the residual landfill facility to waste arising from the North East Region as defined by the counties Meath, Louth, Cavan & Monaghan.

1.2.4 Meath County Council Planning Reference: NA60336

Meath County Council, in November 2006, granted permission to Greenstar Ltd. for the removal of the regional restriction on the origin of the waste accepted at the Knockharley Landfill facility by modifying condition no. 2(a) of permission ref. no: 01/5006 and An Bord Pleanála decision PL17.125891 so the facility can accept waste from adjoining waste regions.

1.2.5 An Bord Pleanála Reference: PL17.220331

Upon appeal by the applicant Greenstar, the Board granted permission on 21st March 2007 for an extension of the landfill footprint (c. 2 ha), for the removal of the regional restriction on the origin of the waste accepted at the facility and for the continuation of the annual intake volume of 132,000 tonnes per annum until the end of 2010, reverting to 88,000 tonnes per annum thereafter. Permission was refused for an increase in the waste intake to 200,000 tonnes per annum.

1.2.6 Meath County Council Planning Reference: NA70015

Permission was granted to Greenstar Ltd. in April 2007 for the installation and operation of a gas utilisation plant on a 0.3 hectare site which will be phased and generate up to 4.2 MW of electricity for export to the national grid.

1.2.7 An Bord Pleanála Reference: PL17.PA0009

The Board refused permission to Greenstar Holdings Ltd. on the 14th May 2009 to increase the rate of waste acceptance at the permitted facility to 400,000 tonnes per annum for disposal, to alter the landfill phasing sequence, with no extension to the permitted landfill void, and all ancillary works including the installation of a second wheelwash.

The reason for refusal stated that the increase would compromise the viability of more sustainable waste infrastructure and the designation of Knockharley as the long-term residual landfill for the North East region and so would conflict with the waste management plan for that region.

1.2.8 An Bord Pleanála Reference: PL17.PA0019

In September 2011, Greenstar North East Ltd. withdrew an application to the Board for an increase in the rate of waste acceptance, an extension of the operational footprint and new waste treatment infrastructure i.e. an anaerobic digestion facility at Knockharley Landfill.

1.2.9 Meath County Council Planning Reference: AA161431

In December 2016, Knockharley Landfill Ltd. applied for an extension of the duration of planning permission 01/5006. Permission was granted by Meath County Council in January 2017.

1.2.10 Meath County Council Planning Reference: AA180145

In February 2018, Starrus LFG Ltd. applied for permission for the development of a solar farm over reclaimed landfill with an export capacity of approximately 3MW comprising photovoltaic panels on ground mounted frames, connection to existing single-storey ESB sub-station, installation of three no. transformers, ducting and underground electrical cabling and all associated ancillary works and services.

1.3 EPA Licensing History

Under Waste Licence Ref. No. 103-1 (now W0103-01), Meath County Council applied to the Environmental Protection Agency (EPA) and was granted a licence authorising the acceptance of a total of 76,000 tonnes per annum [62,500 tonnes for disposal and 13,500 tonnes for recovery]. It is understood that waste licence W0103-01 was never commenced and has now ceased.

Waste licence W0146-01 was granted to Celtic Waste Limited in March 2003 and was amended in October 2005 to include conditions relating to resource use and energy efficiency, accident prevention and emergency response and restoration and aftercare.

W0146-01 was also reviewed by the EPA as part of a national review of landfill licences to ensure that the landfills were operating in compliance with all relevant requirements of the Landfill Directive, with the result that W0146-02 was granted to Greenstar Holdings Ltd. in March 2010.

W0146-02 was amended by Technical Amendment A in January 2013 for a conditional amendment relating to groundwater risk screening; it was subsequently amended by Technical Amendment B regarding a trial for incinerator bottom ash metals recovery and was further amended by Technical Amendment C in November 2016 in relation to the acceptance of further quantities of waste material for a limited period of time i.e. to 31 December 2016. Technical Amendment D was issued in March 2018 for the acceptance of waste from an unauthorised landfill.

Furthermore, W0146-02 was changed from classification as a waste licence to an industrial emission (IE) licence in December 2013 by the EPA, while the licence was also transferred from Greenstar Holdings Ltd. to Knockharley Landfill Ltd. in March 2014.

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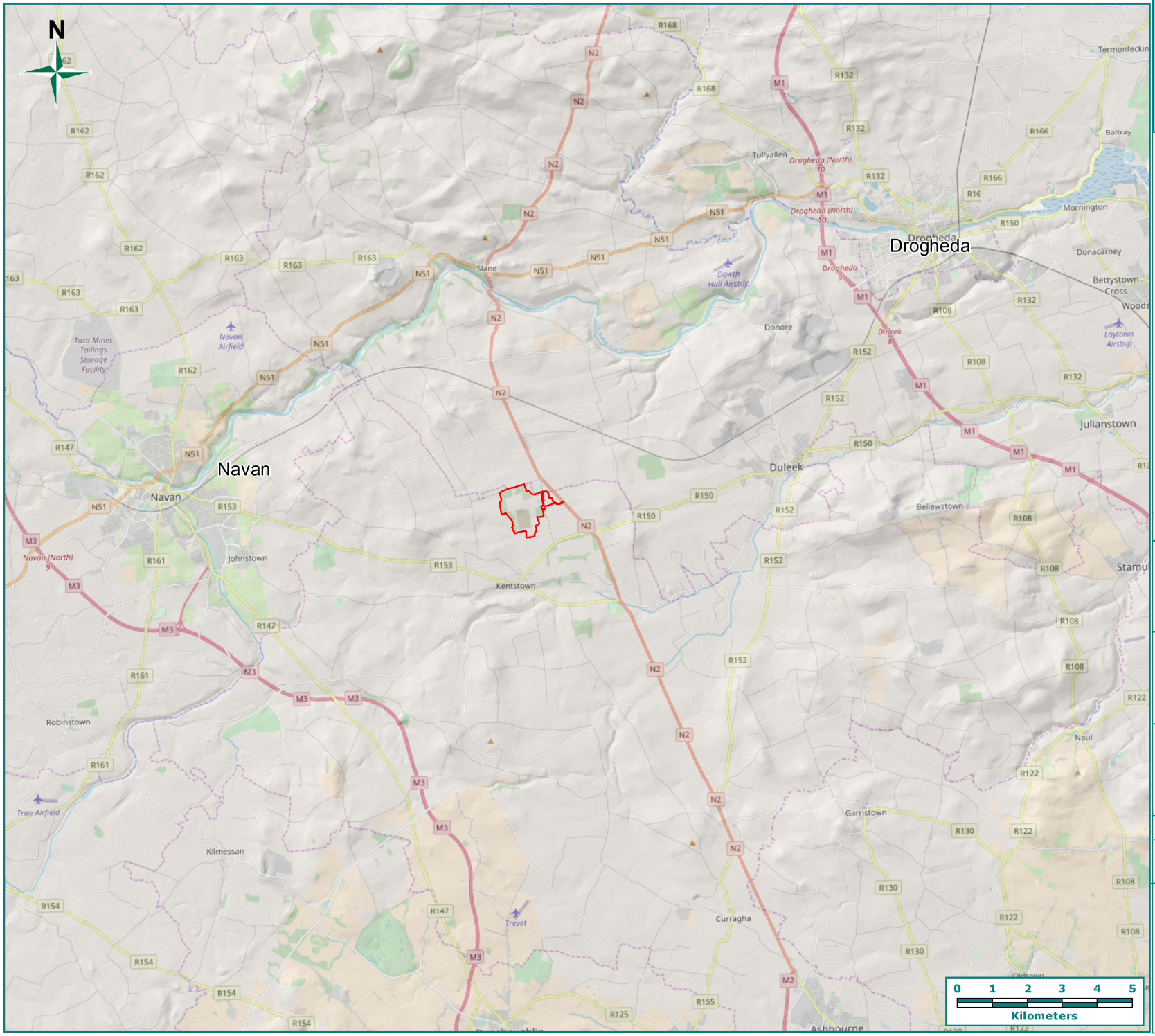

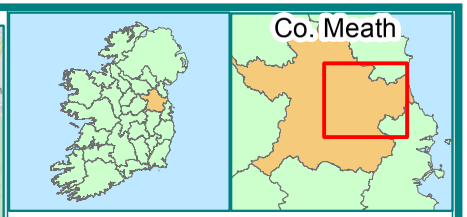

Legend

Site Boundary

Date 24/05/2018

Name Of Client

AGB Landfill Ltd.

Name Of Job

AA Screening for Strategic Development Report Knockharley

Title Of Figure

Site Location Map

Scale Used 1:150,000 @ A4

Figure No. 1.1

Rev A

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1.4 Methodology

1.4.1 Identifying European Sites & Potential Impacts

The first step in the screening process is to develop a list of European sites which may have the potential to be affected by the proposed development. Each relevant European site is reviewed to establish if the proposed development is likely to have a significant effect on the integrity of the site, as defined by its structure and function, and its conservation objectives.

The qualifying interests of each European site are identified, and the potential effects summarised under the following headings for the purposes of the screening process:

- Direct effects refer to habitat loss or fragmentation arising from land-take requirements for development or agricultural purposes. Direct effects can arise because of a change in land use or management, such as the elimination of agricultural practices that prevent scrub encroachment.
- Indirect and secondary effects may arise, for example, when a development alters the hydrology of a catchment area, which in turn affects the movement of groundwater to a site, and the qualifying interests that rely on the maintenance of water levels. Deterioration in water quality could occur as both an indirect and direct consequence of a development, which in turn changes the aquatic environment and reduces its capacity to support certain plants and animals. The introduction of invasive species can also be defined as an indirect impact, which results in increased movement of vectors (humans, fauna, surface water), and consequently the transfer of alien species from one area to another.
- Disturbance to fauna can arise directly through the loss of habitat (e.g. otter holts) or indirectly through noise, vibration and increased activity associated with construction and operation.

1.4.2 Desktop Study

To complete the assessment, certain information on the existing environment is required. For the purposes of preparing this NIS report, a desk study was carried out to collate available information on any relevant sites' natural environment. This comprised a review of the following publications, data and datasets:

- National Parks and Wildlife Service (NPWS) website and metadata available (www.npws.ie).
- NPWS data on rare/protected species obtained by request.
- OSI Aerial photography and 1:50000 mapping.
- Information on the waterbody catchments in the development area was obtained from the Environmental Protection Agency's Mapping Information System http://gis.epa.ie/Envision

1.4.3 Consultation

Thereafter, as part of the consultation process for the proposed development, correspondence was sent to a number of bodies:

(a) Development Applications Unit of the Department of Arts, Heritage and the Gaeltacht [DAU];

(b) Inland Fisheries Ireland [IFI];

(c) Meath County Council.

(a) Development Applications Unit of the Department of Arts, Heritage and the Gaeltacht

A response was received from the DAU, dated 2nd March 2015, and is presented in Appendix 1 of this document.

The main points raised were in relation to:

- Available guidance
- Conservation objectives
- Cumulative and ex situ impacts
- Water and wastewater
- Alien invasive species
- Construction Management Plans
- Licences

(b) IFI

In addition, IFI responded to consultation on 7th November 2016 and 11th of October 2017. The response dated 7th November 2016 stated as follows:

> *"Having examined this proposal as it stands IFI is concerned about the potential generation of suspended solids, hydrocarbons and other related deleterious matter that may flow to waters.*
>
> *We are also concerned about the potential blocking of any waters and any proposed new channel diversions. The Nanny River is a tributary of the River Boyne and has significant stocks of Brown Trout and lamprey."*

A response received on 11th of October 2017 reiterated the issues raised in the correspondence dated 27th October 2016 regarding the '*potential generation of suspended solids*' and the '*potential blocking'* of waters. The 2017 response also stated:

> *"Also, article 28(2) of the said Regulations states that a surface water body whose status is determined to be less than good shall be restored to at least good status not later than the end of 2015. This application is in close proximity to the Veldonstown tributary of the Nanny River whose status is poor and has to be restored to good status."*

(c) Meath County Council

Following consultation with Meath County Council on 29th March 2018, an email was received regarding biodiversity on 18th April 2018. The response is summarised as follows:

- Indirect impacts on designated sites in the vicinity must be considered: e.g. Discharge run-off.
- To determine if an AA is required, and if an NIS should be submitted.
- Ecological assessment to be carried out on habitats on site.
- Mitigation measures to be clearly stated (in the context of the EIAR).
- NPWS should be consulted with.

1.4.4 Existing Environment and Field Assessment

Ecological surveys were carried out by FT at Knockharley Landfill on a number of occasions. Surveys were undertaken for breeding and wintering birds, habitats and flora, mammals and bats. The findings of the surveys and a description of the existing environment are presented in Appendix 2 of this NIS.

2 DESCRIPTION OF THE EXISTING AND PROPOSED DEVELOPEMNT

2.1 Introduction

Detailed in Sections 2.2 – 2.20 is a description of the existing and proposed development.

2.2 Existing Development

The existing facility comprises a landfill facility where waste disposal and recovery activities are undertaken. The landfill opened for waste acceptance in December 2004. The landfill accepts the residual fraction of, household, commercial and industrial wastes together with construction/demolition wastes and incinerator bottom ash (IBA) and is licensed by the EPA with an Industrial Emissions (IE) Licence W0146-02. The site is licensed to operate from 07:30 to 18:30 Monday to Saturday inclusive and is licensed to accept waste between 08:00 and 18:00 (excluding public holidays). The proposed planning boundary of the facility is shown in red on Drawing No. LW14-821-01-P-0002 Existing Site Layout in Volume 4 of the EIAR and the ownership boundary (of Knockharley Landfill Ltd.) is shown in blue. This figure identifies the existing planning boundary, ownership boundary, landfill footprint, both built and permitted, screening berms, and infrastructure.

The existing facility infrastructure is shown in Volume 4 of the EIAR on drawing LW14-821-01-P-050-0004 which comprises:

1. Administration building
2. Machinery/maintenance garage
3. Four portable cabins for storage
4. Weighbridge building
5. Two weighbridges
6. Inspection slab
7. Quarantine slab
8. Car parking
9. Landfill gas treatment compound
10. Leachate lagoon
11. Surface water attenuation lagoon and wetland

The facility is located on a 135.2 hectare (333-acre site). The existing landfill footprint is positioned near the centre of the landholding and the current planning permission permits the development of approximately 25 hectares of landfill cells. The landfill is being developed in seven phases. To date, Phases 1-4 (Cell 1 to Cell 16 inclusive) of the seven planned cell phases have been fully constructed. As of November 2018, Cells 13, 14, 15 and 16 are operational.

A permanent cap has been placed on all cells in Phase 1 and Phase 2 (Cells 1-8 inclusive). In relation to Phase 3, Cells 9 and 10 and half of Cells 11 and 12 are fully capped. The permanent lining of the final cap on Cells 11 and 12 is complete, the soil placement will take place in 2019. There is an intermediate cap on the remainder on Cells 13 and 14. The landfill development and waste placement is in a northerly direction. The leachate storage lagoon is located to the south of the administrative buildings and the surface water attenuation pond and wetland is situated to the south of the landfill.

The ownership boundary is shown on Drawing No. LW14-821-01-P0000-BDY in Volume 4 of the EIAR. There is a public road, CR384 to the east of the facility with several residential properties. The access road to the facility from the N2 passes under this public road. The applicant, Knockharley Landfill Ltd. owns land on either side of the public road and residential properties along the public road. The planning boundary excludes the public road and one residential property adjoining the public road as shown on Drawing No. LW14-821-01-P0000-003 Proposed Site Layout in Volume 4 of the EIAR – see red hatched areas.

Knockharley Landfill Facility comprises development, outlined below, that are described in the following sections of this chapter:

- Access road and internal road network
- Buildings, fencing and security
- Environmental monitoring infrastructure
- Existing Utilities
- An engineered lined landfill
- Groundwater management infrastructure
- Leachate management system (comprising collection and storage)
- Surface water management system (comprising collection, attenuation and wetland)
- Landfill gas management system (comprising collection pipework, wells and a landfill gas compound)
- Landfill capping system
- Landfill void
- Existing waste types
- Existing waste activities

2.2.1 Existing Road Network

The landfill is accessed via the N2 national primary route (see Drawing No, LW14-821-01-P-0000-002 Existing Site Layout in Volume 4 of the EIAR) which provides direct vehicular access to the national roads network, with access facilitated at a ghost island priority junction on the N2 at the facility entrance (see aerial overview of entrance in Plate 2-1). The ghost island provides sheltered access for right turning vehicles travelling from the north.

This is complimented with an auxiliary left turn deceleration lane to facilitate access for vehicles coming from the south. Both turning facilities aid in preserving the flow, speed and therefore the capacity of through traffic on the N2. The junction has been designed and constructed in accordance with the NRA: Design Manual for Roads and Bridges (DMRB) and has been the subject of Roads Safety Auditing (Stages 1, 2 and 3) in accordance with procedures set out in the relevant NRA guidelines.

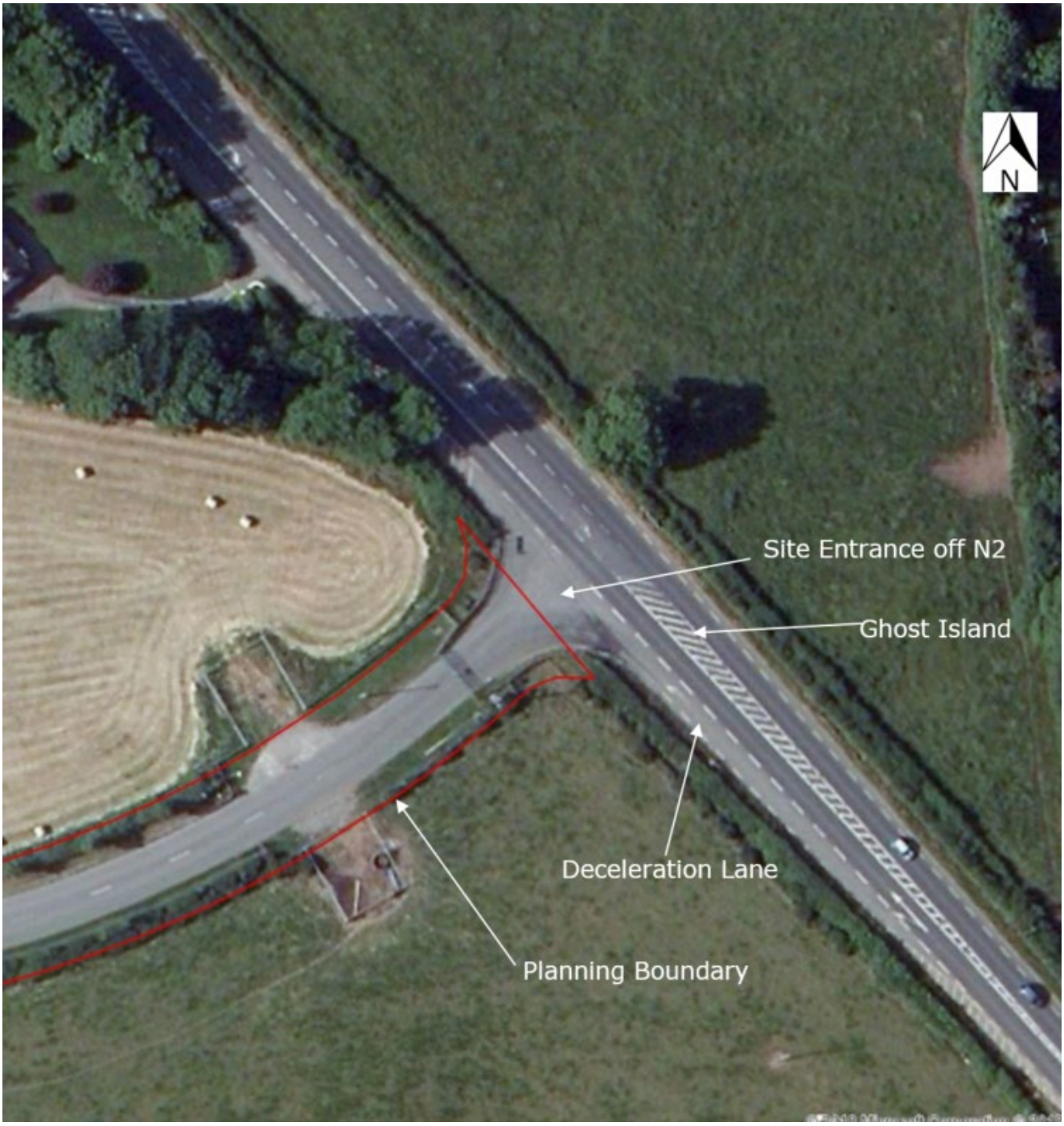


Plate 2-1: Knockharley Landfill Facility Access

The access road to the site runs due west through arable lands, thereafter running under the CR384 County Road. The entrance proper to the site is located approximately 80 to 100 metres west of the underpass of the CR384. The distance from the N2 to the onsite weighbridges is approximately 900 m. The dedicated access road is single carriage way and is the only road access to and from the site.

2.2.2 Existing Buildings, Fencing and Security

Plate 2-2 presents an aerial view of the existing administration building, car parking, weighbridges and weighbridge building, waste inspection and quarantine areas which includes the machinery/maintenance garage, portable storage cabins and bunded fuel storage.

Plate 2-2: Knockharley Landfill Administration Area

The facility is accessed off the national route N2 via a private gated entrance road. A security gate with closed circuit television is located on the access road. This aids site security staff in preventing unauthorised traffic from entering the site. This is the only road access to and from the facility. The perimeter of the site is fenced.

2.2.3 Existing Environmental Monitoring Infrastructure

The conditions and schedules of the current IE Licence (W0146-02) detail the requirements for environmental compliance. This includes monitoring requirements, trigger levels and emission limit values.

The current environmental infrastructure comprises:

- landfill gas perimeter monitoring wells
- in-waste landfill gas monitoring wells
- groundwater wells to monitor groundwater level and quality
- leachate side risers (to monitor leachate quality) and level sensors in cells and in the leachate lagoon
- continuous monitoring of pH, TOC and electrical conductivity at the outlet of the surface water pond
- meteorological monitoring station

Monitoring of the following is carried out on site at pre-defined locations but not requiring permanent monitoring infrastructure:

- surface water
- noise
- dust and PM10
- odour
- surface emissions (VOCs)
- stack emissions (flares and engines)

Existing monitoring locations are shown on Drawing No. LW14-821-01-P-050-001 in Volume 4 of the EIAR.

2.2.4 Existing Utilities

Existing overhead power lines (see Drawing No, LW14-821-01-P-0000-002 Existing Site Layout in Volume 4 of the EIAR), are present at the following locations:

- 220 KV running north south and adjacent to the western boundary of the landfill footprint
- 20 KV running north south on the eastern boundary parallel to the existing local road with spurs to:
    - An ESB substation exporting power from the landfill gas compound to a 20KV line
    - An ESB substation importing power to the administration building

An existing below ground high pressure natural gas main is located south of and off-set from the permitted landfill footprint traversing the site in an east west direction. There is no connection from the facility to this gas main.

The facility is connected to the water mains and has phone and broadband. All foul effluent generated from administration welfare facilities is collected on site and passed through a 'biocycle' treatment unit and is discharged thereafter to the leachate lagoon.

2.2.5 Existing Engineered Landfill

The facility was designed, constructed and is being operated in accordance with the EU Landfill Directive 1999/31/EC, the original Licence, licence review, the IE Amendment and Technical Amendment A, B, C and D, relevant EPA guidance manuals on landfill selection, design, operation and monitoring and the relevant planning permissions that pertain to the site. Of the 7 no. approved landfill phases, the first 4 phases (Cells 1-16) have been constructed. Waste is being placed in Cells 15 and 16 during 2018.

The landfill liner system is a 1 m thick composite barrier comprising HDPE membrane and clay basal layer with a permeability of $1X10^{-9}$ m/s or similar approved, complying with both EU regulation and the licence conditions. Plate 2-3 shows an empty cell as constructed at Knockharley.

Plate 2-3: Lined cells at Knockharley Landfill

The clay component of the basal lining system was won from material excavated during the construction of the cells. The clay was screened by mechanical means to eliminate stone sizes greater than 50 mm. The clay was placed and compacted in layers, to achieve the required degree of permeability, in compliance with the licence. The cells were then lined with a 2 mm thick high-density polyethylene (HDPE) geomembrane. The liner is textured on the side-slopes and smooth on the cell floors. The cell floor falls to low points equipped with leachate pumps. The composite barrier layer is protected against mechanical damage using a protective geotextile overlain by drainage stone on the floor and using a protective geotextile on the side slopes. The construction of the landfill liner system was subject to independent quality assurance testing and controls approved by the EPA.

Cell numbering is shown on Drawing No, LW14-821-01-P-0000-002 Existing Site Layout in Volume 4 of the EIAR.

2.2.6 Existing Groundwater Management Infrastructure

Groundwater drains are constructed below the engineered clay lining system, to maintain groundwater below cell formation. Groundwater flows observed during construction of cells 14 and 15 was approximately 3 m^3 per day. These flows are typically encountered during phased cell developments (plan area approximately 250 m x 70 m). The groundwater pipe drains consist of trenches of 1000 mm deep and 1000 mm wide below the bottom of the cells. 150 mm diameter open jointed concrete and/or slotted drainage pipes are surrounded by a stone filter and wrapped in geotextile, as shown in Figure 2.1. Gravity flows collected in this pipe terminate in sumps and electricity powered pumps discharge groundwater via a rising main to the surface water attenuation pond on site.

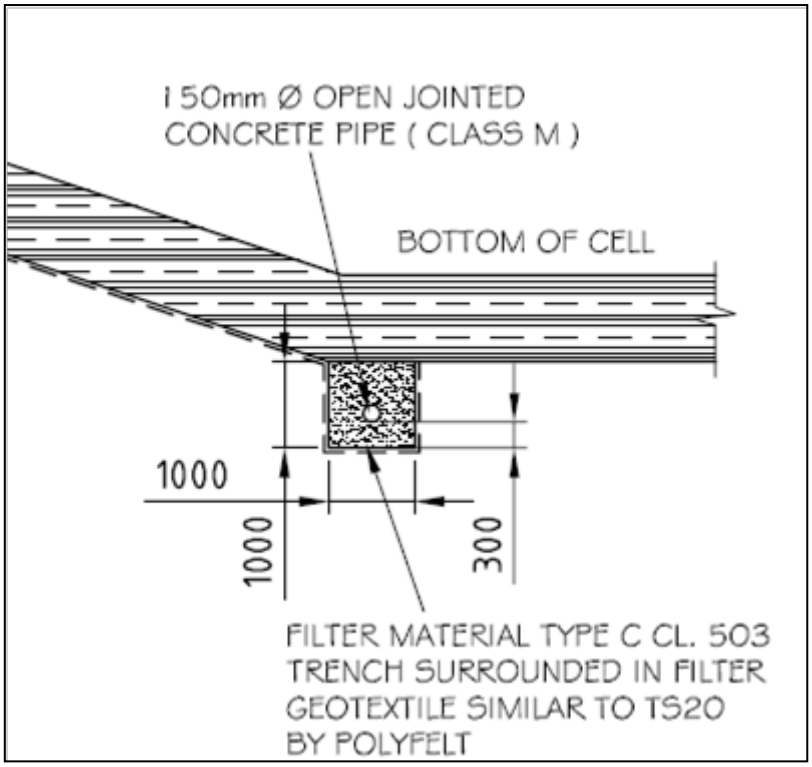


Figure 2-1: Typical Detail of Groundwater Drain

2.2.7 Existing Leachate Management Infrastructure

Leachate that gathers in the base of cells is collected in a leachate collection system comprising slotted drainage pipework, laid in a 'herringbone' fashion within a 500 mm thick leachate drainage layer of granular material laid on the cell floors. Electricity - powered leachate pumps are located in the low points of the cells, and leachate is pumped from side riser sumps to the perimeter leachate collection rising main. The leachate collection rising main, which will ultimately be laid around the entire perimeter of the landfill, discharges to the leachate lagoon.

The leachate lagoon (see Plate 2-4) has a floating cover to prevent rainfall ingress and to minimise odour nuisance. The lagoon is lined with 2 mm HDPE membrane on a 1 m clay layer. The capacity of the leachate lagoon is approximately 2,500 m^3, with an allowance for a 0.75 m freeboard. Leachate is tankered off-site for treatment at a wastewater treatment plant.

There is no foul sewer service near the site. Accordingly, all foul effluent generated from the onsite administration welfare facilities is collected on site and through a 'biocycle' treatment unit, the treated effluent is discharged thereafter to the leachate lagoon.

Plate 2-4: Covered Leachate Lagoon

2.2.8 Existing Surface Water Drainage Infrastructure

Surface water runoff from roads and hard standing areas discharge to a surface water trunk main collection pipe. This surface water trunk is located on the eastern side of the perimeter access road and runs between the administration building to the southern surface water attenuation lagoon. Refer to Drawing LW14-821-01-P-0000-002 in Volume 4 of the EIAR. This below ground pipe main varies from 225 mm diameter up to 750 mm diameter. There is also a 450 mm diameter spur from this pipe main to the north of the proposed building for the biological treatment of the organic fraction of Municipal Solid Waste (also referred to as MSW fines) which runs from east to west and turns north to receive runoff from the main site access road.

The pipe discharges to an existing attenuation pond and wetland serving the overall site, via a Class 1 bypass proprietary oil/water separator. This petrol interceptor prevents petroleum products from entering the storm water attenuation pond and wetland.

Surface water from the landfill footprint is drained via the main landfill perimeter swale to a purpose-built storm water attenuation pond and constructed wetland. Swales are vegetated channels over which flows are conveyed at low non-erosive velocities. The existing swales drain the surface water from the landfill footprint and embankments surrounding the landfill cells. These swales are of approximate depth 600 mm with a bottom width of 1000 mm and side slopes of 1 in 3. The swales were constructed in accordance with CIRIA C698, Site Handbook for the Construction of SUDS. As the landfill cells develop further, the surface water swales will continue to be constructed around the landfill footprint and embankments.

The attenuation pond and wetland (located on the southern boundary of the landfill footprint) were designed to manage the runoff from the development for up to a 1 in 100-year design return period storm event. The outflow from the constructed wetland discharges into the local drainage network at the south-eastern corner of the site.

The discharge from the surface water pond is controlled by a slam shut valve that prevents surface water discharging if continuous monitoring of TOC indicates potential contamination of the surface water. The live storage volume of the pond is 4,253 m^3, (theoretical requirement 3,758 m^3). The 1:20 discharge capacity from the existing attenuation pond to the receiving watercourse (via the wetland) is 0.188 m^3/s. The storm water attenuation pond also has a 1:100 emergency spill capacity of 0.28 m^3/s.

The storm water attenuation pond (see Plate 2-5 foreground) is lined with a composite barrier, comprising a HDPE membrane and a 1.0 m clay basal layer with a permeability of 1 x 10^{-9} m/s, which is the same specification as the landfill cell clay barrier. The constructed wetland comprises a shallow clay-lined pond both naturally colonised and planted with appropriate species.

Plate 2-5: Surface Water Attenuation Pond and Wetland

2.2.9 Existing Landfill Gas Management Infrastructure

Landfill gas (LFG) is extracted from all active and filled cells via vertical and horizontal gas wells. Gas wells are constructed from the cell floor upwards as waste is placed in each cell. Additional bored gas wells are constructed in each cell to aid gas extraction upon reaching a predetermined filling height. Gas extraction commences from each cell once sufficient waste has been placed above the leachate stone drainage layer to prevent air infiltration into the gas extraction system. In addition, short-term use of driven extraction pipes ('pin wells') are used as a temporary gas collection measure, close to the working face. A slotted horizontal gas collection pipe also is installed at the top of the cell side-slopes to intercept any gas travelling up the cell embankments.

Landfill gas is fed via both temporary over-ground and permanent below-ground HDPE pipes to a 355 mm HDPE gas ring main located outside the perimeter of the waste cells. The ring main transfers landfill gas from the cells to the landfill gas compound via two condensate knock-out pots located 'upstream' of the compound.

At present, Cells 1 to 10 and approximately half of Cells 11 & 12 are fully capped. As part of these works, there is a permanent gas collection system connected to the ring main.

Capping works for the other landfill phases will involve the installation of more condensate knock-out pots, permanent well heads and below ground pipes to enable management of the landfill gas field.

The landfill-gas compound is located east of the landfill footprint and north of the surface water lagoon.

The landfill gas treatment infrastructure consisting of enclosed flares and landfill gas utilisation engines are in the landfill gas compound. Currently, there are four engines on site. Two engines are run continuously as lead engines, these have a capacity of 1,000 m^3/hr.

Two back up engines of 800 m^3/hr capacity each are installed on site. There are 3 no. enclosed flares in the landfill gas compound, two duty and one back up. The two duty flares provide flaring capacity of 2,500 m^3/hr and 1,500 m^3/hr. The back-up flare is 1,500 m^3/hr.

The largest flare, is directly connected to the booster station that provides the primary back up to the two duty engines. A fourth open flare of 500 m^3/hr capacity is located within the compound. It is not currently operational and is only used for odour control measures if required.

There is an ESB substation in the compound to facilitate the transfer of energy generated by the plant to the national grid via an overhead 20 KV power line. The landfill gas plant was commissioned in 2010 and has been exporting power to the grid since then. The current energy generation from landfill gas generated on site is 2.1 MW.

Plate 2-6: Landfill Gas Compound

2.2.10 Existing Landfill Capping System

As part of ongoing operations at the site, the active area of the landfill is covered with daily cover. Near-horizontal areas of the working face are covered with soil and woodchip, the slope of the working face is covered with daily cover at the end of each working day.

Temporary low-permeability covers are installed as areas of the landfill reach full height. At the time of writing, a temporary cap has been installed on parts of Cells 13 and 14.

A fully engineered cap is in place over a Cells 1-10 and half of Cells 11 and 12. This cap comprises: a gas collection layer, 1 mm fully welded LLDPE liner, sub-surface drainage layer, subsoil layer and a topsoil layer. The overall thickness of the soil layers is 1 m in accordance with the requirements of the facility licence. Approximately 96,000 m² has been capped to date. The final capping of Cells 11 and 12 is underway, the welded LLDPE liner is in place and the soil layers will be placed in 2019.

Future permanent capping will continue on a phased basis.

2.2.11 Existing Landfill Void Capacity

The total quantity of waste and recovery materials landfilled at the site up to the end of 2017 within cells 1 through 16 is approximately 2,170,954 tonnes.

The existing design capacity of Knockharley landfill is approximately 3.137 x10^6 m³. The estimated remaining void in the current permitted development based on void assessments of Phases 4b, 5, 6 and 7 is 1,627,431 m^3.

The current planning permission permits the acceptance of waste at Knockharley until the 26 August 2021. Condition 3 of the permission granted by An Bord Pleanála in March 2007 (Ref: PL17.220331) restricted disposal at the facility to 132,000 tonnes per annum until December 2010, thereafter reducing to 88,000 tonnes per annum for disposal. Assuming a density of 1.0 t/m^3 It will not be possible to fill the remaining void by the 26 August 2021.

2.2.12 Existing Waste Types Accepted

The categories of waste accepted are as per Schedule A of the licence W0146-02 which includes for the disposal and recovery of household, commercial and industrial waste and construction and demolition waste is shown in Table 2-1. The current planning permission limits intake to 88,000 tonnes per annum.

Table 2-1: Schedule A – Wastes for Acceptance

Waste Type	Maximum Tonnes per Annum
Household	100,000
Commercial	45,000
Industrial	30,000
Sub Total for Disposal	175,000
Construction & Demolition for Recovery	25,000
Total	**200,000**

2.2.13 Existing Waste Activities

Waste Management Act 1996, as amended

The relevant classes of the Third Schedule (Disposal Activities) & Fourth Schedule (Recovery Activities) of the Waste Management Act 1996, on which the original facility licence was granted are shown in Tables 2.2 & 2.3. Note that since the grant of the facility licence, the Waste Management Act 1996 was amended in 2011 such that disposal and recovery activities identified in the Third and Fourth Schedules respectively were revised. The tables indicate in italics the respective revised activities that correspond to those originally licensed, while providing a description of the operational activities to which the classes relate.

Table 2-2: Third Schedule Waste Disposal Activities

Third Schedule Waste Disposal Activities	
Class 1	Deposit on, in or under land (including landfill)
Class D1	*Deposit into or on to land (e.g. landfill, etc.)*
Description of Activity	Deposit of non-hazardous wastes in lined cells that are on, in and under land
Class 4	Surface impoundment, including placement of liquid or sludge discards into pits, ponds or lagoons
Class D4	*Surface impoundment (e.g. placement of liquid or sludgy discard into pits, pond or lagoons, etc.)*
Description of Activity	Storage of leachate in a lagoon prior to disposal off-site at a suitable wastewater treatment plant and the use of a surface water pond to control the quality and quantity of the surface water run-off from the site
Class 5	Specially engineered landfill, including placement into discrete cells which are capped and isolated from one another and the environment
Class D5	*Specially engineered landfill (e.g. placement into lined discrete cells which are capped and isolated from one another and the environment, etc.)*
Description of Activity	The deposition of non-hazardous waste into lined landfill cells
Class 6	Biological treatment not referred to elsewhere in this Schedule; which results in final compounds or mixtures which are disposed of by means of any activity referred to in paragraphs to 10 of this Schedule.
Class D8	*Biological treatment not specified elsewhere in this Schedule which results in final compounds or mixtures which are discarded by means of any of the operations numbered D 1 to D 12.*
Description of Activity	The possible future biological pre-treatment of leachate subject to the agreement of the Agency.
Class 13	Storage prior to submission to any activity referred to in a preceding paragraph of this schedule other than temporary storage pending collection on the premises where the waste concerned is produced.
Class D15	*Storage pending any of the operations numbered D 1 to D 14 (excluding temporary storage (being preliminary storage according to the definition of 'collection' in section 5(1)), pending collection, on the site where the waste is produced).*
Description of Activity	The temporary storage on-site of unacceptable waste in the waste quarantine area prior to transport to another site.

Table 2-3: Fourth Schedule Waste Recovery Activities

Fourth Schedule Waste Recovery Activities	
Class 4	Recycling or reclamation of other inorganic materials
Class R5	*Recycling/reclamation of other inorganic materials, which includes soil cleaning resulting in recovery of the soil and recycling of inorganic construction materials*
Description of Activity	The use of recycled construction and demolition waste as cover and/or construction material at the site.
Class 9	Use of any waste principally as a fuel or other means to generate energy
Class R1	*Use principally as a fuel or other means to generate energy: This includes incineration facilities dedicated to the processing of municipal solid waste only where their energy efficiency is equal to or above –* *- 0.65 for installations permitted after 31 December 2008,* *using the following formula, applied in accordance with the reference document on Best Available Techniques for Waste Incineration:* *Energy efficiency = (Ep - (Ef + Ei)/ (0.97x(Ew+Ef)* *where -* *'Ep' means annual energy produced as heat or electricity calculated with energy in the form of electricity being multiplied by 2.6 and heat produced for commercial use multiplied by 1.1(GJ/year),* *'Ef' means annual energy input to the system from fuels contributing to the production of steam (GJ/year),* *'Ew' means annual energy contained in the treated waste calculated using the net calorific value of the waste (GJ/year),* *'Ei' means annual energy imported excluding Ew and Ef(GJ/year),* *'0.97' is a factor accounting for energy losses due to bottom ash and radiation*
Description of Activity	The utilisation of landfill gas
Class 11	Use of waste obtained from any activity referred to in a preceding paragraph of this Schedule
Class R11	*Use of waste obtained from any of the operations numbered R 1 to R 10*
Description of Activity	The use of construction and demolition waste on site
Class 13	Storage of waste intended for submission to any activity referred to in a preceding paragraph of this Schedule, other than temporary storage, pending collection, on the premises where such waste is produced
Class R13	*Storage pending any of the operations numbered D 1 to D 12 (excluding temporary storage (being preliminary storage according to the definition of 'collection' in section 5(1)), pending collection, on the site where the waste is produced)*
Description of Activity	The storage of construction and demolition waste on site prior to recovery.

Industrial Emissions Directive

The facility Waste Licence W0146-02 was amended by the EPA in December 2013 in compliance with the Industrial Emissions Directive (2010/75/EU), as implemented by the European Union (Industrial Emissions) Regulations (S.I. 138 of 2013), thus changing the licence from a Waste Licence to an Industrial Emissions (IE) Licence.

In accordance with the revised First Schedule of the EPA Act 1992 to 2013, the 'Schedule of Licensed Activities' of the facility licence at the site are:

11.1 The recovery or disposal of waste in a facility, within the meaning of the Act of 1996, which facility is connected or associated with another activity specified in this Schedule in respect of which a licence or revised licence under Part IV is in force or in respect of which a licence under the said Part is or will be required. (is an industrial emissions directive activity, in so far as the process development or operation specified in 11.1 is carried on in an installation connected or associated with another activity that is an industrial emission directive activity)

11.5 Landfills, within the meaning of section 5 (amended by Regulation 11(1) of the Waste Management (Certification of Historic Unlicensed Waste Disposal and Recovery Activity) Regulations 2008 (S.I. No. 524 of 2008)) of the Act of 1996, receiving more than 10 tonnes of waste per day or with a total capacity exceeding 25,000 tonnes, other than landfills of inert waste.

Note that this revised Schedule identifies that the relevant activities in accordance with the Waste Management Act 1996 as amended, continue to apply at the facility, where the revised Schedule states:

> *"Notwithstanding the foregoing, any limitation on waste recovery and disposal activities in this Part in accordance with the Third Schedule and Fourth Schedule of the Waste Management Act 1996 as amended including, where applicable, any refused waste disposal and recovery activities form the Third Schedule and Fourth Schedule of the Waste Management Act as amended shall continue to apply."*

2.3 Proposed Development

2.3.1 Introduction

The proposed development comprises:

- The acceptance of up to 435,000 tonnes per annum of non-hazardous wastes, which will comprise up to 150,000 tonnes of incinerator bottom ash (IBA), as well as household, commercial and industrial wastes including residual fines, non-hazardous contaminated soils, construction and demolition (C&D) wastes and baled recyclables. In addition, the acceptance of up to 5,000 tonnes per annum of stable non-reactive hazardous waste is proposed. Permission is sought for the acceptance of waste until the landfill cells are full.
- The acceptance and placement within the existing permitted landfill footprint of incoming wastes for recovery or disposal as appropriate; the increase in height of the landfill body from the current permitted post settlement final contour height of 74 mOD to a post settlement contour height of 85 mOD – the proposed height increase will apply from the active landfill phase at the time of permission grant. Permission is sought for the acceptance of waste until the cells are full.
- The construction and operation of a dedicated IBA facility. Permission is sought to store IBA until recovery outlets are identified. Permission is sought for trials to prepare IBA for recovery and removal off site. The IBA facility will consist of 5 no. cells which will be constructed in accordance with the requirements of the Landfill Directive 99/31/EC for non-hazardous wastes. A final post settlement contour height of 85 mOD is proposed. Permission is sought for operation of the IBA facility until the cells are full and subsequent aftercare activities as may be required are complete. The development includes additional perimeter (haul) roads and screening berms.

  The IBA facility will comprise 1 no. portal frame building 76 m x76 m x 15.5 m to facilitate:
  - weathering
  - metals recovery trials
  - crushing and washing to facilitate recovery trials and processing

- The construction and operation of a building for:
  - The biological treatment of the organic fraction of MSW (otherwise known as MSW 'fines' material) and;
  - contingency storage of baled recyclables
  - contingency storage of baled MSW

  This facility shall comprise:
    - a processing building of 108 m in length, 50 m in width and up to 17 m in height, of portal frame construction with 13 no. vehicle roller shutter doors and 7 or more pedestrian access doors (subject to fire certification requirements)
    - internal storage bays as required
    - 12 no. concrete composting tunnels located within the processing building of c. 6 m in width, 25m in length and 5 m in height
    - a covered bio-filtration unit within the overall processing building footprint, with a stack of height of 20 m
    - access from the internal site road with a marshalling yard area with egress from the existing site road to the landfill gas compound
  - all other ancillary and associated works, including leachate storage in a below ground tank, bio-treatment system for sanitary wastewater drainage and fencing.
  Permission is sought for the continued use of this building post filling of the landfill cells onsite.

- The construction and operation of a leachate management facility comprising:
  - 3 no. additional floating cover leachate storage lagoons (L2, L3 and L4) of c. 3,000 m^2 each
  - 2 no. bunded above ground tanks for raw leachate from IBA cells (S1 and S2) approximately 25 m diameter 6.0 m high.
  - 3 no. bunded above ground tanks:
    - 1 no. tank (S3) for treated leachate from landfill leachate approximately 22m diameter 6.0m high.
    - 1 no, tank for treated leachate from IBA approximately 25 m diameter 6.0 m high (S4).
    - 1 no. tank for leachate concentrate 16 m diameter by 6.0 m high (S5).
  - Modular - typically containerised plant units (C1 through C6), on concrete slab of c. 1,000 m^2 and 1 no. elevated tank 5 m diameter 10 m high (T1) with provision for 2 no. additional low level (<5.0 m high) bunded storage tanks for dosing and other compounds (T2 and T3).
  - Extension of existing loading area for 2 no. 25 tonne articulated tankers and a new loading area for 2 no. 25 tonne articulated tankers.

  Permission is sought for the continued operation of this plant post filling of the landfill cells to facilitate continued leachate management.

- Construction of screening berms along the western boundary to a maximum of 10 m in height, on the eastern boundary to a maximum height of 10 m and on the northern boundary, to a maximum height of 6 m, with a total berm footprint of c. 11.3 ha. Haul roads for construction will be in or immediately adjacent to berm footprint.
- Construction of surface management infrastructure, with discharge to the adjacent Knockharley Stream to the northern end of the landfilling footprint and the proposed IBA cell development. Key elements will comprise:
  - holding pond for surface water runoff
  - storm water attenuation lagoon to maintain green field surface water discharges to Knockharley stream and to facilitate suspended solids management
  - wetland
  - flood culvert to provide equivalent 1:1000-year flood plain storage
  - permitted stream diversion around permitted development

- Felling of c. 12.5 ha of the existing commercial broadleaf/conifer mix plantations to facilitate:
    - construction of the screening berms along the western boundary and to the north of the proposed IBA area, and
    - development of Phase 7 Cells 27 and 26 and the new northern surface water attenuation pond.

  Replanting and new planting totalling (c.16.8 ha) will off-set loss of commercial forestry in the proposed development footprint at the following locations:

    - replanting over screening berms
    - new planting on the cap over cells 25, 26, 27 and 28 in what is currently the permitted development

- Relocation of an existing 20 KV overhead ESB powerline that provides power to the existing landfill facility administration buildings, that will be impacted by the development of the screening berm to the east of the proposed IBA cell area.
- Construction of an additional ESB sub-station and new overhead ESB supply to the north-western corner of the currently permitted landfill footprint to facilitate power provision for pumps and other infrastructure.
- Construction of a new ESB sub-station adjacent to the proposed building for biological waste treatment and storage with ESB connection to adjacent 20 kV power lines.
- Extension of existing below ground infrastructure (permitted development) and provision of additional below ground infrastructure. (Power, water, telemetry, leachate rising mains, drainage). Extension of the existing car park for the administration area (760 m^2) to provide additional no. 40 parking spaces.

The proposed site layout is shown in Drawing No.'s LW14-821-01-P-0000-003 through 011 Proposed Site Layout Plan in Volume 4 of the EIAR[1]. To support the written description of the proposed works in this chapter, Drawing LW14-821-01-P-0050-0005 Proposed Site Layout Plan with Infrastructure Locations, in Volume 4 of the EIAR includes a numbering notation as below:

1. Proposed waste acceptance types, activities & quantities (see Section 2.3)
    a. Non-stabilised residual including biodegradable
    b. IBA
    c. Non-hazardous and non-biodegradable stabilised and inert
2. Proposed changes to current permitted cell development (see Section 2.4)
    a. Increased profile
    b. Revised cell layout and additional working faces
3. Proposed dedicated IBA facility (see Section 2.5)
    a. Cell layout
    b. IBA road access
    c. IBA wheel wash
    d. Suspended solids management at side risers
    e. Side risers and rising mains
    f. Suspended solids management
    g. Weathering area including weathering building
4. Proposed biological treatment facility (see Section 2.6)

[1] A separate drawing, No. LW14-821-01-P0000-013 contains the same details as the Proposed Site Layout series 1-8, but includes the proposed surface water management infrastructure, IBA facility, leachate management facility and biological treatment facility on one drawing for ease of reference.

5. Proposed leachate storage and treatment (see Section 2.7)
    a. Bunded storage
    b. Floating cover lagoons
    c. Tanker loading areas
    d. Leachate treatment / conditioning area
6. Proposed surface water/drainage infrastructure (see Section 2.8)
    a. Additional surface water attenuation lagoon
    b. Surface water outfall
    c. Replacement 1:1000 yr flood plain
    d. Surface water holding pond
7. Earth balance and proposed berms (see Section 2.9)
    a. Cell development
    b. Berm phasing
8. Proposed tree felling & replanting (see Section 2.10)
9. Relocation of ESB powerline (see Section 2.11)
10. Ancillary infrastructure (see Section 2.12)
    a. Additional ESB substation
    b. Additional ESB substation
    c. Additional drainage
    d. New overhead ESB line

An application will also be made to the EPA to facilitate the licensing of the proposed development as outlined herein. The existing facility is licensed to operate by the EPA by IE W0146-02.

2.3.2 Proposed Waste Types, Activities & Quantities

It is proposed to accept up to 440,000 tonnes per annum of waste at Knockharley in total. This waste shall be managed through disposal or recovery activities, dependent on the nature of the waste material.

It is necessary to consider the processes that will be applied to each waste type to be accepted in terms of the process being either a recovery or a disposal activity, as defined by the relevant activities outlined in Schedules 3 & 4 of the Waste Management Acts 1996 to 2011, as amended. The classification of the activities being applied to each waste type is discussed further in this section.

While the current permission pertaining to the facility limits the acceptance of waste for disposal to 88,000 tonnes per annum, for reasons discussed in Chapter 4 'Need for the Development & Alternatives Considered', it is considered that an increased acceptance rate at Knockharley Landfill would be appropriate, and sustainable to provide required national landfilling capacity including contingency capacity.

The proposed development will see the acceptance of a total of 440,000 tonnes 'through the gate' on an annual basis, that will either be recovered or disposed of, dependent on the nature and quantity of the material. The types of waste to be accepted at the proposed development and proposed quantities and related disposal or recovery activities are outlined in more detail in the following sections.

2.3.3 Waste Types to be Accepted

Broadly, the waste types to be accepted as part of the proposed development are the same as those currently accepted at the facility, with the addition of two new waste types; stable non-reactive hazardous waste (maximum 5,000 tonnes per annum) and baled recyclable waste.

The waste types to be accepted are:

- Non-hazardous residual municipal solid wastes of household, commercial and industrial origin, which will have undergone various degree of pre-treatment from separate 'black bin' collection to biological treatment in the form of stabilised residual fines, as well as residual MSW from other sources such as unauthorised landfill remediation and/or repatriated wastes; the issue of unauthorised landfill remediation and waste repatriation is discussed in more detail in Chapter 4 'Need for the Development & Alternatives Considered'.
- Non-hazardous incinerator bottom ash (which is currently accepted at the facility).
- Non-recyclable bulky wastes, where bulky wastes are broadly considered as larger wastes which do not fit in household/commercial bins e.g. mattresses, furniture etc.
- Non–hazardous soils and stones and other C&D wastes.
- Street sweepings and similar cleansing wastes.
- 'Individual' volumes of non-hazardous industrial wastes from various industries such as food preparation, chemical processes, thermal processes, metal treatments, health care (non-hazardous) and water/wastewater treatment industries, all of which are currently accepted at the facility.
- Stable non-reactive hazardous waste
- Baled recyclable waste (contingency storage)
- Baled MSW (contingency storage)

2.3.4 Proposed Waste Activities

The proposed activities to be undertaken at the facility are classified in accordance with relevant legislation and can broadly be described as:

- placement of waste within lined cells
- biological treatment of residual MSW fines
- management of leachate
- storage of surface water for attenuation prior to discharge
- storage of unsuitable waste in quarantine area prior to removal off-site
- contingency storage of baled recyclables
- contingency storage of baled MSW
- IBA recovery trials (screening and washing and recovery of metals)

Waste Activities under the Industrial Emissions Directive

The facility Licence W0146-02 was amended by the EPA in December 2013 in compliance with the Industrial Emissions Directive (2010/75/EU), as implemented by the European Union (Industrial Emissions) Regulations (S.I. 138 of 2013), thus changing the licence from a Licence to an Industrial Emissions (IE) Licence.

An application shall be made to the EPA in respect of the IE Licence following submission of the SID planning application which shall include for the proposed waste activities under the Industrial Emissions Directive. Table 2-4 over shows a list of the proposed activities that may apply to the proposed development.

Table 2-4: Proposed Activities in accordance with the Industrial Emissions Directive 2010/75/EU as per Revised First Schedule of EPA Act 1992 to 2013

Proposed Activity 11.1	The recovery or disposal of waste in a facility, within the meaning of the Act of 1996, which facility is connected or associated with another activity specified in this Schedule in respect of which a licence or revised licence under Part IV is in force or in respect of which a licence under the said Part is or will be required. (is an industrial emissions directive activity, in so far as the process development or operation specified in 11.1 is carried on in an installation connected or associated with another activity that is an industrial emission directive activity).
Description of Activity	All waste related site activities as described in 11.4 (a), 11.4 (b) & 11.5 following
Proposed Activity 11.4 (a)	Disposal of non-hazardous waste with a capacity exceeding 50 tonnes per day involving one or more of the following activities (other than activities to which the Urban Waste Water Treatment Regulations 2001 (S.I. 254 of 2001) apply): (ii) physico-chemical treatment;
Description of Activity	Leachate management
Proposed Activity 11.4 (a)	Disposal of non-hazardous waste with a capacity exceeding 50 tonnes per day involving one or more of the following activities (other than activities to which the Urban Waste Water Treatment Regulations 2001 (S.I. 254 of 2001) apply): (iv) Treatment of slags and ashes
Description of Activity	IBA recovery trials
Proposed Activity 11.4 (b)	Recovery, or a mix of recovery and disposal, of non-hazardous waste with a capacity exceeding 75 tonnes per day involving one or more of the following activities, (other than activities to which the Urban Waste Water Treatment Regulations 2001 (S.I. No. 254 of 2001) apply): (iii) treatment of slags and ashes
Description of Activity	IBA recovery trials
Proposed Activity 11.4 (b)	Recovery, or a mix of recovery and disposal, of non-hazardous waste with a capacity exceeding 75 tonnes per day involving one or more of the following activities, (other than activities to which the Urban Waste Water Treatment Regulations 2001 (S.I. No. 254 of 2001) apply): (i) biological treatment;
Description of Activity	Leachate management Biological treatment of MSW fines
Proposed Activity 11.5	Landfills, within the meaning of section 5 (amended by Regulation 11(1) of the Waste Management (Certification of Historic Unlicensed Waste Disposal and Recovery Activity) Regulations 2008 (S.I. No. 524 of 2008)) of the Act of 1996, receiving more than 10 tonnes of waste per day or with a total capacity exceeding 25,000 tonnes, other than landfills of inert waste.
Description of Activity	The acceptance of waste at a landfill facility where the proposed rate of acceptance exceeds the identified threshold.

Waste Activities under the Waste Management Act

The classification of an activity as recovery or disposal is an important consideration from a legislative viewpoint, in terms of correctly classifying an activity, such that it has appropriate authorisation to be undertaken.

As per the Waste Framework Directive 2008/98/EC, 'recovery' is defined as:

> *"any operation the principal result of which is waste serving a useful purpose by replacing other materials which would otherwise have been used to fulfil a particular function, or waste being prepared to fulfil that function, in the plant or in the wider economy"*

Annex II to the Waste Framework Directive contains a non-exhaustive list of recovery activities, which are replicated in the Fourth Schedule of the Waste Management Act, 1996 as amended. In a landfilling context, wastes are generally recovered through their use as daily and temporary cover materials, where they replace other non-waste materials that could also be used as cover, as well as construction materials in, for example, internal haul roads.

'Disposal' is defined in 2008/98/EC as:

> *"any operation which is not recovery, even where the operation has as a secondary consequence the reclamation of substances or energy"*

Annex II to the Directive contains a non-exhaustive list of disposal activities, which are those replicated in the Third Schedule of the Waste Management Act, 1996 as amended. Again, in a landfilling context, wastes placed within the landfill cell void that serve no recovery use are considered as being disposed.

In terms of the waste activities proposed as part of this development, wastes to be accepted have the potential, to varying degrees, to be either 'recovered' or 'disposed of' in keeping with the definitions of 2008/98/EC and the Third and Fourth Schedules of the Waste Management Act 1996, as amended.

Table 2-5 over outlines different situations in which incoming waste types could be identified as undergoing recovery or disposal activities. Further background to the likely origin of these wastes is provided in Chapter 4 'Need for the Proposed Development & Alternatives Considered'.

The acceptance of IBA in dedicated cells is described in more detail in Section 2.5.2 following - the placement of this material could potentially be classified as a recovery or disposal activity, depending on a number of factors.

Table 2-5: Waste Types, Quantities & Recovery and/or Disposal Application

Waste Types	Total Quantities Envisaged	Recovery Activity	Disposal Activity
Incinerator Bottom Ash	Up to 150,000 tonnes per annum	In the event of the acceptance and placement of IBA in dedicated cells, prior to a subsequent offsite recovery application, being considered as an 'R13' storage activity [2]	In the event of the acceptance and placement of IBA in dedicated cells with no subsequent recovery
Soils & Stones & Other C&D wastes	Up to 290,000 tonnes per annum	Where used as cover and/or construction materials during landfilling operations	When not used as cover and/or construction materials and deposited within the landfill void
Residual Municipal Solid Waste (including municipal bulky waste)		Where residual MSW fines are processed, either onsite in the proposed biological treatment plant or offsite, and utilised as cover material during landfilling operations	Where residual MSW is deposited directly within the landfill void
Non-municipal Bulky Waste		Unlikely to be utilised in a recovery application	Where non-municipal bulky waste is deposited directly within the landfill void
Street Sweepings & Cleansing Wastes		Unlikely to be utilised in a recovery application	Where street sweepings and cleansing wastes are deposited directly within the landfill void
Non-hazardous Industrial Wastes		Unlikely to be utilised in a recovery application	Where non-hazardous industrial wastes are deposited directly within the landfill void
Stable Non-Reactive Hazardous Waste (SNRH)	Up to 5,000 tonnes annum [3]	Will not be utilised in a recovery application	SNRH to be deposited directly within landfill void.

To this end, the likelihood of the further use of this material in a recovery application (most likely the R5 recovery activity[4] as per the Fourth Schedule of the Waste Management Act 1996, as amended) is an important factor in the designation of placement of this material in dedicated cells as a recovery or disposal activity.

C&D soil and stones type material, as well as stabilised residual fines materials may also be recovered, when used in daily and temporary cover applications at landfill sites. The use of this material as cover, and hence classification as recovery, is governed by the facility licence and will be undertaken in accordance with the EPA Guidance Note "Guidance Note on Daily and Intermediate Cover at Landfills"[5]

[2] Where Class R13 of the Third Schedule of the Waste Management Acts 1996 to 2011, is "Storage of waste pending any of the operations numbered R 1 to R 12 (excluding temporary storage (being preliminary storage according to the definition of 'collection' in section 5(1)), pending collection, on the site where the waste is produced)" where it could be followed by a Class R5 recovery operation

[3] Not to exceed 49,999 tonnes over the lifetime of the facility.

[4] Where R5 is "Recycling/reclamation of other inorganic materials, which includes soil cleaning resulting in recovery of the soil and recycling of inorganic construction materials"

[5] Guidance Note on Landfill Daily and Intermediate Cover, EPA 2014

Residual MSW accepted at landfill is, on the whole, disposed of within the landfill void – one situation where material of residual MSW origin can be recovered is when residual MSW fines which have undergone biological stabilisation, such that it falls within applicable stabilisation limits[6], are used as daily or temporary cover materials within the landfill.

The activities outlined in Tables 2.9 and 2.7 identify the recovery and disposal activities, in accordance with the Third & Fourth Schedules of the Waste Management Act 1996, as amended, that may apply to the proposed development, and reflect the different situations as outlined in Table 2.4 and above, where materials may be classified as being recovered or disposed.

[6] Respiration activity after four days (AT4) is <7 mg O_2/g DM

Table 2-6: Relevant Disposal Activities as per Third Schedule of the Waste Management Act 1996, as amended

Third Schedule Waste Disposal Activities	
Class D1	Deposit into or on to land (e.g. landfill, etc.)
Class D5	Specially engineered landfill (e.g. placement into lined discrete cells which are capped and isolated from one another and the environment, etc.)
Description of Activity	Classes D1 & D5 relate to the deposition of non-hazardous wastes in lined cells that are on, in and under land
Class D4	Surface impoundment (e.g. placement of liquid or sludgy discard into pits, pond or lagoons, etc.)
Description of Activity	Class D4 relates to the storage of leachate in lagoons prior to disposal off-site at a suitable wastewater treatment plant and the use of surface water ponds to control the quality and quantity of the surface water run-off from the site
Class D8	Biological treatment not specified elsewhere in this Schedule which results in final compounds or mixtures which are discarded by means of any of the operations numbered D 1 to D 12
Description of Activity	Biological treatment of residual waste. Treatment of leachate.
Class D9	Physico-chemical treatment not specified elsewhere in this Schedule which results in final compounds or mixtures which are discarded by means of any of the operations numbered D 1 to D 12 (e.g. evaporation, drying, calcination, etc.)
Description of Activity	Treatment of leachate
Class D13	Blending or mixing prior to submission to any of the operations numbered D 1 to D 12 (if there is no other D code appropriate, this can include preliminary operations prior to disposal including pre-processing such as, amongst others, sorting, crushing, compacting, pelletising, drying, shredding, conditioning or separating prior to submission to any of the operations numbered D1 to D12)
Description of Activity	IBA handling Mixing of different leachate streams prior to treatment and/or disposal off-site.
Class D15	Storage pending any of the operations numbered D 1 to D 14 (excluding temporary storage (being preliminary storage according to the definition of 'collection' in section 5(1)), pending collection, on the site where the waste is produced).
Description of Activity	Class D15 relates to the temporary storage on-site of unacceptable waste in the waste quarantine area prior to transport to another site. Class D15 relates to the temporary storage of baled MSW in the biological treatment facility building prior to transport off-site.

Table 2-7: Relevant Recovery Activities as per Fourth Schedule of the Waste Management Act 1996, as amended

Fourth Schedule Waste Recovery Activities	
Class R3	Recycling/reclamation of organic substances which are not used as solvents (including composting and other biological transformation processes), which includes gasification and pyrolysis using the components as chemicals
Description of Activity	Class R3 refers to the onsite biological treatment of residual fines
Class R5	Recycling/reclamation of other inorganic materials, which includes soil cleaning resulting in recovery of the soil and recycling of inorganic construction materials
Description of Activity	Class R5 refers to the use of soils, C&D materials, IBA and other inorganic materials as cover materials and/or in construction related activities
Class R11	Use of waste obtained from any of the operations numbered R 1 to R 10
Description of Activity	Class R11 refers to the use of stabilised residual fines from the biological stabilisation of the organic fraction of municipal solid waste as cover material
Class R12	Exchange of waste for submission to any of the operations numbered R 1 to R 11 (if there is no other R code appropriate, this can include preliminary operations prior to recovery including pre-processing such as, amongst others, dismantling, sorting, crushing, compacting, pelletising, drying, shredding, conditioning, repackaging, separating, blending or mixing prior to submission to any of the operations numbered R1 to R11)
Description of Activity	Where R12 refers to the washing and screening of IBA (trials) Class R12 refers to the recovery of metals from IBA (trials)
Class R13	Storage of waste pending any of the operations numbered R 1 to R 12 (excluding temporary storage, pending collection, on the site where the waste is produced).
Description of Activity	Class R13 may refer to the placement of IBA material within dedicated cells prior to its subsequent recovery in off-site applications, dependent on the duration of its storage and other factors. Class R13 refers to the storage of baled recyclable waste in the biological treatment facility building. Class R13 refers to the storage of baled MSW in the biological treatment facility building.

Waste Quantities

Waste quantities defined in Table 2-8 are indicative and will be subject to availability of national landfill capacity and to prevailing market conditions. Accordingly, it is not proposed to limit waste disposal or recovery for respective waste inputs.

Chapter 4 'of Volume 2 of the EIAR considers that there is a significant capacity requirement for the overall waste tonnages proposed as part of this application totalling 440,000 tonnes per annum. In the event of any of the proposed capacities not being utilised in a given year, which is considered an unlikely situation, the presence of such capacity will provide contingency capacity, the requirement for which is identified in Chapters 3 and 4 of Volume 2 of the EIAR.

To inform the modelling of potential impacts related to noise and air quality addressed in subsequent chapters of the EIAR, as well as to inform the future cell phasing of the development, Table 2-8 presents a likely breakdown of waste types to be accepted at the facility in the coming years and the rate at which they may be accepted, based on the intended operational development of Knockharley Landfill Facility as informed by the market knowledge of the applicant and their consultants.

Table 2-8: Possible Future Breakdown of Incoming Materials to Facility

Incoming material type	Annual intake	Description
Residual MSW	65,000	Biological fraction (unstabilised)
Fines materials - MSW		
Soil & stone and other C&D materials	225,000	Stabilised and inert
Non-recoverable bulky waste individual industrial waste streams & SNRHW		
Fines materials –C&D, C&I, MSW		
Street Sweepings & Cleansing Wastes		
IBA	150,000	No biological fraction
Total	**440,000**	

Drawing No. LW14-821-01-P-0050-005 Proposed Site Layout Plan with Infrastructure and Waste Locations in Volume 4 of the EIAR shows the proposed cell footprints for respective waste types. Cell layout and filling sequence have been designed to accommodate changes in waste streams (volume and input rate) and final cell footprints may change to reflect incoming waste streams.

The material types as presented in Table 2-8 are discussed as follows:

Residual Non-Stabilised Waste

Residual non-stabilised waste is residual MSW material with a biodegradable fraction, originating from household, commercial and industrial waste collections, where thermal treatment and/or export capacity for the management of this material may not either be available at certain times, e.g. thermal plant routine shut down or where suitable treatment is not available.

Included within this waste stream are quantities of waste originating from repatriation activities or historic legacy sites undergoing remediation, which can only be managed at landfill.

It is assumed that a portion of fines accepted at the facility from time to time will have a gas generation potential and therefore has been included in the non-stabilised portion of waste.

These residual non-stabilised wastes will be placed in cells developed within the existing permitted landfill footprint where it will, under anaerobic conditions, result in landfill gas production, which will be either utilised to generate electricity or flared in accordance with facility licence conditions. Leachate from these wastes will be collected from the cell drainage layer and discharged via existing pipework for leachate treatment, as described in Section 2.7.1.

Stabilised and Inert Wastes

Stabilisation' means the reduction of the decomposition properties of the biodegradable fraction of waste to such an extent that offensive odours are minimised and that the Respiration Activity after four days (AT4) is <7 mg O_2 /g DM thereafter[i].

The term stabilised is used to reflect the relatively 'non-reactive' nature, in terms of leachate and landfill gas generation of this waste. It includes stabilised fines, bulky waste, street sweepings, stable non-reactive hazardous waste and inert wastes.

Stabilised and inert waste will be landfilled in separate specific cells and isolated from the non-stabilised waste, by use of using a 1.0 mm LLDPE membrane, (use of an impermeable LLDPE membrane prevents oxygen ingress into anaerobic cells)

It is proposed to provide landfill capacity at Knockharley for non-hazardous soil and stone and C&D waste as there is significant under capacity in the Country for these materials at present. This is discussed in further detail on Chapter 4 'of Volume 2 of the EIAR. Final capping material will be additional to the above.

It is estimated that non-recyclable bulky wastes and individual industrial origin waste streams that are not suitable for thermal treatment will be landfilled at Knockharley. Stabilised fines material may comprise non-biodegradable C&D/C&I type fines, as well as residual MSW fines stabilised on site in the biological waste treatment facility or at other locations prior to acceptance on site. Street sweepings and other cleansing wastes may be accepted. Stable non-reactive hazardous waste shall be accepted on site up to 5,000 tonnes per annum but not exceeding 49,999 tonnes over the lifetime of the facility. Stable non-reactive hazardous waste will be landfilled within dedicated sub cell areas within cells 27 and or 28.

Waste will be contained within plastic sheeting and covered with stable inert waste. Landfill locations of respective consignments will be recorded. Best practice will be carried out in accordance with EPA Technical Guidance.

Once deposited, waste will be covered immediately to a depth of at least 250 mm and by the end of the working day at least one metre of cover will be placed on all flanks and surfaces. Prior to final capping at least two metres of suitable material will be placed below the liner. The waste will be placed in areas removed from gas extraction.

These stabilised and inert wastes will not produce landfill gas and so a system of passive venting to atmosphere via carbon filters, shall be employed for the specific cells in which this material is placed. Leachate collected from these cells will be handled separately to other leachates generated on site. This is, described in Section 2.7. It is likely that a proportion of the stabilised and inert waste accepted at the facility will be utilised for daily cover in the residual non- stabilised waste cells, as a recovery activity.

Incinerator Bottom Ash (IBA)

It is proposed to accept up to 150,000 tonnes per annum of IBA in a dedicated IBA facility. The design is such that the IBA area will ultimately "piggy back" onto the adjacent landfill cells. Only inert waste will be placed under the "piggy back" area to provide future stability for the IBA material. This is described in more detail in Section 2.5. A passive gas venting system shall be employed within these cells, while leachate generated shall be managed in accordance with the manner described in Section 2.7.

It is the intention of the operator to store IBA in lined cells for future recovery off-site and permission is sought to carry out trials to facilitate recovery.

2.3.5 Future Cell Construction

Future cell construction within the currently permitted development will continue to be constructed in the same manner as cells currently constructed i.e. using a 1.0 m composite barrier system comprising an underliner drainage system to control groundwater, 1.0 m clay (permeability of $1*10^{-9}$ m/s) or equivalent, overlain with a 2.0 mm thick HDPE drainage liner.

A 500 mm drainage stone layer will be placed above the HDPE barrier within which collection pipework will facilitate leachate removal. Side slopes will be overlain with a protection geocomposite or similar, to protect the liner during waste placement.

Cell depth below existing ground level will continue as per the existing planning permission and IED Licence. Overburden will continue to be used for the engineered clay barrier and for screening bunds, as discussed in more detail in Section 2.14.3.2, Section 2.14.3.6, and in Chapter 11 Soils, Geology and Hydrogeology of Volume 2 of the EIAR.

During waste placement, horizontal and vertical gas collection pipework will be installed to facilitate extraction, under negative pressure, of landfill gas, as may be required in cells designated for the placement of non-stabilised residual waste. During cell construction, the perimeter gas collection pipework will be extended from the in-situ above ground system on-site.

Leachate from cells is currently pumped from the base of cells via a rising main to a below ground floating cover leachate lagoon onsite, prior to tankering off-site to a wastewater treatment plant. Future leachate treatment is described in more detail in Section 2.7. Future cell construction will include similar leachate extraction infrastructure.

At time of writing Cells 1 through 16 (See Drawing LW14-821-01-P-0000-002 Existing Site Layout in Volume 4 of the EIAR) have been constructed, Cells 17 and 18 are under construction and Cells 19 through 28 have yet to be constructed.

2.4 Proposed Changes to Current Permitted Cell Development

The proposed changes to the operation of the landfill under this application include:

- intensification of landfilling
- increase in final contour height
- operation of 2 no. active faces in the permitted landfill development

These are discussed in the following sections.

There will be no changes to the existing landfill gas management system, leachate management system, surface water management system – albeit a new attenuation pond is required to manage flows in the northern portion of the site. There will be no changes to existing practices associated with nuisance control or other operational practices in place for the existing landfill facility.

2.4.1 Proposed Intensification of Landfilling in Existing Permitted Footprint

The existing permitted development is as described in Section 2.1. It is proposed to intensify the filling of the existing permitted landfill by increasing rate of waste acceptance to 440,000 tonnes per annum and to continue landfilling until the void in the remaining permitted cells is utilised. No change is proposed to the existing permitted footprint of the landfill Phases 1-7. Permission is sought to operate the landfill until the void is filled.

2.4.2 Increase Final Contours

In is proposed to increase the void capacity of the existing permitted footprint by raising the profile of the landfill from 74 m AOD to 85 m AOD. The existing final contour of previously capped cells will remain as is. The increased profile will apply to operational cells post grant of permission. The increased void associated with reprofiling will be approximately 217,000 m^3.

2.4.3 Proposed Future Cell Phasing & Filling

The proposed cell phasing and filling for the existing permitted landfill cells will require 2 no. working faces and the proposed IBA Cells will require a working face.

This is illustrated in Figure 2-2, please note that the size of the working face will be a condition of the licence, e.g. face 2 shall be no more than 25 m long and 25 m wide (i.e. <625 m^2 surface area), no more than 2.5 metres in height after compaction, and have a slope no greater than 1 in 3. The larger faces in Figure 2-3 are only to illustrate the concept. The proposed IBA cell development is discussed in Section 2.5.

The primary objectives of separate working faces are to:

- Separate the different leachates by composition to facilitate targeted and appropriate treatments.
- Facilitate management of different settlement characteristics associated with respective wastes.
- Facilitate more effective management of odour emissions from, and oxygen ingress into, the anaerobic waste body.
- Facilitates alternate engineering design solutions to manage landfill gas e.g. vertical wells under negative extraction in anaerobic cells and passive venting from horizontal wells in the "stabilised aerobic waste body.
- Mitigates the risk of collision from vehicle movements.

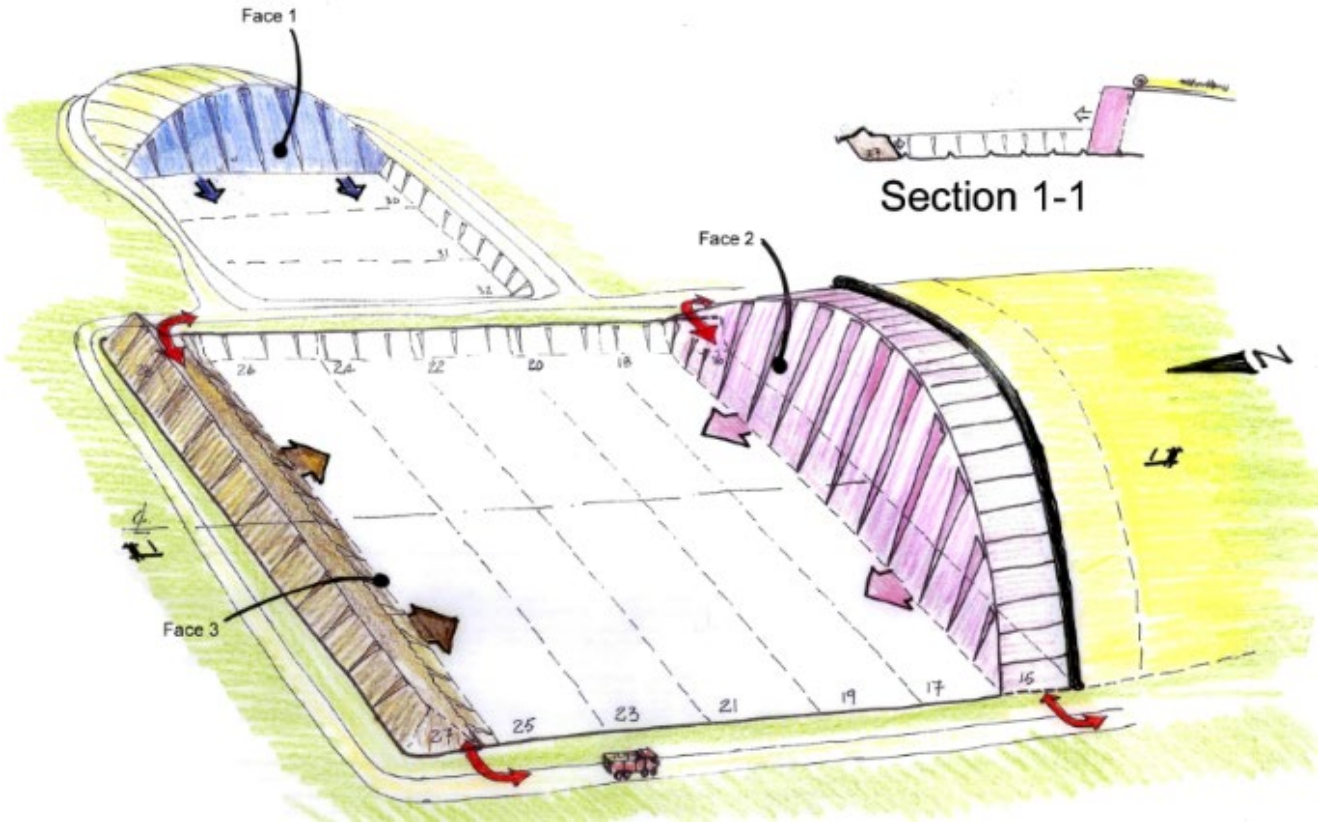


Figure 2-2: Artist Impression of Operational Waste Faces

Drawing LW14-821-01-P-0050-010 Proposed Filling Sequence Volume 4 of the EIAR and Figure 2-2 illustrate the proposed cell layout with cell numbers as defined in the permitted cell development and the proposed operational waste faces which are:

- Face 1 (Blue) is the IBA working face. The blue arrow reflects the fill direction (westerly) of the proposed IBA cell 29 to Cell 33.
- Face 2 (Pink) is the residual non-stabilised waste face and the pink arrow illustrates the direction of filling (northerly).
- Face 3 (Brown) is the stabilised and inert waste face. The brown arrow indicates the direction of filling (southerly direction).

2.4.3.1 Face 1 IBA

Face 1 for IBA in proposed cells 29 through 33 discussed in Section 2.5.5.

2.4.3.2 Face 2 Non-Stabilised Residual

Face 2 which is the current operational face will accept residual non-stabilised waste with the face developing progressively in a northerly direction. This broad waste stream typically has a significant organic fraction, is readily compressible and produces landfill gas under anaerobic conditions. Landfill gas will be collected under negative pressure via horizontal and vertical pipe systems and treated in engines (to produce electricity) or flares. During operations, proactive use of daily and intermediate covers will contain odours, facilitate development of anaerobic conditions within the waste body and isolate the waste from rainfall inputs.

2.4.3.3 Face 3 Stabilised and Inert Waste

Face 3 will accommodate deposition of stabilised and inert wastes. During operations, proactive use of daily and intermediate covers will isolate the waste from rainfall inputs. This broad waste stream will typically be less compressible than residual non-stabilised wastes, contain minimal/no organic matter and as such will not produce odours or landfill gas. Such emissions as may be produced will be vented passively via an appropriate filter to atmosphere via, typically, horizontal piping system and the waste will be landfilled under aerobic conditions.

Placement of stabilised and inert waste in cells 27 and 28 and moving in a southerly direction is designed to maximise the distance between residential receptors on the northern boundary and Face 2. Inert waste will be placed in cells 20 and 22 to create a stable foundation for the future piggy back of the IBA facility.

2.4.3.4 Filling Sequence

Subject to waste intake rates and operational considerations, placement location/filling sequence may change and waste types within the permitted cells may overlap at the interfaces between respective waste faces.

Figure 2-3 over illustrates the proposed filling sequence at respective faces.

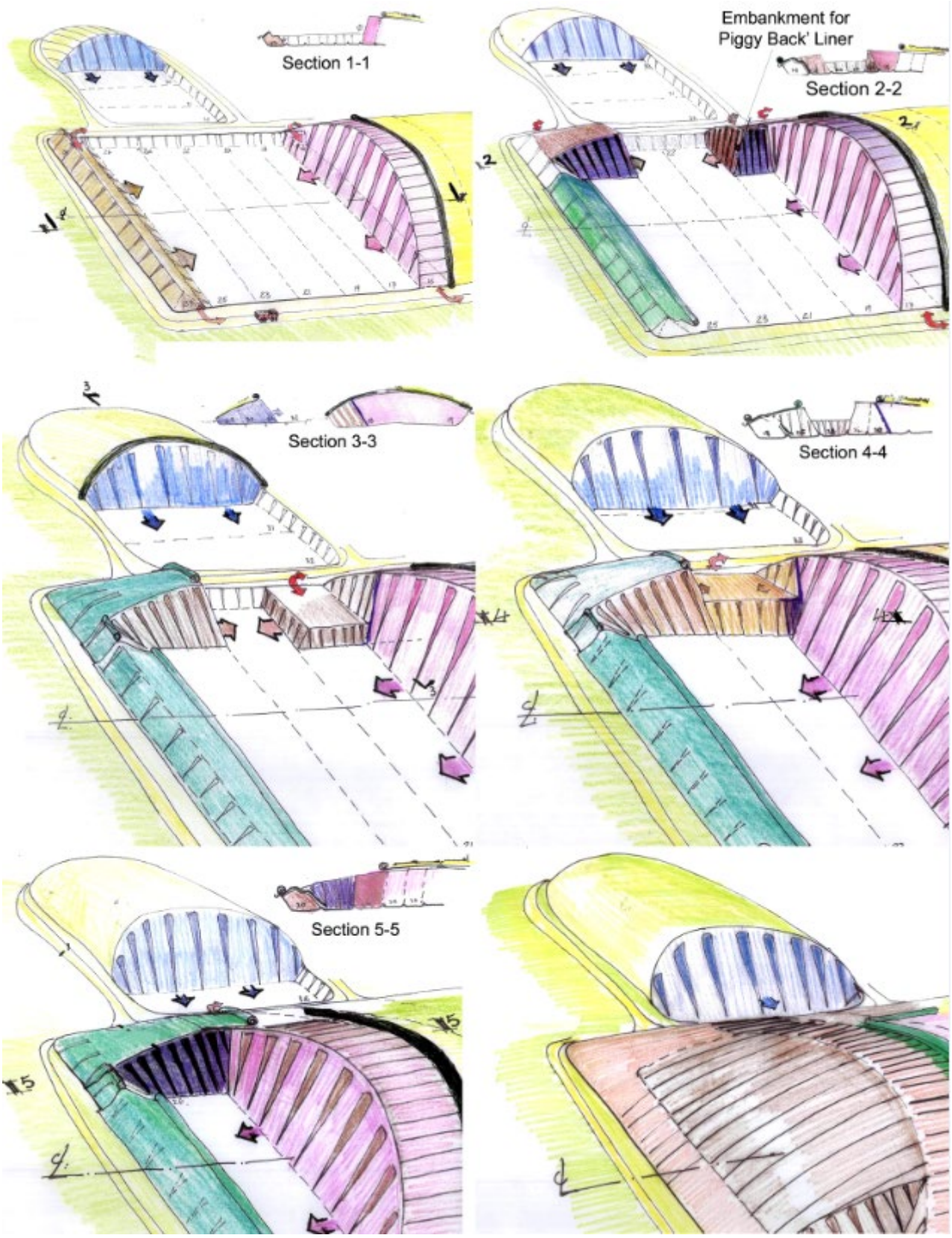


Figure 2-3: Cell Filling Direction Permitted and Proposed Development Footprint

Filling sequence for residual non-stabilised waste

Drawing LW14-821-01-P-0050-010 Proposed Filling Sequence Volume 4 of the EIAR and Figure 2-3 show the filling sequence for the (pink) residual non-stabilised waste. Residual non-stabilised waste will be placed in a south to north direction commencing in cells 17 and 18, reflecting current practice.

Permanent capping will also progress in a south to north direction. There will be one working face within each cell and individual cells or sub cells, will typically be filled in east-west / west-east directions. Filling will typically commence in the low point of cells which will always be adjacent to the perimeter access roads. Whilst the location of the active face on any working day will change it will typically be limited to a width approximately equal to 25 m and the plan and vertical locations will change as filling progresses such that working areas may be placed over one or more cells.

Cells will be subdivided into units approximately 50 m wide by 50 m long to facilitate management of leachate and landfill gas.

To reduce leachate volumes every effort will be made to minimise the working face. Initially rainfall runoff from empty cells (clean) will be directed to the storm water collection system. Once waste is placed in a cell/sub cell rainfall percolation inputs within the cell will be directed to the leachate collection system.

Once the cell floor is covered with waste, operations will be structured to minimise the working face and to place temporary covers on adjacent waste to facilitate management of odour and to isolate the waste body from rainfall inputs to reduce leachate production.

Filling sequence for stabilised and inert waste

The filling sequence for stabilised and inert waste is designed to:

- Reduce leachate volumes – Cell formations will be divided into sub-cells by leachate collection pipework in all cells, approximately 30 m wide by 50 m long, to facilitate isolation of rain falling on empty cells (clean) from rain falling on active cells (leachate). Pipework will be designed to collect, segregate and discharge respective streams to designated outlets (rain to surface water and contaminated rain / leachate to leachate management facility) as required.
- Maximise distance between Face 2 non-stabilised residual waste with gas generation potential and the northern receptors.
- Provide screening for northern receptors by placing stabilised and inert waste in the northern most cells 27 and 28 such that waste placement operations in cells 17 onwards will be screened as waste height in cells 27 and 28 and subsequent cell increases.
- Hermetically isolate the residual non-stabilised (anaerobically landfilled) waste from the aerobic stabilised and inert waste and IBA waste bodies using a LLDPE 'piggy back' liner or similar within cells during waste placement.
- Facilitate future 'piggy back' placement of IBA prior to final capping by placing (inert) material in cells 20, 22, and 24 that will not be subject to the settlement typically associated with MSW.

The filling sequence for stabilised and inert waste, will commence in cells 27 and 28 and fill direction will initially be in a southerly direction. Placement and fill direction of stabilised and inert waste will be subject to material availability and the active face may alternate to a south to north direction subject to finished contours in the adjacent (residual non-stabilised) cells. However only one active face will be open to accept stabilised and inert waste at any one time.

To facilitate a hermetic seal at the interface between the aerobic face and adjacent anaerobic bodies, the stabilised and inert waste needs to form an embankment below and ahead of the advancing active Face 2 (non-stabilised waste). The embankment, see Figure 2-3 Sections 2-2, 3-3 and 4-4 will facilitate installation of an impermeable "piggy back" liner (see green cover, see Figure 2-3, Section 5-5 in advance of non-stabilised waste placement. The "piggy back" liner will be placed within cells 18, 20, 22, 24 and 26.

2.4.3.5 Leachate Balance Permitted Development

The planned intensification will impact leachate production, and this is summarised in Table 2-9. Residual non-stabilised wastes will produce similar flow rates to that being produced at present. The intensified inputs will however reduce the cumulative generation of waste as the cells will be open for shorter periods.

Inert and stabilised waste may produce higher flow rates and higher volumes than residual non-stabilised waste as they will have a lower absorptive capacity and require an additional working face. However, it will be easier to install temporary covers to reduce overall volumes.

The inert and stabilised waste cell will have a lower absorptive capacity that traditional non-stabilised residual wastes and will therefore produce more leachate.

Table 2-9: Predicted Annual Landfill Leachate Generation

Year	Annual Leachate Generation m^3
2017	15,830
2018	10,552
2019	21,811
2020	19,188
2021	26,827
2022	27,531
2023	20,995
2024	28,031
2025	10,838
2026	5,419
2027	2,710
2028	1,355
2029	677
2030	339
2031	169
2032	85
2033	42

2.4.4 Proposed Capping and Restoration Programme

Residual non-stabilised waste temporary capping

As part of ongoing current operations at the site, the active area of the landfill is covered with daily cover. The near-horizontal working platform is being covered with soil and woodchip and the slope of the working face will be covered with synthetic cover sheets at the end of each working day.

Daily soil/woodchip covers will be installed as areas of the landfill reach respective lift heights. These cover systems are used to minimise odour nuisance, facilitate gas extraction, contain litter, discourage scavenging birds and to provide a working platform for vehicles.

Temporary synthetic low-permeability covers (intermediate capping) are installed as areas of the landfill reach full height.

Temporary synthetic covers are designed to facilitate odour control, to minimise leachate generation and to allow differential settlement to occur prior to installing the final landfill cap. These practices will continue for future residual non-stabilised waste inputs.

Stabilised and inert waste temporary capping

Capping systems over in stabilised and inert wastes will adopt similar approaches albeit that odour and landfill gas will not be generated.

Permanent engineered cap

There are no significant proposed changes to the permanent engineered cap makeup that has been and will be placed on the permitted development.

The proposed changes to the capping will comprise:

- an increase in post settlement final cap height from 74 m AOD to 85 m AOD, and
- an increase in cap area to accommodate the proposed IBA development

The final cap makeup will be similar in the permitted and proposed development and subject to EPA approval.

A fully engineered cap will be placed over all wastes within 12 months of wastes reaching the pre-settlement final contours. This cap will comprise an under liner geocomposite for management of gas and/or leachate, a 1 mm fully welded LLDPE liner, sub-surface drainage layer, subsoil layer and topsoil layer. The overall thickness of the soil layers will be 1 m in accordance with the requirements of the licence. Approximately 96,000 m² of the existing permitted footprint has been permanently capped at the time of writing and an area of approximately 250,000 m^2 will be capped in the future (anchor trench footprint excluding swales).

The IBA cell footprint discussed in Section 2.5, (excluding wedge infill), will be approximately 58,000 m^2. The final cap footprint for the permitted and proposed development to the anchor trench will be approximately 390,000 m^2.

Surface drainage swale outfalls will convey storm runoff from the permanent cap to either the existing storm water attenuation pond on the southern boundary or to the proposed surface water attenuation outfall on the north-eastern boundary of the site (refer to Section 2.8).

Future permanent capping will continue on a phased basis as described above. Landscaping on the cap will comprise an amenity grassland mix. Following completion of the cap, the landfill will enter the aftercare phase, which will be undertaken in accordance with the conditions of the licence.

2.5 Proposed IBA Facility Development

2.5.1 Introduction

It is proposed to develop five dedicated cells (no. 29 through no. 33) for the acceptance and placement of IBA material only, directly to the east of the permitted facility footprint and directly north of the site accommodation and weighbridge. Cell 33 is termed the 'wedge' as it sits at the interface between the existing landfill and the proposed IBA area. The location of the IBA facility is shown in Drawing No. LW14-821-01-P-0000-003 Proposed Site Layout. The "wedge" cell 33 is not shown on the proposed layout drawing as it will be created post filling of cells, 20, 22, 24 and 32. The proposed IBA facility design will facilitate its future recovery.

IBA will be delivered to site over the existing facility weighbridge and directed to these cells where it will be placed.

The dedicated IBA cells will tie into adjacent filled cells 20, 22 & 24 of the current permitted footprint and the final capping profile will cover all wastes within both types of cells with no evident visual delineation when viewed externally. The cap makeup will be identical.

IBA leachate will be collected from the IBA storage cells, passed through temporary localised suspended solids lagoons to mitigate the risk of solids blocking pipes and managed as described in Section 2.7.

This section includes the following:

- Overview of IBA Landfilling
- Cell design, Construction and Phasing
- IBA Acceptance
- Overview of IBA Landfill Operations
    - IBA Cell layout
    - IBA Filling Sequence
    - Weathering
    - Placement, Working Face, Covers
    - Management of Surface water runoff
    - Management of Leachate
    - Management of Hydrogen
    - Management of Temperature
    - Management of Dust
    - Management of Noise
    - Future 'Winning' of IBA

2.5.2 Overview of IBA Placement

The landfilling of IBA in its own dedicated cells as a 'monofill' introduces specific issues that are not realised in the landfilling of other materials, such as non-stabilised residual (MSW) waste. To inform the design and operational considerations of the proposed IBA cells, a review of available literature sources related to the landfilling of MSW IBA residues was carried out to identify issues to be considered and addressed.

2.5.3 Cell Design, Void & Construction

2.5.3.1 Cell Design

The proposed IBA cells will be constructed using a 1.0 m composite barrier system comprising an under-liner drainage system to control groundwater, 1.0 m clay (permeability of 1 $x10^{-9}$ m/s) or equivalent (bentonite enhanced geocomposites or similar), overlain with a 2.0 mm thick HDPE drainage liner. A 500 mm drainage stone layer will be placed above the HDPE barrier within which will be collection pipework to facilitate leachate removal. Side slopes will also be overlain with a protection geo-composite and/or drainage stone to protect the liner during waste placement and to facilitate collection and controlled passive venting of hydrogen gas (described below).

The proposed IBA cell HDPE liner formation, whilst being connected to the existing waste cell development at the anchor trench interface, will be isolated hermetically from those adjacent landfill cells.

Isolation will occur within the adjacent landfill development in:

- cells 20, 22 and 24 as shown in Figure 2.4 Section 5 illustrating the 'piggy back' liner isolating inert soils from the adjacent anaerobic waste; and
- within the IBA 'wedge' infill (cell 33) isolating IBA leachate from the underlying inert soils.

Leachate and hydrogen gas produced within the IBA cell will be managed by independent collection systems.

IBA waste undergoes an exothermic weathering process during which time significant heat is generated and hydrogen and carbon dioxide gases are emitted. Weathering will typically be accommodated under cover within a dedicated weathering area within the IBA cells (described in more detail in sections following).

Figure 2-5 illustrates the proposed IBA cell footprint and provides an indicative section through the IBA cells.

The blue lines in the IBA cell show locations of recessed drainage pipework within the drainage layer at the base of the cell.

2.5.3.2 Cell Construction

Cells 29 and 32 will be constructed as a single entity to facilitate weathering, landfilling and future recovery/winning of IBA, as may be required. As the cells approach capacity, Cell 33 will be the last IBA cell to be constructed prior to filling in the remaining void to raise the landfill to its final finished planning contour height of 85 m AOD and will tie into the final cap on the adjacent cells. Cell 33 is termed the 'wedge' and is the lined 'cell' connection between the IBA cells and the MSW cells.

Cells 29 through 32 within the IBA footprint will be approximately 225 m long and 48 m wide and will be further subdivided in the base by leachate collection pipework such that each sub cell will be approximately 24 m wide (see Drawing No. LW14-821-01-050-006 IBA Cell Layout and Leachate Pipework in Volume 3 of the EIAR).

The 2D plan footprint of the IBA landfill including wedge infill (cells 29 through 33) will be approximately 81,000 m^2.

The 2D plan footprint of the IBA landfill excluding wedge infill (cells 29 through 32) will be approximately 57,829 m^2.

2.5.3.3 IBA Void Capacity

Void capacity will be subject to the need or otherwise to 'win' material as discussed in 2.3.3. If winning is implemented the 'wedge' infill may not be capped, or capping may be deferred. Accordingly, indicative voids are presented below for two scenarios:

- Cells 29 through 32 (excluding wedge infill); and
- Cells 29 through 33 (including wedge infill)

The void capacity of cells 29 through 32 (excluding 'wedge' infill) to be 645,331 m^3. Assuming a density of 1.6 t/m^3 this equates to 1,032,530 tonnes.

The void capacity of the "wedge" infill will be will be 245,112 m^3. Assuming a density of 1.6 t/m^3 this equates to 392,179 tonnes.

Total estimated capacity for IBA is 1,424,709 tonnes.

2.5.3.4 Engineered Cap

A fully engineered cap will be placed over waste once final contours have been reached in accordance with the licence. This cap will comprise an under liner geocomposite for management of gas and or leachate, a 1 mm fully welded LLDPE liner, sub-surface drainage layer, subsoil layer and topsoil layer. The overall thickness of the soil layers will be 1 m in accordance with the requirements of the licence. Surface drainage swale outfalls will convey storm runoff either to the storm water attenuation pond on the southern boundary or to the proposed surface water attenuation outfall on the north-eastern boundary.

As with cells 17 to 28, future permanent capping will continue on a phased basis and landscaping on the cap will comprise an amenity grassland mix. Following completion of the 1.0 m cap, the landfill will enter the aftercare phase.

2.5.3.5 Screening Berms

Screening berms on the eastern and northern boundaries of the IBA cells (see Drawing Nos. LW14-821-01-P-000-003 Proposed Site Layout and Cut Fill Phasing Plan LW14-821-01-P-0050-011 in Volume 4 of the EIAR), will be constructed using overburden from the cell excavation. The berms will mitigate visual and noise impacts associated with landfill related operations on sensitive receptors on these boundaries.

2.5.4 Access and Traffic Control

2.5.4.1 Access & Traffic Control

Access to the IBA cells will be via a new access road to the north of the existing site accommodation, with traffic being directed there from the existing site weighbridge. Vehicles delivering IBA will utilise the existing private entrance road to Knockharley Landfill and existing weighbridge, prior to travelling to the dedicated cells. All waste vehicles entering and exiting the facility must pass over the weighbridge. Appropriate signage will direct waste vehicles to delivery locations.

2.5.4.2 Acceptance

Incoming incinerator bottom ash (IBA) will be transported to the site in articulated covered trailers and following acceptance at the existing facility weighbridge, will be directed to the IBA facility. Upon arrival at the IBA facility, the delivery truck will be directed either to the weathering storage area or to the IBA working face, as appropriate.

2.5.4.3 Site Access

Access to the weathering area and to the IBA working face will be via surfaced perimeter roads. In addition to the perimeter road surrounding the IBA cells, there will be a concrete road in the middle of the weathering area to facilitate unloading of articulated delivery trucks and loading of weathered IBA onto site vehicles. Within the IBA (Areas 1 through 4) the IBA material formation will always be compacted prior to vehicular trafficking to facilitate safe vehicle movements and vehicle tipping.

2.5.4.4 Inspections

Incoming materials following acceptance at the weighbridge, be they deposited in the weathering area or at the working face will be tipped, levelled and visually inspected for the presence of non-conforming materials i.e. non-IBA materials, unburnt organic fractions, large size materials which, if identified, will be removed and temporarily stored in the dedicated quarantine area and then consigned off site for appropriate management, or for landfilling within cells 23 to 28 of the existing landfill, assuming that it conforms with relevant landfill acceptance criteria.

2.5.4.5 One-way system

Vehicles will travel using a one-way system albeit that flow directions will change subject to stockpile movements in the weathering area and placement methodologies.

Incoming articulated vehicles after exiting the weighbridge will turn left into the IBA facility, tip their loads and exit the site in an anticlockwise direction via a dedicated wheel wash before exiting the site via the weighbridge (see Figure 2-4).

Site vehicles will take weathered IBA from respective stockpiles and access the cells in a clockwise direction.

Vehicles will drive over previously tipped and compacted materials and tip the load on a compacted formation. Thereafter vehicles will drive out in a clockwise direction and return to the weathering area for re-loading.

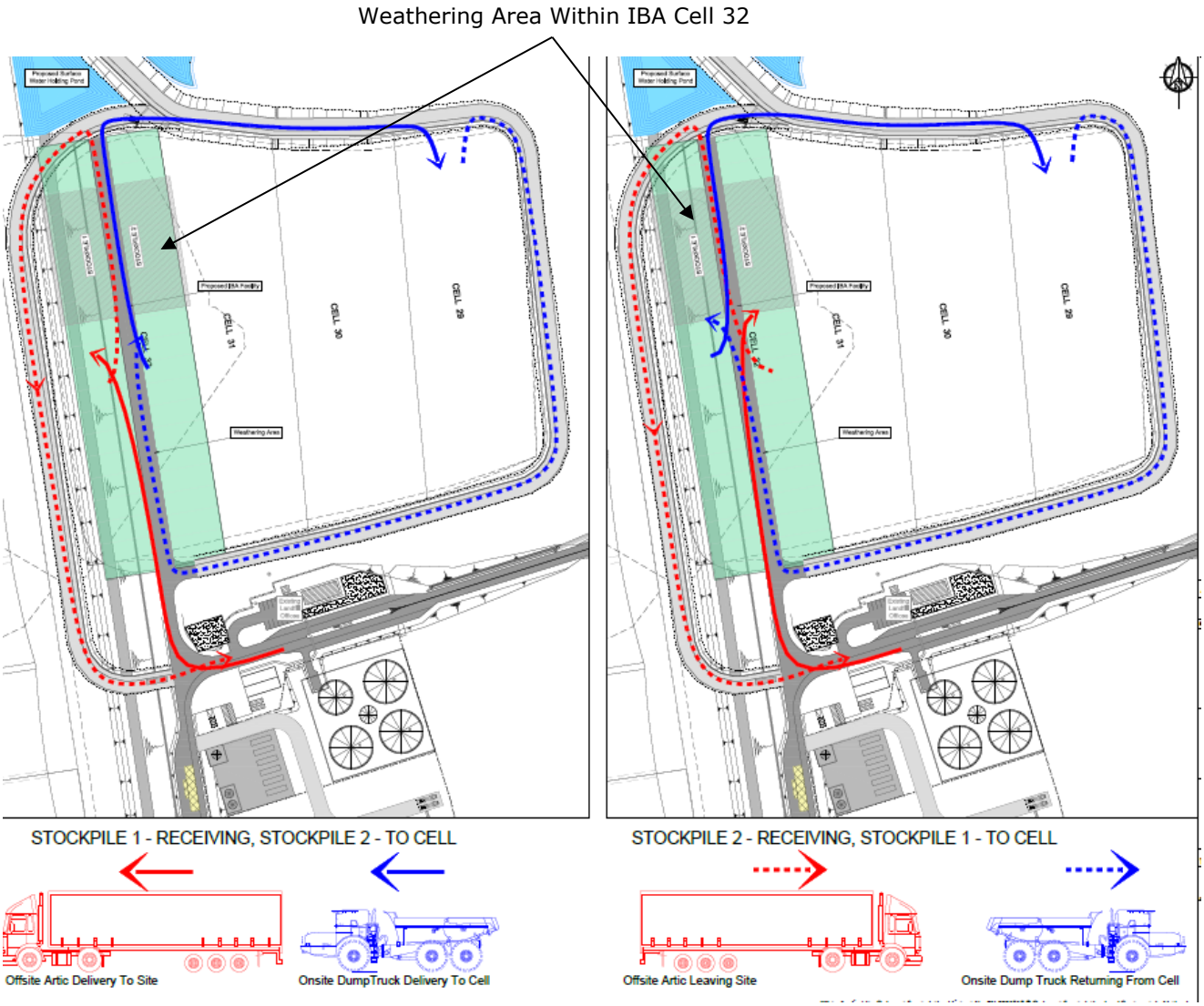


Figure 2-4: Traffic Movements

2.5.5 IBA Area Operations

2.5.5.1 IBA Cell Layout

Figure 2-5 presents an aerial overview of the proposed IBA cell footprint encompassing cells 29 through 32. The cell footprint will be divided into four distinct areas during the operational period, which will vary in size and shape depending on the rate at which the cells are filled and if recovery operations are to be implemented in the future.

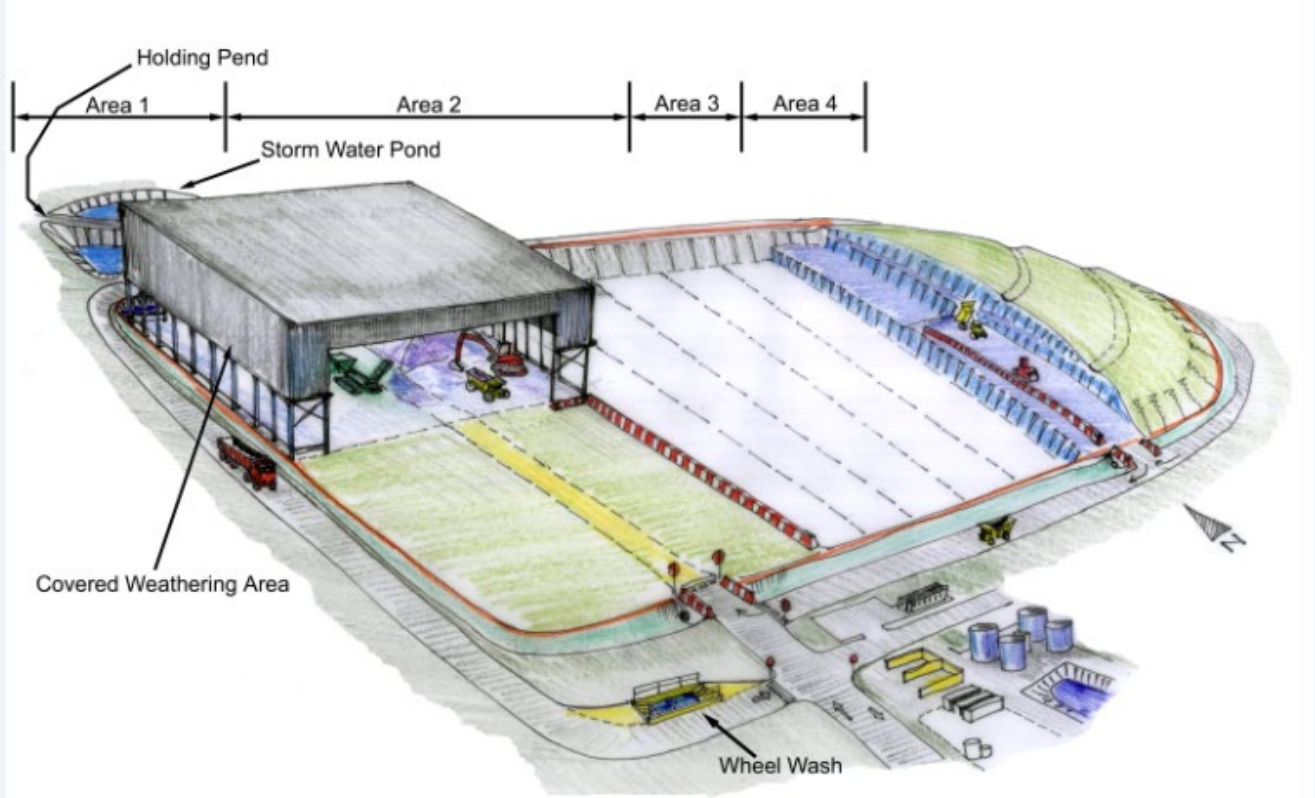


Figure 2-5: IBA Operational Layout (View from Southwest)

Area 1

Area 1 (overlying cell 32) will be assigned to weathering of IBA prior to placement and will provide a covered weathering footprint of approximately 5,776 m^2 (76 m x 76 m). It will comprise a central access reinforced concrete formation route to facilitate access to 2 no. stockpiles. Both stockpiles within Area 1 will each have sufficient capacity to accommodate up to 3 months of IBA acceptance (c. 37,500 tonnes) and temporary storage so that an appropriate weathering period is provided for. Incoming IBA material will be tipped at the relevant stockpile location and placed in the stockpile using a front-end loading shovel. The stockpiling process will facilitate turning of the IBA material during the weathering period, as required.

The building will be a single span structure with roof and side wall ventilation. Its primary objective will be to minimise leachate production and reduce dust and noise impact on adjacent receptors.

The building may also facilitate recovery trials which may include metal recovery, crushing, screening, and washing of IBA.

If an additional weathering footprint is required, the footprint Area 1 will be extended.

In the northern end of Area 1, (see Figure 2.9) the temporary settlement ponds will attenuate IBA leachate and facilitate settlement of suspended solids to mitigate the risk of solids blocking leachate pipework.

A pump sider riser sump in this temporary settlement pond location will pump leachate generated in Area 1 to a holding tank/lagoon in the Leachate Management Facility for treatment and/or tankering offsite to a wastewater treatment facility, as described in Section 2.7.

To mitigate the risk of high pH liquids causing injury to humans, mammals or other the leachate from the weathering area collected from below the weathering building will be directed to the side riser adjacent to the settlement pond and will be pumped via a sealed settlement unit as with all other IBA cell side risers to the leachate management facility and the open water surfaces of the pond will be covered with netting and / or floating covers.

Area 2

Area 2 illustrates the empty cells that initially will have no IBA in place but will accept IBA as the working face develops from the east. Until waste is placed in Area 2, runoff from this area will be considered as clean surface water and directed for discharge via surface water swales (refer to Section 2.8).

Area 2 will be developed progressively subject to IBA inputs.

Area 3

Area 3 illustrates the active area where IBA will be progressively placed. Placement of IBA will occur in 'lifts' of c. 500 mm, in a north-south direction in the respective cells. The filled IBA footprint will progress incrementally from the east to west as respective lifts are developed.

Area 4

Area 4 illustrates IBA with temporary or permanent capping in place. As the area is filled progressively from east to west, temporary sealing/covers and permanent covers will be installed to prevent rainfall ingress to mitigate leachate generation.

Cell formation for the proposed IBA cells will be recessed below original ground level to facilitate below ground containment of leachate. Drainage within the cells will further sub-divide cells to facilitate segregation of clean rainfall runoff and leachates of differing quality. Cell design will be carried out in accordance with guidelines defined in the EU Landfill Directive for non-hazardous cells and the Environmental Protection Agency Landfill Site Design Manual.

2.5.5.2 IBA Filling Sequence

Cell filling will start in cell 29 and progress in a westerly direction through cells 29, 30, 31, 32 and 33.

Figure 2-6 illustrates a section east to west through the IBA footprint above cells 29 and 30 illustrating the filling sequence of respective lifts. Lifts 1 through 4 will be in Cell 29 and will be filled in the first year of IBA acceptance.

Placement of IBA materials will be such that cell 29 will provide supplemental screening to existing perimeter screening berms for works in Cell 30. Similarly, Cell 30 works will provide screening to Cell 31 and Cell 31 works will provide screening for Cells 32 and 33.

The interface between the permitted development will be Cell 33 in the proposed IBA cell development i.e. the 'wedge'.

This is shown in Figure 2.7. To the west in the permitted landfill to facilitate this interface stabilised inert materials will be landfilled under aerobic conditions. Cells 29 through 33 will be landfilled under aerobic conditions where the hydrogen gas will be allowed to vent passively to atmosphere.

Respective waste faces will be typically 24 m wide and will extend approximately 250 m in length (north to south).

Lifts illustrated in Figure 2-6 are approximately 4.0 m high albeit that during operations actual placement lift height will be limited to 2.0 m at any one time. IBA will be installed to grade within each lift in 'mini' lifts 500 mm thickness and compacted thereafter.

Figure 2-6 illustrates how respective operational lifts will be placed. Each lift shown below will be typically 4.0 m deep, 24 m wide and approximately 225 m long and the respective lifts will accommodate approximately 35,000 t of IBA and take approximately 3 months to place assuming an intake of 150,000 t annually.

Figure 2-6 shows that lifts through 16 once placed, will be permanently capped such that these will act as a supplemental screening and noise berm for subsequent works in adjacent areas.

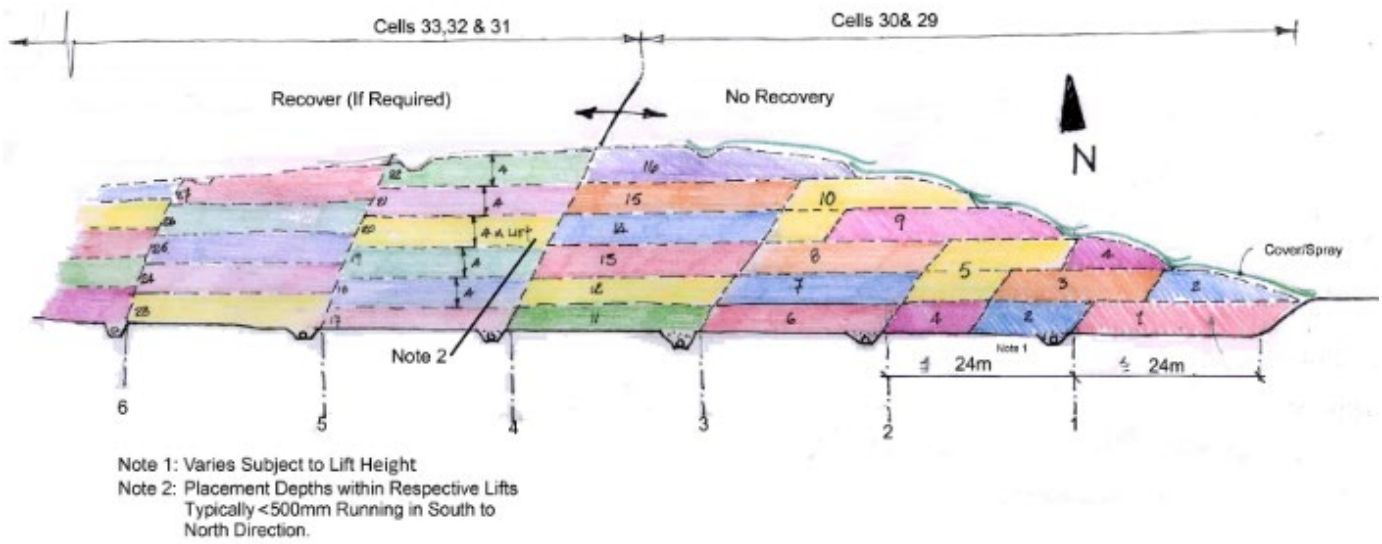


Figure 2-6: IBA Sectional Filling Sequences

Cell 33 "Wedge" infill will be the last cell to be filled See Figure 2.7 below:

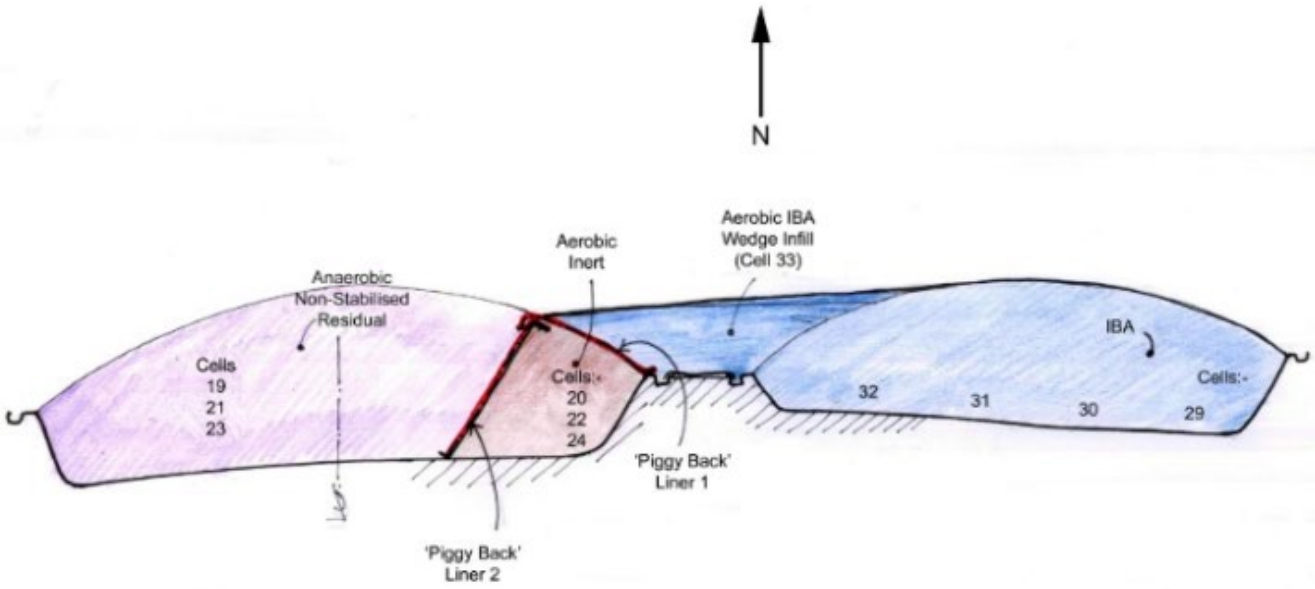


Figure 2-7: Section through Cell 33 "Wedge"

2.5.5.3 *Weathering*

Section 2.5.2 referenced weathering as being a process whereby silica, calcium, aluminium and sulphate minerals along with heavy metals in the presence of carbon dioxide and water undergo complex physio chemical carbonation (and other) processes.

To understand the operational impacts associated with placement of IBA, this section describes weathering with respect to the pH characteristics of leachate. There are three major stages in weathering that can be identified by the pH characteristics of the IBA and / or leachate. Stage 1 weathering will occur at the incinerator. Operations at Knockharley will accommodate weathering Stages 2 and 3 within the IBA landfill footprint.

Stage 1 will occur when un-weathered IBA leaves the combustion chamber prior to quenching. Typically, IBA will have a pH > 12 in this uncarbonated phase. It will be quenched at the incinerator and thereafter it will be transported to a processing plant for the removal of metals or to processing equipment at the landfill for a similar metals removal process. IBA received at the facility will be in covered trailers.

Stage 2 weathering will occur following placement of IBA in the IBA cells within the dedicated weathering area 1 as shown in Figure 2.6 (or within cells subject to location) over a period of 3 months or more during which time the IBA will become carbonated following exposure to water and carbon dioxide. During this stage of the weathering process, hydrogen gas will be produced, and exothermic reactions may cause elevated temperatures. Hydrogen is potentially explosive between 4% and 75% by volume of air in the presence of an ignition source. The building will have no gables, perforated side sheeting will terminate 6.0 m above ground level and the roof will have ventilation provision to facilitate a well-ventilated space to mitigate the risk of explosive conditions developing.

Specific design and operational practices will be put in place to manage safe venting of hydrogen to atmosphere and to mitigate the risk of high temperatures damaging the HDPE liner of the cell. During this weathering process the pH of leachate will reduce and will be typically < 10.5. During placement, dust will be managed to mitigate potential impacts.

The IBA will be moist when tipped but wind will dry out the surface and therefore dust mitigation measures will be required on an ongoing basis/as part of standard operation procedures in the IBA area.

Stage 3 the final stage of weathering, will occur following placement in cells over many years during which time the pH of leachate from carbonated IBA will typically stabilise between 8 and 8.5. Nominal volumes of hydrogen may also be produced and design provision in the engineered cap and within the IBA body will facilitate safe venting of hydrogen to atmosphere.

Placement operations will therefore be designed to:

- prevent liner damaged from elevated temperatures
- mitigate the uncontrolled release of hydrogen
- Isolate high pH leachate in the weathering area and in dedicated tanks within the leachate management facility
- facilitate weathering

2.5.5.4 Placement Criteria

Operational procedures will be developed to mitigate the risk of elevated temperatures damaging the basal liner system. Typically, Area 1 within the IBA cells will provide for a c. 3-month weathering process prior to placement of IBA within the designated cells.

For subsequent placement of IBA within cells in the lifts illustrated in Figure 2-6, for heights exceeding 2.0 m, Stage 2 weathering of IBA material will need to have occurred within the dedicated weathering Area 1.

Whilst the majority of IBA will undergo Stage 2 weathering in within Area 1 under cover as previously described, weathering may also be facilitated through direct placement with the cells subject to location and prescribed operational criteria. These criteria will require (but not be limited to) presence of a weathered formation layer above the liner (acting as an insulator) with evidence of falling temperatures and sufficient time to allow weathering to occur (> 3 months) prior to subsequent lifts or liners being placed.

2.5.5.5 Placement of IBA in Cells

The first lift in contact with the cell formation will vary between 1.0 m and 2.0 m depth above the liner. This initial lift will be placed to protect the liner, as it will provide both a 'thermal blanket' and a physical barrier. This first layer will also form a tipping platform for subsequent landfill operations.

The lift height of 4.0 m presented in Figure 2-6 was selected to illustrate the lift thickness required to accommodate 3 months of waste inputs. It is not a prescriptive requirement and during operations, lifts are unlikely to exceed 2.0 m and will be subject to operational considerations. The placement of materials will start on the eastern boundary in Cell 29 and respective placement lifts will result in the development of the landfill body.

IBA materials will be placed over large plan areas in vertical lifts within the active placement area.

IBA within respective lifts will be placed in layers not exceeding 500 mm in height, graded to form a smooth finish with falls to facilitate surface water management and compacted to 90 % proctor maximum dry density to facilitate safe tipping of trailers.

Articulated trailers or dump trucks (Volvo A40 or similar) will drive onto the working face, tip in a controlled manner and exit in a one-way system.

The tipped materials will be graded using proprietary equipment (e.g. 20 tonne 360 excavator or grader Cat 120k or paver Barber Green BG-260D or similar), inspected for signs of contamination and compacted using a vibrating roller (Bomag single drum or similar).

2.5.5.6 Management of Surface Water Runoff

Once IBA materials are placed, surface water management procedures will facilitate surface water runoff to minimise rain water infiltration and subsequent leachate generation.

The surface water management procedures include a combination of temporary covers, dust suppression sprays and permanent capping will be progressively installed. These practices will also mitigate potential dust impacts.

Following placement of IBA, temporary impermeable covers or sprays[7] will shed runoff into horizontal contoured swales (see Figure 2-8) which will be formed within the final capping profile.

Leachate (light green area in Figure 2-8), will be directed to the active face. Clean surface water (from dark green areas in Figure 2.10) will be directed to a new surface water holding pond immediately upstream of the new northern storm water attenuation lagoon.

Water from the new surface water holding pond outfall will, subject to quality, be:

- used for dust suppression
- discharged to receiving waters via the new storm water attenuation lagoon
- directed to the on-site floating cover storage prior to transfer off-site to a wastewater treatment facility.

Further detail on proposed surface water management is outlined in Section 2.8.

Figure 2-8 illustrates two swales on a cap that has reached its final height. The lower swales have sandbags or similar placed at outfall to prevent runoff entering the cell. The upper swale illustrates with no sand bags shows how swale runoff can be directed into the cell.

[7] Numerous products are available e.g. Posi-Clear Dust Control http://www.lscenv.com/dust-control-pg.html, or similar

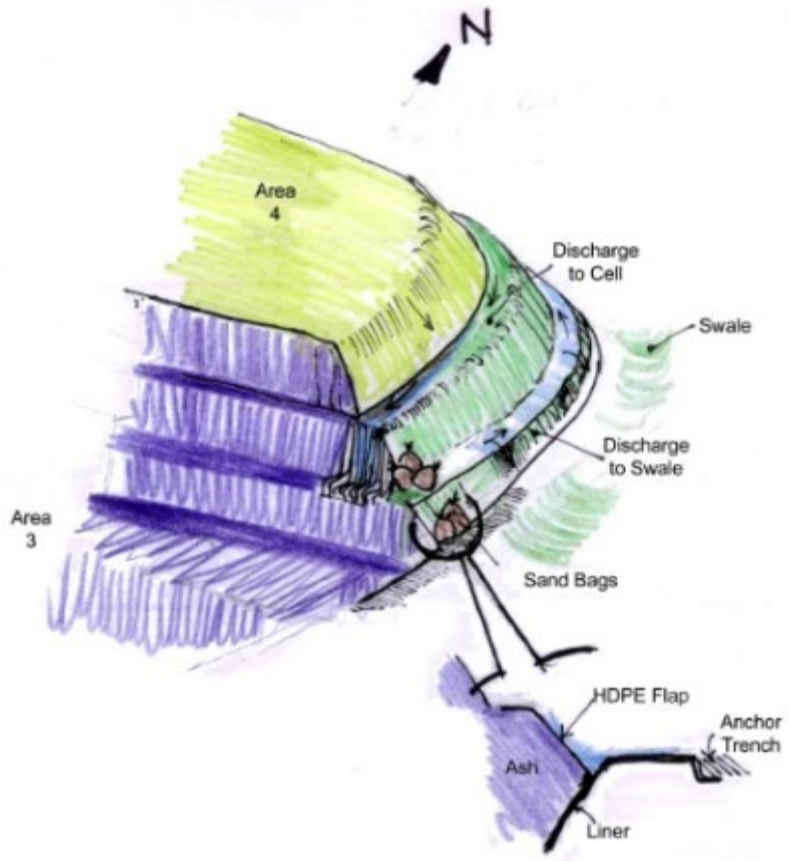


Figure 2-8: Surface Water Management (Intermediate Cap)

Note: Leachate – from light green area. Clean surface water – dark green from capped/sealed area. Purple illustrates – IBA.

2.5.5.7 Management of Leachate During and Post IBA Placement

With reference to Figure 2-5, leachate from the IBA landfilling operations will develop from the following sources:

- weathering stockpiles in 'Area 1'
- IBA placed within cells ('Areas 2, 3 and 4') i.e. from active face

Leachates with differing pH will be produced within the IBA cell footprint. pH will vary according to source location and extent of weathering. A pH of up to 12 can be expected from the weathering Area 1. Over the weathering process the pH of leachate in Areas 2, 3 and 4 will reduce to approximately 8. When the IBA is placed in layers in Areas 1 through 4, the 'strength 'of leachate generated (in terms of contaminants such as salts and heavy metals) will also vary, with a more concentrated leachate expected from Area 1 and a minimally contaminated leachate generated during placement expected in Areas 2, 3 and 4.

To facilitate targeted and cost-effective treatment, leachate streams from respective sources will be collected and managed separately, prior to treatment on site and/or tankering off-site to a wastewater treatment facility.

The leachate treatment methodology is described in detail in Section 2.7. The following sections describe the handling philosophy required within respective areas.

Area 1

All leachate from the IBA weathering Area 1 will be collected from the basal stone drainage and from surface runoff in perimeter edge drains which will direct leachate to a temporary settlement pond located on the northern boundary of Cell 32.

Figure 2-9 over shows the layout of the settlement pond and weir. Solid materials within runoff from Area 1 will settle by gravity within the pond and will be retained behind a weir. Leachate will pass over the weir into an adjacent side riser pump sump (not shown in Figure) and from there to onsite storage tanks via a pumped rising main.

The settlement pond will be de-sludged as required during operations. De-sludged material will be placed within the Area 2, 3 or 4.

Netting and/or floating covers to prevent mammals drinking contaminated storm water have been omitted for clarity.

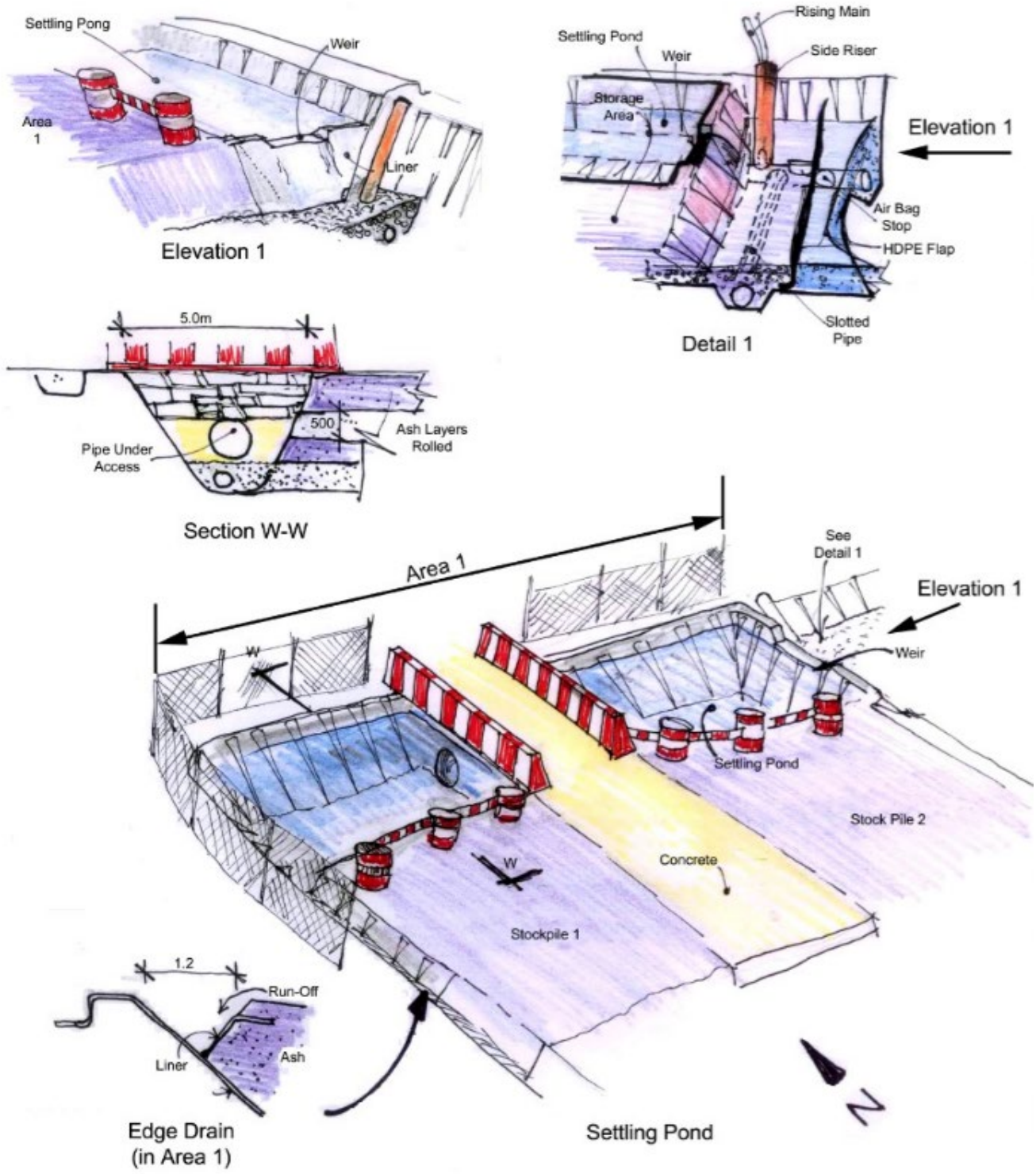


Figure 2-9: Weathering Area Leachate Management

Areas 2, 3 and 4

Leachate generated within active areas 2, 3 and 4, and will be collected within the cell drainage layer and pumped via a rising main to a small sedimentation tank (see settling pond in Drawing No. LW14-821-01-P-0050-006 in Volume 4 of the EIAR) to remove suspended solids before being pumped to covered attenuation leachate storage tanks. On-site attenuation storage will be sufficient to manage at least 1-month of leachate production.

2.5.5.8 Management of Storm Water Runoff

The proposed storm water outfall system on the northern boundary will comprise two storm water lagoons, a holding pond and an attenuation lagoon.

All surface water from the IBA cells will be directed to a holding pond immediately upstream of the northern attenuation lagoon. Continuous monitoring of TOC and Electrical Conductivity will be carried out. If runoff is clean it will be directed to the northern attenuation storm water lagoon. If runoff is contaminated an automated motorised valve will isolate the holding pond from northern attenuation stormwater lagoon and contaminated runoff will be pumped to covered leachate lagoons within the leachate management facility (see Section 2.7). Holding pond and covered attenuation storage within the leachate management facility will be sufficient to manage at least 1-month of surface runoff. Water as may be present in the storm water attenuation or holding ponds may also be used for dust suppression or wetting of IBA as may be required to facilitate weathering.

2.5.5.9 Water Balance IBA Development

Leachate generation from IBA cells will be impacted significantly by the weathering area, and active, open area of which will typically be similar year on year.

In addition, as IBA waste reaches a finished level temporary covers or final cap will be installed to isolate rainfall inputs from the IBA waste body.

Table 2-10 is an estimate of the annual water balance for the IBA area.

Table 2-10: Annual Water Balance for IBA Development

Location	Annual Volumes (m^3)	pH	Comments
IBA Weathering	4,156	12	Assume 5% rainfall (roofed area)
Clean runoff	38,447	7	Storm water
IBA active face	10,067	8 to 10	Assume 250 m x 350 m
Temporary capping	15,901	7	Storm water
Permanent capping	15,901	7	Storm water
Recovery	38,447	8	Not applicable
WWTP	**14,223**		**Estimated WWTP capacity required**

2.5.5.10 Management of Hydrogen Gas

As previously identified, hydrogen gas production is a by-product of IBA weathering, with peak gas production expected to occur within 3 to 4 months following receipt of IBA on-site. Thereafter, research shows that hydrogen gas production declines rapidly over 12 or more months.

Hydrogen is not detrimental to the environment and is not considered a greenhouse gas.

The following design and operational procedures will facilitate safe venting of hydrogen to the atmosphere during weathering, waste placement and post capping and will mitigate the risk explosion.

- All pumps and control equipment in confined spaces will be EX rated.
- Pipes within the leachate stone drainage layer will have vented rodding eyes and operations will maintain free draining conditions within the stone drainage layer to facilitate passive venting from same.
- Leachate drainage pipework will at high points terminate in a collector pipe linked to a vertical riser that will facilitate egress of hydrogen at a fenced point source 5.0 m above the surrounding ground level (during operations and post final capping).
- Horizontal slotted gas pipe will be placed at horizontal spacings no greater than 40 m and at staggered vertical lifts no greater than 12.0 m spacing. This will facilitate egress of gas produced at depth within the IBA material.
- Hydrogen gas produced during weathering, be it in the dedicated weathering Area 1 or in Area 3 cells, will naturally vent to atmosphere via surface emissions, during turning and placement and from dedicated piped point sources within placed material.
- Hydrogen gas produced from capped material in Area 4 will be vented to atmosphere from dedicated outlets at the top of the landfill
- Temporary covers and or spray products will be used with passive venting systems to mitigate leachate production and facilitate passive venting of hydrogen.
- Potential future extraction of IBA, if carried out, (refer to Section 2.5.6 following) will require appropriate method statements to facilitate working practices where hydrogen may be present.

2.5.5.11 Management of Potential Temperature Impacts During IBA Placement

Peak temperatures will develop during the initial weathering in Area 1 or within active areas if weathered in situ and appropriate measures will be employed to prevent any potential damage to the HDPE liner.

The following operational procedures will be implemented to mitigate the risk of elevated temperatures compromising the full life cell liner integrity during the IBA weathering period of approximately 3 months:

- Initial IBA placement in the weathering Area 1 will be used to form a level and stable platform atop a thermal blanket prior to stockpiling activities. Placement will be limited to less than 2.0 m above the stone drainage layer to facilitate weathering for a period not less than 3 months. During this initial weathering process the heat will be encouraged to dissipate via surface emissions to atmosphere. Such heat and hydrogen as may develop within the stone drainage layer will be removed either passively in the case of air or pumped in the case of leachate being present. Following weathering this layer will also provide a thermal barrier between liner and subsequent IBA lifts.
- IBA stockpiles above the previously described platform will be limited to 6.0 m if placed on a dedicated weathering location in Area 1.
- IBA lifts of weathered materials in adjacent areas will be placed in mini lifts of 500 mm to facilitate trafficking and a maximum lift 2.0m in one operational pass to mitigate the risk of vehicles overturning over steep embankments. This will also facilitate dissipation of heat.
- Subject to Agency approval, the basal HDPE liner under the weathering slab will be protected against elevated temperatures below the leachate stone drainage layer by:
    - A thermal protection barrier in contact with the HDPE liner, and/or
    - a permeable stone drainage layer below the weathering formation to remove heat and/or hydrogen via passive or pumped venting, and/or
    - a saturated drainage layer and pumping system designed to facilitate heat exchange.
- If weathering is being carried out in cells, respective 2.0 m lifts shall be left in place for a minimum period of 3 months.
- All weathering and landfill placement works will be subject to site specific method statements.

Dust Generation During IBA Placement

There is potential for dust impact in the absence of mitigation measures. Dust will be managed using a combination of the following:

- dust suppression using water
- dust suppression spray (will also make surface impermeable to shed surface runoff)
- temporary covers to shed surface runoff

Weathering Area 1

IBA tipped in within the weathering area (building) will be in stockpiles < 6.0 m high and materials will be subject to subsequent moving operations using front end loaders, 360° excavators or similar. IBA in these areas will be kept moist using overhead sprinkler systems or similar.

Active cell Areas 2, 3 and 4

Dust production during placement of IBA in cells will be negligible as the IBA will require wetting to facilitate compaction.

The primary potential source of dust in the active cell areas will come from vehicle movements, post compaction and following evaporation within cells in the absence of mitigation measures

Potential dust generation in these areas will be mitigated by compaction of placed IBA using smooth rollers and thereafter by a combination of the following:

- sprinklers
- vehicle mounted dribble bars
- dust suppression sprays

Once IBA has reached its final profile, temporary covers or a permanent LLDPE liner will mitigate the risk of dust generation.

Air quality is also discussed in Chapter 7 'of Volume 2 of the EIAR.

2.5.5.12 Management of Noise During and Post IBA Placement

Screening berms on the eastern boundary of the IBA cells have been designed to mitigate potential noise impacts from IBA related operations.

Thereafter IBA in cells 29 and 30 will facilitate supplemental visual screening for subsequent and adjacent landfill operations.

Noise is discussed in Chapter 9 of Volume 2 of the EIAR.

2.5.6 Future Winning of IBA Material

As identified in Section 2.3.3, potential exists for the future winning of the IBA placed within these cells i.e. the extraction of IBA material for recovery.

A significant factor in the decision to propose the development of IBA cells as part of this proposed development is to enable the future recovery of this material, for use in offsite applications such as road construction (embankments, sub-bases), concrete block or cement production.

It is acknowledged that there are several steps and processes to be undertaken before this could happen, but the availability of the IBA material within its own dedicated location means that there is potential for its future winning should a recovery use be identified. This will be subject to future regulatory approval.

2.5.6.1 Recovery of IBA

Recovery of IBA is well developed in the UK and continental Europe, where the use of incinerator bottom ash aggregate (IBAA) is quite commonplace and is approved for use by the Environment Agency.

IBAA refers to the IBA material that has been produced to a specification for an identified end use. 7 million tonnes of IBAA has been produced from IBA and utilised in the UK to date[8] according to anecdotal references IBAA displays properties that are similar to other 'virgin' aggregates and displays good pozzolanic (cementitious) properties, making it a suitable foundation aggregate.

In the Netherlands, where annual IBA generation runs at approximately 1.8 million tonnes per annum, the historical approach to IBAA use has been to adopt an 'isolate, constrain and monitor' approach when IBAA is used in application such as embankment construction – this effectively required the encapsulation of IBAA within a HDPE liner within an embankment, which among other things, placed continual aftercare requirements on the embankment. This approach has now been discarded by the Dutch authorities such that targets have been set for other recovery applications, subject to IBA being further processed through washing and/or separation.

2.5.6.2 IBA Transfer Off-Site for IBA Recovery Trials

IBAA may be developed in Ireland if appropriate standards are developed. Commercial trials will be required for the development of these standards.

For the purpose off facilitating future recovery trials off site, there may be a requirement to transfer weathered IBA materials off site. Material from the weathered stockpiles in areas 1 and 2 will be used for the trials. Crushing of the IBA may be required to loosen the material for haulage.

The annual material transferred off-site will not exceed the maximum annual intake level and will be backhauled in IBA delivery vehicles.

Operational procedures will be developed for the loading of weathered IBA from the Area 1 stockpiles.

2.5.6.3 IBA Processes within Weathering Area

As described previously in 2.5.5.3 Covered articulated trailers will tip IBA within the weathering area (building) it will be stockpiled, and eventually loaded using front end loaders of tracked excavators into site dump trucks for transfer to the IBA cells.

It may also be necessary to turn stockpiles periodically. To stream line the weathering process it is proposed to carry out site-based trials within the covered weathering area to examine the impacts of metals recovery, screening and washing on the weathering process and to implement same as may be appropriate.

Typically, the trials will require mobile screening plant to facilitate separation of metals and washing. The screening equipment will be loaded using the same loading shovels and tracked excavators required to manage stockpiles. The screening equipment will be similar to that used to screen the engineered clay barrier during cell construction.

[8] http://www.smithsbletchington.co.uk/assets/files/Ibaa-brochure.pdf

2.6 Proposed Biological Treatment Facility

2.6.1 Overview

It is proposed to develop an aerobic biological treatment (composting) facility as part of the overall development. This facility will process residual MSW fines accepted at the landfill, to stabilise this material, prior to landfilling. The facility will compost 25,000 tonnes per annum of MSW fines material. A sketch of the proposed facility is shown in Figure 2.10.

This facility is termed a 'Type 8' facility and it will require approval by the Department of Agriculture, Food and the Marine (DAFM) to operate. The design and operation will be in accordance with the "Conditions for Approval and Operation of a 'Type 8' Composting/Biogas plant transforming Category 3 catering waste", DAFM 2014 (herein after referred to as the 'Conditions Document').

In the future, the facility maybe reconfigured to process the source segregated organic fraction of municipal solid waste i.e. brown bin" material, through a relatively minor internal reconfiguration of the processing building. Such a reconfiguration would be driven by market demand for composting capacity and would subject to regulatory approval. The EIAR examines the potential impacts of biological treatment of 25,000 tpa of MSW fines. The facility, in whatever configuration, will continue to operate post void utilisation.

The stabilisation process which residual MSW fines will undergo within the treatment facility is defined by the EPA to a respiration activity limit is <7 mgO_2/g DM.

Graph 2.1 shows the impact of biological treatment on the reactivity of MSW against time. As can be seen the reactivity decreases as the time within the managed biological treatment system is extended. The proposed treatment facility at Knockharley Landfill is expected to have a retention time of approximately 10 weeks to achieve the EPA stability standard of <7 mg O_2/kg DM, as shown in Graph 2.1.

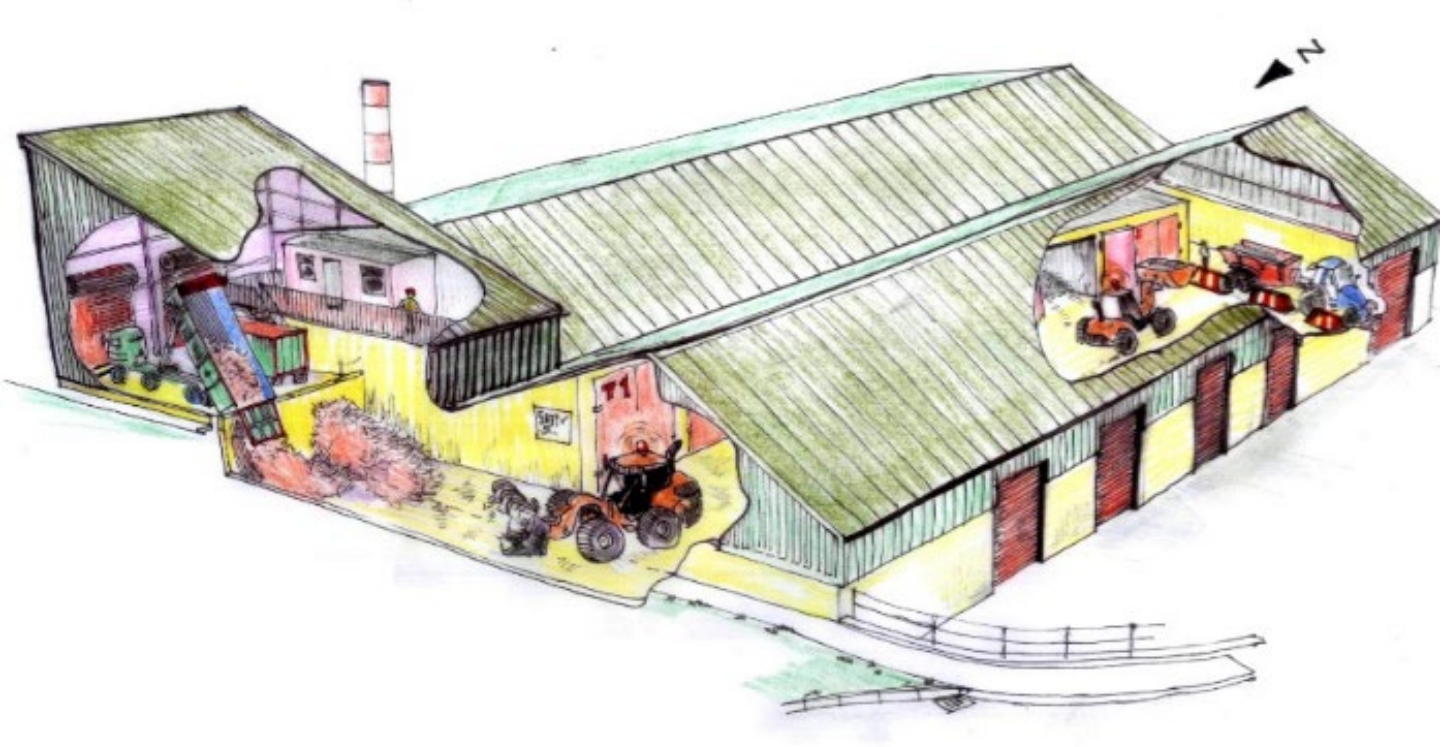
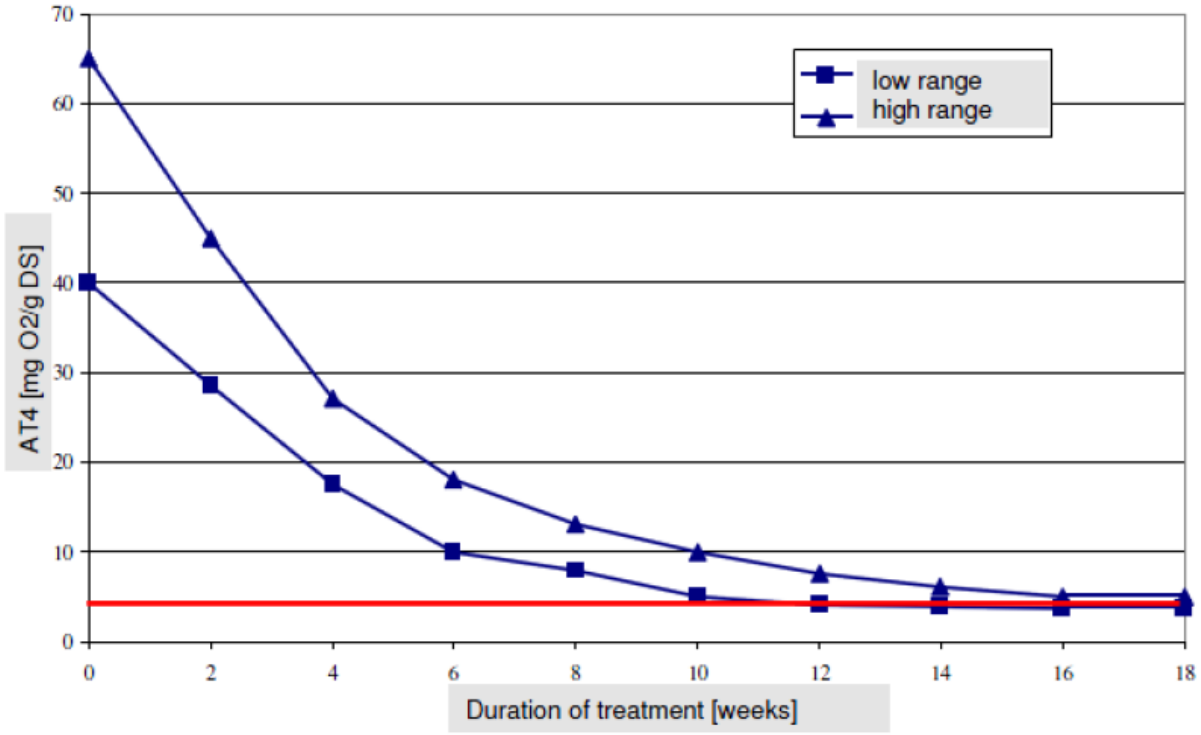


Figure 2-10: Proposed Biological Waste Treatment Facility



Source: Ingenieurgesellshaft Witzenhausen Technical Consultants

Graph 2-1: Typical Reduction in the Biodegradability of MSW as a function of time (based on high and low levels of biological reactivity in the source material)

Therefore, the purpose of the proposed biological treatment facility is to:

- Reduce both the quantity and biodegradability of waste going to landfill in accordance with the facility licence, the Landfill Directive 1999/31/EC and the EPA Pre-Treatment & Residuals Management Guidance (2009).
- Reduce the potential for environmental nuisance in the absence of mitigation caused by the landfilling of biodegradable waste such as odours, landfill gas generation, leachate generation, attractiveness to vermin, flies and birds, etc.

The biological treatment proposed will use composting as its core technology. Composting harnesses a natural process whereby organic matter is broken down by bacteria in the presence of oxygen, producing carbon dioxide and water vapour. Over time, the organic components within the waste (carbohydrates, proteins etc.) are metabolised by these bacteria, resulting in the reduction in mass/volume of the input material and the production of a stabilised humus type material of low respirability/biological activity, to meet the relevant standard previously identified.

In addition, the facility is designed to accommodate storage of baled recyclables and or baled MSW on the ground floor and above the compost tunnels.

2.6.2 Access and Traffic Control

The proposed biological treatment facility will be located within the south-eastern corner of the facility, directly north of the existing landfill gas compound. It will occupy an area of c. 5,400 m^2. Ground levels in this location are in the region c. 56 mOD and as such the facility will be at a lower level than the haul road around the landfill.

Access to the facility will be via the existing facility entrance road and weighbridge, followed by a left turn in a southerly direction along the existing internal road. A new entrance and access road to the biological treatment facility will be constructed off the internal road.

The facility operations will make use of an existing road off the perimeter haul road to the landfill gas compound, see Figure 2.11 and Drawing No. LW14-821-01-P-050-0008 Traffic Management Biological Treatment Facility in Volume 4 of the EIAR.

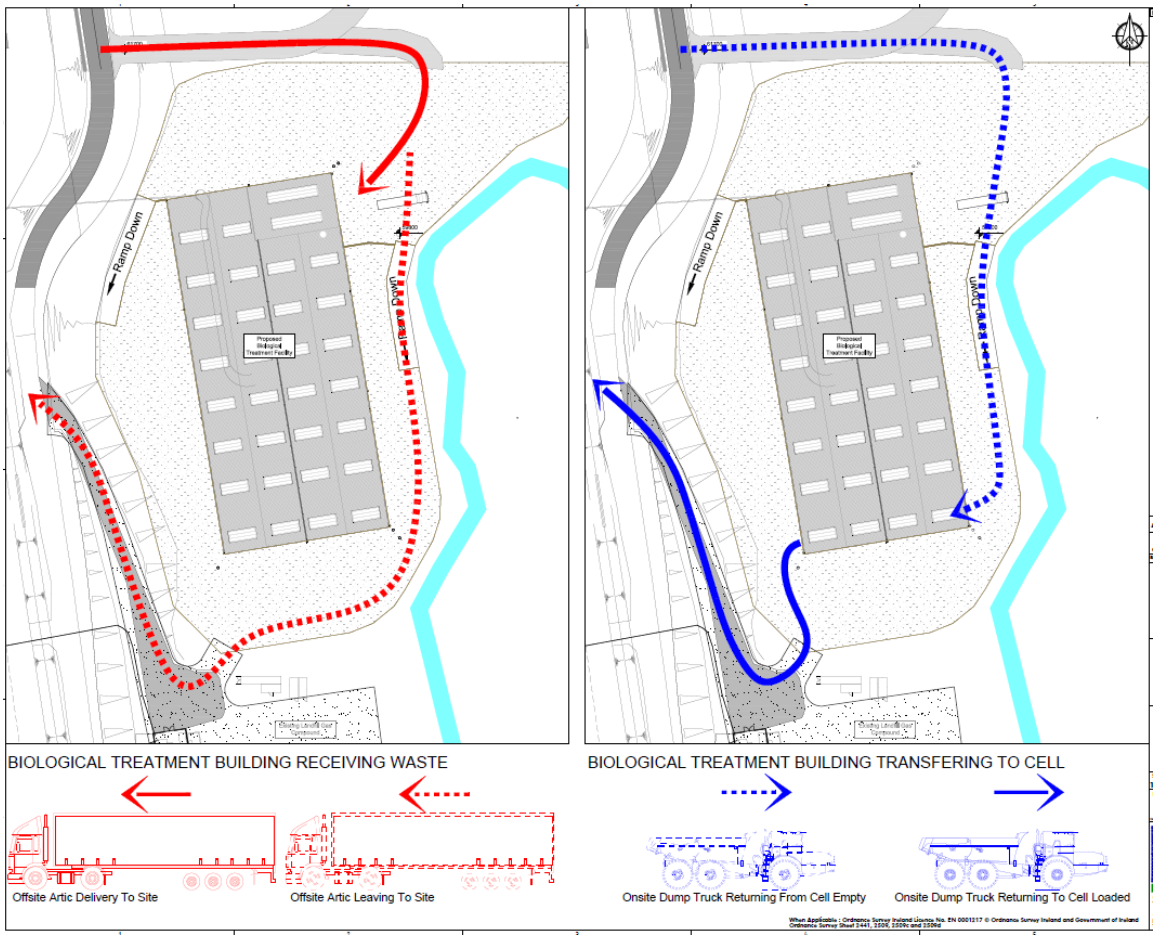


Figure 2-11: Traffic Movements to and from the Biological Treatment Facility

2.6.3 Principal Building Dimensions & Layout

Figure 2-10 is an artist impression of the proposed facility building and Drawing No. LW14-821-01-P-1700-005 in Volume 4 of the EIAR shows the sections and elevations of the facility. The following is a list of the major structural components of the proposed biological waste treatment facility:

- Facility processing building of 108 m in length, 50 m in width and varying between 12 m and 17 m in height, of portal frame construction, with 9 no. roller shutter doors containing:
  - Incoming material stockpile area
  - 12 no. aerobic composting tunnels (25 m x 6 m x 5 m) with single doors
  - Outgoing material stockpile area
  - 1 no. biofilter and a stack with 3 no access hatches to facilitate placement and removal of biofilter material.
  - Storage space for baled recyclables
- Marshalling yard and adjacent hardstanding with an approximate footprint of 1.31ha.

The ground elevation at this location varies between 56 and 59 mOD and the finished floor level of this building is at 57.0 mOD with the southern end of the building at 59 mOD. The general building height is 12 m to ridge height. There is a local increase in building height to accommodate tipping vehicles where the height above the tipping bay varies approximately between 14.0 m and 17.0 m. The biofilter stack height is approximately 20 m above ground level. Overall, the processing building at its highest at the southern end (excluding the stack will be approximately 74.0 m AOD). The building will be constructed in a portal frame configuration of reinforced concrete and cladded steel. The colour of the steel cladding will be RAL 1006020 or similar.

The aerobic composting tunnels will be typically 25 m long, 6 m wide and 5 m in height. The tunnels will be constructed from reinforced concrete designed to withstand strong chemical attack and high abrasion. They will be sealed by insulated stainless steel lined sliding doors. The tunnels will be equipped with an aerated floor system with a computer-controlled blower system that will be mounted in a gallery on the roof of the tunnels overlooking the tunnel loading area.

2.6.4 Composting Process

2.6.4.1 Waste Acceptance

Waste will enter the facility via the newly constructed road and marshalling area and will enter the processing building via fast acting roller shutter doors on the north-eastern side of the building. Both incoming vehicles and out-going vehicles will be in "clean areas" (shown below in Figure 2-12 as salmon colour), replicated from Drawing No. LW14-821-01-P-1700-0002 Proposed Biological Treatment Facility Ground Floor Plan in Volume 4 of the EIAR where dimensions and text descriptions are legible.

Input materials (residual fines) will be delivered by walking floor or tipper transfer trailers in a pre-screened form, directly suitable for composting. Record keeping and acceptance procedures in accordance with the requirements of the DAFM Conditions Document and the EPA licence shall be implemented.

Given the sequencing and logistics of compost tunnel filling and unloading, sufficient space on the floor will be provided to accommodate daily operations. As a minimum, the bio-waste will be stockpiled until the volume of feedstock is sufficient to half - fill a composting tunnel (c. 260 m^3).

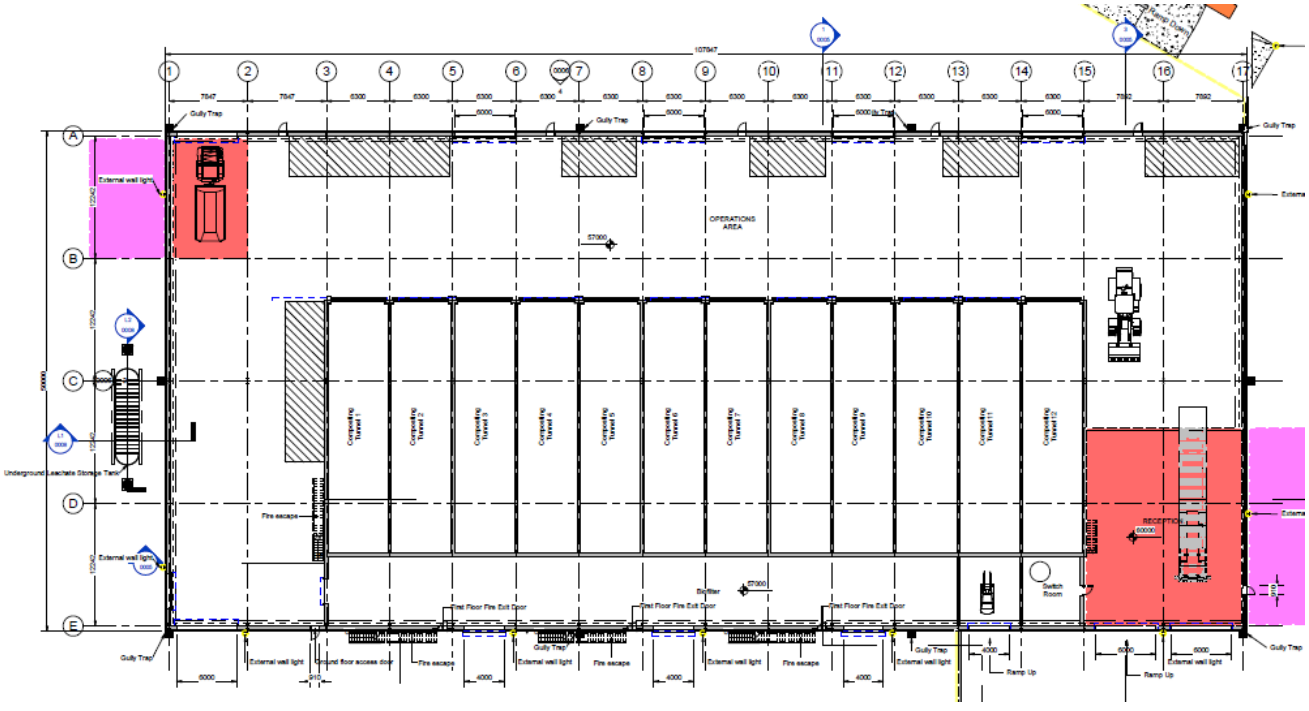


Figure 2-12: Layout of Biological Treatment Facility

The building will operate under negative pressure to mitigate potential dust and odour emissions. The incoming material will be inspected during unloading. Residual fines material will be mixed and blended with a portion of retained post-stabilised material and/or woodchip (or similar) amendment material in the reception hall floor before being loaded into a composting tunnel. The added stabilised material inoculates the incoming material with micro-organisms before composting and provides stability to facilitate aeration.

2.6.4.2 Tunnel Filling and Operation

Material will be loaded into the composting tunnels using a front-end loader where it will remain for an appropriate period of aerobic maturation. Each full tunnel of material shall be considered as a 'batch' in terms of the logistics of the process. The material readily de-waters (through evaporation and free drainage) and the aerobic microbial population rapidly increases.

The composting process for the tunnels will be controlled by a PLC/PC interface which records time and temperature and controls airflow within the waste from individual tunnel blowers/fans located in a gallery on the roofs of the composting tunnels, with air delivered through a network of piping located within the tunnel floors. As a result, temperature will be maintained for the appropriate time period to ensure pasteurisation.

Typically, the compost will be turned mechanically a number of times (2-3 times) within its overall composting duration to break up compaction. Depending on facility logistics, composting material may be unloaded from one tunnel into another, several times during the composting process, resulting in a fully stabilised material, with a final moisture content of 30-40%.

2.6.4.3 Testing and Storage

Upon completion of the composting process, the composted 'batch' of material will be unloaded from the tunnel in a dedicated 'clean' vehicle and placed in the outgoing stockpile area which will be separated from the tunnel area by moveable barriers to prevent vehicle entry and facilitate tipping of clean material over the barrier. (see Figure 2.10)

While located within the outgoing stockpile area, the material will be sampled and analysed, for compliance with AT4. Where more than one batch is located within the outgoing stockpile area, these batches will be kept separated by moveable concrete walls, of Alfabloc variety or similar. Sufficient capacity for storage of 1 – 1.5 weeks stabilised output will be provided in the outgoing stockpile area.

2.6.4.4 Dispatch

When results are obtained indicating that a batch meets the appropriate AT4 standard, the composted fines material will be loaded into a tipper trailer that enters the facility building via a fast-acting roller shutter door on the south-eastern side of the building and exits the building through the fast-acting roller shutter door on the south-western side of the building. Record of dispatch in accordance with the requirements of the DAFM Conditions Document will be maintained.

Vehicles exiting the facility through the roller shutter door on the western flank will be subjected to cleaning procedures in accordance with the DAFM Conditions Document in a designated cleaning area located outside of this door.

2.6.5 Air Handling

2.6.5.1 Ventilation System

The ventilation system will extract:

(1) 'Moderate-strength' aerobic exhaust from the composting tunnels, which will be subjected to bio-filtration and or/ scrubbing, prior to venting via blowers to atmosphere via stack;

(2) 'Low-strength' building ventilation air that will be mixed with the treated exhaust from the scrubber and treated via the biofilter prior to venting to atmosphere via stack

The ventilation system within the main building void will be designed for 3-6 air changes per hour. This ventilation rate allied with a good building skin integrity, will ensure that all odorous air produced within the facility will be contained and directed to the odour abatement system.

The processing building will be designed to be operated under slight negative pressure. Ventilation pipe work installed in the head space of the building and within tunnels will be connected to a high-volume medium-pressure blower that will draw off the warm, buoyant building air that will be generated by a combination of emissions in the processing building from the input materials in the intake area and from fugitive emissions from the movement of the material between composting tunnels.

2.6.5.2 Scrubber

Exhaust air from the composting tunnels, generated by the active aeration of the compost, will be extracted and passed through an acid scrubber if required subject to technology. The acid scrubber will be designed to remove odorants that are poorly degraded in biofilters. This particularly includes ammonia and amines. The removal of ammonia is particularly important as its oxidation in biofilters can give rise to elevated emissions of nitrous oxide, a strong greenhouse gas. An appropriately scaled acid scrubber will be installed to treat air from the proposed facility design if required to mitigate potential emissions by design.

The following minimum design performance and specification in Table 2-11 will influence the design of the scrubbing plant if required.

Table 2-11: Acid Scrubber Process Characteristics for the Development

Parameter	Values
Inlet NH_3 Concentration	100-250 mg/Nm³
Liquid Recirculation Rate	30 m³/h
Liquid Temperature	55 °C
pH in Sump	2.0
Packing Vol	10 m^3
Safety Factor	1.25
Outlet NH_3 Concentration	<0.50 mg/m³
NH_3 Removal Efficiency	99%

With the removal of ammonia and amines, the airstream will be mixed with the low strength building ventilation air and directed to the biofilter.

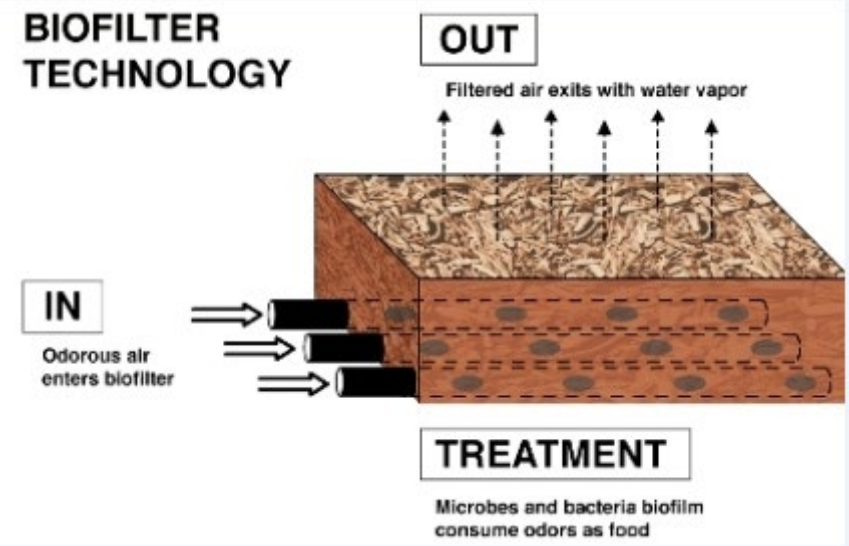
2.6.5.3 Biofilter

The combined scrubber exhaust and the building ventilation air will be mixed and directed to the biofilter located at the western side of the building (mitigation by design). The biofilter bed will comprise either a proprietary high surface-area inorganic media such as clay or activated carbon or an organic media such as woodchip, peat, bark or combinations of same. The biofilter will be designed to allow an empty bed retention time (EBRT) of between 40 and 60 seconds.

The design will consider contingency for media change-out and preventative maintenance to ensure optimal performance. The inlet air distribution floor within the biofilter will provide homogenous airflow throughout the biofilter bed medium thereby eliminating short-circuiting and poor treatment.

The operation of the biofilter with a continuous moving liquid film will minimise the build-up of contaminants within the media and will allow for the continuous control and addition of nutrients, minerals, pH and biofilm development. A schematic of a typical biofilter is illustrated in Figure 2-13.

As part of the overall odour treatment system, an integrated SCADA monitoring system will be incorporated into to allow for continuous monitoring of performance of the ventilation and odour control equipment.



Source: www.environmental-systems.co.uk/services/odour-control/

Figure 2-13: Typical Schematic of a Biofilter Bed

The biofilter will be on the western side of the building, as shown in Figure 2-12. The containment of the biofilter will be within concrete walling with an airtight fabric roof. All air will be directed to a single emission stack to ensure good dispersion of the residual odour plume to mitigate odour nuisance.

The biofilter design will ensure compliance with EPA emission standards for odour, ammonia, hydrogen sulphide and mercaptan concentrations. The overall incorporation of robust preventative maintenance procedures, containment measures, focused extraction, zoned and cascade ventilation, SCADA control, monitoring, trending and data-logging and multiple stages of treatment will ensure that odours will not cause impact on the surrounding area and that the odour control system will operate at optimal capacity.

Further detail in relation to the assessment of impacts on air quality and climate is provided in Chapter 7 of Volume 2 of the EIAR.

2.6.6 Effluent Management

The proposed biological treatment facility will generate a few effluents for management. The facility will be designed to maximise the reuse of effluents within the process, such that it operates on a balanced process water requirement, with a slight 'water demand' possible i.e. all effluent generated within the facility will be re-circulated within the process, with a potential requirement for fresh input water.

As the facility will be completely enclosed, the generation of contaminated storm water will be avoided. The facility will generate a few effluents that will require management including:

1. Internal floor wash-down
2. Vehicle wash-down (internal and external)
3. Composting tunnel leachate
4. Odour abatement effluents
5. Sanitary wastewater from welfare facilities
6. Leachate storage tank adjacent to Biological Facility

2.6.6.1 Vehicle Wash-Down

There will be internal vehicle wash-down facilities shown in Figure 2-12 (salmon colour) within the building at both the northern and southern ends and a wash down facility area located external to the roller shutter door on the northern external flank of the building (purple colour), which will be a concrete area of c. 200 m^2 graded to fall to a dedicated collection tank. Given the expected incoming traffic, truck wash down is expected to generate approximately 30 - 50 m^3/month, including for rainfall which will be captured in the external wash-down area. This wash down will drain to the leachate storage tanks.

2.6.6.2 Internal Floor Wash-Down

The internal floor area of the facility will all be subject to wash-down. Wash down of these floors will be reuse in the composting process and excess wash-down is expected to generate approximately 10 - 12 m^3 of effluent per month. This wash down will drain to the leachate storage tanks.

2.6.6.3 Composting Tunnel Leachate Management

It is not proposed to add moisture to the input residual fines material when being placed within the first composting tunnel due to the expected moisture content of the incoming material but, during the composting process, the composting material will lose moisture due to the process heat generated plus seepage/drainage from the material itself.

The in-floor aeration system will also act as a leachate collection system from the material when it is in the composting tunnels, such that leachate generated within the composting tunnel will be collected and directed towards a leachate holding tank(s). The aeration system will be configured using a series of controlled valves such that valves will be open during periods when air is not being delivered to the tunnels to allow leachate to freely drain, but which will be closed when air is being blown into the composting tunnel so that no air is lost from the system.

The leachate initially generated by the composting process will then be added to the composting material that is being transferred from one tunnel to another, in order that optimum moisture content is maintained within the composting material – this will either be done manually using a hose pipe as material is being placed within the tunnel or through in-tunnel roof sprinklers when material has been placed within the tunnels.

2.6.6.4 Odour Abatement Effluents

The odour abatement system will consist of a wet scrubber in tandem with a biofilter. The biofilter is designed to operate in a bio-trickling mode with the recirculation of the effluent generated back through the bio-filter.

At full capacity, the scrubbers will generate up to 20 m^3/month of excess wastewater with the biofilter generating a net 25 m^3/month. The leachate from the scrubber will be directed to the leachate holding tank.

2.6.6.5 Sanitary Wastewater from Welfare Facilities

Effluent from welfare facilities will generate up to 200 litres per day and will discharge to a 2,000 litre proprietary biocycle unit. Treated effluent will be discharged thereafter by pumped rising main to the leachate treatment and storage area) and tankered off site.

2.6.6.6 Leachate Storage Tank

Up to 120 m^3 per month of leachate may be generated at the proposed facility from the sources outlined. This leachate will be collected through a series of sumps that will drain to underground leachate storage tanks of 120 m^3 total capacity, located adjacent to the composting tunnel footprint. All leachate collected within the process will be captured together for re-use within the composting process, where a significant water demand will exist when composting material is being moved from one tunnel to another.

The leachate tank will be equipped with level indicators and high-level alarms to ensure visibility on the liquid levels within the tanks.

While the facility will be designed such that a sufficient quantity of leachate for addition to composting material is available always, a pipeline shall be provided from the leachate tanks to the wider landfill site leachate collection lagoons to allow for pumping to these lagoons in the unlikely event of the tanks capacity being reached or exceeded.

Likewise, a pumped water supply pipe shall be provided from the existing surface water attenuation lagoon at such that surface water in the lagoon can be supplement the leachate tanks for use for the composting process, should there be a deficit of compost 'make-up' water.

The leachate storage tank will have secondary containment provided by a 1.0m thick clay barrier k $1*10^{-9}$ m/s or similar.

2.6.7 Surface Water Management

Runoff from clean areas of the facility, such as the roof, marshalling yard and roadways external to the building will be collected and conveyed to the southern and existing surface water attenuation pond.

2.6.8 Ancillary Infrastructure

Key ancillary proposed developments are discussed as follows:

- Removal of a small area of trees adjacent to the south-east corner of the building.
- Relocation of site installed drains and minor services within the building footprint.
- Access roads and hardstands to facilitate access and egress and working areas around the building on all sides. These will drain into to the adjacent site surface water system.
- Water supplies to the building including internal wash down systems at vehicle egress points.
- External below ground tanks for leachate storage.
- External biotreatment unit with pumped discharge of treated effluent to the leachate management facility.
- Retaining walls to facilitate incoming vehicle access to the building and to facilitate a 'level' working platform surrounding the building on what is currently sloping ground with natural falls exceeding 3.0 m.
- Additional below ground pumped leachate rising mains.
- Additional below ground ducting for water, telemetry and power.

2.6.9 Operational Aspects

2.6.9.1 Traffic Control & Marshalling Area

The biological treatment plant shall be surrounded by a hard-surfaced marshalling area with appropriate drainage to allow for vehicle circulation and movement throughout the site. Vehicles shall enter the facility from the northern proposed access road off the internal perimeter road, through an entrance gate and all vehicles delivering waste material, shall enter the facility processing building through the northern eastern roller shutter door and shall exit the facility through the north-eastern roller shutter door. Upon exiting the facility, all vehicles shall be subjected to a wash-down procedure in accordance with the requirements of the DAFM Conditions Document.

All vehicles collecting stabilised waste from the facility shall enter the building through the south-western roller shutter door and exit the building through the south-eastern roller shutter door. All vehicles shall be subjected to a wash-down procedure in accordance with the requirements of the DAFM Conditions Document and wash facilities will be provided at both exit and entry doors to facilitate reverse movements if required.

2.6.9.2 Security

A paladin fence of c.2.4 m in height will be installed along all sides of the marshalling area and access to the site outside of operational hours will be restricted.

2.6.9.3 Staff Resources

It is expected that the proposed facility will be operated by 4 primary staff at full capacity. These will comprise one facility manager, one supervisor and 2 machine operatives working in one shift.

2.6.9.4 Staff Welfare

Within the building an office and welfare facilities (WC, sink, shower, changing room) will be provided.

2.6.10 Health and Safety

2.6.10.1 Vehicle Safety

There are risks and hazards associated with operating any type of biological treatment facility and operators will be trained to operate the equipment. Drivers and operators of all vehicles and plant shall hold all appropriate training credentials. Dedicated pedestrian areas will be identified within the building to avoid accidental contact with reversing loaders and delivery lorries.

2.6.10.2 Infectious risks

Training for all staff will include:

- precautions such as regular washing of hands before eating
- procedures on protective clothing washing before re-use
- protecting wounds and open sores
- appropriate respiratory protection
- vaccinations in line with HSE recommendations.

2.6.10.3 Air quality

The primary gases generated in the process will be water vapour and carbon dioxide. In addition, other gases will be present in trace amounts, including ammonia, organic acids, alcohols, sulphides and other odorants.

These gases will be subject to double containment within the composting tunnels and the gases will be retained within the odour abatement and biofiltration systems prior to discharge to atmosphere after treatment.

Within the building dust, gases and bioaerosols will be managed and treated by the ventilation system. The level of ventilation will be typically increased during compost transfer periods, i.e. when the material in the tunnels is being turned. At these times, there is potential for increased levels of emissions and therefore, these operations will be undertaken by operators within air-conditioned loader cabs and offices. High rates of air exchange in the tunnels and transfer corridors will be maintained at these times to maximise visibility, to maintain high oxygen concentrations and to extract waste air.

2.6.10.4 Risk of Fire

Fire can occur from the overheating of any machinery and potentially from self-heating of the material within the incoming and outgoing storage piles and within the composting tunnels.

However, the moisture content of the compost piles will be continuously monitored to optimise biological activity and this process also acts as a fire prevention measure. Therefore, the risk of spontaneous combustion is very low with these mitigation measures.

No naked flames or smoking will be allowed at the facility, in keeping with the no smoking policy for the wider site and machinery will be serviced regularly in accordance with manufacturers recommendations.

The Fire Prevention Management Plan and Emergency Response Procedure for the site will be updated to reflect the proposed development and shall be submitted to the EPA for approval.

2.6.10.5 Fire Safety Certificate

Meath County Council Fire Officer will be informed of the development prior to commencement of operations as part of the preparation of emergency procedures for the site in line with the requirements of the facility licence. An application for a Fire Safety Certificate will be made prior to the construction phase of the proposed development to ensure full compliance with Part B of the current Building Regulations.

The number and location of pedestrian access and egress points may change be subject to fire safety assessments.

2.7 Proposed Leachate Storage and Treatment

Refer to Drawing No. LW14-821-01-P-0600-01 Layout Leachate Management Facility in Volume 4 of the EIAR.

- The construction and operation of a leachate management facility comprising:
    - 3 no. additional floating cover leachate storage lagoons (L2. L3 and L4) of c. 3,000 m^2 each
    - 2 no. bunded above ground tanks for raw leachate from IBA cells (S1 and S2) approximately 25 m diameter 6.0 m high.
    - 3 no. bunded above ground tanks:
        - 1 no. tank (S3) for treated leachate from landfill leachate approximately 20m diameter 6.0m high.
        - 1 no, tank for treated leachate from IBA approximately 25 m diameter 6.0 m high (S4).
        - 1 no. tank for leachate concentrate 10 m diameter by 6.0 m high (S5).
    - Modular - typically containerised plant units (C 1 through C6), on concrete slab of c. 1,600 m^2 and 1 no. elevated tank 5 m diameter 10 m high (T1) with provision for 2 no. additional low level (<5.0 m high) bunded storage tanks for dosing and other compounds (T2 and T3).
    - Extension of the existing loading area to accommodate 2 no. 25 tonne articulated tankers
    - 1 new tanker loading area to accommodate 2 no. 25 tonne articulated tankers.

Permission is sought for the continued operation of this plant post filling of the landfill cells onsite to facilitate continued leachate management.

The leachate plant will be designed to facilitate treatment of respective leachate streams as may be required prior to transfer to off-site wastewater treatment plants. The different leachate streams will be generated from the following sources:

- residual non-stabilised waste in landfill
- stabilised and inert waste in landfill
- IBA cells (weathering, placement cells and contaminated stormwater runoff)
- biological treatment facility

The leachate management facility will:

- Provide at least 1 month's on-site attenuation storage for all leachate streams using both elevated above ground bunded tanks and below ground floating cover lagoons.
- Facilitate on-site treatment and or conditioning of respective leachate streams.
- Provide tankering loading facilities for transport of treated and un-treated leachate to wastewater treatment plants.

2.7.1 Location and Layout

The facility will be located south of the administration building and adjacent to the existing covered leachate lagoon.

2.7.2 Leachate Storage

Raw leachates will be stored in lagoons, underground tank and or above ground bunded tanks.

Lagoons will be constructed using a composite containment system comprising 2.0 mm HDPE overlying 1.0 m clay barrier with a permeability < $1*10^{-9}$ m/s. Surface runoff from rainfall will be directed from floating covers to the site surface water system.

Above ground bunded tanks will have proprietary systems to accommodate drainage of clean surface water runoff to surface water site drainage system under normal operations. In the event of a spill or tank damage, bund contents will be discharged to a wastewater treatment plant or similar approved. Bunds will facilitate containment of 110% of the largest tank or 25% of total storage capacity whichever is greater. In addition, rainfall storage over and above bunded capacity will be provided in excess of 50 l/m^2.

Leachate from respective sources will be stored separately to facilitate site specific pre-treatment as required.

On-site raw leachate capacity will accommodate no less than 1 month's storage. Pumping to these storage lagoons will be automated and controlled by proprietary SCADA control systems or similar.

If leachate is treated on-site, treated effluent will be stored in adjacent bunded above ground tanks. On-site capacity for treated effluents will accommodate no less than 7 days treatment throughput.

Tables 2-12 and 2-13 over summarise the capacities of the proposed storage tanks and lagoons.

Table 2-12: Raw Leachate Storage

Notation	Leachate source	Tank description	Width/diameter/Volume	Height /Depth
L1	Residual non-stabilised waste	Existing floating cover lagoon	50 m x 50 m	< 1.0 m high <5.m deep
L2	Stabilised and inert waste	Proposed floating cover lagoon	<60 m x 60 m	<1.0 m high <5.0 m deep
L3	IBA recovery	Proposed floating cover lagoon	<60 m * 60 m	< 1.0m high < 5m deep
L4	IBA contaminated storm runoff	Proposed Floating Cover Lagoon	<60 m * 60 m	< 1.0m high < 5m deep
S1	IBA weathering	Proposed Bunded tank	25 m Ø	< 6.0 m high
S2	IBA cells	Proposed Bunded tank	25 m Ø	< 6.0m high
None	Biological facility	Below ground storage	120 m^3	0 m

Table 2-13: Treatment Units and Treated Leachate Storage

Notation	Contents	Tank Description	Diameter /Size	Height / Depth
S3	Treated stabilised and inert	Proposed Bunded tank	20 m Ø	< 6 m
S4	Treated IBA leachate	Proposed bunded tank	25 m Ø	< 6 m
S5	Concentrate from leachate treatment process	Proposed bunded tank	6 Ø	<10 m
T1	Modular containerised vertical tank	Covered bunded storage	10 m * 5 m	< 6 m
T2 & T3	Chemicals for Dosing	Bunded storage tanks	5 m Ø	< 5 m
C1–C6	Various leachates for treatment	Containerised proprietary treatment units	12 m * 3 m	< 3 m unit (container only)
None	Proprietary Bio Treatment plant adjacent to and servicing biological facility	Below ground tank	< 5 m * 5 m * 3 m	< 4 m deep

Refer to Drawing No. LW14-821-P-0600-001 Layout Leachate Management Facility in Volume 4 of the EIAR.

2.7.2.1 Treatment

The need or otherwise for on-site treatment as advised previously may be subject to factors such as local waste water treatment facilities, IE licence conditions, commercial considerations or other which may change over the lifetime of the facility.

Accordingly, a dedicated plan area 40 m*40 m will be provided to accommodate proprietary containerised modular leachate treatment units. Any treatment carried out on site will be subject to EPA approval.

Storage of materials if required to support treatment, e.g. caustic for pH balancing, will be in modular bunded units located on the dedicated concrete pavement plant area.

Drainage from the concrete pavement area, roads, floating covers and tank roof systems will discharge into the existing on-site surface water drainage system discharging to the existing southern storm water attenuation pond.

2.7.2.2 Tanker Loading

It is proposed to upgrade the current tanker loading facility to facilitate collection of treated or untreated leachate from the lagoons and tanks on-site within the leachate treatment facility. This will allow filling of two tankers concurrently.

Each tank / lagoon will have a valved discharge pipe that will terminate in the tanker loading area at a manifold.

The vacuum tanker or similar will drive into the tanker loading area and a flexible pipe will connect the tanker to the manifold. Typically, a vacuum in the tanker facilitates removal of effluent from respective tanks.

The tanker loading area will retain and connect to the in-situ below ground drainage system to accommodate, as required, spills and runoff from this area which will be discharged to the in-situ leachate lagoon for subsequent treatment and or transfer off site to a waste water treatment facility.

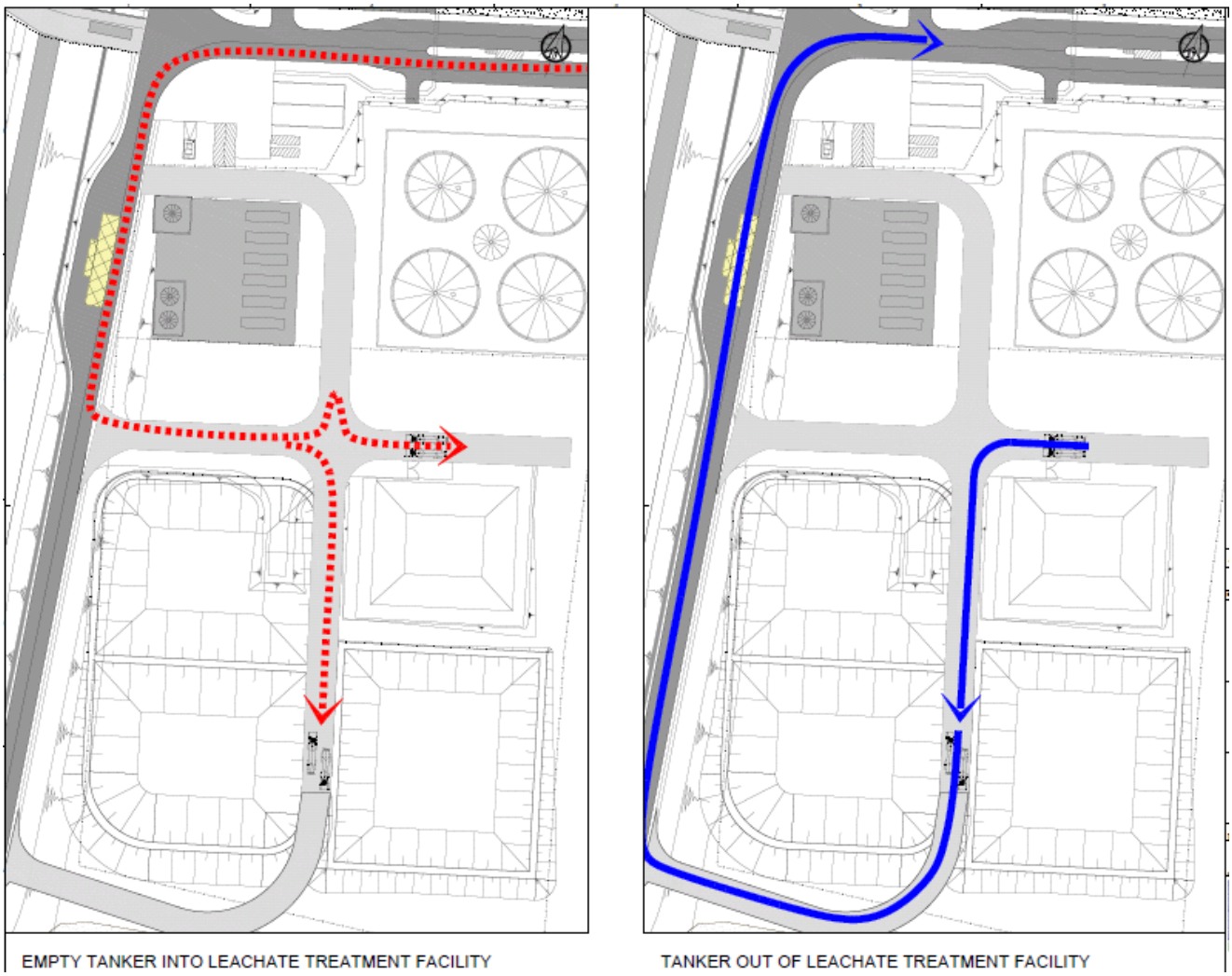


Figure 2-14: Traffic Movements to and from the Leachate Management Facility

2.7.2.3 Operative Wash Area

There will be operational procedures for:

- tanker loading
- leachate storage
- leachate treatment

Operatives will be trained in accordance with these procedures and in accident and emergency procedures. In the event of an accident, an external shower wash down and medical station will be located adjacent to the bunded storage.

2.7.2.4 Odour Control

All tanks and exhaust from vacuum tankers will have dedicated venting with carbon filters to facilitate passive or pumped venting of gases which may be dissolved in leachate.

2.7.2.5 Traffic Management

Traffic associated with leachate management will use the existing site road infrastructure and the tankers will exit the facility over the weighbridge as per existing procedures to record the transfer of leachate (volume and destination) off-site.

Up to 14 no. daily vehicle traffic movements will be associated with the following:

- Transfer of leachate off-site to WWTPS (articulated 25 tonne and 15 tonne rigid tankers)

In addition, occasional deliveries to support leachate treatment may require product deliveries using articulated 25 tonne and 15 tonne rigid delivery vehicles.

The proposed traffic movements are shown in Figure 2-14 and in Drawing No. LW14-821-01-P-0500-0009 Traffic Management Leachate Management Facility in Volume 4 of the EIAR.

2.7.2.6 Security & Staff Resources

The existing security and facility staff will operate the leachate storage and treatment facility. Training will be provided as appropriate.

2.7.2.7 Surface Water & Foul Water Infrastructure

Surface water runoff from hard standings, bunds, roof systems and roads will be directed into the existing on-site surface water drainage network and will pass via the existing petrol interceptor to the southern storm water attenuation lagoon.

Leachate spills, contaminated arisings from the tanker loading area, or other spills from bunded containers will be tankered off site.

2.7.2.8 Fire Control

The Fire Prevention Management Plan and Emergency Response Procedure for the site will be updated to reflect the proposed development and will be submitted to the EPA for approval.

Meath County Council Fire Officer will be informed of the development prior to commencement of operations as part of the preparation of emergency procedures for the site in line with the requirements of the facility licence. An application for a Fire Safety Certificate will be made prior to the construction phase of the proposed development to ensure appropriate measures are in place.

2.7.2.9 Other Services and Ancillary Infrastructure

The leachate management facility will have provision for the following services:

- Water
- Telemetry
- Power
- Lighting
- Laboratory
- Operative wash area (as described previously)
- Leachate recirculation (subject to Agency approval)

2.8 Proposed Surface Water Drainage Infrastructure Northern Catchment Area

The site has a watershed running approximately east to west through the permitted Phase 4 cell development area of the landfill, see Figure 12.2 Chapter 12 Surface Water of Volume 2 of the EIAR.

Historically surface runoff from the landfill and adjacent lands south of the watershed has discharged surface waters by overland flows, piped drainage and surface water drainage networks to the surface water attenuation pond and wetland south of the landfill.

It is proposed to develop a northern surface water attenuation pond to facilitate surface water generated in the northern catchment. This is shown in Drawing No. LW14-821-01-P-0500-0001 Proposed Layout Plan of Surface Water Management Infrastructure in Volume 4 of the EIAR.

An artist's impression of the northern surface water management pond system is included as Figure 2.15.

To provide access to the northern part of the site, it will be necessary to replace an existing culvert across the existing stream. This new culvert will also facilitate flooding described below. A Section 50 application in accordance with the Office of Public Works (OPW) document 'A Guide to Applying for Consent under Section 50 of the EU (Assessment and Management of Flood Risks) Regulations SI 122 of 2010 and Section 50 of The Arterial Drainage Act, 1945' will be submitted to the OPW to seek permission for this crossing.

Refer to Drawing No's LW14-821-01-P-0500-0001 through 0004 in Volume 4 of the EIAR. The proposed surface water management infrastructure consists of:

- A surface water holding pond with a 1,000 m^2 top water footprint and live capacity >2,000 m^3 upstream of the new surface water attenuation lagoon to facilitate containment, if required, of contaminated storm water. The pond will have a composite lining system comprising a 2.0 mm HDPE liner overlying a 1.0m clay ($1*10^{-9}$ m/s) barrier. Flows into the pond will be via baffled chute inlet structures. An automated "slam shut" control valve will be installed within an inlet weir to facilitate isolation, if required of incoming (contaminated) surface water flows. The weir structure will also have provision for a pump to discharge contaminated storm water into the leachate collection pipework system. Flows will discharge via the sluice valves/overflow weir, through a culvert (or in emergency conditions via a ford overlying the culvert) normal conditions via a baffled chute to the surface water attenuation lagoon.
- A surface water attenuation lagoon, with a 3,880 m^2 water footprint, live capacity > 4,698 m^3 to:
    - Attenuate surface water runoff from the permitted and proposed developments.
    - Facilitate settlement of suspended solids.

  The lagoon will have dead storage to accommodate solids, an overflow weir discharging via a baffled chute structure to accommodate extreme storm events into the adjacent stream, and a constant discharge outflow structure (floating inlet or similar) discharging to a wetland.
- A wetland, footprint 250 m^2 at the outlet of the surface water attenuation lagoon to the north of the currently permitted footprint. This structure is designed to polish surface water flows and reduce further suspended solids suspensions below statutory guidelines. The wetland will also have an overflow weir to accommodate failure of the outflow structure which will be the primary discharge outlet to the receiving drain/watercourse via a circular riser weir discharging via a piped outflow to the existing watercourse.
- The existing storm water drain/watercourse is typically 800 to 1000 m deep with a top width of approximately 2.0 m. It will require a permitted minor realignment at the north-eastern corner of the permitted development over an approximate length of 171 m requiring an increase in stream length approximately equal to 8 m. A section 50 application will be made to the OPW to seek consent for this realignment.
- IBA french drain perimeter pipework taking surface runoff from the IBA perimeter road and discharging runoff into:
    - IBA cells during operations, and;
    - Holding pond via petrol interceptor post operations.

- A culvert 1500 mm diameter with an 825 mm orifice or similar approved at the entrance, c. 45 m long in the existing drain/watercourse is proposed to off-set loss of flood storage by constructing the permitted cell footprint and the proposed storm water attenuation pond within an existing flood plain. The culvert will restrict upstream extreme runoff flows and cause water level upstream of the culvert to backup resulting in flooding of lands immediately upstream of the culvert and contained within the confines of the waste licence (and planning) boundaries of the proposed development. A 1:30 year storm events will pass through the culvert with no impacts on upstream levels.
- Ancillary infrastructure includes:
    - 2 no. culverts (60 m) connecting the attenuation lagoon to the holding pond and the baffled chute outfall to the surface water attenuation lagoon.
    - 2 no baffled chute inlet structures discharging swale drainage flows into the holding pond.
    - 1 no baffle chute energy dissipation structure discharging holding pond outflows into the storm water attenuation lagoon.
    - 1 no baffled chute conveying emergency spills from the storm water attenuation lagoon to the Knockharley Stream.
    - 1 no emergency spill each on holding pond and attenuation lagoon.
    - Surface water quality monitoring stations at interface between Holding pond and Attenuation pond and at outfall from wetland into receiving drain/watercourse.
    - Infrastructure to support management of surface water monitoring and contaminated water arisings should they occur, (monitoring, pump sump, control valves).

Surface water management is described in Chapter 12 of Volume 2 of the EIAR.

2.8.1 Surface Water Attenuation

The permitted and proposed developments will be constructed on an existing 1000-year flood plain. Accordingly, replacement storage measures detailed in Chapter 12 of Volume 2 of the EIAR are proposed to offset volume lost from the permitted development.

Surface water runoff from all roads, hard standings and development north of the watershed divide will be diverted to the proposed northern surface water drainage attenuation outfall via a surface water trunk pipe. This pipe will vary from a 225 mm diameter up to a 750 mm diameter. The pipe will discharge into a holding pond and thereafter into the new northern attenuation pond and wetland, via a Class 1 bypass proprietary oil/water separator.

The attenuation system will be designed to manage the runoff from the development for up to a 1 in 100-year design return period storm event.

Surface water arising south of the watershed divide will discharge to the existing "Southern" storm water management system details of which are presented in Appendix 12.1 of Volume 3 of the EIAR proposed IBA cell area will drain via the main perimeter swale into a holding pond and thereafter enter the storm water attenuation pond via a culvert and baffled chute inlet. This pond has sufficient capacity to the accommodate increased

Surface water runoff from the "Northern" catchment will first pass through a proposed holding pond. The function of the holding pond will be to provide a containment facility in case contaminated surface water enters the storm water system. Flow will then pass to the proposed "Northern" surface water attenuation lagoon.

The function of the surface water attenuation lagoon will be attenuation and suspended solids management. Sizing details for the Proposed "Northern" attenuation is presented Appendix 12.4 of Volume 3 of the EIAR. The attenuation pond will have 4,969 m^3 dead storage, 4,698 m^3 live storage and 750 mm freeboard. The catchment area north of the watershed is c 62 ha and the greenfield 20-year outflow rate will be designed to throttle flows to 255 l/s.

Outflows from the storm water pond will enter wetland via a floating weir or similar and will be discharged thereafter into the receiving Knockharley stream/storm drain via a piped outfall with rip rap or similar lining protection. The attenuation pond will also have an emergency spill capable of passing a 1:100-year discharge of 3,240 l/s into the receiving watercourse via a baffled chute.

The lagoon will be designed to accommodate a suspended solid loading of 2,500 mg/l and deliver an outflow containing less than 35 mg/l in accordance with current licence emission limit values.

The receiving wetlands will provide additional polishing to reduce suspended solids loading to typically less than 5 mg/l once wetland vegetation has been established.

This attenuation design approach is appropriate according to The CIRIA SUDS Manual C753 ISBN: 978-0-86017-759-3 (published December 2015) as pre-treatment devices for SUDS components receiving point source inflows.

The perimeter swales will have an approximate depth 600 mm with a bottom width of 1,000 mm and side slopes of 1 in 3.

The swales will be constructed in accordance with The CIRIA SUDS Manual C753 version 6. Surface water swales will initially commence at the storm water attenuation lagoon outfall and be constructed around the landfill footprint and embankments as the facility develops.

The storm water attenuation pond will be lined with a composite barrier, comprising a HDPE membrane and a 1.0 m clay basal layer with a permeability of $1x10^{-9}$ m/s, which is the same specification as the landfill cell clay barrier. The constructed wetland will comprise a shallow clay-lined pond both naturally colonised and planted with appropriate species. The outflow from the constructed wetland will flow into the local water course/drainage network at the north-eastern corner of the site. The 1:20 year outflow discharge rate will be 255 l/s.

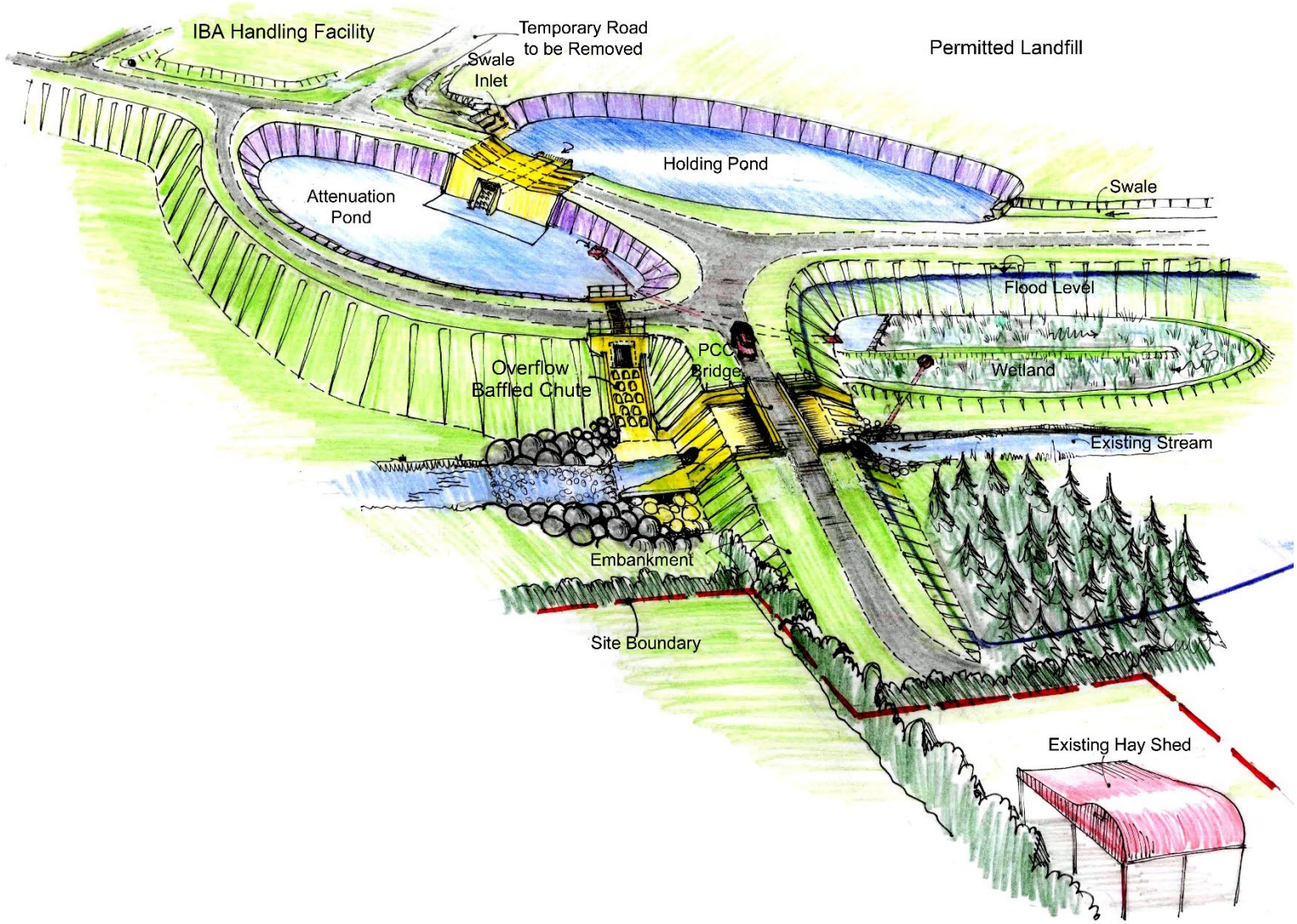


Figure 2-15: Artist Impression Northern Stormwater Attenuation Pond and New Flood Area

2.9 Earth Balance & Proposed Berms

Perimeter screening berms will be constructed using excavated materials from the cell development. The proposed berms are shown on Drawing No. LW14-821-01-P-050-0011 Cut Fill Phasing in Volume 4 of the EIAR. It is proposed to construct screening berms along the western boundary to a maximum of 10 m in height, on the eastern boundary to a maximum height of 10 m and on the northern boundary, to a maximum height of 6 m, with a total berm footprint of c. 11.3 ha. Haul roads for construction of the berms will be in or immediately adjacent to berm footprint.

2.10 Proposed Tree Felling & Replanting

The development of the proposed IBA cells, as well as the installation of the proposed screening berms, will necessitate the felling of approximately 12.5 ha. of commercial forestry currently in place within the boundary of the existing facility. A total of 37.7 ha of forestry is in place. Post restoration the forestry will comprise more than 40 ha. The replanted areas will require restoration of forestry over proposed screening berms (8.8 ha) and new planting within the site of 7.1 ha. Felling and Replanting locations are presented in Drawing No. LW14-821-050-003 Existing Forestation, Proposed Felling and New Planting in Volume 4 of the EIAR. In the context of this development reforestation means restoring forestry in areas that were felled to facilitate development, i.e. replanting. New planting/forestation means planting forestry in areas that were not previously forested to maintain the same level of forestry on the site.

The existing and forestry and proposed felling and replanting is discussed in more detail in Chapter 10 of Volume 2 of the EIAR.

Typically, woodland to be felled is immature woodland comprising mixed broadleaved/coniferous woodland (WD2). The trees are largely less than 4-5 m in height in the still immature sections and comprise a mixture of Alder, Silver Birch, Beech, Willow species, Sitka Spruce and Lodgepole Pine (among others). The more mature compartments now comprise trees up to 10m in height though wet conditions underfoot have restricted growth in some locations. These are largely in the northwest of the site.

It is expected that the clear felling will occur in sequential phases prior to clearance of the areas required for IBA cell development and the areas required for berm development and will correspond with one of the phases of construction of landfill cells.

It is assumed that the clear felling over respective areas will occur over periods between 4 and 8 weeks.

It is also proposed that replanting of the felled forestry will take place within the site and this replacement planting will occur on the berms to be developed. The replant lands will be properly certified as suitable for forestry by a certified forester. Replanting will be influenced by the following criteria:

- not occurring within an environmentally designated area
- not within high ecological value habitat
- replanting to be in accordance with Forest Service Guidelines e.g. 'no-plant' buffers from aquatic zones to be implemented.
- no fertilization to take place when replanting

All felling and replanting will be undertaken in accordance with the Felling Act 2014.

The felling will be the subject of a Felling Licence from the Forest Service and will be in accordance with the conditions of such a licence. Subject to receipt of planning, Knockharley Landfill Ltd. will apply to the Forest Service for the necessary Limited Felling licence(s) for clear felling works at the Knockharley site, in line with the requirements of the Forestry Acts 1988 to 2014.

Clear felling has the potential to impact adversely upon the environment if undertaken in an uncontrolled manner; however, the adoption of felling procedures, operating techniques and control measures will mitigate any potential adverse environmental effects.

The impacts associated with clear felling in respect of other aspects, such as hydrology and water quality, ecology, soils and geology, traffic, etc. are appraised in detail in the relevant chapters of the EIAR.

No felling will be required for the proposed development during the decommissioning phase and as such the operational and decommissioning phases of development are not discussed in this chapter, other than in respect of turbulence felling.

2.10.1 Proposed Felling Methodology

A harvester or processor is used for harvesting operations, which incorporates the felling of trees, de-branching, and cutting them into required lengths. Processing is the term used to describe de-branching and cross-cutting. The harvesting machine operates the harvesting head which is located on the front arm of the machine. The head contains the saw, wheels for moving and de-branching the tree, measuring devices for measuring the length and diameter along the tree, and a urea applicator. A typical harvester/processor is shown in Plate 2-7.

(source: www.teagasc.ie)

Plate 2-7: Typical Harvester Unit

The harvester will fell four rows of trees at each side of the machine, so from a standing position 8 rows of trees, within the reach of the machine, are cut. The rows of trees are typically planted 2m apart, so a harvester can cut a c. 16m wide strip. Therefore, the harvesting racks, laid down as the harvester moves along will be c. 16m apart.

The harvesting or extraction rack is the path used by timber harvesting and extraction machinery. It is normally formed by the harvesting machine during the cutting of the timber using the branches and crown of the tree. The covering of branches on the extraction rack is also called a brash mat or lop and top.

A number of racks at c. 16 m centres will be required to clear the respective cell and berm development areas which can link together along a central extraction corridor, as required.

Each tree will be cut at its butt as close to the ground as possible. Each tree will then be de-branched and processed into several lengths of log which are dependent on the tree diameter and its length. The minimum useable diameter is generally 7 cm. The harvesting machine is calibrated to make maximum use of each tree to avoid unnecessary wastage.

The processed logs will be dropped in piles beside the extraction racks with the different categories of logs grouped together to facilitate forwarder extraction.

A forwarder is a mechanically propelled machine which uses a hydraulic arm to gather timber logs and stacks them on the body of the machine.

It then transports the logs to the required location and stacks them in heaps. A forwarder has a rotating operating area which allows it to be operated efficiently going forward or backward. A typical forwarder is shown in Plate 2-8.

A forwarder will be used to transport the timber logs from the forested areas to intermediate storage areas within the Knockharley site before collection and transport off-site.

The proposed storage areas are shown in Drawing No. LW14-821-050-0003 Existing Forestation, Proposed Felling and New Planting in Volume 4 of the EIAR are located adjacent to the proposed internal road network within the facility, for ease of loading/storage of the timber. The timber logs will be transported along the racks laid down by the harvester to join into the existing landfill site roads. The extraction or haul distances will vary throughout the site depending on the distance to the existing site roads but has been laid out to minimise the length of travel. Temporary adjoining roads, from the harvesting area/racks to the existing landfill roads, will be developed utilising suitable virgin material available within the Knockharley Landfill. As the proposed felling will be undertaken in conjunction with a phase of landfill cell development at the Knockharley landfill site, the development of these temporary adjoining roads will be included within the specification associated with this construction phases.

(source: www.teagasc.ie)

Plate 2-8: Typical Forwarder Unit

Smaller forwarders which can transport up to 12m^3 of timber will be used throughout the site.

The forwarder transports each different category of logs separately and stacks them at the forest road in separate piles in a stable and safe condition.

Dense, fresh brash mats are the most important part of a felling site as they serve to avoid soil damage, erosion and sedimentation. These will be designed and installed to protect the underlying soil from damage, while avoiding aquatic zones and will be maintained throughout the felling operation. Their purpose is to prevent breaking of the ground surface thus preventing silt or nutrient run-off.

Brash mats will be installed along the extraction racks to protect the underlying soil from damage and will be well maintained and functional throughout the harvesting operation. The minimum amount of brash necessary to support the machinery will be used throughout the site. The bulk of the brash will be bundled and recovered from the site in a process known as forest residue recovery.

Double- wheeled machinery and close poling (laying timber or logs side by side perpendicular to the direction of travel to spread the load across a low bearing surface) will be used as necessary to maximise the recovery of brash and where the bearing capacity of the ground may be poor.

Before any harvesting works commence on site all personnel, particularly machine operators, will be made aware of the following and have copies of relevant documentation:

- the felling plan, surface water management, construction management, emergency plans and any contingency plans
- environmental issues relating to the site
- the outer perimeter of all/any buffer and exclusion zones
- all health & safety issues relating to the site

The harvested timber will be transferred off site. The proposed traffic movements associated with the removal of timber off site is discussed in Chapter 8 Roads, Traffic and Transportation of Volume 2 of the EIAR.

2.11 Relocation of ESB Powerline & Substation Construction

2.11.1 Relocation of Existing 20KV line

An existing 20 KV overhead ESB powerline, which runs roughly north-south through the eastern portion of the Knockharley Landfill site, provides power to the landfill facility administration buildings via a 'spur' that runs overhead to the buildings.

The proposed route of the relocated powerline is shown in Drawing No. LW14-821-01-P-0000-003 Proposed Site Layout.

This spur runs over an area that will be impacted by the development of the proposed IBA cells area and the screening berm to the east of the cells, and thus will require relocation.

A new connection will be made approximately 100 m south of the existing connection point on the 20 KV line, such that an overhead line will run from this new point, roughly parallel with the existing entrance road, to the administration building.

All works in relation to the relocation of the powerline will be undertaken by ESB Networks or an approved contractor and will likely involve, *inter alia*:

- the erection of powerline poles by approved contractors
- the pulling of the electrical cable along the poles
- the disconnection of power and the temporary interruption of power supply associated with the 20 KV line
- the reconnection of the new cable as part of the powerline
- the powering up and checking of the new line

2.11.2 New ESB Substations

It is proposed to construct 2 no. new ESB substations located within the existing Knockharley Landfill site boundary. Station 1 will be at the north-eastern corner of the currently permitted landfill footprint. Station 2 will be adjacent to the proposed Biological Management facility. The location of the substations is shown in Drawing No. LW14-821-01-P-0000-003 Proposed Site Layout in Volume 4 of the EIAR and details of the substations are provided in Drawing LW14-821-P-1700-010 in Volume 4 of the EIAR.

Overhead lines will be constructed to connect into ESB substation subject to ESB approval and shall connect into overhead lines running east west parallel to and offset from the Kentstown Road on the northern boundary of the facility.

2.12 Proposed Ancillary Developments

To facilitate intensification of the permitted cells and the proposed IBA cell development, ancillary infrastructure will be required for the management of surface water, leachate, air and for traffic movement. These have been discussed in the relevant sections above.

2.12.1 Ancillary Services

The permitted development has provision for:

- Above ground gas collection ring mains, site lighting and overhead power lines, site access.

The proposed development will require extension of the following in-situ services:

- Below ground services associated with power, water supply and telemetry to leachate, groundwater side risers and associated proposed development areas.
- Additional leachate side riser pump installations to remove IBA leachate from the cells.
- Above ground temporary site lighting in cells and permanent site lighting on:
  - The proposed IBA cell perimeter road.
  - The proposed leachate management facility.
  - The proposed biological facility.

2.13 Environmental Controls

The facility was designed and is being operated in accordance with the EU Landfill Directive 1999/31/EC (hereinafter referred to as the Landfill Directive), IE Licence W00146-02 and Technical Amendments A, B, C and D and the EPA Manuals on landfill selection, design, operation and monitoring.

It is not proposed, nor is it deemed necessary, to implement changes to the comprehensive environmental controls and monitoring that are presently in operation for the permitted development.

Environmental Controls are currently implemented via monitoring and reporting undertaken in accordance with Schedule D of the existing facility licence.

As identified previously, the proposed development will require an updated licence to reflect the proposed operations as outlined herein. An application is being prepared for the Environmental Protection Agency (EPA) to follow the planning application to which the EIAR relates.

Pre-application consultation has been undertaken with the EPA and further detail on this is provided in Chapter 5 of Volume 2 of the EIAR.

Subsequent sections hereinunder will therefore refer to, current licence conditions or future variants as may be required to identify how controls will be implemented.

2.13.1 Groundwater Protection

Leachate has the potential to impact on groundwater quality in the absence of mitigation.

The existing landfill facility was designed and is being operated in accordance with the EU Landfill Directive 1999/31/EC (hereinafter referred to as the Landfill Directive), IE Licence W00146-02 and Technical Amendments A, B, C and D and the EPA Manuals on landfill selection, design, operation and monitoring. The remainder of the permitted landfill development and the proposed IBA cell area will be designed in accordance with the EU Landfill Directive.

Prior to any construction on site, EPA approval is required for all specified engineering works. Following construction an independent Construction Quality Assurance (CQA) report will be prepared for submission to the EPA for approval.

All containment structures such as lagoons and tanks shall be designed to mitigate any potential impacts on groundwater. Please refer to section 2.6.3 and 2.7. All bunds, tanks, lagoons, containment structures and pipework are, and will be subject to integrity assessment every 3 years in accordance with the licence.

A leachate management system will control leachate generated in the landfill, the IBA cells and the biological treatment facility. Leachate management is discussed in Sections 2.2.6, 2.5.5, 2.6.3 and 2.7.

Groundwater monitoring is carried out quarterly with biannual reports submitted to the Agency which are available on the EPA web site. Monitoring will continue in accordance with the licence. As part of the preparation of this application, 3 new boreholes were installed in 2016 to facilitate baseline sampling at locations downgradient of proposed infrastructure.

Leachate lagoons and tanks will be designed, constructed and operated as discussed in Section 2.7. All lagoons and bunds will be tested for integrity at 3-year intervals in accordance with the licence.

Groundwater control

Historically groundwater has required drainage systems below the cell liner systems to intercept such groundwater as may be present.

Typically, groundwater from site has been present in sand lenses within the boulder clay and flow rates are historically very low. Such groundwater as may be pumped will be directed to the existing storm water lagoons as is presently the case or to the proposed northern storm water lagoon. This was discussed in Section 2.2.5. This method of groundwater control will be employed for all future cell development on site.

Historic evidence shows that groundwater pumping has little if any influence on surrounding groundwater elevations.

Once cells are full, subject to Agency approval, groundwater may be allowed to rise above leachate levels within cells, to mitigate further the risk to groundwater. Under these circumstances and in the unlikely event of a leak in a liner, groundwater elevation would be higher than the 1.0 m leachate depth conditioned in the waste licence and groundwater would enter the cell as opposed to leachate egressing from the cell.

The potential impacts to groundwater and mitigation measures are discussed in Chapter 11 of Volume 2 of the EIAR.

2.13.2 Protection of Air Quality

The following have the potential to impact on air quality in the environment in the absence of mitigation measures:

- Landfill gas generated by the landfilling of waste
- Malodourous waste materials accepted and managed at the facility (including leachate)
- Dust, particulate matter and traffic emissions generated at the facility

There is an existing landfill gas collection and management system at the facility which will be extended (collection network) to include the permitted development. There is sufficient treatment capacity on site to treat landfill gas produced by the proposed development. This is discussed in Section 2.2.9.

An air handling system will be installed in the proposed biological waste treatment facility to manage air quality in the building and emissions from it. A new monitoring point will be located at the stack emissions point from this facility. This is discussed in Section 2.6.

Operational practices in accordance with the licence are and will be employed to manage nuisance from dust and odour.

Air quality is discussed in further detail in Chapter 7 of Volume 2 of the EIAR.

2.13.3 Surface Water Protection

The facility was designed and is being operated in accordance with the EU Landfill Directive 1999/31/EC (hereinafter referred to as the Landfill Directive), IE Licence W00146-02 and Technical Amendments A, B, C and D and the EPA Manuals on landfill selection, design, operation and monitoring.

A second surface water attenuation lagoon and wetland with an associated surface water holding pond and a new flood plain is proposed for the facility to facilitate management of surface water in the northern portion of the site. It is proposed to create a new surface water sampling point at the outlet from the northern wetland. There are existing monitoring points upstream and downstream of the proposed discharge location.

Surface water at the facility is managed in accordance with the surface water management plan. Surface water during construction will be managed in accordance with the Outline Construction Environmental Management Plan (CEMP) in Appendix 2.0 of Volume 3 of the EIAR.

The potential impacts on surface water are addressed in Chapter 12 of Volume 2 of the EIAR.

Surface water monitoring and reporting of results is and will continue to be carried out in accordance with the licence.

2.13.4 Noise Control

Noise monitoring is and will be carried out in compliance the licence and the licence specified noise emission limits. The potential impacts of noise on the environment are discussed in detail in Chapter 9 of Volume 2 of the EIAR. Two new noise monitoring points are proposed on the local road to the east of the facility, located to monitor potential noise emissions from the proposed IBA facility and the proposed biological treatment facility.

2.13.5 Nuisance Controls

2.13.5.1 Vermin Control

Strict management and mitigation measures are in place and have been successful in the control of populations of vermin in the vicinity of the landfill. These measures include the following:

- Daily cover material comprising soil-like material is placed on the active area of the landfill to deny access for scavenging birds and vermin to the waste
- The surface area of exposed waste is minimised during operations and good housekeeping practices are employed to minimise the potential for scavenging
- Professional vermin control experts are employed to control vermin levels using standard humane methods. Measures used as part of this programme include internal and external bait boxes, rodenticides and insect control measures. Vermin control commenced before the onset of landfilling
- Baiting is undertaken monthly, or more frequently as required
- Precautions are taken to avoid non-target species from coming in contact with vermin bait e.g. rodenticides. This includes the following: laying bait in areas not accessible to non-target species and strict control of vermin population levels. The success of the programme is manifest by the diversity of fauna that has colonised the site since farming has ceased and landfilling has commenced.

These measures will be extended to provide vermin control for the proposed biological treatment facility.

2.13.5.2 Litter Control

Measures used to control litter at the site include the following:

- The active tipping area is kept to the minimum area required to efficiently operate the site
- The active tipping area is covered daily with soil-like material
- All waste in non-active areas of the landfill is always covered with soil or an alternative mineral layer
- Netting systems are employed around active areas of the site
- Mobile litter cages are used as necessary close to unloading vehicles
- A minimum buffer of approximately 100 m exists between the landfill footprint and the site boundary. This ensures that in the event of a failure in the netting system the primary receptor of any litter will be on land owned by the site operator and a clean-up can be instigated immediately
- All waste is delivered to the site in covered vehicles. Any vehicle delivering uncovered waste is deemed to be in breach of waste acceptance contract conditions and appropriate action is taken by Knockharley Landfill Ltd. This action is designed to ensure that this practice does not recur
- Future deliveries of biodegradable waste will also be in fully-covered vehicles that will be unloaded indoors with no potential for littering
- Waste contractors are prohibited from using minor roads on their approach to and departure from the site and all access is directly from the N2
- Staff at the site patrol the nearby roads regularly to ensure that there is no litter emanating from vehicles using the facility. The nature of the waste to be deposited on the north face will be less prone to litter nuisance
- The site is closed in the event of severe wind conditions.

These measures will continue to be employed at the facility and shall be reviewed annually.

2.13.5.3 Bird Control

The number of scavenging birds such as gulls and crows attracted to the landfill site are minimised by the following measures:

- Daily cover material comprising soil-like material is placed on the active area of the landfill to deny access for scavenging birds to the waste
- The surface area of exposed waste is minimised during operations
- The number of birds at the surface water attenuation pond is monitored regularly by site personnel confirming the success of the bird control measures.

In over ten years of operation, there has been no significant increase in the number of birds at the site. Current procedures will be maintained as part of controls associated with the proposed increase in waste acceptance. The pre-treatment of MSW such that the biodegradable fraction of waste is reduced in accordance with specific conditions of W01465-02 reduces the attractiveness of the waste to birds and vermin.

2.13.6 Other Environmental Controls

The controls in place to mitigate potential impacts on the human environment are discussed in Chapter 6 of Volume 2 of the EIAR.

The controls in place to mitigate potential impacts on roads, traffic and transportation are discussed in Chapter 8 of Volume 2 of the EIAR.

The controls in place to mitigate potential impacts on biodiversity are discussed in Chapter 10 of Volume 2 of the EIAR.

The controls in place to mitigate potential impacts on soil are discussed in Chapter 11 of Volume 2 of the EIAR.

The controls in place to mitigate potential impacts on landscape are discussed in Chapter 13 of Volume 2 of the EIAR.

The controls in place to mitigate potential impacts on material assets are discussed in Chapter 14 of Volume 2 of the EIAR.

The controls in place to mitigate potential impacts on archaeology are discussed in Chapter 15 of Volume 2 of the EIAR.

2.14 Construction Phase Methodology

2.14.1 Construction Programme

The proposed cell layout and phasing for the permitted and proposed developments are presented in Table 2-14. Drawing LW14-821-01-P-0050-011 Cut and Fill Phasing in Volume 4 of the EIAR shows the proposed construction cut locations and phasing of screening berms associated with key mile stone developments. This drawing should also be read in conjunction with Drawing no. LW14-821-01-P-0050-003 Existing Forestation Proposed Felling and New Planting in Volume 4 of the EIAR as programming was designed to facilitate replanting / new planting within 2 years following felling as may be required.

It is preferable, from a construction viewpoint, that construction of the facility take place during the summer months to take advantage of longer daylight hours and drier weather. However, this is dependent on a number of factors including the implementation of appropriate mitigation measures in relation to the ecology of the development locations (refer to Section 11).

Upon appointment of a contractor for the works, a programme will be developed taking account required mitigation factors.

Table 2-14: Proposed Construction Phasing

Infrastructure	Cell Construction Programme (years post grant of permission)	Screening Berm
Cells 19, 20, 21, 22, 28, 29 and cell weathering area 32	0 through 2	Berms A and B
Advance works, security, felling, suspended solids management, site clearance, haul roads, services	0 through 1	Berm A
Surface water management infrastructure	0 through 1	Berm A
Screening Berms	1 through 8	Berms A through D
Leachate infrastructure	1 through 5	Berms A through D
Miscellaneous infrastructure	1 through 5	Berms A through D
Cells 24, 26 and 27	3 through 4	Berm C
Cells 23. 25 and 30	5 though 6	Berm D
Cells 31 and remainder 32	7 through 8	Berm E
Capping	1 through 8	

Infrastructure provision (access roads, power, telemetry, gas, leachate, surface water) will be developed concurrent with cell construction.

2.14.2 Construction elements

The key construction elements are as follows:

- advance works
- general earthworks and associated concrete works
- internal roads
- deforestation
- screening berms
- access Roads
- IBA storage facility
- additional above ground and below ground floating cover lagoons to store incoming and treated leachates
- leachate management facility
- a weathering / future reprocessing area within the IBA cells
- an additional wheel wash to clean vehicles leaving the IBA cell development
- additional leachate rising mains and associated suspended solids management systems tanks
- additional below ground ducting for water, telemetry and power
- biological treatment facility
- upgrading of leachate management facility
- new underground ESB power supplies and remove existing overhead power supplies

2.14.3 Construction Methods and Materials

2.14.3.1 Advance works

The following section outlies the key construction related deliverables required prior to development of Cells and associated Infrastructure:

- Establishment of site security, fences and Works compound (s) with appropriate welfare provision.
- Establishment of temporary surface water management measures requiring construction of silt fences and or localised settlement ponds to contain suspended solids associated with dig and deposition areas.
- Site clearance for screening berms.
- Installation of site access roads requiring stripping and stockpiling of topsoil and installation of granular formations atop separation membranes.
- Felling in accordance in accordance with the Felling Act 2014.
- Relocation / exposing of existing services to facilitate connection to proposed works.

2.14.3.2 *Overview of Earthworks and Associated Concrete Works*

Construction element broadly fall under two categories for earthworks related operations; earthworks and structures.

Bulk dig and construction of stockpiles and screening berms

An earth balance will define excavation locations and fill (typically screening berm) locations subject to construction program considerations and detailed design.

Prior to earthworks taking places advances works described above will require construction of haul roads, silt ponds and installation silt fences to mitigate impact of suspended solids on adjacent watercourses.

Thereafter overburden material will be excavated using tracked 360° excavators and transported in off road dump trucks to screening berm locations where material will be placed, compacted in layers, profiled, top soiled planted with trees and grass seed. If boulder clay (at depth) is encountered it will be stockpiled for reuse as engineered clay in lining systems, see below.

Where ground water is present gravity and or pumped drainage will be provided with outlets via suspended solids pond into receiving surface waters.

In all lagoons engineered clay will be installed in layers and compacted using a sheep's foot roller or similar in layers to ensure compliance with permeability specifications after which 2.00 mm welded HDPE lining materials will be installed.

Production of engineered clay

Following removal of overburden to screening berms or stockpiles, in-situ boulder clay will be excavated, passed through trommels to remove boulders exceeding 50 mm diameter and stockpiled or placed within excavations to form a 1.0 m engineered clay barrier.

Boulders will be used on site as granular fill in haul roads.

Engineered clay (with boulders removed) will be placed and compacted in layers not exceeding 250 mm typically to a proctor maximum dry density of 98% or more subject to permeability testing.

Concrete works

Concrete works will typically require local excavations, drainage and suspended solids management for dig and concrete pours and into which structures will be built requiring placement of blinding, shutters, reinforcement and final concrete pour. Near watercourses, where possible precast concrete (e.g. culvert) to mitigate any potential impacts on surface water will be used.

Swales and inlet structures will be excavated, profiled and seeded asap to mitigate development of suspended solids

2.14.3.3 *Internal Roads*

Internal roads will comprise:

- Haul roads during construction. These will typically comprise stone aggregate compacted using vibrating rollers on separation membranes.
- Paved roads in the IBA cells constructed using reinforced concrete over IBA formations.
- Perimeter roads using conventional barber greens, vibrating and dead rollers for:
    - IBA cells
    - Permitted development.

2.14.3.4 Screening Berms

Screening berms will be constructed on a phased basis concurrent with overburden from cell excavation works. Prior to berm installation, top soil will be stripped back formation compacted and soils as may become available placed and compacted in layers.

Layers will be overfilled and once berms are at the final height is reached will have side slopes profiled receive and allow subsequent placement of topsoil, seeding and tress as required.

To minimise erosion, storm drainage will be installed prior to bulk earth moves and silt fences will be placed around screening berms until a grass cover has become established.

Prior to earthworks taking place temporary haul roads will also be installed.

2.14.3.5 Surface Water Management

Prior to any earthworks or forestry works taking place, measures to mitigate potential impact on surface water from suspended solids will be implemented. Where permanent measures are not in place temporary settlement ponds and or silt fences will be established to mitigate the risk of suspended solids entering water courses.

Settlement ponds will typically have below ground excavation facilitating gravity flows where possible lined with a synthetic material and a discharge pipe system with appropriate downstream protection in the receiving water using concrete or rip rap to dissipate energy and prevent downstream erosion.

Prior to cell development works taking place, the northern catchment storm water infrastructure will be constructed.

Excavated materials will be removed to screening berms. Clay barrier material won from underlying boulder clays to produce engineered clay will be placed in layers and compacted to 98% maximum dry density.

Thereafter a 2mm textured HPPE liner will installed with welding being monitored by independent CQA.

Inlet and outlet structures and associated protection works will constructed using reinforced concrete.

2.14.3.6 IBA Cells

Overburden will be removed and placed in screening berms. In-situ boulder clays will be engineered via screening to remove boulders. A ground water drainage system will be installed to accommodate prevailing site conditions upon which the engineered clay barrier will be installed and compacted to 95% maximum dry density.

Thereafter a 2 mm textured HPPE liner will installed with welding being monitored by independent CQA upon which a protection geotextile will be placed prior to installation of a 500 mm drainage stone blanket within which will be a HDPE drain pipe network will terminate in HDPE sider risers.

Headwalls and valve chambers associated with leachate pumping will be constructed using reinforced concrete and pipework and telemetry ducts will be constructed using HDPE welded pipework.

2.14.3.7 IBA Weathering Facility

The construction of the IBA Weathering Facility is described as follows.

The storage area will be constructed within the IBA footprint in cell 32. Following completion of the cells a level formation will be established using IBA materials to facilitate acceptance of IBA materials. A single span portal frame building (76 m x 76 m) will be constructed on concrete pad foundations within the in the IBA weathering footprint.

Initially IBA material will be placed in thin layer above a thermal protection barrier to mitigate elevated temperatures damaging the liner.

To facilitate weathering. Once a level platform of weathered IBA is in place, a central access road will be constructed using reinforced concrete.

Clay barrier material will be won from underlying boulder clays excavated to form cells. Boulders within the excavated clay will be removed via screening and engineered clay will be placed in layers and compacted to 96% maximum dry density.

Thereafter a 2mm textured HPPE liner will installed with welding being monitored by independent CQA.

Inlet and outlet structures and associated protection works will constructed using reinforced concrete.

2.14.3.8 Leachate Management Facility

The primary elements associated with the leachate management facility will comprise:

- Floating cover lagoons excavated below ground and lined with 1.0 m clay barrier. Clay barrier material will be won from underlying boulder clays excavated to form cells. Boulders within the excavated clay will be removed via screening and engineered clay will be placed in layers and compacted to 96% maximum dry density. The floating cover will be constructed using LLDPE.
- Overground tank constructed using glass lined prefabricated steel tanks founded on a reinforced concrete foundation with reinforced concrete bund walls to facilitate emergency containment.
- Leachate tanker loading facility constructed with reinforced concrete bays and associated HDPE pipe drainage to adjacent tanks to accommodate spills. Pipework from tanks and lagoons will be below ground welded HDPE.
- Reinforced concrete area on granular fill to accommodate containerised treatment modules as may be required for future treatment and or conditioning of leachate road.
- Surfaced dressed access road on granular formation facilitating access to the facility.

2.14.3.9 *Biological Treatment Facility*

The biological treatment facility will be a portal frame building surrounded by a concrete working area to facilitate access and egress of vehicles.

Prior to building construction, the topsoil will be stripped back under the footprint of the buildings. Additional excavation will be carried out to the formation level of foundations and underground tanks, where required. The foundations will be ground bearing reinforced concrete pads/strips on a suitable stratum. Once the foundations are poured, rising walls will be constructed. These will be comprised of a mixture concrete blockwork walls and reinforced concrete retaining "push walls" in material handling areas and in tunnels. Push walls will be designed to retain the weight of stockpiled material and pushing forces from loading vehicles. Due to site topography, import of fill material to raise the levels to the underside of floor will be required. Imported fill shall be a granular engineered fill, compacted to provide a suitable subgrade for the building floors. Floors will be steel, or fibre reinforced concrete industrial floors on a suitable depth of compacted granular fill.

The steel frame will be erected on the reinforced concrete substructure. The frame will consist of rolled steel columns and rafters at 5-7m typical spacing. Cold rolled light gauge steel purlins and cladding rails will be fixed to the main columns and rafters. The frame will be cladded with corrugated coated steel cladding, to match the existing building. Access to the building will be by fast acting industrial roller shutter doors, with personnel access/fire escape doors as required to comply with Fire Regulations.

The walls and roof of the composting tunnels will be entirely of reinforced concrete construction.

External cladding will be affixed to the steel frame when completed.

Roof drainage will consist of gutters and downpipes draining the pitched roofs, the roof of the composting tunnels will be "flat" with a nominal fall. The concrete surface of the tunnel roof will be made waterproofed by means of a bonded membrane system. All roof water will be collected for harvesting.

Below ground tanks leachate tanks will use proprietary fibre glass or similar encased in concreted and surrounded by a 1.0m engineered clay barrier.

The external marshalling yard areas will be topsoil stripped. Imported fill will be required on the lower portion of the site to raise the subgrade to the final levels. The yard will be paved with steel or fibre reinforced concrete slabs and ramps similar to the internal floors of the building. The slab will be jointed to control cracking. The slab will bear on a layer of compacted granular fill. Services and drainage in the yard area will run underneath the slab.

The concrete slabs will be laid to falls, surface water drainage will be by means of gullies or drainage channels. Reinforced concrete retaining walls and gabion structures will be constructed along the western boundary of the facility footprint to retain the raised ground levels.

Drainage runoff will pass through petrol interceptors by gravity into the existing stormwater system. Manhole chambers will be constructed using reinforced concrete.

2.14.3.10 Wastes generated during construction

The wastes/spoils likely to be generated during the construction phase are presented in Table 2-15 below.

Table 2-15: Potential Wastes Generated during Construction Phase

Waste	Source
Hardcore, stone, gravel, concrete and plaster	Materials used during construction
Timber	Temporary supports, concrete shuttering and product deliveries
Miscellaneous building materials	Chemical toilets
Waste from chemical toilets	Packaging materials
Plastics	Unused quantities at end of construction period
Lubricating oils, diesel	

All wastes will be collected at the end of the construction phase, taken off site, and reused, recycled, recovered or disposed of according to best practice in an authorised facility. Lubricating oils and diesel will be removed from the site and disposed of by an approved waste contractor in accordance with the European Communities (Waste Oil) Regulations, 1992, as amended.

An Outline Construction Environmental Management Plan has been prepared and included in Appendix 2.0 of Volume 3 of the EIAR which includes a draft waste management plan to be implemented during the construction phase.

2.14.4 Hours of work

Construction work will generally be carried out during daylight hours. Construction work will generally be confined to the following times:

07:30 to 18:30 Monday to Saturday

2.14.5 Construction Traffic & Access

The facility's construction will lead to construction-related traffic on the roads in the proximity of the development.

It will include:

- Site personnel driving to the work site and site compounds (by car, van and 4x4)
- Delivery of liner materials, tanks, steel, cladding and other construction materials by van and HGV
- Movement of construction equipment and refuelling trucks to and around the site
- Import of fill material and concrete
- Export of felled timber

A detailed Traffic Management Plan will be prepared prior to the commencement of the construction work. This will be drawn up in consultation with Meath County Council. Written procedures will also be put in place to deal with refuelling machinery in line with best practice. The Outline Construction Environmental Management Plan is prepared and included in Appendix 2.0 of Volume 3 of the EIAR which includes a Draft traffic management plan to be finalised to take account of relevant conditions attached to any permission or IE review granted and implemented during the construction phase.

Potential impacts from construction traffic are further dealt with in Chapter 8 Roads, Traffic & Transportation of Volume 2 of the EIAR.

2.14.6 Construction Compound

A temporary Contractors Compound will be required for the duration of the construction cycles. It will consist of a hardcore area surrounded by secure fencing, comprising site office, canteen, toilet facilities, storeroom and staff parking areas. Fuel/oil storage areas will be bunded in accordance with best practice. The compound will move around site to accommodate the cycles of construction.

Temporary toilet facilities will be required for construction workers. These will consist of temporary 'portaloo' type chemical toilets located within the construction site compound.

2.14.7 Environmental Management

The Outline CEMP is included as Appendix 2.0 in Volume 3 of the EIAR. It sets out the key construction and environmental management issues associated with the proposed development. This plan will be finalised to take account of relevant conditions attached to any permission or IE review granted.

2.15 Management of the Facility

2.15.1 Operational Hours

The IE Licence currently permits the following operational and waste acceptance hours:

Hours of Operation:

- 07.30 to 18.30 Monday to Saturday

Hours of Waste Acceptance:

- 08.00 to 18.00 Monday to Saturday

No changes to the hours of operation or waste acceptance are proposed.

2.15.2 Management & Staffing

Knockharley Landfill currently operates with 6 no. permanent personnel:

- Landfill Manager
- Assistant Landfill Manager
- Site Foreman
- Weighbridge Operator
- 2 no. general operatives

When operational, it is envisaged that further operational personnel will be required in addition to those currently employed, for the operation of the various elements of development as follows:

IBA Cells:

- 1 no. overseer
- 3 no. general operatives/plant drivers

Landfill - 2nd Working Face:

- 1 no. overseer
- 2 no. general operatives/plant drivers

Biological Treatment Plant:

- 1 no. overseer
- 3 no. general operatives/plant drivers

Therefore, it is envisaged that 17 no. personnel shall be employed on a full-time basis when the proposed development is operational.

2.15.3 Management of wastes generated onsite

All non-process related wastes generated onsite (from administration building, weighbridge office etc.) will continue to be managed by a suitable waste management contracting company and will be taken offsite for treatment at relevant approved waste management facilities.

2.16 Environmental Monitoring & Reporting

Environmental monitoring and reporting is undertaken in accordance with Schedule D of the existing facility licence W0146-02. Additional monitoring locations will be proposed as part of the required licence review of W0146-02 and are shown on Drawing No. LW14-821-01-P0050-002 in Volume 4 of the EIAR

There are also a number of engineering/design monitoring requirements under the existing licence, which will be maintained within any revised licence, as summarised below.

2.16.1 Stability and Settlement

A survey of the landfill body site is carried out once per year and submitted to the EPA in accordance with Condition 8 of the existing licence. If settlement is found to be interfering with the integrity of the cap or interfering with run-off from the landform, measures will be taken to reinforce the cap or reshape the landform as required. No issues have arisen to date. The most recent survey was carried out in May 2018.

The height difference between the permitted and proposed development will be realised with slopes not steeper than 1:20 such that impacts of differences in differential settlement will be minimal.

Where non-stabilised residual waste abuts inert and stabilised waste differential settlement rates and extents will differ significantly and reprofiling may be required over several years subject to annual survey findings.

Preliminary design studies also informed selection of the proposed side slopes to ensure that translational cap and rotational stabilities within the waste body will not present long-term problems.

2.16.2 Contingency Arrangements

Contingency arrangements for the current landfill operation as conditioned in the licence i.e. emergency response procedures, will apply to the proposed development.

2.16.3 Closure and Restoration

On closure, the landfill body will be capped, and the area returned to vegetation in compliance with Closure, Restoration and Aftercare plans agreed with the Agency. As part of the facility licence review, the existing Closure, Restoration and Aftercare plan will be revised to account for the new elements of development i.e. increased waste acceptance, IBA cell development, biological treatment plan development etc.

2.16.4 Reporting

Quarterly, bi-annual and annual environmental reports are submitted to the Agency in compliance with Schedule E of the existing licence for the facility. All records of monitoring are also kept in the information room. The general public can request sight of all monitoring data associated with the landfill and this practice will continue after review of the existing facility licence. Since 2016, all monitoring compliance reports are available online on the EPA website www.epa.ie.

2.17 Description of Natural Resources Used

Natural resources will be consumed during both the construction and operational phases related to the proposed development.

2.17.1 Construction Phase – Natural Resource Consumption

Natural resources consumed during the construction phase will include:

- diesel fuel for construction machinery
- steel in the building construction
- granular material for use as in-fill material for site development works and in concrete

While exact quantities are difficult to quantify at this juncture, it is expected that the following maximum quantities of resources will be consumed during construction:

- 9,975 m^3 of concrete
- 1,547 tonnes of steel
- 212,000 litres of diesel
- 52,495 m^3 of granular fill material

2.17.2 Operational Phase – Natural Resource Consumption

Natural resources consumed during the operational phase will include:

- Diesel fuel for site machinery (loading shovels, compactors, tracked machines etc.)
- Woodchip/peat/bark (if used for biofilter bed media)
- Water

Machinery

Biological Facility:

- Front end loader 2
- Tractor trailer 1

IBA Landfill:

- 30 t off road vehicles 2
- Roller 1
- Grader 1
- 360 excavator 2

Permitted development:

- Compactors 2

Fuel consumption per year assuming the average plant consumes on average 50 l/day average 275 days will be 151,250 l annually.

Biofilter

With a biofilter bed depth of approximately 3 metres, and a biofilter length of 70 m and width of 7m, approximately 1,450 m^3 of woodchip/peat/bark (if used as bed media) would require replacing very 3 – 4 years. This 'spent' woodchip could then be consumed within the composting process as a structural amendment material or as a daily cover within the landfill cells.

Water

Potable water loading on site will be less than 40,000 l annually.

Water loading for dust suppression will be significant and is estimated at 3,650,000 l annually but will typically use surface water runoff or contaminated runoff from cells.

Electricity Use within the Biological Treatment Facility

The estimated electricity usage at the proposed biological treatment facility is estimated at 750 – 1,000 MWhrs per annum.

2.18 Regulatory Control

As identified previously, the proposed development will require an update of the licence to reflect the proposed operations as outlined herein. An application is being prepared to the Environmental Protection Agency (EPA) which will be submitted concurrently to the planning application to which the EIAR relates.

Pre-application consultation has been undertaken with the EPA and further detail on this is provided in Chapter 5 of Volume 2 of the EIAR.

Works associated with the development of the surface water attenuation lagoon to the north of the proposed IBA facility and the realignment of the stream on the north-eastern corner of the permitted landfill development will each require a Section 50 consent from the Office of Public Works (OPW).

Felling associated with the removal of existing forestry at the location of the proposed screening berms will require a Felling Licence from the Forestry Service.

The acceptance and processing of residual municipal solid fines at the proposed biological treatment facility will require a 'Type 8' facility approval by the Department of Agriculture, Food and the Marine (DAFM).

2.19 Decommissioning

As an existing licensed landfill facility, closure, a restoration and aftercare plan has been agreed with the EPA which relates the period aftercare cessation of waste acceptance at the site. This plan centres on the creation of nature trails and a wetland at the site.

As part of the update of the facility licence, a revised closure, restoration and aftercare plan will be agreed to address the aftercare period when:

- waste acceptance within the landfill body ceases
- waste acceptance at the IBA cells ceases
- waste acceptance at the biological treatment facility ceases

Upon cessation of waste acceptance and processing proposed as part of this application, it is anticipated that the following closure and restoration measures will be undertaken at a minimum:

- The plant used within the individual development elements will be removed from the site.
- Portable structures will be removed from the site, where applicable.
- Road sweeper vehicles will be employed to clean the site.
- Tanks will be decommissioned and emptied, backfilled filled and or removed by a licensed contractor with ground reprofiled.

The restoration and aftercare plan covering decommissioning will be subject to Agency approval.

Knockharley Landfill Ltd. has put in place the financial provision to cover any liabilities associated with the operation of the facility including closure and aftercare of the facility. This financial provision is reviewed and revised annually.

In the event of receiving permission and an IE licence in respect of the proposed development, the financial aspects of the closure, restoration and aftercare management plan will be revised to include the biological treatment waste facility and IBA cells development. This will ensure that the financial provision is available to fully decommission the facility when appropriate.

2.20 Health & Safety

The proposed facilities will be designed, constructed and operated in accordance with the:

- Safety, Health & Welfare at Work (Construction) Regulations 2013
- Safety, Health & Welfare at Work Act 2005
- Safety, Health & Welfare at Work (General Application) Regulations 2007
- Safety, Health and Welfare at Work (Biological Agents) Regulations 2013
- Best practice guidelines
- Relevant BREF/BAT guidance
- The facility IE licence
- DAFM Type 8 facility approval

2.20.1 Health & Safety During Design

Design stage risks can be described as risks which can easily be identified at the design stage, and detailed design will eliminate or minimise risks where possible.

FT is appointed as Project Supervisor for the Design Process (PSDP) for the preliminary design phase of the development. This role is carried out in accordance with the Safety, Health and Welfare at Work (Construction) Regulations 2013.

The PSDP ensures that the appropriate Design Stage Risk Assessments are prepared and that a safety file is developed and maintained for the works. These are required to demonstrate that the designers have taken account of the General Principles of Prevention as required by the Safety, Health and Welfare at Work (Construction) Regulations 2013.

Where possible, the facility design stage will eliminate and minimise many of the potential risks at construction stage. However, health and safety risks at construction stage will need to be properly managed.

2.20.2 Health & Safety During Construction

The construction contractor will be appointed as Project Supervisor for the Construction Stage (PSCS) in accordance with the Safety, Health and Welfare at Work (Construction) Regulations 2013. The suitability and competence of the contractor to fulfil this role will be carefully assessed by Knockharley Landfill Ltd. prior to the appointment.

A site-specific Health and Safety Plan for the construction phase of this project will be prepared in accordance with the Safety, Health and Welfare at Work (Construction) Regulations 2013. This will address all safety aspects of the construction project including, but not limited to:

- site access and general induction training
- general site safety
- chains, ropes and lifting gear
- special provisions for hoists
- protective clothing and footwear required
- lockout/tag-out procedures for safe electrical
- method statements for work procedures
- miscellaneous items

2.20.3 Operational Health & Safety

Access to the site is currently restricted to employees, waste trucks and occasional visitors and this will continue to be the case. Procedures are in place at the facility to ensure the health and safety of all persons entering the site, including the signing in/out of all visitors.

All new staff working at the site will be made familiar with the contents of the site-specific Health and Safety Plan. Health and safety practices are reviewed on an annual basis to ensure that they are in line with best practice in this sector and will continue to be so.

Regular safety audits are carried out on-site to ensure the safety of all personnel working there. Furthermore, suitable operation and maintenance procedures are currently in place to facilitate the safe operation of the whole site and these will be amended to reflect the proposed new facilities.

Vehicular traffic movements within the site are restricted and monitored and all traffic movements are subject to strict procedures, in full accordance with health and safety requirements.

Other operational health and safety aspects, such as noise and air quality are discussed in other Chapters of the EIAR. Measures have been taken in the design of the proposed infrastructure to minimise the potential impact of these aspects on health and safety.

Existing IE licence W0146-02 currently require the following procedures/systems to be in place at the facility:

- Full training for all employees
- Accident Prevention Policy – procedures to identify hazards onsite
- Emergency response procedures - setting out all procedures that, in the event of an emergency, will be undertaken by personnel at the facility

As identified, a review of W1046-02 will be undertaken – this review process will require the review of the existing procedures to reflect the proposed development.

Given the nature of the material to be accepted at the proposed biological treatment facility, all operational recommendations outlined in and legally required by the 2013 Code of Practice for the Safety, Health and Welfare at Work (Biological Agents) Regulations 2013 shall be adhered to.

3 STAGE TWO APPROPRIATE ASSESSMENT

3.1 Introduction

As stated above, the findings of the Stage One Screening for Appropriate Assessment Report were that there was potential for significant effects on the conservation interests of only one European site, namely, the River Nanny Estuary and Shore SPA which is approximately 22Km (instream distance) from the proposed development. Therefore, having set out the nature of the proposed development, this section of the Natura Impact Statement has been prepared to appraise whether or not the proposed development would adversely affect the integrity of that European site.

Stage Two of the Appropriate Assessment involves an assessment by the competent authorities as to whether a proposed plan or project (which is not directly connected with or necessary to the management of the site) will adversely affect (either alone or in combination with other projects or plans) the integrity of a European Site with respect to the conservation objectives and the structure and function of the sites.

For the avoidance of doubt, there are four distinct requirements which must be satisfied for a valid Appropriate Assessment which is a necessary pre-condition to any decision to grant development consent where, as in this instance, an Appropriate Assessment is required:

(i) the AA must identify, in the light of the best scientific knowledge in the field, all aspects of the development project which can, by itself or in combination with other plans or projects, affect the European site in the light of its conservation objectives;

(ii) there must be complete, precise and definitive findings and conclusions regarding the previously identified potential effects on any relevant European site;

(iii) on the basis of those findings and conclusions, the competent authority must be able to determine that no scientific doubt remains as to the absence of the identified potential effects; and;

(iv) where the preceding requirements are satisfied, the competent authority may determine that the proposed development will not adversely affect the integrity of any relevant European site.

3.2 Conservation Objectives

In circumstances where it can be excluded that, on the basis of objective information, that the proposed development, individually or in combination with other plans or projects, will have a significant effect on any other European site, the site is brought forward for Appropriate Assessment, and in this case, the site is the River Nanny Estuary and Shore SPA (Site Code: 004158) – refer to Figure 5.1. The River Nanny Estuary and Shore SPA is designated for the following special conservation interests:

- A130 Oystercatcher (*Haematopus ostralegus*) - wintering
- A137 Ringed Plover (*Charadrius hiaticula*) - wintering
- A140 Golden Plover (*Pluvialis apricaria*) - wintering
- A143 Knot (*Calidris canutus*) - wintering
- A144 Sanderling (*Calidris alba*) - wintering
- A184 Herring Gull (*Larus argentatus*) - wintering
- A999 Wetlands

There are detailed conservation objectives available for this site (NPWS (2012) *Conservation Objectives: River Nanny Estuary and Shore SPA 004158*. Version 1.0. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht) – which are appended to this NIS at Appendix 9. Information pertaining to the conservation objectives detailed below was also derived from the *Conservation Objectives Supporting Document Version 1*, NPWS, September 2012. The overall conservation objective to maintain the favourable conservation condition within the SPA relates to each of the special conservation interests - Oystercatcher, Ringed Plover, Golden Plover, Knot, Sanderling, Herring Gull and wetlands.

The selection species listed for the River Nanny Estuary and Shore SPA are as follows:

1. During winter the site regularly supports 1% or more of the all-Ireland population of Ringed Plover. The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 185 individuals.
2. During winter the site regularly supports 1% or more of the all-Ireland population of Knot. The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 1,140 individuals.
3. During winter the site regularly supports 1% or more of the all-Ireland population of Sanderling. The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 240 individuals.

Additional Special Conservation Interests for the River Nanny Estuary and Shore SPA area as follows:

4. During winter the site regularly supports 1% or more of the all-Ireland population of Oystercatcher. The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 1,014 individuals.
5. During winter the site regularly supports 1% or more of the all-Ireland population of Golden Plover. The mean peak number of this Annex I species within the SPA during the baseline period (1995/96 – 1999/00) was 1,759 individuals.
6. During winter the site regularly supports 1% or more of the all-Ireland population of Herring Gull. The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 609 individuals.
7. The wetland habitats contained within the River Nanny Estuary and Shore SPA are identified of conservation importance for non-breeding (wintering) migratory waterbirds. Therefore, the wetland habitats are considered to be an additional Special Conservation Interest.

According to the Habitats Directive, the *conservation status of a natural habitat* will be taken as 'favourable' within its biogeographic range when:

- Its natural range and areas it covers within that range are stable or increasing; and
- The specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future; and
- The conservation status of its typical species is favourable as defined below.

Moreover, the conservation status of a species means the sum of the influences acting on the species concerned that may affect the long-term distribution and abundance of its populations. The conservation status will be taken as 'favourable' within its biogeographic range when:

- Population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- The natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future; and:
- There is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

The conservation objectives identify attributes and targets for each of the bird species which are the special conservation interests (SCI) for the SPA. The attributes and targets are the same for each SCI within the SPA. The first attribute is population trend and the target is for the long-term population trend to be stable or increasing. The second attribute is distribution and the target is that there should be no significant decrease in the range, timing or intensity of use of areas by each bird species, other than that occurring from natural patterns of variation (see Table 3.1).

Factors that can adversely affect the population trend include habitat modification and disturbance. Activities that modify discreet areas or the overall habitat could result in species being displaced from these areas.

In terms of disturbance, anthropogenic disturbance could result in displacement of species from areas within the SPA or a reduction in their numbers.

Table 3-1: Conservation Objectives

Attribute	Measure	Target
Population Trend	Percentage Change	Long term population trend stable or increasing
Distribution	Range, timing and intensity of use of areas	There should be no significant decrease in the range, timing or intensity of use of areas by (each SCI) other than that occurring from natural patterns of variation.

There is one attribute and target relating to wetlands. The attribute is 'wetland habitat' and the target is that the permanent area occupied by the wetland habitat should be stable and not significantly less than the area of 230ha, other than that occurring from natural patterns of variation.

The boundary of the SPA was defined to include the primary wetland habitats of the site. The wetland habitats can be divided into three broad categories – subtidal, intertidal and supratidal. It is recognised that over time and through natural variation that these three subcomponents of the complex may vary due to e.g. changing rates of sedimentation, erosion etc.

The conservation condition of each of the SCIs was assessed as part of the Supporting Document (NPWS, 2012). The conservation condition of waterbird species is determined using the long-term site population trend and is assigned using the following criteria:

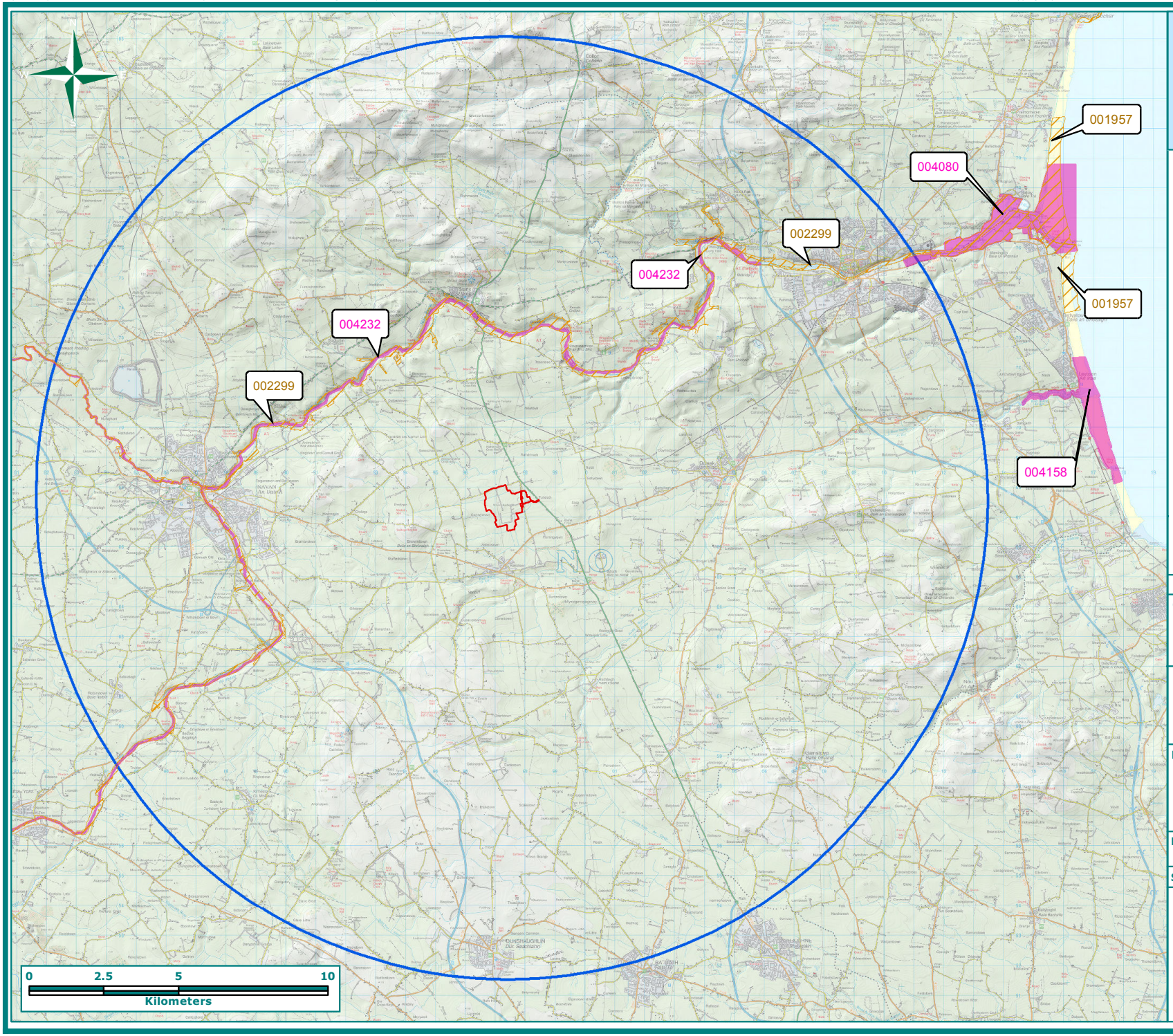
Conservation Condition	Definition
Favourable population	population is stable/increasing
Intermediate (unfavourable)	Population decline in the range 1.0 – 24.9%
Unfavourable population	Populations that have declined between 25.0 – 49.9% from the baseline reference value
Highly unfavourable population	populations that have declined >50% from the baseline reference value

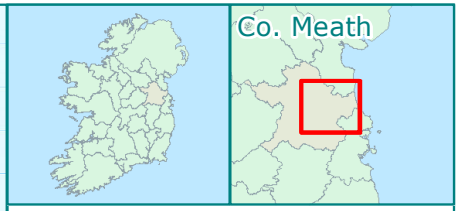
For the six SCI species within the River Nanny and Estuary and Shore SPA, one species is considered as Highly unfavourable (Golden Plover); 4 species are considered favourable (Ringed Plover, Knot, Sanderling and Oystercatcher) and one species is un-assessed (Herring Gull). Refer to Table 3.2 over.

Table 3-2: SCI species – Current Site Conservation Condition (NPWS, 2012)

Special Conservation Interests	BoCCI Category[a]	Site Population Trend[b]	Site Conservation Condition	Current all-Ireland Trend[c]	Current International Trend[d]
Ringed Plover*	Amber	+ 97.1	Favourable	+ 21.8	Decline
Knot*	Red	+ 878.01	Favourable	- 2.91	Decline
Sanderling*	Green	+ 119.6	Favourable	+ 109.3	Stable/Increase
Oystercatcher	Amber	+ 115.4	Favourable	+ 23.5	Decline
Golden Plover	Red	- 59.8	Highly Unfavourable	- 2.2	Decline
Herring Gull	Red	n/c	n/c	n/c	n/c

* denotes site selection species. n/c = not assessed.
[a]After Lynas *et al.* (2007); [b] Site population trend analysis; see Table 4.2; [c]all-Ireland trend calculated for period 1994/95 to 2008/09; [d]international trend after Wetland International (2006).





Legend

- Site Boundary
- 15km from Site Boundary
- Special Areas of Conservation within 15km (Distance in kilometers)
  - 002299, River Boyne And River Blackwater SAC, 4.3
  - 001957, Boyne Coast and Estuary SAC, 18.7
- Special Protection Areas within 15km (Distance in kilometers)
  - 004080, Boyne Estuary SPA, 14.6
  - 004158, River Nanny Estuary and Shore SPA, 16.5
  - 004232, River Boyne and River Blackwater SPA, 4.4

Date	06/12/2018
Client Name	Knockharley Landfill Ltd.
Project Title	Proposed Development at Knockharley Landfill
Figure Title	European Sites in Relation to the Proposed Development
Figure No.	3.1
Rev.	A
Scale	1:175,000 @ A4

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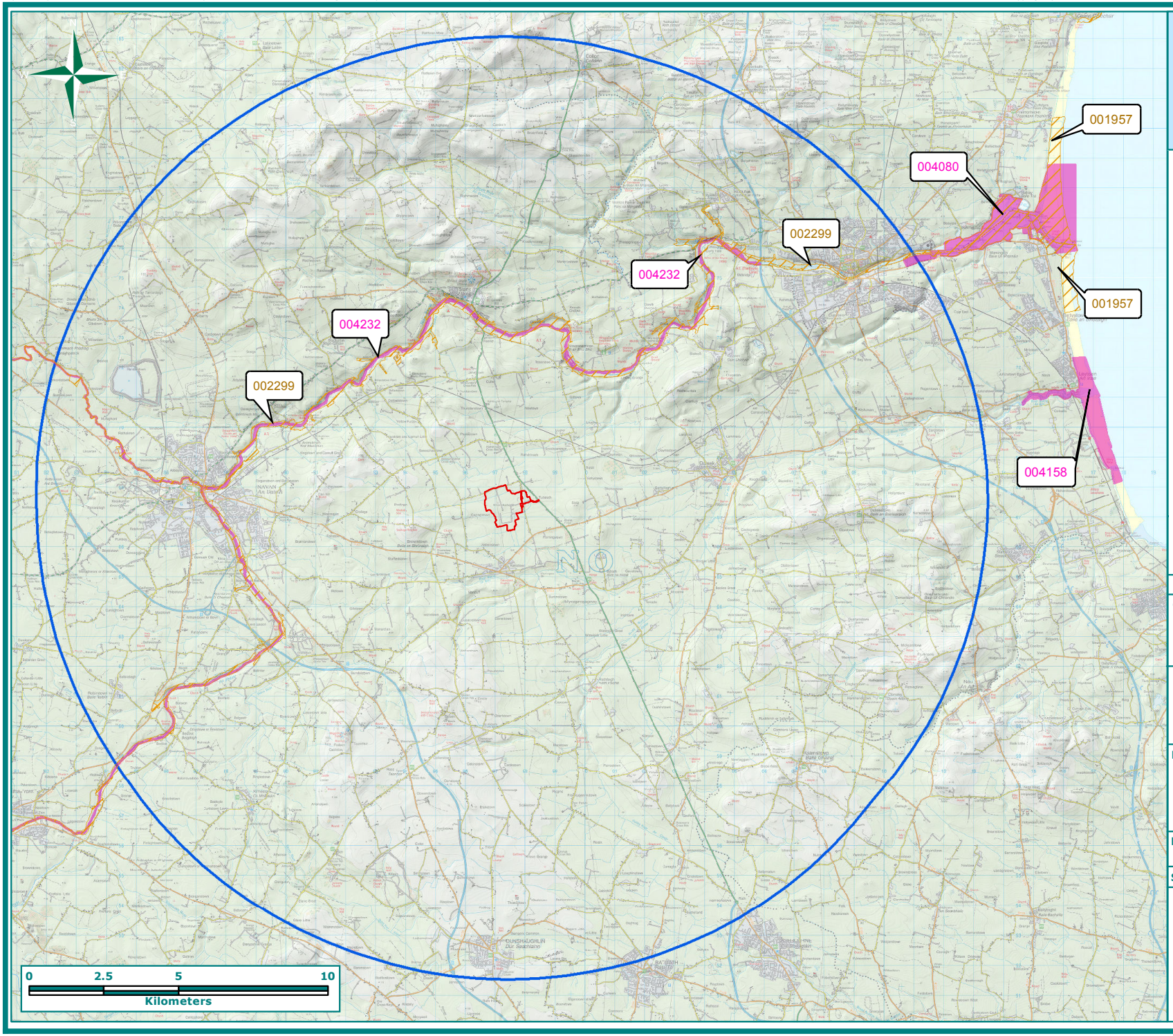

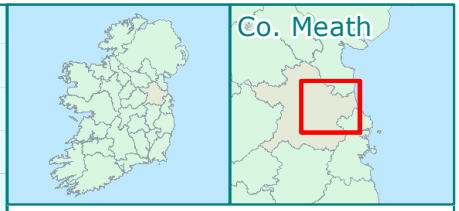

Legend

- Site Boundary
- 15km from Site Boundary
- Special Areas of Conservation within 15km (Distance in kilometers)
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3.3 Description of the elements of the proposed development with the potential to give rise to adverse impacts on European Site

As outlined in the Stage One Screening for Appropriate Assessment Report (which was submitted to the competent authorities with the applications for development consent), without mitigation, there is a possibility of adverse impacts to the conservation status of the special conservation interests of the River Nanny Estuary and Shore SPA. This is detailed below and summarised in Table 3.3.

3.3.1 Potential for Effects on the River Nanny Estuary and Shore Estuary SPA

The potential for adverse impacts arising from the proposed development was determined based on a number of indicators including:

- Habitat loss or alteration
- Disturbance or displacement of species
- Potential impairment of water quality and the consequent impacts on aquatic habitats and species
- Potential impacts during the construction phase
- Potential impacts during the operation phase
- Potential impacts during the decommissioning

3.3.1.1 *Potential adverse impacts during the Construction Phase*

Loss or Alteration of Habitat

River Nanny Estuary and Shore SPA (Site Code: 004158) has been designated for *Wetlands [A999]* and the following 6 bird species for which the SPA is also designated:

- Oystercatcher (*Haematopus ostralegus*) [A130]
- Ringed Plover (*Charadrius hiaticula*) [A137]
- Golden Plover (*Pluvialis apricaria*) [A140]
- Knot (*Calidris canutus*) [A143]
- Sanderling (*Calidris alba*) [A144]
- Herring Gull (*Larus argentatus*) [A184]

There will be no direct loss to *Wetlands [A999]* as the proposed development is not located within the SPA. The proposed development is located ca. 22km (instream distance) upstream of the SPA; hydrologically connected via the Knockharley Stream and the River Nanny. It is extremely unlikely that a resultant adverse impact could ensue from the proposed development to this site given the distance and dilution factor. This wetland habitat could potentially be adversely impacted indirectly if pollutants such as hydrocarbons, concrete, and sediment, entered the watercourse downstream of the proposed development. Based on the precautionary principle, appropriate mitigation measures during the construction phase of the development will further reduce any potential risk.

Disturbance or Displacement of Species

Due to the distance between the proposed development (ca. 16.5 km across land distance) birds within the *River Nanny Estuary and Shore SPA (Site Code: 004158)* will not be disturbed by activity at the proposed development site. There is a hydrological link between the proposed development and SPA. Due to the distance (ca. 22km instream distance) and dilution factor it is extremely unlikely that a resultant adverse impact could ensue from the proposed development on birds for which the SPA is designated. However, the SPAs receiving habitat could potentially be adversely impacted indirectly if pollutants (during both the construction and operation phase) entered the watercourse downstream of the proposed development.

This could result in the reduction of food source for birds (special conservation interests) which would result in the displacement in bird species. Based on the precautionary principle appropriate mitigation measures during the construction phase of the development will further reduce any potential risk.

Water Quality

The *River Nanny Estuary and Shore SPA (Site Code: 004158)* is hydrologically connected to the proposed development via the Knockharley stream which feeds into the River Nanny.

There is a possible risk of entry of pollutants via the aforementioned links during construction activities which could be transported to the *River Nanny Estuary and Shore SPA*. In the event that ingress of pollutants should occur this could, potentially, cause loss of habitat due to sedimentation and pollution and a loss of prey items for bird species foraging in the SPA.

All waterfowl and waders of special conservation interest species are vulnerable to any ingress of suspended solids or deleterious material. In the absence of adequate control measures, contamination of the water course with suspended solids and or other pollutants may have the potential to adversely impact water quality or potential foraging habitat for these and other species. While unlikely, in the absence of mitigation measures, pollution of the local watercourse could potentially result in an adverse impact on River Nanny Estuary and Shore SPA and could result from:

1. Pollution of watercourses with suspended solids due to run-off from excavations during construction,
2. Pollution of watercourses with nutrients from felling during construction,
3. Pollution of watercourses with cementitious material from construction areas,
4. Pollution of watercourses with oils or fuels due to run-off from operating machinery or refuelling operations during construction.

In the absence of adequate mitigation measures, pollution of the Knockharley Stream and River Nanny has the potential to adversely impact on the special conservation interests, bird species and habitats within the River Nanny Estuary and Shore SPA. As already stated the potential for this to happen is unlikely given the distance and dilution factor but cannot be absolutely ruled out.

3.3.1.2 *Potential adverse impacts during the operational phase*

Loss or Alteration of Habitat

There is the potential, in the absence of mitigation measures, for contaminated run-off to be collected via the proposed surface water management system which discharges into the Knockharley Stream via both existing and proposed surface water holding ponds and wetlands. There is potential for an adverse impact on water quality due to the previously mentioned hydrological link between the proposed development and the *River Nanny Estuary and Shore SPA (Site Code: 004158)* which could alter *Wetland and Waterbirds [A999].* While unlikely it cannot be excluded out without the implementation of mitigation measures.

Disturbance or Displacement of Species

There is the potential, in the absence of mitigation measures, for contaminated run-off to be collected via the proposed surface water management system which discharges into the Knockharley Stream via both existing and proposed surface water holding ponds and wetlands. There is potential for an adverse impact on water quality due to the previously mentioned hydrological link between the proposed development and the *River Nanny Estuary and Shore SPA (Site Code: 004158)* which could result in the displacement of bird species due to a lack of food. While unlikely, it cannot be ruled out without the implementation of mitigation measures.

Water Quality

Due to a hydrological link between the proposed development and *River Nanny Estuary and Shore SPA (Site Code: 004158)* there is potential for an adverse impact on the habitats and species for which the SPA is designated.

Adverse impacts could result from pollution of watercourses with oils or fuels due to run-off from operating machinery or refuelling operations during construction and operation and pollution of watercourse with from collected site run-off contaminated with IBA dust and leachate spills during operation.

While unlikely, an adverse impact on water quality could cause the alteration of habitat and displacement of birds for which the SPA is designated in the absence of mitigation.

3.3.1.3 *Potential adverse impacts during the restoration and aftercare phase*

During the restoration phase, leachate will still be produced. An existing closure restoration and aftercare management plan has been agreed with the EPA. This closure restoration and aftercare management plan will be revised to include the proposed development and is to be agreed with the EPA. No adverse impact is envisaged to *River Nanny Estuary and Shore SPA (Site Code: 004158)*.

3.3.1.4 *Potential adverse impacts during the decommissioning phase*

The decommissioning phase will begin following the completion of the restoration and aftercare; once approved by the EPA. There is potential for the release of sediment and pollutants (from construction vehicles) into the Knockharley Stream. Due to the distance between the site (22km) and *River Nanny Estuary and Shore SPA (Site Code: 004158)* as well as the dilution factor, no adverse impacts are envisaged.

Table 3-3: Summary of unmitigated adverse impacts

Ecological Feature	Potential impacts
Oystercatcher (*Haematopus ostralegus*) [A130]	Possible decrease in habitat quality and/or prey availability from sedimentation or pollution.
Ringed Plover (*Charadrius hiaticula*) [A137]	Possible decrease in habitat quality and/or prey availability from sedimentation or pollution.
Golden Plover (*Pluvialis apricaria*) [A140]	Possible decrease in habitat quality and/or prey availability from sedimentation or pollution.
Knot (*Calidris canutus*) [A143]	Possible decrease in habitat quality and/or prey availability from sedimentation or pollution.
Sanderling (*Calidris alba*) [A144]	Possible decrease in habitat quality and/or prey availability from sedimentation or pollution.
Herring Gull (*Larus argentatus*) [A184]	Possible decrease in habitat quality and/or prey availability from sedimentation or pollution.
Wetlands [A999]	Possible decrease in habitat quality from sedimentation or pollution.

3.4 Cumulative Effects

The EC (2001) guidelines on the provision of Article 6 of the Habitats' Directive state that the phrase 'in combination with other plans or projects' in Article 6(3) of the Habitats Directive refers to the cumulative impacts due to plans or projects 'that are currently under consideration together with the effects of any existing or proposed projects or plans.

A cumulative impact arises from incremental changes caused by other past, present or reasonably foreseeable actions together with the proposed development. The surrounding environment is dominated by agricultural land, residential and farming properties.

The main damaging operations and threats to the greater regions ecological resources are agriculture, overgrazing/stocking, fertilisation and water pollution. These operations are the most extensive but other threats and potentially damaging operations to valuable habitats include land drainage and reclamation, fertilisation and unauthorised dumping.

In terms of the cumulative effects of the existing landfill operations and the proposed development operations, without the implementation of mitigation measures, as set out in the AA Screening Report, there is potential for cumulative adverse effects from pollution and sedimentation during the construction phase and operational phase of the development.

In considering whether the proposed development, by itself or in combination with other plans and projects, has the potential to affect the conservation objectives of the designated sites, the following documents were considered relevant:

- *The County Meath Biodiversity Action Plan: 2015-2020 [Draft]* (MCC, 2015).
- *Meath County Development Plan 2013-2019* (MCC, 2012).
- Meath County Council Online Planning Query System http://www.meath.ie/CountyCouncil/Planning/SearchPlanningPermissionApplications/
- Planning Applications within the vicinity of the proposed development are detailed in Table 3.4.

Table 3-4: Applications for Planning Permission in the Vicinity

Reference	Description	Status
AA140523	permission to demolish existing dwelling house and to construct a replacement single storey dwelling house with domestic garage, new wastewater treatment system and percolation area, new well, retention of existing relocated entrance and construction of new entrance to serve replacement dwelling and all associated site development works	Conditional grant
AA140524	retention of alterations to all elevations consisting of alterations to window opes and doors, alterations to roof, alterations to all dormer and velux window sizes and locations, internal alterations consisting of alterations to ground and first floor layouts with increased floor area at first floor level, from that already granted under NA40439 and all associated site development works	Conditional grant
AA141110	development will consist of the demolition of an existing fire damaged dwelling and replacing it with a proposed new dormer dwelling house repositioned on the site, close up existing vehicular entrance and relocate new entrance onto public roadway, replace and upgrade existing septic tank with a proposed new waste water treatment system and percolation area to EPA regulations, existing connection to existing mains water supply and all ancillaries	Conditional grant
AA150005	EXTENSION OF DURATION OF PLANNING PERMISSION REF. NO. NA/100913 - construction of dwelling	Unconditional
AA150136	development will consist of demolition of existing two storey dwelling and to construct a replacement two storey dwelling and attached granny flat, remove existing septic tank and provide new sewage treatment system & alter location of existing domestic entrance to public road	Conditional grant
AA150238	development will consist of a single storey dwelling, waste water treatment system & all associated site works	Conditional grant

Reference	Description	Status
AA150334	a proposed two storey dwelling, separate domestic garage, connection to existing mains sewerage and mains water, entrance onto public roadway and all ancillaries	Conditional grant
AA150886	the development consists of the retention of alterations to a domestic garage that was granted planning permission under planning register reference AA/140523. The alterations include an increase in height to include a loft storage area, 2 velux roof windows to the front (east elevation), 4 velux roof windows to the rear (west elevation), a ground floor window in the gable wall (south elevation), a change in the orientation of the domestic garage and all associated site works	Conditional grant
AA151165	development will consist of construction of a storey & a half style dwelling with detached domestic garage, install a proprietary sewage treatment system and form new entrance from public road	Conditional grant
AA151182	development will consist of a proposed new canopy over existing petrol pumps on existing forecourt and all ancillaries	Conditional grant
AA160064	construct two storey garage to house applicants vintage car/Vehicle collection. Significant further information/revised plans submitted on this application	Conditional grant
AA160127	the development will consist of the erection of 6 No. floodlights over an existing tennis court	Conditional grant
AA160203	the development will consist of revised house plans to omit attached granny flat to previously approved Planning Permission Ref. No. AA/150136 for demolition of existing two storey dwelling and to construct a replacement two storey dwelling and attached granny flat, remove existing septic tank and provide new sewage treatment System & to alter location of existing domestic entrance to public road	Conditional grant
AA160274	retention permission for existing side and rear extensions, detached domestic garage, existing windows, existing detached domestic garage and domestic store, including all ancillary site works	Conditional grant
AA160390	development will consist of construction of a storey & a half style dwelling with detached domestic garage, install a proprietary sewage treatment system and form new entrance from public road	Conditional grant
AA160420	a new ground floor extension to side of existing dwelling, consisting of new vehicular garage and storage area with internal modifications and associated site works	Conditional grant
AA160892	the development will take place in the townlands of Brownstown and Curraghtown. The development will consist of the construction of a six bay slatted shed, with lie back area, and a walled silage slab	Conditional grant
AA161304	alterations to existing north west classroom, extension of link corridor and relocation of existing heating system structure and to construct new mainstream classroom (80sqm), new wc for assisted users (16sqm) and all ancillary site works	Conditional grant
AA161431	EXTENSION OF DURATION OF PLANNING PERMISSION - 01/5006 - To develop and operate an engineered landfill to	Unconditional

Reference	Description	Status
	accept non-hazardous waste and ancillary facilities as described on the public notices	
AA170481	the development will consist of a single storey extension for use as After-School Childcare Services to side of existing Sessional Pre-School building. Significant Further Information/Revised plans submitted on this application	Conditional grant
AA170938	The development will consist of the construction of a single storey extension to the side of an existing house	Conditional grant
AA170987	the development will consist of the relocation & redesign of dwelling, with amended site boundary from previously granted AA/150238, with a domestic garage	Conditional grant
AA171026	construction of a single storey detached extension to existing school comprising of: classroom (80sqm), wheelchair accessible WC (10.5 sqm) and boiler room (3.2 sqm) to north west (rear) of existing school including all ancillary site works	Conditional grant
AA180022	the development consists of planning permission for a new detached dwelling house to the side of the existing dwelling house and retention permission for works to the existing detached dwelling house, details as follows (A) Planning permission for a part single and part storey and a half-detached dwelling. Roof mounted solar panels, new vehicular entrance gateway in lieu of the existing field gate, new proprietary waste water treatment unit and percolation area along with all associated services, service connections, landscape and site development works. (B) Planning permission for a new relocated proprietary waste water treatment unit and percolation for the existing detached dwelling in lieu of the existing septic tank. (C) Planning permission for retention of the ground floor extension to the front of the existing dwelling house created by enclosing the covered area, along with associated elevational changes	Conditional Grant
AA180145	the development will consist of: a solar farm to be installed over reclaimed landfill with an export capacity of approximately 3MW comprising photovoltaic panels on ground mounted frames, connection to existing single-storey ESB Sub-Station / switch room building, installation of 3 No. transformers, ducting & underground electrical cabling and all associated ancillary works and services	Conditional Grant
AA180391	Retention for a utility room, domestic garage and storage shed to the side of the existing house and all associated site works	Conditional Grant
LB150177	development will consist of extensions to sides of existing dwelling & demolish existing shed and construct new detached domestic garage to rear. To remove existing septic tank and provide new proprietary sewage treatment system & revised site boundaries	Conditional Grant
LB150465	development will consist of a proposed agricultural field entrance and all ancillaries	Conditional Grant
LB171308	the development will consist of construction of a storey & a half style dwelling with detached domestic garage, install a Proprietary Sewage Treatment system and form new entrance from public road	Conditional Grant

Reference	Description	Status
LB180628	retention permission for a one storey garage to the rear of the house	Conditional Grant
AA181205	HOUSE EXTENSION	NEW APPLICATION
AA181270	RETENTION OF EXTENSION	NEW APPLICATION
AA181000	EXTENSION TO DWELLING	GRANTED
AA180939	ADDITIONAL SERIVES TO PRESCHOOL / CRECHE	GRANTED
AA181275	NEW DWELLING	NEW APPLICATION
LB180570	SOLAR FARM	APPEALED (ABP 3032368-18)
LB171409	NEW DWELLING	GRANTED
LB180628	RETENTION OF GARAGE	GRANTED
AA181223	NEW DWELLING	NEW APPLICATION
LB181257	NEW DWELLING	NEW APPLICATION
AA181283	NEW AGRICULTURAL ENTRANCE	NEW APPLICATION
AA180716	NEW DWELLING	GRANTED
AA180693	NEW DWELLING	GRANTED
AA180794	CHANGE OF USE FROM AGRICULTURAL PURPOSES TO REPOSITORY USE	GRANTED
LB180585	NEW DWELLING	GRANTED
AA180411	INCREASE IN NO. OF CHILD PLACES AT CRECHE	GRANTED
LB180931	NEW SHED / AGRICULTURAL USES	GRANTED
AA180857	EXTENSION OF DWELLING	GRANTED

- Previously permitted (2013 – 2018) development within the townlands of Knockharley, Tuiterath, Curraghtown, Veldonstown, Flemingstown and Kentstown are listed hereunder:

Knockharley, Tuiterath, Curraghtown, Veldonstown, Flemingstown, Kentstown
o AA180145 - Starrus LFG Ltd. – Solar Farm within Knockharley Landfill (3.87ha)
o AA150136 - Demolition of 2 storey dwelling and construction of replacement dwelling
o NA130915 – New wastewater treatment system and percolation area
o AA150302 – New dwelling house, new site access and new wastewater treatment system
o AA150500 – Retention of garage
o AA151156 – Alterations to dwelling
o AA151157 – Construction of 2 storey dwelling
o AA151165 – construction of dwelling
o AA160027 - Retention of alterations
o AA160892 – construction of 6 bay slatted shed
o AA160935 – retention of playroom
o DA140449 – Retention of extension
o NA130582 – Construction of dwelling
o RA140563 – Extension of duration for 12 horse stables
o RA150249 – Construction of 4 bay underground slatted tank
o RA160088 – 3 bay barn with underground slatted tank
o RA160530 – Single storey dwelling
o RA160597 – Retention for garage
o RA170507 – Retain and complete a portal frame structure
o RA171537 – 2 storey dwelling
o AA140722 – Dormer dwelling
o AA150835 – One and a half storey dwelling
o AA160390 - One and a half storey dwelling
o AA160686 - One and a half storey dwelling
o AA161080 – Removal of kitchen and garage, construction of extension
o AA161466 – change of house type
o FS17084 – Upgrading the fire safety of an existing dwelling
o AA140895 – retention of shed
o AA141110 – demolition of fire damaged dwelling and replacement with new dormer dwelling
o AA150227 – extension to dwelling
o AA151182 – New canopy over petrol pumps on existing forecourt
o AA160127 – Retention of alterations
o AA161431 – Extension of duration of planning permission – Knockharley landfill
o AA170877 – extension of garage and conversion to granny flat
o AA170901 – 2 grass based soccer pitches with training areas
o RA160565 – single storey dwelling

Knockharley, Tuiterath, Curraghtown, Veldonstown, Flemingstown, Kentstown
o AA141042 – Demolition of weaner house and farrowing unit; construct animal welfare extension to dry sow house and replace demolished buildings with new weaner house and farrowing unit; construct new mill building
o AA141072 – single storey extension
o AA150334 – new 2 storey dwelling
o AA150416 – decommission septic tank and replace with new sewage treatment system
o AA150591 – community sports facilities
o AA150982 – sub-division of an existing commercial unit
o AA160064 – 2 storey garage
o AA160127 – 6 floodlights over existing tennis courts
o AA160319 – single storey extension
o AA160420 – extension
o AA160608 – Lean-to extension
o AA160941 – Storey and a half dwelling
o AA160942 – 2 storey dwelling
o AA160975 – Demolition of existing dwelling and construction of new dwelling
o AA161080 – single storey extension
o AA161153 – dwelling
o AA161304 – alterations to school
o AA170347 – 2 storey dwelling
o AA170404 – storey and a half dwelling
o AA170467 - storey and a half dwelling
o AA170491- storey and a half dwelling and change of use to Childcare services
o AA170635 – Inlet screening chamber and stone/grit trap; storm tank and sump; weir chamber, electrical control kiosks – Kentstown Wastewater Treatment Plant
o AA170888 – 39no. 2 storey houses
o AA170938 – single storey extension
o AA171026 – detached extension to Kentstown National School
o AA180022 – detached dwelling
o AA180248 – extension to dwelling
o FS14012 – alterations to butcher's shop
o FS16033 – change of use of commercial unit
o FS16133 – Lean-to extension to workshop
o FS17011 – new classroom, WC to Kentstown National School
o FS17082 – lean-to extension to workshop
o FS17084 – upgrading the fire safety of a dwelling
o FS17164 - new classroom, WC to Kentstown National School
o FS17169 – extension to pre-school
o NA130606 – extension of duration for 2 storey farmhouse

Knockharley, Tuiterath, Curraghtown, Veldonstown, Flemingstown, Kentstown
o NA130835 – single storey dwelling
o NA1360866 – retention of log cabin
o NA140123 – Extension of duration for demolition of dwelling and construction two 4-bed and six 2-storey with velux
o NA141070 – extension of duration for two 4-bed dwellings
o NA141163 – single storey studio
o NA171515 – replace 2 storey dwelling with 2 two-storey semi-detached dwellings
o NT130048 – change of use from commercial to religious community facility
o NT140006 – change of use of the existing dwelling to childcare with one and a half storey extension
o NT140013 – Partial demolition of garage and construction of 2 storey dwelling.

Other projects within 10km of the site include solar farms, housing developments, one-off housing, agricultural developments, a business park and other small-scale developments related to villages/town centres.

There are a number of facilities within the surrounding hinterlands that operate under licences issued by the EPA:

- Kentstown Sow Unit (transferred to Marry Pig Farms Limited) is located approximately 4 km south of the Knockharley Landfill facility in Danestown. It is operated under an IE licence P0456-01 from the EPA. It is a piggery with approximately 4,000 pigs and employs 3 people. Planning permission was granted in January 2015 for the demolition and reconstruction of facility buildings
- There is a poultry farm in Gerrardstown, Garlow Cross, located approximately 3.5 km south west of the facility. The poultry farm produces eggs and currently has capacity for 40,000 layers and is licensed for 117,500 layer spaces. The facility is licensed by the EPA through IE licence P0917-01. The 2015 AER lists one employee.
- A poultry farm in Garballagh, Duleek rears c. 3,000 broilers per annum. It is operated under IE licence P0887-01. It is approximately 4 km west of the facility and employs one person.
- Dunbia operates a meat processing facility in Beauparc under IE licence P0811-02 the operation of slaughterhouses with a carcass production capacity greater than 50 tonnes per day. It has over 70 employees and is 3.5 km north of the facility.
- Cooksgrove Ltd., trading as Euro Farm Foods, operates as cattle slaughterhouse in Cooksgrove, Duleek. It has an IE licence P0822-01 with a throughput of 300 cattle a day. It has over 100 employees. The facility is approximately 8 km west of the Knockharley Landfill facility.
- Nurendale Ltd. trading as Panda Waste Services Ltd. owns and operates a large Materials Recovery Facility at Rathdrinagh Cross Roads, approximately 4 km north east of the facility on the N2 to Slane. It is operated under a licence from the EPA, W0140-04 and is licenced to accept up to 250,000 tonnes per annum of household, commercial and industrial waste, biowaste and biodegradable waste, and construction and demolition waste and the facility employs approximately 160 people.

A licence review application for, *inter alia*, the acceptance and processing of incinerator bottom ash is at time of writing under consideration by the Agency.

- Advanced Environmental Solutions (AES) Ltd. owns and operates a waste transfer facility in Navan under IE licence no. W0131-02, approximately 10 km west of Knockharley Landfill. The licensed capacity of the facility is 95,000 tonnes per annum. The facility has approximately 15 employees.
- Perma Pigs Limited, is an operational pig farm located at Littlegrange, Drogheda, County Louth, is operated under licence P0431-02.
- Irish Cement Limited, located at Platin Works, Platin, Drogheda, County Meath, is operated under licence register number P0030-04.

- A poultry farm, located at Dowth, Slane, County Meath is operated under licence P0951-01.
- Indaver Ireland Limited, operating at Carranstown, Duleek, Co. Meath, is licensed under register number: W0167-03.

As the proposed development is linked hydrologically to only the River Nanny Estuary and Shore SPA (22km instream distance from the proposed development), this is the only European Site which could be impacted by the proposed development alone or in combination with the other projects listed above and in Table 3.4.

Of the projects detailed above, one-off housing, extensions and alterations will not give rise to adverse effects on the integrity of the European Site. The proposed solar farm at Knockharley will not give rise to any discharges to watercourses. New wastewater treatment systems with suitable percolation areas to groundwater are likely to prevent significant impacts to hydrogeological connected surface waters. In terms of the EPA licensed facilities, each facility is subject to controls to prevent adverse effects on watercourses and the downstream SPA.

Following the implementation of measures set out in the proceeding section and the limits imposed by the EPA under licences there will be no adverse effects on the River Nanny Estuary and Shore SPA. In addition, there is a large dilution factor between the proposed development and the SPA.

In terms of plans, the Meath County Development Plan 2013 – 2019 sets out the policies for natural heritage which include:

- NH POL 1 – *To protect, conserve and seek to enhance the County's Biodiversity*

It is an objective of Meath County Council – NH OBJ 1 – To implement, in partnership with the Department of Arts, Heritage and the Gaeltacht, relevant stakeholders and the community, the objectives and actions of *Actions for Biodiversity 2011 – 2016 Ireland's National Biodiversity Plan* that relate to the remit and functions of Meath County Council and the County Meath Biodiversity Plan and any revisions thereof.

- NH POL 5 – *To permit development on or adjacent to designated Special Areas of Conservation, Special Protection Areas, National Heritage Area or those proposed to be designated over the period of the plan, only where an assessment carried out to the satisfaction of the Meath County Council, in consultation with National Parks and Wildlife Service, indicates that it will have no significant adverse effect on the integrity of the site.*
- NH POL 6 – *To have regard to the views and guidance of the National Parks and Wildlife Service in respect of proposed development where there is a possibility that such development may have an impact on a designated European or National Site or a site proposed for such designation.*

The related objectives to these policies are:

- NH OBJ 2: *To ensure an Appropriate Assessment in accordance with Article 6(3) and Article 6(4) of the Habitats Directive, and in accordance with the Department of Environment, Heritage and Local Government Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities, 2009 and relevant EPA and European Commission guidance documents, is carried out in respect of any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect on a Natura 2000 site(s), either individually or in-combination with other plans or projects, in view of the site's conservation objectives.*

- NH OBJ 3: *To protect and conserve the conservation value of candidate Special Areas of Conservation, Special Protection Areas, National Heritage Areas and proposed Natural Heritage Areas as identified by the Minister for the Department of Arts, Heritage and the Gaeltacht and any other sites that may be proposed for designation during the lifetime of this Plan.*

The Draft County Meath Biodiversity Action Plan 2015-2020 aligns with the objectives in the Meath County Development Plan in terms of implementing the requirements of the Habitats Directive. These plans, their objectives and policies will aid in ensuring that cumulative effects on European Sites do not result in adversely affecting the integrity of European Sites and any future developments will require in the first instance Stage One Screening for Appropriate Assessment and if required, a NIS to allow the planning authority to conduct an Appropriate Assessment.

3.5 Proposed Mitigation Measures

As outlined in the EC guidance, the following is addressed in Tables 3.5 and 3.6:

'Describe what mitigation measures are to be introduced to avoid or reduce the adverse effects on the integrity of the site. Acknowledge uncertainties and any gaps in information'

- *List measures to be introduced*
- *Explain how the measures will avoid the adverse effects on the integrity of the site*
- *Explain how the measures will reduce the adverse effects on the integrity of the site*
- *Provide evidence of how they will be implemented and by whom.*

The following mitigation measures will be implemented to ensure the absence of potential effects on the integrity of *River Nanny Estuary and Shore SPA (Site Code: 004158)*, having regard to the site's conservation objectives. The mitigation measures are listed in Tables 3.5 and 3.6, along with information on when they will be implemented, how the measures will ensure that there are no adverse effects on the European site, who will implement the measures and the efficacy of their implementation.

3.5.1 Construction Mitigation Measures

The drainage system for the proposed development has been designed to preclude potential adverse effects on hydrology and surface water quality. A four-stage treatment train (swale – holding pond- attenuation – wetland) will prevent increased run-off and sediment loading on watercourses from the proposed development. For more information drainage layout is shown in Drawing Nos. LW14-821-01- P-0000-003 through 011 in Appendix 4 of this report and the proposed Surface Water Management Plan can be found in within the Appendix 8 of this report.

An outline Construction and Environmental Management Plan (located in Appendix 7 of this report) has been drawn up for Knockharley Landfill and will be finalised if development consent is granted to include any additional measures required pursuant to any conditions and will contain all mitigation measures set out in this NIS and the EIAR.

For ease of reference, the principal elements of the Construction Phase Mitigation Measures are set out in Table 3-5 over.

Table 3-5: Details of Mitigation Measures for Construction Phase

Mitigation Measure	How Measure Will Avoid Adverse Effects	Implementation of Mitigation Measure	Monitoring scheme to reduce the risk of mitigation failure
The new attenuation pond will be put in place at the commencement of construction at the site.	Eliminate the risk any increase in the rate of runoff, erosion control and silt and/or polluted runoff control	In the event that development consent is granted, all mitigation measures set out in the EIAR and NIS will be conditioned as part of the development consent granted and will be included as a contractual obligation on the contractor, in combination with competent supervisory staff overseeing the works and have been included in the outline CEMP.	A suitably qualified person will be appointed by the developer to ensure the effective management and maintenance of mitigation measures during the construction process.
Site drainage, including silt traps and stilling ponds, will be put in place in parallel with or ahead of construction.	Control run-off and erosion and trap silt.	As above	As above
The 4-stage treatment train (swale – holding pond-attenuation pond–wetland/diffuse outflow) will retain and treat the discharges from the new surfaces as a result of the development.	Control flooding, control run-off and erosion and trap silt going into the Knockharley Stream	As above	As above
During the permitted stream diversion and culverting, in-stream sedimentation traps will be positioned prior to construction and maintained for the duration. All diverted water /run-off can be sent to the onsite surface water attenuation lagoon.	Avoid risk of sediment entering the Knockharley stream	As above	As above
Additional silt fencing and silt-prevention measures will be kept on site for use in emergencies.	Avoid risk of failure of silt-based mitigation in the case fencing fails or more is required.	As above	As above
No work will take place on site during severe weather conditions.	Avoid risk of silt/pollution contaminated runoff.	As above	As above

Mitigation Measure	How Measure Will Avoid Adverse Effects	Implementation of Mitigation Measure	Monitoring scheme to reduce the risk of mitigation failure
All fuels will be kept in bunded areas. Any diesel or fuel oils stored on site will be bunded to 110 % of the capacity of the storage tank in accordance with the facilities waste licence. Design and installation of fuel tanks to be in accordance with best practice guidelines BPGCS005, oil storage guidelines.	Avoid the risk of hydrocarbon leaks and contaminate runoff entering the Knockharley Stream.	As above	As above
Re-fuelling of plant during construction will be carried out in a designated refuelling area. Each station is fully equipped for a spill response and a specially trained and dedicated environmental and emergency spill response team is in place on site.	Avoid the risk of hydrocarbons to enter the Knockharley Stream	As above	As above
Only emergency breakdown maintenance will be carried out on site and appropriate containment facilities will be provided to ensure that any spills from breakdown maintenance vehicles are contained and removed off site. Drip trays and spill kits will be kept available on site, to ensure that any spills from the vehicle are contained and removed off site.	Avoid the risk of hydrocarbons to enter the Knockharley Stream	As above	As above
During construction, daily visual inspections will be performed. If sediment appears to be entering streams, work will stop immediately and measures to identify the source will be undertaken and measures undertaken to stop further sediment entering the stream.	Avoid the risk of sediment entering the Knockharley Stream.	As above	As above

Mitigation Measure	How Measure Will Avoid Adverse Effects	Implementation of Mitigation Measure	Monitoring scheme to reduce the risk of mitigation failure
The construction of flood culvert within the Knockharley Stream	Designed to provide storage for the flood plain storage lost through constructing the northern surface water management system in a 1:1000-year flood plain.	As above	As above
During stream diversion and culverting, vegetation clearance will be kept to a minimum and in-stream sedimentation traps will be positioned prior to construction and maintained for the duration. All diverted water /run-off can be sent to the onsite surface water attenuation lagoon if required. Any in-stream works will be undertaken in consultation with the Planning Authority and Inland Fisheries Ireland (IFI) and subject to Section 50 approval from the OPW. In consideration of fisheries resources downstream, works in watercourses will be carried out during the period July-September unless prior agreement has been reached with IFI.	Avoid the risk of sediment entering the stream.	As above	As above
Where required, portaloos and/or containerised toilets will be used in combination with existing site welfare facilities and associated waste water management facilities to provide toilet facilities for site personnel during construction. Sanitary waste produced by portaloos/containerised toilets will be removed from site via a licensed waste disposal contractor.	Prevent potential run-off being contaminated by sanitary waste.	As above	As above

Mitigation Measure	How Measure Will Avoid Adverse Effects	Implementation of Mitigation Measure	Monitoring scheme to reduce the risk of mitigation failure
The soil stability will also be assessed at site specific locations particularly at stockpile, screening berms and stream bank locations where earthworks are proposed. Best practices will be employed.	Prevent silt laden run-off from entering Knockharley Stream.	As above	As above
Silt Protection Controls (SPCs) are proposed at the location of watercourse crossings and where access roads pass close to watercourses during construction. Silt fencing will be used at the flowing locations: a. All stockpile material will be bunded adequately and/or surrounded by silt fences and protected from heavy rainfall to reduce silt run-off, where necessary. b. All open water bodies adjacent to proposed construction areas will be protected by fencing, including the proposed attenuation pond. c. along the banks of any streams at the location of the proposed tree felling to provide additional protection to the watercourses in this area.	Prevent any contamination of Knockharley Stream.	As above	As above
Standing water, which may arise in excavations, has the potential to contain an increased concentration of suspended solids as a result of the disturbance to soils. The excavations will be pumped into the site drainage system (including attenuation ponds), after which permanent insitu dewatering will be implemented during	Prevent the overland flow of contaminated water into the Knockharley Stream	As above	As above

Mitigation Measure	How Measure Will Avoid Adverse Effects	Implementation of Mitigation Measure	Monitoring scheme to reduce the risk of mitigation failure
operations. As historically there is little evidence of high inflows, it is anticipated that pumped flows from excavations will be very low. Bio-degradable silt bags (or equivalent approved) will be used during dewatering of excavations.			
Swales will be shallow. Temporary silt traps will also be provided at regular intervals in the swales.	To minimize the disturbance to sub-soils and the production of silt thereby preventing silt contaminating the Knockharley Stream.	As above	As above
Tree felling will be undertaken in accordance the felling licence and the specifications set out in the Forest Service Guidelines (34) and Forest Harvesting and Environmental Guidelines (36).	To ensure a tree clearance method that avoids the risk of sediment and nutrient runoff.	As above	As above
Trees will be felled away from aquatic zones where possible. Branches, logs or debris will not be allowed to accumulate in aquatic zones and will be removed as soon as possible.	Prevent the introduction of excess nutrients into the Knockharley Stream	As above	As above
Berms to be developed on the deforested areas immediately following felling, followed by replanting.	Avoid the risk of a significant increase in the rate of run-off into the Knockharley Stream.	As above	As above
The outfall from the constructed wetland will have vertical pipe drop energy dissipation structure within the wetland outlet chamber prior to discharge into the adjacent launching apron protection works.	This design approach will avoid the risk of suspended solids developing within the Knockharley stream downstream of the outfall.	As above	As above
Rock armour will be used to provide bank protection works upstream and downstream of new structures.	To ensure no undercutting or destabilisation of either the structure or	As above	As above

Mitigation Measure	How Measure Will Avoid Adverse Effects	Implementation of Mitigation Measure	Monitoring scheme to reduce the risk of mitigation failure
	riparian bank areas occurs thereby ensuring that sediment will not be released into the Knockharley Stream		
All personnel currently working on site are trained in pollution incident control response and this will be a requirement of the construction contract(s).	Avoid the risk of pollutants entering the Knockharley Stream.	As above	As above
Appropriate information will be available on site outlining the spillage response procedure and a contingency plan to contain silt.	Avoid the risk of silt/pollutants entering the Knockharley Stream.		As above
Adequate security will be provided to prevent spillage as a result of vandalism.	Avoid the risk of pollutants entering the Knockharley Stream.	As above	As above
A regular review of weather forecasts of heavy rainfall is required, and a contingency plan will be prepared for before and after such events.	Avoid the risk of pollutants entering the Knockharley Stream.	As above	As above
A suitably qualified person will be appointed by the developer to ensure the effective implementation of the CEMP onsite. They will also ensure: c. regular monitoring of the drainage system and maintenance as required. d. Record keeping of the daily visual examinations of watercourses which receive flows from the proposed development, during and for an agreed period after the construction phase.	Ensure mitigation measures are effectively implemented.	As above	As above

Mitigation Measure	How Measure Will Avoid Adverse Effects	Implementation of Mitigation Measure	Monitoring scheme to reduce the risk of mitigation failure
e. Water quality monitoring will continue to be carried out in accordance with the licence. (There will be one new monitoring point, at the discharge point from the new wetland.)			
If excessive suspended solids are noted, construction work will be stopped, and remediation measures will be put in place immediately.	To allow for the immediate correction of any underperforming mitigation and avoid a risk of impact to the water quality of Knockharley Stream	As above	As above
Discharges from paved roads paved areas will be surrounded by filter drains with petrol interceptors installed at respective outlets upstream of the storm water management attenuation ponds or other.	Allow for the collection and removal of hydrocarbons from site, preventing them entering the Knockharley Stream	As above	As above

3.5.2 Operational Phase Mitigation Measures

Section 2.1.8 of this report details the existing surface water drainage infrastructure; section 2.8 details the proposed surface water management within the site; section 2.13 details the environmental controls for the development. The existing landfill facility was designed to ensure surface water discharges to receiving waters do not affect water quality. Rainfall on the undeveloped parts of the landfill discharges directly to the surface water drainage system. Rainfall on active areas of the landfill is collected in the leachate collection system. The surface drainage from all roads, capped areas and hard standing areas is directed to the surface water attenuation pond via an oil interceptor. Drainage from the existing waste inspection and quarantine bays is directed to the leachate lagoon. Drainage from the biological treatment facility will be directed to an underground leachate tank. Drainage from the IBA facility operational area will be directed to a new leachate storage facility. Again, for ease of reference, the details of mitigation measures for the operational phase of the proposed development are set out in Table 3-6 over.

These combined measures will ensure that water quality is not affected by the existing or proposed development and that there will not be any adverse effect to any special conservation interests of the European site.

Table 3-6: Details of Mitigation Measures for Operational Phase

Mitigation Measure	How Measure Will Avoid/Reduce Adverse Impacts	Implementation of Mitigation Measure and Likely Success	Monitoring scheme to reduce the risk of mitigation failure
All surface water run-off from the permitted development will flow through an existing class 1 interceptor. Surface water will discharge from the interceptor to the existing attenuation pond and wetland provided for the landfill. Additional Class 1 interceptors will be provided for the proposed development at outfalls from filter drains surrounding the IBA facility.	This petrol interceptor will prevent chemical and petroleum products from entering the attenuation and wetland system downstream and avoid the risk contaminated water being discharged to Knockharley Stream.	In the event that development consent is granted, all mitigation measures set out in the EIAR and NIS will be conditioned as part of the development consent granted and the developer will be required to ensure their efficacious implementation.	A suitably qualified person will be appointed by the developer to ensure the effective management and maintenance of mitigation measures.
Bypass chambers in the road drainage system surrounding the IBA facility will direct contaminated storm runoff into the adjacent IBA facility cell 32 at two locations during IBA operations.	Prevent any IBA contaminated run-off from entering the existing attenuation pond and avoid the risk of contaminated water being discharged to Knockharley Stream.	As above	As above
Both (existing "Southern" and proposed "Northern") surface water attenuation ponds are / will be sized to manage a 1 in a 100-year storm, in accordance with the GDSDS guidelines (2).	Avoid the risk of the system being flooded and prevent uncontrolled release of collected run-off into the Knockharley Stream.	As above	As above
Constructed wetlands downstream of the existing "Southern" and proposed "Northern" attenuation ponds will receive surface water discharges to further attenuate flows and 'polish' storm water suspended solids before discharge to the Knockharley Stream.	Allow run-off containing silt to settle out and prevent potential release into the Knockharley Stream.	As above	As above

Mitigation Measure	How Measure Will Avoid/Reduce Adverse Impacts	Implementation of Mitigation Measure and Likely Success	Monitoring scheme to reduce the risk of mitigation failure
A combination of roof and pavement storm water will be managed. There are a number of SuDS features proposed such as filter strips, filter drains and rainwater harvesting from the roof of the biological treatment facility and stored in tanks, for grey water usage.	To provide an effective system to prevent storm water runoff entering the Knockharley Stream.	As above	As above
All fuels are to be kept in bunded areas. Any diesel or fuel oils stored on site will be bunded to 110 % of the capacity of the storage tank in accordance with the facilities waste licence. Design and installation of fuel tanks to be in accordance with best practice guidelines BPGCS005, oil storage guidelines.	Prevent biofuels from entering the Knockharley Stream	As above	As above
There is continuous monitoring of total organic carbon, pH and conductivity on the "Southern" surface water attenuation pond discharge and there is an automated shut-off of discharge in the event of exceedance of the trigger level for TOC which is 20 mg/l.	Prevent any contaminated run-off from being released into the Knockharley Stream.	As above	As above
There will be continuous monitoring of total organic carbon, pH, turbidity and conductivity on the "Northern" surface water holding pond discharge and there will be an automated shut-off of discharge in the event of an exceedance of the trigger level which will be initially set at 20 mg/l TOC	Prevent any contaminated run-off from being released into the Knockharley Stream.	As above	As above
Ongoing biannual surface water physio-chemical and annual biological monitoring will be undertaken in accordance with the licence conditions.	Allow for the monitoring of effective mitigation by comparing the results of upstream and downstream monitoring locations.	As above	As above

Mitigation Measure	How Measure Will Avoid/Reduce Adverse Impacts	Implementation of Mitigation Measure and Likely Success	Monitoring scheme to reduce the risk of mitigation failure
In the event of a pollution incident onsite, the discharge from the existing "Southern" surface water pond can be shut down to prevent pollution entering the watercourse. In the event of a pollution incident on the proposed "Northern" development the discharge from the holding pond and attenuation pond can be shut down to prevent pollution entering the watercourse.	Prevent polluted water from being discharged into the Knockharley Stream	As above	As above
In the event of an upstream pollution event off-site, there is also a diversion device at the "Southern" outfall on the Knockharley stream to allow the stream to be diverted into the sites pollution control infrastructure, if required.	To prevent pollution upstream of the Knockharley Stream entering the River Nanny.	As above	As above
Inspection and maintenance of the surface water management system including swales, culverts, rainwater harvesting tank filters and outfalls will be undertaken regularly.	Ensure no blockages have occurred and the system is operating correctly.	As above	As above
In keeping with the IED licence, regular visual inspections and monitoring will be required of the surface water management system.	This will avoid any risk of potential impacts on the Knockharley Stream.	As above	As above
The conceptual drainage has been designed to operate effectively during the operational period. Surface water run-off will discharge to the drainage swales during rain events. During the operation period the swales will have vegetated and will serve to further attenuate flows and reduce the amount of sediment discharging from the site. The attenuation ponds will be permanent features and will continue to be effective in filtering the run-off from the site should any accidental release of silt combine with the surface water run-off during operational activities.	Drainage swales will prevent the free flow of runoff from rain events and their vegetation will further attenuate water and filter silt from runoff; avoiding the risk of contamination to the Knockharley Stream runoff and silt which enters the surface water attenuation lagoons.	As above	As above

Mitigation Measure	How Measure Will Avoid/Reduce Adverse Impacts	Implementation of Mitigation Measure and Likely Success	Monitoring scheme to reduce the risk of mitigation failure
Surface water runoff from the IBA facility perimeter road will be directed to the IBA weathering area leachate collection system to avoid dust contamination of drainage outfalls.	This will prevent IBA dust from entering into the surface water attenuation lagoon and avoid the risk of it entering the Knockharley Stream.	As above	As above
The mitigation measures applicable for spills during the construction phase are applicable during the operational phase. In the event of a leachate spill from a tanker, spill kits are kept on site and site staff are trained in the management of a spill. The haulage contractor will be required to have spill kits and training. There will be regular inspections and maintenance of leachate tankers to mitigate leaks. In the event of an unforeseen road traffic accident resulting in a leachate spill adjacent to a watercourse, Meath County Council and Inland Fisheries shall be contacted and spill protection measures will be implemented.	Avoid the risk of the pollutants from potential spill event entering the Knockharley Stream	As above	As above
Surface water will be visually inspected as part of the operational site walkovers on a weekly basis. There will be continuous monitoring of surface water quality at the outfall from the surface water attenuation ponds to the wetland. Routine surface water sampling is and will continue to be carried out in accordance with the licence which includes the submission of interpretive reports to the EPA for approval. Any incidents shall be notified to the EPA in accordance with the licence.	Monitor the effectiveness of the waste water management system to ensure silt/pollutants do not enter the Knockharley Stream.	As above	As above

3.6 Effects on Special Conservation Interests

As outlined previously, the proposed development located 22km from the River Nanny Estuary and Shore SPA and therefore there will be no direct effects on the SCIs of the site. There is an indirect link via the Knockharley Stream to the River Nanny Estuary and Shore SPA.

The combination of mitigation measures detailed in Table 3.5 and Table 3.6 during construction and operation of the proposed development will ensure that no indirect effect on water quality will occur in the Knockharley Stream. This will ensure that no downstream effects on water quality will occur within the River Nanny Estuary and Shore SPA as a result of the proposed development.

Table 3.7 summarises the assessment of effects on the conservation objectives of the SCIs for which the site is designated. As outlined previously, the attributes and targets for each of the SCI bird species are identical and so they are grouped in Table 3.7.

Table 3-7: Summary of Effects on Special Conservation Interests

Special Conservation Interest	Attribute	Target	Effect Post Mitigation
Oystercatcher Ringed Plover Golden Plover Knot Sanderling Herring Gull	Population Trend	Long-term population trend to be stable or increasing	Following the implementation of surface water mitigation and design measures as detailed in Table 3.5 and 3.6, detrimental effects on water quality in the Knockharley Stream will not occur and therefore there will be no effect downstream in the SPA. Therefore, potential impacts affecting prey and feeding for the SCIs will not occur. As no effects will occur, the long-term population trend not be affected.
Oystercatcher Ringed Plover Golden Plover Knot Sanderling Herring Gull	Distribution	No significant decrease in the range, timing or intensity of use of areas used by birds, other than that occurring from natural patterns of variation	As above - no effects on water quality and hence on prey and feeding will occur, so the distribution of bird species will not change as a result of the proposed development.
Wetlands	Wetland habitat	The permanent area occupied by the wetland habitat should be stable and not significantly less that the area of 230ha, other than that occurring from natural patterns of variation	The area of wetland habitat will not be affected by the proposed development.

3.6.1 Efficacy of the Proposed Mitigation Measures

Provide evidence of the degree of confidence in the likely success of the mitigation measures

Mitigation measures were devised in consideration of the following guidelines:

- Draft Guidelines on the information to be contained in Environmental Impact Assessment Reports (EPA, 2017);
- Advice Notes on Current Practice, EPA (Draft, 2015);
- Sustainable Development: A Strategy for Ireland, Department of the Environment, 1997;
- *The County Meath Biodiversity Action Plan: 2015-2020 [Draft];*
- *Meath County Development Plan 2013-2019;*
- Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a Framework for Community Action in the Field of Water Policy;
- Eastern Regional Fisheries Board - Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites (Current guidance document adopted by IFI for all fisheries areas);
- The Planning System and Flood Risk Management - Guidelines for Planning Authorities - Department of Environment, Heritage and Local Government (DoEHLG) and the Office of Public Works (OPW);
- Flood Mapping Website (http://www.floodmaps.ie);
- OPW preliminary flood risk assessment (PFRA) indicative mapping website (www.cfram.ie);
- CIRIA Environmental Good Practice on Site;
- Best Practice Guide BPGCS005, Oil Storage Guidelines;
- CIRIA Control of Water Pollution from Linear Construction Sites. Technical Guidance (C648);
- CIRIA Control of Water Pollution from Construction Sites. Guidance for Consultants and contractors (C532);
- CIRIA Sustainable Construction Procurement. A Guide to Delivering Environmentally Responsible Projects (C571);
- UK Pollution Prevention Guidelines (PPG):
    - PPG1: Understanding your environmental responsibilities – good environmental practice;
    - PPG2: Above Ground Oil Storage Tanks;
    - PPG3: Pollution Prevention Guidelines;
    - PPG4: The Disposal of Sewage where no Mains Drainage is Available;
    - PPG5: Works in, near or liable to affect Watercourses;
    - PPG6: Working at Construction and Demolition Sites;
    - PPG7: The Safe Operation of Refuelling Facilities;
    - PPG8: Safe Storage and Disposal of Used Oil;
    - PPG21: Pollution Incident Response Planning;
    - PPG22: Dealing with Spills; and
    - PPG26: Drums and intermediate bulk containers.
- Guidelines for the Crossing of Watercourses During the Construction of National Road Schemes (National Roads Authority, 2005);
- Design Manual for Roads and Bridges (2013);
- Biological River Water Quality Data, (Environmental Protection Agency (EPA);
- Code of Best Forest Practice – Ireland, (Forest Service and Department of Marine and Natural Resources – 2000);
- Forestry and Water Quality Guidelines (Forest Service and Department of Marine and Natural Resources 2000); and
- Forest Road Manual, Guidelines for the Design, Construction and Management of Forest Roads, (COFORD 2004).

The mitigation measures outlined in Tables 3.5 and 3.6, as implemented, will be successful in ensuring that the European site concerned is preserved at a favourable conservation status by ensuring the lasting preservation of the constitutive characteristics of the site.

In circumstances where the mitigation measures have been developed in light of the best scientific knowledge as detailed in the above guidelines, and are tried and tested over time, no scientific doubt remains to the *absence* of any adverse impacts caused by the proposed development either alone or in combination with other plans or projects, on the integrity of the River Nanny Estuary and Shore SPA under consideration in circumstances where those mitigation measures are implemented.

3.6.2 Mitigation for Cumulative Impacts

Potential cumulative impacts on water quality from the proposed development, were identified in section 3.4 of the of this NIS. Taking into consideration the extensive mitigation measures detailed on Table 3.5 and 3.6, there will be no adverse effects on the *River Nanny Estuary and Shore SPA (Site Code: 004158)* as a result of the proposed development and as a result, there is no scientific doubt remaining as to the absence of the identified potential cumulative effects from this project in combination with other plans and projects to have an adverse effect on any European site. Therefore, there are no additional mitigation measures required to avoid or reduce cumulative impacts over above those set out in Tables 3.5 and 3.6.

3.7 Ensuring Effective Mitigation

The following measures will ensure effective mitigation:

- Routine surface water sampling in accordance with the facilities Industrial Emissions (IE) Licence W0146-02 as well as regular visual inspections of the proposed mitigation measures will ensure that the satisfactory performance of all mitigation measures is confirmed on an ongoing basis.
- All personnel working on site will be trained in pollution incident control response.
- An emergency response plan for surface water incidents (located within the outline CEMP, Appendix 7 of this report) will ensure that appropriate information will be available on site outlining the spillage response procedure and a contingency plan to contain silt, concrete and other pollutants (oil, fuels and other chemicals).
- In the very unlikely event of a pollution incident onsite, the discharge from the existing "Southern" surface water pond will be shut down immediately to prevent pollution entering the watercourse.
- In the event of a pollution incident on the proposed "Northern" development the discharge from the holding pond and attenuation pond will be shut down immediately to prevent pollution entering the Knockharley Stream.
- The discharge from the surface water pond is controlled by a "slam shut" valve that prevents surface water discharging if continuous monitoring of TOC indicates potential contamination of the surface water. The live storage volume of the pond is 4,253 m^3, (theoretical requirement 3,758 m^3). The 1:20 discharge capacity from the existing attenuation pond to the receiving watercourse (via the wetland) is 0.188 m^3/s. The storm water attenuation pond also has a 1:100 emergency spill capacity of 0.28 m^3/s.
- In the case of potential flooding, a replacement 1:1000 yr flood plain will be provided within the development area if the 1 in 100-year flood is exceeded. In such an event, when the attenuation pond has reached its 1 in 100-year flood event capacity, the inlet into the pond will be closed and surface water held in a holding pond upstream of the northern attenuation pond. If the flood culvert becomes blocked an overflow spill will be provided to accommodate a 1:1000-year flood event.

In all the circumstances as outlined in this NIS, there is no scientific doubt remaining as to the efficacy of the mitigation measures identifed, so as to prevent adverse effects on the integrity of the *River Nanny Estuary and Shore SPA (Site Code: 004158*).

3.8 Conclusion

The Stage 1 Screening for Appropriate Assessment found that there is a remote risk to the River Nanny Estuary and Shore SPA as a result of indirect effects via hydrological links from the proposed development, in the absence of mitigation measures. There is also the remote possibility, in the absence of mitigation measures, of cumulative effects on water quality as a result of construction impacts from residential, agricultural and industrial activities within the catchment area of River Nanny Estuary and Shore SPA (site code 004158).

Therefore, it could not be excluded, on the basis of objective scientific information, that the proposed development, individually or in combination with other plans or projects, in the absence of mitigation measures, will have a significant effect on the River Nanny Estuary and Shore SPA.

This report has assessed the potential effects on the integrity of the River Nanny Estuary and Shore SPA in light of the site's conservation objectives and mitigation measures have been developed to prevent such potential effects occurring.

On the basis of objective scientific information, the proposed development will not, either alone or in combination with other plans or projects, adversely affect any of the constitutive interests of the River Nanny Estuary and Shore SPA, in light of the site's conservation objectives.

Accordingly, it can be concluded as follows:

(i) all aspects of the proposed development project have been identified which, in the light of the best scientific knowledge in the field, can by themselves or in combination with other plans or projects, affect the European site in the light of its conservation objectives;

(ii) there are complete, precise and definitive findings and conclusions regarding the identified potential effects on any relevant European site;

(iii) on the basis of those findings and conclusions, the competent authorities are able to determine that no scientific doubt remains as to the absence of the identified potential effects; and

(iv) thus, the competent authorities may determine that the proposed development will not adversely affect the integrity of any relevant European site.

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Appendix 1

Consultation Response (DAU/NPWS)

An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Your Ref: **J: LW14/821/01/Let006/DFM/MG**
Our Ref: **G Pre00037/2015**

02 March 2015

Derek Milton
Fehily Timoney and Company
Core House
Pouladuff Road
Cork
knockharleylandfillscoping@ftco.ie

Re: **Pre-planning enquiry for proposed EIS scoping for Knockharley Landfill intensification, Co. Meath.**

A Chara,

On behalf of the Department of Arts, Heritage and the Gaeltacht, I refer to the notification in relation to the above proposal. Outlined below are the observations and recommendations of the Department in relation to nature conservation.

Please find below scoping comments for EIA and Appropriate assessment screening/appropriate assessment and for licensing requirements.

EIA

Ecological Survey

With regard to scoping for an EIA for a proposed development, in order to assess impacts on biodiversity, fauna, flora and habitats, an ecological survey should be carried out of the proposed development site including the route of any access roads, pipelines or cables etc. to survey the habitats and species present. Where ex-situ impacts are possible survey work may be required outside of the development sites. Such surveys should be carried out by suitably qualified persons at an appropriate time of the year depending on the species being surveyed for. The EIS should include the results of the surveys, and detail the survey methodology and timing of such surveys. It is expected by this Department that in any survey methodology used that best practice will be adhered to. The EIS should cover the whole project, including construction, operation and, if applicable, restoration or decommissioning phases. Alternatives examined should also be included in the EIS. Inland Fisheries Ireland should be consulted with regard to fish species if applicable. For information on Geological and Geomorphological sites the Geological Survey of Ireland should be consulted.

Baseline data

With regard to the scope of baseline data, details of designated sites can be found at www.npws.ie. For flora and fauna in the SEA, the data of the National Parks and Wildlife Service (NPWS) should be consulted at www.npws.ie . Where further detail is required on any information on the website www.npws.ie , a data request form should be submitted. This can be found at http://www.npws.ie/media/npws/publications/Data%20request%20form.doc. Other sources of information relating to habitats and species include that of the National Biodiversity Data Centre (www.biodiversityireland.ie), Inland Fisheries Ireland (www.fisheriesireland.ie), BirdWatch Ireland (www.birdwatchireland.ie) and Bat Conservation Ireland (www.batconservationireland.org). Data may also exist at a County level within the Planning Authority.

Impact assessment

The impact of the development on the flora, fauna and habitats present should be assessed. In particular, the impact of the proposed development should be assessed, where applicable, with regard to:

- Natura 2000 sites, i.e. Special Areas of Conservation (SAC) designated under the EC Habitats Directive (Council Directive 92/43/EEC) and Special Protection Areas designated under the EC Birds Directive (Directive 2009/147 EC),
- Other designated sites, or sites proposed for designation, such as Natural Heritage Areas and proposed Natural Heritage Areas, Nature Reserves and Refuges for Fauna or Flora, designated under the Wildlife Acts 1976 to 2010,
- Species protected under the Wildlife Acts including protected flora,
- '*Protected species and natural habitats*', as defined in the Environmental Liability Directive (2004/35/EC) and European Communities (Environmental Liability) Regulations, 2008, including Birds Directive – Annex I species and other regularly occurring migratory species, and their habitats (wherever they occur) and Habitats Directive – Annex I habitats, Annex II species and their habitats, and Annex IV species and their breeding sites and resting places (wherever they occur),
- Important bird areas such as those identified by Birdlife International,
- Features of the landscape which are of major importance for wild flora and fauna, such as those with a "stepping stone" and ecological corridors function, as referenced in Article 10 of the Habitats Directive.
- Other habitats of ecological value in a national to local context (such as those identified as locally important biodiversity areas within Local Biodiversity Action Plans and County Development Plans).
- Red data book species,
- and biodiversity in general.

Reference should be made to the National Biodiversity Plan and any relevant County Biodiversity Plan.

In order to assess the above impacts it may be necessary to obtain hydrological and/or geological data. In particular, any impact on water table levels or groundwater flows may impact on wetland sites some distance away. The EIS should assess cumulative impacts with other plans or projects if applicable. Where negative impacts are identified suitable mitigation measures should be detailed if appropriate. As EU Member States have to report every 6 years on the National resource of habitats and species listed under the Habitats Directive it is important that any impact on such habitats and species both inside and outside of Natura 2000 sites is recorded.

Alien invasive species

The EIS should also address the issue of invasive alien plant and animal species, such as Japanese Knotweed, and detail the methods required to ensure they are not accidentally introduced or spread during construction. Information on alien invasive species in Ireland can be found at http://invasives.biodiversityireland.ie/ and at http://invasivespeciesireland.com/ .

Hedgerows and protected species

Hedgerows form important wildlife corridors and provide areas for birds to nest in. In addition, badger setts may be present. If suitable trees are present, bats may roost there and they use hedgerows as flight routes. Hedgerows also provide a habitat for woodland flora. Where a hedgerow forms a townland or other historical boundary it is usually an old hedgerow. Such hedgerows will contain more biodiversity than a younger hedgerow. Hedgerows should be maintained where possible. The EIS should provide an estimate the length of hedgerow that will be lost, if any. Where trees or hedgerows have to be removed there should be suitable planting of native species in mitigation. Where possible hedgerows and trees should not be removed during the nesting season (i.e. March 1st to August 31st). Birds' nests can only be intentionally destroyed under licence issued under the Wildlife Acts of 1976 and 2000.

Rivers and Wetlands

Wetlands are important areas for biodiversity. Any watercourse or wetland impacted on should be surveyed for the presence of protected species and species listed on the Annexes II and IV of the Habitats Directive. These species could include otters (*Lutra lutra*), which are protected under the Wildlife Acts and listed on Annexes II and IV of the Habitats Directive, Salmon (*Salmo salar*) and Lamprey species listed on Annex II of the Habitats Directive, and White-clawed Crayfish (*Austropotamobius pallipes*) which are protected under the Wildlife Acts and listed on Annex II of the Habitats Directive, Frogs (*Rana temporaria*) and Newts (*Trituris vulgaris*) protected under the Wildlife Acts and Kingfishers (*Alcedo atthis*) protected under the Wildlife Acts and listed on Annex I of the Birds Directive (Council Directive 79/409 EEC*)*.

A suitable riparian habitat should be left along each watercourse. Construction work should not be allowed impact on water quality and measures should be detailed in the EIS to prevent sediment and/or fuel runoff from getting into watercourses which could adversely impact on aquatic species. Flood plains, if present, should be identified in the EIS and left undeveloped to allow for the protection of these valuable habitats and provide areas for floodwater retention. If applicable, the EIS should take account of the guidelines for Planning Authorities entitled "The Planning System and Flood Risk Management" and published by the Department of the Environment, Heritage and Local Government in November 2009.

IFI should be consulted with regard to impacts on fish species and the applicant may find it useful to consult their publication entitled "Planning for watercourses in the urban environment" which can be downloaded from their web site at http://www.fisheriesireland.ie/fisheries-management-1/86-planning-for-watercourses-in-the-urban-environment-1 .

Water quality

Ground and surface waters quality should be protected during construction and operation of the proposed development and if applicable the applicant should ensure that adequate sewage treatment facilities are or will be in place prior to any development. The applicant should also ensure that adequate water supplies are present prior to development.

Construction Management Plans

Complete project details including construction management plans (CMPs) need to be provided in order to allow an adequate EIS and appropriate assessment to be undertaken. Applicants need to be able to demonstrate that CMPs and other such plans are adequate and effective mitigation, supported by scientific information and analysis, and that they are feasible within the physical constraints of the site. The positions, locations and sizes of construction infrastructure and mitigation, such as settlement ponds, disposal sites and construction compounds, may significantly affect European and other designated sites, habitats, and species in their own right and could have an effect for example on drainage, water quality, habitat loss, and disturbance. If these are undetermined at time of the assessment, all potential effects of the development on the site are not being considered. If applicants are not in a position to decide the exact location and details at time

of application, then they need to consider the range of options that may be used in their assessment so that all issues are covered.

Appropriate Assessment

Guidance

With regard to appropriate assessment (AA) and screening for AA, some Guidance documents are referred to below which may help. However, CJEU case law has to some extent clarified certain issues and should be consulted. In particular, case C-258/2011- N6 Galway City Outer Bypass is relevant as is the recent opinion on the Briels case, C-521/12.

Guidance on AA is available in the Departmental guidance document on Appropriate Assessment, which is available on the NPWS web site at http://www.npws.ie/media/npws/publications/codesofpractice/AA%20Guidance%2010-12-09.pdf and in the EU Commission guidance entitled "*Assessment of plans and projects significantly affecting Natura 2000 sites. Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC*" which can be downloaded from http://ec.europa.eu/environment/nature/natura2000/management/docs/art6/natura_2000_assess_en.pdf

Conservation objectives

In order to carry out the appropriate assessment screening, and/or prepare the Natura Impact Statement (NIS), information about the relevant Natura 2000 sites including their conservation objectives will need to be collected. Details of designated sites and species and conservation objectives can be found on www.npws.ie . Site-specific, as opposed to generic, conservation objectives are now available for some sites. Each conservation objective is defined by a list of attributes and targets. Where these are not available for a site, the detailed conservation objectives for other sites, which have the same qualifying interests, should be examined. For example if a site without detailed conservation objectives has otters as a qualifying interest one could refer to the River Barrow and River Nore SAC detailed conservation objectives to see how otters are treated. It is now advised, as per the notes and guidelines in the detailed conservation objectives, that any reports quoting conservation objectives should give the version number and date. This will allow statutory consultees and others assessing reports to be confident that the correct and most up to date version of the conservation objectives is used at the time of writing any report.

Where further detail is required on any information on the website www.npws.ie , a data request form should be submitted. This can be found at http://www.npws.ie/media/npws/publications/Data%20request%20form.doc.

Cumulative and ex situ impacts

A rule of thumb often used is to include all Natura 2000 sites within a distance of 15km. It should be noted however that this will not always be appropriate. In some instances where there are hydrological connections, a whole river catchment or a groundwater aquifer may need to be included. Similarly, where bird flight paths are involved the impact may be on an SPA more than 15 km away.

Other relevant Local Authorities should be consulted to determine if there are any projects or plans which, in combination with this proposed development, could impact on any Natura 2000 sites

Water and wastewater

If this development is not on mains sewerage then impacts from wastewater, including cumulative impacts, on groundwater and any nearby surface waters or wetland habitats should be assessed. In addition if it is not on mains water supply then impacts, including cumulative impacts, relating to water abstraction should be assessed. This may require hydrogeological information. Where

connection will be to existing infrastructure the impact of the demand for additional potable water, wastewater treatment, and additional surface runoff should be assessed.

Alien invasive species

If the proposed development is adjacent to a Natura 2000 site and involves landscaping or a garden, care should be taken to ensure that no terrestrial or aquatic invasive species are used which could impact negatively on these sites. Information on alien invasive species in Ireland can be found at http://invasives.biodiversityireland.ie/ and at http://invasivespeciesireland.com/ .

CMPs

Complete project details including construction management plans (CMPs) need to be provided in order to allow an adequate appropriate assessment to be undertaken. Applicants need to be able to demonstrate that CMPs and other such plans are adequate and effective mitigation, supported by scientific information and analysis, and that they are feasible within the physical constraints of the site. The positions, locations and sizes of construction infrastructure and mitigation, such as settlement ponds, disposal sites and construction compounds, may significantly affect European sites, designated sites, habitats, and species in their own right and could have an effect for example on drainage, water quality, habitat loss, and disturbance. If these are undetermined at time of the assessment, all potential effects of the development on the site are not being considered. If applicants are not in a position to decide the exact location and details of these at time of application, then they need to consider the range of options that may be used in their assessment so that all issues are covered. The CMP should also include methods to ensure invasive alien species are not introduced or spread. If applicants are not in a position to decide the exact location and details at time of application, then they need to consider the range of options that may be used in their assessment so that all issues are covered.

Licenses

Where there are impacts on protected species and their habitats, resting or breeding places, licenses may be required under the Wildlife Acts or derogations under the Habitats Regulations. In particular bats and otters are strictly protected under annex IV of the Habitats Directive and a copy of Circular Letter NPWS 2/07 entitled “Guidance on Compliance with Regulation 23 of the Habitats Regulations 1997 – strict protection of certain species/applications for derogation licences” can be found on our web site at http://www.npws.ie/media/npws/publications/circulars/media,6686,en.pdf.

In addition licenses will be required if there are any impacts on other protected species or their resting or breeding places, such as on protected plants, badger setts or birds’ nests. Where possible hedges and trees should not be removed during the nesting season (i.e. March 1st to August 31st). Birds’ nests can only be intentionally destroyed under licence issued under the Wildlife Acts of 1976 and 2000.

In order to apply for any such licenses or derogations as mentioned above the results of a survey should be submitted to NPWS which should have been carried out by appropriately qualified person/s at an appropriate time of the year. Details of survey methodology should also be provided. Such licences should be applied for in advance of planning to avoid delays and in case project modifications are necessary.

Should the original survey work take place well before construction commences it is recommended that an ecological survey of the development site should take place immediately prior to construction to ensure no significant change in the baseline ecological survey has occurred. If there has been any significant change mitigation may require amendment and where a licence has expired will be a need for new licence applications with regard to protected species.

The acknowledgement to this letter or any further information should ideally be sent to manager.dau@ahg.gov.ie; if this is not possible, correspondence may alternatively be sent to:

The Manager
Development Applications Unit
Department of Arts, Heritage and the Gaeltacht
Newtown Road
Wexford

Finally, the above observations and recommendations are based on the papers submitted to this Department on a pre-planning basis and are made without prejudice to any observations the Minister may make in the context of any consultation arising on foot of any development application referred to the Minister, by the planning authority, in her role as statutory consultee under the Planning and Development Act 2000, as amended.

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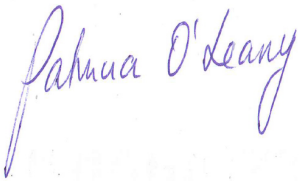

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Appendix 2

Field Survey Results

Existing Environment

While the proposed development site is mostly a brownfield site, the area in the vicinity of the proposed development is rural in nature with Kentstown village located circa 900m southwest of the site. The land use classification within the site, as defined by the 2012 CORINE landcover dataset, is 'Dump' (code: 132), 'Pastures' (code: 231) and 'Non-irrigated land' (code: 211). Land use within the vicinity of the proposed development is mainly classified as 'Pastures' (code: 231) and 'Non-irrigated land' (code: 211) with 'Discontinuous urban fabric' (code: 112) and 'Broad-leaved forest' (code: 311) also present.

The Teagasc online mapping for the site indicates that the soils underlying the site and the surrounding area mainly comprise poorly drained acidic mineral soils consisting of surface water gleys and groundwater gleys.

The overburden consists of glacial till predominantly derived from the underlying Namurian shales and sandstones, with the southern part of the site being underlain by tills derived from Carboniferous limestone. Two narrow swathes of alluvium deposits are identified within the southern section of the site and along the northern boundary, with glacial till derived from the Limestone identified to the south of the site.

The Knockharley Stream or FLEMINGSTOWN(Meath)_010[6] runs along the north of the proposed development, traveling south into the Nanny River or NANNY(MEATH)_020. FLEMINGSTOWN(Meath)_010 is a first order stream and has not been assigned a Q-Value. The NANNY(MEATH)_020 has a Q-Value of Q3/Q2-3 or 'Poor'.

Habitats in the Existing Environment

A total of 12 dominant habitats were recorded on the site during the habitat survey (Fossitt, 2000) conducted in 2010 (FT, 2010) and ground-truthed in 2015 and 2016. The dominant habitats recorded within the site, have not changed over the period 2016-2018.

A habitat map is located in Appendix 4 of this report and displays the location and extent of the dominant habitats recorded on the site in 2010 and also any amendments to these as a result of landscaping and /or further planting of trees in the interim period to March 2015 and February 2016. The site is surrounded almost exclusively by improved agricultural grassland and arable fields.

No habitats protected under the Annex I of the EU Habitats Directive were recorded within the site and no protected flora have been identified within the site. In addition, no invasive non-native species have been recorded within the site.

Biological Water Quality

The site is located within the River Nanny catchment and is drained by the Knockharley Stream (Eroding/Upland River, FW1), which initially flows from west to east along the northern portion of the site and then flows from north to south along the western boundary of the site. A network of small drains is also present on the site; however, water flow is stagnant in many of these drains.

The Knockharley Stream flows into the River Nanny *c.* 3km southeast of the site. The stream is of some ecological value and is evaluated as being of Local Importance (higher value).

The River Nanny holds a small stock of wild trout and is stocked annually with brown trout. It also gets a small run of sea trout (Eastern Regional Fisheries Board). Knockharley Stream appears to have limited habitat for fish and previous surveys have shown that there are no salmonid fish in the stream, although some Three-Spined Stickleback and eels have been recorded (Celtic Waste Ltd, 2000).

Biological water quality in Knockharley Stream is assessed on an annual basis in compliance with the EPA licence. Previous biological monitoring surveys by means of calculating EPA Q-values or using the Q-rating system were carried out at sites (sites 1-4) from 2007 to 2011. Table 1 shows the results of the surveys at Knockharley using the Q-rating system, from 2007–2011.

[6] Environmental Protection Agency identification: http://gis.epa.ie/Envision. Viewed May 2018.

The Q Values for all four sites averaged at a Q3 or 'Poor status' according to the Water Framework Directive (WFD); upstream and downstream of Knockharley Landfill. Q-rating is generally more useful in larger rivers and not applicable to 1st and 2nd order streams and rivers such as sites 1–4 surrounding Knockharley landfill.

Biological monitoring was also conducted from 2013–2017 at the same four sites by means of calculating Small Stream Risk Scores (SSRS) which is a more appropriate methodology for the type of stream on site.

Due to the different methodologies used between previous surveys (2007-2011) and more recent surveys (2013-2016), direct comparison between the Q-values collected in previous years and the 2013–2017 results is not possible. Table 2 shows the results of the SSRS surveys from 2013–2017, at the same four sites.

As previously mentioned, Q-values calculated between 2007 and 2011 were mostly Q3 or 'Poor status' according to the Water Framework Directive (WFD) (see Table 1). The 2013-2017 surveys have shown that Sites 1–4 were all 'at risk' of not achieving good status. Thus, both methodologies of biological sampling have revealed water quality which is below the required Q4 or 'Good status'; both upstream and downstream of Knockharley Landfill. This indicates that water quality is below the required Q4 or 'Good status' before it enters the Knockharley Landfill site and remains that way downstream of Knockharley Landfill. Water quality monitoring conducted to date has not found any deterioration in water quality downstream of the site and hence the operation of the landfill has not resulted in an impact on surface water quality.

Table 1 Q-Values Obtained from 2007–2011 at Knockharley

Sampling Period	Site 1	Site 2	Site 3	Site 4
2007	Q2 – Q3	Q2 – Q3	Q3 – Q4	Q3
2008	Q3	Q2	Q3	Q3 – Q4
2009	Q3	Q3	Q3 – Q4	Q3
2010	Q2	Q3	Q3	Q3
2011	Q3	Q3	Q2	Q2 – 3

Table 2: Small Stream Risk Score and Associated Risk Category Obtained from 2013–2016 at Knockharley

Sampling Period	Site 1	Site 2	Site 3	Site 4
2013	3.2 'stream at risk'	3.2 'stream at risk'	5.6 'stream at risk'	3.2 'stream at risk'
2014	0.8 'stream at risk'	2.4 'stream at risk'	6.4 'stream at risk'	2.4 'stream at risk'
2015	1.6 'stream at risk'	2.4 'stream at risk'	1.6 'stream at risk'	1.6 'stream at risk'
2016	4.0 'stream at risk'	2.4 'stream at risk'	4.8 'stream at risk'	2.4 'stream at risk'
2017	2.4 'stream at risk'	1.6 'stream at risk'	2.4 'stream at risk'	2.4 'stream at risk'

In accordance with licence condition 8.8.1, a continuous monitoring programme is in place at the surface water pond (SW lagoon) and at the discharge point from the reedbeds (SW9). There is a trigger level of 20 mg/l for Total Organic Carbon (TOC). Electrical Conductivity, pH and TOC are measured continuously at the inlet to the pond.

Physico-Chemical Monitoring

Phyisco-chemical monitoring upstream and downstream of the site is carried out quarterly/annually as part of the existing Industrial Emissions (IE) Licence, W0146-02, for the facility. The locations of the monitoring points are detailed in Table 3. Monitoring results for the period 2012 – 2018 are presented in Appendix 5 and discussed below.

Table 3: Monitoring Locations for Physico-chemical monitoring

Monitoring Location	Easting	Northing	Stream	Description
SW1	296706	267600	Knockharley/Flemingstown St.	Upstream
SW2	297464	267862	Knockharley/Flemingstown St.	Upstream
SW3	298087	267634	Knockharley/Flemingstown St.	Upstream
SW5	297764	267116	Knockharley/Flemingstown St.	Upstream
SW6	297663	266562	Knockharley/Flemingstown St.	Downstream
SW7	297510	266525	Kentstown St.	Downstream
SW8	297916	266029	Knockharley/Flemingstown St.	Downstream (and d/s of confluence of Kentstown and Knk/Flem St.)
SW9	297587	266621	Outlet from wetland	Discharge from the surface water wetland

The monitoring programme, carried out at the facility since 2001 before waste was accepted, established baseline water quality and identified seasonal variations. The seasonal variation is thought to be associated with local agriculture practices and individual wastewater treatment systems in the area surrounding the facility. Baseline surface water quality results are shown in Table 4 for comparative purposes.

Surface water samples are analysed each quarter for a range of parameters as specified in Schedule D of the licence. Surface water results over the last 5-year period were assessed and compared to the baseline and are discussed in following paragraphs.

Table 4: Baseline Surface Water Quality

Parameter	Units	SW1	SW2	SW3	SW5	SW6	SW7	SW8
pH	pH Units	7.94-8.20	7.7-8.44	7.75-7.98	7.61-8.07	7.76-8.06	7.42-8.37	7.63-8.02
Electrical Conductivity	mS/cm	0.613-0.730	0.653-0.682	0.593-0.688	0.549-0.726	0.625-0.698	0.590-0.694	0.662-0.720
Ammoniacal Nitrogen	mg/l	<0.2-0.6	<0.2	<0.2-1.1	<0.2-0.5	<0.2-0.5	<0.2-1.7	<0.2-0.4
Dissolved Oxygen	mg/l	5.3-9.4	4.7-8.9	5.1-8.6	4.4-8.4	5.0-8.9	5.0-8.7	4.6-8.5
Chloride	mg/l	21-31	23-56	29-36	29-35	28-33	24-36	30-54
Total Suspended Solids	mg/l	<10-48	<10-46	<10-34	<10	<10-11	<10-10	<10-15
BOD	mg/l	<2-2	<2-12	<2-5	<2-4	<2-3	<2-3	<2-3
COD	mg/l	<15-41	<15-25	<15-46	<15-43	<15-41	<15-29	<15-31
Potassium	mg/l	9	2.6	10.8	11.6	11.8	17.6	2.4

Parameter	Units	SW1	SW2	SW3	SW5	SW6	SW7	SW8
Sodium	mg/l	13.5	8.1	13	14	15	9.8	15
Total Oxidised Nitrogen	mg/l	4.1	7.9	5.4	5.1	5.3	3.7	4.3
Calcium	mg/l	95.44	99.93	77.87	74.7	72.58	99.99	93.66
Cadmium	µg/l	3.5	3.5	3.5	3.5	<0.4	<0.4	<0.4
Chromium	µg/l	4	4	3	4	<1	<1	<1
Copper	µg/l	10	8	8	9	6	6	<5
Iron	µg/l	75	47	112	132	123	38	55
Lead	µg/l	<5	<5	<5	<5	<5	<5	<5
Magnesium	mg/l	6.48	4.44	5.38	5.3	5.23	8.89	6.73
Manganese	µg/l	11	10	10	9	5	6	4
Mercury	µg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Sulphate	mg/l	25	24	29	29	30	30	29
Zinc	µg/l	<5	<5	<5	<5	<5	<5	<5
Total Alkalinity as CaCo3	mg/l	300	220	200	90	250	270	250
Total Phosphorous	mg/l	0.44	0.09	0.34	0.56	0.54	0.54	0.32

The following is a discussion of surface water quality as monitored in compliance with the licence in the period 2012 to 2018. The results of surface water monitoring at SW2 and SW6 over the last 5 years are averaged in Table 5. The full set of monitoring results for all monitoring locations are presented in Appendix 6.

Table 5: Averages of Surface Water Monitoring Results at SW2 & SW6 2012-2018

Parameters	Units	Average	Average
		SW2	SW6
Ammoniacal Nitrogen	mg/l	0.12	0.10
BOD	mg/l	2.09	4.59
Cadmium	µg/l	0.40	0.18
Calcium	mg/l	115.33	119.45
Chloride	mg/l	21.69	19.25
COD	mg/l	14.68	18.91
Dissolved Oxygen	mg/l	9.00	8.40
Electrical Conductivity (lab)	mS/cm	0.60	0.77
Iron	mg/l	0.24	0.18
Lead	µg/l	1.82	2.15
Magnesium	mg/l	8.90	16.95
Manganese	µg/l	97.00	38.50
Mercury	µg/l	0.26	0.26
Orthophosphate	mg/l	1.00	1.00
pH	pH units	7.98	7.47
Sodium	mg/l	15.43	14.18
Sulphate	mg/l	21.65	246.30
Temperature	mg/l	7.73	8.75
TON	mg/l	0.62	0.37
Total Chromium	µg/l	1.01	1.06
Total Phosphorous	mg/l	0.35	0.21
Total Suspended Solids	mg/l	7.00	8.59
Zinc	mg/l	0.01	0.01

In accordance with licence condition 8.8.1, a continuous monitoring programme is in place at the surface water pond (SW lagoon) and at the discharge point from the wetland (SW9). There is a trigger level of 20 mg/l for Total Organic Carbon (TOC). If this limit is recorded the outlet to the pond is shut. Electrical Conductivity, pH and TOC are measured continuously at the inlet to the pond.

Ammoniacal Nitrogen

The parameter ammoniacal nitrogen is indicative of organic pollution from sources such as leachate, wastewater or agriculture. Ammoniacal Nitrogen levels overall across site have remained relatively stable in the period. There is no baseline for SW9 as it is the outfall from the proposed development. The outfall SW9 from the facility wetland is located upstream and immediately adjacent to SW6 on the Knockharley/Flemingstown Stream (see Drawing No. LW14-821-01-P-050-001 Existing Monitoring Points) in Volume 4 of this EIAR. There has been no exceedance of the baseline level of ammoniacal nitrogen at SW6 in the past 5 years. The level of ammoniacal nitrogen at SW9 the outfall, was recorded once in 2014 above the EQS of ≤0.140 mg/l (95%ile) (S.I. No. 272/2009 - European Communities Environmental Objectives (Surface Waters) Regulations 2009), however at that event, the result for SW6 was similar but was below the baseline. The trendline for ammoniacal N at SW6 and SW9 in the period 2013 to 2018 is flat. These results indicate no impact from the existing development.

Electrical Conductivity

Electrical Conductivity at monitoring locations upstream of the landfill (SW1, SW2, SW3 and SW5) have remained relatively stable but display an upward trend at all locations over the period and the results are generally within the baseline range.

Results for Electrical Conductivity at SW7 and SW8 are broadly stable. Electrical Conductivity results at locations SW6 and SW9 are similar and display a slight upward trend of 0.1 mS/cm in the 5-year period. Electrical Conductivity levels at SW6 were outside the baseline range on occasion in 2015 and in 2016, and on three occasions in 2017 and 2018. The trend in Electrical Conductivity results is upwards at all locations SW1-SW9 over the 5-year period and all locations show results outside the baseline range. The trends displayed at SW6 and SW9 are normal in the context of the upstream results.

Total Suspended Solids

Total suspended solids levels have remained below the surface water discharge limit of 35 mg/l at SW9, as set in the licence with the exception of the Q2 sampling event in 2017 but this was attributed to sampler error due to very low flow.

pH

pH levels are relatively stable across all monitoring locations. Overall trends in pH levels have remained within the baseline range and have been relatively stable over the monitoring period.

Dissolved Oxygen

Dissolved Oxygen levels were broadly similar upstream and downstream of the facility and are within typical ranges for surface waters.

BOD

The levels of BOD recorded at all locations are usually below the laboratory limit of detection and are usually within the baseline level. The results show BOD above the baseline and limit of detection at a number of locations around the site both up and downstream of the facility. The levels of BOD at SW9 were above the EQS on five occasions in the 5-year period but the results are lower than those detected at other locations and the 5 year trend is downwards.

The levels of BOD were above the baseline on two occasions in May 2016 and May 2017 at SW6, however in both instances, the BOD at SW9 was lower than that recorded at SW6 indicating the result was not attributable to the facility.

Chemical Oxygen Demand (COD)

Levels of COD in the past 5 years have generally been recorded within the baseline range. There were 5 no. exceedances of the baseline at upstream locations and one exceedance at SW6 in 2013. Chemical Oxygen Demand exhibits a decreasing trend at all locations in the period.

Chloride

Chloride levels downstream of the facility at SW6 and SW8 have been recorded within the baseline range. The 5-year trend at SW9 and SW6 (discharge to stream) is downwards. At locations upstream, SW1-SW5, the trends are downwards except for SW5. The chloride results are generally within the baseline range, exhibiting higher levels upstream at SW1 and SW3 on two occasions and downstream at SW7 on two occasions.

Given that elevated readings were observed upstream of SW6 and at SW7 which is not influenced by the facility it is likely that external sources are responsible for chloride outside the baseline range.

Annual Parameters

Metals; cadmium, copper, chromium, lead, mercury, zinc have overall remained at low stable levels and have not shown increasing trends in the period. Levels are below the EQS limits and baseline levels.

Iron has been detected at above the baseline range at monitoring locations both upstream and downstream of the landfill. In general, there is no increase in levels of iron at downstream locations than recorded at upstream locations.

Magnesium levels have been recorded above baseline ranges for the period at all monitoring locations.

Levels of Total Phosphorus have been recorded above baseline ranges at a number of monitoring stations periodically throughout 2013-2018 but is within the baseline range at SW6. Levels of Total Phosphorous at SW6 and SW9 have been consistently similar or lower than those upstream.

The results indicate good surface water quality overall at the monitoring locations, with no impact from the landfill development.

Birds in the Existing Environment

Desktop studies showed that several rare/threatened and/or protected species have been recorded historically in the 10 km square (N96) surrounding Knockharley Landfill Site. Only up-to-date records (made since 2007) have been included (http://maps.biodiversityireland.ie/#/Map) – see Table 6a. Table 6b details the IWeB counts within the River Nanny Estuary and Shore SPA.

Table 6a: Rare/threatened and/or protected bird species recorded since 2007 within grid square N96 (source: NBDC)

Common Name	Scientific Name	Birds Directive	Conservation Status 2013	Wildlife Acts
Barn Owl	*Tyto alba*	No	Red	Yes
Barn Swallow	*Hirundo rustica*	No	Amber	Yes
Black-headed Gull	*Larus ridibundus*	No	Red	Yes
Common Coot	*Fulica atra*	Annex II & III	Amber	Yes
Common Grasshopper Warbler	*Locustella naevia*	No	Amber	Yes
Common Kingfisher	*Alcedo atthis*	Annex I	Amber	Yes
Common Linnet	*Carduelis cannabina*	No	Amber	Yes
Common Starling	*Sturnus vulgaris*	No	Amber	Yes
Common Swift	*Apus apus*	No	Amber	Yes
Eurasian Tree Sparrow	*Passer montanus*	No	Amber	Yes
Eurasian Woodcock	*Scolopax rusticola*	Annex II & III	Amber	Yes
Golden Plover	*Pluvialis apricaria*	Annex I, II & III	Red	Yes
Herring Gull	*Larus argentatus*	No	Red	Yes
House Sparrow	*Passer domesticus*	No	Amber	Yes
Kestrel	*Falco tinnunculus*	No	Amber	Yes
Mew / Common Gull	*Larus canus*	No	Amber	Yes

Common Name	Scientific Name	Birds Directive	Conservation Status 2013	Wildlife Acts
Mute Swan	*Cygnus olor*	No	Amber	Yes
Northern Lapwing	*Vanellus vanellus*	Annex II	Red	Yes
Peregrine Falcon	*Falco peregrinus*	Annex I	Green	Yes
Ringed Plover	*Charadrius hiaticula*	No	Amber	Yes
Sand Martin	*Riparia riparia*	No	Amber	Yes
Skylark	*Alauda arvensis*	No	Amber	Yes
Spotted Flycatcher	*Muscicapa striata*	No	Amber	Yes
Whooper Swan	*Cygnus cygnus*	Annex I	Amber	Yes
Yellowhammer	*Emberiza citrinella*	No	Red	Yes

Table 6b Site summary table of the most recent 10 seasons of I-WeBs peak counts at the Nanny Estuary & shore [0V401], an I-WeBs site encompassed by the River Nanny Estuary and Shore SPA

Species	1% National	1% International	2006 /07	2007 /08	2008 /09	2009 /10	2010 /11	2011 /12	2012 /13	2013 /14	2014 /15	2015 /16	2016 /17
Golden Plover	1200	9300	200	50*	300	450	56	91*		90	250	200	
Herring Gull		10200	40		1*	96			117	56	79		
Knot	280	4500	262	1800*	6000	4042	1500	1800*	1400*	212	1	660	200
Oystercatcher	690	8200	1001	961*	1357	848	291	396*	378*	369	228	560	700
Ringed Plover	100	730	192	108*	158	184	148	110*	120*	134	124	135	54
Sanderling	60	1200	103	81*	420	421	246	104*	259*	350	300	339	117

Data extracted from Birdwatch Ireland I-WeBs counts accessed online at [https://f1.caspio.com/dp/f4db3000060acbd80db9403f857c]

Peak counts for each species in each of the most recent 10 seasons are presented. Please note:

- Blank columns indicate seasons when no counts were carried out, while blank cells show that a species was absent.
- Counts that are poor quality are represented by an asterisk '*'

A total of 24 bird species were recorded during avian surveys on the site in 2010 (FT, 2010). A further 2 species were recorded in March 2015 and a further 9 species in 2016. Table 7 shows the total number of birds recorded on all five avian transects in 2010, 2015 and 2016, and their conservation status following the most recent Birds of Conservation Concern in Ireland (BoCCI) list (Colhoun & Cummins 2013). Of the total number of species detected in al surveys between 2010 and 2016, only one species listed in Annexes I or II or III of the Birds Directive was observed (Pheasant, listed in Annex III).

Results of 2010 Survey

The most abundant species recorded during avian surveys were Woodpigeon, Wren, Goldfinch and Willow Warbler (9-10 records each). Skylark and Blackbird were also abundant on the site and these species were recorded on all five of the avian transects. All avian species were recorded on a minimum of two transects. Many of the species were associated with field boundaries, however the immature forestry also provides cover for many species.

Two Buzzards were recorded on the site on both of the surveys days and a third Buzzard was also recorded on the second survey day. Buzzards were recorded on transects 4 and 5 only. This species was observed flying over the northern area of the site and a roost site was located in a mature tree in the north of the site. It is possible that this species nests in the vicinity of the roost site and the birds became very vocal when the roost tree was approached. No evidence of a nest could be seen however, and the presence of a third bird may indicate that these could be non-breeding birds. This species is regularly observed by site staff to the north of the site. Buzzards were not recorded on the site during previous surveys (Celtic waste, 2000, Greenstar, 2008), although it was observed in the wider landscape.

Figure 10-1 in Appendix 3 of this report shows the location of the avian transects (2010, 2015 and 2016) and Appendix 2 of this report gives the locations and habitats occurring on each transect. The habitats surveyed by all transects were similar, being dominated by a mosaic of wet grassland and improved agricultural grassland as well as immature woodland. Transects 2, 4 and 5 were located adjacent to field boundaries, including either hedgerows or treelines.

Avian species richness was highest on transect 5 (16 species) followed by transects 1 and 4 (15 species). Avian species richness was lowest (7 species) on transect 2, which was located to the east of the existing landfill site. It should be noted that a number of additional species were recorded flying over this area towards the landfill site (i.e. Rook and Jackdaw). Disturbance was higher in this area than on the other transects due to human and vehicular activity and this may have contributed to the low number of species recorded here. Furthermore, the areas of improved agricultural grassland here provide little cover and/or food for birds.

A pair of Coots (listed in Annex II and Annex III of the Birds Directive) appear to be breeding on the constructed wetland in the south of the site and a Mallard was also seen flying over this area. Two Grey Heron were seen flying over the site in the northern area of the site and Hooded Crow were only recorded on the active landfill site itself. It should be noted that numbers of birds on the active landfill site were low, indicating that the bird control measures in place at the active landfill site were effective at the time of the survey.

Results of 2015 Survey

A total of 17 species were recorded, with distribution, as in previous surveys, mainly along field boundaries and in forestry. Species not recorded previously at the site included Kestrel, recorded twice (assumed to be the same bird) and Mistle Thrush. None of the species recorded are listed in the Birds Directive.

As in previous surveys two Buzzards were recorded from transects, however an additional bird was also noted between transect T2 and T3 bringing the total recorded to 3.

It is assumed that up to 2 pairs of Buzzard may still be present in the area. Mallard were recorded in a drainage ditch adjacent to T3. Numbers of birds active on the constructed landfill continue to be low with only corvids such as Hooded Crow noted.

The migrant species Grasshopper Warbler, Barn Swallow, Willow Warbler and Chiffchaff were not recorded However this is due to the timing of the survey and all are likely to occur given that suitable habitat still exists.

Results of 2016 Survey

The number of species recorded in 2016 at transects 1 – 5 was 7 (T1); 9(T2); 6(T3); 10(T4) and 9(T5). Species diversity was highest in Transect 4 (10 species) and lowest in Transect 3 (6 species). None of the species recorded are listed in Annex I of the Birds Directive.

Additional species compared with previous years included Blackcap, Black-headed Gull, Coal Tit, Spotted Flycatcher, Herring Gull, Hooded Crow, Lesser Black-backed Gull, Long-tailed Tit and Magpie. At Transect 4, there was a lot of disturbance in the environs due to new and ongoing expansion works and cattle were also grazing in the adjacent field. There were no observations of Common Buzzard or Kestrel during the summer surveys in 2016.

Overall, species diversity in T1 was reduced from 15 in 2010, to 3 in 2015 and 7 in 2016. Species diversity increased in T2 from 7 in 2010 to 8 in 2015 and 9 in 2016. Species diversity in T3 was reduced in 2016 (6) compared with 2010 and 2015 (12 each year). At T4, species diversity was reduced from 15 in 2010 to 5 in 2015 and rose to 10 in 2016. At T5, species diversity was also highest in 2010 and reduced to 7 in 2015 and 9 in 2016.

Table 7: Total number of bird species recorded on all transects on the site 2010, 2015, 2016 and conservation status (BoCCI 2013)

		2010	2015	2016	2010	2015	2016	2010	2015	2016	2010	2015	2016	2010	2015	2016	
Common Name	**Scientific Name**	**T 1**	**T 1**	**T 1**	**T 2**	**T 2**	**T 2**	**T 3**	**T 3**	**T3**	**T 4**	**T 4**	**T 4**	**T 5**	**T 5**	**T 5**	**Conservation Status**
Blackbird	*Turdus merula*	1		3	1	4		1	4		1	2		1			Green
Blackcap	*Sylvia atricapilla*															2	Green
Black-headed gull	*Chroicocephalus ridibundus*									20							Red
Blue Tit	*Cyanistes caeruleus*	1		2							1		2			2	Green
Bullfinch	*Pyrrhula pyrrhula*	1			1		3	1	1					1			Green
Chaffinch	*Fringilla coelebs*		1		1	3	2	2			1			2		2	Green
Chiffchaff	*Phylloscopus collybita*	1					1							1			Green
Common Buzzard	*Buteo buteo*								1		2			1	1		Green
Coal tit	*Periparus ater*												1				Green
Spotted flycatcher	*Muscicapa striata*												1			1	Green
Dunnock	*Prunella modularis*	1		1					1		1	2	1				Green
Goldcrest	*Regulus regulus*					1			1		1		1	1			Amber
Goldfinch	*Carduelis carduelis*	2						2			4			1			Green
Grasshopper Warbler	*Lacustella naevia*							1									Green
Great Tit	*Parus major*						1		1		1					2	Green
Herring gull	*Larus argentatus*									300							Red

Appendix 2 – Field Survey Results

		2010	2015	2016	2010	2015	2016	2010	2015	2016	2010	2015	2016	2010	2015	2016	
Common Name	**Scientific Name**	**T 1**	**T 1**	**T 1**	**T 2**	**T 2**	**T 2**	**T 3**	**T 3**	**T3**	**T 4**	**T 4**	**T 4**	**T 5**	**T 5**	**T 5**	**Conservation Status**
Hooded crow	*Corvus cornix*									100							Green
Jackdaw	*Corvus monedula*							1						1			Green
Kestrel	*Falco tinnunculus*								1						1		Amber
Lesser black backed gull	*Larus fuscus*									500							Amber
Linnet	*Carduelis canniabina*						2	1									Amber
Long Tailed tit	*Aegithalos caudatus*			4									3			3	Green
Magpie	*Pica pica*												1			1	Green
Mallard	*Anas platyrhynchos*								3								Green
Meadow Pipit	*Anthus pratensis*		2	2		2		1		2		3	5		1	2	Red
Mistle Thrush	*Turdus viscivorus*						1								1		Amber
Pheasant	*Phasianus colchicus*	1									1			1	1	1	Green
Raven	*Corvus corax*																Green
Reed Bunting	*Emberiza schoeniclus*							1			1						Green
Robin	*Erithacus rubecula*	1		4	2	2	4	1				1	3	1	7		Amber
Rook	*Corvus frugilegus*	1	2			3			2	25							Green
Skylark	*Alauda arvensis*	1			2			1			1			1			Amber
Song Thrush	*Turdus philomelos*	1		1					1		1			2			Green
Swallow	*Hirundo rustica*	1			2									1			Amber
Willow Warbler	*Phylloscopus trochilus*	2					1	3			2			2			Green
Woodpigeon	*Columba palumbus*	2				3			1		3	1	2	5			Green
Wren	*Troglodytes troglodytes*	2			4	2	2		2		1			3	1		Green
Species Count		**15**	**3**	**7**	**7**	**8**	**9**	**12**	**12**	**6**	**15**	**5**	**10**	**16**	**7**	**9**	

Amber = Medium Conservation Concern (*Amber-listed*), Red = High Conservation Concern (*Red-listed*) according to the Birds of Conservation Concern in Ireland list (BOCCI, Colhoun & Cummins 2013). All other species are not currently of special conservation concern in Ireland (*Green-listed*).

Wintering Survey

A winter survey was conducted in December 2015, January 2016 and November 2018 along each of the five transects. The results are presented in Table 8. Additional species recorded during the winter 2015/2016/2018 surveys include Common Gull, Stonechat, Fieldfare, Redwing, Starling, Greenfinch, Collared Dove, Great Black-backed Gull and Yellowhammer. Buzzards were also observed during the winter 2016 and 2018 survey. No species listed in the Annexes of the Birds Directive were recorded within the site.

Table 8: Winter Survey Results

Common Name	T1 Dec 15			T1 Jan 16			T1 Nov 18		
	0-25m	25m-100m	Fly over	0-25m	25m-100m	Fly over	0-25m	25-100m	Fly over
Blackbird	1	1					2		1
Blue Tit	1		1	1					
Dunnock				2	1				
Collared Dove							1		
Common Linnet							2		10
Greenfinch							2		
Herring Gull									44
Hooded Crow				1		2			2
Lesser Black-backed Gull			3			3			
Long-tailed Tit				5			1		
Magpie								2	
Meadow Pipit			3	2					
Mew / Common Gull									1
Robin	1			2			4		
Rook						1			
Song Thrush	1			2					
Woodpigeon		2							1
Wren							1		

Appendix 2 – Field Survey Results

Common Name	T2 Dec 15			T2 Jan 16			T2 Nov 19		
	0-25m	25m-100m	Fly over	0-25m	25m-100m	Fly over	0-25m	25-100m	Fly over
Blackbird							1		
Black-headed Gull			9			5			
Blue Tit	2								
Bullfinch	1			3					
Chaffinch	1	1		2					
Dunnock							1		
Fieldfare									10
Goldfinch									20
Great Tit				1					
Hooded Crow									6
Herring Gull			2			6			1
Lesser Black-backed Gull			15						
Linnet				1					
Mew / Common Gull									4
Mistle Thrush				1					
Robin	2			2			1		
Song Thrush							1		
Woodpigeon									3
Wren							3		

Common Name	T3 Dec 15			T3 Jan 16			T3 Nov 18		
	0-25m	25m-100m	Fly over	0-25m	25m-100m	Fly over	0-25m	25-100m	Fly over
Woodpigeon		2				3			
Wren	1			2					
Black-headed Gull		10			30				2
Coal Tit							1		
Chaffinch									2
Common Gull			2						
Common Linnet							2		
Goldfinch									1
Great Black-backed Gull								1	
Herring Gull		60	20		200		17	30	6
Hooded Crow		75			200		5	1	30
Jackdaw									6
Lesser Black-backed Gull		40	15		300		3	13	2
Long-tailed Tit							2		
Magpie									2
Meadow Pipit				2					
Mew / Common Gull								2	1
Pied Wagtail							1		1
Robin							4		
Rook		15			35			30	
Song Thrush							1		
Stonechat				2					
Woodpigeon					2				

Common Name	T4 Dec 15			T4 Jan 16			T4 Nov 18		
	0-25m	25m-100m	Fly over	0-25m	25m-100m	Fly over	0-25m	25-100m	Fly over
Black-headed Gull									1
Blue Tit	2	1		2					
Buzzard			1			1			
Coal Tit	2								
Fieldfare		30			40				
Goldfinch	1			1					
Herring Gull									1
Hooded Crow			2			2			4
Jackdaw									2
Lesser Black-backed Gull			15			5			
Long-tailed Tit				3					
Magpie	2			1			1		1
Mistle Thrush							1		
Meadow Pipit	1			3	1				
Pheasant		1			1		1		
Redwing					15				
Robin	1			2	1			1	
Rook			2			12			6
Starling		20			30				4
Woodpigeon		3		2		5	1		1
Blackbird	2	1					4		
Blue Tit		2		2					
Buzzard				1					
Chaffinch	1			3			1		1

Common Name	T5 Dec 15			T5 Jan 16			T5 Nov 18		
	0-25m	25m-100m	Fly over	0-25m	25m-100m	Fly over	0-25m	25-100m	Fly over
Buzzard									1
Chaffinch							2		
Coal Tit	1								
Common Linnet							1		
Dunnock	2			1					
Goldfinch							1		
Great Black-backed Gull									1
Great Tit				2					
Herring Gull									6
Hooded Crow								1	3
Jackdaw									1
Lesser Black-backed gull						12			
Long-tailed Tit				1					
Magpie			2	1					
Meadow Pipit				4					
Pheasant					1				
Pied Wagtail	1								
Robin							1		
Redwing				2					
Rook			6			5			
Song Thrush							1		
Starling					5				
Woodpigeon			4			5	2		
Wren	1								
Yellowhammer	2								

Review of Species Recorded

Overall the general assemblage of birds present is evaluated as not differing significantly from that recorded in previous surveys. Habitats on site have not significantly changed in terms of species likely to occur, with the increased area of immature woodland likely to hold the same species as previously recorded.

Due to the change in the Birds of Conservation Concern in Ireland (BoCCI) list since 2010, the status of a number of species recorded on site has changed since the previous appraisal. This includes Robin, Goldcrest and Mistle Thrush, which are now amber listed on the basis of short term declines in abundance of at least 25% (Colhoun & Cummins 2013); Meadow Pipit has moved from green to red due to declines in breeding populations (a greater than 50% decline in the short term).

Conversely, the Grasshopper Warbler has moved from amber to green on the basis of a short-term increase in breeding population and an increase in the range of the species.

It has been suggested that the short-term declines in species such as Meadow Pipit and other resident passerines, which formed the basis for their revised status in 2013, coincided with the prolonged cold weather experienced during the winters of 2009/10 and 2010/11 (Crowe *et al.* 2011 cited in Colhoun & Cummins 2013). These species are still widespread with very little change in range or distribution.

Barn Owl (*Tyto alba*) was recorded on the site during previous surveys (Greenstar EIS, 2008), however no nocturnal surveys were carried out as part of the work carried out in 2010, 2015 or 2016. It is likely that this species forages on the site. Golden Plover (*Pluvialis apricaria*) was recorded in arable adjacent to the site in previous surveys (Greenstar EIS, 2008), however the habitats on the landfill site provide limited suitability for this species.

The dominant habitats within the site have not changed since the 2016 survey and the results of the wintering 2018 survey reflect this.

6.1.1 Mammals in the existing environment

Results of 2010 survey

A total of 6 mammal species were recorded on the site during the site walkover. Table 9 lists the species recorded, together with the details of the observation and conservation status. Figure 10-4 in Appendix 4 of this report shows the location of the main mammal records on the site. The most abundant and widespread species on the site is Fox.

Table 9: Terrestrial Mammal species observations/signs on the site in 2010

Common Name	Scientific name	Habitat	Note	Conservation Status
Fox	*Vulpes vulpes*	All	Widespread - prints and scent	Least Concern
Rabbit	*Oryctolagus cuniculus*	GS4	Burrows in earthen bank in western site	Least Concern
Badger	*Meles meles*	GA1/GS4	Track and latrine found adjacent to access road in eastern site	Least Concern
Irish Hare	*Lepus timidus hibernicus*	GS4	Seen in wet grassland in northwest site	Least Concern
Otter	*Lutra lutra*	FW1	Spraints found along Knockharley Stream	Near Threatened
Wood Mouse	*Apodemus sylvaticus*	GA1/GS4	Nest hole in dry grass northwest of site	Least Concern

Results of 2015 survey

Four mammal species were recorded during the site visit in March 2015 (see Table 10).

Table 10: Mammal Species recorded on the Site 2015

Common Name	Scientific name	Habitat	Note	Conservation Status
Fox	*Vulpes vulpes*	GA1	Scat recorded; assumed widespread throughout	Least Concern
Irish Hare	*Lepus timidus hibernicus*	GA1	Tracks seen in improved agricultural grassland in east of site.	Least Concern
Badger	*Meles meles*	GA1/GS4 and WS2	Track, latrine and hair found in south east of site	Least Concern
Otter	*Lutra lutra*	FW1	Spraints found along Knockharley Stream and channels in three locations	Near Threatened

Results of 2016 bat survey

At the start of the bat survey in 2016, a single Leisler's bat was observed emerging from a mature Ivy covered tree within a treeline within the site (see ID 1 in Table 11 for location). This tree along with the treeline has subsequently been removed under the permitted Knockharley landfill.

The survey also highlighted that Leisler's bat, brown long-eared bat, common pipistrelle and soprano pipistrelle bats are using some of the site's hedgerows and treelines to forage and/or commute (see Figure 10-5 Appendix 2 of this report for more information). Whilst the 10km Grid N96 in which the site occurs was found to contain no bat species; this is likely due to under recording as opposed to the lack of bat activity in the area. It is likely that Leisler's bat, brown long-eared bat, common pipistrelle and soprano pipistrelle bats use the hedgerows and treelines throughout the site and in the general area to commute and forage.

Table 11: Results of 2016 Bat Survey

ID	Common Name	Scientific Name	Timestamp	Latitude [WGS84]	Longitude [WGS84]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Peak Frequency [kHz]
1	Leisler's bat	*Nyctalus leisleri*	29/08/2016 20:57	53.647825	-6.53098	21.6	22.8	20.7	21.4
2	Leisler's bat	*Nyctalus leisleri*	29/08/2016 21:09	53.647845	-6.53095	22.5	25.1	21.4	21.4
3	Leisler's bat	*Nyctalus leisleri*	29/08/2016 21:09	53.647868	-6.53098	23.1	24.9	22	22.3
4	Brown long-eared bat	*Plecotus auritus*	29/08/2016 21:17	53.647822	-6.531	30.5	34.9	26.6	33.9
5	Leisler's bat	*Nyctalus leisleri*	29/08/2016 21:18	53.647837	-6.53102	25.5	27.8	24.3	26.9
6	Common pipistrelle	*Pipistrellus pipistrellus*	29/08/2016 21:20	53.647887	-6.53103	43.4	49.9	42.2	42.7
7	Common pipistrelle	*Pipistrellus pipistrellus*	29/08/2016 21:22	53.647812	-6.53108	54	41.1	34.6	8.2
8	Common pipistrelle	*Pipistrellus pipistrellus*	29/08/2016 21:29	53.647845	-6.53099	49.4	54.7	48.2	49.7
9	Leisler's bat	*Nyctalus leisleri*	29/08/2016 21:33	53.647848	-6.531	27.4	28.5	24.5	4.6
10	Common pipistrelle	*Pipistrellus pipistrellus*	29/08/2016 21:47	53.649122	-6.53157	48.9	54.9	47.9	49.7
11	Common pipistrelle	*Pipistrellus pipistrellus*	29/08/2016 21:48	53.649122	-6.53157	49.2	56	47.9	48.8
12	Soprano pipistrelle	*Pipistrellus pygmaeus*	29/08/2016 21:49	53.649097	-6.53112	57.2	65.5	55.8	59.8
13	Soprano pipistrelle	*Pipistrellus pygmaeus*	29/08/2016 21:52	53.649237	-6.52992	56	64.7	54.2	56.5
14	Common pipistrelle	*Pipistrellus pipistrellus*	29/08/2016 21:53	53.649307	-6.52962	46.3	55.7	45.4	44.3
15	Brown long-eared bat	*Plecotus auritus*	29/08/2016 21:55	53.649298	-6.52916	38	40.2	34	7.9
16	Soprano pipistrelle	*Pipistrellus pygmaeus*	29/08/2016 21:56	53.648835	-6.52882	35.7	37.8	32	53.4
17	Soprano pipistrelle	*Pipistrellus pygmaeus*	29/08/2016 21:56	53.648647	-6.52869	26.9	30	23.4	26.6
18	Soprano pipistrelle	*Pipistrellus pygmaeus*	29/08/2016 22:20	53.648222	-6.53138	51.9	60.4	50.9	51
19	Leisler's bat	*Nyctalus leisleri*	29/08/2016 22:20	53.648252	-6.53147	24	30.9	28.2	23.8
20	Brown long-eared bat	*Plecotus auritus*	29/08/2016 22:23	53.648097	-6.53181	24	32	26	18.3
21	Brown long-eared bat	*Plecotus auritus*	29/08/2016 22:23	53.648107	-6.53215	29.5	32.5	26.2	26.9
22	Soprano pipistrelle	*Pipistrellus pygmaeus*	29/08/2016 22:24	53.648068	-6.53307	52	59.7	50.9	53.7
23	Brown long-eared bat	*Plecotus auritus*	29/08/2016 22:26	53.648065	-6.5337	29.5	32.8	26.5	36.6

Appendix 2 – Field Survey Results

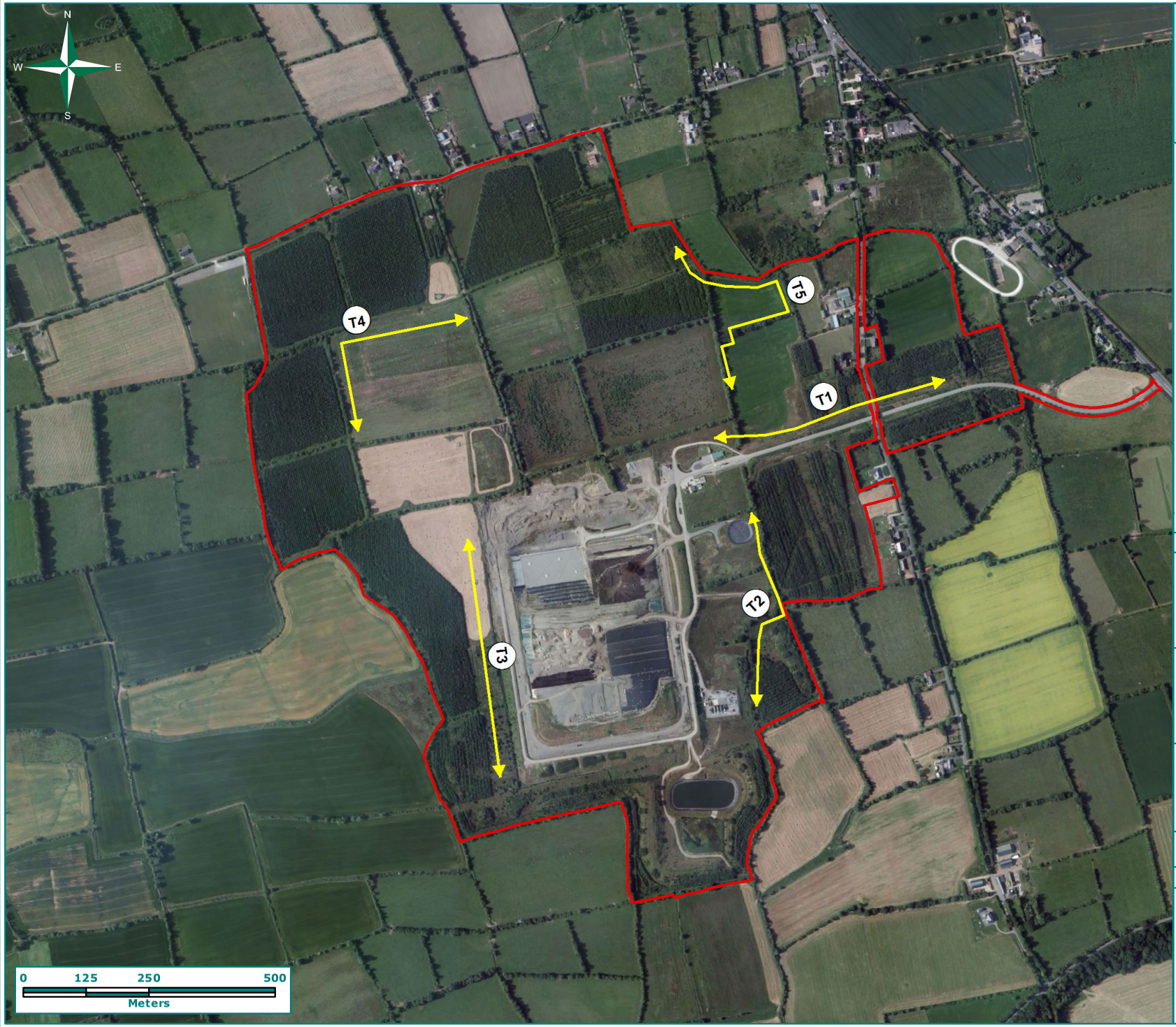
ID	Common Name	Scientific Name	Timestamp	Latitude [WGS84]	Longitude [WGS84]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Peak Frequency [kHz]
24	Brown long-eared bat	*Plecotus auritus*	29/08/2016 22:26	53.648012	-6.534	30.4	33.6	27.1	9.8
25	Common pipistrelle	*Pipistrellus pipistrellus*	29/08/2016 22:28	53.647912	-6.53494	43.9	54.7	43	43.9
26	Brown long-eared bat	*Plecotus auritus*	29/08/2016 22:33	53.648005	-6.53299	29.4	32.6	26.5	22.6
27	Brown long-eared bat	*Plecotus auritus*	29/08/2016 22:34	53.648047	-6.5326	22.2	26.2	19.9	12.5
28	Brown long-eared bat	*Plecotus auritus*	29/08/2016 22:34	53.64806	-6.53238	34	29.1	23.5	7
29	Common pipistrelle	*Pipistrellus pipistrellus*	29/08/2016 22:35	53.648053	-6.53223	52	39.3	34.7	4.6
30	Common pipistrelle	*Pipistrellus pipistrellus*	29/08/2016 22:35	53.648097	-6.53191	42.2	48.2	41	12.8
31	Brown long-eared bat, Leisler's bat	*Plecotus auritus, Nyctalus leisleri*	29/08/2016 22:38	53.648988	-6.5317	24.1	26.7	22.5	3.7
32	Leisler's bat, Brown long-eared bat	*Nyctalus leisleri, Plecotus auritus*	29/08/2016 22:41	53.649595	-6.53191	27.8	29.7	25.6	24.4
33	Brown long-eared bat	*Plecotus auritus*	29/08/2016 22:48	53.650425	-6.53259	24.8	27.7	22.3	24.4
34	Leisler's bat	*Nyctalus leisleri*	29/08/2016 22:48	53.65083	-6.53253	25.1	27.7	22.9	8.9

6.1.2 Salmonid Rivers

The EU Freshwater Fish Directive (78/659/EEC) designates surface waters for protection and improvement to support fish populations. The Directive was transposed into Irish law in 1988 through the European Communities Regulation on Quality of Salmonid Waters [S.I. No. 293/1988]. The regulations designate waters in order to protect and improve "Salmonid Waters." Salmonid waters must be able to sustain Atlantic salmon (*Salmo salar*), trout (*Salmo trutta*), char (Salvelinus) and whitefish (Coregonus). Water is sampled and analysed regularly to ensure certain quality standards are met. Neither the Knockharley Stream nor the River Nanny to which the Knockharley Stream feeds into are designated Salmonid Water under the E.U. Freshwater Fish Directive.

Appendix 3

Biodiversity Figures



Legend

- Bird Survey Transects
- Site Boundary

Date	18/05/2018
Client Name	Knockharley Landfill Ltd.
Project Title	Proposed Development at Knockharley Landfill
Figure Title	Bird Survey Transects
Figure No.	10.1
Rev.	A
Scale	1:10,500 @ A4

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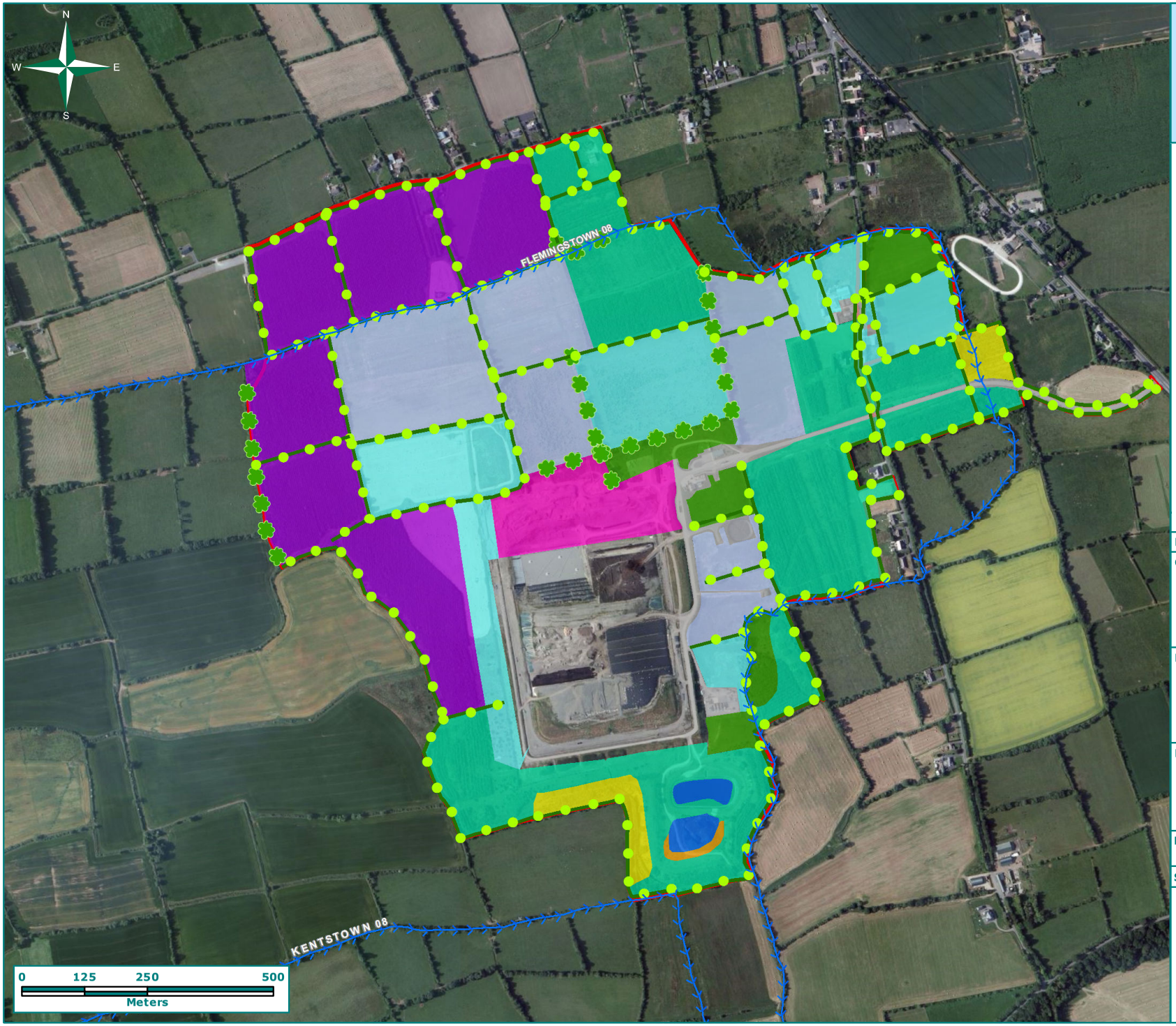

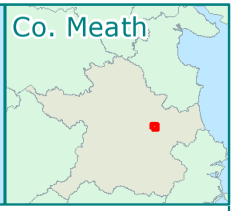

Legend

- Site Boundary

Habitat Types

- BL3 - buildings and artificial surfaces
- ED2 - spoil and bare ground
- FL8 - artificial lakes and ponds
- FS1 - reed and large sedge swamps
- GA1 - improved agricultural grassland
- GA1 / GS4 - improved agricultural grassland / wet grassland mosaic
- GS4 - wet grassland
- WD1 - (mixed) broadleaved woodland
- WD2 - mixed broadleaved / conifer woodland
- WS1 - scrub
- FW1 - Eroding Upland River
- WL1 - Hedgerow
- WL2 - Treeline

Date	18/05/2018
Client Name	Knockharley Landfill Ltd.
Project Title	Proposed Development at Knockharley Landfill
Figure Title	Habitats On-site
Figure No.	10.3
Rev.	A
Scale	1:10,500 @ A4

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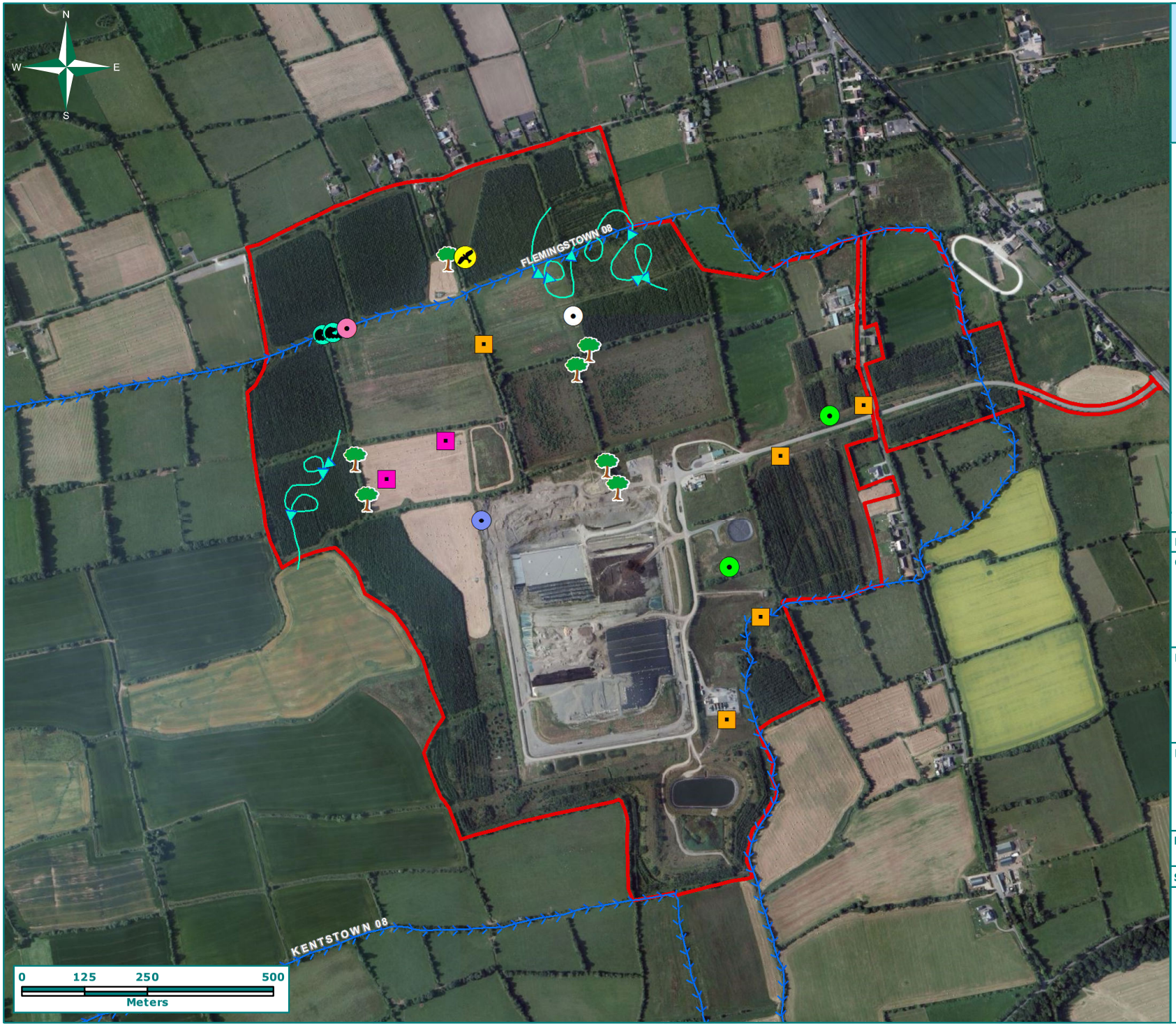

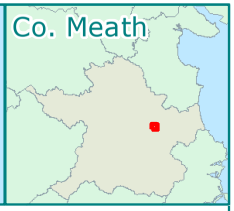

Legend

- Site Boundary

Fauna Survey Results

- Badger Latrine
- Common Buzzard Roost Site
- Hare Sighting
- Fox Print / Scent
- Otter Spraint
- Rabbit Burrow
- Rat Prints
- Trees with Potential for Bat Roost
- Woodmouse Nest / Hole
- Common Buzzard Flightlines

Date	18/05/2018
Client Name	Knockharley Landfill Ltd.
Project Title	Proposed Development at Knockharley Landfill
Figure Title	Fauna Survey Results (2010 & 2015)
Figure No.	10.4
Rev.	A
Scale	1:10,500 @ A4

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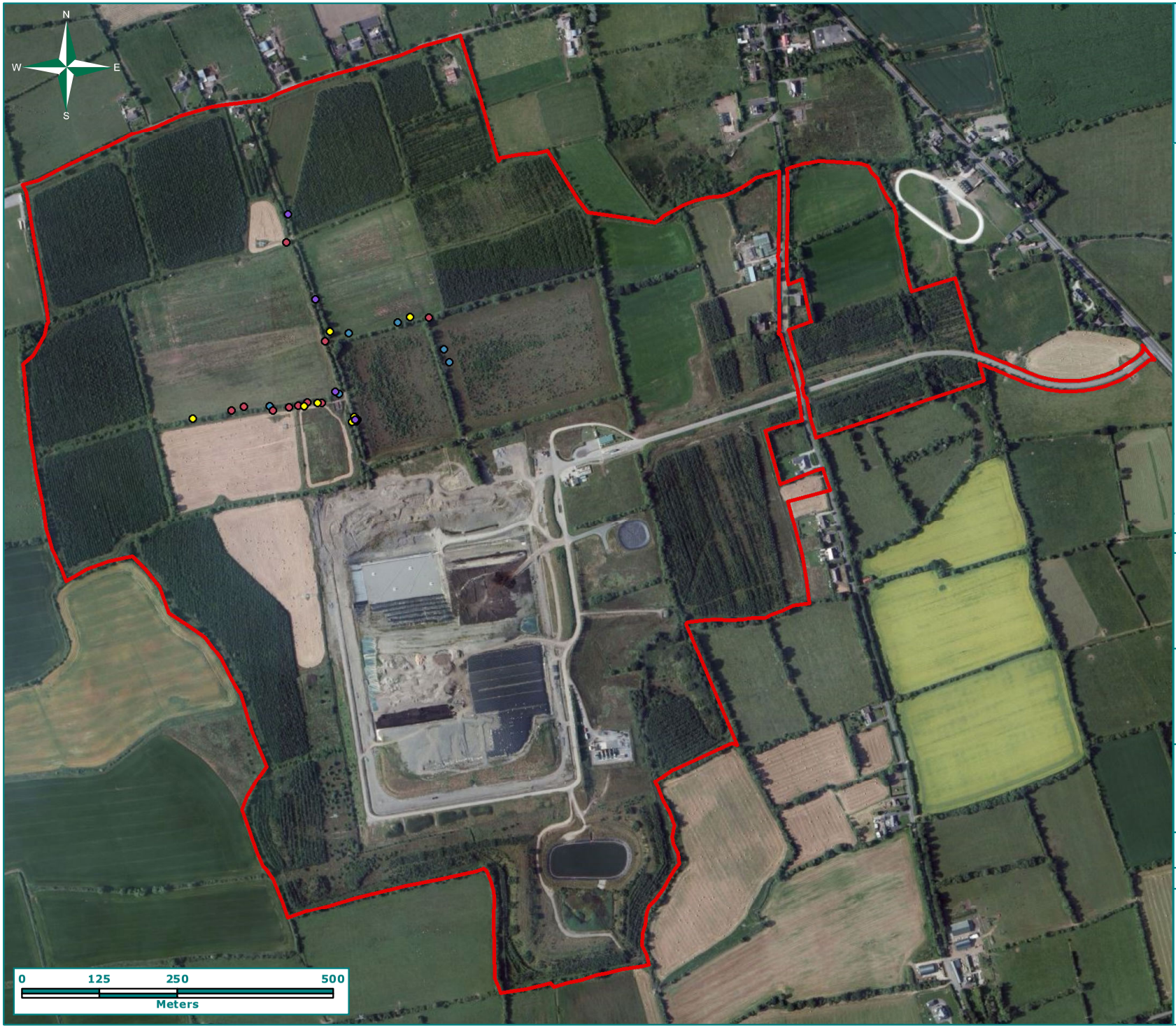

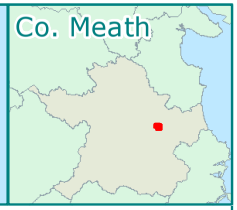

Legend

Site Boundary

Species

- Nyctalus leisleri
- Pipistrellus pipistrellus
- Pipistrellus pygmaeus
- Plecotus auritus

Date	18/05/2018
Client Name	Knockharley Landfill Ltd.
Project Title	Proposed Development at Knockharley Landfill
Figure Title	Results of 2016 Bat Survey
Figure No.	10.5
Rev.	A
Scale	1:8,500 @ A4

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Appendix 4

Drawings

Drawing Number	Drawing Title	Scale	Size
LW14-821-01- P-0000-002	EXISTING SITE LAYOUT	1:3,750	A1
LW14-821-01- P-0000-003	PROPOSED SITE LAYOUT PLAN	1:3,750	A1
LW14-821-01- P-0000-004	PROPOSED SITE LAYOUT PLAN SHEET 1 OF 8	1:1000	A1
LW14-821-01- P-0000-005	PROPOSED SITE LAYOUT PLAN SHEET 2 OF 8	1:1000	A1
LW14-821-01- P-0000-006	PROPOSED SITE LAYOUT PLAN SHEET 3 OF 8	1:1000	A1
LW14-821-01- P-0000-007	PROPOSED SITE LAYOUT PLAN SHEET 4 OF 8	1:1000	A1
LW14-821-01- P-0000-008	PROPOSED SITE LAYOUT PLAN SHEET 5 OF 8	1:1000	A1
LW14-821-01- P-0000-009	PROPOSED SITE LAYOUT PLAN SHEET 6 OF 8	1:1000	A1
LW14-821-01- P-0000-010	PROPOSED SITE LAYOUT PLAN SHEET 7 OF 8	1:1000	A1
LW14-821-01- P-0000-011	PROPOSED SITE LAYOUT PLAN SHEET 8 OF 8	1:1000	A1
LW14-821-01-P-0050-001	EXISTING MONITORING LOCATIONS	1:3,750	A1
LW14-821-01-P-0050-002	PROPOSED ENVIRONMENTAL MONITORING LOCATIONS	1:3,750	A1
LW14-821-01-P-0050-003	EXISTING FORESTATION PROPOSED FELLING & NEW PLANTING	1:3,750	A1
LW14-821-01-P-0050-004	EXISTING SITE LAYOUT WITH INFRASTRUCTURE LOCATIONS	1:3,750	A1
LW14-821-01-P-0050-005	PROPOSED SITE LAYOUT PLAN WITH INFRASTRUCTURE LOCATIONS	1:3,750	A1
LW14-821-01-P-0050-006	PROPOSED IBA FACILITY BUILDING LOCATION AND CROSS SECTION	1:500	A1
LW14-821-01-P-0050-008	TRAFFIC MANAGEMENT BIOLOGICAL TREATMENT FACILITY	1:500	A1
LW14-821-01-P-0050-009	TRAFFIC MANAGEMENT LEACHATE MANAGEMENT FACILITY	1:500	A1
LW14-821-01-P-0050-010	PROPOSED CELL FILLING	1:2,500	A1
LW14-821-01-P-0050-011	CUT/FILL PHASING PLAN	1:7,500	A1
LW14-821-01-P-0500-001	PROPOSED MANAGEMENT PLAN OF SURFACE WATER MANAGEMENT INFRASTRUCTURE	1:1000	A1
LW14-821-01-P-0500-002	SURFACE WATER MANAGEMENT INFRASTRUCTURE LAYOUT PLANS	1:200	A1
LW14-821-01-P-0500-003	PROPOSED SURFACE WATER INFRASTRUCTURE CROSS SECTIONS	1:1000	A1
LW14-821-01-P-0500-004	LAMP STANDARD, GAS EXTRACTION AND SWALE INLET DETAILS	Vary	A1
LW14-821-01-P-0600-001	PROPOSED LEACHATE MANAGEMENT FACILITY	1:500	A1
LW14-821-01-P-1700-002	PROPOSED BIOLOGICAL TREATMENT FACILITY GROUND FLOOR PLAN	1:200	A1
LW14-821-01-P-1700-005	PROPOSED BIOLOGICAL TREATMENT FACILITY CROSS SECTIONS	1:200	A1
LW14-821-01-P-1700-010	ESB MV SUBSTATION DETAILS	1:50	A1

LEGEND

- Planning Boundary
- Areas Within Planning Boundary, Not Within Application Site
- Ownership Boundary (Refer to dwg P-0000-BDY For Clarity)
- Existing Wayleave
- Ground Contours (90m / 100m)
- Existing Watercourse
- Landfill Cells currently being filled (2017/ '18)
- Constructed Landfill Cells
- Existing Forested Areas
- Permitted Landfill Cells, To Be Constructed
- Existing Berm

EXISTING SERVICES LEGEND

- ESB Power lines
- Water Supply Pipes
- Storm Sewer
- Telemetry & Power
- Leachate Rising Main
- Groundwater Drainage
- Leachate Collection

PHASE 1
PHASE 2
PHASE 3
PHASE 4
PHASE 5
PHASE 6
PHASE 7
CELL 1 CELL 2 CELL 3 CELL 4 CELL 5 CELL 6 CELL 7 CELL 8 CELL 9 CELL 10 CELL 11 CELL 12 CELL 13 CELL 14 CELL 15 CELL 16 CELL 17 CELL 18 CELL 19 CELL 20 CELL 21 CELL 22 CELL 23 CELL 24 CELL 25 CELL 26 CELL 27 CELL 28

KNOCKHARLEY
TUITERATH
Elm Grove
Existing Wayleave
Area under construction
Permitted Stream Diversion
Permitted Cell Development
Existing Landfill Offices
Existing Wheel Wash
L1-Existing Leachate Lagoon
Existing O/H 20KV Powerline
Existing Underpass
Existing Cattle Underpass
SITE NOTICE LOCATION
Ruin
EXISTING GAS MAIN
Existing Landfill Gas Compound
Existing Southern Surface Water Attenuation & Wetland
Existing Screening Berm
Existing gas main
Quarry
1.83m FF
CS
ESB
W
SS
T+P
LR
UND

Refer To Existing Infrastructure References On Drawing P-0050-004

Scale 1:3750 (0m 38m 75m 113m 150m 188m 225m 263m 300m 338m 375m)

Rev.	Drawn	Chk'd	App'd	Date	Description
A	SK	CJC	BG	Cork 10.07.18	Issue For Planning Application

Revision History: A — EIAR

Name of Client
KNOCKHARLEY LANDFILL LTD.

Name of Job
PROPOSED DEVELOPMENT AT KNOCKHARLEY LANDFILL

Title of Drawing
EXISTING SITE LAYOUT

Scales Used	This Drawing was printed to
1:3750	A1-

Dwg. No.	Rev.
LW14-821-01-P-0000-002	A

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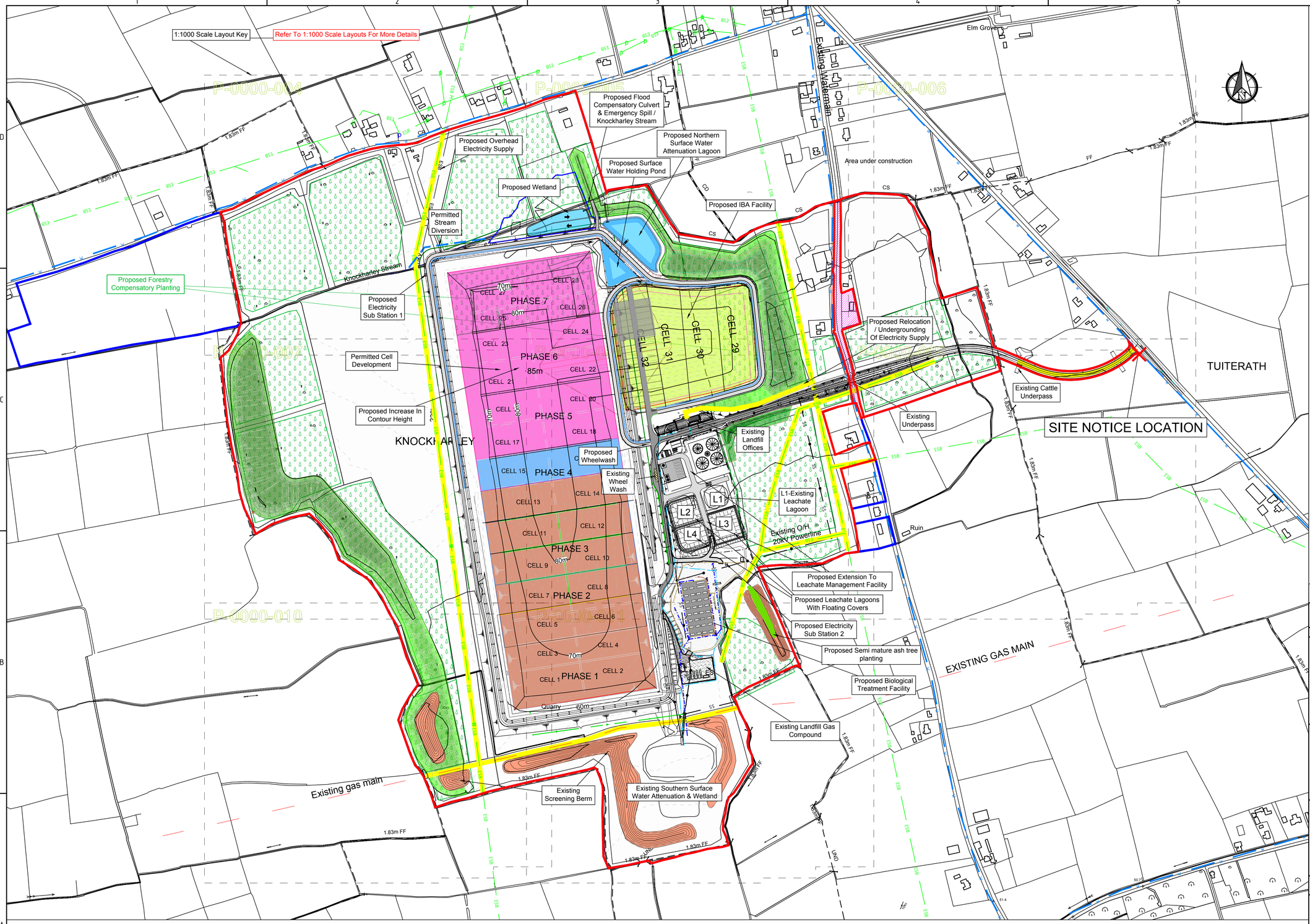
SCALE - VERTICAL 1:500 (10 0 5 10 20 50 100)
SCALE HORIZ. 1:500 (10 0 5 10 20 50 100)
ORIGINAL DRAWING SIZE A1 - (841 x 594)



SCALE - VERTICAL

0 10 20 50 100

SCALE HORIZ.

0 10 20 50 100

ORIGINAL DRAWING SIZE A1 - (841 x 594)

LEGEND

- Planning Boundary
- Areas Within Planning Boundary, Not Within Application Site
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- IBA, Cell 33 (Outline Only Shown For Calrity)
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- Proposed Stream Diversion
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EXISTING SERVICES LEGEND

- ESB Power lines
- Water Supply Pipes
- Storm Sewer
- Telemetry & Power
- Leachate Rising Main
- Groundwater Drainage
- Leachate Collection

PROPOSED SERVICES LEGEND

- Power, Telemetry & Gas
- Leachate Collection
- Surface Water Drain
- Water Supply
- Foul Sewer (gravity / pumped)

Rev.	Drawn	Chk'd	App'd	Date	Description
A	SK	CJC	BG	Cork 10.07.18	Issue For Planning Application
Revision History	A				EIAR

Name of Client

KNOCKHARLEY LANDFILL LTD.

Name of Job

PROPOSED DEVELOPMENT AT KNOCKHARLEY LANDFILL

Title of Drawing

PROPOSED SITE LAYOUT PLAN

Scales Used	This Drawing was printed to
1:3750	A1 -

Dwg. No.	Rev.
LW14-821-01-P-0000-003	A

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0m 38m 75m 113m 150m 188m 225m 263m 300m 338m 375m

Scale 1:3750

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Rev.	Drawn	Chk'd	App'd	Date	Description
A	SK	CJC	BG	10.07.18	Issue For Planning Application

Revision History: A — EIAR

Name of Client

KNOCKHARLEY LANDFILL LTD.

Name of Job

PROPOSED DEVELOPMENT AT KNOCKHARLEY LANDFILL

Title of Drawing

PROPOSED SITE LAYOUT PLAN
SHEET 1 OF 8

Scales Used	This Drawing was printed to
1:1000	A1 -

Dwg. No.	Rev.
LW14-821-01-P-0000-004	A

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Scale 1:1000 (0m 10m 20m 30m 40m 50m 60m 70m 80m 90m 100m)

1.83m FF
CR
Proposed Electricity Connection
Permitted Stream Diversion
Proposed Temporary Suspended Solids Management Outfall
Leachate Collection
Power, Telemetry & Gas
Proposed Electricity Sub Station 1
To Site Boundary 259.0m
Knockhardey Stream
CELL 27
PHASE 7
CELL 25
70m
80m
62m
220.8
225.7

ORIGINAL DRAWING SIZE A1 - (841 x 594)
SCALE - VERTICAL
SCALE HORIZ.

Flood Compensatory Embankment
Proposed Temporary Suspended Solids Management Outfall
Proposed Flood Compensatory Culvert & Emergency Spill / Knockharley Stream
Proposed Surface Water Outfall Via Wetland
Proposed Temporary Suspended Solids Management Outfall
Proposed Inlet Structure
Proposed Surface Water Attenuation Lagoon Outfall / Emergency Spill
Proposed Wetland
Proposed Wetland Inlet
Proposed Inlet Structure
Proposed Northern Surface Water Attenuation Lagoon
Drain
100.8m To Site Boundary
Leachate Collection
Power, Telemetry & Gas
Proposed Inlet Structure
Proposed Holding Pond Outfall, Pumpsump & Control Valve Structures
Proposed Surface Water Holding Pond
Leachate Collection
Power, Telemetry & Gas
Proposed Inlet Structure
Stockpile 1
Stockpile 2
Proposed Weathering Slab & IBA Facility Building (Temporary)
Proposed IBA Facility
Drain
Leachate Collection
Power, Telemetry & Gas
Drain
Proposed Embankment Perimeter Swale
80.9m To Site Boundary
1.83m FF
CD
CS
CS
Watermain
Area unde
CELL 28
CELL 26
CELL 24
CELL 32
CELL 31
CELL 30
CELL 29
ASE 7
225.1
106.6
20.5
29.6
24.7
10.0
13.7
8.7
100.8m To Site Boundary
ESB
W
IK

LEGEND

- Planning Boundary
  Areas Within Planning Boundary, Not Within Application Site
- Ownership Boundary
  Refer to dwg P-0000-BDY For Clarity
- Existing Wayleave
- Ground Contours (90m / 100m)
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- Groundwater Drainage
- Leachate Collection

PROPOSED SERVICES LEGEND

- Power, Telemetry & Gas
- Leachate Collection
- Surface Water Drain
- Water Supply
- Foul Sewer (gravity / pumped)

Rev.	Drawn	Chk'd	App'd	Description
A	SK	CJC	BG	Issue For Planning Application — Cork 10.07.18
Revision History	A			EIAR

Name of Client
KNOCKHARLEY LANDFILL LTD.

Name of Job
PROPOSED DEVELOPMENT AT KNOCKHARLEY LANDFILL

Title of Drawing
PROPOSED SITE LAYOUT PLAN
SHEET 2 OF 8

Scales Used	This Drawing was printed to
1:1000	A1 -

Dwg. No.	Rev.
LW14-821-01-P-0000-005	A

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Scale 1:1000 (0m 10m 20m 30m 40m 50m 60m 70m 80m 90m 100m)

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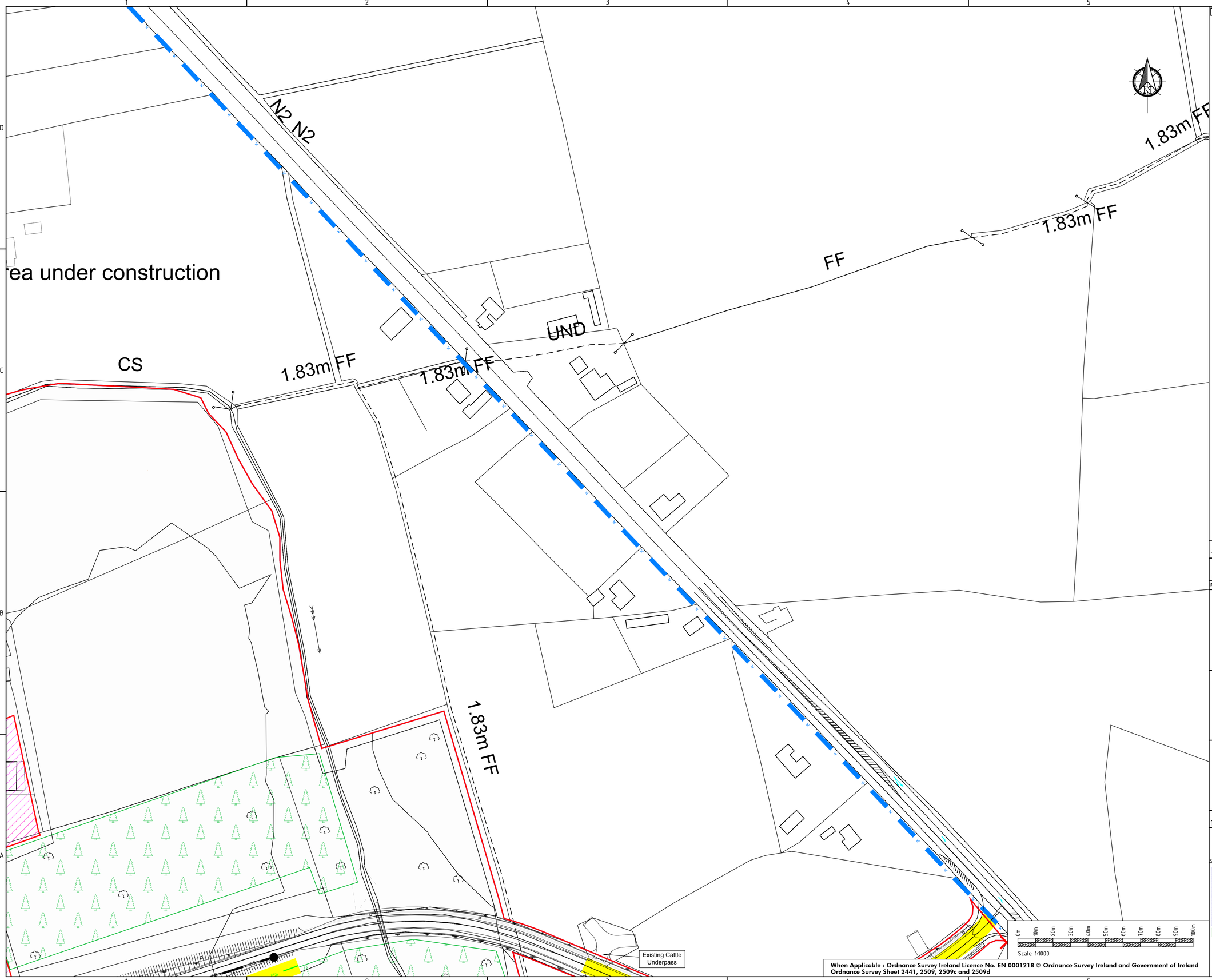
SCALE - VERTICAL 100 50 20 10 0
SCALE HORIZ. 0 10 20 50 100
ORIGINAL DRAWING SIZE A1 - (841 x 594)



LEGEND

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Rev.	Drawn	Chk'd	App'd	Date	Description
A	SK	CJC	BG	Cork 10.07.18	Issue For Planning Application

Revision History: A — EIAR

Name of Client

KNOCKHARLEY LANDFILL LTD.

Name of Job

PROPOSED DEVELOPMENT AT KNOCKHARLEY LANDFILL

Title of Drawing

PROPOSED SITE LAYOUT PLAN

SHEET 3 OF 8

Scales Used	This Drawing was printed to
1:1000	A1-

Dwg. No.	Rev.
LW14-821-01-P-0000-006	A

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Scale 1:1000 (0m 10m 20m 30m 40m 50m 60m 70m 80m 90m 100m)

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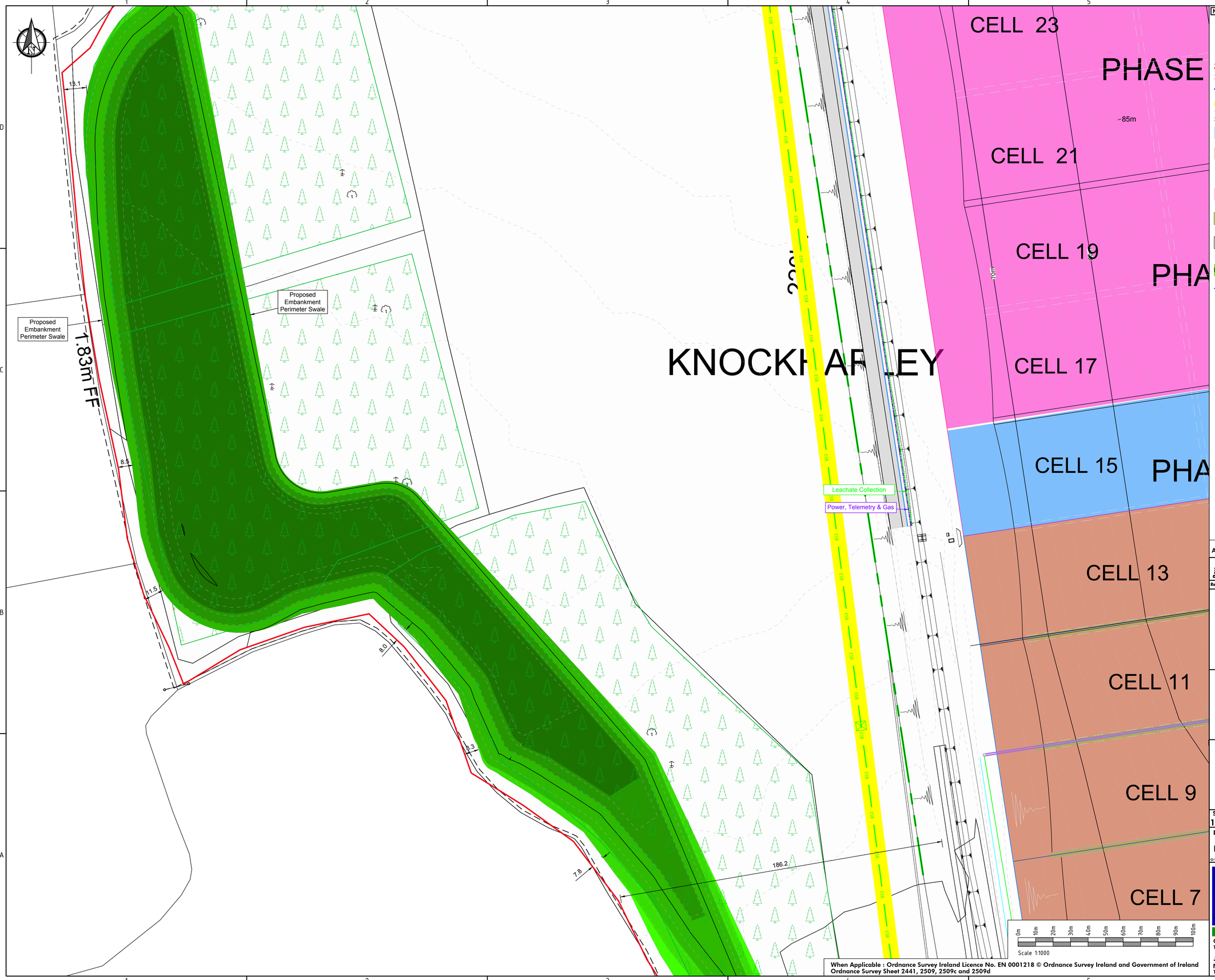
SCALE - VERTICAL (10 0 2 5 10 20 50 100)

SCALE HORIZ. (1 2 5 10 20 50 100)

ORIGINAL DRAWING SIZE A1 - (841 x 594)



LEGEND

- Planning Boundary
- Areas Within Planning Boundary, Not Within Application Site
- Ownership Boundary (Refer to dwg P-0000-BDY For Clarity)
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- Leachate Collection
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- Water Supply
- Foul Sewer (gravity / pumped)

Rev.	Drawn	Chkd	App'd	Date	Description
A	SK	CJC	BG	10.07.18	Issue For Planning Application
Revision History	A				EIAR

Name of Client

KNOCKHARLEY LANDFILL LTD.

Name of Job

PROPOSED DEVELOPMENT AT KNOCKHARLEY LANDFILL

Title of Drawing

PROPOSED SITE LAYOUT PLAN

SHEET 4 OF 8

Scales Used	This Drawing was printed to
1:1000	A1-

Dwg. No.	Rev.
LW14-821-01-P-0000-007	A

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SCALE - VERTICAL 0 10 20 50 100

SCALE HORIZ. 0 10 20 50 100

ORIGINAL DRAWING SIZE A1 - (841 x 594)

PHASE 6
CELL 22
CELL 20
PHASE 5
CELL 18
CELL 16
PHASE 4
CELL 14
CELL 13
CELL 12
CELL 11
PHASE 3
CELL 10
CELL 9
CELL 8
CELL 7
PHASE 2
CELL 6
85m
80m
CELL 32
CELL 31
CELL 30
Proposed IBA Facility
Proposed Haul Road
Leachate Collection
Power, Telemetry & Gas
Proposed Petrol Interceptor
Proposed Embankment Perimeter Swale
Connect To Existing Sewer
Existing Landfill Offices
Proposed Carpark Extension
Existing Weighbridges & Hut
S3 - Tank, 20Ø x 6m High
S4 - Tank, 25Ø x 6m High
S5 - Tank 10Ø x 6m High
S1-Tank 25Ø x 6m High
S2-Tank 25Ø x 6m High
Proposed Bund
Existing Maintenance Area
Proposed Wheelwash
Proposed Leachate Treatment Facility, 40x40m
Proposed Tanker Loading Area
Proposed Extension To Leachate Management Facility
Existing Wheel Wash
L1-Existing Leachate Lagoon
Proposed Leachate Lagoons With Floating Covers
Proposed Tanker Loading Area
Proposed Electricity Sub Station 2
Proposed Septic Tank and Pump Sump
Proposed Biological Treatment Facility
Ramp Down
Ramp Down
Proposed Semi mature ash tree planting
Drain
214.5m To Site Boundary
220.5m To Site Boundary
106.2m To Site Boundary
564.2m To Site Boundary
Existing O/H 20kV Powerline
61.3
61.3
61.5
50.0
60.0
60.0
564.4
X1
X2
X2
X1
SCALE - VERTICAL
SCALE HORIZ.
0m 10m 20m 30m 40m 50m 60m 70m 80m 90m 100m
Scale 1:1000

LEGEND

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PROPOSED SERVICES LEGEND

- Power, Telemetry & Gas
- Leachate Collection
- Surface Water Drain
- Water Supply
- Foul Sewer (gravity / pumped)

Rev.	Drawn	Chk'd	App'd	Date	Description
A	SK	CJC	BG	Cork 10.07.18	Issue For Planning Application
Revision History	A				EIAR

Name of Client

KNOCKHARLEY LANDFILL LTD.

Name of Job

PROPOSED DEVELOPMENT AT KNOCKHARLEY LANDFILL

Title of Drawing

PROPOSED SITE LAYOUT PLAN
SHEET 5 OF 8

Scales Used	This Drawing was printed to
1:1000	A1-

Dwg. No.	Rev.
LW14-821-01-P-0000-008	A

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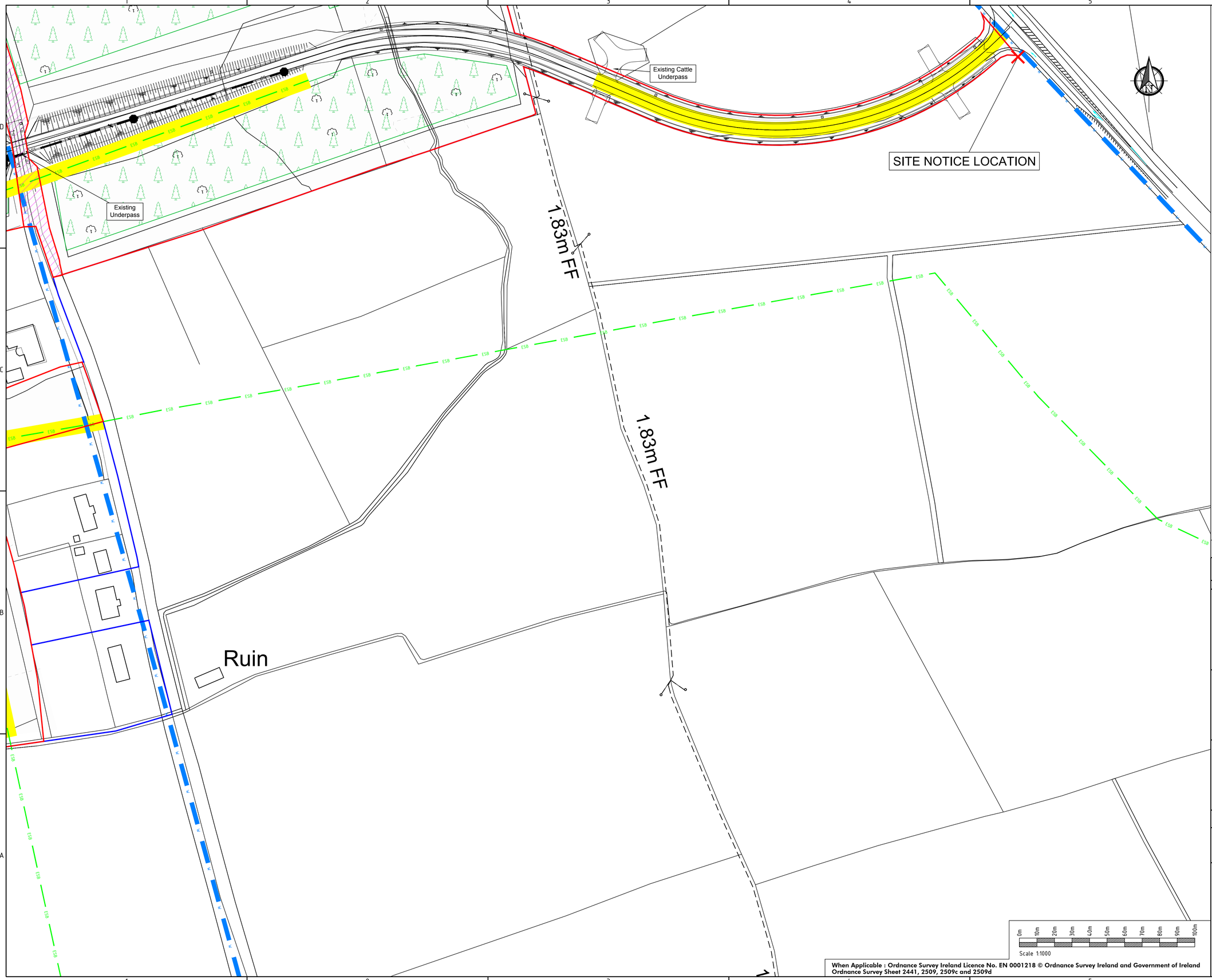
ORIGINAL DRAWING SIZE A1 - (841 x 594)



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Rev.	Drawn	Chk'd	App'd		
A	SK	CJC	BG	Cork 10.07.18	Issue For Planning Application

Revision History: A — EIAR

Name of Client

KNOCKHARLEY LANDFILL LTD.

Name of Job

PROPOSED DEVELOPMENT AT KNOCKHARLEY LANDFILL

Title of Drawing

PROPOSED SITE LAYOUT PLAN

SHEET 6 OF 8

Scales Used	This Drawing was printed to
1:1000	A1-

Dwg. No.	Rev.
LW14-821-01-P-0000-009	A

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Scale 1:1000 (0m, 10m, 20m, 30m, 40m, 50m, 60m, 70m, 80m, 90m, 100m)

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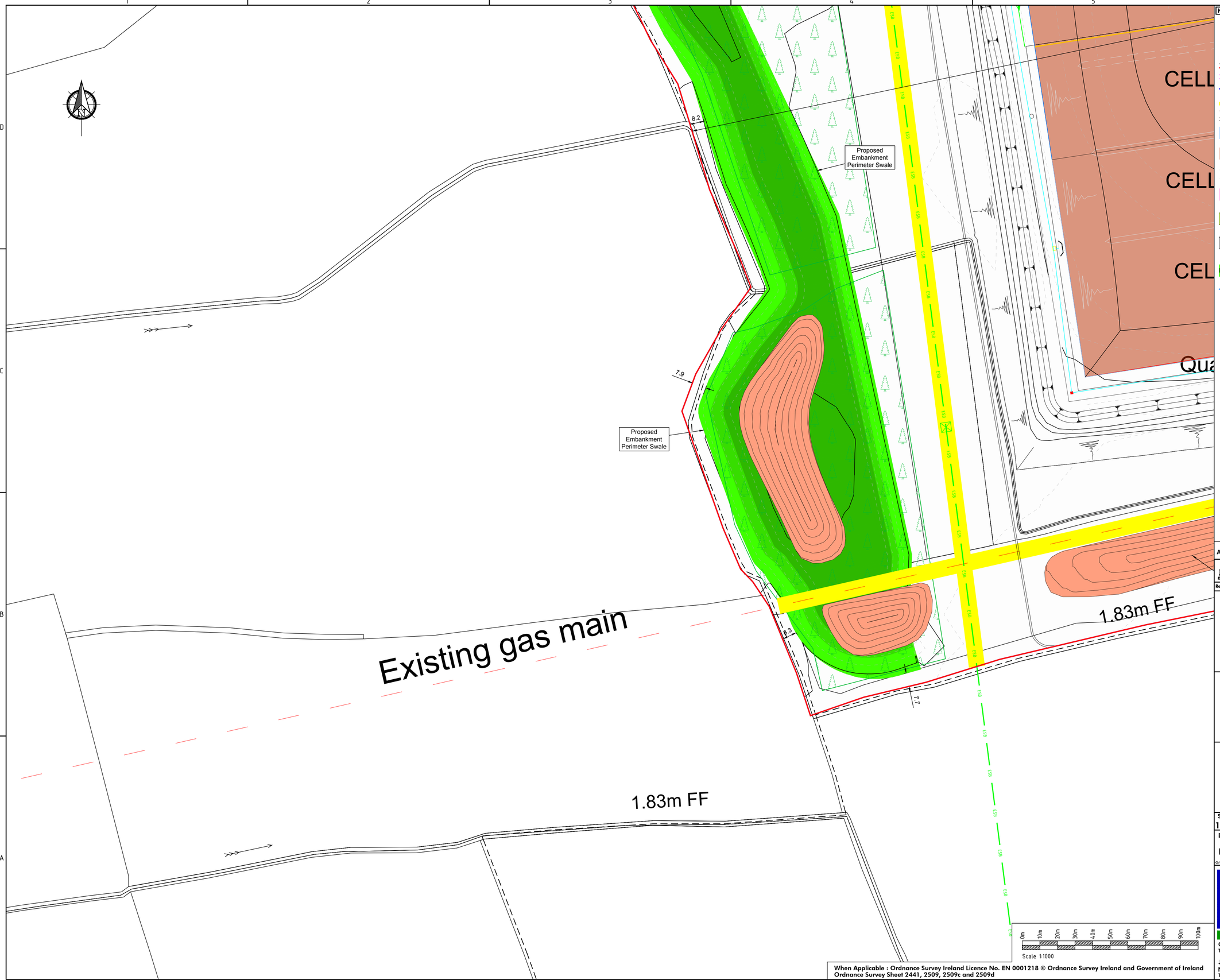

LEGEND

- Planning Boundary
- Areas Within Planning Boundary, Not Within Application Site
- Ownership Boundary (Refer to dwg P-0000-BDY For Clarity)
- Existing Wayleave
- Ground Contours (90m / 100m)
- Existing Watercourse
- Landfill Cells currently being filled (2017/ '18)
- Constructed Landfill Cells
- Final Forested Areas
- Permitted Landfill Cells, To Be Constructed
- Proposed IBA Facility
- IBA, Cell 33 (Outline Only Shown For Calrity)
- Proposed Screening Berms with New Replanting
- Proposed Stream Diversion
- Existing Berm

EXISTING SERVICES LEGEND

- ESB Power lines
- Water Supply Pipes
- Storm Sewer
- Telemetry & Power
- Leachate Rising Main
- Groundwater Drainage
- Leachate Collection

PROPOSED SERVICES LEGEND

- Power, Telemetry & Gas
- Leachate Collection
- Surface Water Drain
- Water Supply
- Foul Sewer (gravity / pumped)

Rev.	Drawn	Chk'd	App'd	Date	Description
A	SK	CJC	BG	10.07.18	Issue For Planning Application

Revision History: A — EIAR

Name of Client

KNOCKHARLEY LANDFILL LTD.

Name of Job

PROPOSED DEVELOPMENT AT KNOCKHARLEY LANDFILL

Title of Drawing

PROPOSED SITE LAYOUT PLAN

SHEET 7 OF 8

Scales Used	This Drawing was printed to
1:1000	A1-

Dwg. No.	Rev.
LW14-821-01-P-0000-010	A

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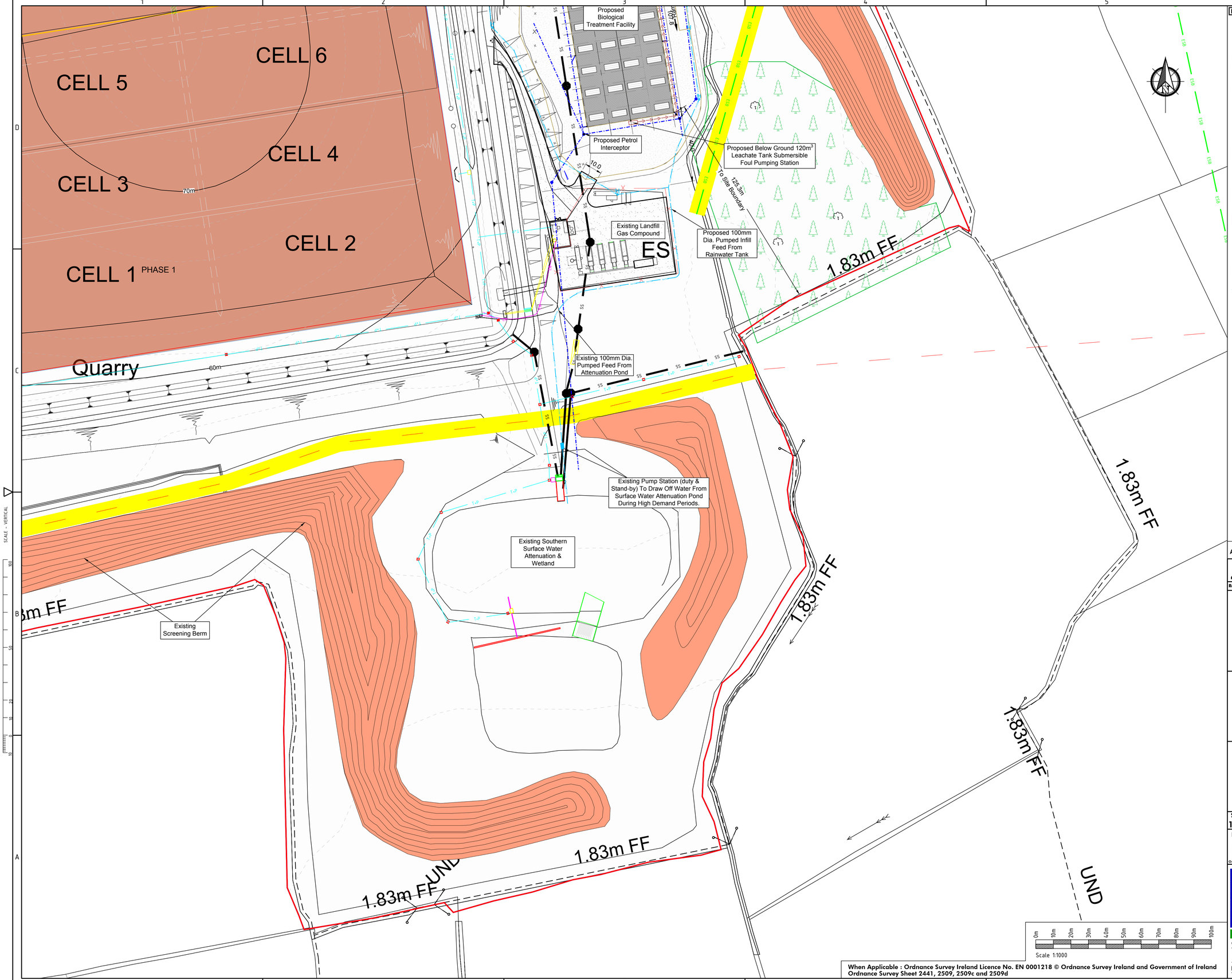

LEGEND

- Planning Boundary
- Areas Within Planning Boundary, Not Within Application Site
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PROPOSED SERVICES LEGEND

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- Leachate Collection
- Surface Water Drain
- Water Supply
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Rev.	Drawn	Chk'd	App'd	Date	Description
A	SK	CJC	BG	Cork 10.07.18	Issue For Planning Application

Revision History: A — EIAR

Name of Client

KNOCKHARLEY LANDFILL LTD.

Name of Job

PROPOSED DEVELOPMENT AT KNOCKHARLEY LANDFILL

Title of Drawing

PROPOSED SITE LAYOUT PLAN

SHEET 8 OF 8

Scales Used	This Drawing was printed to
1:1000	A1-

Dwg. No.	Rev.
LW14-821-01-P-0000-011	A

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Scale 1:1000 (0m 10m 20m 30m 40m 50m 60m 70m 80m 90m 100m)

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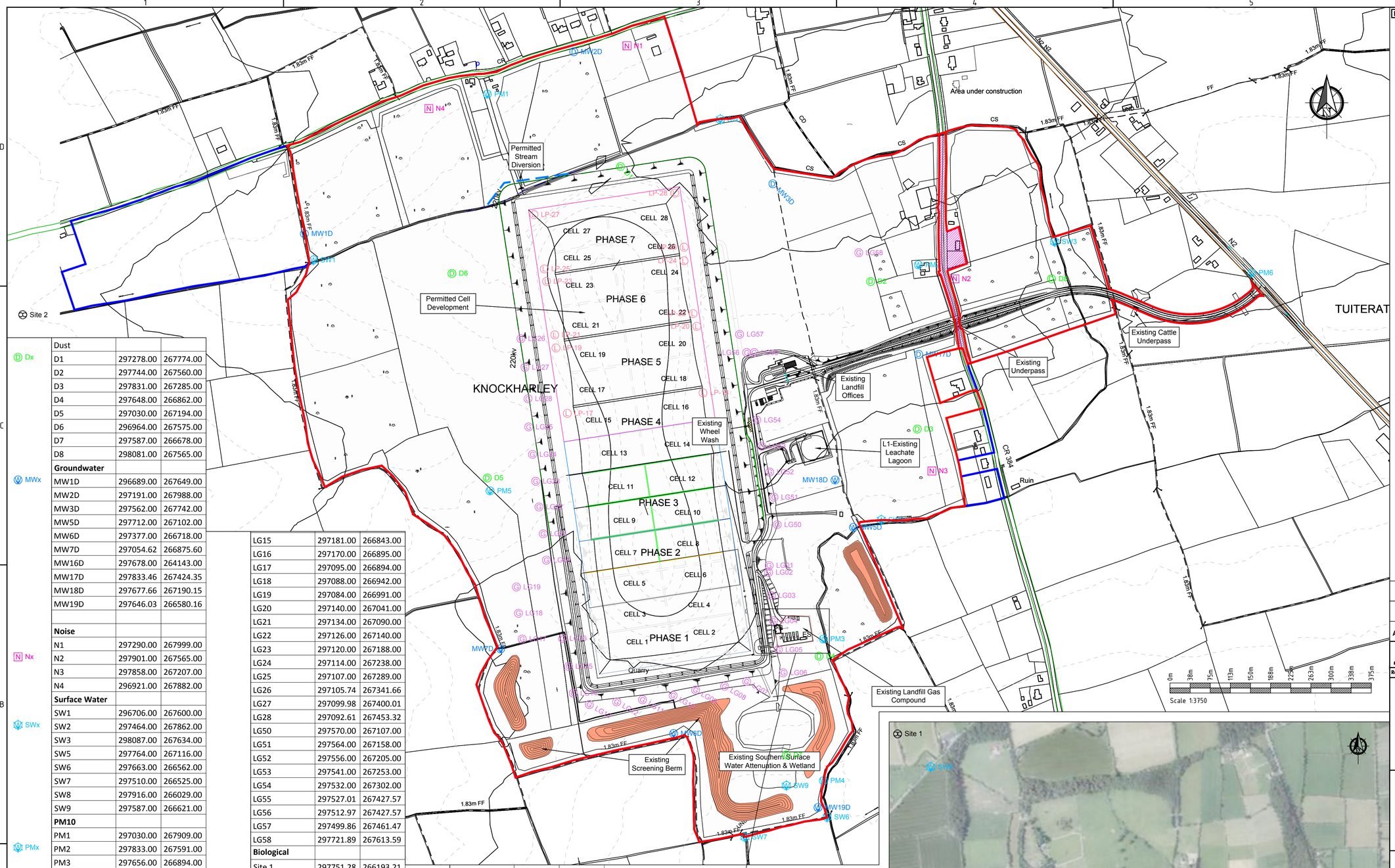
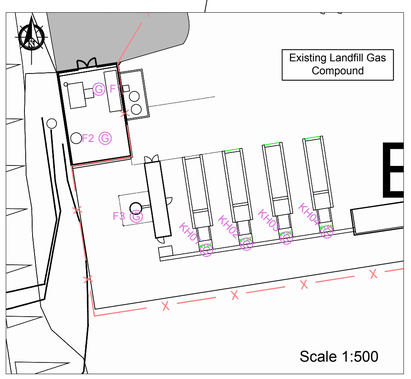
LEGEND

- Planning Boundary
- Areas Within Planning Boundary, Not Within Application Site
- Ownership Boundary

Note: MW17D, MW18D and MW19D were Installed in 2016 for baseline monitoring for proposed development

D Dx	Dust		
	D1	297278.00	267774.00
	D2	297744.00	267560.00
	D3	297831.00	267285.00
	D4	297648.00	266862.00
	D5	297030.00	267194.00
	D6	296964.00	267575.00
	D7	297587.00	266678.00
	D8	298081.00	267565.00
	Groundwater		
W MWx	MW1D	296689.00	267649.00
	MW2D	297191.00	267988.00
	MW3D	297562.00	267742.00
	MW5D	297712.00	267102.00
	MW6D	297377.00	266718.00
	MW7D	297054.62	266875.60
	MW16D	297678.00	264143.00
	MW17D	297833.46	267424.35
	MW18D	297677.66	267190.15
	MW19D	297646.03	266580.16
	Noise		
N Nx	N1	297290.00	267999.00
	N2	297901.00	267565.00
	N3	297858.00	267207.00
	N4	296921.00	267882.00
	Surface Water		
SW SWx	SW1	296706.00	267600.00
	SW2	297464.00	267862.00
	SW3	298087.00	267634.00
	SW5	297764.00	267116.00
	SW6	297663.00	266562.00
	SW7	297510.00	266525.00
	SW8	297916.00	266029.00
	SW9	297587.00	266621.00
	PM10		
PM PMx	PM1	297030.00	267909.00
	PM2	297833.00	267591.00
	PM3	297656.00	266894.00
	PM4	297656.00	266630.00
	PM5	297035.00	267170.00
	PM6	298454.00	267576.00
	Landfill Gas		
LG LGx	LG01	297555.00	267031.00
	LG02	297554.00	267018.00
	LG03	297559.00	266975.00
	LG04	297563.00	266928.00
	LG05	297572.00	266874.00
	LG06	297581.00	266831.00
	LG07	297513.00	266815.00
	LG08	297472.00	266806.00
	LG09	297418.00	266799.00
	LG10	297376.00	266789.00
	LG11	297319.00	266781.00
	LG12	297271.00	266777.00
	LG13	297220.00	266772.00
	LG14	297190.00	266793.00
	LG15	297181.00	266843.00
	LG16	297170.00	266895.00
	LG17	297095.00	266894.00
	LG18	297088.00	266942.00
	LG19	297084.00	266991.00
	LG20	297140.00	267041.00
	LG21	297134.00	267090.00
	LG22	297126.00	267140.00
	LG23	297120.00	267188.00
	LG24	297114.00	267238.00
	LG25	297107.00	267289.00
	LG26	297105.74	267341.66
	LG27	297099.98	267400.01
	LG28	297092.61	267453.32
	LG50	297570.00	267107.00
	LG51	297564.00	267158.00
	LG52	297556.00	267205.00
	LG53	297541.00	267253.00
	LG54	297532.00	267302.00
	LG55	297527.01	267427.57
	LG56	297512.97	267427.57
	LG57	297499.86	267461.47
	LG58	297721.89	267613.59
	Biological		
SiteX	Site 1	297751.28	266193.21
	Site 2	296164.36	267498.06
	Site 3	300118.26	264757.42
	Site 4	297817.74	265030.67
	Leachate		
L LPx	LP-1	297217.00	266895.00
	LP-2	297523.00	266943.00
	LP-3	297216.00	266904.00
	LP-4	297520.00	266962.00
	LP-5	297200.00	267006.00
	LP-6	297505.00	267051.00
	LP-7	297197.00	267107.00
	LP-8	297501.00	267072.00
	LP-9	297196.00	267106.00
	LP-10	297194.00	267112.00
	LP-11	297180.00	267137.00
	LP-12	297482.00	267183.00
	LP-13		
	LP-14	297463.00	267304.00
	LP-S	297612.00	267263.00
	Air		
G KHx	**LFG Plant**		
	KH01	297589.09	266889.81
	KH02	297595.61	266890.81
	KH03	297602.14	266891.81
	KH04	297608.74	266892.81
G Fx	F1	297571.54	266916.10
	F2	297572.56	266908.08
	F3	297577.64	266895.34





Rev.	Drawn	Chkd	Appd	Date	Description
A		CJC	BG	Cork 10.07.18	Issue For Planning Application

Revision History: A — EIAR

Name of Client

KNOCKHARLEY LANDFILL LTD.

Name of Job

PROPOSED DEVELOPMENT AT KNOCKHARLEY LANDFILL

Title of Drawing

EXISTING MONITORING POINTS

Scales Used	This Drawing was printed to
1:3750	A1 -

Dwg. No.	Rev.
LW14-821-01-P-0050-001	A

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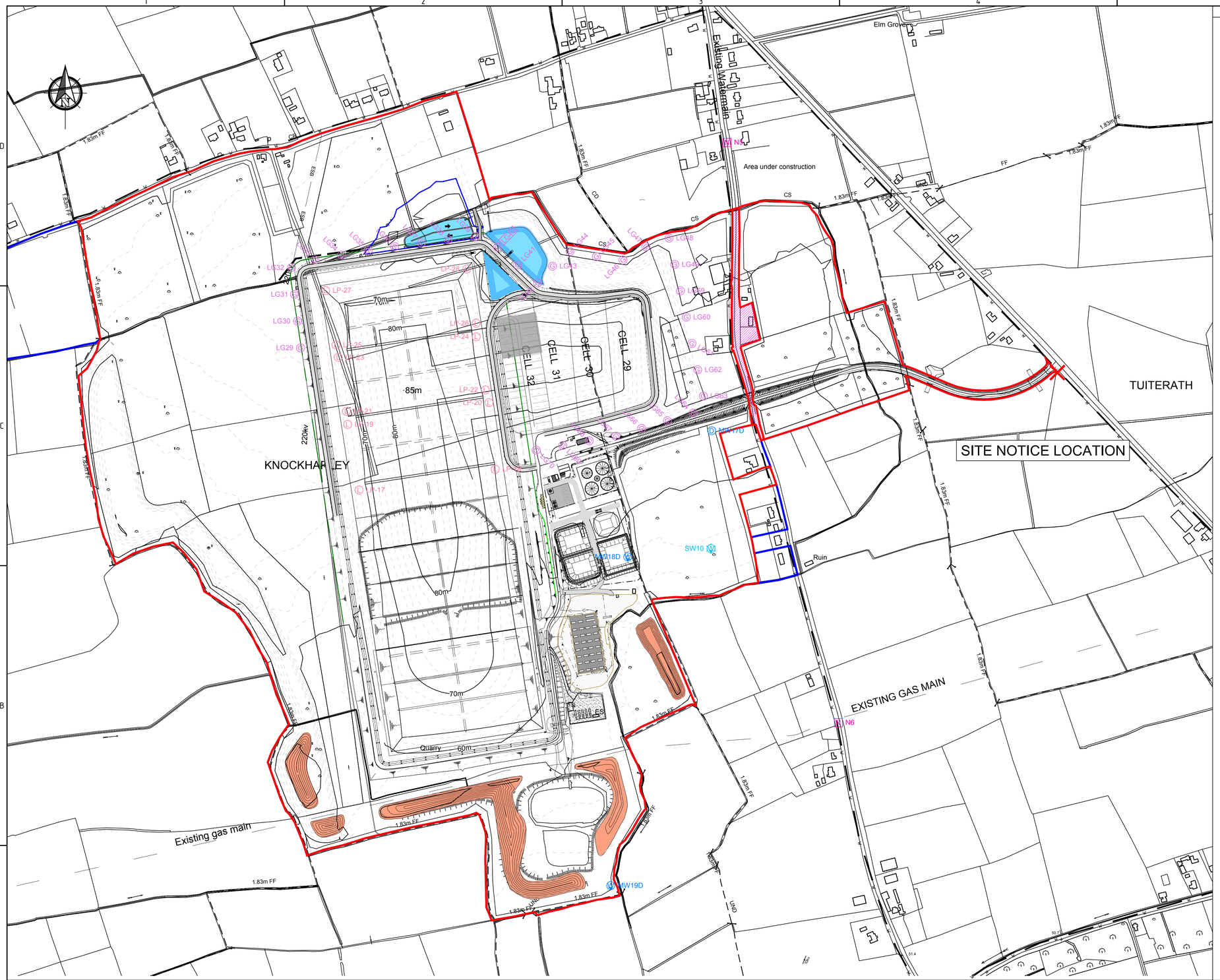

REF	EASTING	NORTHING
Gas		
LG29	297070	267578
LG30	297065	267628
LG31	297059	267677
LG32	297053	267727
LG33	297097	267741
LG34	297146	267750
LG35	297196	267759
LG36	297245	267766
LG37	297295	267773
LG38	297344	267779
LG39	297394	267785
LG40	297436	267765
LG41	297473	267732
LG42	297511	267699
LG43	297538	267730
LG44	297570	267757
LG45	297619	267747
LG46	297669	267741
LG47	297711	267766
LG48	297754	267782
LG49	297765	267733
LG59	297776	267684
LG60	297786	267635
LG61	297797	267586
LG62	297807	267538
LG63	297818	267489
LG64	297799	267457
LG65	297751	267443
LG66	297703	267429
LG67	297655	267414
LG68	297606	267406
LG69	297557	267397
LG70	297508	267388
Groundwater		
MW17D	297833	267424
MW18D	297678	267190
MW19D	297646	266580
Noise		
N5	297862	267959
N6	298069	266882
Surfacewater		
SW10	297832	267206
Leachate		
LP-17	297178.9149	267314.3403
LP-18	297431.7139	267352.6671
LP-19	297157.7742	267436.1495
LP-20	297420.2549	267476.5585
LP-21	297155.4964	267460.4859
LP-22	297413.2442	267500.0493
LP-23	297140.2212	267560.3116
LP-24	297396.3194	267598.6386
LP-25	297136.0972	267583.3901
LP-26	297396.3194	267623.7777
LP-27	297116.7019	267684.5522
LP-28	297378.986	267724.5276

LEGEND

- Planning Boundary
- Areas Within Planning Boundary, Not Within Application Site
- Ownership Boundary

Rev.	Drawn	Chk'd	App'd	Date	Description
A	SK	CJC	BG	Cork 10.07.18	Issue For Planning Application
Revision History	A			Rev Origin	EIAR

Name of Client

KNOCKHARLEY LANDFILL LTD.

Name of Job

PROPOSED DEVELOPMENT AT KNOCKHARLEY LANDFILL

Title of Drawing

PROPOSED ENVIRONMENTAL MONITORING LOCATIONS

Scales Used	This Drawing was printed to
1:3750	A1-

Dwg. No.	Rev.
LW14-821-01-P-0050-002	A

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0m 38m 75m 113m 150m 188m 225m 263m 300m 338m 375m
Scale 1:3750

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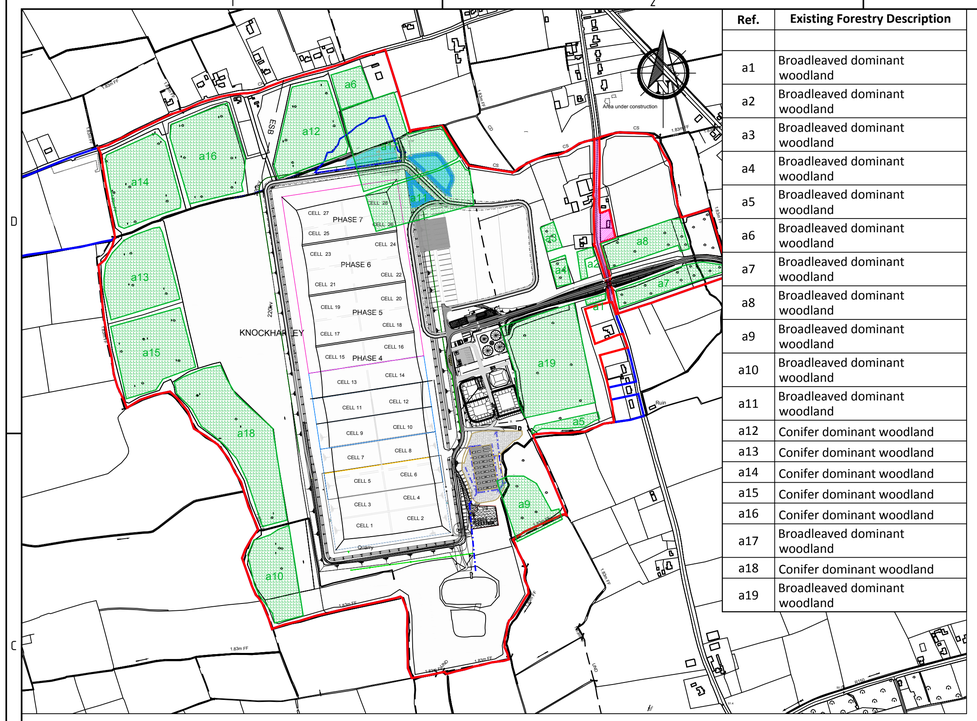
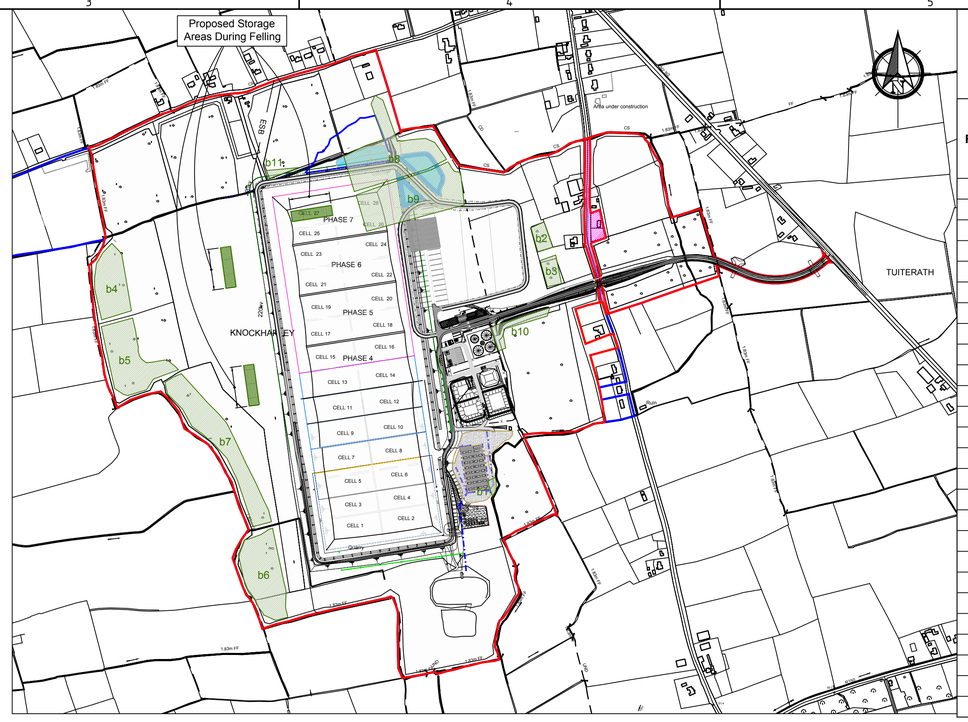


Ref.	Existing Forestry Description
a1	Broadleaved dominant woodland
a2	Broadleaved dominant woodland
a3	Broadleaved dominant woodland
a4	Broadleaved dominant woodland
a5	Broadleaved dominant woodland
a6	Broadleaved dominant woodland
a7	Broadleaved dominant woodland
a8	Broadleaved dominant woodland
a9	Broadleaved dominant woodland
a10	Broadleaved dominant woodland
a11	Broadleaved dominant woodland
a12	Conifer dominant woodland
a13	Conifer dominant woodland
a14	Conifer dominant woodland
a15	Conifer dominant woodland
a16	Conifer dominant woodland
a17	Broadleaved dominant woodland
a18	Conifer dominant woodland
a19	Broadleaved dominant woodland

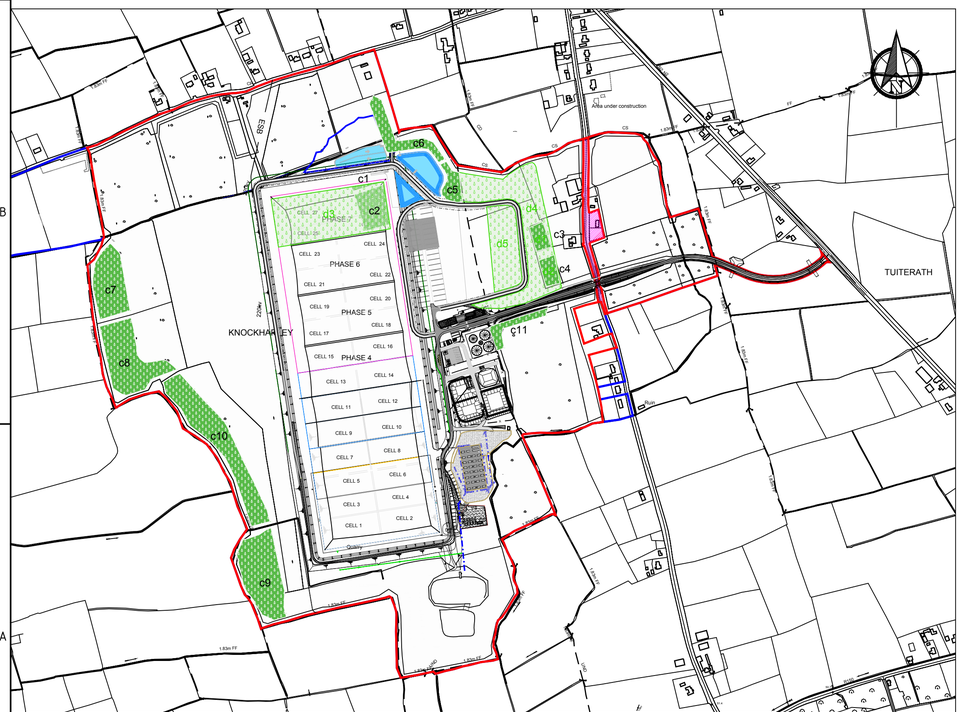
(a) EXISTING FOREST PLANTING



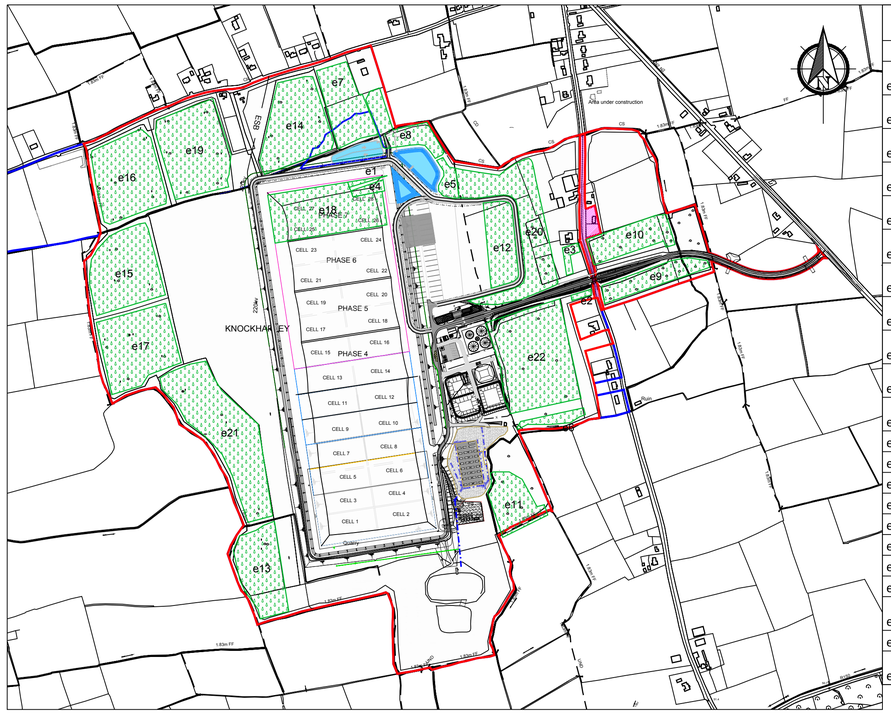
(b) PROPOSED FOREST FELLING

Ref.	Existing Forestry, (a)	Existing Forestry To Be Cut, (b)	Existing Forestry To Be Restored, (c)	New Forestry (New), (d)	Final Forestry Planting Areas. (e)
1	673	592	649	-2315	649
2	1677	2315	2315	-2596	673
3	2315	2596	2596	13916	1677
4	2596	11689	3257	32551	1728
5	3349	16793	3410	33676	3257
6	6909	17435	6575		3349
7	11269	21152	7061		17420
8	13677	23414	11689		11050
9	14348	25483	16793		11269
10	20878	3410	17435		13677
11	25716	794	21152		13756
12	28322				13916
13	28857				20878
14	29551				28322
15	29852				28857
16	32339				29551
17	38762				29852
18	42256				30190
19	43708				32339
20					32551
21					42256
22					43708
	Areas in sq. meters				
	377054	125673	92932	75232	410925

Reforestation means restoring forestry in areas that were felled to facilitate development.
New forestation means planting forestry in areas that were not previously forested to maintain the same level of forestry on the site.



(c) AREAS OF PROPOSED FORESTRY RESTORATION &
(d) NEW PLANTING



Ref.	Final Proposed Forestry Description
e1	Broadleaved dominant woodland
e2	Broadleaved dominant woodland
e3	Broadleaved dominant woodland
e4	Broadleaved dominant woodland
e5	Broadleaved dominant woodland
e6	Broadleaved dominant woodland
e7	Broadleaved dominant woodland
e8	Broadleaved dominant woodland
e9	Broadleaved dominant woodland
e10	Broadleaved dominant woodland
e11	Broadleaved dominant woodland
e12	Conifer dominant woodland
e13	Conifer dominant woodland
e14	Conifer dominant woodland
e15	Conifer dominant woodland
e16	Conifer dominant woodland
e17	Conifer dominant woodland
e18	Conifer dominant woodland
e19	Conifer dominant woodland
e20	Broadleaved dominant woodland
e21	Conifer dominant woodland
e22	Broadleaved dominant woodland

(e) PROPOSED FINAL FOREST PLANTING

0m 75m 150m 225m 300m 375m 450m 525m 600m 675m 750m
Scale 1:7500

Rev.	Drawn	Chk'd	App'd	Date	Description
A	SK	CJC	BG	10.07.18	Issue For Planning Application

Revision History A — EIAR

Name of Client
KNOCKHARLEY LANDFILL LTD.

Name of Job
PROPOSED DEVELOPMENT AT KNOCKHARLEY LANDFILL

Title of Drawing
EXISTING FORESTATION PROPOSED FELLING & NEW PLANTING

Scales Used: 1:7500
This Drawing was printed to A1 -
Dwg. No.: LW14-821-01-P-0050-003
Rev.: A
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LEGEND

- Planning Boundary
- Areas Within Planning Boundary, Not Within Application Site
- Ownership Boundary (Refer to dwg P-0000-BDY For Clarity)
- Existing Wayleave
- Ground Contours (90m / 100m)
- Existing Watercourse
- Landfill Cells currently being filled (2017/ '18)
- Constructed Landfill Cells
- Existing Forested Areas
- Permitted Landfill Cells, To Be Constructed

REFERENCE

1	Administration building
2	Machinery/maintenance garage
3	Portable cabins for storage (4 No)
4	Weighbridge Building
5	Weighbridge (2 No.)
6	Inspection slab
7	Quarantine slab
8	Car parking
9	Landfill gas treatment compound
10	Leachate lagoon
11	Surface water attenuation lagoon and wetland

Permitted Stream Diversion
Permitted Cell Development
PHASE 7
PHASE 6
PHASE 5
PHASE 4
PHASE 3
PHASE 2
PHASE 1
CELL 1 CELL 2 CELL 3 CELL 4 CELL 5 CELL 6 CELL 7 CELL 8 CELL 9 CELL 10 CELL 11 CELL 12 CELL 13 CELL 14 CELL 15 CELL 16 CELL 17 CELL 18 CELL 19 CELL 20 CELL 21 CELL 22 CELL 23 CELL 24 CELL 25 CELL 26 CELL 27 CELL 28
KNOCKHARLEY
Area under construction
Elm Grove
TUITERATH
Existing Cattle Underpass
Existing Underpass
SITE NOTICE LOCATION
Existing Wheel Wash
L1-Existing Leachate Lagoon
Existing O/H 20KV Powerline
Ruin
Existing Landfill Gas Compound
Existing Screening Berm
Existing Southern Surface Water Attenuation & Wetland
EXISTING GAS MAIN
Existing Landfill Offices
Existing Weighbridge & Hut
Existing Maintenance Area
Quarry
Scale 1:1000
Scale 1:3750
0m 38m 75m 113m 150m 188m 225m 263m 300m 338m 375m

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Ordnance Survey Sheet 2441, 2509, 2509c and 2509d

Rev.	Drawn	Chk'd	App'd	Date	Description
A	SK	CJC	BG	10.07.18	Issue For Planning Application
				Rev Origin	
Revision History	A				EIAR

Name of Client

KNOCKHARLEY LANDFILL LTD.

Name of Job

PROPOSED DEVELOPMENT AT KNOCKHARLEY LANDFILL

Title of Drawing

EXISTING SITE LAYOUT WITH INFRASTRUCTURE LOCATIONS

Scales Used	This Drawing was printed to
1:3750	A1-

Dwg. No.	Rev.
LW14-821-01-P-0050-004	A

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LEGEND

- Planning Boundary
- Areas Within Planning Boundary, Not Within Application Site
- Ownership Boundary — Refer to dwg P-0000-BDY For Clarity
- Existing Wayleave
- Ground Contours
- Existing Watercourse
- Landfill Cells currently being filled (2017/ '18)
- Constructed Landfill Cells
- Final Forested Areas
- Permitted Landfill Cells, To Be Constructed
- 1a / 1c — Proposed IBA Facility
- IBA / 1b — IBA, Cell 33 (Outline Only Shown For Calrity)
- Proposed Screening Berms with New Replanting
- Proposed Stream Diversion
- Existing Berm

REFERENCE

1	**Proposed waste types, activities & quantities**
1a	Non stabilised residual
1b	IBA
1c	"Inert" + stabilised
2	**Proposed intensification of landfilling**
2a	Increased profile
2b	Revised cell layout and additional working faces
3	**Proposed dedicated IBA cells**
3a	IBA Cell layout
3b	Additional road access
3c	Additional wheel wash
3d	Suspended solids management leachate
3e	Additional side risers and rising mains
3f	Suspended solids management
3g	Weathering area and temporary building
4	**Proposed biological treatment plant**
5	**Proposed leachate plant**
5a	Bunded storage
5b	Floating cover lagoons
5c	Tanker loading area
5d	Leachate treatment / conditioning area
6	**Proposed surface water/drainage infrastructure**
6a	Additional surface water attenuation
6b	Surface water outfall
6c	Flood compensation
6d	Surface water holding pond
7	**Earth balance and proposed berms**
7a	Berm phase 1
7b	Berm phase 2
8	**Proposed extent of tree felling cut back**
9	**Relocation of ESB powerline**
10	**Ancillary infrastructure**
10a	Additional ESB substation
10b	Additional ESB substation
10c	Additional drainage
10d	New overhead line

Scale 1:3750

Rev.	Drawn	Chk'd	App'd	Date	Description
A	SK	CJC	BG	10.07.18	Issue For Planning Application
Revision History	A			Cork	EIAR

Name of Client

KNOCKHARLEY LANDFILL LTD.

Name of Job

PROPOSED DEVELOPMENT AT KNOCKHARLEY LANDFILL

Title of Drawing

PROPOSED SITE LAYOUT PLAN WITH INFRASTRUCTURE LOCATIONS

Scales Used	This Drawing was printed to
1:3750	A1-

Dwg. No.	Rev.
LW14-821-01-P-0050-005	A

O:\ACAD\2014\LW14\821\01\PLANNING APPLICATION\LW14-821-01-P-0050-005

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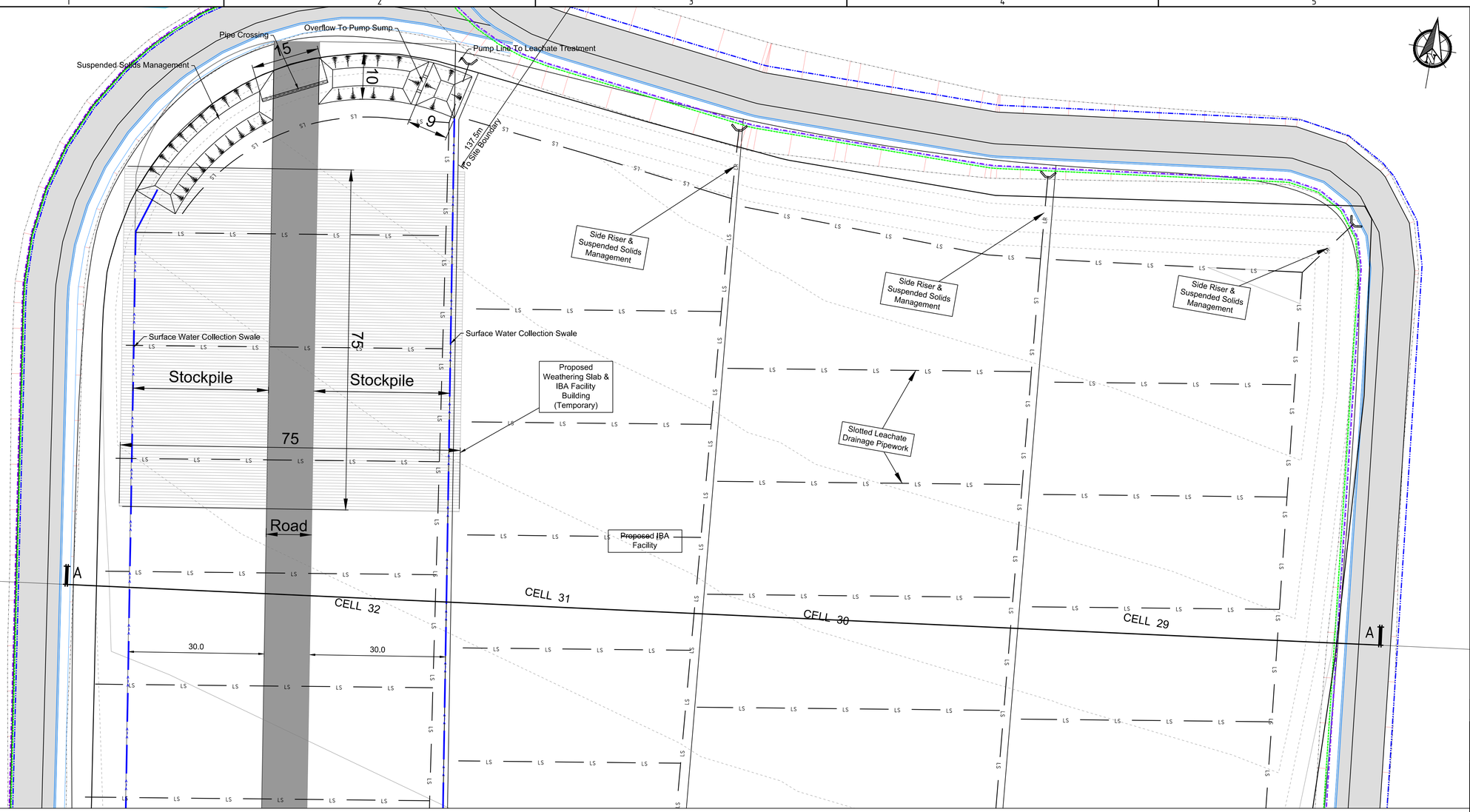

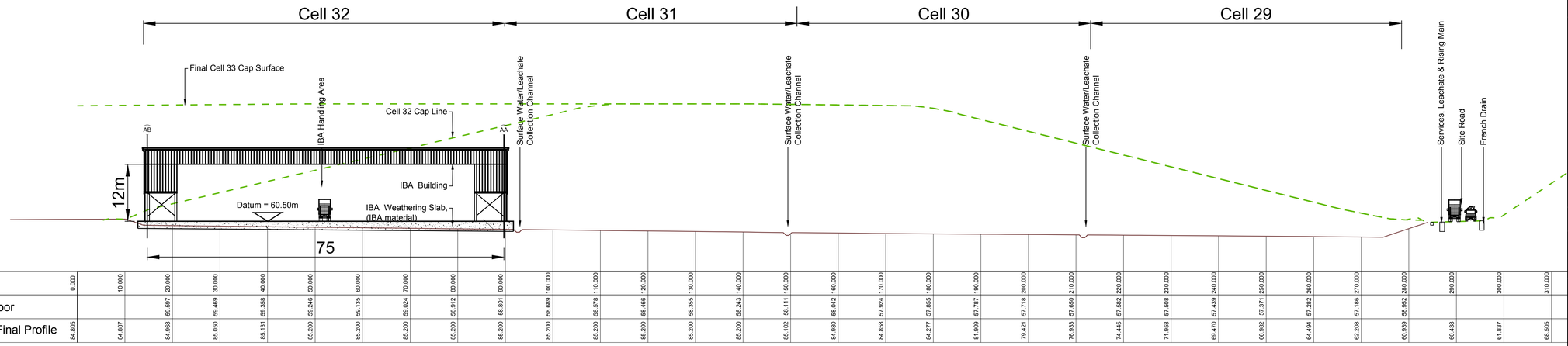

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IBA Cell Floor			59.597	59.469	59.398	59.246	59.135	59.024	58.912	58.801	58.689	58.578	58.466	58.355	58.243	58.111	58.042	57.924	57.855	57.787	57.718	57.650	57.582	57.508	57.439	57.371	57.282	57.186	58.952			
Proposed Final Profile	84.805	84.887	84.868	85.050	85.151	85.200	85.200	85.200	85.200	85.200	85.200	85.200	85.200	85.200	85.200	85.102	84.890	84.558	84.277	81.909	79.421	76.933	74.445	71.958	69.470	66.982	64.494	62.206	60.039	60.438	61.837	68.805

IBA SECTION A

Scale 1:500

Legend

Leachate Side Riser & Suspended Solids Management

Leachate Pipework

Rev.	Drawn	Chk'd	App'd	Rev Origin	Description
A		CJC	BG	Cork 10.07.18	Issue For Planning Application

Revision History: A — EIAR

Name of Client

KNOCKHARLEY LANDFILL LTD.

Name of Job

PROPOSED DEVELOPMENT AT KNOCKHARLEY LANDFILL

Title of Drawing

PROPOSED IBA FACILITY BUILDING LOCATION AND CROSS SECTION

Scales Used	This Drawing was printed to
1:500	A1-

Dwg. No.	Rev.
LW14-821-01-P-0050-006	A

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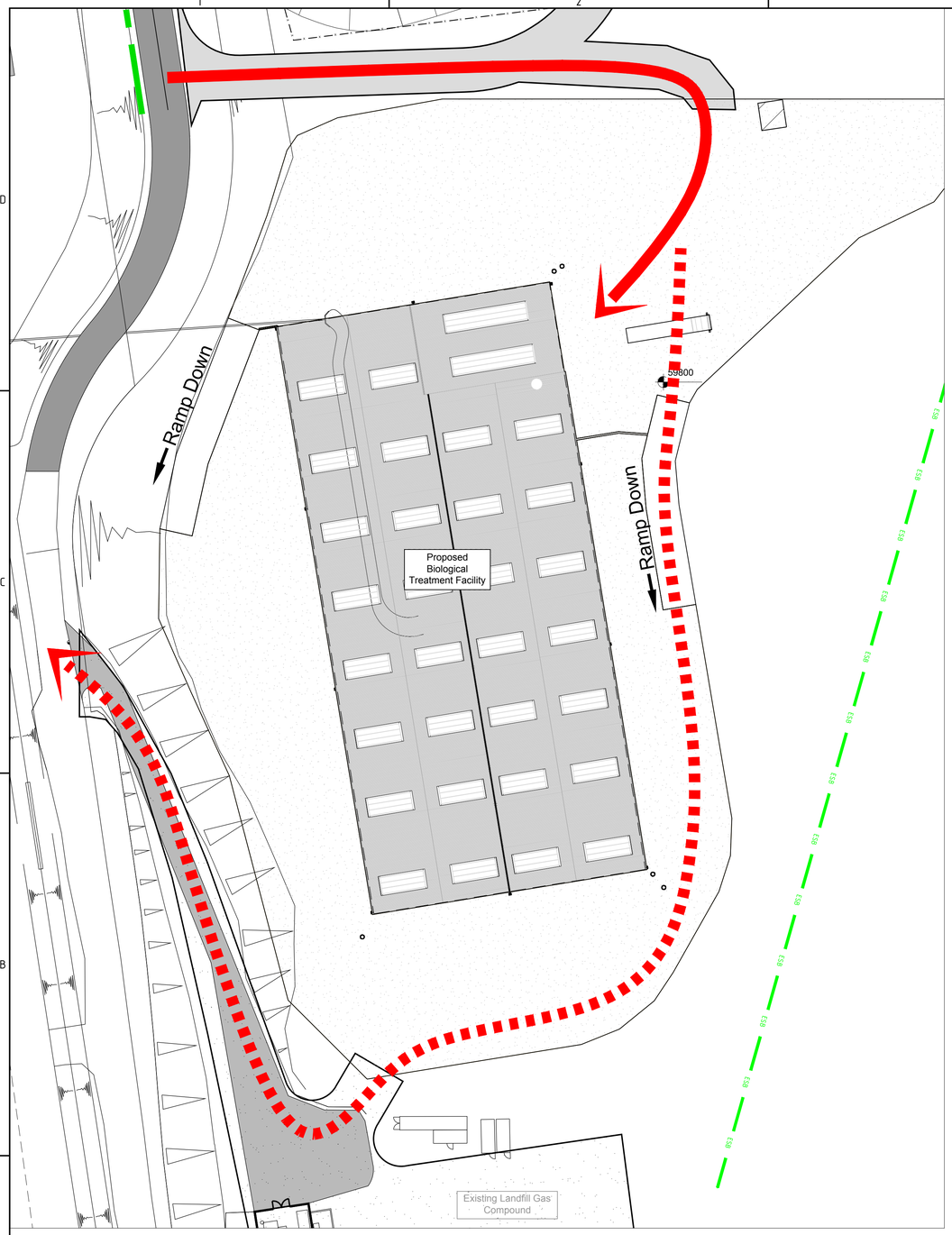
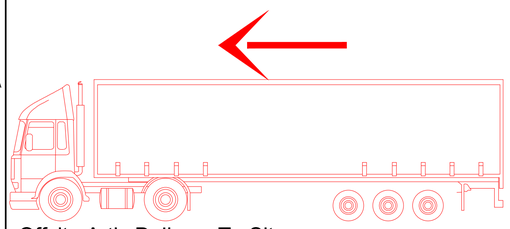
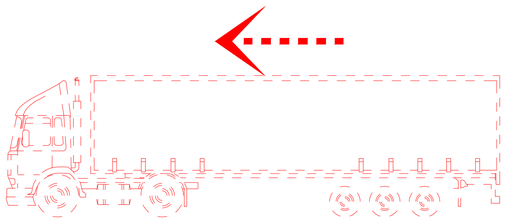
ORIGINAL DRAWING SIZE A1 - (841 x 594)



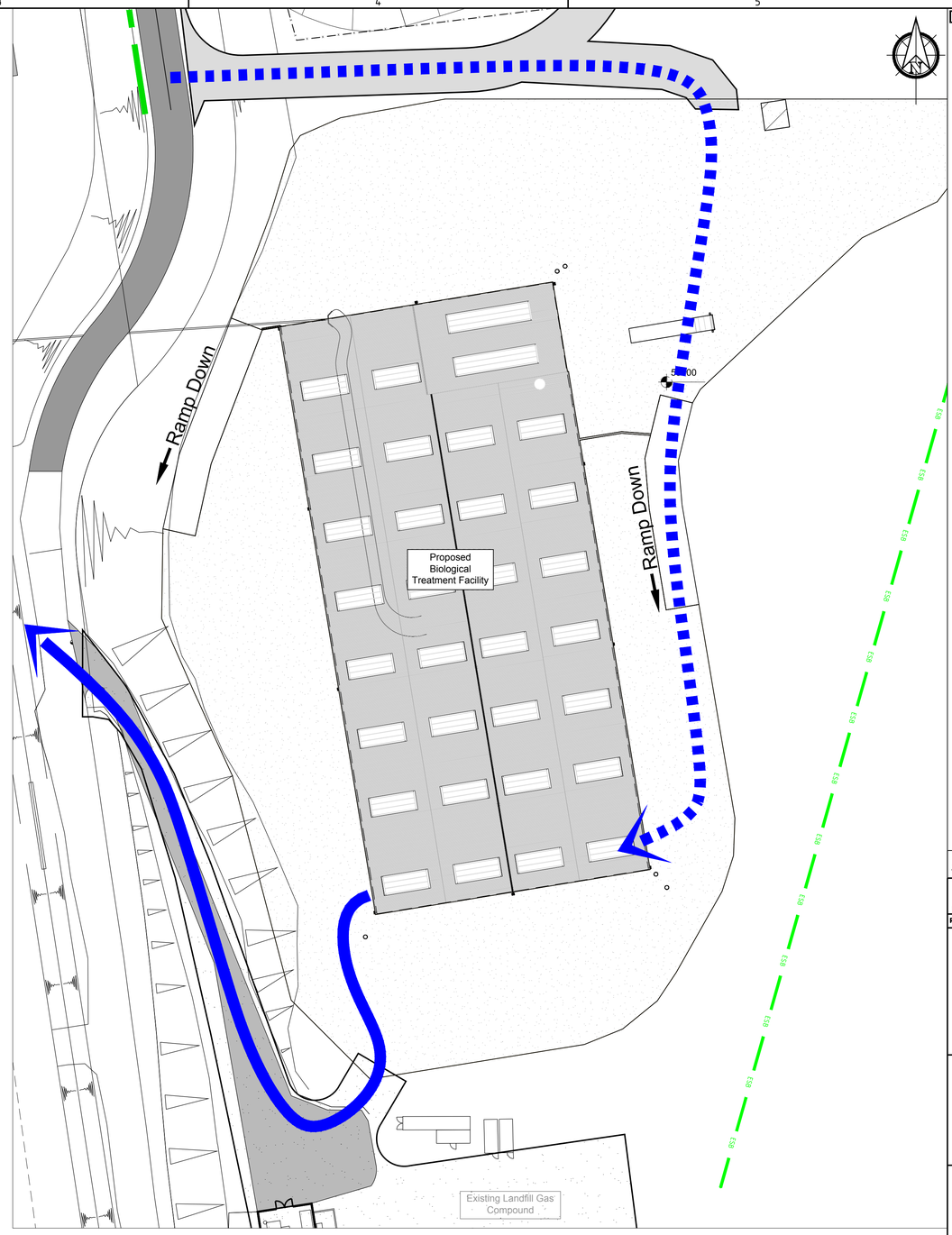
BIOLOGICAL TREATMENT BUILDING RECEIVING WASTE



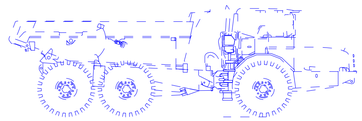
Offsite Artic Delivery To Site



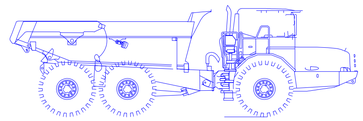
Offsite Artic Leaving To Site



BIOLOGICAL TREATMENT BUILDING TRANSFERING TO CELL



Onsite Dump Truck Returning From Cell Empty



Onsite Dump Truck Returning To Cell Loaded

Rev.	Drawn	Chk'd	App'd		
A		CJC	BG	Cork	Issue For Planning Application
				10.07.18	
				Rev Origin	Description
				Date	

Revision History: A — EIAR

Name of Client

KNOCKHARLEY LANDFILL LTD.

Name of Job

PROPOSED DEVELOPMENT
AT KNOCKHARLEY LANDFILL

Title of Drawing

TRAFFIC MANAGEMENT
BIOLOGICAL TREATMENT FACILITY

Scales Used	This Drawing was printed to A1:-
1:500	

Dwg. No.	Rev.
LW14-821-01-P-0050-008	A

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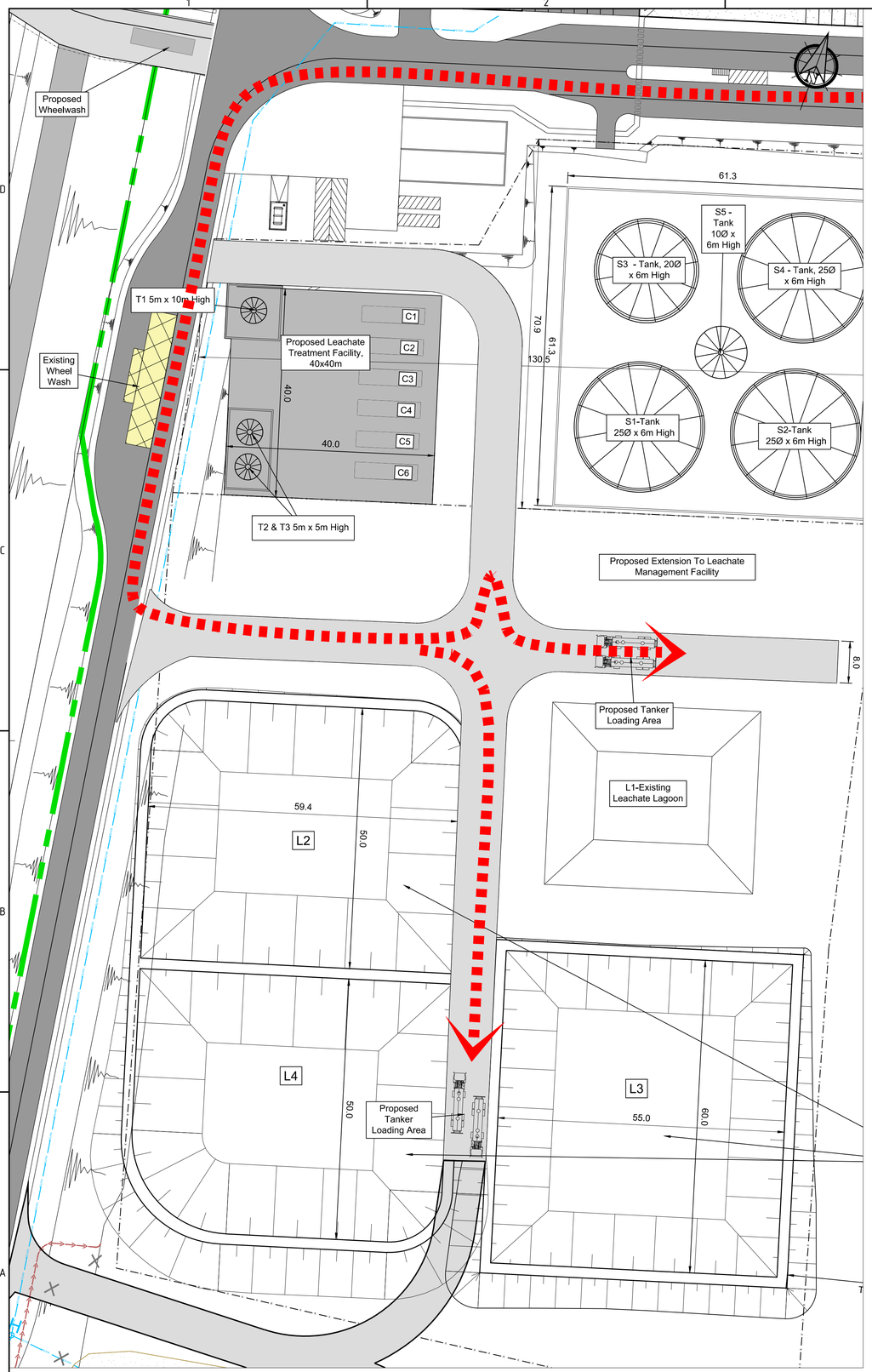
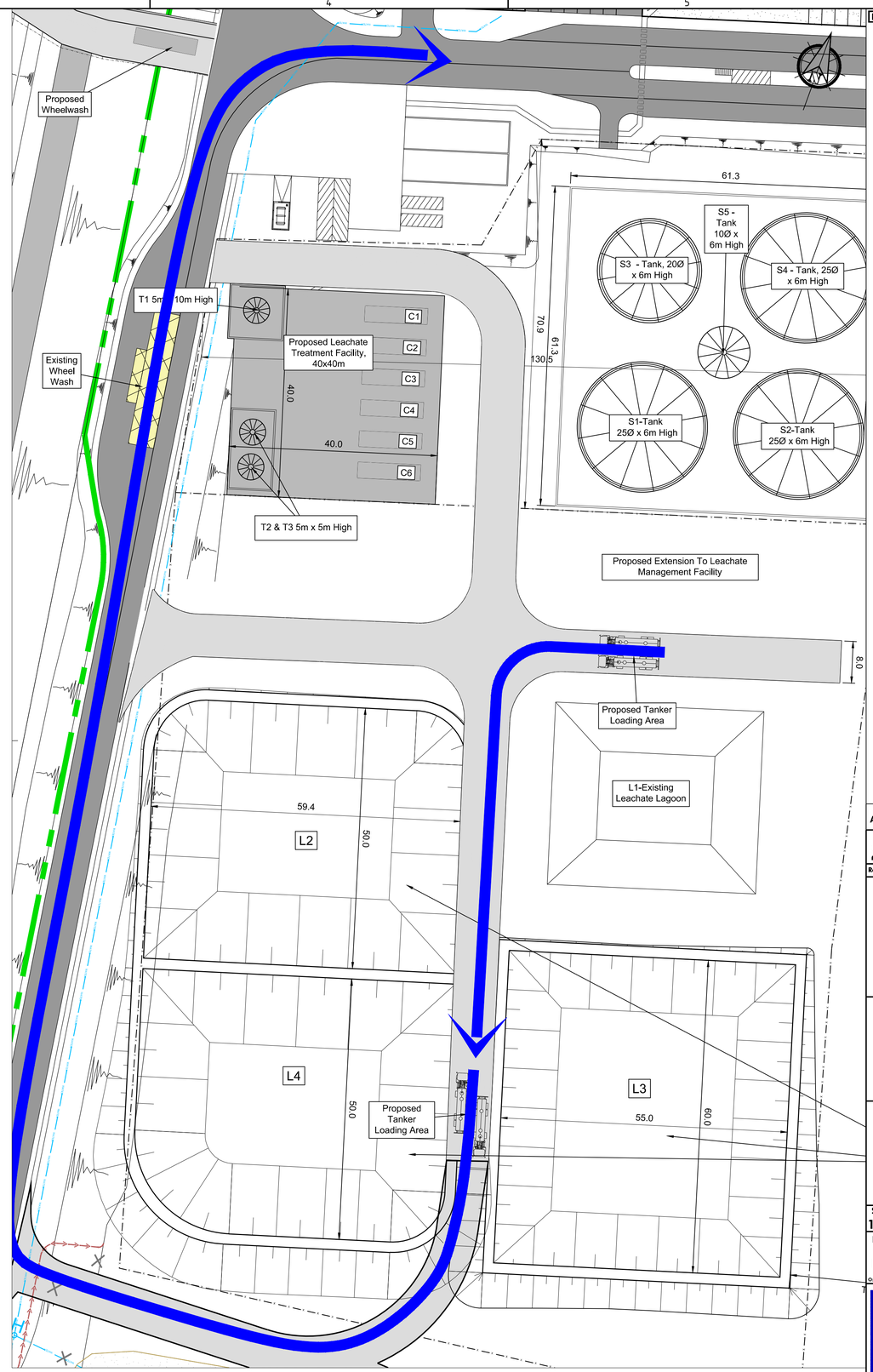


EMPTY TANKER INTO LEACHATE TREATMENT FACILITY



TANKER OUT OF LEACHATE TREATMENT FACILITY

Offsite Tanker (Empty) To Site

Offsite Tanker Leaving Site

Rev.	Drawn	Chkd	Appd	Date	Description
A		CJC	BG	Cork 10.07.18	Issue For Planning Application

Revision History: A — EIAR

Name of Client

KNOCKHARLEY LANDFILL LTD.

Name of Job

PROPOSED DEVELOPMENT AT KNOCKHARLEY LANDFILL

Title of Drawing

TRAFFIC MANAGEMENT LEACHATE MANAGEMENT FACILITY

Scales Used	This Drawing was printed to
1:500	A1-

Dwg. No.	Rev.
LW14-821-01-P-0050-009	A

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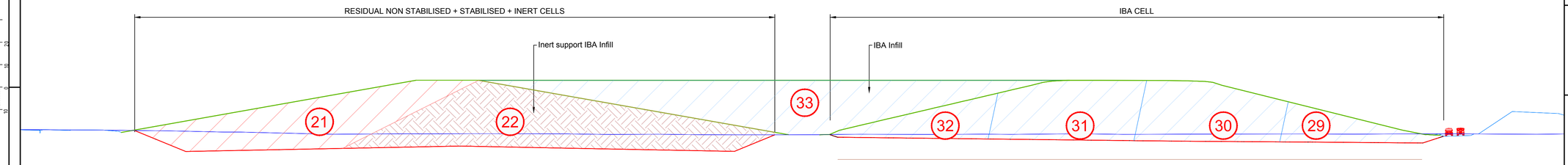

SECTION A-A (Scale 1:1000)

LEGEND

- Planning Boundary
- Areas Within Planning Boundary, Not Within Application Site
- Ownership Boundary (Refer to dwg P-0000-BDY For Clarity)
- Existing Wayleave
- Ground Contours (90m / 100m)
- Existing Watercourse
- Landfill Cells currently being filled (2017/'18)
- Residual Non Stabilised
- Inert Stabilised
- IBA
- Direction Of Waste Placement
- 29 Cell Number

Rev.	Drawn	Chk'd	App'd	Rev Origin	Description
A	SK	CJC	BG	Cork 10.07.18	Issue For Planning Application

Revision History: A — EIAR

Name of Client

KNOCKHARLEY LANDFILL LTD.

Name of Job

PROPOSED DEVELOPMENT AT KNOCKHARLEY LANDFILL

Title of Drawing

PROPOSED CELL FILLING

Scales Used	This Drawing was printed to A1-
1:2500	

Dwg. No.	Rev.
LW14-821-01-P-0050-010	A

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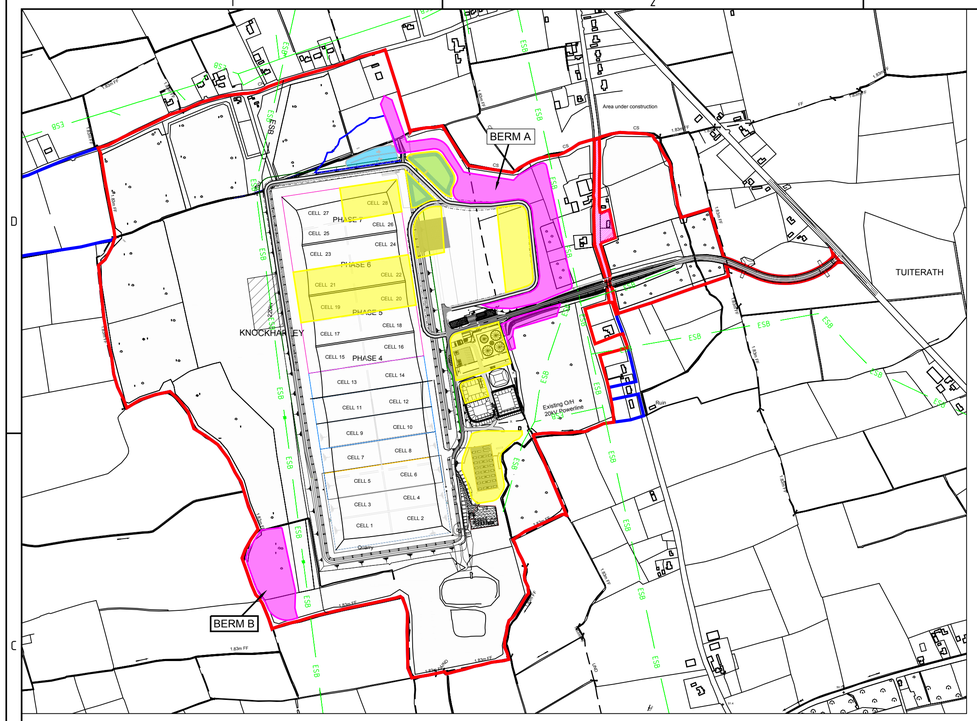
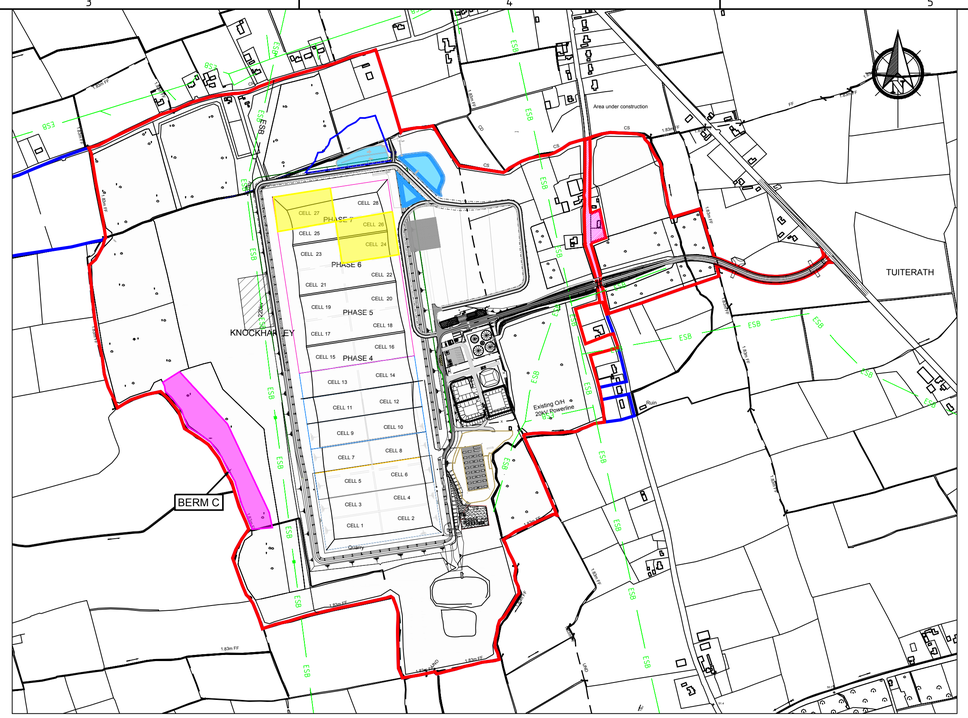
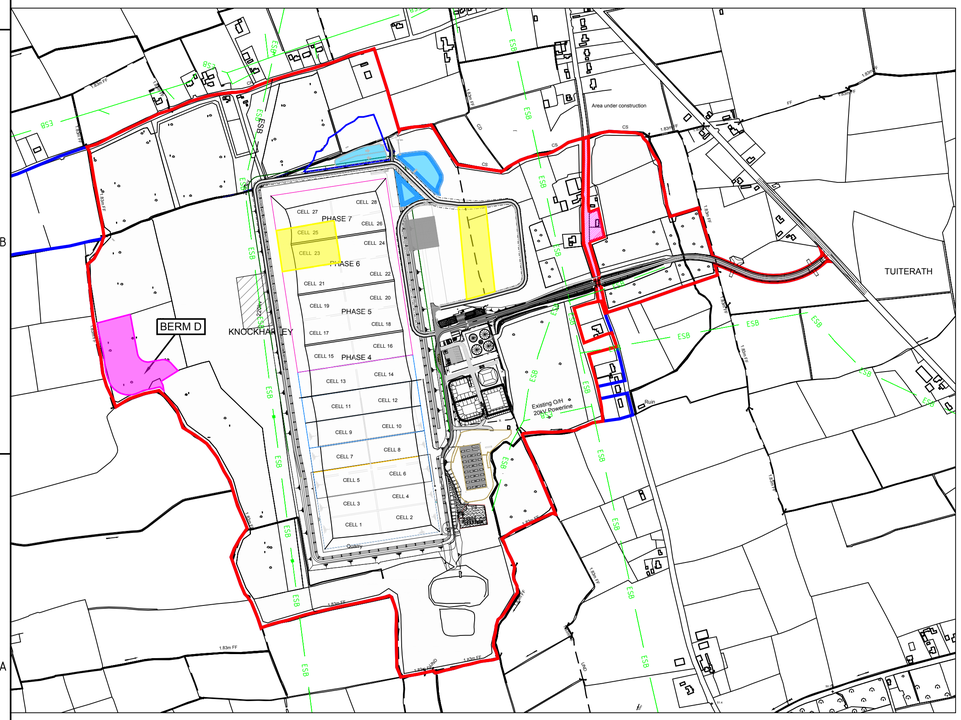


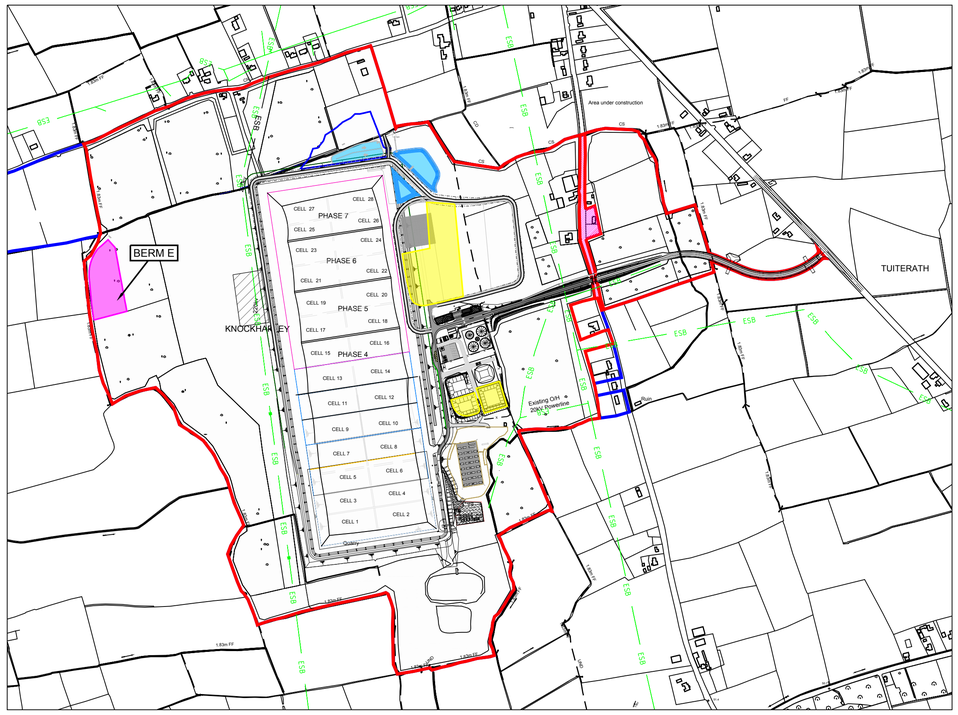
a. CUT - Construction year 0, 1 & 2
b. BERM FILL - Construction year 0, 1 & 2
c. Temporary stockpile area.



a. CUT - Construction year 3 & 4
b. BERM FILL - Construction year 3 & 4
c. Temporary stockpile area.



a. CUT - Construction year 5 & 6
b. BERM FILL - Construction year 5 & 6
c. Temporary stockpile area.



a. CUT - Construction year 7 & 8
b. BERM FILL - Construction year 7 & 8
c. Temporary stockpile area.

	Notes
1	Refer to Chapter 2 Proposed Development - Section Construction Phase Methodology.
2	Refer to Dwg Lw14-821-01-P-0050-003 for Proposed felling and Compensatory Planting Details.
3	Earthwork phasing associated with capping ommited for clarity on Dwg. Capping under prevailing waste license conditions typically requires a cap to be in place 12 months after waste reaches pre-settlment and will be subject to Specified Engineering Submission to Agency.
4	Construction year 0 refers to onging cell works under permitted development. Years 1 + will be subject to grant of permission for proposed development.

Scale 1:7500
0m 75m 150m 225m 300m 375m 450m 525m 600m 675m 750m

Rev.	Drawn	Chk'd	App'd	BG	
A		CJC		Cork 10.07.18	Issue For Planning Application
				Rev Origin	Description
				Date	

Revision History A — EIAR

Name of Client

KNOCKHARLEY LANDFILL LTD.

Name of Job

PROPOSED DEVELOPMENT AT KNOCKHARLEY LANDFILL

Title of Drawing

CUT/FILL PHASING PLAN

Scales Used 1:7500

This Drawing was printed to A1.

Dwg. No. LW14-821-01-P-0050-011

Rev. A

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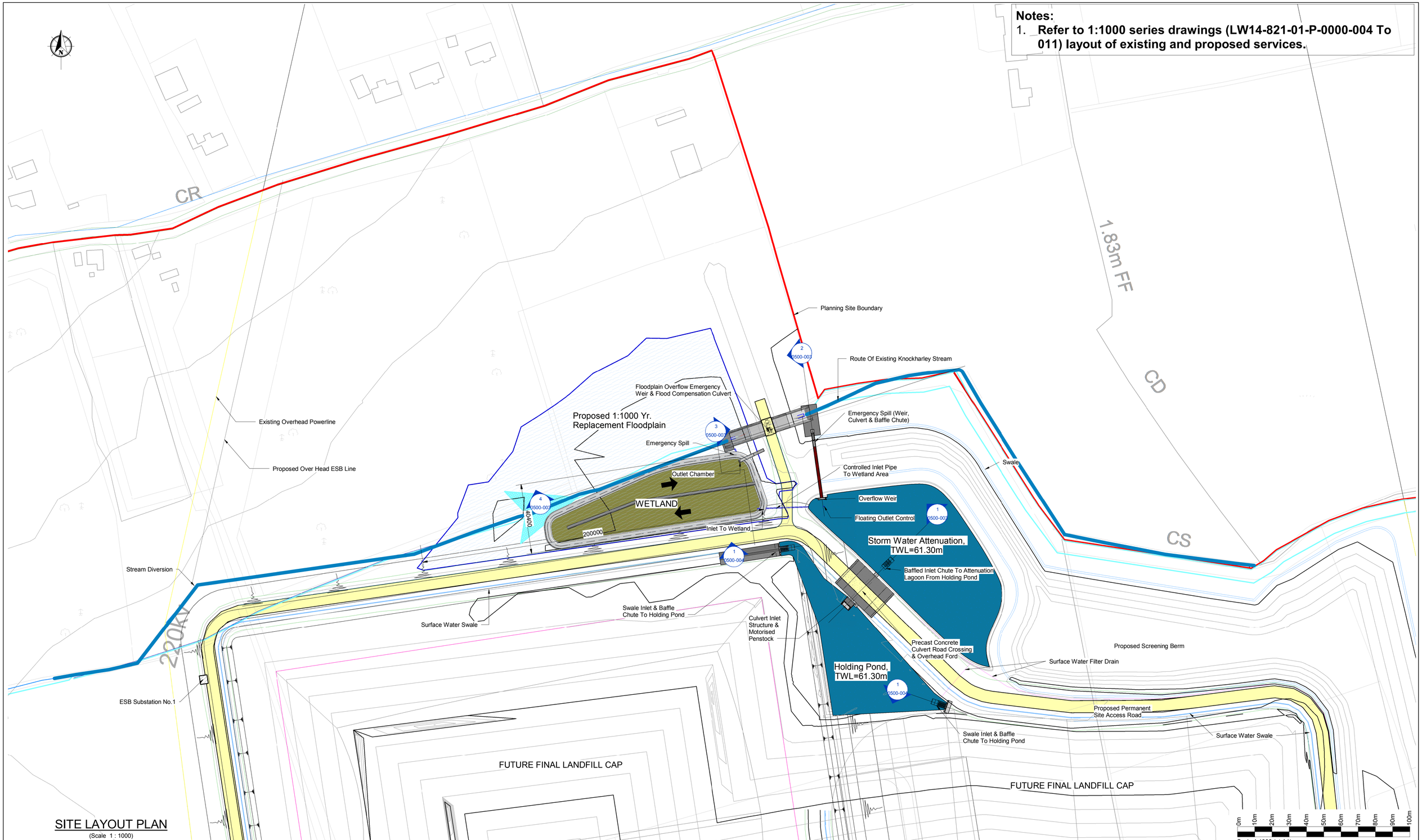
Notes:
1. **Refer to 1:1000 series drawings (LW14-821-01-P-0000-004 To 011) layout of existing and proposed services.**



SITE LAYOUT PLAN

(Scale 1 : 1000)

Rev.	Description	App By	Date
A	ISSUE FOR PLANNING APPLICATION	BG	10.07.18

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CODE	STATUS	SUITABILITY DESCRIPTION	PURPOSE OF ISSUE
0500		PLANNING	EIAR

PROJECT

PROPOSED DEVELOPMENT AT KNOCKHARLEY LANDFILL

CLIENT

KNOCKHARLEY LANDFILL Ltd.

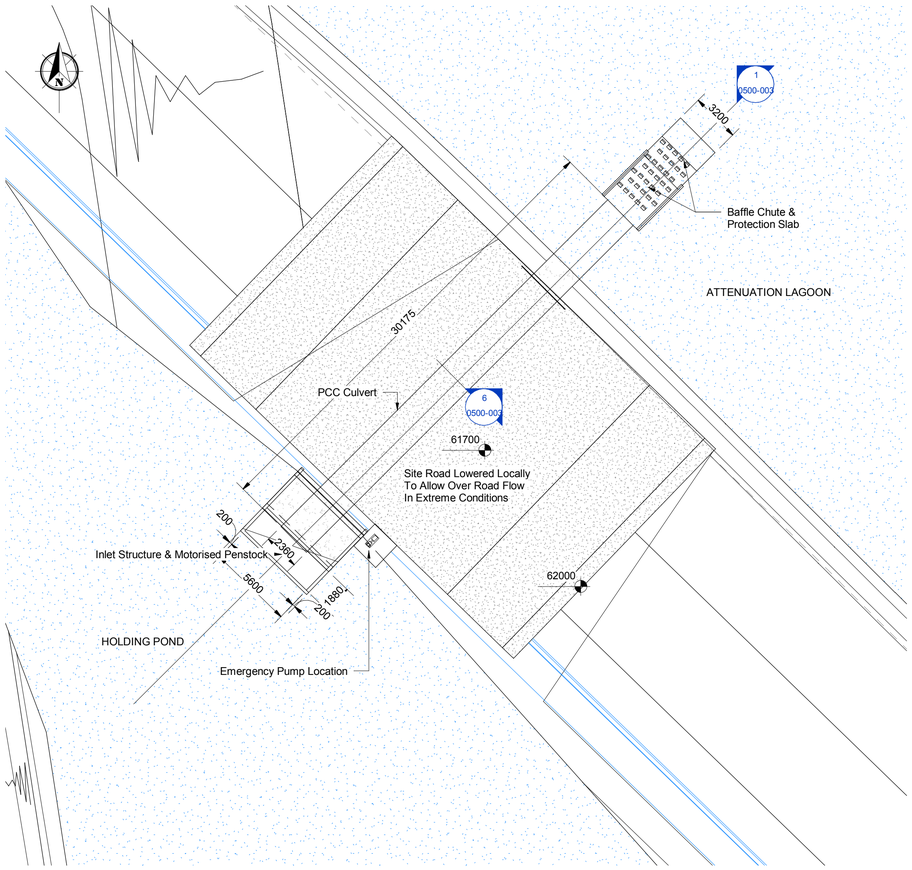
SHEET

PROPOSED LAYOUT PLAN OF SURFACE WATER MANAGEMENT INFRASTRUCURE

Date	Project number	Scale (@ A1)
09/11/17	LW14-821-01	As indicated
Drawn by SK	Drawing Number	Rev
Checked by CJC	LW14-821-01-P-0500-001	A

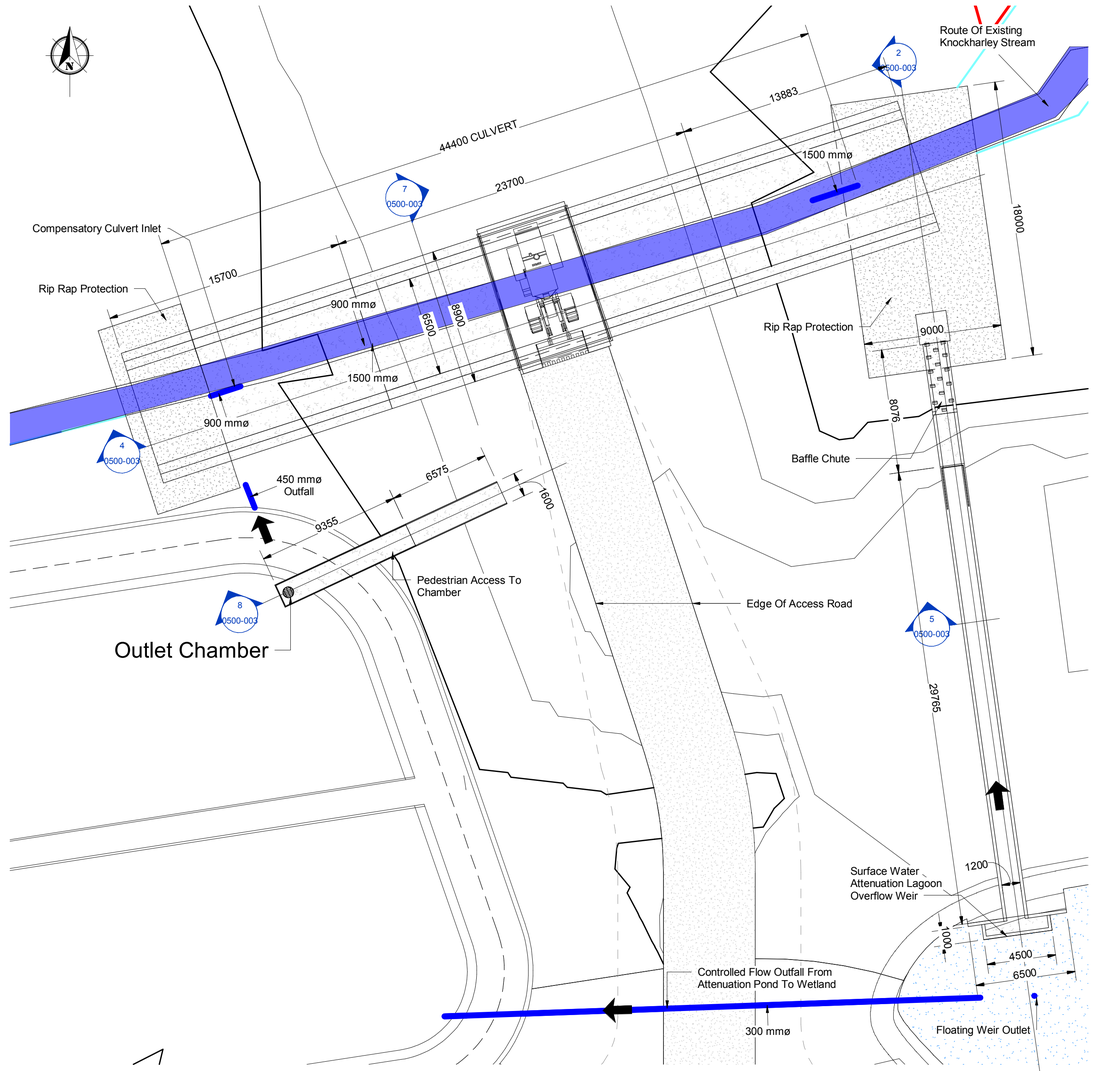
Drawing printed: 13/07/2018 12:15:45

Notes:
1. **Refer to 1:1000 series drawings (LW14-821-01-P-0000-004 To 011) layout of existing and proposed services.**



1/200 LAYOUT PLAN OF ATTENUATION INLET STRUCTURE

(Scale 1 : 200)



1/200 LAYOUT PLAN OF FLOODPLAIN OVERFLOW WEIR AND ATTENUATION POND OVERFLOW

(Scale 1 : 200)

0m 2m 4m 6m 8m 10m 12m 14m 16m 18m 20m

Scale 1:200 (at A1)

Rev.	Description	App By	Date
A	ISSUE FOR PLANNING APPLICATION	BG	10.07.18

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CODE	STATUS	SUITABILITY DESCRIPTION	PURPOSE OF ISSUE
0500		PLANNING	EIAR

PROJECT

PROPOSED DEVELOPMENT AT KNOCKHARLEY LANDFILL

CLIENT

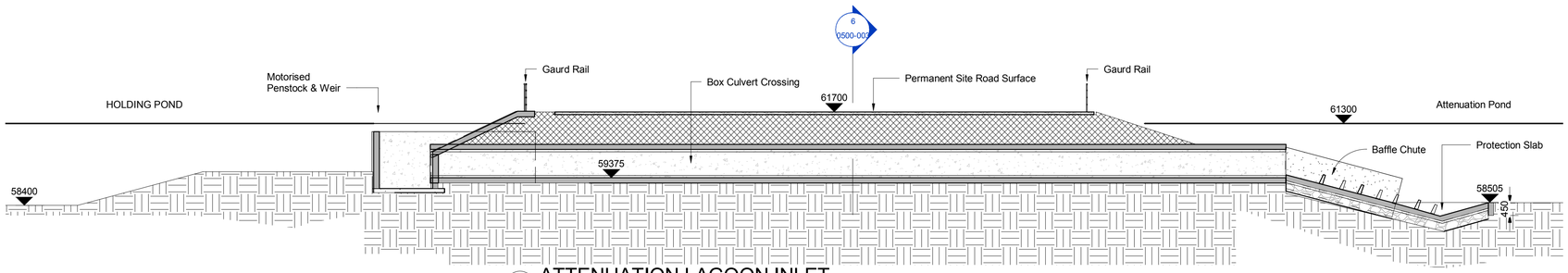
KNOCKHARLEY LANDFILL Ltd.

SHEET

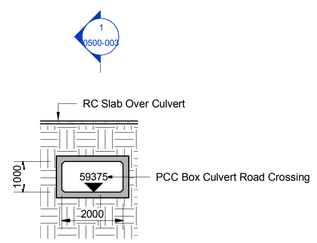
SURFACE WATER MANAGEMENT INFRASTRUCTURE LAYOUT PLANS

Date	Project number	Scale (@ A1)
09/11/17	LW14-821-01	As indicated
Drawn by SK	**Drawing Number**	**Rev**
Checked by CJC	LW14-821-01-P-0500-002	A

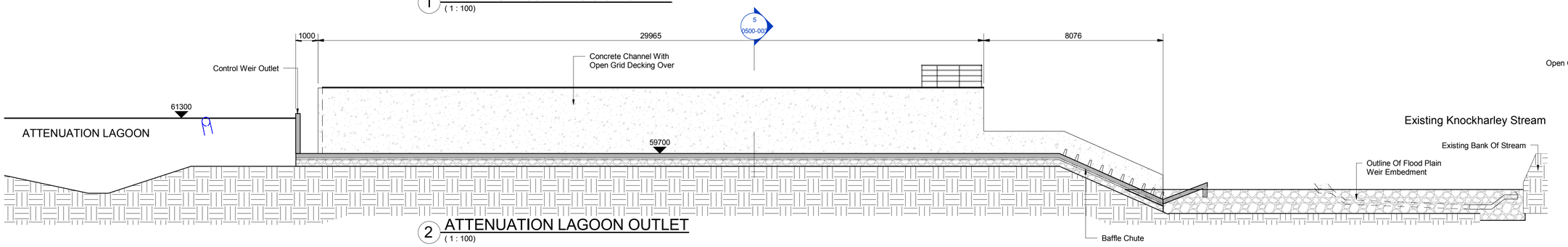
Drawing printed: 09/07/2018 10:29:24



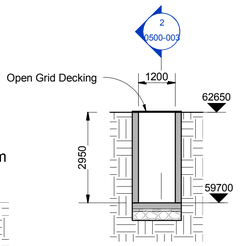
1 ATTENUATION LAGOON INLET
(1 : 100)



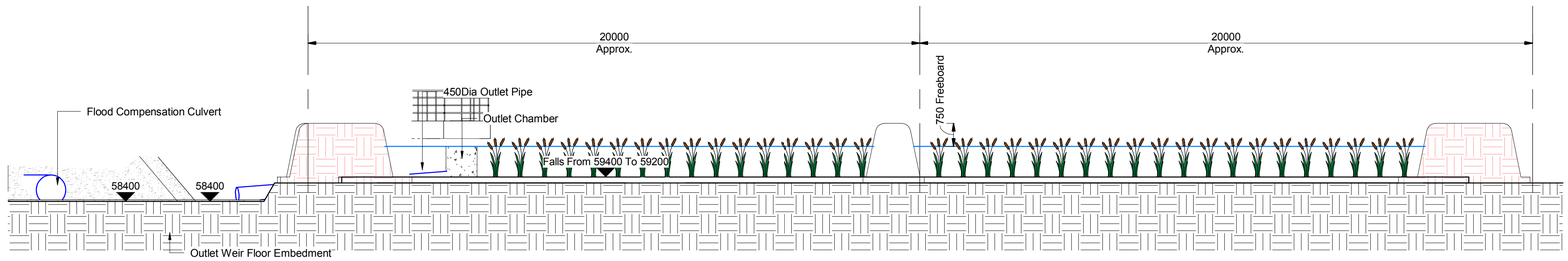
SECTION 6
(Scale 1 : 100)



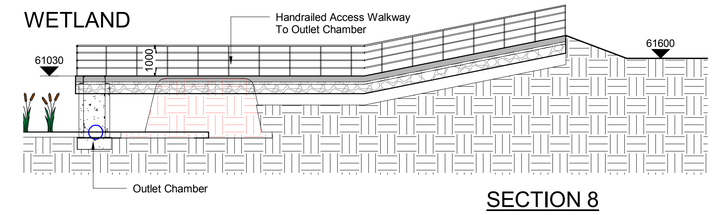
2 ATTENUATION LAGOON OUTLET
(1 : 100)



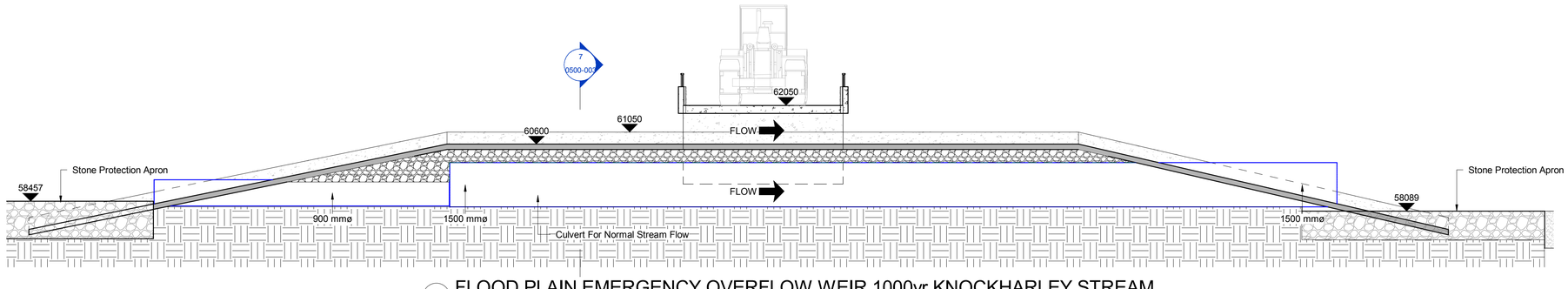
SECTION 5
(Scale 1 : 100)



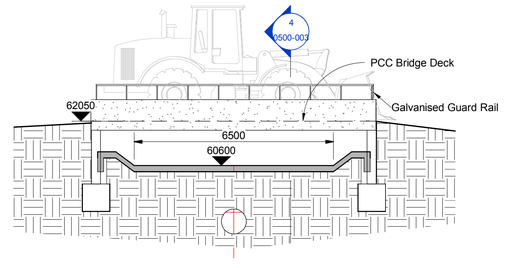
3 CROSS SECTION THRU' WETLAND
(1 : 100)



SECTION 8
(Scale 1 : 100)



4 FLOOD PLAIN EMERGENCY OVERFLOW WEIR 1000yr KNOCKHARLEY STREAM
(1 : 100)



SECTION 7
(Scale 1 : 100)

0m 1m 2m 3m 4m 5m 6m 7m 8m 9m 10m

Scale 1:100 (at A1)

Rev.	Description	App By	Date
A	ISSUE FOR PLANNING APPLICATION	BG	10.07.18

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CODE	STATUS	SUITABILITY DESCRIPTION	PURPOSE OF ISSUE
0500		PLANNING	EIAR

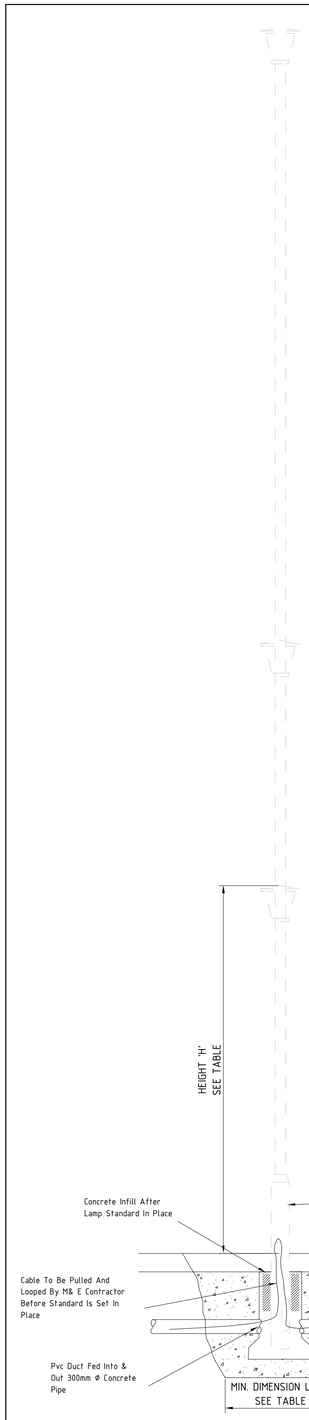
PROJECT
PROPOSED DEVELOPMENT AT KNOCKHARLEY LANDFILL

CLIENT
KNOCKHARLEY LANDFILL Ltd.

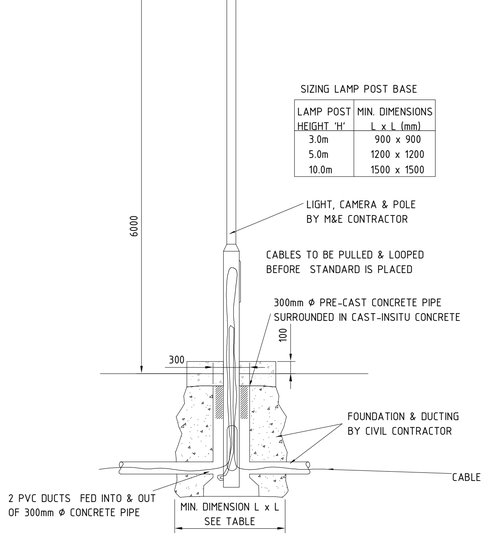
SHEET
PROPOSED SURFACE WATER INFRASTRUCTURE CROSS SECTIONS

Date	Project number	Scale (@ A1)
09/11/17	LW14-821-01	1 : 100
Drawn by SK	Drawing Number	Rev
Checked by CJC	LW14-821-01-P-0500-003	A

Drawing printed: 09/07/2018 10:29:26



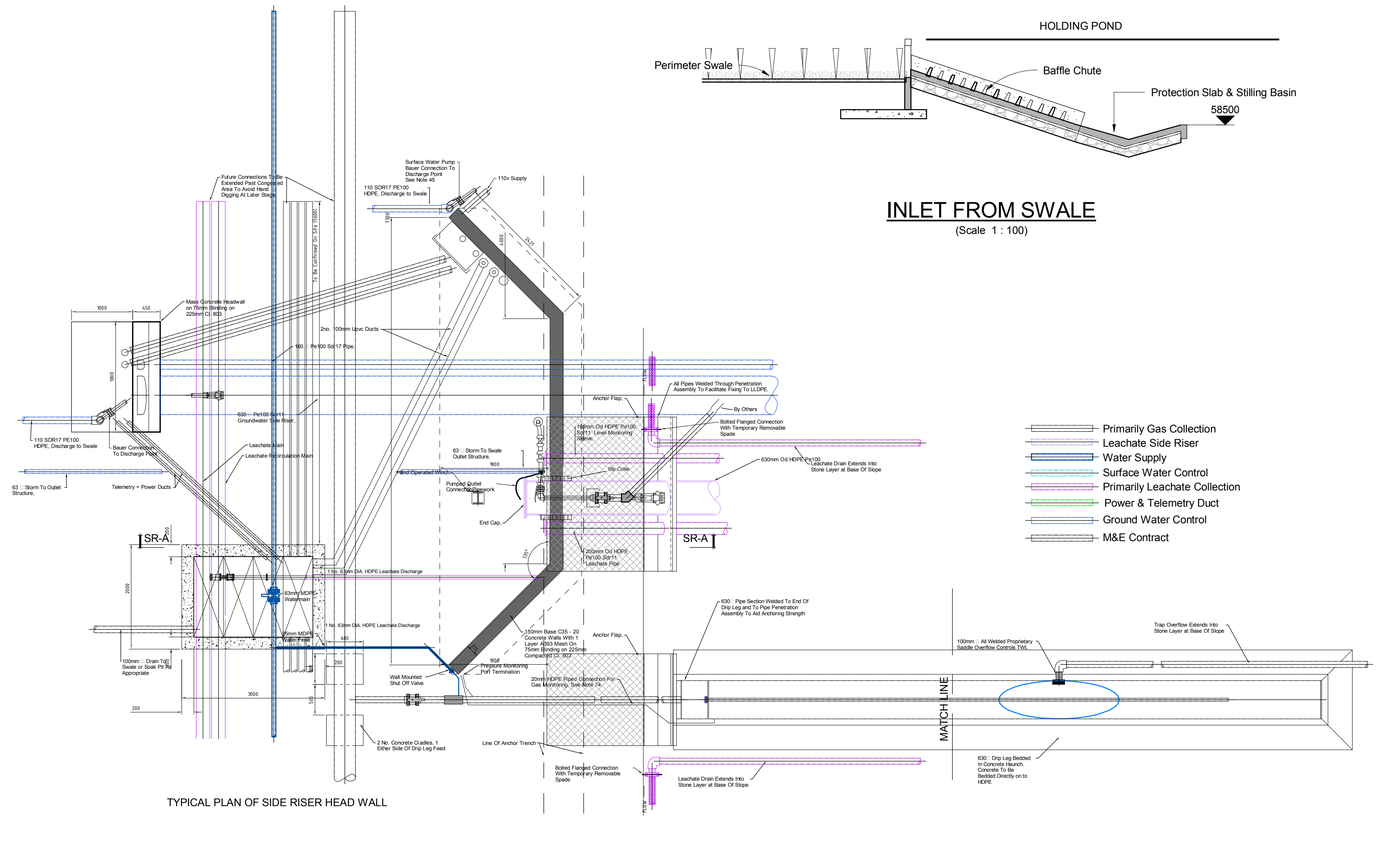
TYPICAL LAMP STANDARD DETAIL



TYPICAL LAMP STANDARD + CCTV DETAIL

Lamp Standard Details

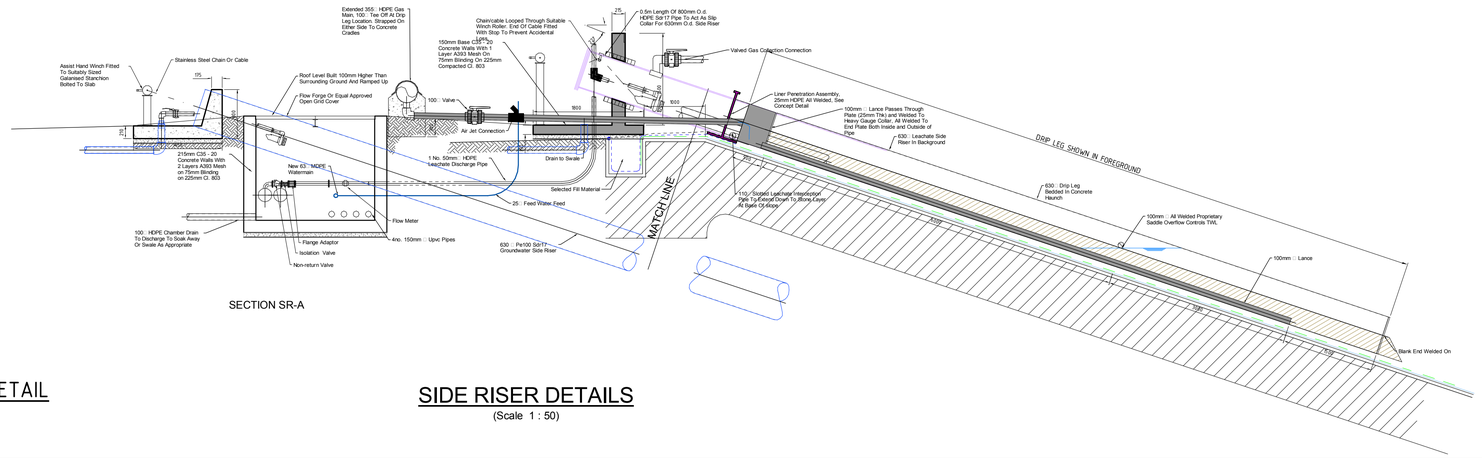
(Scale 1 : 25)



TYPICAL PLAN OF SIDE RISER HEAD WALL

INLET FROM SWALE

(Scale 1 : 100)



SECTION SR-A

SIDE RISER DETAILS

(Scale 1 : 50)

Rev.	Description	App By	Date
A	ISSUE FOR PLANNING APPLICATION	BG	10.07.18

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CODE	STATUS	SUITABILITY DESCRIPTION	PURPOSE OF ISSUE
0500		PLANNING	EIAR

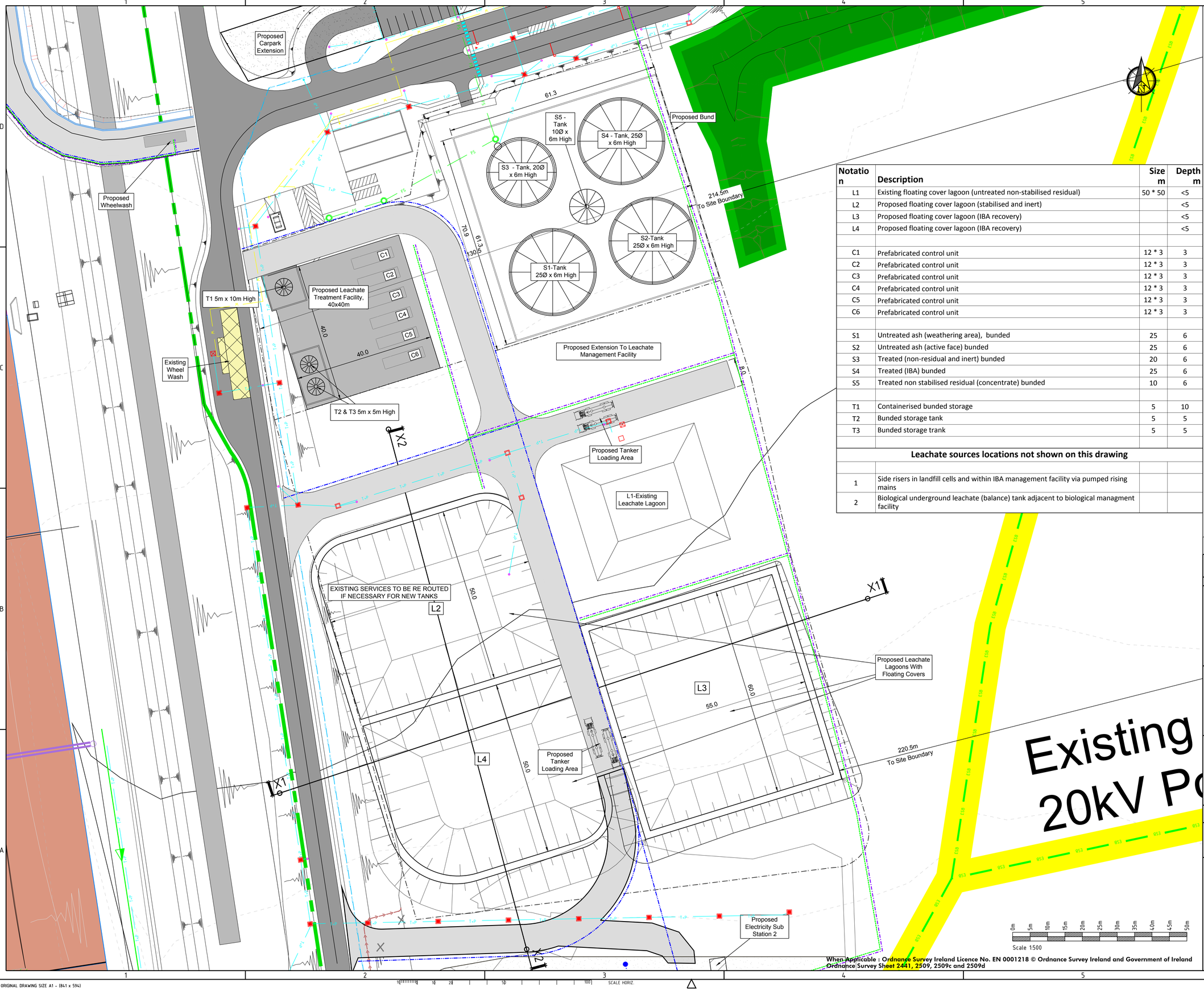
PROJECT: PROPOSED DEVELOPMENT AT KNOCKHARLEY LANDFILL

CLIENT: **KNOCKHARLEY LANDFILL Ltd.**

SHEET: LAMP STANDARD, GAS EXTRACTION AND SWALE INLET DETAILS

Date	Project number	Scale (@ A1)
01/17/18	LW14-821-01	As indicated
Drawn by SK	Drawing Number	Rev
Checked by CJC	LW14-821-01-P-0500-004	A

Drawing printed: 09/07/2018 10:29:28



Notation	Description	Size m	Depth m
L1	Existing floating cover lagoon (untreated non-stabilised residual)	50 * 50	<5
L2	Proposed floating cover lagoon (stabilised and inert)		<5
L3	Proposed floating cover lagoon (IBA recovery)		<5
L4	Proposed floating cover lagoon (IBA recovery)		<5
C1	Prefabricated control unit	12 * 3	3
C2	Prefabricated control unit	12 * 3	3
C3	Prefabricated control unit	12 * 3	3
C4	Prefabricated control unit	12 * 3	3
C5	Prefabricated control unit	12 * 3	3
C6	Prefabricated control unit	12 * 3	3
S1	Untreated ash (weathering area), bunded	25	6
S2	Untreated ash (active face) bunded	25	6
S3	Treated (non-residual and inert) bunded	20	6
S4	Treated (IBA) bunded	25	6
S5	Treated non stabilised residual (concentrate) bunded	10	6
T1	Containerised bunded storage	5	10
T2	Bunded storage tank	5	5
T3	Bunded storage trank	5	5

Leachate sources locations not shown on this drawing

1	Side risers in landfill cells and within IBA management facility via pumped rising mains		
2	Biological underground leachate (balance) tank adjacent to biological managment facility		

LEGEND

- Planning Boundary
- Areas Within Planning Boundary, Not Within Application Site
- Ownership Boundary (Refer to dwg P-0000-BDY For Clarity)
- Existing Wayleave
- Ground Contours (90m, 100m)
- Existing Watercourse
- Landfill Cells currently being filled (2017/ '18)
- Constructed Landfill Cells
- Existing Forested Areas
- Permitted Landfill Cells, To Be Constructed
- Proposed IBA Facility
- IBA, Cell 33 (Outline Only Shown For Calrity)
- Proposed Screening Berms with Compensatory Replanting
- Proposed Stream Diversion
- Existing Berm

EXISTING SERVICES LEGEND

- ESB Power lines
- Water Supply Pipes
- Storm Sewer
- Telemetry & Power
- Leachate Rising Main
- Groundwater Drainage
- Leachate Collection

PROPOSED SERVICES LEGEND

- Power, Telemetry & Gas
- Leachate Collection
- Surface Water Drain
- Water Supply
- Foul Sewer (gravity / pumped)

Rev.	Drawn	Chk'd	App'd		
A	SK	CJC	BG	Cork 10.07.18	Issue For Planning Application
				Rev Origin / Date	Description

Revision History: A — EIAR

Name of Client

KNOCKHARLEY LANDFILL LTD.

Name of Job

PROPOSED DEVELOPMENT AT KNOCKHARLEY LANDFILL

Title of Drawing

PROPOSED LEACHATE MANAGEMENT FACILITY

Scales Used	This Drawing was printed to
1:500	A1-

Dwg. No.	Rev.
LW14-821-01-P-0600-001	A

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Scale 1:500

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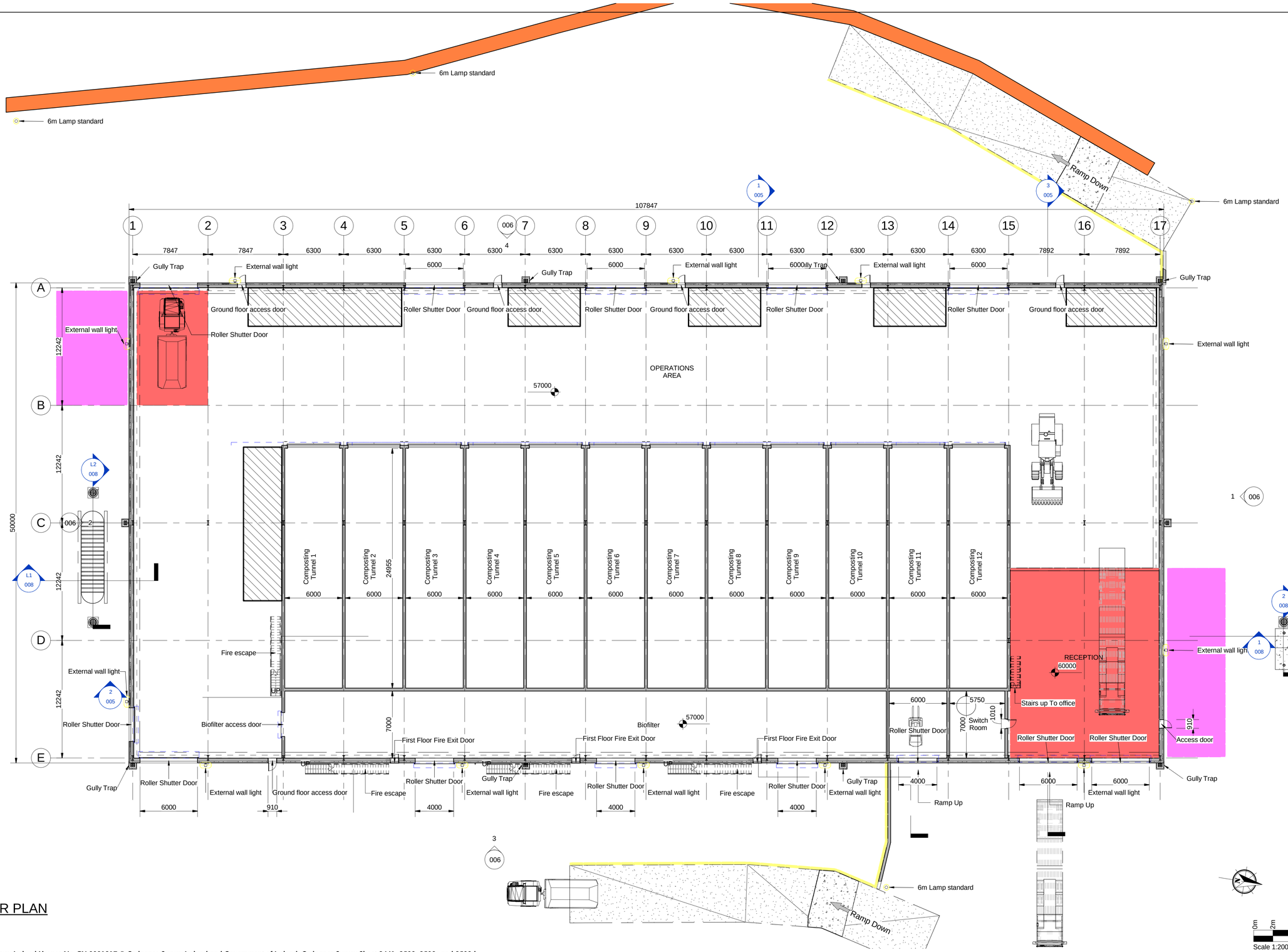

GROUND FLOOR PLAN

(Scale 1 : 200)

Rev.	Description	App By	Date
A	Issue For Planning Application	BG	10.07.18

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CODE	STATUS	SUITABILITY DESCRIPTION	PURPOSE OF ISSUE
			EIAR

PROJECT

PROPOSED DEVELOPMENT AT KNOCKHARLEY LANDFILL

CLIENT

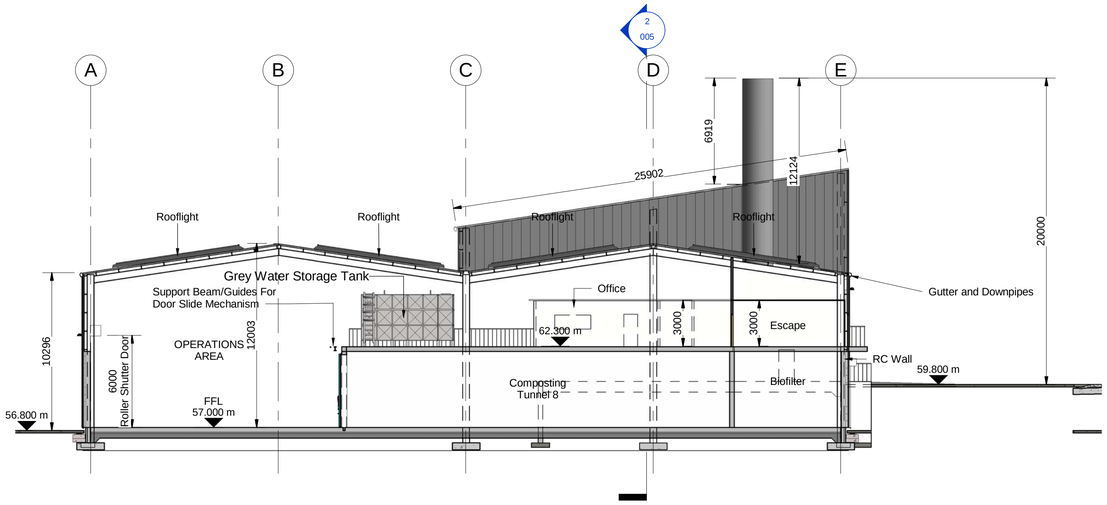
KNOCKHARLEY LANDFILL Ltd.

SHEET

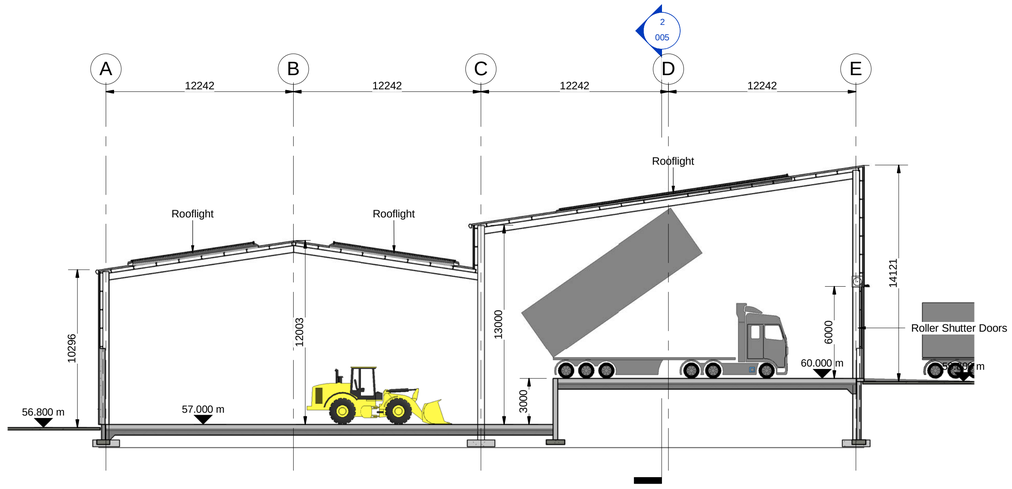
PROPOSED BIOLOGICAL TREATMENT FACILITY GROUND FLOOR PLAN

Date	Project number	Scale (@ A1)
09/27/17	LW14-821-01	1 : 200
Drawn by SK	Drawing Number	Rev
Checked by CC	LW14-821-01-P-1700-002	A

Drawing printed: 09/07/2018 10:23:32



Section 1
(Scale 1 : 200)



Section 3
(Scale 1 : 200)

Section 2
(Scale 1 : 200)

0m 2m 4m 6m 8m 10m 12m 14m 16m 18m 20m
Scale 1:200 (at A1)

Rev.	Description	App By	Date
A	Issue For Planning Application	BG	10.07.18

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CODE	STATUS	SUITABILITY DESCRIPTION	PURPOSE OF ISSUE
			EIAR

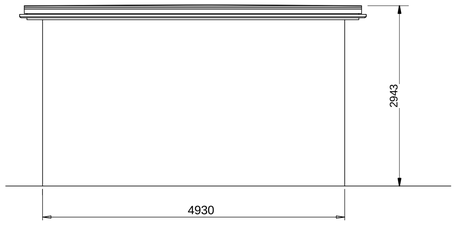
PROJECT
PROPOSED DEVELOPMENT AT KNOCKHARLEY LANDFILL

CLIENT
KNOCKHARLEY LANDFILL Ltd.

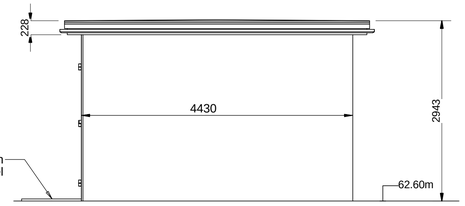
SHEET
PROPOSED BIOLOGICAL TREATMENT FACILITY CROSS SECTIONS

Date	Project number	Scale (@ A1)
09/27/17	LW14-821-01	1 : 200
Drawn by SK	Drawing Number	Rev
Checked by CC	LW14-821-01-P-1700-005	A

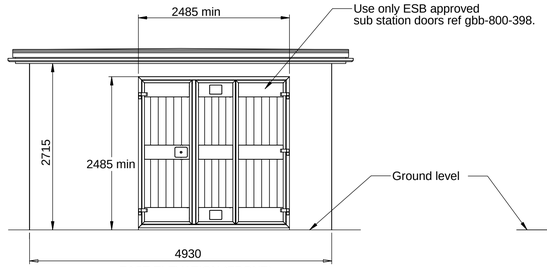
Drawing printed: 09/07/2018 10:23:52



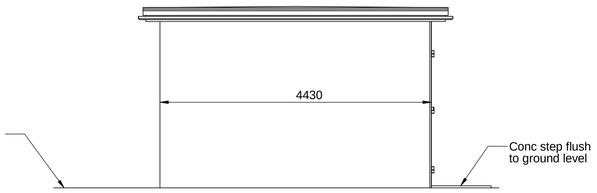
WEST ELEVATION



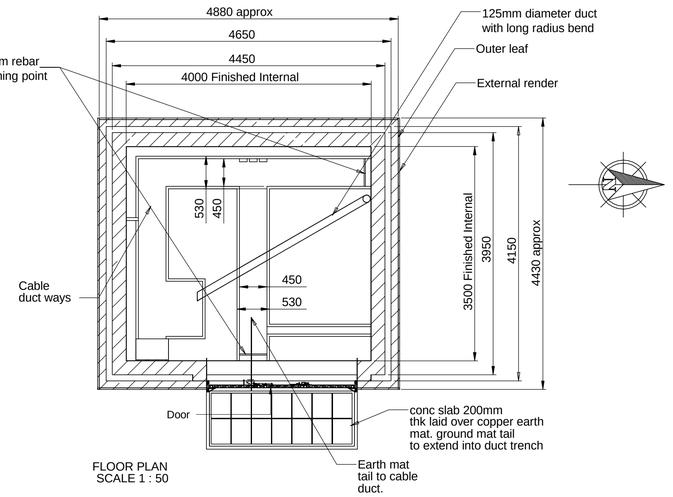
NORTH ELEVATION



EAST ELEVATION (FRONT)



SOUTH ELEVATION



FLOOR PLAN
SCALE 1 : 50

NOTES:

1. GENERAL.

   The following notes refer to the siting for the sub-station.

2. ACCESS.

   The substation building must be located at ground level. Vehicular access may be required at any time of day or night. The station will have an access corridor of at least 3m wide and 4m high. The maximum slope of access will be 1:10.

   Where necessary, a driveway 3m wide will be laid. The driveway will be 100mm of concrete on 150mm bed of well compacted hard core.

   If the sub-station is to be located in a car park, it may be necessary to install demountable bollards or paint yellow hatching on the ground to ensure that ESB can gain un-restricted access to the station.

3. SITING OF THE STATION WITHIN A BUILDING COMPLEX (An Incorporated MV Station).

   Where substation doors are more than 10m from main entrances and exits, air conditioning intakes, escape ways, oil pipes, gas pipes, fuel tanks or similar risks, then will be no more additional fire safety requirements.

   Where substation doors are less than 10m from main entrances and exits, air conditioning intakes, escape ways, oil pipes, gas pipes, fuel tanks or similar risks, then additional precautions shall be taken and written agreement must be obtained from the Fire Officer.
   If there are windows within a 3m radius of the substation door frame, the rooms, units or apartments served by the windows shall have an alarm activated by a detector in the substation.

4. DRAINAGE.

   Adequate below ground level drainage must be provided to ensure that the substation and ducts are not liable to flood.

NOTES cont... :

5. RAINWATER PIPE.

   For free standing stations a non metallic rain water pipe must be provided. Drainage pipes must not pass inside the sub-station.

6. DOORS.

   Special doors have been designed to include vertical louvres for ventilation. It must be possible to open the doors through 180 degrees. The doors are available in one standard size and the door ope must be made to accommodate these. The ope size must be 2485 X 2485mm -0mm / +20mm.

7. EARTHING.

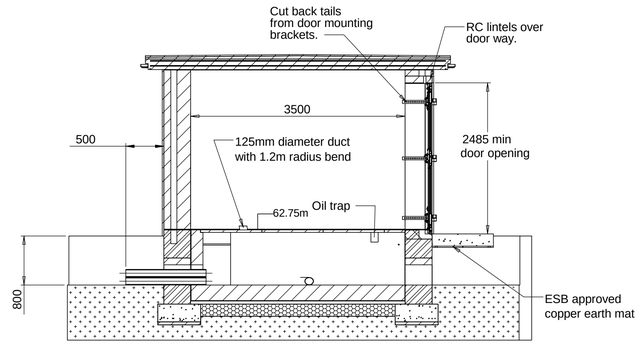
   To ensure electrical safety, the re-inforcing steel incorporated in the sub-station floor will be earthed. The earthed reinforcing steel in the floor must not be connected to any other steelwork.

   Connection points and electrical test points are shown in Fig's A & B in sheet 2 of this drawing.

8. NO IMPEDIMENTS.

   There must be no impediments (beams, columns etc) within the substation. Pipes or other services not related to the electricity connection must not be routed through the substation.

A number of possible duct locations are shown on all four sides of the substation building. Details of cable trench layout shall be discussed with a local ESB representative to determine duct installation best suited to the particular site.



SECTION F-F
SCALE 1 : 50

ESB SUB STATION DETAILS

(Scale 1 : 50)

0m 0.5m 1m 1.5m 2m 2.5m 3m 3.5m 4m 4.5m 5m

Scale 1:50 (at A1)

Rev.	Description	App By	Date
A	Issue For Planning Application	BG	10.07.18

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CODE	STATUS	SUITABILITY DESCRIPTION	PURPOSE OF ISSUE
			EIAR

PROJECT: PROPOSED DEVELOPMENT AT KNOCKHARLEY LANDFILL

CLIENT: **KNOCKHARLEY LANDFILL Ltd.**

SHEET: ESB MV SUBSTATION DETAILS

Date	Project number	Scale (@ A1)
11/07/17	LW14-821-01	1 : 50
Drawn by SK	Drawing Number	Rev
Checked by CC	LW14-821-01-P-1700-010	A

Drawing printed: 09/07/2018 10:24:16

Appendix 5

Physico-Chemical Water Quality Monitoring Results

Parameter	Units	Date	SW1	SW2	SW3	SW5	SW6	SW7	SW8	SW9
Ammoniacal Nitrogen	mg/l	12/01/2012	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
BOD	mg/l	12/01/2012	**3**	<2	<2	<2	<2	**4**	3	<2
COD	mg/l	12/01/2012	7	<4	7	10	<4	5	8	4
Chloride	mg/l	12/01/2012	22	20	25	27	15	26	26	15
Dissolved Oxygen (lab)	mg/l	12/01/2012	**10.5**	**9.4**	**8.7**	**9.2**	7.7	**10.4**	**9.8**	8
Electrical Conductivity (lab)	mS/cm	12/01/2012	0.554	0.558	0.584	0.596	**0.781**	0.622	0.626	0.778
pH (lab)	pH units	12/01/2012	8.2	8	7.9	7.9	7.7	8.1	8.1	7.8
Total Suspended Solids	mg/l	12/01/2012	5	2	6	3	3	9	2	3
Ammoniacal Nitrogen	mg/l	02/05/2012	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
BOD	mg/l	02/05/2012	<5	<5	<5	<5	<2	<3	<3	3
COD	mg/l	02/05/2012	28	**32**	31	32	10	18	24	10
Chloride	mg/l	02/05/2012	14	15	14	16	16	22	18	16
Dissolved Oxygen (lab)	mg/l	02/05/2012	9.2	8.8	**8.7**	**8.7**	**9.1**	**9**	**8.8**	9.1
Electrical Conductivity (lab)	mS/cm	02/05/2012	0.448	0.441	0.433	0.432	0.658	0.567	0.503	0.658
pH (lab)	pH units	02/05/2012	7.9	7.4	7.5	7.6	7.9	7.9	7.8	8
Total Suspended Solids	mg/l	02/05/2012	6	7	6	8	2	8	12	3
Ammoniacal Nitrogen	mg/l	12/07/2012	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	0.42	<0.08
pH (lab)	pH units	12/07/2012	7.3	6.8	7.0	6.9	7.0	6.8	7.3	7.1
BOD	mg/l	12/07/2012	<3	<3	<3	**8**	<5	<3	**9**	<5
COD	mg/l	12/07/2012	18	22	26	18	29	19	**47**	31
Electrical Conductivity (lab)	mS/cm	12/07/2012	0.575	0.555	0.564	0.617	0.581	0.614	0.702	0.618
Chloride	mg/l	12/07/2012	20	15	15	12	19	12	23	18
Total Suspended Solids	mg/l	12/07/2012	13	3	3	5	7	2	10	11
Dissolved Oxygen (lab)	mg/l	12/07/2012	9.3	7.8	7.6	**8.8**	8.2	8.2	8.2	8.2
Alkalinity	mg/l	15/11/2012	**330**	**350**	**345**	**320**	195	**360**	**345**	185
Ammoniacal Nitrogen	mg/l	15/11/2012	0.27	**0.25**	0.10	0.12	<0.08	<0.08	<0.08	0.13
pH (lab)	pH units	15/11/2012	8.0	7.8	7.8	7.9	7.8	8.2	8.1	7.8
BOD	mg/l	15/11/2012	<5	<5	<5	<5	<3	<3	<5	5
Cadmium	ug/l	15/11/2012	0.061	<0.030	<0.030	<0.030	<0.030	<0.030	0.047	<0.030
Calcium	mg/l	15/11/2012	**123**	**124**	**119**	**119**	**141**	**140**	**131**	142
COD	mg/l	15/11/2012	33	29	35	39	18	21	29	20
Copper	ug/l	15/11/2012	2.4	1.6	2.2	2.6	**31**	1.4	**1.5**	1.7

Parameter	Units	Date	SW1	SW2	SW3	SW5	SW6	SW7	SW8	SW9
Electrical Conductivity (lab)	mS/cm	15/11/2012	0.589	0.592	0.587	0.583	0.714	0.658	0.622	0.709
Chloride	mg/l	15/11/2012	20	15	18	20	16	23	20	17
Dissolved Oxygen (lab)	mg/l	15/11/2012	8.9	8.7	9	**8.6**	**9.2**	**8.8**	**8.8**	9.2
Iron	mg/l	15/11/2012	**0.17**	**0.18**	**0.18**	**0.25**	<0.05	**0.16**	**0.25**	<0.05
Lead	ug/l	15/11/2012	<10	<10	<10	<10	<10	<10	<10	<10
Magnesium	mg/l	15/11/2012	**9**	**9**	**10**	**9**	**16**	**11**	10	16
Manganese	µg/l	15/11/2012	<30	<30	<30	<30	<30	<30	<30	<30
Mercury	ug/l	15/11/2012	0.018	0.012	0.011	<0.010	<0.010	<0.010	<0.010	<0.010
Orthophosphate	mg/l	15/11/2012	<1	<1	<1	<1	<1	<1	<1	<1
Potassium	mg/l	15/11/2012	7	6	8	8	5	6	6	5
Sodium	mg/l	15/11/2012	12	8	11	11	12	**10**	11	13
Sulphate	mg/l	15/11/2012	12	12	13	13	219	23	21	219
Total Suspended Solids	mg/l	15/11/2012	7	4	5	6	10	8	7	4
Total Chromium	ug/l	15/11/2012	1.1	<1	<1	<1	<1	<1	<1	<1
TON	mg/l	15/11/2012	1.0	1.0	1.1	1.1	0.19	2.2	1.3	0.15
Total Phosphorous	mg/l	15/11/2012	0.34	**0.29**	**0.37**	0.34	0.09	0.30	0.30	0.07
Zinc	mg/l	15/11/2012	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Ammoniacal Nitrogen	mg/l	21/02/2013	<0.08	<0.08	<0.08	0.28	<0.08	0.13	0.12	<0.08
BOD	mg/l	21/02/2013	2	<2	<2	3	<3	<2	<3	<3
COD	mg/l	21/02/2013	12	14	17	23	20	13	17	19
Chloride	mg/l	21/02/2013	24	22	23	25	25	23	26	26
Dissolved Oxygen (lab)	mg/l	21/02/2013	8.8	8.7	8.5	**8.8**	8.9	**8.8**	8.5	8.7
Electrical Conductivity (lab)	mS/cm	21/02/2013	0.608	0.62	0.629	0.651	0.747	0.672	0.676	0.75
pH (lab)	pH units	21/02/2013	8.3	8.2	8	7.9	7.7	8.1	8	7.9
Total Suspended Solids	mg/l	21/02/2013	6	6	13	8	4	5	7	19
Ammoniacal Nitrogen	mg/l	24/04/2013	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
BOD	mg/l	24/04/2013	<2	<2	<2	2	3	2	<2	3
COD	mg/l	24/04/2013	11	12	12	14	23	10	13	22
Chloride	mg/l	24/04/2013	**37**	25	29	30	30	26	28	30
Dissolved Oxygen (lab)	mg/l	24/04/2013	8.7	8.8	9	**8.8**	8.8	**8.9**	**9**	9
Electrical Conductivity (lab)	mS/cm	24/04/2013	0.648	0.623	0.64	0.64	0.693	0.627	0.649	0.685
pH (lab)	pH units	24/04/2013	8.2	8	7.9	7.9	7.5	8.2	8.2	7.7

Parameter	Units	Date	SW1	SW2	SW3	SW5	SW6	SW7	SW8	SW9
Total Suspended Solids	mg/l	24/04/2013	5	10	3	6	8	12	6	7
Ammoniacal Nitrogen	mg/l	22/08/2013	<0.08	0.11	0.12	0.17	<0.08	0.51	0.29	<0.08
BOD	mg/l	22/08/2013	<3	<3	<2	4	<3	**7**	<5	<5
COD	mg/l	22/08/2013	17	17	44	34	**125**	**34**	23	29
Chloride	mg/l	22/08/2013	**38**	40	**50**	28	24	37	29	24
Dissolved Oxygen (lab)	mg/l	22/08/2013	8.7	8.7	**8.7**	**8.9**	8.5	8.6	**8.6**	8.7
Temperature	°C	22/08/2013	14.5	14.4	14.5	14.7	17.1	14.6	14.9	16.3
Electrical Conductivity (lab)	mS/cm	22/08/2013	0.681	0.707	0.663	**0.742**	0.65	0.925	0.676	0.647
Electrical Conductivity (field)	mS/cm	22/08/2013	0.585	0.613	0.573	0.649	0.599	**0.779**	0.595	0.609
pH (lab)	pH units	22/08/2013	8	7.8	7.7	7.5	7.2	7.5	7.7	7.1
pH (field)	pH units	22/08/2013	**8.89**	**8.7**	**8.48**	**8.48**	**8.46**	8.34	**8.7**	**8.49**
Total Suspended Solids	mg/l	22/08/2013	14	7	7	**19**	**31**	**25**	5	3
Alkalinity	mg/l	22/08/2013	**345**	**350**	**335**	**385**	135	**355**	240	140
Cadmium	ug/l	22/08/2013	<1	<1	<0.1	<0.1	<0.1	<1	<0.1	<0.1
Calcium	mg/l	22/08/2013	**119**	**116**	**113**	**139**	**106**	**168**	**117**	107
Copper	ug/l	22/08/2013	0.71	4	1.9	1.2	1	2.5	**1**	1.3
Iron	mg/l	22/08/2013	**0.13**	**0.11**	**0.42**	0.09	0.06	**0.59**	**0.09**	0.13
Lead	ug/l	22/08/2013	<2	<2	<2	<2	<2	<2	<2	<2
Magnesium	mg/l	22/08/2013	**13**	**12**	**10**	**12**	**17**	**15**	14	17
Manganese	ug/l	22/08/2013	<30	80	210	170	<30	1700	50	<30
Mercury	ug/l	22/08/2013	0.023	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Orthophosphate	mg/l	22/08/2013	1	<1	1	<1	<1	3	1	<1
Potassium	mg/l	22/08/2013	9	12	10	6	1	25	4	<1
Sodium	mg/l	22/08/2013	**20**	**25**	**21**	**17**	**19**	**14**	**21**	19
Sulphate	mg/l	22/08/2013	27	24	20	32	221	154	136	221
Total Chromium	ug/l	22/08/2013	<1	<1	<1	<1	<1	<1	<1	<1
TON	mg/l	22/08/2013	0.72	0.21	0.16	0.57	<0.17	<0.17	0.71	<0.17
Total Phosphorous	mg/l	22/08/2013	**0.57**	**0.61**	**0.56**	0.52	0.1	1.04	**0.48**	<0.05
Zinc	mg/l	22/08/2013	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.04	0.01
Temperature	°C	07/11/2013	7.3	6.6	6.3	6.8	6.4	7.2	7.1	6.5
pH (lab)	pH units	07/11/2013	8.1	8	7.9	7.9	7.6	8.2	8.2	7.6
pH (field)	pH units	07/11/2013	**8.54**	8.34	**8.31**	**8.64**	**8.2**	8.35	**8.44**	**8.32**

Parameter	Units	Date	SW1	SW2	SW3	SW5	SW6	SW7	SW8	SW9
Electrical Conductivity (lab)	mS/cm	07/11/2013	0.553	0.541	0.56	0.567	**0.776**	0.618	0.604	0.769
Electrical Conductivity (field)	mS/cm	07/11/2013	0.386	0.429	0.382	0.396	0.538	0.431	0.421	0.542
Ammoniacal Nitrogen	mg/l	07/11/2013	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
Dissolved Oxygen (lab)	mg/l	07/11/2013	9.2	8.9	**8.8**	**8.8**	8.8	**9.1**	**9.1**	9.1
Chloride	mg/l	07/11/2013	25	18	22	24	19	29	25	19
Total Suspended Solids	mg/l	07/11/2013	4	1	1	2	1	3	1	1
BOD	mg/l	07/11/2013	<2	<2	<2	<2	<2	<2	<2	<2
COD	mg/l	07/11/2013	16	15	18	18	8	12	11	7
Temperature	°C	13/03/2014	6.4	5.9	5.8	5.7	6.7	6	6.2	6.7
pH (lab)	pH units	13/03/2014	8.4	8.3	8.1	8.2	8.1	8.4	8.4	8.1
pH (field)	pH units	13/03/2014	**8.49**	8.29	**8.25**	7.85	7.97	8.3	8.38	**8.54**
Electrical Conductivity (lab)	mS/cm	13/03/2014	0.549	0.553	0.56	0.557	0.648	0.576	0.58	0.651
Electrical Conductivity (field)	mS/cm	13/03/2014	0.394	0.391	0.393	0.418	0.475	0.412	0.416	0.477
Ammoniacal Nitrogen	mg/l	13/03/2014	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
Dissolved Oxygen (lab)	mg/l	13/03/2014	**9.9**	**9.4**	**9.4**	**9.6**	**10.7**	**9.6**	**9.7**	10.9
Chloride	mg/l	13/03/2014	23	20	23	24	18	23	24	18
Total Suspended Solids	mg/l	13/03/2014	2	7	9	4	2	2	3	2
BOD	mg/l	13/03/2014	<2	<2	3	<2	<2	<2	<2	<2
COD	mg/l	13/03/2014	14	17	16	17	13	8	14	13
Temperature	°C	29/05/2014	11.1	11.1	11.3	11.4	14.8	10.9	11.8	14.9
pH (lab)	pH units	29/05/2014	8.1	8	7.9	8.1	7.6	8.3	8.3	7.6
pH (field)	pH units	29/05/2014	**8.63**	8.4	**8.34**	8.06	7.86	8.34	**8.53**	7.97
Electrical Conductivity (lab)	mS/cm	29/05/2014	0.52	0.515	0.52	0.53	0.66	0.612	0.582	0.66
Electrical Conductivity (field)	mS/cm	29/05/2014	0.417	0.434	0.424	0.4223	0.589	0.362	0.478	0.589
Ammoniacal Nitrogen	mg/l	29/05/2014	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
Dissolved Oxygen (lab)	mg/l	29/05/2014	8.8	9	8.3	8.4	7.9	**8.8**	**8.7**	7.9
Chloride	mg/l	29/05/2014	17	16	16	16	15	22	20	15
Total Suspended Solids	mg/l	29/05/2014	4	<1	1	**16**	<1	8	8	10
BOD	mg/l	29/05/2014	<3	<3	<3	<3	<2	<2	<2	<2
COD	mg/l	29/05/2014	22	17	19	17	11	13	15	16
Temperature	°C	14/08/2014	13.4	12.8	12.9	13	15.6	13.1	13.9	15.6
pH (lab)	pH units	14/08/2014	8.3	8.1	7.9	8.1	7.4	8.2	8.1	7.2

Parameter	Units	Date	SW1	SW2	SW3	SW5	SW6	SW7	SW8	SW9
pH (field)	pH units	14/08/2014	**9.12**	**8.73**	**8.65**	**8.52**	**8.42**	**8.53**	**8.92**	**8.5**
Electrical Conductivity (lab)	mS/cm	14/08/2014	0.577	0.574	0.583	0.58	0.593	0.62	0.611	0.592
Electrical Conductivity (field)	mS/cm	14/08/2014	0.486	0.482	0.49	0.491	0.537	0.519	0.529	0.538
Ammoniacal Nitrogen	mg/l	14/08/2014	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
Dissolved Oxygen (lab)	mg/l	14/08/2014	8.8	8.4	**8.8**	**8.5**	8.1	**8.9**	8.2	7.9
Chloride	mg/l	14/08/2014	21	20	21	22	14	24	25	14
Total Suspended Solids	mg/l	14/08/2014	28	4	2	4	1	1	5	2
BOD	mg/l	14/08/2014	**4**	3	3	<3	<2	<2	<2	<2
COD	mg/l	14/08/2014	24	15	15	19	9	11	14	13
Ammoniacal Nitrogen	mg/l	20/11/2014	<0.08	<0.08	<0.08	<0.08	0.21	<0.08	<0.08	0.22
Alkalinity	mg/l	20/11/2014	255	220	**250**	**255**	135	**300**	**260**	150
pH (lab)	pH units	20/11/2014	7.8	7.6	7.6	7.7	7.4	8.0	7.8	7.4
BOD	mg/l	20/11/2014	<3	<3	<3	<3	<3	<2	<2	<2
COD	mg/l	20/11/2014	23	20	24	26	25	15	7	7
Electrical Conductivity (lab)	mS/cm	20/11/2014	0.488	0.469	0.472	0.485	0.463	0.572	0.523	0.459
Chloride	mg/l	20/11/2014	19	15	18	20	13	27	21	13
Cadmium	ug/l	20/11/2014	0.05	0.06	0.05	0.05	0.08	0.04	0.06	0.06
Calcium	mg/l	20/11/2014	93	94	**92**	**95**	**84**	**117**	**105**	84
Copper	ug/l	20/11/2014	2.6	2.4	2.2	2.5	4.4	1.8	**2.8**	5.2
Dissolved Oxygen (lab)	mg/l	20/11/2014	**10.1**	**10.1**	**9.7**	**9.9**	**9.9**	**9.5**	**9.3**	9.0
Iron	mg/l	20/11/2014	**0.12**	**0.45**	**0.43**	**0.30**	**0.54**	**0.12**	**0.22**	0.54
Lead	ug/l	20/11/2014	0.17	0.17	0.21	0.19	0.69	<0.09	0.28	0.94
Manganese	ug/l	20/11/2014	<30	<30	30.00	<30	30.00	<30	<30	40.00
Magnesium	mg/l	20/11/2014	6	**5**	**6**	**6**	**8**	**9**	7	8
Mercury	ug/l	20/11/2014	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Orthophosphate	mg/l	20/11/2014	<1	<1	<1	<1	<1	<1	<1	<1
Potassium	mg/l	20/11/2014	3	2	3	3	3	4	3	4
Sodium	mg/l	20/11/2014	12	**10**	11	11	7	**10**	11	9
Sulphate	mg/l	20/11/2014	17	21	21	21	117	28	29	115
Suspended Solids	mg/l	20/11/2014	5	6	7	**27**	9	**14**	12	13
TON	mg/l	20/11/2014	2	1	1	1	1	4	2	1
Total Chromium	ug/l	20/11/2014	<0.25	0.54	0.43	0.34	0.68	<0.25	0.32	0.85

Parameter	Units	Date	SW1	SW2	SW3	SW5	SW6	SW7	SW8	SW9
Total Phosphorous	mg/l	20/11/2014	0.17	**0.13**	0.18	0.22	0.19	0.17	0.17	0.18
Zinc	mg/l	20/11/2014	<0.01	0.01	0.02	<0.01	0.02	0.02	<0.01	0.02
Temperature	°C	12/03/2015	7.9	7.5	6.9	6.8	6.9	7.4	7.3	6.8
pH (lab)	pH units	12/03/2015	8.3	8.1	8	8	7.6	8.2	8.2	7.5
pH (field)	pH units	12/03/2015	**8.88**	8.41	**8.56**	7.27	7.91	8.21	**8.88**	7.77
Electrical Conductivity (lab)	mS/cm	12/03/2015	0.551	0.584	0.589	0.591	**0.843**	0.607	0.612	0.843
Electrical Conductivity (field)	mS/cm	12/03/2015	0.393	0.415	0.41	0.42	0.598	0.434	0.373	0.571
Ammoniacal Nitrogen	mg/l	12/03/2015	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
Dissolved Oxygen (lab)	mg/l	12/03/2015	8.8	8.7	**8.8**	**8.5**	8.7	**8.9**	8	8.3
Dissolved Oxygen (field)	%	12/03/2015	99.3	95	94.9	98	99.9	100	99.3	100
Chloride	mg/l	12/03/2015	22	22	28	29	18	25	27	19
Total Suspended Solids	mg/l	12/03/2015	1	<1	1	1	8	**29**	11	<1
BOD	mg/l	12/03/2015	<2	<2	<2	<2	<2	<2	<2	<2
COD	mg/l	12/03/2015	13	10	12	11	13	12	13	16
Temperature	°C	21/05/2015	8.9	7.9	8.4	8.5	10.7	8.3	9.1	10.5
pH (lab)	pH units	21/05/2015	8.4	8.2	8.1	8	7.5	8.2	8.2	7.5
pH (field)	pH units	21/05/2015	**8.8**	7.97	**8.05**	7.68	7.45	8.17	8.3	7.41
Electrical Conductivity (lab)	mS/cm	21/05/2015	0.588	0.59	0.603	0.606	**0.793**	0.672	0.648	0.794
Electrical Conductivity (field)	mS/cm	21/05/2015	0.479	0.504	0.486	0.502	0.65	0.543	0.533	0.672
Ammoniacal Nitrogen	mg/l	21/05/2015	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
Dissolved Oxygen (lab)	mg/l	21/05/2015	8.8	8.7	8.6	**8.7**	8.7	8.5	**8.8**	8.6
Dissolved Oxygen (field)	%	21/05/2015	97	75	97	89	63	92	96	61
Chloride	mg/l	21/05/2015	21	20	23	24	17	26	25	17
Total Suspended Solids	mg/l	21/05/2015	6	7	4	2	7	3	9	4
BOD	mg/l	21/05/2015	<2	<2	<2	<2	<2	<2	<2	<2
COD	mg/l	21/05/2015	11	8	13	11	13	15	15	14
Temperature	°C	20/08/2015	13.2	12.2	13.5	13.4	16.6	13.7	16	16.8
pH (lab)	pH units	20/08/2015	8.2	8	7.9	7.8	**7.7**	7.9	7.9	7.6
pH (field)	pH units	20/08/2015	**8.42**	7.85	**8**	7.9	7.85	7.87	**8.2**	7.85
Electrical Conductivity (lab)	mS/cm	20/08/2015	0.577	0.65	0.536	0.571	0.673	**0.936**	0.674	0.676
Electrical Conductivity (field)	mS/cm	20/08/2015	0.563	0.597	0.503	0.66	0.606	**0.883**	0.667	0.684
Ammoniacal Nitrogen	mg/l	20/08/2015	<0.08	0.08	<0.08	<0.08	<0.08	**3.1**	<0.08	0.09

Parameter	Units	Date	SW1	SW2	SW3	SW5	SW6	SW7	SW8	SW9
Dissolved Oxygen (lab)	mg/l	20/08/2015	8.5	8.2	7.8	7.8	7.8	7.4	8.2	8
Dissolved Oxygen (field)	%	20/08/2015	99.7	98.2	84.5	99.8	77.8	70	99.1	97.7
Chloride	mg/l	20/08/2015	25	35	31	31	20	**57**	22	20
Total Suspended Solids	mg/l	20/08/2015	2	5	4	1	7	**13**	3	4
BOD	mg/l	20/08/2015	<2	<5	<3	<3	<3	**10**	<3	<3
COD	mg/l	20/08/2015	16	**28**	20	22	23	**69**	25	19
Alkalinity	mg/l	20/08/2015	**310**	**340**	**240**	**275**	95	**480**	110	95
Copper	µg/l	20/08/2015	1	1	0.6	0.6	0.9	2.4	**1.3**	1
Cadmium	µg/l	20/08/2015	<0.03	<0.03	<0.03	<0.03	<0.03	0.04	<0.03	<0.03
Calcium	mg/l	20/08/2015	**113**	**120**	**99**	**105**	**117**	**137**	**120**	118
Iron	mg/l	20/08/2015	**0.12**	**0.35**	**0.23**	**0.18**	0.08	**1.5**	**0.11**	0.1
Lead	µg/l	20/08/2015	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09
Manganese	µg/l	20/08/2015	**60**	**240**	**200**	**270**	**50**	**2600**	**60**	70
Magnesium	mg/l	20/08/2015	**8**	**9**	**8**	**8**	**20**	**19**	**17**	19
Mercury	µg/l	20/08/2015	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Orthophosphate	mg/l	20/08/2015	1	1	1	1	<1	3	<1	<1
Potassium	mg/l	20/08/2015	4	**8**	5	5	3	**57**	4	3
Sodium	mg/l	20/08/2015	12	**16**	**15**	**15**	**15**	**19**	**16**	16
Sulphate	mg/l	20/08/2015	**29**	19	**42**	**34**	**282**	7	**254**	277
TON	mg/l	20/08/2015	0.35	0.48	0.29	0.32	0.12	0.31	0.19	0.13
Chromium	µg/l	20/08/2015	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Total Phosphorous	mg/l	20/08/2015	0.4	**0.53**	**0.64**	0.46	0.05	**1.5**	0.14	<0.05
Zinc	mg/l	20/08/2015	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01
Temperature	°C	05/11/2015	9.7	8.8	8.16	9.4	9.2	9.4	9.4	9.1
pH (lab)	pH units	05/11/2015	**7.3**	**7.1**	**6.9**	**6.9**	**6.3**	**7**	**7**	6.1
pH (field)	pH units	05/11/2015	**8.27**	8.03	**8.16**	**8.15**	7.81	8.29	**8.34**	7.96
Electrical Conductivity (lab)	mS/cm	05/11/2015	0.676	0.625	0.624	0.629	**0.804**	0.653	0.659	0.809
Electrical Conductivity (field)	mS/cm	05/11/2015	0.267	0.561	0.507	0.468	0.656	0.54	0.54	0.684
Ammoniacal Nitrogen	mg/l	05/11/2015	0.13	<0.08	<0.08	<0.08	<0.08	<0.08	0.08	<0.08
Dissolved Oxygen (lab)	mg/l	05/11/2015	8.8	**9**	**8.8**	**8.9**	8.8	8.6	**8.8**	9
Dissolved Oxygen (field)	%	05/11/2015	71	70	66	84	88	75	72	93
Chloride	mg/l	05/11/2015	**45**	22	25	28	19	29	28	19

Parameter	Units	Date	SW1	SW2	SW3	SW5	SW6	SW7	SW8	SW9
Total Suspended Solids	mg/l	05/11/2015	<1	<1	<1	<1	<1	**20**	4	5
pH (lab)	pH units	25/02/2016	**7.9**	7.6	7.7	7.7	7.5	7.9	7.9	7.5
Electrical Conductivity (lab)	mS/cm	25/02/2016	**0.592**	0.529	0.535	0.54	**0.792**	0.605	0.587	0.819
Temperature	°C	25/02/2016	3.7	3.8	2.6	2.8	2.9	3.5	3.3	3.1
Ammoniacal Nitrogen	mg/l	25/02/2016	<0.08	<0.08	<0.08	0.09	0.09	0.12	<0.08	0.08
Dissolved Oxygen (lab)	mg/l	25/02/2016	**9.5**	**9.4**	**9.1**	**9.4**	**9.3**	**9.4**	**9.5**	9.4
Chloride	mg/l	25/02/2016	24	17	20	20	24	24	25	23
Total Suspended Solids	mg/l	25/02/2016	1	8	6	4	5	2	6	7
BOD	mg/l	25/02/2016	<3	<3	<2	<2	<3	<2	<2	<2
COD	mg/l	25/02/2016	15	15	14	14	15	12	10	11
pH (lab)	pH units	31/05/2016	**8.28**	8.1	7.96	8.02	7.37	8.21	**8.13**	7.34
Electrical Conductivity (lab)	mS/cm	31/05/2016	0.712	0.652	0.665	0.709	0.696	0.665	0.684	0.7
Temperature	°C	31/05/2016	15.1	14.2	14.5	14.2	18.3	14.5	16.7	18.1
Ammoniacal Nitrogen	mg/l	31/05/2016	0.04	0.09	0.11	0.12	0.46	0.38	0.1	0.05
Dissolved Oxygen (lab)	mg/l	31/05/2016	**10**	**9**	**9**	**9**	**10**	**9**	**9**	9
Chloride	mg/l	31/05/2016	18.3	18.5	23	25.2	11.1	22.3	25.3	11.2
Total Suspended Solids	mg/l	31/05/2016	<10	<10	<10	<10	<10	<10	<10	<10
BOD	mg/l	31/05/2016	1	1	1	1	**4**	1	1	3
COD	mg/l	31/05/2016	8	11	19	10	22	19	15	21
BOD	mg/l	05/11/2015	**6**	<3	<3	<3	<3	<5	**4**	<3
COD	mg/l	05/11/2015	24	17	21	19	15	**30**	20	16
pH (lab)	pH units	05/09/2016	8.06	7.92	7.64	7.75	7.22	8	7.87	7.16
Electrical Conductivity (lab)	mS/cm	05/09/2016	0.638	0.592	0.656	0.672	0.72	0.668	0.527	0.726
Temperature	°C	05/09/2016	17.9	18	17.8	17	17.4	17.4	17.9	17.7
Chloride	mg/l	05/09/2016	22	21.2	27.7	27.6	15.7	29.8	24.2	15.7
Ammoniacal Nitrogen	mg/l	05/09/2016	0.16	**0.23**	0.15	0.21	0.05	0.78	0.21	0.05
BOD	mg/l	05/09/2016	2	1	3	2	2	2	2	2
COD	mg/l	05/09/2016	20	16	27	20	<7	8	18	<7
Total Suspended Solids	mg/l	05/09/2016	<10	<10	<10	14	<10	11	<10	<10
Dissolved Oxygen (lab)	mg/l	05/09/2016	8	8	7	7	6	8	8	6
Cadmium	µg/l	20/12/2016	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Calcium	mg/l	20/12/2016	**124**	**131.3**	**127.9**	**129.2**	**170.8**	**136.8**	**131.3**	170.2

Parameter	Units	Date	SW1	SW2	SW3	SW5	SW6	SW7	SW8	SW9
Total Chromium	µg/l	20/12/2016	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
Copper	µg/l	20/12/2016	>7	>7	>7	>7	>7	>7	>7	>7
Iron	mg/l	20/12/2016	<0.02	0.046	0.047	0.039	<0.02	0.03	<0.02	<0.02
Lead	µg/l	20/12/2016	<5	<5	<5	<5	<5	<5	<5	<5
Magnesium	mg/l	20/12/2016	**8.9**	**9.6**	**9.6**	**9.1**	**22.8**	**9.8**	10.3	22.8
Manganese	µg/l	20/12/2016	9	38	32	21	44	7	80	11
Mercury	µg/l	20/12/2016	<1	<1	<1	<1	<1	<1	<1	<1
Potassium	mg/l	20/12/2016	3	3	3.6	3.2	3.8	5.5	3.4	3.8
Sodium	mg/l	20/12/2016	11	10.7	12.1	11.4	15.7	8.6	10.8	15.7
Zinc	ug/l	20/12/2016	<3	<3	<3	<3	<3	<3	<3	<3
Total Phosphorous	mg/l	20/12/2016	0.153	0.141	0.15	0.129	0.048	0.245	**0.202**	0.042
Sulphate	mg/l	20/12/2016	17.6	22.6	23.6	25.4	365.2	35.1	39.7	369
Chloride	mg/l	20/12/2016	16.3	14.7	18.8	20.3	21.5	29.9	21	19.4
TON	mg/l	20/12/2016	1	0.8	0.9	1.2	<0.2	2.7	1.2	<0.2
Ammoniacal Nitrogen	mg/l	20/12/2016	0.04	0.06	0.1	0.11	0.07	0.78	0.49	0.07
Alkalinity	mg/l	20/12/2016	**322**	**322**	**326**	**324**	170	**330**	**332**	170
BOD	mg/l	20/12/2016	<1	<1	<1	<1	<1	<1	<1	<1
COD	mg/l	20/12/2016	<7	<7	<7	<7	<7	12	<7	<7
Dissolved Oxygen (lab)	mg/l	20/12/2016	9	**10**	**9**	**10**	**9**	**11**	**9**	9
Electrical Conductivity (lab)	mS/cm	20/12/2016	0.652	0.672	**0.781**	0.689	**0.965**	**0.744**	0.696	0.99
pH (lab)	pH units	20/12/2016	7.99	7.89	7.75	7.8	7.21	7.83	7.8	7.53
Total Suspended Solids	mg/l	20/12/2016	<10	<10	<10	<10	<10	<10	81	<10
Temperature	°C	20/12/2016	5.1	4	4.2	4.4	3.7	5.1	4.7	3.5
Electrical Conductivity (field)	mS/cm	20/12/2016	0.67	**0.688**	**0.707**	0.719	**1.102**	**0.944**	**0.743**	1.016
pH (field)	pH units	20/12/2016	9.22	9.04	8.9	8.92	8.74	8.82	8.86	8.76
pH	pH units	21/02/2017	8.18	8.08	8.05	8.07	7.66	8.26	8.2	7.69
Electrical Conductivity (lab)	mS/cm	21/02/2017	**0.753**	**0.688**	**0.697**	0.704	**1.092**	**0.727**	0.717	1.111
Temperature	°C	21/02/2017	10.7	10.1	10.3	10.2	10.1	9.9	11	10.4
Ammoniacal Nitrogen	mg/l	21/02/2017	0.06	0.12	0.012	0.12	0.1	0.15	0.12	0.07
Dissolved Oxygen	mg/l	21/02/2017	**10**	**9**	**9**	**9**	7	**10**	**10**	6
Chloride	mg/l	21/02/2017	24.2	18.8	24.7	27.7	20.9	27.7	25.2	21.1
Total Suspended Solids	mg/l	21/02/2017	<10	<10	<10	<10	<10	11	<10	13

Parameter	Units	Date	SW1	SW2	SW3	SW5	SW6	SW7	SW8	SW9
BOD	mg/l	21/02/2017	1	2	2	1	1	1	<1	<1
COD	mg/l	21/02/2017	17	14	14	10	9	<7	12	16
pH	pH units	24/05/2017	8.22	8.13	8.07	8.13	7.43	8	7.98	7.58
Electrical Conductivity (lab)	mS/cm	24/05/2017	0.715	0.64	0.637	0.642	**0.854**	0.678	0.703	0.837
Temperature	°C	24/05/2017	14.6	14.9	14.6	14.6	16.2	14.9	15.5	17.9
Ammoniacal Nitrogen	mg/l	24/05/2017	0.06	0.14	0.1	0.19	0.16	0.28	0.34	0.12
Dissolved Oxygen	mg/l	24/05/2017	8	8	8	8	8	8	8	7
Chloride	mg/l	24/05/2017	25.1	27.4	31.6	31.9	14.4	19.6	29	14
Total Suspended Solids	mg/l	24/05/2017	<10	<10	<10	<10	<10	<10	<10	54
BOD	mg/l	24/05/2017	<1	2	2	1	**54**	**4**	3	4
COD	mg/l	24/05/2017	<7	<7	<7	11	22	<7	7	15
pH	pH units	25/08/2017	8.19	8.12	**8.1**	8.07	7.12	8.19	**8.03**	7.23
Electrical Conductivity (lab)	mS/cm	25/08/2017	0.561	0.558	0.551	0.602	0.612	0.672	0.618	0.657
Temperature	°C	25/08/2017	14.6	14.4	14.7	15.4	171	15.7	15.6	16.5
Ammoniacal Nitrogen	mg/l	25/08/2017	0.05	0.06	0.06	0.09	0.04	0.09	0.17	0.12
Dissolved Oxygen	mg/l	25/08/2017	9	8	8	8	6	**9**	8	6
Chloride	mg/l	25/08/2017	22	15.9	19.7	22	13.2	25.5	20.9	13
Total Suspended Solids	mg/l	25/08/2017	<10	<10	<10	10	<10	10	<10	<10
BOD	mg/l	25/08/2017	<1	<1	<1	<1	1	<1	1	2
COD	mg/l	25/08/2017	18	20	13	24	11	14	14	15
pH	pH units	16/11/2017	8.08	8.08	**8.01**	8.04	7.6	8.1	8.03	7.3
Electrical Conductivity (lab)	mS/cm	16/11/2017	0.635	0.645	0.652	0.677	**0.95**	**0.797**	**0.726**	1.008
Temperature	°C	16/11/2017	8.4	8.3	8.1	8.1	7.9	8.1	7.9	7.6
Ammoniacal Nitrogen	mg/l	16/11/2017	0.03	0.05	0.08	0.06	0.03	**2.15**	0.23	0.02
Dissolved Oxygen	mg/l	16/11/2017	**10**	**10**	**9**	**10**	6	9	9	4
Chloride	mg/l	16/11/2017	16.5	16.6	23.7	21.7	15.4	32.3	22	15.2
Total Suspended Solids	mg/l	16/11/2017	<10	<10	<10	<10	<10	<10	<10	<10
BOD	mg/l	16/11/2017	<1	<1	<1	<1	<1	<1	<1	<1
COD	mg/l	16/11/2017	7	9	10	25	<7	14	7	<7
pH	pH units	26/02/2018	7.84	8.4	8.96	8.42	8.07	7.85	7.99	8.09
Electrical Conductivity (lab)	mS/cm	26/02/2018	0.637	0.624	0.671	0.978	**0.931**	**0.749**	**0.724**	0.934
Temperature	°C	26/02/2018	2.8	2.8	2.4	2.6	2.4	2.9	3.2	3.4

Parameter	Units	Date	SW1	SW2	SW3	SW5	SW6	SW7	SW8	SW9
Ammoniacal Nitrogen	mg/l	26/02/2018	0.07	0.11	0.34	0.09	0.08	**3.39**	**0.86**	0.08
Dissolved Oxygen	mg/l	26/02/2018	9	10	10	10	9	10	10	9
Chloride	mg/l	26/02/2018	23.8	26	29.6	31.3	27.7	30.6	28.9	27.5
Total Suspended Solids	mg/l	26/02/2018	<10	<10	<10	<10	17	<10	<10	<10
BOD	mg/l	26/02/2018	<1	<1	<1	1	2	1	1	2
COD	mg/l	26/02/2018	12	17	31	13	9	<7	18	20
pH	pH units	06/04/2018	7.71	7.77	7.65	7.63	7.63	7.84	7.66	7.4
Electrical Conductivity (lab)	mS/cm	06/04/2018	0.663	0.658	0.653	0.688	**0.977**	**0.79**	**0.764**	0.968
Temperature	°C	06/04/2018	5.9	5.4	4.5	5.6	7.6	7.5	5.4	6.9
Ammoniacal Nitrogen	mg/l	06/04/2018	0.06	**0.61**	0.09	0.11	0.05	1.48	**0.51**	0.93
Dissolved Oxygen	mg/l	06/04/2018	9	10	10	10	9	10	10	9
Chloride	mg/l	06/04/2018	23.8	26	29.6	31.3	27.7	30.6	28.9	27.5
Total Suspended Solids	mg/l	06/04/2018	<10	<10	<10	<10	17	<10	<10	<10
BOD	mg/l	06/04/2018	<1	<1	<1	1	2	1	1	2
COD	mg/l	06/04/2018	12	17	31	13	9	<7	18	20
Cadmium	µg/l	11/09/2018	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	<0.5
Calcium	mg/l	11/09/2018	115.5	115.1	-	159.2	136.2	-	111.5	129.9
Total Chromium	µg/l	11/09/2018	<1.5	<1.5	-	<1.5	<1.5	-	<1.5	<1.5
Copper	µg/l	11/09/2018	<7	<7	-	<7	<7	-	<7	<7
Iron	mg/l	11/09/2018	0.054	0.088	-	0.116	0.088	-	0.058	0.054
Lead	µg/l	11/09/2018	<5	<5	-	<5	<5	-	<5	<5
Magnesium	mg/l	11/09/2018	9.2	9.3	-	13.4	26.2	-	9.1	26.4
Manganese	µg/l	11/09/2018	82	55	-	275	167	-	10	52
Mercury	µg/l	11/09/2018	<1	<1	-	<1	<1	-	<1	<1
Potassium	mg/l	11/09/2018	6.9	8.9	-	5.1	1.3	-	5.3	1.1
Sodium	mg/l	11/09/2018	13	16.1	-	11.1	16.6	-	23.7	16.7
Zinc	µg/l	11/09/2018	<3	<3	-	<3	4	-	<3	<3
Total Phosphorous	mg/l	11/09/2018	0.527	0.593	-	0.436	0.056	-	0.668	0.052
Sulphate	mg/l	11/09/2018	23.4	18.8	-	41.7	330.1	-	79.1	393.5
Chloride	mg/l	11/09/2018	24.4	32.6	-	20.7	24.1	-	37.1	23.4
Total Oxidised Nitrogen	mg/l	11/09/2018	<0.2	<0.2	-	<0.2	<0.2	-	<0.2	<0.2
Ammoniacal Nitrogen	mg/l	11/09/2018	0.07	0.2	-	0.36	0.06	-	1.32	0.05
Total Alkalinity	mg/l	11/09/2018	316	324	-	418	116	-	236	110

Parameter	Units	Date	SW1	SW2	SW3	SW5	SW6	SW7	SW8	SW9
BOD	mg/l	11/09/2018	<1	<1	-	2	<1	-	<1	1
COD	mg/l	11/09/2018	21	29	-	23	24	-	25	21
Dissolved Oxygen (lab)	mg/l	11/09/2018	8	6	-	6	7	-	6	8
Electrical Conductivity (lab)	mS/cm	11/09/2018	0.626	0.656	-	0.877	0.897	-	0.701	0.802
pH (lab)	pHunits	11/09/2018	8.22	8.06	-	7.99	7.46	-	8.04	7.56
Total Suspended Solids	mg/l	11/09/2018	<10	<10	-	11	<10	-	<10	<10

Bold font indicates results above the baseline

Appendix 6

EIA Scoping and Related Responses

APPENDIX 6.1

Records of Consultation Documentation and Responses - October 2016

FEHILY TIMONEY & COMPANY

CONSULTANTS IN ENGINEERING & ENVIRONMENTAL SCIENCES

IRELAND UNITED KINGDOM POLAND SAUDI ARABIA

Our Ref: LW14/821/01/ConLet/DFM/CF

Mr. Eoin McDonnell
Planning & Environmental Department
Failte Ireland
88-95 Amiens Street
Dublin 1

25 October 2016

RE: Proposed development at Knockharley Landfill, Kentstown, Co. Meath

Dear Mr. McDonnell,

Knockharley Landfill Ltd. is applying to An Bord Pleanála (ABP), under the Strategic Infrastructure provisions of the 2000 Planning & Development Act, as amended, for permission to intensify waste acceptance at the existing landfill facility (ABP File ref: PL17.PC0223).

You may have received correspondence relating to previously proposed development at this facility in 2015 – these development applications did not proceed at the time.

Knockharley Landfill is located approximately 1.5 km north of Kentstown village, Co. Meath in the functional area of Meath County Council. The existing landfill facility operates under an Industrial Emission Licence (Ref. No. W0146-02) from the Environmental Protection Agency.

Knockharley Landfill Ltd. has appointed Fehily Timoney and Company to prepare an Environmental Impact Statement (EIS) for the proposed development. This letter is being issued to you as part of the scoping process for the EIS.

A scoping document describing the proposed development and the approach being taken to the preparation of the EIS is enclosed.

As part of the consultation process, we would be interested in receiving any comments you may have on the proposed development, relevant to your area of expertise, within two weeks of the date of this letter.

If you have no comments to make, we would be grateful if you would please acknowledge receipt of this letter.

Comments or acknowledgements can be sent via email to knockharleylandfillscoping@ftco.ie.

Yours sincerely,

Derek Milton
for and on behalf of **Fehily Timoney & Company**

ACEI Association of Consulting Engineers of Ireland Cumann Innealtóirí Comhairle na hÉireann

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KNOCKHARLEY LANDFILL

ENVIRONMENTAL IMPACT STATEMENT - SCOPING REPORT FOR PROPOSED DEVELOPMENT

OCTOBER 2016

FEHILY TIMONEY & COMPANY

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1 INTRODUCTION

1.1 Applicant

The applicant is Knockharley Landfill Limited who is the owner and operator of the facility located in County Meath. The facility was developed and previously owned and operated by Greenstar North East Limited. The site was acquired by Knockharley Landfill Limited in March 2014.

1.2 The Development in Summary

Knockharley Landfill is located approximately 1.5 km north of Kentstown village, Co. Meath in the functional area of Meath County Council. The existing landfill operates under an Industrial Emissions Licence (Licence reference no. W0146-02) from the Environmental Protection Agency which permits the acceptance of up to 200,000 tonnes per annum (tpa) of waste, of which 175,000 tonnes is disposal capacity and 25,000 tonnes is recovery. Condition 3 of the planning consent (PL17.220331), restricted the disposal capacity at the facility to 132,000 tonnes per annum until December 2010, thereafter reducing to 88,000 tonnes per annum.

It is proposed to apply for consent to increase waste intake at Knockharley Landfill to up to 440,000 tpa for recovery and disposal. The development proposal includes the following recovery and disposal activities:

1. landfilling of residual non-hazardous waste and non-hazardous soils
2. storage of incinerator bottom ash (IBA) to facilitate future recovery

The proposal will require the development of a dedicated storage area for IBA, in addition to the existing permitted landfill footprint. The proposed layout of the storage activity is shown on Figure 1: Drawing INFO-001. No changes are proposed to the current permitted landfill footprint. In order to increase the void capacity within the existing landfill footprint, it is proposed to raise the final profile of the landfill by up to 10-12 m.

In addition, the footprint of the existing leachate management area, which comprises a covered lagoon, will be increased to facilitate installation of a leachate treatment plant for pre-treatment of leachate generated from the landfill, prior to its removal offsite, as currently occurs.

To facilitate soils management onsite, as well as to mitigate potential impacts associated with noise and visual impact, it is also proposed to create a number of screening berms at a number of locations on the facility perimeter.

It is proposed to construct a 40 m^2 building on site to facilitate the short term storage of baled waste and/or the recovery of metals from ash.

1.3 Planning Process for the Proposed Development

1.3.1 Strategic Infrastructure

The Planning and Development Act 2000 was amended in 2006 to require applications for planning permission for major infrastructure projects to be made directly to An Bord Pleanála rather than to the local planning authority, as would have previously been the case.

In order to fall within the Strategic Infrastructure provisions of the 2000 Act, as amended, a proposed development must be, *inter alia*, of a class specified in the Seventh Schedule to the Act and satisfy one or more of the conditions of Section 37A (2) of the Act. The applicable class in this case is in Part 3 of the Seventh Schedule, as amended, which specifies, *inter alia*, the following class of development:

- *"An installation for the disposal, treatment or recovery of waste with a capacity for an annual intake greater than 100,000 tonnes."*

The conditions in Section 37A (2) are that:

> 37A (2)... *"following consultations under Section 37B, the Board serves on the prospective applicant a notice in writing under that section stating that, in the opinion of the Board, the proposed development would, if carried out, fall within one or more of the following paragraphs, namely—*
>
> *(a) the development would be of strategic economic or social importance to the State or the region in which it would be situate,*
>
> *(b) the development would contribute substantially to the fulfilment of any of the objectives in the National Spatial Strategy or in any regional spatial and economic strategy in force in respect of the area or areas in which it would be situate,*
>
> *(c) the development would have a significant effect on the area of more than one planning authority."*

In July 2016, Knockharley Landfill Limited wrote to An Bord Pleanála to formally request a pre-application consultation meeting under Section 37B of the Planning and Development Act 2000, as amended, in respect of their existing development in County Meath. This pre-application consultation process is being undertaken under reference PL17.PC0223.

Under Section 37E of the Act, a planning application for a development which comes within the scope of Section 37A must be accompanied by an Environmental Impact Statement (EIS). Fehily Timoney & Company has been commissioned to prepare the EIS. This scoping document has been prepared to inform the preparation of the EIS.

Screening will be undertaken to determine if an Appropriate Assessment (AA) of the proposed development at Knockharley Landfill is required. If the screening assessment indicates that an AA is required, a Natura Impact Statement will be prepared and submitted to accompany the planning application and EIS.

1.4 Environmental Impact Assessment and the Function of the EIS

The European Union Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment, requires member states to ensure that a competent authority carries out an appraisal of the environmental impacts of certain types of project, as listed in the Directive, prior to development consent being given for the project. Knockharley Landfill is such a project. The environmental impact assessment of the proposed development at Knockharley Landfill will be undertaken by An Bord Pleanála, should the project be deemed as strategic infrastructure.

The EIS, to be submitted with the planning application for the development, will provide information on the possible environmental impacts of the project and propose mitigation measures to reduce the residual impacts. Thus the function of the EIS is to provide information for the environmental impact assessment.

1.5 Purpose of Scoping

The purpose of the EIS scoping process is to identify the issues which are likely to be important during the environmental impact assessment and to eliminate those that are not. The scoping process will identify the sources or causes of potential environmental effects, the pathways by which the effects can happen, and the sensitive receptors which are likely to be affected. The issues identified in the scoping process will be examined in the EIS, any potential impacts will be quantified, mitigation measures proposed as required, and residual impacts described. The scoping process will also identify the appropriate level of detail for the information to be provided in the EIS.

There is provision in the legislation for formal scoping of an EIS. The person preparing the EIS can request the competent authority, in this case An Bord Pleanála, to provide a written opinion on the information to be contained in the EIS. The applicant must provide sufficient information on the project to allow informed opinions to be given. The competent authority can request additional information from the applicant.

When sufficient information has been obtained, the competent authority seeks a written opinion from the statutory consultees. Upon receipt of these opinions, the competent authority issues its formal opinion to the applicant. Giving a formal scoping opinion does not preclude the competent authority from requiring further information at a later stage.

The alternative to formal scoping is informal scoping. This can be undertaken by the authors of the EIS by direct consultation with the relevant statutory and non-statutory consultees. Informal scoping is proposed for the EIS for Knockharley Landfill.

1.6 Consultation

A consultation process is being undertaken by Knockharley Landfill Limited and the EIS team. This will include liaising with relevant departments of the local planning authority, Meath County Council.

It is also the intention of the applicant to undertake public consultation and details of this consultation will be included in the EIS.

Article 28 of the Planning and Development Regulations (as amended) requires that certain bodies are contacted depending on the nature of the potential impacts of a development. Consequently, consultation letters will be sent to the relevant prescribed bodies (as defined in Article 28 of the Planning and Development Regulations as amended) as well as non-governmental organisations (NGOs) and local stakeholders.

This scoping document will be sent to the organisations listed below:

- Meath County Council – Planning
- Meath County Council – Environment
- An Taisce
- Failte Ireland
- Teagasc
- The Heritage Council
- Dublin Airport Authority
- Development Application Unit, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs
- Inland Fisheries Ireland – Eastern River Basin District
- Irish Wild Life Trust
- Transport Infrastructure Ireland
- Irish Geological Heritage Programme
- Environmental Health Department,
- Eastern & Midlands Regional Assembly
- Irish Water
- Office of Public Works (OPW)
- Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs –National Parks and Wildlife Service
- An Chomhairle Ealaíon
- Department of Communications, Climate Action and Environment
- Department of Agriculture, Food & Marine
- National Transport Authority
- Meath County Development Board
- Eastern-Midlands Region Waste Management Office
- Environmental Protection Agency
- Kentstown Village Project
- Knockharley and Districts Residents Association
- Knockharley Landfill Liaison Committee
- Department of Housing, Planning, Community and Local Government

Comments on the scope of the EIS can be submitted by email to knockharleylandfillscoping@ftco.ie

LEGEND

- Planning Boundary
- Existing Wayleave
- Finished Ground Contour
- National Primary Route
- National Regional Route
- National County Route
- Landfill Cells currently being filled
- Constructed Landfill Cells
- Proposed Future Landfill Cells
- Proposed Screening Berms
- Existing Watercourse
- Existing Forested Areas

Surface Water Pond
Existing Watermain
Existing O/H 20kV Powerline
Area under construction
Elm Grove
TUITERATH
SW Swale
Existing overhead power lines 20kV
KNOCKHARLEY
MSW LANDFILL
Landfill Gas Flare
Existing O/H 20kV Powerline
PROPOSED EXTENSION TO TREATMENT WORK
Existing Surface Water Settling Pond
EXISTING GAS MAIN
Existing gas main
Ruin
Villany
R150

DRAFT - FOR REVIEW ONLY

Rev.	Drawn	Chk'd	App'd	CC	
A	AK			Cork	Issue For Planning Application
			Rev Origin		Description
			Date		

Revision History: A — PLANNING + EIS

Name of Client

KNOCKHARLEY LANDFILL LTD.

Name of Job

PROPOSED DEVELOPMENT AT KNOCKHARLEY LANDFILL

Title of Drawing

PROPOSED SITE LAYOUT PLAN

Scales Used	This Drawing was printed to
1:3750	A1-

Dwg. No.	Rev.
LW14-821-01-P-0000-003	A

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Scale 1:3750 (0m, 38m, 75m, 113m, 150m, 188m, 225m, 263m, 300m, 338m, 375m)

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2 PROJECT DESCRIPTION

2.1 Existing Development

The existing facility comprises a non-hazardous disposal site (landfill). It is located on a 135 hectare land holding with the existing landfill footprint positioned near its centre. The current planning permission (PL17.220331) permits the development of approximately 25 ha of landfill cells in seven phases. To date, four of the seven planned phases have been constructed. Phase 1 has been permanently capped. Phase 2 and 3 has part permanent and part intermediate capping (temporary). Phase 4 is partly filled and has both daily and intermediate capping. Permanent capping of the remainder of Phase 2 and part of Phase 3 has commenced and is due to be completed by year end.

The facility was designed, constructed and is being operated in accordance with the EU Landfill Directive 1999/31/EC, EPA Industrial Emissions Licence (W0146-02) and EPA manuals on landfill selection, design, operation and monitoring and its relevant planning permissions.

The landfill opened in December 2004 and accepts residual household, commercial and industrial wastes together with construction & demolition (C&D) wastes and incineration bottom ash (IBA). The site is licensed to operate from 07:30 to 18:30 Monday to Saturday inclusive and is licensed to accept waste between 08:00 and 18:00 (excluding public holidays).

The existing buildings on the site comprise an administration building, two weighbridges, inspection slab, quarantine slab, machinery/maintenance garage, car parking and other facilities. These are located within the buildings area to the east of the landfill cells.

The landfill is connected to the national primary route, the N2, by a private dedicated access road via an underpass under the regional road CR384. Waste arriving at the facility enters the site via this private dedicated access road.

The daily operation of the landfill facility is monitored as required under the Industrial Emissions Licence and consists of a number of monitoring programmes that address groundwater and surface water quality, leachate and landfill gas management, air emissions, VOC, noise, odour and dust deposition. The frequency of monitoring of the different environmental parameters is set out in the licence with a requirement to submit all the monitoring data from the facility to the EPA. Environmental monitoring data is reported to the EPA on a biannual and annual basis. Any non-compliances, incidents or complaints are reported by the next working day following occurrence.

Environmental management facilities on-site include:

- Leachate management system
- Landfill gas management system
- Surface water management system

2.1.1 Leachate Management System

Leachate that gathers in the base of filled cells is collected via a system of pipework, laid in a 'herringbone' fashion within the granular material laid on the cell floors. Electricity- powered leachate pumps are located in the low points of the cells, and leachate is pumped from here to the on-site leachate storage lagoon. The lagoon itself is covered with a floating cover to minimise water ingress and odour emissions. Leachate is tankered from this lagoon to an off-site waste-water treatment facility.

2.1.2 Landfill Gas Management System

Landfill gas is extracted from all active and filled cells via vertical and horizontal gas wells and pipework. Gas extraction commences from each cell once sufficient waste has been placed to prevent air infiltration into the gas extraction system. In addition, temporary extraction pipes are installed at the landfill working face to further enhance gas collection. A slotted horizontal gas collection pipe is also installed at the top of the cell side-slopes to intercept any gas travelling up the cell embankments.

Landfill gas is fed from the cells to the utilisation compound just east of the landfill footprint and north of the surface water lagoon. This compound contains three enclosed flares and four landfill gas engines. The latter generate electricity for export to the Irish national grid. The landfill gas utilisation plant is operated by Bioverda Power Systems Ltd., under contract from Knockharley Landfill Ltd. There is a flare dedicated to the management of poor quality landfill gas generated in the active area.

2.1.3 Surface Water Management System

Drainage from adjoining lands onto the site is directed around the property and flows into the local drainage network at the southern boundary of the facility.

Surface water from the landfill is drained via the main landfill swale to a purpose-built storm water attenuation pond and constructed wetland. The storm water attenuation pond is lined with an engineered lining system, comprising a HDPE membrane (permeability 1 x 10^{-9}m/s) and a layer of engineered clay to the same specification as the landfill cells. The constructed wetland comprises a shallow clay-lined pond both naturally colonised and planted with appropriate species. The outflow from the constructed wetland flows into the Knockharley Stream local drainage network at the south-eastern corner of the site.

Surface water arising from all roads and hardstandings is diverted to the main surface water sewer. This surface water sewer discharges to the surface water pond via a full retention oil interceptor and stilling chamber.

2.1.4 Cell Lining System

The deposited waste is fully contained through the use of a 1m thick clay basal liner with a permeability of 1 x 10^{-9}m/s and a composite high-density polyethylene (HDPE) membrane, complying with both the EU Landfill Directive and with the licence conditions. Placed waste is compacted immediately and covered daily to limit wind-borne litter and other nuisances.

The clay component of the basal lining system is won from material excavated during the construction of the cells. The clay is screened and subsequently placed and compacted in layers, to achieve the required degree of permeability, in compliance with the licence. The cells are then lined with a 2 mm thick HDPE geomembrane. The liner is textured on the side-slopes and smooth on the cell floors. The cell floors fall to low points equipped with leachate pumps. The composite barrier layer is protected against mechanical damage using a protective geotextile overlain by drainage stone on the floor and using a protective geotextile on the side slopes. The construction of the landfill liner system is subject to independent quality assurance testing and controls approved by the EPA.

2.1.5 Landfill Capping System

As part of ongoing operations at the site, the active area of the landfill is covered with daily cover. Near-horizontal areas of the working face are covered with soil and woodchip, the slope of the working face is covered with synthetic cover sheets at the end of each working day. Temporary low-permeability cover is installed as areas of the landfill reaches full height.

Phase 1 final capping at Knockharley Landfill consisted of 12,500m^2 of capping predominantly over Cells 1 and 2 and was undertaken in 2008/2009.

Phase 2 final capping consisted of 16,500m^2 of capping over the remaining areas above Cells 1, 2, 3 and 4. This work was undertaken during 2012.

Phase 3 capping at Knockharley Landfill consisted of final capping of 26,500m^2 over Cells 5 and 6. It also extended over part of Cells 7 and 8. This work was undertaken during 2013. Phase 4 capping is underway consisting of final capping over Cells 7 to 10.

The fully engineered final cap comprise a gas collection layer, a 1 mm fully welded linear low-density polyethylene (LLDPE) liner, sub-surface drainage layer, subsoil layer and topsoil layer. The overall thickness of the soil layers is 1 m in accordance with the requirements of the waste licence.

2.2 Proposed Development

It is proposed to increase the waste intake at the facility to up to 440,000 tpa for disposal and recovery, comprising the following waste management processes:

1. Landfilling of residual non-hazardous waste and non-hazardous soils
2. Storage of incinerator bottom ash (IBA) to facilitate future recovery

2.2.1 Landfilling of residual non-hazardous waste and non-hazardous soils

Landfilling of residual non-hazardous waste and non-hazardous soils is currently undertaken at the facility and the proposed development will see an increase in tonnage of these materials to be accepted for disposal and recovery at the site. This increase will be accommodated within the current permitted landfill footprint, and proposed to raise the final profile by up to 10-12 m.

2.2.2 Storage of IBA

It is proposed to develop a dedicated area for the storage of incinerator bottom ash (IBA). This area will be developed as a 'land raise' concept and will comprise shallow cells constructed in accordance with the requirements of the Landfill Directive, as well as leachate collection and gas venting infrastructure, site access roads, covered leachate lagoon and all ancillary and associated works.

The indicative footprint of this area is shown in Figure 1.

2.2.3 Building

It is proposed to develop a 40 m^2 building to facilitate the following activities:

- temporary storage of baled non-hazardous residual waste
- recovery of metals from IBA

The temporary storage of baled waste is proposed in response to a market identified requirement for capacity of this nature, as it provides contingency in terms of scheduling baled waste export shipments, as well as providing contingency during maintenance or unforeseen downtime experienced at energy from waste facilities.

2.2.4 Tonnages for acceptance

Up to 440,000 tonnes of material may be accepted at the facility per annum. Table 2.1 identifies potential tonnages of input materials and means of management of same.

Table 2.1: Potential Tonnages for acceptance

Waste Type	Input tonnage	Means of Management
Non-hazardous residual waste and non-hazardous soils	up to 290,000 tpa	Disposal within existing footprint & recovery through approved means e.g. daily and intermediate cover etc., temporary baled waste storage
Incinerator Bottom Ash	up to 150,000 tpa	Recovery/disposal through storage within dedicated area

2.2.5 Leachate treatment infrastructure

It is also proposed to augment the existing leachate storage lagoon through the installation of leachate pre-treatment/conditioning plant in order to reduce the concentration and volume of leachate being consigned from site for treatment at offsite wastewater treatment facilities.

Specialised plant (likely to be membrane bioreactor or reverse osmosis technology) will be installed within housed, enclosed containerised systems on a concrete plinth, with 1-2 further covered lagoons installed to store the separated leachate fractions. Final detail of these systems will be presented in the EIS.

2.2.6 Screening Berm development & and Ancillary development

In order to facilitate the management of soils onsite, won from the development of the IBA storage area as well as the future development of the currently permitted landfill cells, it is proposed to develop a number of berms at certain locations along the facility perimeter. The installation of these berm will also serve a purpose in terms of mitigation of potential noise impacts and visual impacts. Indicative locations of these berms are shown on Figure 1.

In addition, a second surface_water attenuation lagoon will be installed to the north of the IBA storage area, to facilitate surface_water management from this area, which will discharge to the existing stream.

3 STRUCTURE AND SCOPE OF THE EIS

3.1 Contents of the EIS - Statutory Requirements

The EIS must be prepared in accordance with the Planning and Development Regulations 2001, as amended, which set out the contents of an EIS.

Schedule 6 of the Regulations specifies the information to be contained in an EIS, including the following:

- *"A description of the proposed development comprising information on the site, design and size of the proposed development*
- *A description of the measures envisaged in order to avoid, reduce and, if possible, remedy significant adverse effects*
- *The data required to identify and assess the main effects which the proposed development is likely to have on the environment, and*
- *An outline of the main alternatives studied by the developer and an indication of the main reasons for his or her choice, taking into account the effects on the environment."*

Information is also required on the following matters:

- *A description of the physical characteristics of the whole proposed development and the land-use requirements during the construction and operational phases*
- *A description of the main characteristics of the production processes, for instance, nature and quantity of the materials used, and*
- *An estimate, by type and quantity, of expected residues and emissions (including water, air and soil pollution, noise, vibration, light, heat and radiation) resulting from the operation of the proposed development."*

Aspects of the environment likely to be significantly affected by the proposed development are also to be described, including in particular:

- *"Human beings, fauna and flora Soil, water, air, climatic factors and the landscape*
- *Material assets, including the architectural and archaeological heritage, and the cultural heritage, and*
- *The inter-relationship between the above factors*."

A description is required of the likely significant effects (including direct, indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative) of the proposed development on the environment resulting from:

- *"The existence of the proposed development,*
- *The use of natural resources, and*
- *The emission of pollutants, the creation of nuisances and the elimination of waste"*

A description is required of the methods used to assess the effects on the environment. A summary in non-technical language of this information is also to be included.

Finally, any difficulties encountered by the developer in compiling the required information should be indicated.

3.2 EIS Methodology

3.2.1 General

The EPA published guidelines on the preparation of environmental impact statements. These are contained in '*Advice Notes on Current Practice (in the preparation of Environmental Impact Statements)*', published in 2003 and '*Guidelines on the Information to be contained in Environmental Impact Statements*' published in 2002. The EIS team will have regard to these guidelines in the preparation of the EIS, as well as the draft revised versions of these guidelines, published for consultation in 2015. The team will also have regard to best practice guidance for individual environmental topics and available Best Available Technique (BAT) conclusion notes.

3.2.2 Mitigation Measures

The central purpose of the EIS is to identify potentially significant adverse impacts at the pre-application stage and to propose measures to mitigate these impacts. The primary mitigation will be by avoidance. Where potential adverse impacts are identified, the element of the proposed development giving rise to the adverse impact will be modified if feasible, to avoid the impact. If impacts cannot be avoided, measures will be incorporated into the project to reduce the adverse impacts to as low as is practicable. Where adverse impacts cannot be prevented, measures will be taken to restore the environment to an approximation of its previous condition or to a new equilibrium.

3.2.3 EIS Structure

There are two different EIS structures which are commonly used and which the EPA guidelines accept as equally valid. The structure, which the EIS team proposes to use for the EIS for the proposed development, is the grouped format structure.

Using this structure there is a separate chapter for each topic, e.g. air and climate, ecology, hydrology. The description of the existing environment, the proposed development and the potential impacts, mitigation measures and residual impacts are grouped in the chapter. The grouped format makes it easy to investigate topics of interest and facilitates cross-reference to specialist studies.

Each of the environmental topics will generally be presented under the following headings:

- Introduction
- Methodology
- Receiving Environment
- Potential Impacts
    - Construction
    - Operation
    - Decommissioning
- Mitigation Measures
    - Construction
    - Operation
    - Decommissioning
- Residual Impacts
- References

The structure proposed for the EIS is as follows:

Volume 1 – Non-Technical Summary (including figures)
Volume 2 - Main EIS
Volume 3 – Appendices for the EIS

4 ENVIRONMENTAL ISSUES TO BE ADDRESSED IN THE EIS

4.1 Background to the Project

The EIS will summarise the nature of the existing development, the planning history associated with the development site, the consultation processes undertaken and the format and structure being followed in the EIS preparation.

4.2 The Need for the Development

The specific need for the proposed development will be outlined identifying the legislative and policy aspects relevant to the wastes proposed for acceptance, the current and likely future generation and capacity demand profiles, as well as alternative management options.

Based on this assessment, the need for the proposed development will be established.

4.3 Alternatives Considered

The alternatives in relation to the proposed development will be considered under the following headings:

- Alternative site layout
- Alternative treatment technologies
- 'Do-nothing' alternative

The reasons, including environmental considerations, for choosing the proposed alternatives will be explained.

4.4 Technical Difficulties

Any technical difficulties encountered during the preparation of the EIS will be outlined.

4.5 Scheme Description

A description of all elements of the proposed development will be provided including:

- Construction methods and programmes of work
- Operations
- Restoration and aftercare
- Monitoring, maintenance and reporting.

4.6 Planning and Policy Context

The European, national, regional and local planning and policy context for the project will be addressed with reference to relevant county development and other plans or policies, regional planning guidelines and Government and waste management policy statements including (but not limited to):

- Council Directive 1999/31/EC on the Landfilling of Waste
- Council Directive 2008/98/EC on waste (and repealing certain Directives)
- European Communities (Waste Directive) Regulations 2011
- Waste Management: Changing Our Ways – 1998
- Preventing and Recycling Waste – Delivering Change – a Policy Statement – 2002
- A Resource Opportunity – Waste Management Policy in Ireland – 2012

- Eastern Midlands Region Waste Management Plan 2015 – 2021
- Southern Region Waste Management Plan 2015 – 2021
- Connacht Ulster Region Waste Management Plan 2015 - 2021
- National Spatial Strategy 2020-2020
- The National Development Plan 2007-2013 (revised in 2010 to 2016)
- Regional Planning Guidelines for the Greater Dublin Area 2010-2022
- Meath County Development Plan 2013 – 2019.

The relevant objectives within each of these documents will be summarised and put in context in relation to the proposed development.

4.7 Consultation Programme

Stakeholders, including national and local regulatory bodies, Government agencies, environmental non-governmental organisations (NGOs) and the general public will be provided with information on the project and asked for their comments and concerns. A list will be provided in the EIS of the bodies consulted and a summary will be provided of the queries and concerns expressed.

4.8 Human Environment – Socio Economic, Land Use and Amenity

The main areas that will be examined in this section with respect to the potential effects of the proposed development on the human environment in the area are:

- Settlements & population
- Land use
- Local employment and economic activity
- Transportation network
- Utilities
- Amenity
- Tourism

4.8.1 Assessment Methodology

Data from the Central Statistics Office will be used to define the socio-economic baseline of the surrounding environment. The potential positive and negative impacts of the project on population, tourism and recreation, employment and economic activity both directly and indirectly, will be assessed. This includes a review of the economic benefits to the surrounding community arising from the community contribution fund.

4.8.2 Existing Environment

The facility is located in a rural area approximately 1.5 km north of Kentstown village. The village of Slane is located 7 km north of the site, the town of Duleek 7 km to the east and the town of Navan 10 km to the west. There are a number of farmsteads and residences located along the local road network surrounding the site with a number of these situated within 1 km of the existing facility.

Community facilities in the immediate area, are primarily focused in Kentstown Village and include schools, a community hall, pubs and shops. The Kentstown Local Area Plan promotes tourism by encouraging and facilitating the development of sustainable tourism in through the conservation, protection and enhancement of the built and natural heritage, in order to maximise upon the economic benefits arising from the industry.

4.8.3 Potential Impacts

The continued operation of the Knockharley has significant economic benefits for the local community through the continued contributions from the community contribution fund.

4.9 Noise and Vibration

4.9.1 Aspects to be Addressed

The chapter will address noise and vibration impacts arising from the development and operation of the IBA storage area, the operation of the existing landfill, the installation of the leachate conditioning plant, screening berms installation and the impact of traffic associated with increased waste acceptance activities at the site.

4.9.2 Assessment Methodology

A noise assessment will be carried out for the construction and operational phases of the proposed development. This will include characterising the existing background noise environment through the review of monitoring data conducted as part of licence compliance.

A site specific noise prediction assessment will be conducted using prediction modelling software which will assess the cumulative impacts from operations within the existing landfill footprint, the construction and operation of the proposed IBA storage area, the installation of screening berms and increased traffic movements on sensitive receptors in the vicinity of the site.

4.9.3 Potential Impacts

The main potential construction phase impacts may arise during the construction of the IBA storage area, which could coincide with the development of future cells within the main landfill footprint, as well as screening berm installation. Construction related impacts related to the use of plant and machinery in the development of these area will be considered.

Operational noise impacts may arise from the acceptance and placement of IBA, residual waste and soils within their respective locations, as well as potential future winning of IBA from the storage area and its movement offsite.

4.10 Traffic and Transportation

4.10.1 Aspects to be Addressed

The traffic impact assessment will address the traffic impacts on the local road network from the construction of IBA storage area and operation of the overall facility at the maximum input of 440,000 tpa.

4.10.2 Assessment Methodology

A traffic impact assessment will be conducted in accordance with the National Roads Authority (NRA) Traffic and Transport Assessment (TTA) Guidelines, May 2014. Data collected from road traffic surveys at the junction to the facility from the N2 will be used in the assessment.

The methodology for the traffic impact assessment will include a review of the traffic volumes and impacts which will be generated by the construction and operation of the facility. The type and nature of waste loads will be characterised to calculate vehicle trips to and from the facility. Baseline traffic volumes will be established for the receiving environment and an assessment of the increases in traffic volumes undertaken. Recommendations will be made to mitigate any potential traffic impacts where required.

4.10.3 Existing Environment

The site is approximately 7 km south of Slane on the west side of the N2 National Primary Road. Navan is located approximately 10 km to the west of the site via the R153 Regional Road.

To the north, the site is bounded by the County Road CR384 running east-west. To the east the site is bounded by the CR384 running north-south between the N2 and R150. To the south, the site is bounded by farmland, which in general is located adjacent to the R150 over the section between the N2 National Primary Road and Kentstown.

The site has direct vehicular access to the national road network with access facilitated at a ghost island priority junction on the N2. The ghost island provides easy access for right-turning vehicles travelling from the north. This is complimented with an auxiliary left turn deceleration lane to facilitate access for vehicles coming from the south. The junction has been designed and constructed in accordance with the NRA: Design Manual for Roads and Bridges (DMRB).

The private access road to the site runs due west through arable lands, thereafter running under the CR384 County Road. The primary controlled site entrance (a security gate with closed circuit television) is located approximately 80 to 100 m west of the underpass of the CR384. Vehicles arriving at the facility enter the site via this private dedicated access road, through the site entrance to the weighbridge facility.

4.10.4 Potential Impacts

It is anticipated that the traffic volumes arising from the construction of any new infrastructure will be minor when considered in context with traffic volumes associated with the operation of the facility. The increase in waste acceptance activities at the facility has the potential to give rise to traffic congestion and capacity issues, such as queuing, in the event of there being inadequate access infrastructure. However, given that works have taken place to upgrade the junction with the N2 along a dedicated private road, the impact arising from increase traffic volumes will be reduced. Nonetheless these potential impacts will be assessed as part of the traffic impact assessment.

4.11 Air and Climate Change

4.11.1 Aspects to be Addressed

The assessment will address the potential impacts on air quality due to construction activities and emissions from traffic and material placement activities associated with the operation of the overall facility.

The climate in the immediate local area of a proposed development is known as the micro-climate whereas the climate of a large geographical area (global) is the macro-climate. The potential impacts of Knockharley Landfill on micro-climate and macro-climate will be addressed.

Odour modelling will be undertaken, which will be informed by baseline field assessment and other information sources, to determine the potential impact of increased waste acceptance at the facility.

4.11.2 Assessment Methodology

Air quality monitoring conducted by the EPA at a number of locations in the vicinity of the site, as well as dust and volatile organic compound (VOC) monitoring conducted on-site, will be reviewed and levels compared with the air quality standards.

To assess the impacts of construction dust emissions, the approach and assessment criteria outline in the *National Roads Authority (NRA) Guidelines for the Treatment of Air Quality during the Planning and Construction of National Road Schemes* (2011) and the *Institute of Air Quality Management (IAQM) publications, Guidance on the assessment of dust from demolition and construction & Guidance on the Assessment of the Impacts of Construction on Air Quality and the Determination of their Significance* will be used.

Potential vehicle emissions arising from the operation of the facility at 440,000 tpa will be assessed using the NRA Guidelines. For the purposes of assessing the impact on air quality of emissions generated by operation traffic, the methodology described in the Design Manual for Roads (DMRB) (Volume 11, Section 3 Air Quality, May 2007) and published by the UK Highways Agency will be used. The DMRB model predicts vehicle emissions for NO_x, NO_2 and $PM_{10,}$ carbon monoxide, benzene and 1,3-butadiene.

The potential for the generation of operational dust, odour and other emissions will be evaluated and mitigation measures proposed, where necessary.

The potential micro-climatic impacts of the Knockharley facility will be assessed in relation to the micro-climatic baseline, the scale of the elements of the project and the nature of use of the surrounding environment.

The data collected during baseline assessments will be used to construct a baseline odour dispersion model of the site. The model will define estimates of the current emissions generated from the site, and the odour exposure levels that are predicted to occur around the site under the range of meteorological conditions that occur over a typical meteorological year. Modelling will be conducted using the AERMOD dispersion model in accordance with relevant guidance issued by the US EPA and Irish EPA. The potential levels of exposure experienced around the site will be presented in the form of concentration isopleths. This model will then be used as a foundation from which to investigate the effect of the proposed development at various points in time during its development.

4.11.3 Existing Environment

Knockharley landfill is located in a rural area, corresponding to air quality zone D under the Air Quality Regulations, SI 180 of 2011, as amended. The air quality is expected to be good.

Existing air emissions from the site include landfill gas which is actively managed and utilised to generate electricity for export to the national grid. There have been odour issues associated with the operation of the landfill and the operators have been actively engaged with the EPA in relation to the implementation of processes and regimes to significantly mitigate these issues.

4.11.4 Potential Impacts

The construction phase of the IBA storage area has the potential to generate dust emissions, which could give rise to nuisance for local residents. Construction plant and equipment, and the traffic generated by the construction process, have the potential to give rise to emissions of oxides of nitrogen, benzene and particulates, which could impact on local air quality in the short term.

Potential air quality impacts arising from the operation of the IBA storage area include dust emissions arising from the placement and/or winning of IBA, while potential emissions from increased landfilling rates includes odour and landfill gas.

4.12 Ecology

4.12.1 Aspects to be Addressed

This chapter of the EIS will address the habitats and species, including those of conservation concern in and in close proximity to the facility.

4.12.2 Assessment Methodology

The assessment will focus on:

- Natura 2000 sites i.e. Special Areas of Conservation designated under the EU Habitats Directive (Council Directive 92/43/EEC) and Special Protection Areas designated under the EU Birds Directive (Directive 2009/147 EC), within 15 km of the proposed sites and routes
- Other designated sites such as Natural Heritage Areas, Nature Reserves and Refuges for Fauna or Flora
- Habitats listed in Annex I of the Habitats Directive
- Birds listed in Annex I of the Birds Directive
- Species protected under the Wildlife Acts including protected flora
- Habitats that can be considered as corridors for the purposes of Article 10 of the Habitats Directive
- Red data book species
- and biodiversity in general.

Desk studies will be undertaken in which ecological databases, such as those of the NPWS and EPA will be consulted. The NPWS (including the local conservation ranger), Inland Fisheries Ireland and the main environmental non-governmental organisations will be consulted.

A flora and fauna assessment for the proposed development will be conducted in accordance with Fossitt (2000) "*A Guide to Habitats in Ireland*", following best practice guidelines in Smith *et al.* (2011) "*Best Practice Guidance for Habitat Survey and Mapping*". The aquatic habitats in the Knockharley Stream and the River Nanny are evaluated based on biological monitoring conducted as part of licence compliance. The results of this assessment will be presented in the EIS using GIS mapping.

Some vegetation and tree removal will be required for the development of the IBA storage area and the screening berms installation and relevant assessments for these areas will be included in the EIS.

4.12.3 Existing Environment

To the north and the east of the existing landfill footprint and within the site boundary is agricultural land which is predominantly managed forestry. The site itself, while relatively flat, rises gradually northwards and westward from approximately 50 mOD at the south-east corner to almost 70 mOD at the western boundary.

There are a number of designated sites located in the vicinity of Knockharley landfill. These include:

- Balrath Woods pNHA (001579)
- Thomastown Bog pNHA (001593)
- Rossnaree Riverbank pNHA (001589)
- River Boyne and River Blackwater SAC (002299)
- Duleek Commons pNHA (001578)

While there will be no direct impact on any of these site, indirect impacts may occur. These include the potential impacts from a discharge of contaminated run-off from the Knockharley site. The local Knockharley Stream, to which surface_water discharges from the site, is within the River Nanny catchment, which discharges to the River Nanny Estuary and Shore SPA, which is located c. 20 km from the site.

Screening will be undertaken to determine if an Appropriate Assessment (AA) of the proposed development at Knockharley Landfill is required. If the screening assessment indicates that an AA is required, a Natura Impact Statement will be prepared and submitted to accompany the planning application and EIS.

4.12.4 Potential Impacts

Potential impacts from the construction and operation of the proposed development on flora and fauna include:

- Direct loss of habitat
- Damage to adjacent habitats during construction
- Impacts on water quality due to polluted run-off emanating from the site
- Disturbance to local wildlife, including loss of habitat for, or displacement from, known foraging or breeding areas of mammals, birds, bats etc.
- The introduction of alien invasive species during construction
- Impact on water quality or aquatic habitats resulting from the stream diversion
- Cumulative impacts which may affect the conservation status of any given species, in particular Annex species
- Impacts on the conservation status of Natura 2000 sites.

4.13 Soils, Geology & Hydrogeology

4.13.1 Aspects to be Addressed

The assessment will address soils, bedrock and aquifer underlying the site.

4.13.2 Assessment Methodology

The methodology for the soils and geology assessment will be in accordance with the guidelines published by the Institute of Geologists of Ireland (2013) *Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements*.

The existing geology will be described in terms of the bedrock geology, overburden geology and hydrogeology. It will be prepared using available published literature for the site area which includes:

1. Groundwater Protection Scheme for County Meath (on GSI website)
2. Geology of Meath - Sheet 13 (McConnell, B et al., 2001)
3. General Soil Map of Ireland - Second Edition 1980 (Gardiner, M.J and Radford, T, 1980)

As part of the assessment the following will be conducted:

- A review of the characteristics of the entire site (ground conditions, topography, vegetation cover/condition)
- Identification of past and present land use on the site (grazing, forestry etc.) and their current impact on the existing ground conditions
- Review and interpretation of data collected during site investigations carried out in July and August 2016

4.13.3 Existing Environment

Site investigations previously undertaken at the site during the phased development of the landfill to-date indicate that the overburden at the site is glacial till which varies in thickness from 12 to 21.5 m, from east to west across the site. The till comprises cobbles and boulders in a silty clay matrix with minor sand content. The till has a low permeability in the range of 1×10^{-9} m/sec to 4.6×10^{-11} m/sec.

Bedrock recovered from boreholes on-site indicate fine grained light coloured sandstone and darker coloured siltstone /mudstone. The elevation of the bedrock surface varies from 40 to 50 mOD, falling away towards the south, following the slope of the topography. The GSI website classifies this bedrock (Namurian rocks) in County Meath as a Poor Aquifer (Pl) which would generally be unproductive except in localised zones. The vulnerability of the aquifer is also classified as low.

4.13.4 Potential Impacts

The impact on soils/geology of the site is limited to any excavations required for the development of the proposed IBA storage area, the expanded leachate storage lagoons and the development of screening berms, in terms of slope stability.

Excavated material will be used in screening berm development and/or as temporary landfill cap. Once operational, the management of clean surface water run-off and/or leachate from the site will be integrated into the existing management systems on-site, through installation of newly required infrastructure. As no alterations are required to the consented landfill footprint to accommodate the proposed intensification of landfilling, it is anticipated that there will be no impacts from increased landfilling activities on the soil/ geology or groundwater. A hydrogeological risk assessment will be prepared in relation to the development of the landfill cells associated with the IBA storage.

Groundwater monitoring conducted as part of licence compliance to date indicates no impact on water quality. Therefore, it is anticipated that the continued employment of the groundwater protection measures in accordance with the Landfill Directive and site operations will result in no degradation of groundwater quality at the site.

4.14 Hydrology & Water Quality

4.14.1 Aspects to be Addressed

The assessment will address water quality impacts on surface water. The impact of the project on the hydrological regime of the receiving environment, including flood risk, will be addressed.

4.14.2 Assessment Methodology

The objectives of the relevant River Basin Management Plan in relation to water quality will be considered. The review will include the County Development Plans for Meath and will consider the policies and objectives of the Plan in relation to surface water and flooding. The assessment will be prepared in accordance with the EPA and Office Public Works (OPW) guidance. Any concerns expressed by consultees relating to hydrology, drainage and/or flooding will be addressed, where appropriate.

The review will have regard to the baseline data and the studies undertaken for the assessment of impacts on terrestrial and fresh water ecology, geology and hydrogeology in relation to environmentally protected areas, receiving waters and soil conditions. Baseline monitoring data collected on a quarterly basis as part of licence compliance will be reviewed and used to characterise the impact, if any, on receiving waterbodies.

Preliminary drainage design, using Sustainable Drainage Systems (SuDs), for the proposed development will be conducted to ensure that additional surface water run-off is incorporated into the existing drainage system design, where possible.

The impact of the proposed stream diversion will be assessed to determine any potential impact on flooding as part of a standalone Flood Risk Assessment report. The design of the second standalone surface_water attenuation facility will ensure sufficient capacity for the flows resulting from the IBA storage area development.

4.14.3 Existing Environment

The site is drained by Knockharley Stream which lies in the Veldonstown waterbody (EA_Nanny160_NannyTRIB_Veldonstown) within the Eastern River Basin District (ERBD). The stream enters to the site from the west and flows eastwards towards the eastern boundary of the site before travelling southwards to Veldonstown Stream, which in turn drains to the River Nanny. The outlet from the existing onsite surface water management system discharges into tributaries of the River Nanny.

4.14.4 Potential Impacts

The main impact from the construction phase of the proposed development will be rainfall run-off containing silt that could potentially lead to siltation and consequently physical effects on flora and fauna in aquatic habitats.

Sediment has the potential to arise from:

- Vegetation removal could lead to an increase in sediment in the surface water run-off
- Temporary spoil heaps from the excavation of foundations of the proposed facilities
- Silt carried on the wheels of vehicles leaving the site could be carried onto the public road.

In addition, potential impacts on water quality and flooding may result from the diversion of the Knockharley Stream.

The potential impacts on hydrology and drainage that may arise from the operation of the facility includes impacts on localised flooding patterns and downstream structures arising from increase run-off/discharge rates as well as cumulative hydrological impacts with neighbouring developments.

4.15 Archaeology, Architecture and Cultural Heritage

4.15.1 Aspects to be Addressed

The assessment will address features and sites of archaeological, architectural and cultural heritage significance.

4.15.2 Assessment Methodology

Archaeological, architectural and cultural heritage assessments of the Knockharley site were conducted for previous applications. In addition, archaeological monitoring was conducted at the site during the previous excavation for the various phases of the landfill footprint. These records will be reviewed and presented in the EIS. Subsequently a walkover of the site, with particular focus on the previously undisturbed area proposed for the development of the IBA storage area, and screening berms will be conducted by an archaeologist.

An impact assessment and mitigation strategy will be prepared. This will outline potential adverse impacts that the proposed development may have on the archaeological, architectural or cultural heritage resource, while the mitigation strategy is designed to avoid, reduce or offset such impacts.

Consultation will take place with a number of bodies including the Heritage Officer and/or Conservation Officer in Meath County Council.

4.15.3 Existing Environment

A number of archaeological features have been recorded within the Knockharley site. Geophysical surveying of targeted areas undertaken in 2003 (Licence Number 03R010) identified potential areas which were subject to pre-development testing. This testing resulted in the identification of a possible well and a posthole feature which were archaeologically resolved. In 2004, nine archaeological features were encountered in the course of pre-development testing and archaeological monitoring. Two of these sites, a deer trap and a well, were excavated and preserved by record.

In 2006, further monitoring was conducted (Licence 04E0788 extension) resulting in five separate areas/features of archaeological significance were uncovered in the course of monitoring.

In 2009, monitoring of the removal of topsoil for the development of the on-site gas utilisation compound in the south eastern portion of the landfill site was conducted. The archaeological monitoring found no evidence of archaeological layers or features. The stratigraphy consisted of topsoil overlying natural layers. Occasional modern debris indicated the area had been disturbed in the recent past.

4.15.4 Potential Impacts

The potential impacts of the proposed development will be the loss or interference with a previously unrecorded site or features of archaeological, architectural and cultural heritage significance caused by excavations. Once construction of the proposed development has been completed, the potential for a negative impact on archaeological, architectural and cultural heritage from the development will be minimal.

4.16 Landscape and Visual Impact

4.16.1 Aspects to be Addressed

The potential impacts from the proposed development within the context of the existing waste management facility will be assessed.

4.16.2 Assessment Methodology

A desktop study will be undertaken to determine the existing landscape of the area and visual envelope of the Knockharley development within that area. Landscape values such as amenity areas, designated views and prospects, and historical archaeological and architectural heritage will be identified from the Meath County Development Plan.

A number of viewpoints illustrating the existing views of the facility and in particular the landfill body itself will be included. An assessment of the impacts of the IBA storage area and in particular the proposed increased landfill height will be conducted with representations of the dimensions and scale of these elements of the development produced and included in the assessment.

4.16.3 Existing Environment

The landscape of the existing facility and the surrounding area is characterised by extensive hedgerow bound fields interspersed with areas of woodland cover and mature trees. Relatively gentle undulations in landform combine with vegetation to generally constrain views across the landscape with the exception of localised vantage points or clearances in vegetation. The existing facility and in particular, the landfill body, is a visible feature in the surrounding landscape.

4.16.4 Potential Impacts

It is anticipated that the potential impacts arising from the IBA storage area development and the increased landfill height will be mitigated by the installation of the screening berms such that impacts will be related to the scale and form of overall development with respect to the visual character of the surrounding area.

5 CUMULATIVE IMPACTS, INDIRECT IMPACTS AND INTERACTION OF EFFECTS

5.1.1 Aspects to be Addressed

The cumulative impacts of the proposed development at Knockharley Landfill with other projects, existing or which have received planning permission but have not yet been built, or for which there is information in the public domain, at a sufficient level of detail to allow assessment, will be addressed. Indirect effects and effects in different environmental media will be addressed.

5.1.2 Assessment Methodology

The assessment methodology will be based on the EPA guidance and the EU guidelines, *'Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions'*, published by the Office for Official Publications of the European Communities in May 1999.

As part of scoping the studies required to assess the impacts of the development in the different environmental media, the potential for significant cumulative and indirect impacts and interactions will be examined and any such potential impacts will be identified. Where the potential for significant cumulative and indirect impacts and interactions is identified, such impacts and interaction of impacts will be included in the scope and addressed in the baseline and impact assessment studies for each of the relevant environmental media and aspects of the project. The cumulative and indirect impacts and interaction of impacts will be presented in the chapters of the EIS which address the most relevant environmental media.

The matrix and expert opinion approaches, as outlined in the EU Guidelines, will be used in the identification of the potential for significant cumulative and indirect impacts and interactions. A matrix of potential interactions will be prepared. Modelling and carrying out of capacity analyses will be used to evaluate impacts.

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Derek Milton
Fehily, Timoney and Company
Core House,
Pouladuff Road,
Cork

04/11/2016

RE: Proposed Development at Knockharley Landfill, Kentstown, Co. Meath

Dear Mr Milton,

Irish Water (IW) acknowledges receipt of your letter dated 25th October regarding the Environmental Impact Statement (EIS) scoping for the above development. On an initial review, Irish Water does not have objections to the proposed development.

We do however note where the proposed extension to treatment works is within close proximity to Irish Water assets, specifically water mains contiguous to the eastern boundary. We suggest a site investigation be carried out prior to the beginning of construction and proposals outlined for dealing with situations where the works would interfere with existing water services infrastructure (watermains, service connections, rising mains, foul and surface water sewers, culverts, etc.).

Please also see attached our suggested scope in relation to Water Services.

Yours Sincerely,

Suzanne Dempsey

Suzanne Dempsey
Spatial Planning Strategy Specialist

Response to EIS Scoping Report Requests

IW currently does not have the capacity to advise on scoping of individual projects. However, in general we would like the following aspects of Water Services to be considered in the scope of an EIS where relevant;

a) Impacts of the development on the capacity of water services (do existing water services have the capacity to cater for the new development if required).
b) Any up-grading of water services infrastructure that would be required to accommodate the development.
c) In relation to a development that would discharge trade effluent – any upstream treatment or attenuation of discharges required prior to discharging to an IW collection network
d) In relation to the management of surface water; the potential impact of surface water discharges to combined sewer networks & potential measures to minimise/stop surface waters from combined sewers
e) Any physical impact on IW assets – reservoir, treatment works, pipes, pumping stations, discharges outfalls etc. including any relocation of assets
f) Any potential impacts on the assimilative capacity of receiving waters in relation to IW discharge outfalls including changes in dispersion /circulation characterises
g) Any potential impact on the contributing catchment of water sources either in terms of water abstraction for the development (and resultant potential impact on the capacity of the source) or the potential of the development to influence/ present a risk to the quality of the water abstracted by IW for public supply.
h) Where a development proposes to connect to an IW network and that network either abstracts water from or discharges waste water to a "protected"/sensitive area, consideration as to whether the integrity of the site/conservation objectives of the site would be compromised.
i) Mitigation measures in relation to any of the above

This is not an exhaustive list.

Please note

- If a development will require a connection to either a public water supply or sewage collection system the developer is advised to contact Irish Water's Connections and Developer Services Team prior to applying for planning permission. The contact in the Eastern Region is Oliver Fogarty ; olfogarty@water.ie
- For Information on Irish Water assets please send a query to DataRequests@water.ie
- Irish Water will not normally accept new surface water discharges to combined sewer networks

An Taisce
The National Trust for Ireland

20162610-FTC-KTLF

Fehily Timoney & Company
J5 Plaza
North Park Business Park
North Road
Dublin 11

Sent by email to:
info@ftco.ie

26.10.16

Ref: **LW14/821/01/ConLet/DFM/CF**
For: **Proposed development at Knickharley Landfill, Kentstown, Co. Meath**

Dear Sir/Madam,

Thank you for your letter dated 25th October 2016.

It is noted that the subject proposal relates to an increase in the quantum of waste intake at Knockarley Landfill of up to 440,000 tpa. The current facility permits the acceptance of up to 200,000 tba.

Due to the large volume of waste intake being proposed at this facility, all environmental considerations need to be adequately assessed.

Under Section 4.8 (Socio Economic, Land Use and Amenity) it is stated that '*there are a number of farmsteads and residences located along the local road network surrounding the site with a number of these situated within 1km of the existing facility*'. An Taisce note that under 'Potential Impacts' [4.8.3] it is stated that '*the continued operation of the Knockharley has significant economic benefits for the local community through the continued contributions from the community contribution fund*'. Due to the proximity of the facility to dwellings, the assessment of 'Potential Impacts' should outline any negative impacts that may occur as a result of increased waste intake (odours etc). Appropriate mitigation measures should be identified.

Section 4.10.4 of the Scoping Report states that "*The increase in waste acceptance activities at the facility has the potential to give rise to traffic congestion and capacity issues, such as queuing*". The application needs to demonstrate that the subject proposal, during construction and operation of this facility will not be prejudicial to public health and safety.

Section 4.12.3 identifies a number of designated sites in the vicinity of Knockharley landfill. These include: Balrath Woods pNHA (001579), Thomastown Bog pNHA (001593), Rossnaree Riverbank pNHA (001589), River Boyne and River Blackwater SAC (002299), Duleek Common pNHA (001578). The application needs to demonstrate that it is consistent with the provision of Article 6(3) of the Habitats Directive. Best practice suggests that sites lying within 15-20km radius of the plan area should be included.

All water quality issues need to be adequately addressed. Leachate management needs to be outlined. It should be demonstrated that the subject proposal will not have an impact on water quality. All downstream impacts need to be addressed. Appropriate mitigation measures need to be identified.

Landscape designations, views and prospects, archaeological features and architectural heritage all need to be assessed.

Yours faithfully,

Ian Lumley,

Built Environment Office
An Taisce – The National Trust for Ireland

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Fehily Timoney & Company
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North Park Business Park
North Road
Dublin 11

Date: 07th November 2016

Ref No: 01.3.006
Your Ref: LW14/821/01/ConLet/DFM/CF

Dear Mr. Milton,

Re: EIA Scoping: Proposed development at Knockharley Landfill, Kentstown, Co. Meath

Further to your letter of 25th of October, daa Plc, Head Office, Dublin Airport, Co. Dublin have no comment to make at the current time with regard to the EIA Scoping for a proposed development to intensify waste acceptance at the existing landfill facility at Knockharley Landfill, Kentsown, Co. Meath.

Yours faithfully,

Jane Roche

Jane Roche
Planning Department

Derek Milton

From: Manager Dau <Manager.Dau@ahg.gov.ie>
Sent: 27 October 2016 15:57
To: knockharley landfill scoping
Cc: Reception
Subject: DAU Ref: G Pre00334/2016 Re Proposed development at Knockharley Landfill, Kentstown, Co. Meath

Your Ref: **LW14/821/01/ConLet/DFM/CF**
Our Ref: **G Pre00334/2016** (Please quote in all related correspondence)

A Chara,

On behalf of the Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs, I acknowledge receipt of your recent consultation from Derek Milton of Fehily, Timoney and Company Consultants in Engineering & Environmental Sciences.

In the event of observations, you will receive a co-ordinated heritage-related response by email from Development Applications Unit (DAU) on behalf of the Department.

The normal target turnaround for pre-planning and other general consultations is six weeks from date of receipt. In relation to general consultations from public bodies under the European Communities (Environmental Assessment of Certain Plans and Programmes) Regulations 2004 to 2011, the Department endeavours to meet deadline dates, where requested.

If you have not heard from DAU and wish to receive an update, please telephone the direct line number below or email manager.dau@ahg.gov.ie .

Le meas
Sinéad O' Brien

Development Applications Unit,
Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs
Newtown Road,
Wexford,
Y35 AP90
(053) 911 7528

Derek Milton

From: Yvonne Jackson <Yvonne.Jackson@failteireland.ie>
Sent: 04 November 2016 11:10
To: knockharley landfill scoping
Subject: Proposed Development at Knockharley Landfill
Attachments: EIS &Tourism Guidelines.pdf

Dear Derek,

I wish to acknowledge receipt of your recent letter to Fáilte Ireland in relation to the **proposed development at Knockharley, Kentstown, Co. Meath**
I have attach a copy of the Fáilte Ireland's Guidelines for the treatment of tourism in an EIS, which we recommend should be taken into account in preparing the EIS.

Yours sincerely,

Yvonne

Yvonne Jackson
Investment and Innnovation | Fáilte Ireland | Áras Fáilte | 88/95 Amiens Street | Dublin 1
T: 01 8847224
W: www.failteireland.ie

Derek Milton

From: Noel McGloin <Noel.McGloin@fisheriesireland.ie>
Sent: 07 November 2016 16:53
To: knockharley landfill scoping
Subject: Derek Milton RE: EIS for a proposed development at Knockharley Landfill, Kentstown, Co. Meath
Attachments: Guidelines Report 2016.pdf

Dear Mr. Milton

We are in receipt of your correspondence dated 25th October, 2016.

Inland Fisheries Ireland (IFI) is a Statutory Body established on the 1st July 2010 .Under section 7(1) of the Inland Fisheries Act 2010 (No. 10 of 2010) *the principal function of IFI is the protection, management and conservation of the inland fisheries resource. Under section 7(3) of the IFI Act it is stated that without prejudice to subsection (1), IFI shall in the performance of its functions have regard to(g) the requirements of the European Communities (Natural Habitats) Regulations 1997 (S.I. No. 94 of 1997) and the need for the sustainable development of the inland fisheries resource (including the conservation of fish and other species of fauna and flora habitats and the biodiversity of inland water ecosystems),(h) as far as possible, ensure that its activities are carried out so as to protect the national heritage (within the meaning of the Heritage Act 1995).*

The EU Water Framework Directive (2000/60/EC) entered into force in December 2000 requires the protection of the ecological status of river catchments – this encompasses water quality and requires the conservation of habitats for ecological communities. One of the primary objectives of the Directive is to establish a framework which prevents further deterioration and protects and enhances the status of aquatic ecosystems. Protection of aquatic ecosystems requires that river systems be protected on a catchment basis.

Article 5 of the 2009 Surface Water Regulations requires that a public authority, in performance of its functions, shall not undertake those functions in a manner that knowingly causes or allows deterioration in the chemical or ecological status of a body of surface water. Also article 28(2) of the said Regulations states that a surface water body whose status is determined to be less than good shall be restored to at least good status not later than the end of 2015. This application is in close proximity to the Veldonstown tributary of the Nanny River whose status is *poor* and has to be restored to *good* status .

Having examined this proposal as it stands IFI is concerned about the potential generation of suspended solids, hydrocarbons and other related deleterious matter that may flow to waters. We are also concerned about the potential blocking of any waters and any proposed new channel diversions.

The Nanny River is a tributary of the River Boyne and has significant stocks of Brown Trout and lamprey.

We attach a copy of our updated Guidelines in relation to construction works.

We look forward to a copy of your EIS in due course.

Yours sincerely

Noel McGloin
Senior Fisheries Environmental Officer
Inland Fisheries Ireland - Dublin

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Inland Fisheries Ireland

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Help Protect Ireland's Inland Fisheries

Call 1890 34 74 24 to report illegal fishing, water pollution or invasive species.

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Meath County Council
Planning Department
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Web: www.meath.ie
Council Registration Number: 00172770

Our Ref: MG/LM

Planning Section

Derek Milton,
Fehily Timoney & Co.,
Unit 16, North Park Offices,
North Road,
Dublin 11

8th November, 2016

Re: Proposed Development at Knockharley Landfill Kentstown Co. Meath.

Dear Mr. Milton,

I refer to your invitation to comment on the preparation of an Environmental Impact Statement for the proposed "intensification of waste acceptance at Knockharley landfill facility for recovery and disposal."

Meath County Council acknowledges receipt of your letter and confirms that it has no comments to make in respect of the scoping report.

Yours sincerely,

Michael Griffin,
Senior Executive Officer,
Planning Department.

Bonneagar Iompair Éireann
Transport Infrastructure Ireland

Lw14-821-01

Mr. Derek Milton
Fehiley Timoney and Company
J5 Plaza
North Park Business Park
North Road
Dublin 11

Dáta | Date	Ár dTag | Our Ref.	Bhur dTag | Your Ref.
10 November 2016	**TII16-95955**	**LW14/821/01/ConLet/DFM/CF**

RE: Proposed Development at Knockharley Landfill, Kentstown, Co. Meath

Dear Mr. Milton,

The Authority wishes to advise that it is not in a position to engage directly with planning applicants in respect to proposed developments. The Authority will endeavour to consider and respond to planning applications referred to it given its status and duties as a statutory consultee under the Planning Acts. The approach to be adopted by the Authority in making such submissions or comments will seek to uphold official policy and guidelines as outlined in the Spatial Planning and National Roads Guidelines for Planning Authorities (DoECLG, 2012). Regard should also be had to other relevant guidance available at www.tii.ie.

The issuing of this correspondence is provided as best practice guidance only and does not prejudice TII's statutory right to make any observations, requests for further information, objections or appeals following the examination of any valid planning application referred.

With respect to access to the proposed operations, it is noted that previous EIS Scoping documentation referred indicates that the site is accessed via a direct private road access to the N2, national primary road. This implies that any proposed development or intensification of use at the landfill will rely on the direct private access to the N2, national primary road.

In that regard, the applicant/developer should be aware that official policy concerning access to national roads seeks to avoid the creation of additional access points from new development or the generation of increased traffic from existing accesses (i.e. non-public road access) to national roads, to which speed limits greater than 50 kph apply.

The developer/applicant should consult the Meath County Development Plan, 2013 – 2019, Section 6.10.8 to ensure proposals are brought forward consistent with the provisions of the adopted plan and the foregoing official policy.
It is also noted that the EIS Scoping document referred makes reference to Figure 1: Drawing INFO-001 (Section 1.2) and Figure 1 (Section 2.2.2) but these do not appear to have accompanied the EIS Scoping Report, therefore, the applicant/developer should be aware that further issues not identified may arise.

With respect to EIS scoping issues, the recommendations indicated below provide only general guidance for the preparation of EIS, which may affect the National Roads Network.

The developer should have regard, *inter alia*, to the following;

- Consultations should be had with the relevant Local Authority/National Roads Design Office with regard to locations of existing and future national road schemes; Leinster Orbital Route (LOR),
- The Authority would be specifically concerned as to potential significant impacts the development would have on any national roads (and junctions with national roads) in the proximity of the proposed development; N2,
- The developer should assess visual impacts from existing national roads,
- The developer should have regard to any Environmental Impact Statement and all conditions and/or modifications imposed by An Bord Pleanála regarding road schemes in the area. The developer should in particular have regard to any potential cumulative impacts,
- The developer, in conducting Environmental Impact Assessment, should have regard to TII Publications (formerly NRA DMRB and the NRA Manual of Contract Documents for Road Works),
- The developer, in conducting Environmental Impact Assessment, should have regard to TII's Environmental Assessment and Construction Guidelines, including the *Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes* (National Roads Authority, 2006),
- The EIS should consider the Environmental Noise Regulations 2006 (SI 140 of 2006) and, in particular, how the development will affect future action plans by the relevant competent authority. The developer may need to consider the incorporation of noise barriers to reduce noise impacts (see *Guidelines for the Treatment of Noise and Vibration in National Road Schemes* (1st Rev., National Roads Authority, 2004)),
- It would be important that, where appropriate, subject to meeting the appropriate thresholds and criteria and having regard to best practice, a Traffic and Transport Assessment be carried out in accordance with relevant guidelines, noting traffic volumes attending the site and traffic routes to/from the site with reference to impacts on the national road network and junctions of lower category roads with national roads. The Authority's Traffic and Transport Assessment Guidelines (2014) should be referred to in this regard. The scheme promoter is also advised to have regard to Section 2.2 of the TII TTA Guidelines which addresses requirements for sub-threshold TTA,
- The designers are asked to consult TII Publications to determine whether a Road Safety Audit is required,
- In the interests of maintaining the safety and standard of the national road network, the EIS should identify the methods/techniques proposed for any works traversing/in proximity to the national road network,
- In relation to haul route identification, the applicant/developer should clearly identify any haul routes proposed (construction and operation) and fully assess the network to be traversed. Separate structure approvals/permits and other licences may be required in connection with the proposed haul route and all structures on the haul route should be checked by the applicant/developer to confirm their capacity to accommodate any abnormal load proposed.

Notwithstanding, any of the above, the developer should be aware that this list is non-exhaustive, thus site and development specific issues should be addressed in accordance with best practise.

I hope that the above comments are of use in your scoping process.

Yours sincerely,

Mark Byrne
Regulatory & Administration Unit

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The Office of Public Works

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Mr. Derek Milton
Fehily Timoney & Company
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J5 Plaza
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North Road
Dublin 11

Our Ref: 873 – 2016
Your Ref: LW14/821/01/ConLet/DFM/CF
Re: Proposed Development at Knockharley Landfill, Kentstown, Co Meath

Dear Mr Milton,

I refer to your correspondence dated 25th October 2016 regarding the above.

I have attached a map showing any of the channels maintained by the Office of Public Works and the Drainage Districts (DD) channels maintained by the Local Authority along with any benefitting land in the vicinity of the site. Benefitting land is land which would have benefitted from the construction of an Arterial Drainage Scheme but which could in extreme weather events be liable to flooding. The channels maintained by the OPW are coloured blue, the channels maintained by the Local Authority are coloured red and the benefitting lands are outlined in black with a green hatch.

OPW Drainage channels require a 10m maintenance strip along the edge of the channel measured out from the top bank edge of the channel. This strip should not be planted or paved in any way which would prevent access for maintenance. This requirement should be applied for all drainage channels where possible to assist in the prevention of flooding.

New culverts/bridges on any watercourse or changes to existing structures or watercourses will require Section 50 consent from the Office of Public Works.

The Office of Public Works website; www.floodmap.ie has information on past flood events in Ireland. This data is obtained by searching for a specific location. Links are provided to the relevant information (reports, photos etc). The map has information on hydrometric stations, rivers lakes, river catchment areas, land commission embankments, drainage districts and benefitting lands.

Yours sincerely

Karen Donovan
Engineering Services Administration Unit
17th November 2016

OPW
Oifig na nOibreacha Poibli
The Office of Public Works

ayers

OPW Drainage Layers

- [x] OPW Channels V3-Jan16
- [x] OPW Chainage
- [x] OPW Embankments V3-Jan16
- [x] OPW Benefited Lands V3-Jan16
- [ ] OPW Bridges V3-Jan16
- [ ] OPW Sluices V3-Jan16
- [ ] OPW Pump Houses V3-Jan16
- [ ] OPW Grids V3-Jan16
- [ ] OPW Weirs V3-Jan16
- [ ] OPW Mills V3-Jan16
- [ ] OPW Sand Traps V3-Jan16

Drainage District

- [x] DD - Embankments V2-May16
- [x] DD - Benefited Land V2-May16
- [x] DD - Channels V2-May16

OPW Environmental Data

EPA Hydrometric Information

Designated Areas

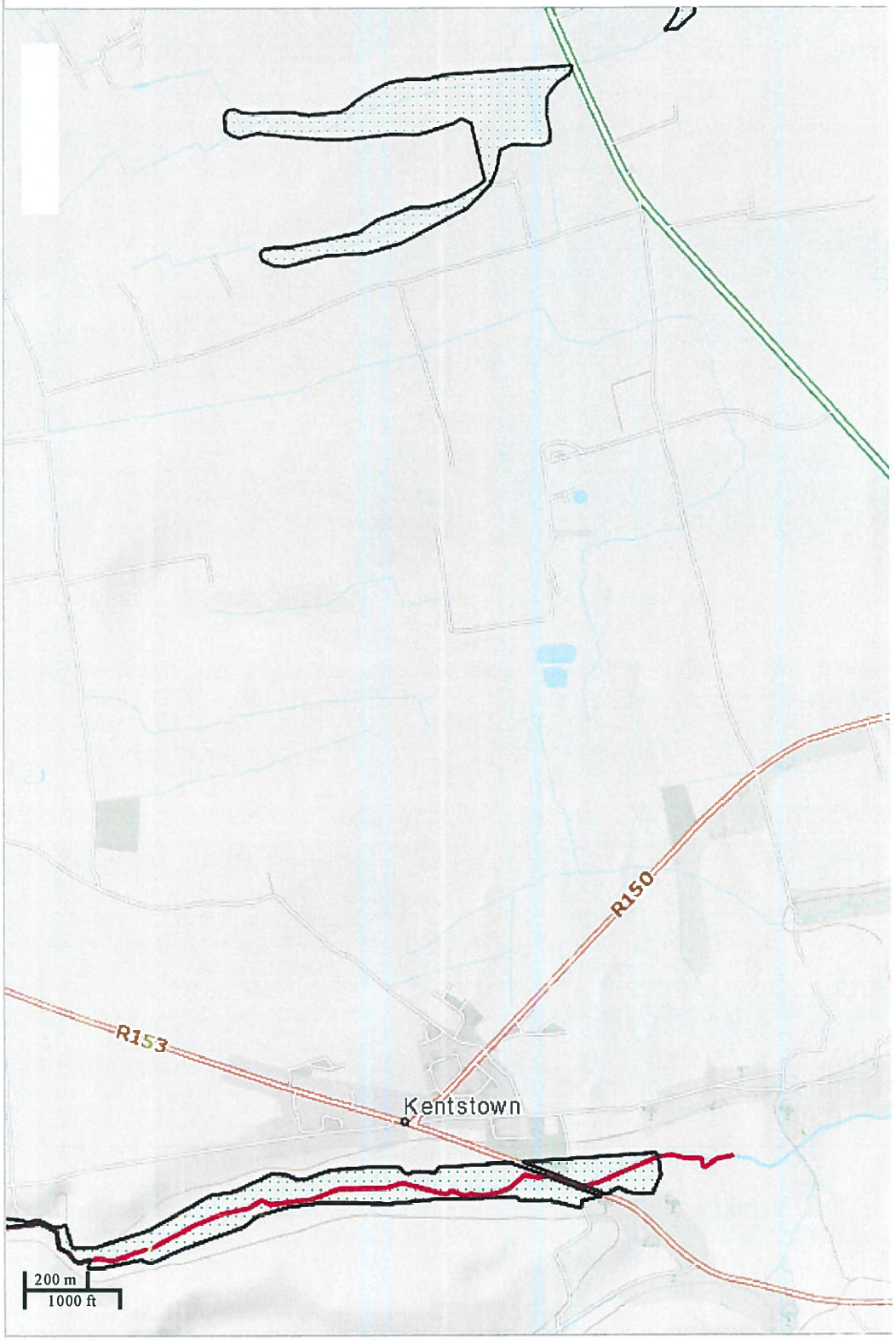
ESB Network (Oct 2016)

Base Layer

- ( ) OSi Orthophotos
- (•) OSi MapGenie
- ( ) OpenStreetMap

nformation

ale
ale = 1 : 27K
use position
sh Grid (IG): 296677, 266717
sh Transverse Mercator (ITM): 696607, 766736
bMercator: -727918, 7102548
ngitude Latitude : -6.539, 53.641



Derek Milton

From: Sarah Lacey <Sarah.Lacey@teagasc.ie>
Sent: 18 November 2016 09:12
To: knockharley landfill scoping
Cc: Paddy Browne
Subject: Proposed development at Knockharley Landfill

REF: LW14/821/01/ConLet/DFM/CF

Thank you for your letter of 25th October 2016 regarding proposed development at Knockharley Landfill, Kentstown, Co Meath. We have no comments.

Kind Regards

Sarah Lacey

Pp Paddy Browne
Head CELUP
Teagasc
Johnstown Castle
Wexford

Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive

Environmental Health Service
HSE Dublin North East
Co. Clinic
Navan
Co. Meath
Telephone: 046-9021595/9098729
Fax: 046 9022818

Mr. Derek Milton
Fehily Timoney & Company
Core House
Pouladuff Road
Cork
Co. Cork

8th November 2017

ID Number: 0531
Proposed Development: Proposed intensification of waste acceptance at Knockharley Landfill facility, Kentstown, Co. Meath for recovery and disposal.

Dear Sir,

Please find attached the HSE scoping report in relation to the above proposal.

The following HSE departments were made aware of the consultation request for the proposed development on 01-11-2017

- HSE Emergency Planning
- HSE Estates
- HSE Health Protection

Environmental Health Report
The EH service response to the proposal is in the attached report. The HSE is keen to ensure the EIA process adequately identifies and assesses impacts of the proposed development on humans and health.

- The assessment is based solely on an assessment of documentation submitted to this office on 28/10/2017.
- This report refers only to those sections of the documents which are relevant to the HSE.
- We have made observations and submissions under the following specific areas ;

Description of the project, Later consents required, Consideration of Alternatives, Public Consultation, Noise, Water, Dust,Odour, Pest Control, Litter, Complaints Procedure, Cumulative Impact, Decommissioning.

All correspondence or any queries with regard to this report including acknowledgement of this report should be forwarded to Elish O'Reilly, Principal Environmental Health Officer.

Yours Sincerely,

Elish O'Reilly
Principal Environmental Health Officer

Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive

Environmental Health Service
HSE Dublin North East
Co. Clinic
Navan
Co. Meath
Telephone: 046-9021595/9098729
Fax: 046 9022818

HSE EIS SCOPING REPORT

Environmental Health Service Consultation Report
(as a Statutory Consultee (Planning and Development Acts 2000, & Regs made thereunder).

Date:	**7th November 2016**
Type of consultation:	**Scoping**
Planning Authority:	**An Bord Pleanala**
Reference Number:	**LW14/821/01ConLet/DFM/CF**
EHIS Reference:	**0531**
Applicant:	**Knockharley Landfill Limited**
Proposed Development:	**Proposed intensification of waste acceptance at Knockharley Landfill facility, Kentstown, Co. Meath for recovery and disposal.**

This report only comments on Environmental Health impacts of the proposed development. I have made observations on the following specific areas:

Description of the Project:
This proposal is a change from previous proposals outlined in scoping reports submitted to this department in both February and May 2016. Clarification should be provided if this is the final proposal for this waste facility or will permission for new waste management processes be looked for in the immediate future.

The scoping report does not fully describe all processes outlined in the proposal. It is stated a new building shall be developed to facilitate the recovery of metals from incinerator bottom ash. Further details should be provided of this process in the EIS. It is also proposed that a dedicated area for the storage of incinerator bottom ash will be developed. The proposed length of storage, the future recovery or final disposal options for IBA should be addressed in the EIS.

The EIS should also describe the waste acceptance criteria and identify the characteristics and volumes of the waste streams to be accepted on site. Clarification shall be provided if hazardous waste is to be handled on site.

With regard to the construction phase of the project all potential impacts should be identified and assessed. Proposed mitigation measure should be fully described. A comprehensive construction management plan outlining specific control measures should be provided in the EIS.

Later Consents Required:
Information on possible future monitoring requirements for the operation of the landfill should be included in the EIS.

Consideration of Alternatives:
The EIS should fully describe and consider any alternatives to this project. The reasons for choosing the proposed treatment and disposal processes shall be outlined.

Public Consultation:
Meaningful public consultation with the local community should be carried out. It is stated that the general public will be provided with information about the project and a summary will be provided of the queries and concerns expressed. All legitimate concerns from the public shall be fully addressed and evaluated. The EIS should clearly demonstrate how the outcome of consultation with the public influenced decision making within the EIA. This development, if not managed correctly, has the potential to generate nuisance for local residents so it is essential that thorough and robust public consultation is carried out with regards to this proposal.

Noise:
A noise survey must be carried out to assess the impact of noise from both the construction and operational phase of the proposed development on the residents living in the vicinity. Up to date baseline monitoring shall be carried out to establish the existing noise environment. All noise sensitive receptors in the vicinity of the landfill shall be identified. Appropriate noise assessment modelling should be carried out to accurately predict the change in the noise environment. This information should be outlined and clearly displayed in the EIS. The significance of the predicted change in the noise environment should be fully assessed.

The potential cumulative effects of other industry in the vicinity of the development should also be assessed as part of the noise survey. All mitigation measures for the control of noise shall be described.

Water:
All drinking water sources, both surface and groundwater (including individual private wells) shall be identified. Any potential impacts to these drinking water sources shall be assessed. Details of bedrock, overburden, vulnerability, groundwater flows and gradients, inner and outer zones of protection and catchment areas should all be considered when assessing potential impacts and possible mitigation measures. The EHS would recommend that all information is gathered by means of a site survey as desktop studies do not always accurately reflect the current use of water resources.

Potential impacts of surface water runoff should be assessed and mitigation measures detailed. Site drainage, increased rainfall and the possibility of flooding should all be considered when identifying possible impacts and mitigation measures.

Dust:
The impact of dust generation from construction and operation of the proposed development should be assessed. A dust minimisation plan or similar mitigation measures should be included within the EIS.

Odour:
The potential impacts of air emissions and odour generation should be clearly assessed in the EIA. Proposals for the capture, containment and treatment of odorous air shall be outlined. The development proposes to dramatically increase the volume of waste intake at the facility. Appropriate odour modelling must be carried out to accurately predict the change in odour emissions from the facility. The impact of the intensified odour emissions on the local community must be full assessed. It is stated in the scoping document there have been odour issues associated with the operation of the landfill. A full and rigorous assessment of all previous odour complaints should be carried out as part of the EIA process to uncover any information which could assist with control measures for odour on site.

Pest Control
The proposal for the new development will result in previously undisturbed land being utilised for earthworks and construction. There is a very real threat of existing rodent habitats being disrupted and destroyed. The EIS should include a description of measures to be put in place to control rodent activity.

Litter
The increased waste streams proposed to be accepted on site have the potential to cause nuisance problems with regards to litter. An assessment of the impact of litter

should be included in the EIS and control measures outlined to prevent problems with litter arising.

Complaints procedure:
The EIS should include proposals for dealing with issues of odour or nuisance from members of the public should they arise. A comprehensive operational management plan outlining working procedures on site and control measures should be provided. Details of a procedure to fully follow up and investigate complaints along with specific contact details for members of the public should also be included.

Cumulative Impacts:
In line with the EPA Guidelines on the information to be contained in Environmental Impact Statements (2002) and their Advice Notes on Current Practise in the preparation of Environmental Impact Statements (2003) the EIA should include the assessment of cumulative impacts of any other industrial or energy developments in the area e.g. quarrying, heavy industry, wind farms, composting facilities etc.

Decommissioning:
The EIS should describe proposals for decommissioning the facility at the end of life of the project. The residual impact of the development on the environment must be fully assessed.

Lisa Maguire
Environmental Health Officer

All correspondence or any queries with regard to this report including acknowledgement of this report should be forwarded to:

Elish O'Reilly
Principal Environmental Health Officer
Environmental Health Department
Co. Clinic
Navan
Co. Meath

Appendix 6.2

Consultation with OPW and IFI

Mary Molloy

From: Noel McGloin <Noel.McGloin@fisheriesireland.ie>
Sent: 11 October 2017 09:19
To: Derek Milton
Cc: Francis Carolan; Kevin O'Brien
Subject: RE: Derek Milton RE: EIS for a proposed development at Knockharley Landfill, Kentstown, Co. Meath
Attachments: Guidelines Report 2016.pdf

Dear Mr. Milton

Apologies for the delay in reverting to you on this.

Inland Fisheries Ireland (IFI) is a Statutory Body established on the 1st July 2010 .Under section 7(1) of the Inland Fisheries Act 2010 (No. 10 of 2010) *the principal function of IFI is the protection, management and conservation of the inland fisheries resource. Under section 7(3) of the IFI Act it is stated that without prejudice to subsection (1), IFI shall in the performance of its functions have regard to(g) the requirements of the European Communities (Natural Habitats) Regulations 1997 (S.I. No. 94 of 1997) and the need for the sustainable development of the inland fisheries resource (including the conservation of fish and other species of fauna and flora habitats and the biodiversity of inland water ecosystems),(h) as far as possible, ensure that its activities are carried out so as to protect the national heritage (within the meaning of the Heritage Act 1995).*

The EU Water Framework Directive (2000/60/EC) entered into force in December 2000 requires the protection of the ecological status of river catchments – this encompasses water quality and requires the conservation of habitats for ecological communities. One of the primary objectives of the Directive is to establish a framework which prevents further deterioration and protects and enhances the status of aquatic ecosystems. Protection of aquatic ecosystems requires that river systems be protected on a catchment basis.

Article 5 of the 2009 Surface Water Regulations requires that a public authority, in performance of its functions, shall not undertake those functions in a manner that knowingly causes or allows deterioration in the chemical or ecological status of a body of surface water. Also article 28(2) of the said Regulations states that a surface water body whose status is determined to be less than good shall be restored to at least good status not later than the end of 2015. This application is in close proximity to the Veldonstown tributary of the Nanny River whose status is *poor* and has to be restored to *good* status .

Having examined this proposal as it stands IFI is concerned about the potential generation of suspended solids, hydrocarbons and other related deleterious matter that may flow to waters. We are also concerned about the potential blocking of any waters.

The Nanny River is a tributary of the River Boyne and has significant stocks of Brown Trout and lamprey.

We attach a copy of our Guidelines(updated since last communication in 2015) in relation to construction works.

We look forward to a copy of your EIS in due course.

Yours sincerely

Noel McGloin
Senior Fisheries Environmental Officer
Inland Fisheries Ireland - Dublin

Iascach Intire Eireann
Inland Fisheries Ireland

Telephone: +353 (0) 1 8842688

EMail: noel.mcgloin@fisheriesireland.ie
Web: www.fisheriesireland.ie

3044 Lake Drive, City West, Dublin 24, IRELAND. **D24 Y265**

From: Derek Milton [mailto:derek.milton@FTCO.IE]
Sent: 10 October 2017 17:19
To: Noel McGloin
Cc: Chris Cronin
Subject: FW: Derek Milton RE: EIS for a proposed development at Knockharley Landfill, Kentstown, Co. Meath

Dear Mr. McGloin,

I am following up on the email below from July to see if the IFI had any further comment in relation to the attached – it would be appreciated if you could revert at your convenience, should this be the case,

Best Regards,

Derek Milton

From: knockharley landfill scoping
Sent: 17 July 2017 15:32
To: 'Noel McGloin' <Noel.McGloin@fisheriesireland.ie>
Subject: RE: Derek Milton RE: EIS for a proposed development at Knockharley Landfill, Kentstown, Co. Meath

Dear Mr. McGloin,

Further to previous communication in relation to proposed development at Knockharley Landfill, attached (along with previous scoping report issued October 2016) is a further scoping document relating to drainage for the proposed development. It would be much appreciated if this could be reviewed to see if it raises any further comments from Inland Fisheries Ireland in relation to the proposed development, in addition to those provided in your correspondence below.

Please reply to this email with any further comments, if possible by 11th August,

Thanking you in advance,

Derek Milton

From: Noel McGloin [mailto:Noel.McGloin@fisheriesireland.ie]
Sent: 07 November 2016 16:53
To: knockharley landfill scoping <knockharleylandfillscoping@ftco.ie>
Subject: Derek Milton RE: EIS for a proposed development at Knockharley Landfill, Kentstown, Co. Meath

Dear Mr. Milton

We are in receipt of your correspondence dated 25th October, 2016.

Inland Fisheries Ireland (IFI) is a Statutory Body established on the 1st July 2010 .Under section 7(1) of the Inland Fisheries Act 2010 (No. 10 of 2010) *the principal function of IFI is the protection, management and conservation of the inland fisheries resource. Under section 7(3) of the IFI Act it is stated that without prejudice to subsection (1), IFI shall in the performance of its functions have regard to(g) the requirements of the European Communities (Natural Habitats) Regulations 1997 (S.I. No. 94 of 1997) and the need for the sustainable development of the inland fisheries resource (including the conservation of fish and other species of fauna and flora habitats and the biodiversity of inland water ecosystems),(h) as far as possible, ensure that its activities are carried out so as to protect the national heritage (within the meaning of the Heritage Act 1995).*

The EU Water Framework Directive (2000/60/EC) entered into force in December 2000 requires the protection of the ecological status of river catchments – this encompasses water quality and requires the conservation of habitats for ecological communities. One of the primary objectives of the Directive is to establish a framework which prevents further deterioration and protects and enhances the status of aquatic ecosystems. Protection of aquatic ecosystems requires that river systems be protected on a catchment basis.

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Having examined this proposal as it stands IFI is concerned about the potential generation of suspended solids, hydrocarbons and other related deleterious matter that may flow to waters. We are also concerned about the potential blocking of any waters and any proposed new channel diversions.

The Nanny River is a tributary of the River Boyne and has significant stocks of Brown Trout and lamprey.

We attach a copy of our updated Guidelines in relation to construction works.

We look forward to a copy of your EIS in due course.

Yours sincerely

Noel McGloin
Senior Fisheries Environmental Officer
Inland Fisheries Ireland - Dublin

Inland Fisheries Ireland

Telephone: +353 (0) 1 8842688

EMail: noel.mcgloin@fisheriesireland.ie
Web: www.fisheriesireland.ie

3044 Lake Drive, City West, Dublin 24, IRELAND.

Help Protect Ireland's Inland Fisheries

Call 1890 34 74 24 to report illegal fishing, water pollution or invasive species.

This email and any attachments to it may be confidential and are intended solely for the use of the individual to whom it is addressed. Any views or opinions expressed are solely those of the author and do not necessarily represent those of Inland Fisheries Ireland. If you are not the intended recipient of this email, you must neither take any action based upon its contents, nor copy or show it to anyone. Please contact the sender if you believe you have received this email in error.

Bernie Guinan

From: Karen Donovan <karen.donovan@opw.ie>
Sent: 20 October 2017 14:32
To: Derek Milton
Subject: Re: FW: Office of Public Works Comments
Attachments: Map.pdf; OPW Comments.pdf

Derek,

Apologies for delay in replying.

This office have no further comment to make in relation to this development apart from to highlight that *New culverts/bridges on any watercourse or changes to existing structures or watercourses will require Section 50 consent from the Office of Public Works*.

Original comments made by OPW in November 2016 are attached.

Regards

Karen

On 10/10/2017 17:18, Derek Milton wrote:

> Dear Ms. Lynch,
>
> I am following up on the email below from July to see if the OPW had any further comment in relation to the attached – it would be appreciated if you could revert at your convenience, should this be the case,
>
> Best Regards,
>
> Derek Milton
>
> **From:** knockharley landfill scoping
> **Sent:** 17 July 2017 15:51
> **To:** 'maryt.lynch@opw.ie' <maryt.lynch@opw.ie>
> **Subject:** FW: Office of Public Works Comments
>
> Dear Ms. Lynch,
>
> I received an out of office response to an email reply to Karen Donovan of your office, in relation to correspondence below.
>
> Further to this previous communication in relation to proposed development at Knockharley Landfill, attached (along with previous scoping report issued October 2016) is a further scoping document relating to drainage for the proposed development. It would be much appreciated if this could be reviewed to see if it raises any further comments from OPW in relation to the proposed development, in addition to those provided in your correspondence below.
>
> Please reply to email with any further comments, if possible by 11th August,

OPW
Oifig na nOibreacha Poiblí
The Office of Public Works

Ceann Oifig
Sráid Jonathan Swift
Baile Átha Troim
Co. na Mí
C15 NX36

Head Office
Jonathan Swift Street
Trim
Co Meath
C15 NX36

Fón/Phone: (0761) 10 6000
(046) 942 6000
Facs/Fax: (046) 948 1793
Íosghlao/LoCall 1890 213414
Suíomh gréasáin/website: www.opw.ie

Mr. Derek Milton
Fehily Timoney & Company
Consultants in Engineering & Environmental Sciences
J5 Plaza
North Park Business Park
North Road
Dublin 11

Our Ref: 873 – 2016
Your Ref: LW14/821/01/ConLet/DFM/CF
Re: Proposed Development at Knockharley Landfill, Kentstown, Co Meath

Dear Mr Milton,

I refer to your correspondence dated 25th October 2016 regarding the above.

I have attached a map showing any of the channels maintained by the Office of Public Works and the Drainage Districts (DD) channels maintained by the Local Authority along with any benefitting land in the vicinity of the site. Benefitting land is land which would have benefitted from the construction of an Arterial Drainage Scheme but which could in extreme weather events be liable to flooding. The channels maintained by the OPW are coloured blue, the channels maintained by the Local Authority are coloured red and the benefitting lands are outlined in black with a green hatch.

OPW Drainage channels require a 10m maintenance strip along the edge of the channel measured out from the top bank edge of the channel. This strip should not be planted or paved in any way which would prevent access for maintenance. This requirement should be applied for all drainage channels where possible to assist in the prevention of flooding.

New culverts/bridges on any watercourse or changes to existing structures or watercourses will require Section 50 consent from the Office of Public Works.

The Office of Public Works website; www.floodmap.ie has information on past flood events in Ireland. This data is obtained by searching for a specific location. Links are provided to the relevant information (reports, photos etc). The map has information on hydrometric stations, rivers lakes, river catchment areas, land commission embankments, drainage districts and benefitting lands.

Yours sincerely

Karen Donovan
Engineering Services Administration Unit
17th November 2016

OPW

Oifig na nOibreacha Poiblí
The Office of Public Works

ayers

OPW Drainage Layers

- [x] OPW Channels V3-Jan16
- [x] OPW Chainage
- [x] OPW Embankments V3-Jan16
- [x] OPW Benefited Lands V3-Jan16
- [ ] OPW Bridges V3-Jan16
- [ ] OPW Sluices V3-Jan16
- [ ] OPW Pump Houses V3-Jan16
- [ ] OPW Grids V3-Jan16
- [ ] OPW Weirs V3-Jan16
- [ ] OPW Mills V3-Jan16
- [ ] OPW Sand Traps V3-Jan16

Drainage District

- [x] DD - Embankments V2-May16
- [x] DD - Benefited Land V2-May16
- [x] DD - Channels V2-May16

OPW Environmental Data

EPA Hydrometric Information

Designated Areas

ESB Network (Oct 2016)

Base Layer

- ○ OSI Orthophotos
- ◉ OSi MapGenie
- ○ OpenStreetMap

nformation

ale
ale = 1 : 27K
ouse position
sh Grid (IG): 296677, 266717
sh Transverse Mercator (ITM): 696607, 766736
bMercator: -727918, 7102548
ngitude Latitude : -6.539, 53.641

Thanking you in advance,

Derek Milton

From: Karen Donovan [mailto:karen.donovan@opw.ie]
Sent: 17 November 2016 16:42
To: knockharley landfill scoping <knockharleylandfillscoping@ftco.ie>
Subject: Office of Public Works Comments

Please find attached OPW Comments on the **Proposed Development at Kncokharley Landfill, Kentstown, Co Meath.**

The original has been issued to Mr.Derek Milton, Fehily Timoney & Company, North Road, Dublin 11.

Regards

Karen Donovan

--
~~~~~~~~~~~~~~~~~~~~~~~~~~~~
Karen Donovan,
Engineering Services Administration Unit,
Office of Public Works,
OPW Headquarters,
Jonathan Swift St.,
Trim, Co. Meath,
Ireland.
~~~~~~~~~~~~~~~~~~~~~~~~~~~~
email: karen.donovan@opw.ie
~~~~~~~~~~~~~~~~~~~~~~~~~~~~
~~~~~~~~~~~~~~~~~~~~~~~~~~~~

company limited by shares. Registration No. 180497. Registered office: Core House, Pouladuff Road, Cork, Ireland

--

Karen Donovan,
Engineering Services Administration Unit,
Office of Public Works,
OPW Headquarters,
Jonathan Swift St.,
Trim, Co. Meath,
Ireland.
C15 NX36

Phone: 046 9426403

email: karen.donovan@opw.ie

Appendix 6.3

Records of Consultation Documentation and Responses - March 2018

CONSULTANTS IN ENGINEERING & ENVIRONMENTAL SCIENCES

Our Ref: LW14/821/01/ConLet/TR/MG

Ms. Noelle Carroll
Department of Communications, Climate Action & Environment
29 - 31 Adelaide Road
Dublin
D02 X285

noellecarroll@dcae.gov.ie

29 March 2018

RE: Proposed development at Knockharley Landfill, Kentstown, Co. Meath

Dear Ms. Carroll,

Knockharley Landfill Ltd. is applying to An Bord Pleanála (ABP), under the Strategic Infrastructure provisions of the 2000 Planning & Development Act, as amended, for permission to intensify waste acceptance at the existing landfill facility (ABP File ref: PL17.PC0223). The pre-application consultation with ABP has now closed and ABP has determined the proposed development is strategic infrastructure development.

Knockharley Landfill is located approximately 1.5 km north of Kentstown village, Co. Meath in the functional area of Meath County Council. The existing landfill facility operates under an Industrial Emission Licence (Ref. No. W0146-02) from the Environmental Protection Agency.

Knockharley Landfill Ltd. has appointed Fehily Timoney and Company to prepare an Environmental Impact Assessment Report/ Environmental Impact Statement (EIAR/EIS) for the proposed development. This letter is being issued to you as part of the scoping process for the EIAR/EIS.

You will have received correspondence relating to previously proposed development at this facility in October 2016. This correspondence related included a scoping document describing the proposed development and the approach being taken to the preparation of the EIAR/EIS. The core elements of the proposal are unchanged. It is proposed to increase the rate of waste acceptance at the site to 440,000 tonnes per annum for disposal and recovery comprising (1) the landfilling of residual non-hazardous waste and non-hazardous soils and (2) the storage of incinerator bottom ash (IBA) to facilitate future recovery. The original proposal included the development of a 40 m^2 building to facilitate the following activities:

- temporary storage of baled non-hazardous residual waste
- recovery of metals from IBA

It is now proposed to develop the following facilities:

- a 76 m^2 portal frame building in the IBA facility to facilitate:
  - weathering
  - metals recovery trials
  - crushing and washing to facilitate recovery trials
- a 73.5 m^2 building for:
  - biological treatment of residual MSW 'fines' material and;
  - contingency storage of recyclable bales

Cont'd...

The construction of the screening berms and other infrastructure on site will require:

- Relocation of an existing 20 kVa overhead ESB powerline that provides power to the existing landfill facility administration buildings
- Felling of c. 12.5 ha of the existing conifer plantations
- Re-planting and compensation planting totalling (c.16.8 ha) will off-set loss of forestry in the proposed development footprint at the following locations:
    - replanting over screening berms
    - compensation planting on the cap over cells 25, 26, 27 and 28 in what is currently the permitted development

A drawing of the proposed development is included as an attachment to this letter.

As part of the consultation process for the EIAR/EIS, we would welcome any comments you may have on the proposed development, relevant to your area of expertise, within three weeks of the date of this letter.

If you have no comments to make, we would be grateful if you would please acknowledge receipt of this letter.

Comments or acknowledgements can be sent via email to knockharleylandfillscoping@ftco.ie.

Yours sincerely,

_____
Bernie Guinan
for and on behalf of **Fehily Timoney & Company**

Encl.

1:1000 Scale Layout Key

Refer To 1:1000 Scale Layouts For More Details

Proposed Surface Water Holding Pond

Proposed Overhead Electricity Supply

Proposed Flood Compensatory Culvert & Emergency Spill / Knockharley Stream

Proposed Northern Surface Water Attenuation Lagoon

Proposed Weathering Slab & IBA Facility Building (Temporary)

Proposed Wetland

Proposed IBA Facility

Permitted Stream Diversion

Proposed Forestry Compensatory Planting

Knockharley Stream

Proposed Electricity Sub Station 1

Permitted Cell Development

Proposed Increase In Contour Height

KNOCKHARLEY

PHASE 7

PHASE 6

PHASE 5

PHASE 4

PHASE 3

PHASE 2

PHASE 1

CELL 1 CELL 2 CELL 3 CELL 4 CELL 5 CELL 6 CELL 7 CELL 8 CELL 9 CELL 10 CELL 11 CELL 12 CELL 13 CELL 14 CELL 15 CELL 16 CELL 17 CELL 18 CELL 20 CELL 21 CELL 22 CELL 23 CELL 24 CELL 25 CELL 26 CELL 27 CELL 28 CELL 29 CELL 31 CELL 32

70m 80m 85m 60m

Existing Landfill Offices

Proposed Wheelwash

S1 S2

Existing Leachate Lagoon

Existing O/H 20kV Powerline

Proposed Extension To Leachate Management Facility

Proposed Electricity Sub Station 2

Proposed Biological Treatment Facility

Existing Landfill Gas Compound

Existing Southern Surface Water Attenuation & Wetland

Existing Screening Berm

Quarry

Existing gas main

EXISTING GAS MAIN

Existing Watermain

Elm Grove

Area under construction

Proposed Relocation / Undergrounding Of Electricity Supply

Existing Underpass

TUITERATH

SITE NOTICE LOCATION

Ruin

1.83m FF

FF

CS

ESB

UND

SCALE - VERTICAL 100 50 20 10 0 10

SCALE HORIZ. 0 10 20 50 100

ORIGINAL DRAWING SIZE A1 - (841 x 594)

LEGEND

Plan

- Planning Boundary
- Ownership Boundary
- Existing Wayleave
- Ground Contours
- National Primary Route
- National Regional Route
- National County Route
- Existing Watercourse
- Landfill Cells currently being filled (2017/ '18)
- Constructed Landfill Cells
- Final Forested Areas
- Permitted Landfill Cells, To Be Constructed
- IBA Facility
- IBA, Cell 33 (Outline Only Shown For Calrity)
- Proposed Screening Berms with Forestry Replanting
- Proposed Stream Diversion

EXISTING SERVICES LEGEND

- ESB Power lines
- Water Supply Pipes
- Storm Sewer
- Telemetry & Power
- Leachate Rising Main
- Groundwater Drainage
- Leachate Collection

PROPOSED SERVICES LEGEND

- Power, Telemetry & Gas
- Leachate Collection
- Surface Water Drain
- Water Supply
- Foul Sewer (gravity / pumped)

Rev.	Drawn	Chk'd	App'd	Rev Origin	Date	Description
A	SK	CC	BG	Cork	02.03.18	Issue For Planning Application

Revision History: A — EIAR/EIS

Name of Client

KNOCKHARLEY LANDFILL LTD.

Name of Job

PROPOSED DEVELOPMENT AT KNOCKHARLEY LANDFILL

Title of Drawing

PROPOSED SITE LAYOUT PLAN

Scales Used: 1:3750

This Drawing was printed to A1-

Dwg. No.: LW14-821-01-P-0000-003

Rev.: A

O:\ACAD\2014\LW14\821\01\PLANNING APPLICATION\LW14-821-01-P-0000-003

Scale 1:3750 (0m 38m 75m 113m 150m 188m 225m 263m 300m 338m 375m)

FEHILY TIMONEY & COMPANY

CONSULTANTS IN ENGINEERING & ENVIRONMENTAL SCIENCES

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Meath County Council comments on Scoping Report dated October 2016

Proposal

It is proposed to apply for consent to increase waste intake at Knockharley Landfill to up to 440,000 tpa for recovery and disposal. The development proposal includes the following recovery and disposal activities:

1. landfilling of residual non-hazardous waste and non-hazardous soils
2. storage of incinerator bottom ash (IBA) to facilitate future recovery

The proposal will require the development of a dedicated storage area for IBA, in addition to the existing permitted landfill footprint. In order to increase the void capacity within the existing landfill footprint, it is proposed to raise the final profile of the landfill by up to 10-12 m.

In addition, the footprint of the existing leachate management area, which comprises a covered lagoon, will be increased to facilitate installation of a leachate treatment plant for pre-treatment of leachate generated from the landfill, prior to its removal offsite, as currently occurs.

To facilitate soils management onsite, as well as to mitigate potential impacts associated with noise and visual impact, it is also proposed to create a number of screening berms at a number of locations on the facility perimeter.
It is proposed to construct a 40 m2 building on site to facilitate the short term storage of baled waste and/or the recovery of metals from ash.

Introduction

Detailed below are Meath County Council's comments on the Scoping Report dated October 2016. Since the preparation of the Scoping Document in 2016 the EIA Directive (2014/52/EU) has been transposed into Irish Law. The Environmental Impact Assessment Report (EIA Report) should follow the requirements of EIA Directive (2014/52/EU) and have regard to original EIA Directive. The EIA should be carried out in compliance with the requirements of the relevant Directive at the time of application to An Bord Pleanala.

EIAR Sections

1. **Alternatives Considered**

This section should include specific reasoning for the site chosen as well as the proposed landfill design and increase in height of same and the alternatives considered. It is also important to detail the need for the increase

in waste tonnage at the facility and the need for a facility for the storage of incinerator bottom ash.

2. **Human Environment – Socio economic, Land Use & Amenity**

The potential positive and negative impacts of the project on the local population, tourism and recreation, employment and economic activity both directly and indirectly, will need to be assessed in this Section. The current and proposed number of employees at the facility should be detailed as well as the indirect employment from the facility. This section should also assess the visual impact and impact on Protected Views given the increase in the landfill height. A full assessment of impact from odour on the local area should also be carried out given the proposed increase in the height of the landfill.

3. **Noise and Vibration**

A map detailing the noise monitoring locations should be provided to ensure that the noise monitoring is indicative of actual potential noise nuisance. The number of noise monitoring stations should reflect the increase in the landfill height and additional onsite ancillary facilities proposed. The noise and vibration from the consequent additional traffic movements and the potential increase in operational noise impacts from the increased height of the landfill area and the construction of the IBA storage area should be clearly assessed. It is noted that additional screening berms are mentioned to mitigate noise, details of other measures such as additional planting and noise reduction equipment, should also be clearly assessed and proposed.

4. **Traffic and Transportation**

Details of traffic associated with the existing, approved and proposed development should be included in the EIAR as follows:

a) The hours of operation of the facility – daily and weekly;
b) The type and frequency of vehicle used to deliver the waste to the development per day, per week and per month;
c) The details of the origin of the waste and the haul routes of the material to the site;
d) The proposed output of materials, leachate, etc. from the site daily, weekly and monthly and the haul routes of this material;
e) Details of the traffic associated with the construction phase;
f) Staff numbers associated with the existing, approved and proposed development and traffic movements generated by same;
g) Any increase in traffic as a result of the proposed development

The EIAR should also assess the carrying capacity of the adjoining road network to cater for the level of traffic anticipated and the suitability of the existing site access. The increase in waste acceptance activities at the facility

has the potential to give rise to traffic congestion and capacity issues which the EIAR will need to assess.

5. **Air Quality and Climate**

This section needs to reference the source of waste material and the potential impacts from same as well as the dusts generated by the additional traffic movements from same. The applicant should pay attention to Meath County Council's Draft Climate Action Strategy (CAS) document that will go on public display in early May. The CAS covers 8 thematic areas which encompass 139 specific actions some of which may be of relevance to the proposed development.

6. **Ecology**

There are a number of designated sites located in the vicinity of Knockharley landfill. These include:

- Balrath Woods pNHA (001579)
- Thomastown Bog pNHA (001593)
- Rossnaree Riverbank pNHA (001589)
- River Boyne and River Blackwater SAC (002299)
- Duleek Commons pNHA (001578)

While there may not be direct impacts on any of these sites, indirect impacts may occur. These include the potential impacts from a discharge of contaminated run-off from the Knockharley site. Screening will have to be undertaken to determine if an Appropriate Assessment (AA) of the proposed development at Knockharley Landfill is required. If the screening assessment indicates that an AA is required, a Natura Impact Statement will be prepared and submitted to accompany the planning application and EIAR.

An Ecological Assessment should be carried out with areas of each habitat onsite provided and an evaluation of relative importance of each habitat. The potential impacts on each habitat and any protected plant and animal species should be assessed. Mitigation proposals should be clearly stated in the EIAR. The NPWS should be consulted with regard to likely impacts on designated sites, and protected plant and animal species.

7. **Soils, Geology & Hydrogeology**

The impact on soils/geology of the site will mainly relate to excavations required for the development of the proposed IBA storage area, the expanded leachate storage lagoons and the development of screening berms, in terms of slope stability. Current groundwater protection measures and any additional

measures required should be clearly identified. Groundwater monitoring locations should be clearly shown.

8. Hydrology & Water Quality

The EIAR should assess the impact and change in run-off rates from the proposed increase in the height of the landfill area. The impact of the proposed additional berms and the felling and replanting of trees should also be assessed.

9. Landscape and Visual Impact

In order to increase the void capacity within the existing landfill footprint, it is proposed to raise the final profile of the landfill by up to 10-12 m. This chapter of the EIAR should include an appraisal of the development in the context of the Landscape Character Assessment which forms Appendix 7 of the County Development Plan 2013-2019. The views and prospects and the amenity of places and features of natural beauty or interest listed in Appendix 12 and shown on Map 9.5.1 of the County Development Plan 2013-2019 are to be considered. Photomontages should be submitted where relevant. A visual assessment from Bru Na Boinne, the Hill of Tara, the Hill of Slane and any other important archaeological sites should form part of this assessment. The visual impact from the N2 National Roadway as well as the local roadways surrounding the site should also be assessed. The current visual impact, visual impact for the lifetime of the proposed permission and the long-term site restoration impact should be clearly shown. Updated site restoration proposals, plans and photomontages will be required.

11. Archaeology, Architecture and Cultural Heritage

Research should include all archaeological, historical buildings including protected structures, and monuments or places subject to statutory protection within the study area and should include an assessment of the potential impacts, if any, arising from the development. Visual assessments from Bru Na Boinne, the Hill of Tara, the Hill of Slane and any other important archaeological sites should form part of this chapter.

_____

Padraig Maguire,
Senior Executive Planner,
Meath County Council

18th April 2018

knockharley landfill scoping

From: Caroline Corrigan <caroline.corrigan@meathcoco.ie>
Sent: 09 April 2018 13:23
To: knockharley landfill scoping
Cc: Larry Whelan; Patrick Gallagher; Padraig Maguire; Sean Clarke
Subject: Proposed SID development at Knockharley Landfill

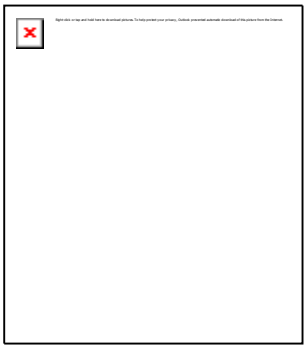
Good afternoon Bernie,

I acknowledge receipt of your correspondence dated 29th March 2018. Presently we have no comments in relation to the scoping of the proposed development. I would however like to draw your attention to our draft Climate Action Strategy (CAS) document that will go on public display in early May, the CAS covers 8 thematic areas which encompass 139 specific actions some of which may be of relevance to the proposed development. Once the document is ready for the consultation period I will forward a copy of same.

Regards,

Caroline

Caroline Corrigan, BEng(Hons) CEng MIEI
Senior Executive Engineer | Environment | Meath County Council
Buvinda House | Dublin Road | Navan | Co. Meath | C15Y291
Tel: 046-9097200 | Fax: 046-9097001



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Meath County Council?s new corporate headquarters are:
Buvinda House,
Dublin Road,
Navan,
Co. Meath, C15 Y291

Roinn Cumarsáide, Gníomhaithe
ar son na hAeráide & Comhshaoil
Department of Communications,
Climate Action & Environment

Ms Bernie Guinan,
Fehily Timoney & Company,
J5 Plaza,
North Park Business Park,
North Road,
Dublin 11.

3rd April, 2018

Re: Proposed development at Knockarley Landfill, Kentstown, Co Meath

Dear Ms Guinan,

On behalf of Department of Communications, Climate Action & Environment, I wish to acknowledge receipt of your correspondence.

The contents of your correspondence will be brought to the attention of the appropriate officials.

Yours sincerely,

Majella Dowling

Fáiltítear roimh comhfhreagras i nGaeilge

An Roinn Tithíochta,
Pleanála agus Rialtais Áitiúil
Department of Housing,
Planning and Local Government

Oifig an Aire
Office of the Minister

3 April, 2018.

Bernie Guinan
Fehily Timoney & Company
J5 Plaza
North Park Business Park
North Road
Dublin 11

Re: Proposed development at Knockharley Landfill, Kentstown, Co. Meath

Dear Ms Guinan,

I have been asked by Mr. Eoghan, T.D. Minister for Housing, Planning, and Local Government, to acknowledge receipt of your recent letter, regarding the proposed development at Knockharley Landfill, in Kentstown, Co. Meath.

The contents have been noted, and have been referred to the relevant Section in the Department for information.

Kind regards,

PP

Niamh Redmond
Private Secretary

knockharley landfill scoping

From: Donncha O'Sullivan <Donncha.OSullivan@gasnetworks.ie>
Sent: 10 April 2018 16:03
To: knockharley landfill scoping
Cc: Peter Keegan; Graham Canty; Tom Considine; Jim Brohan (James); Chris Dillon (C)
Subject: Knockharley Landfill - Attn: Bernie Guinan
Attachments: GNI-DLE-4429.pdf; Code of Practice 2015.pdf

Bernie,

You recently contacted Gas Networks Ireland and requested information on its infrastructure in the vicinity of your forthcoming works. The 14m wide GNI Wayleave about the Gas Transmission Pipeline in the general area of interest to you is shown, in **RED**, on the drawing attached. Please treat all Gas Networks Ireland Drawings as 'indicative' only.

To verify the *in situ* position of the Gas Transmission Pipeline please contact Chris Dillon, 087-927 9284, chris.dillon@gasnetworks.ie. All work in the vicinity of a Gas Transmission Pipeline must be completed in compliance with the attached 'Code of Practice 2015'.

The Gas Transmission Pipeline exists within Gas Networks Ireland Wayleaves. No excavation may take place within any such Wayleave unless consent, in the form of a valid Excavation Permit, has been granted by Gas Networks Ireland. For further advice in regard to such Wayleaves please contact our Tom Considine, Tom.Considine@gasnetworks.ie.

Regards,

Donncha

Donncha Ó Sullivan BE CEng MIEI MIGEM
Development Liaison Engineer

Gas Networks Ireland
P.O. Box 51,Gasworks Road, Cork, Ireland

T +353 21 453 4613 | **M** +353 87 982 2437
E donncha.osullivan@gasnetworks.ie

gasnetworks.ie | Find us on Twitter

You are reminded that all work in the vicinity of Gas Networks Ireland Pipelines and Installations must be completed to comply fully with the relevant guidelines to be found in the current editions of the Health & Safety Authority publications, 'Code Of Practice For Avoiding Danger From Underground Services' and 'Guide To Safety In Excavations'. Both documents are available free of charge from The Health And Safety Authority. www.hsa.ie, 1890-28 93 89.

scaipeadh den fhaisnéis, aon athbhreithniú ar nó aon úsáid eile a bhaint as, nó aon ghníomh a dhéantar ag brath ar an bhfaisnéis seo ag daoine nó ag eintitis nach dóibh siúd an fhaisnéis seo, toirimiscthe agus féadfar é a bheith neamhdhleathach. Níl Líonraí Gáis Éireann faoi dhliteanas maidir le seachadadh iomlán agus ceart na faisnéise sa chumarsáid seo nó maidir le haon mhoill a bhaineann léi. Ní ghlacann Líonraí Gáis Éireann le haon dliteanas faoi ghnímh nó faoi iarmhairtí bunaithe ar úsáid thoirmiscthe na faisnéise seo. Níl Líonraí Gáis Éireann faoi dhliteanas maidir le seachadadh ceart agus iomlán na faisnéise sa chumarsáid seo nó maidir le haon mhoill a bhaineann léi. Má fuair tú an teachtaireacht seo in earráid, más é do thoil é, déan teagmháil leis an seoltóir agus scrios an t-ábhar ó gach aon ríomhaire.
Féadfar ríomhphost a bheith soghabhálach i leith truaillithe, idircheaptha agus i leith leasaithe neamhúdaraithe. Ní ghlacann Líonraí Gáis Éireann le haon fhreagracht as athruithe nó as idircheapadh a rinneadh ar an ríomhphost seo i ndiaidh é a sheoladh nó as aon dochar do chórais na bhfaighteoirí déanta ag an teachtaireacht seo nó ag a ceangaltáin. Más é do thoil é, tabhair faoi deara chomh maith go bhféadfar monatóireacht a dhéanamh ar theachtaireachtaí chuig nó ó Líonraí Gáis Éireann chun comhlíonadh le polasaithe agus le caighdeáin Líonraí Gáis Éireann a chinntiú agus chun ár ngnó a chosaint. Líonraí Gáis Éireann cuideachta ghníomhaíochta ainmnithe, faoi theorainn scaireanna, atá corpraithe in Éirinn leis an uimhir chláraithe 555744 agus a tá hoifig chláraithe ag Bóthar na nOibreacha Gáis, Corcaigh, T12 RX96.

Go raibh maith agat as d'aird a thabhairt.

Thank you for your attention.

Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive

Environmental Health Service
HSE Dublin North East
Co. Clinic
Navan
Co. Meath
Telephone: 046-9021595/9098729
Fax: 046 9022818

HSE EIS SCOPING REPORT

Environmental Health Service Consultation Report
(as a Statutory Consultee (Planning and Development Acts 2000,
& Regs made thereunder).

Date:	**26th April 2018**
Type of consultation:	**Scoping**
Planning Authority:	**Environmental Protection Agency**
Reference Number:	**2085**
EHIS Reference:	**0748**
Applicant:	**Knockharley Landfill Ltd**
Proposed Development:	**Permission to intensify waste acceptance at the existing landfill facility to 440,000 tonnes per annum for disposal and recovery comprising (1) the landfilling of residual non-hazardous waste and non-hazardous soils and (2) the storage of incinerator bottom ash to facilitate future recovery. A 76m^2 portal frame building in the IBA facility to facilitate weathering, metals recovery trials and crushing and washing to facilitate recovery trials. A 73.5m^2 building for biological treatment of residual MSW 'fines' material and contingency storage of recyclable bales. Construction of screening berms and other infrastructure, relocation of existing 20kVa overhead ESB powerline, felling 12.5 ha of existing conifer plantations, replanting 16.8 ha at Knockharley Landfill, Kentstown, Co. Meath.**

This report only comments on Environmental Health impacts of the proposed development.

Introduction
The following documents should be considered when preparing the Environmental Impact Statement:

- Guidelines on the information to be contained in EIS (2002), 187kb
- Advice Notes on Current Practice in the preparation of EIS (2003), 435kb
- Guidelines for Planning Authorities and An Bord Pleanala on carrying out Environmental Impact Assessment http://www.housing.gov.ie/sites/default/files/migrated-files/en/Publications/DevelopmentandHousing/Planning/FileDownLoad%2C32720%2Cen.pdf

Adoption of the Directive (2014/52/EU) in April 2014 initiated a review of the above guidelines. The draft new guidelines can be seen at:
http://www.epa.ie/pubs/consultation/reviewofdrafteisguidelinesadvicenotes/
(Please note that the original Guidelines and Advice Notes are still applicable until such date as the final revision of the Guidelines are published.

Generally the Environmental Impact Assessment should examine all potentially significant impacts and provide the following information for each:

a) Description of the receiving environment;
b) The nature and scale of the impact;
c) An assessment of the significance of the impact;
d) Proposed mitigation measures;
e) Residual impacts.

Directive 2014/52/EU has an increased requirement to assess potential significant impacts on Population and Human Health. In the experience of the Environmental Health Service (EHS) impacts on human health are generally inadequately assessed in EIA in Ireland. It is recommended that the wider determinants of health and wellbeing are considered. Guidance on determinants of health can be found at www.publichealth.ie

In addition to the above, the following information should be included in the EIAR:

Description of the Project:

Clarification should be provided if this is the final proposal for this waste facility or will permission for new waste management processes be looked for in the immediate future.

The scoping report does not fully describe all processes outlined in the proposal. Further details should be provided of the process of recovering metal from IBA and of the biological treatment process of residual MSW 'fines' material. The proposed length of storage, the future recovery or final disposal options for IBA should be addressed in the EIAR.

The EIAR should also describe the waste acceptance criteria and identify the characteristics and volumes of the waste streams to be accepted on site. Clarification shall be provided if hazardous waste is to be handled on site.

With regard to the construction phase of the project all potential impacts should be identified and assessed. Proposed mitigation measure should be fully described. A comprehensive construction management plan outlining specific control measures should be provided in the EIAR.

Later Consents Required:
Information on possible future monitoring requirements for the operation of the landfill should be included in the EIAR.

Consideration of Alternatives:
The EIAR should fully describe and consider any alternatives to this project. The reasons for choosing the proposed treatment and disposal processes shall be outlined.

Public Consultation:
Meaningful public consultation with the local community should be carried out. It is stated that the general public will be provided with information about the project and a summary will be provided of the queries and concerns expressed. All legitimate concerns from the public shall be fully addressed and evaluated. The EIAR should clearly demonstrate how the outcome of consultation with the public influenced decision making within the EIA. This development, if not managed correctly, has the potential to generate nuisance for local residents so it is essential that thorough and robust public consultation is carried out with regards to this proposal.

Noise:
A noise survey must be carried out to assess the impact of noise from both the construction and operational phase of the proposed development on the residents living in the vicinity. Up to date baseline monitoring shall be carried out to establish the existing noise environment. All noise sensitive receptors in the vicinity of the landfill shall be identified. Appropriate noise assessment modelling should be carried out to accurately predict the change in the noise environment. This information should be

outlined and clearly displayed in the EIAR. The significance of the predicted change in the noise environment should be fully assessed and the criteria for the evaluation of the significance clearly identified.

The potential cumulative effects of other industry in the vicinity of the development should also be assessed as part of the noise survey. All mitigation measures for the control of noise shall be described.

Water:
All drinking water sources, both surface and groundwater (including individual private wells) shall be identified. Any potential impacts to these drinking water sources shall be assessed. Details of bedrock, overburden, vulnerability, groundwater flows and gradients, inner and outer zones of protection and catchment areas should all be considered when assessing potential impacts and possible mitigation measures. The EHS would recommend that all information is gathered by means of a site survey as desktop studies do not always accurately reflect the current use of water resources.

Potential impacts of surface water runoff should be assessed and mitigation measures detailed. Site drainage, increased rainfall and the possibility of flooding should all be considered when identifying possible impacts and mitigation measures.

Dust:
The impact of dust generation from construction and operation of the proposed development should be assessed. A dust minimisation plan or similar mitigation measures should be included within the EIAR.

Odour:
The potential impacts of air emissions and odour generation should be clearly assessed in the EIA. Proposals for the capture, containment and treatment of odorous air shall be outlined. The development proposes to significantly increase the volume of waste intake at the facility. Appropriate odour modelling must be carried out to accurately predict the change in odour emissions from the facility. The impact of the intensified odour emissions on the local community must be full assessed. It is stated in the scoping document there have been odour issues associated with the operation of the landfill. A full and rigorous assessment of all previous odour complaints should be carried out as part of the EIA process to uncover any information which could assist with control measures for odour on site.

Pest Control
The proposal for the new development will result in previously undisturbed land being utilised for earthworks and construction. There is a very real threat of existing rodent habitats being disrupted and destroyed. The EIAR should include a description of measures to be put in place to control rodent activity.

Litter
The increased volumes of waste proposed to be accepted on site have the potential to cause nuisance problems with regards to litter. An assessment of the impact of litter should be included in the EIAR and control measures outlined to prevent problems with litter arising.

Complaints procedure:
The EIAR should include proposals for dealing with issues of odour or nuisance from members of the public should they arise. A comprehensive operational management plan outlining working procedures on site and control measures should be provided. Details of a procedure to fully follow up and investigate complaints along with specific contact details for members of the public should also be included.

Cumulative Impacts:
In line with the EPA Guidelines on the information to be contained in Environmental Impact Statements (2002) and their Advice Notes on Current Practise in the preparation of Environmental Impact Statements (2003) the EIA should include the assessment of cumulative impacts of any other industrial or energy developments in the area e.g. quarrying, heavy industry, wind farms, composting facilities etc.

Decommissioning:
The EIAR should describe proposals for decommissioning the facility at the end of life of the project. The residual impact of the development on the environment must be fully assessed.

Lisa Maguire
Environmental Health Officer

All correspondence or any queries with regard to this report including acknowledgement of this report should be forwarded to:

Elish O'Reilly
Principal Environmental Health Officer
Environmental Health Department
Co. Clinic
Navan
Co. Meath

Bernie Guinan
Fehily Timoney & Company
J5 Plaza, North Park Business Park
North Road
Dublin 11

09/04/2018

Uisce Éireann
Bosca OP 6000
Baile Átha Cliath 1
Éire

Irish Water
PO Box 6000
Dublin 1
Ireland

T: +353 1 89 25000
F: +353 1 89 25001
www.water.ie

Re: Proposed Development at Knockharley Landfill, Kentstown, Co Meath

Dear Ms Guinan,

Irish Water (IW) acknowledges receipt of your letter dated 29th March regarding the Environmental Impact Assessment Report (EIAR) scoping for the above development.

In accordance with the 'Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements' Irish Water believes that further information is required in order to scope any impacts to our assets including –

- Information on the nature, location and volume of any groundwater development for dewatering.
- Location of Aquifers, showing groundwater abstractions and any related protection zones and discharges to groundwater.
- Outline of the proposed site and demonstration of how the proposed development relates spatially to conservation sites, aquifers and groundwater abstractions.
- A geological cross section where a conservation site, groundwater abstraction or a discharge location is located within 2km of the proposed development site.

We also suggest a site investigation be carried out prior to the beginning of construction and proposals outlined for dealing with situations where works would interfere with existing water services infrastructure (watermains, service connections, rising mains, foul and surface water sewers, culverts, etc.). Irish Water notes that this development has been determined as strategic infrastructure development by ABP and is open for further discussion in relation to water services. Please also see attached our suggested scope in relation to water services.

Yours Sincerely,

P.P

Suzanne Dempsey
Spatial Planning Strategy Specialist

Response to EIAR Scoping Report Requests

IW currently does not have the capacity to advise on scoping of individual projects. However, in general we would like the following aspects of Water Services to be considered in the scope of an EIAR where relevant;

a) Impacts of the development on the capacity of water services (do existing water services have the capacity to cater for the new development if required).
b) Any up-grading of water services infrastructure that would be required to accommodate the development.
c) In relation to a development that would discharge trade effluent – any upstream treatment or attenuation of discharges required prior to discharging to an IW collection network
d) In relation to the management of surface water; the potential impact of surface water discharges to combined sewer networks & potential measures to minimise/stop surface waters from combined sewers
e) Any physical impact on IW assets – reservoir, treatment works, pipes, pumping stations, discharges outfalls etc. including any relocation of assets
f) Any potential impacts on the assimilative capacity of receiving waters in relation to IW discharge outfalls including changes in dispersion /circulation characterises
g) Any potential impact on the contributing catchment of water sources either in terms of water abstraction for the development (and resultant potential impact on the capacity of the source) or the potential of the development to influence/ present a risk to the quality of the water abstracted by IW for public supply.
h) Where a development proposes to connect to an IW network and that network either abstracts water from or discharges waste water to a "protected"/sensitive area, consideration as to whether the integrity of the site/conservation objectives of the site would be compromised.
i) Mitigation measures in relation to any of the above

This is not an exhaustive list.

Please note

- If a development will require a connection to either a public water supply or sewage collection system the developer is advised to contact Irish Water's Connections and Developer Services Team prior to applying for planning permission. The contact in the Eastern region is Chris Smith chsmith@water.ie
- For Information on Irish Water assets please send a query to DataRequests@water.ie

Irish Water will not normally accept new surface water discharges to combined sewer networks.

knockharley landfill scoping

From: John Spink <John.Spink@teagasc.ie>
Sent: 09 April 2018 14:13
To: knockharley landfill scoping
Subject: FW: knockharley

John Spink
Head of Crop Science Dept.
Teagasc Crops, Environment and Land Use Programme
Oak Park Crops Research Centre
Carlow Ireland

D. Dial +353 (0) 599170250
Mobile +353 (0) 872043892

www.Teagasc.ie

From: John Spink
Sent: 09 April 2018 14:11
To: 'knockhartleylandfillscoping@ftco.ie'
Subject: knockharley

Your letter to Noel Culleton has been passed on to me as Noel retired in 2012. I'm afraid it's contents fall out of any area in which I would have the expertise to comment.

John Spink
Head of Crop Science Dept.
Teagasc Crops, Environment and Land Use Programme
Oak Park Crops Research Centre
Carlow Ireland

D. Dial +353 (0) 599170250
Mobile +353 (0) 872043892

www.Teagasc.ie

Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive

Environmental Health Service
HSE Dublin North East
Co. Clinic
Navan
Co. Meath
Telephone: 046-9021595/9098729
Fax: 046 9022818

HSE EIS SCOPING REPORT

Environmental Health Service Consultation Report
(as a Statutory Consultee (Planning and Development Acts 2000, & Regs made thereunder).

Date:	**17th April 2018**
Type of consultation:	**Scoping**
Planning Authority:	**An Bord Pleanala**
Reference Number:	**LW14/821/01/ConLet/TR/MG**
EHIS Reference:	**0748**
Applicant:	**Knockharley Landfill Ltd**
Proposed Development:	**Permission to intensify waste acceptance at the existing landfill facility to 440,000 tonnes per annum for disposal and recovery comprising (1) the landfilling of residual non-hazardous waste and non-hazardous soils and (2) the storage of incinerator bottom ash to facilitate future recovery. A 76m^2 portal frame building in the IBA facility to facilitate weathering, metals recovery trials and crushing and washing to facilitate recovery trials. A 73.5m^2 building for biological treatment of residual MSW 'fines' material and contingency storage of recyclable bales. Construction of screening berms and other infrastructure, relocation of existing 20kVa overhead ESB powerline, felling 12.5 ha of existing conifer plantations, replanting 16.8 ha at Knockharley Landfill, Kentstown, Co. Meath.**

This report only comments on Environmental Health impacts of the proposed development.

Introduction
The following documents should be considered when preparing the Environmental Impact Statement:

- Guidelines on the information to be contained in EIS (2002), 187kb
- Advice Notes on Current Practice in the preparation of EIS (2003), 435kb
- Guidelines for Planning Authorities and An Bord Pleanala on carrying out Environmental Impact Assessment http://www.housing.gov.ie/sites/default/files/migrated-files/en/Publications/DevelopmentandHousing/Planning/FileDownLoad%2C32720%2Cen.pdf

Adoption of the Directive (2014/52/EU) in April 2014 initiated a review of the above guidelines. The draft new guidelines can be seen at:
http://www.epa.ie/pubs/consultation/reviewofdrafteisguidelinesadvicenotes/
(Please note that the original Guidelines and Advice Notes are still applicable until such date as the final revision of the Guidelines are published.

Generally the Environmental Impact Assessment should examine all potentially significant impacts and provide the following information for each:

a) Description of the receiving environment;
b) The nature and scale of the impact;
c) An assessment of the significance of the impact;
d) Proposed mitigation measures;
e) Residual impacts.

Directive 2014/52/EU has an increased requirement to assess potential significant impacts on Population and Human Health. In the experience of the Environmental Health Service (EHS) impacts on human health are generally inadequately assessed in EIA in Ireland. It is recommended that the wider determinants of health and wellbeing are considered. Guidance on determinants of health can be found at www.publichealth.ie

In addition to the above, the following information should be included in the EIAR:

Description of the Project:

Clarification should be provided if this is the final proposal for this waste facility or will permission for new waste management processes be looked for in the immediate future.

The scoping report does not fully describe all processes outlined in the proposal. Further details should be provided of the process of recovering metal from IBA and of the biological treatment process of residual MSW 'fines' material. The proposed length of storage, the future recovery or final disposal options for IBA should be addressed in the EIAR.

The EIAR should also describe the waste acceptance criteria and identify the characteristics and volumes of the waste streams to be accepted on site. Clarification shall be provided if hazardous waste is to be handled on site.

With regard to the construction phase of the project all potential impacts should be identified and assessed. Proposed mitigation measure should be fully described. A comprehensive construction management plan outlining specific control measures should be provided in the EIAR.

Later Consents Required:
Information on possible future monitoring requirements for the operation of the landfill should be included in the EIAR.

Consideration of Alternatives:
The EIAR should fully describe and consider any alternatives to this project. The reasons for choosing the proposed treatment and disposal processes shall be outlined.

Public Consultation:
Meaningful public consultation with the local community should be carried out. It is stated that the general public will be provided with information about the project and a summary will be provided of the queries and concerns expressed. All legitimate concerns from the public shall be fully addressed and evaluated. The EIAR should clearly demonstrate how the outcome of consultation with the public influenced decision making within the EIA. This development, if not managed correctly, has the potential to generate nuisance for local residents so it is essential that thorough and robust public consultation is carried out with regards to this proposal.

Noise:
A noise survey must be carried out to assess the impact of noise from both the construction and operational phase of the proposed development on the residents living in the vicinity. Up to date baseline monitoring shall be carried out to establish the existing noise environment. All noise sensitive receptors in the vicinity of the landfill shall be identified. Appropriate noise assessment modelling should be carried out to accurately predict the change in the noise environment. This information should be

outlined and clearly displayed in the EIAR. The significance of the predicted change in the noise environment should be fully assessed and the criteria for the evaluation of the significance clearly identified.

The potential cumulative effects of other industry in the vicinity of the development should also be assessed as part of the noise survey. All mitigation measures for the control of noise shall be described.

Water:
All drinking water sources, both surface and groundwater (including individual private wells) shall be identified. Any potential impacts to these drinking water sources shall be assessed. Details of bedrock, overburden, vulnerability, groundwater flows and gradients, inner and outer zones of protection and catchment areas should all be considered when assessing potential impacts and possible mitigation measures. The EHS would recommend that all information is gathered by means of a site survey as desktop studies do not always accurately reflect the current use of water resources.

Potential impacts of surface water runoff should be assessed and mitigation measures detailed. Site drainage, increased rainfall and the possibility of flooding should all be considered when identifying possible impacts and mitigation measures.

Dust:
The impact of dust generation from construction and operation of the proposed development should be assessed. A dust minimisation plan or similar mitigation measures should be included within the EIAR.

Odour:
The potential impacts of air emissions and odour generation should be clearly assessed in the EIA. Proposals for the capture, containment and treatment of odorous air shall be outlined. The development proposes to significantly increase the volume of waste intake at the facility. Appropriate odour modelling must be carried out to accurately predict the change in odour emissions from the facility. The impact of the intensified odour emissions on the local community must be full assessed. It is stated in the scoping document there have been odour issues associated with the operation of the landfill. A full and rigorous assessment of all previous odour complaints should be carried out as part of the EIA process to uncover any information which could assist with control measures for odour on site.

Pest Control
The proposal for the new development will result in previously undisturbed land being utilised for earthworks and construction. There is a very real threat of existing rodent habitats being disrupted and destroyed. The EIAR should include a description of measures to be put in place to control rodent activity.

Litter
The increased volumes of waste proposed to be accepted on site have the potential to cause nuisance problems with regards to litter. An assessment of the impact of litter should be included in the EIAR and control measures outlined to prevent problems with litter arising.

Complaints procedure:
The EIAR should include proposals for dealing with issues of odour or nuisance from members of the public should they arise. A comprehensive operational management plan outlining working procedures on site and control measures should be provided. Details of a procedure to fully follow up and investigate complaints along with specific contact details for members of the public should also be included.

Cumulative Impacts:
In line with the EPA Guidelines on the information to be contained in Environmental Impact Statements (2002) and their Advice Notes on Current Practise in the preparation of Environmental Impact Statements (2003) the EIA should include the assessment of cumulative impacts of any other industrial or energy developments in the area e.g. quarrying, heavy industry, wind farms, composting facilities etc.

Decommissioning:
The EIAR should describe proposals for decommissioning the facility at the end of life of the project. The residual impact of the development on the environment must be fully assessed.

Lisa Maguire

Lisa Maguire
Environmental Health Officer

All correspondence or any queries with regard to this report including acknowledgement of this report should be forwarded to:

Elish O'Reilly
Principal Environmental Health Officer
Environmental Health Department
Co. Clinic
Navan
Co. Meath

knockharley landfill scoping

From: Environmental Co-ordination (Inbox) <Environmental_Co-ordination@agriculture.gov.ie>
Sent: 16 April 2018 14:09
To: knockharley landfill scoping
Subject: Knockharley Landfill proposed development at Kentstown, Co. Meath

Dear Bernadette,

I refer to your recent correspondence concerning the above.

If the proposed development will involve the felling or removal of any trees, the developer must obtain a Felling License from this Department before trees are felled or removed. A Felling Licence application form can be obtained from **Felling Section, Department of Agriculture, Food and the Marine, Johnstown Castle Estate, Co. Wexford**. Tel: 076-1064459, Web https://www.agriculture.gov.ie/forestservice/treefelling/treefelling/

A Felling Licence granted by the Minister for Agriculture, Food and the Marine provides authority under the Forestry Act 2014 to fell or otherwise remove a tree or trees and/or to thin a forest for silvicultural reasons. The Act prescribes the functions of the Minister and details the requirements, rights and obligations in relation to felling licences. The principal set of regulations giving further effect to the Forestry Act 2014 are the Forestry Regulations 2017 (S.I. No. 191 of 2017).

The developer should take note of the contents of **Felling and Reforestation Policy** document which provide a consolidated source of information on the legal and regulatory framework relating to tree felling. The policy document is available at:
https://www.agriculture.gov.ie/media/migration/forestry/treefelling/FellingReforestationPolicy240517.pdf .

In order to ensure regulated forestry operations in Ireland accord with the principles of sustainable forest management (SFM) , as well as fulfilling the requirements of other relevant environmental protection laws, the Department (acting through its Forest Service division) must undertake particular consultations and give certain matters full consideration during the assessment of individual Felling Licence applications. This includes consultation with relevant bodies, the application of various protocols and procedures (e.g. Forest Service Appropriate Assessment Procedure), and the requirement for applicants on occasion to provide further information (e.g. a Natura Impact Statement).

Consequently, when the Forest Service is considering an application to fell trees, the following applies:

1. The interaction of these proposed works with the environment locally and more widely, in addition to potential direct and indirect impacts on designated sites and water, is assessed. Consultation with relevant environmental and planning authorities may be required where specific sensitivities arise (e.g. local authorities, National Parks & Wildlife Service, Inland Fisheries Ireland, and the National Monuments Service);

2. Where a tree Felling Licence application is received, the Department will publish a notice of the application before making a decision on the matter. The notice shall state that any person may make a submission to the Department within 30 days from the date of the notice. The notices for 2018 are published online at:

https://www.agriculture.gov.ie/forestservice/publicconsultation/environmentalimpactassessmenteiapublicconsultationforafforestationforestroadconstructionandfellinglicenses2018/

3. Third parties that make a submission or observation will be informed of the decision to grant or refuse the licence and on request details of the conditions attached to the licence, the main reasons and considerations on which the decision to grant or refuse the licence was based, and where conditions are attached to any licence, the reasons for the conditions. Both third parties and applicants will be also informed of their right to appeal any decision within 28 days to the Forestry Appeals Committee. Felling Licence decisions for 2018 are published online at: https://www.agriculture.gov.ie/forestservice/publicconsultation/environmentalimpactassessment-2018registerofdecisions/

Yours sincerely,

Liz McDonnell

Liz McDonnell | *Executive Officer,**An tAonad um Chomhordú Timpeallachta, An Rannóg um Athrú Aeráide agus Beartas Bithfhuinnimh,***
Environmental Co-ordination Unit |Climate Change & Bioenergy Policy Division | environmentalco-ordination@agriculture.gov.ie
An Roinn Talmhaíochta, Bia agus Mara
Department of Agriculture, Food and the Marine
Lárionad Gnó Grattan, Bóthar Bhaile Átha Cliath, Port Laoise, Co Laoise, R32 K857
Grattan Business Centre, Dublin Road, Portlaoise, Co. Laoise, R32 K857
T +353 (0)57 868 9915
www.agriculture.gov.ie

Bonneagar Iompair Éireann
Transport Infrastructure Ireland

Ms. Bernie Guinan
Fehily Timoney & Company
J5 Plaza
North Park Business Park
North Road
Dublin 11

Dáta | Date	Ár dTag | Our Ref.	Bhur dTag | Your Ref.
18 April 2018	**TII18-101318**	

Re: EIS Scoping; proposed development at Knockharley Landfill, Kentstown, Co. Meath

Dear Ms. Guinan,

I refer to your letter of 29 March 2018 regarding the above.

TII wishes to advise that it is not in a position to engage directly with planning applicants in respect to proposed developments. TII will endeavour to consider and respond to planning applications referred to it given its status and duties as a statutory consultee under the Planning Acts. The approach to be adopted by TII in making such submissions or comments will seek to uphold official policy and guidelines as outlined in the Spatial Planning and National Roads Guidelines for Planning Authorities (DoECLG, 2012). Regard should also be had to other relevant guidance available at www.tii.ie.

The issuing of this correspondence is provided as best practice guidance only and does not prejudice TII's statutory right to make any observations, requests for further information, objections or appeals following the examination of any valid planning application referred.

With respect to access to the proposed operations, it is noted that previous EIS Scoping documentation referred indicates that the site is accessed via a direct private road access to the N2 national primary road. This implies that any proposed development or intensification of use at the landfill will rely on the direct private access to the N2 national primary road.

In that regard, the applicant/developer should be aware that official policy concerning access to national roads seeks to avoid the creation of additional access points from new development or the generation of increased traffic from existing accesses (i.e. non-public road access) to national roads, to which speed limits greater than 50 km/h apply.

The developer/applicant should consult the Meath County Development Plan, 2013 – 2019, Section 6.10.8 to ensure proposals are brought forward consistent with the provisions of the adopted plan and the foregoing official policy.

Bonneagar Iompair Éireann
Ionad Gnó Gheata na Páirce
Sráid Gheata na Páirce
Baile Átha Cliath 8
Éire, D08 DK10

Transport Infrastructure Ireland
Parkgate Business Centre
Parkgate Street
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With respect to EIAR scoping issues, the recommendations indicated below provide only general guidance for the preparation of EIAR, which may affect the national roads network.

The developer should have regard, *inter alia*, to the following;

- Consultations should be had with the relevant local authority/National Roads Design Office with regard to locations of existing and future national road schemes; Leinster Orbital Route (LOR),
- TII would be specifically concerned as to potential significant impacts the development would have on any national roads (and junctions with national roads) in the proximity of the proposed development; N2,
- The developer should assess visual impacts from existing national roads,
- The developer should have regard to any Environmental Impact Statement (EIS) and all conditions and/or modifications imposed by An Bord Pleanála regarding road schemes in the area. The developer should in particular have regard to any potential cumulative impacts,
- The developer, in conducting EIAR, should have regard to TII Publications (formerly NRA DMRB and the NRA Manual of Contract Documents for Road Works),
- The developer, in conducting EIAR, should have regard to TII's Environmental Assessment and Construction Guidelines, including the *Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes* (National Roads Authority, 2006),
- The EIAR should consider the Environmental Noise Regulations 2006 (SI 140 of 2006) and, in particular, how the development will affect future action plans by the relevant competent authority. The developer may need to consider the incorporation of noise barriers to reduce noise impacts (see *Guidelines for the Treatment of Noise and Vibration in National Road Schemes* (1st Rev., National Roads Authority, 2004)),
- It would be important that, where appropriate, subject to meeting the appropriate thresholds and criteria and having regard to best practice, a Traffic and Transport Assessment (TTA) be carried out in accordance with relevant guidelines, noting traffic volumes attending the site and traffic routes to/from the site with reference to impacts on the national road network and junctions of lower category roads with national roads. TII's TTA Guidelines (2014) should be referred to in this regard. The scheme promoter is also advised to have regard to Section 2.2 of the TII TTA Guidelines which addresses requirements for sub-threshold TTA,
- The designers are asked to consult TII Publications to determine whether a Road Safety Audit is required,
- In the interests of maintaining the safety and standard of the national road network, the EIAR should identify the methods/techniques proposed for any works traversing/in proximity to the national road network,
- In relation to haul route identification, the applicant/developer should clearly identify any haul routes proposed (construction and operation) and fully assess the network to be traversed. Separate structure approvals/permits and other licences may be required in connection with the proposed haul route and all structures on the haul route should be checked by the applicant/developer to confirm their capacity to accommodate any abnormal load proposed.

Notwithstanding, any of the above, the developer should be aware that this list is non-exhaustive, thus site and development specific issues should be addressed in accordance with best practise.

I trust that the above comments are of use in your scoping process.

Yours sincerely,

pp

Michael McCormack
Senior Land Use Planner

knockharley landfill scoping

From: Yvonne Jackson <Yvonne.Jackson@failteireland.ie>
Sent: 10 April 2018 12:14
To: knockharley landfill scoping
Subject: Proposed development at Knockharley, Kentstown, Co. Meath
Attachments: EIS &Tourism Guidelines.pdf

Hello Bernie,

I wish to acknowledge receipt of your recent letter to Fáilte Ireland in relation to the **proposed development at Knockharley, Kentstown, Co. Meath**
I have attach a copy of the Fáilte Ireland's Guidelines for the treatment of tourism in an EIS, which we recommend should be taken into account in preparing the EIS.

Yours sincerely,

Yvonne

Yvonne Jackson
Product Development-Activities | Fáilte Ireland | Áras Fáilte | 88/95 Amiens Street | Dublin 1
T: 01 8847224
W: www.failteireland.ie

Meath County Council comments on Scoping Report dated October 2016

Proposal

It is proposed to apply for consent to increase waste intake at Knockharley Landfill to up to 440,000 tpa for recovery and disposal. The development proposal includes the following recovery and disposal activities:

1. landfilling of residual non-hazardous waste and non-hazardous soils
2. storage of incinerator bottom ash (IBA) to facilitate future recovery

The proposal will require the development of a dedicated storage area for IBA, in addition to the existing permitted landfill footprint. In order to increase the void capacity within the existing landfill footprint, it is proposed to raise the final profile of the landfill by up to 10-12 m.

In addition, the footprint of the existing leachate management area, which comprises a covered lagoon, will be increased to facilitate installation of a leachate treatment plant for pre-treatment of leachate generated from the landfill, prior to its removal offsite, as currently occurs.

To facilitate soils management onsite, as well as to mitigate potential impacts associated with noise and visual impact, it is also proposed to create a number of screening berms at a number of locations on the facility perimeter.
It is proposed to construct a 40 m2 building on site to facilitate the short term storage of baled waste and/or the recovery of metals from ash.

Introduction

Detailed below are Meath County Council's comments on the Scoping Report dated October 2016. Since the preparation of the Scoping Document in 2016 the EIA Directive (2014/52/EU) has been transposed into Irish Law. The Environmental Impact Assessment Report (EIA Report) should follow the requirements of EIA Directive (2014/52/EU) and have regard to original EIA Directive. The EIA should be carried out in compliance with the requirements of the relevant Directive at the time of application to An Bord Pleanala.

EIAR Sections

1. **Alternatives Considered**

This section should include specific reasoning for the site chosen as well as the proposed landfill design and increase in height of same and the alternatives considered. It is also important to detail the need for the increase

in waste tonnage at the facility and the need for a facility for the storage of incinerator bottom ash.

2. **Human Environment – Socio economic, Land Use & Amenity**

The potential positive and negative impacts of the project on the local population, tourism and recreation, employment and economic activity both directly and indirectly, will need to be assessed in this Section. The current and proposed number of employees at the facility should be detailed as well as the indirect employment from the facility. This section should also assess the visual impact and impact on Protected Views given the increase in the landfill height. A full assessment of impact from odour on the local area should also be carried out given the proposed increase in the height of the landfill.

3. **Noise and Vibration**

A map detailing the noise monitoring locations should be provided to ensure that the noise monitoring is indicative of actual potential noise nuisance. The number of noise monitoring stations should reflect the increase in the landfill height and additional onsite ancillary facilities proposed. The noise and vibration from the consequent additional traffic movements and the potential increase in operational noise impacts from the increased height of the landfill area and the construction of the IBA storage area should be clearly assessed. It is noted that additional screening berms are mentioned to mitigate noise, details of other measures such as additional planting and noise reduction equipment, should also be clearly assessed and proposed.

4. **Traffic and Transportation**

Details of traffic associated with the existing, approved and proposed development should be included in the EIAR as follows:

a) The hours of operation of the facility – daily and weekly;
b) The type and frequency of vehicle used to deliver the waste to the development per day, per week and per month;
c) The details of the origin of the waste and the haul routes of the material to the site;
d) The proposed output of materials, leachate, etc. from the site daily, weekly and monthly and the haul routes of this material;
e) Details of the traffic associated with the construction phase;
f) Staff numbers associated with the existing, approved and proposed development and traffic movements generated by same;
g) Any increase in traffic as a result of the proposed development

The EIAR should also assess the carrying capacity of the adjoining road network to cater for the level of traffic anticipated and the suitability of the existing site access. The increase in waste acceptance activities at the facility

has the potential to give rise to traffic congestion and capacity issues which the EIAR will need to assess.

5. **Air Quality and Climate**

This section needs to reference the source of waste material and the potential impacts from same as well as the dusts generated by the additional traffic movements from same. The applicant should pay attention to Meath County Council's Draft Climate Action Strategy (CAS) document that will go on public display in early May. The CAS covers 8 thematic areas which encompass 139 specific actions some of which may be of relevance to the proposed development.

6. **Ecology**

There are a number of designated sites located in the vicinity of Knockharley landfill. These include:

- Balrath Woods pNHA (001579)
- Thomastown Bog pNHA (001593)
- Rossnaree Riverbank pNHA (001589)
- River Boyne and River Blackwater SAC (002299)
- Duleek Commons pNHA (001578)

While there may not be direct impacts on any of these sites, indirect impacts may occur. These include the potential impacts from a discharge of contaminated run-off from the Knockharley site. Screening will have to be undertaken to determine if an Appropriate Assessment (AA) of the proposed development at Knockharley Landfill is required. If the screening assessment indicates that an AA is required, a Natura Impact Statement will be prepared and submitted to accompany the planning application and EIAR.

An Ecological Assessment should be carried out with areas of each habitat onsite provided and an evaluation of relative importance of each habitat. The potential impacts on each habitat and any protected plant and animal species should be assessed. Mitigation proposals should be clearly stated in the EIAR. The NPWS should be consulted with regard to likely impacts on designated sites, and protected plant and animal species.

7. **Soils, Geology & Hydrogeology**

The impact on soils/geology of the site will mainly relate to excavations required for the development of the proposed IBA storage area, the expanded leachate storage lagoons and the development of screening berms, in terms of slope stability. Current groundwater protection measures and any additional

measures required should be clearly identified. Groundwater monitoring locations should be clearly shown.

8. Hydrology & Water Quality

The EIAR should assess the impact and change in run-off rates from the proposed increase in the height of the landfill area. The impact of the proposed additional berms and the felling and replanting of trees should also be assessed.

9. Landscape and Visual Impact

In order to increase the void capacity within the existing landfill footprint, it is proposed to raise the final profile of the landfill by up to 10-12 m. This chapter of the EIAR should include an appraisal of the development in the context of the Landscape Character Assessment which forms Appendix 7 of the County Development Plan 2013-2019. The views and prospects and the amenity of places and features of natural beauty or interest listed in Appendix 12 and shown on Map 9.5.1 of the County Development Plan 2013-2019 are to be considered. Photomontages should be submitted where relevant. A visual assessment from Bru Na Boinne, the Hill of Tara, the Hill of Slane and any other important archaeological sites should form part of this assessment. The visual impact from the N2 National Roadway as well as the local roadways surrounding the site should also be assessed. The current visual impact, visual impact for the lifetime of the proposed permission and the long-term site restoration impact should be clearly shown. Updated site restoration proposals, plans and photomontages will be required.

11. Archaeology, Architecture and Cultural Heritage

Research should include all archaeological, historical buildings including protected structures, and monuments or places subject to statutory protection within the study area and should include an assessment of the potential impacts, if any, arising from the development. Visual assessments from Bru Na Boinne, the Hill of Tara, the Hill of Slane and any other important archaeological sites should form part of this chapter.

Padraig Maguire,
Senior Executive Planner,
Meath County Council

18th April 2018

Appendix 6.4

Pre-Application Consultation with An Bord Pleanála

An Bord Pleanála

Recording of Meeting 17.PC0223 1st meeting

Case Reference / Description	17.PC0223 Increased acceptance of non-hazardous waste for recovery and disposal, Co. Meath.		
Case Type	Pre-application consultation		
1st / 2nd / 3rd Meeting	1st		
Date	04/08/16	**Start Time**	11a.m.
Location	Conference Room	**End Time**	12.05p.m.
Chairperson	Philip Green	**Executive Officer**	Kieran Somers

Attendees		
Representing An Bord Pleanála		
Staff Member	**Email Address**	**Phone**
Philip Green, Assistant Director of Planning		
Pauline Fitzpatrick, Senior Planning Inspector		
Diarmuid Collins, Senior Administrative Officer		
Kieran Somers, Executive Officer	k.somers@pleanala.ie	01-8737107

Representing the Prospective Applicant		
Derek Milton, Fehily Timoney and Company		
Tim Hodnett, Knockharley Landfill Ltd		
John O'Malley, Kiaran O'Malley and Co Ltd		

The meeting commenced at 11a.m.

Introduction:

The Board referred to the letter received from the prospective applicant dated the 8th July, 2016 formally requesting pre-application consultations with the Board.

The Board advised the prospective applicant that the instant meeting essentially constituted an information-gathering exercise for the Board; it also invited the prospective applicant to outline the nature of the proposed development and to highlight any matters it wished to receive advice on from the Board.

The Board mentioned general procedures in relation to the pre-application consultation process as follows:

- The Board will keep a record of this meeting and any other meetings, if held. Such records will form part of the file which will be made available publicly at the conclusion of the process.
- The Board will serve formal notice at the conclusion of the process as to whether or not the proposed development is SID. It may form a preliminary view at an early stage in the process as to whether the proposed development would likely constitute strategic infrastructure.
- A further meeting or meetings may be held in respect of the proposed development.
- Further information may be requested by the Board and public consultations may also be directed by the Board.
- The Board may hold consultations in respect of the proposed development with other bodies.
- The holding of consultations does not prejudice the Board in any way and cannot be relied upon in the formal planning process or any legal proceedings.

Presentation by the prospective applicant:

The prospective applicant began by outlining the main issues it intended to address by way of the instant meeting. These were as follows:

- Development proposal
- Site location
- Existing development
- Elements of the proposed development
- Need for the proposed development
- Why the proposed development is considered to be strategic
- Intended submission programme

Development Proposal:

The prospective applicant stated that the proposed development is intended to facilitate the increased need for landfilling of non-hazardous municipal solid waste (MSW); the recovery, through long-term storage, of non-hazardous incinerator bottom ash (IBA); and the development of a leachate treatment/conditioning plant. The prospective applicant noted that this is a smaller scale development in the context of its previous proposal which was the subject of a pre-application consultation process under case reference number 17.PC0210.

Site Location:

With respect to the location of the subject site, the prospective applicant said that it is strategically located off the N2, has direct access to the Greater Dublin Area, and is the closest landfill facility to Carranstown and Poolbeg Waste to Energy Facilities. In terms of road access, there is a dedicated junction on the N2 leading to the facility, as well as a private access road.

Existing Development:

The prospective applicant said that the current facility, and operations as they exist are covered by an EPA Industrial Emissions Licence. This licence permits the acceptance of up to 200,000 tonnes per annum (which is constituted of 175,000 tonnes of MSW and the recovery of 25,000 tonnes of construction and demolition material). The prospective applicant referred to planning permission received from the Board under appeal case reference number PL 17.220331 which restricted disposal at the facility to 132,000 tonnes per annum until the end of 2010, and 88,000 tonnes per annum thereafter.

Elements of the Proposed Development:

The prospective applicant gave an indicative layout of the proposed development and outlined the constituent elements of this. The proposed development would have proposed inputted tonnages of up to 290,000 tonnes per annum of non-hazardous MSW and non-hazardous soils for disposal, and up to 150,000 tonnes for the recovery of incinerator bottom ash.

As regards the first element of this (non-hazardous MSW and non-hazardous soils for disposal), the proposed development would provide for:

- Additional capacity to be incorporated within the existing permitted landfill facility footprint.
- A proposal to increase the existing height profile of the landfill body.
- Additional annual capacity to provide replacement MSW capacity for closed and closing landfills, as well as contingency capacity.
- An increase in demand for non-hazardous soils capacity.

As regards the second element (recovery of incinerator bottom ash), the prospective applicant said that the proposed development would provide for:

- The recovery of IBA which is currently accepted at Knockharley from the Indaver Carranstown facility.
- The construction of a dedicated IBA storage area to facilitate the future reclamation of such material should markets be developed for this.
- The sourcing of IBA material at the existing Carranstown and Poolbeg facilities and other similar facilities should they be developed.

In response to the Board's query, the prospective applicant said that the IBA material proposed to be stored in a dedicated area on site would be kept separate from MSW. This will enable the IBA material to be re-used in the future if a market for it develops.

As regards the third element (development of a leachate conditioning plant), the prospective applicant said that this would result in a reduction of the quantity of leachate for treatment at an off-site wastewater treatment plant, and could also entail processes such as reverse osmosis, sequential batch reactors and membrane bioreactors.

Responding to the Board's query, the prospective applicant said that a dedicated lagoon would be installed for the capture of leachate arising from IBA. It added that the amount of leachate arising from this material would not be particularly high. In a general context, the prospective applicant noted that there are very limited outlets for leachate at the present time and this informs its decision to include a leachate conditioning plant as part of the overall proposal.

Need for the Proposed Development:

The prospective applicant said there is a clear need for the proposed development having regard to the following considerations:

- Providing a facility for an increased level of MSW and soils acceptance having regard to reducing national landfill capacity generally, as well as the need to manage MSW and soils disposal in the most effective possible way.

- Providing IBA management capacity having regard to the significant waste stream requiring management and to ensure the potential for future sustainable re-use opportunity, if such an opportunity arises.

- Providing for leachate treatment having regard to the need for a reduction in cost and volume, and a requirement in the reduction of loading on wastewater treatment plants.

Why the Proposed Development is considered to be Strategic:

The prospective applicant said that the proposed development clearly comes under the remit of the Seventh Schedule of the Planning and Development Act 2000, as amended, under the following category:

- An installation for the disposal, treatment or recovery of waste with a capacity for an annual intake greater than 100,000 tonnes.

Having regard also to the criteria as set out under 37A(2) of the Planning and Development Act 2000, as amended, the prospective applicant said that the proposed development would constitute strategic infrastructure in that it would have both regional and national importance, would have significance pertaining to the regional spatial and economic strategy, and would have significant effects on the functional area of more than one planning authority.

Intended Submission Programme:

The prospective applicant indicated to the Board that its intention is to lodge a formal application for the proposed development some time in the fourth quarter of 2016.

Board comments/queries:

Having regard to the previous pre-application case which was before it (case reference number 17.PC0210), the Board enquired as to why there are material changes between this and the instant pre-application case. Noting that elements such as the proposed biological waste treatment facility and the development of a hazardous waste landfill have been omitted, the prospective applicant said that these decisions were based primarily on commercial considerations.

The prospective applicant advised the Board that the Indaver Carranstown facility primarily accounts for the IBA material currently being accepted at the existing facility equating to approximately 45,000 tonnes per annum. Responding to the Board's query, the prospective applicant said that the Poolbeg facility, once operational, would likely generate 120,000 to 130,000 tonnes per annum. Taking this figure in conjunction with the amount currently being accepted from Indaver Carranstown, the prospective applicant said that there would be provision for 90% acceptance of tonnage from these two facilities. It added that this overall figure would be subject to commercial arrangements.

The prospective applicant said that there are no current proposals for the acceptance of IBA material from other jurisdictions.

With respect to the proposed intake of up to 290,000 tonnes per annum figure in relation to non-hazardous MSW and non-hazardous soils, the Board enquired as to how that figure was arrived at.. The prospective applicant replied that the figure in question is premised on striking a balance between operational and engineering capacity at the facility and what is reasonably to be expected in terms of throughput, as well as contingency factors. If the throughput of 290,000 tonnes was reached on a per annum basis, the prospective applicant said that the lifespan of the facility would likely end circa 2025-2026. The prospective applicant added that in recent times local authorities have had to invoke the provisions of section 56 of the Waste Management Act 1996 in response to capacity issues in waste disposal.

In respect of the proposal to increase the existing height profile of the landfill body, the prospective applicant advised the Board that this would be in the order of between seven to twelve metres in terms of additional height.

The Board enquired as to whether IBA material changes in any way when it is placed in storage over time, as is proposed as part of the subject development. The prospective applicant replied that there is no chemical change, but that a certain degree of solidification occurs. In respect of this material generally, the prospective applicant reiterated that it remains to be seen if a market demand for it emerges.

Responding to the Board's query, the prospective applicant said that there would be low levels of contamination in respect of soils accepted for disposal at the facility. It added that these would not be hazardous. It also noted that there has been a general increase in the demand for the disposal of soils.

In response to the Board's query, the prospective applicant confirmed that the facility is currently operating under the permission obtained under appeal case reference number PL 17.220331. There have been no further permissions.

The Board enquired as to whether there have been any discussions yet between the prospective applicant and the relevant regional authorities and local authority. The prospective applicant advised that there have not been but that there will be soon. It also said that a public consultation event is planned within the next four to six weeks. Noting this, the Board said that it may seek meetings with relevant prescribed bodies as part of the pre-application consultation process.

Conclusion:

It was agreed that, following its initial round of consultations, the prospective applicant will then revert to the Board seeking a further meeting. This request will likely be made circa mid-September, 2016. At that point the prospective applicant will give the Board feedback on its consultations and also expects to have a design for the proposed development finalised. The Board's representatives indicated to the prospective applicant that, in the meantime, they may seek a meeting with the relevant waste management body.

The meeting concluded at 12.05p.m.

P. Fitzpatrick

Philip Green

cc.

Assistant Director of Planning

An Bord Pleanála

Recording of Meeting 17.PC0223 2nd meeting

Case Reference / Description	17.PC0223 Increased acceptance of non-hazardous waste for recovery and disposal, Co. Meath.		
Case Type	Pre-application consultation		
1st / 2nd / 3rd Meeting	2nd		
Date	25/10/16	**Start Time**	11a.m.
Location	Conference Room	**End Time**	12.10p.m.
Chairperson	Philip Green	**Executive Officer**	Kieran Somers

Attendees		
Representing An Bord Pleanála		
Staff Member	**Email Address**	**Phone**
Philip Green, Assistant Director of Planning		
Pauline Fitzpatrick, Senior Planning Inspector		
Marcella Doyle, Senior Executive Officer		
Kieran Somers, Executive Officer	k.somers@pleanala.ie	01-8737107

Representing the Prospective Applicant		
Derek Milton, Fehily Timoney and Company		
Dee Stevenson, Knockharley Landfill Ltd		
John O'Malley, Kiaran O'Malley and Co Ltd		

The meeting commenced at 11a.m.

The Board referred to the previous meeting which took place on the 4th August, 2016 and asked the prospective applicant if it wished to make any comments on the record of this meeting. The prospective applicant replied that it had no comments to make.

The Board noted that this may be the final meeting in this particular pre-application consultation case. Notwithstanding this, it recommended that the prospective applicant keep the process open until it deems it necessary to close the consultations.

Presentation by the prospective applicant:

The prospective applicant began by providing an update on the project. It noted that since the time of the previous meeting with the Board, there have been some minor revisions to the proposed development. In particular, the prospective applicant drew the Board's attention to the inclusion of a facility processing building for Incinerator Bottom Ash (IBA) processing or temporary baled Municipal Solid Waste (MSW) storage. The prospective applicant said that the dimensions of the building will be 40 metres by 40 metres comparable to a typical industrial type building. The prospective applicant also noted some revisions to the proposed development layout as previously presented to the Board. These include the omission of the proposed stream diversion and the consolidation of the proposed bottom ash area.

With respect to consultations since the time of the previous meeting, the prospective applicant provided the Board with the following updates:

EPA: The prospective applicant said that a formal meeting took place with the Agency on the 29th August, 2016. Matters discussed included the potential for increased odour generation and the requirement to demonstrate appropriate means of mitigation. The prospective applicant said that the Agency enquired as to the means of classification of activities being proposed and the extent of Appropriate Assessment to be carried out (Stage 1 or Stage 2). It also wished to have more

details regarding proposals related to future winning of IBA material and the requirement for indoor containment of IBA processing were it to occur. Specific licensing procedural issues were also discussed at this meeting.

Meath County Council: The prospective applicant said that a formal meeting took place with representatives from the local authority on the 7th September, 2016. Matters discussed included the nature and scale of the proposed development compared to previous developments on site and the potential for IBA or bale storage element within the proposed facility building. The prospective applicant said that the local authority's main concerns related to visual impact and odour effects on the environment. It suggested to the prospective applicant that it include elevated areas in its visual assessment and clear odour management proposals. The local authority also queried the extent of Appropriate Assessment to be carried out and emphasised the importance of public consultations.

Eastern Midlands Waste Regional Office: The prospective applicant said that a formal meeting with the EMWRO took place on the 12th September, 2016. Matters discussed included the nature and scale of the proposed development compared to previous developments on site and the breakdown of proposed input tonnages. The EMWRO also enquired as to the potential for the IBA or bale storage element within the proposed facility building. Other matters discussed included the extent of Appropriate Assessment to be carried out and any potential environmental impacts arising from the proposed development.

As regard consultations with the general public, the prospective applicant said that it has scheduled an event to take place on Monday 14th November, 2016. It intends to present information relating to the proposed development at this event and invite feedback from members of the public attending.

The prospective applicant asked the Board's advice regarding the scale of drawings to accompany the planning application. It said that it would wish to provide the best visual representation of the proposed development and remarked that drawings of a typical scale of 1:200 or 1:500 might not be adequate in this regard. The Board agreed that it would be looking for a scale of drawing which would give a proper representation of the extent of the proposed development, including technical and structural detail such as sections through the proposed landfill. It invited the prospective applicant to forward examples of drawings for its advice prior to the lodgement of any planning application. Following this, it is the intention of the prospective applicant to formally close the pre-application consultation process and request a formal SID determination from the Board.

Board comments/queries:

The Board enquired as to any policy context discussion regarding the proposed development which may have taken place between the prospective applicant and the EMWRO. The prospective applicant replied that such a discussion took place at a relatively high level. It said the view of the EMWRO is that the proposed development would be supported in a policy context. Noting this, the Board recommended that the proposed development be firmly put into a policy context in any subsequent planning application.

The Board posed the scenario of two similar facilities being potentially applied for and operational at the same time and queried how such a scenario might be considered. The prospective applicant said that it would seek to establish a price per tonne of IBA as well as securing the amount of annual storage. The producers of IBA looks for security of disposal with five year contracts, minimum, the norm. It noted that commercial and market conditions would be a matter for the EMWRO. Responding to the Board, it said it is not foreseen that material will come from the North.

The Board enquired as to the extent of Appropriate Assessment and asked if a Stage 2 (submission of a Natura Impact Statement with the planning application) is likely. The prospective applicant noted that the River Nanny Estuary and Shore SPA is approximately 25 kilometres from the proposed development. It intends to apply a precautionary approach as regards AA and that the production of an NIS is quite likely. Noting this, the Board also advised the prospective applicant to consider any indirect effects arising from the proposed development. As regards AA generally, the Board noted that it is the competent authority and that it can screen in European Sites as well as screen them out.

The potential re-use and storage of IBA material was raised by the Board. It enquired as to whether any chemical alteration or other reaction occurs when this material is in storage that might hinder its re-use. The prospective applicant replied by saying that a stabilisation/solidification process does take place in respect of the material in such storage. It added that the material in question would be stored/stockpiled in such a way as to facilitate easy access and/or reclamation. Noting this, the Board said it would be important for any planning application to formally state that the proposed method of disposal would not be prejudicial to the potential re-use of this material. The prospective applicant said that it is satisfied that the material in question would not be sufficiently altered in storage and that there would be no risks of cross-contamination in respect of other waste types. It added that its intention is to clearly outline how the IBA material will be stored and, potentially, reclaimed for use. It also confirmed that the environmental considerations of such a re-use will be included in the EIS to accompany the planning application.

Procedures:

Procedures in relation to the making of a formal planning application to it were given by the Board as follows:

- An application can only be lodged after formal notice has been received by the prospective applicant from the Board.

- The application must be made by way of full completion of an application form to the Board.

- The Board requires as a minimum that the public notice of the application would be in two newspapers circulating in the area to which the proposed development relates, one of which should be a national newspaper (A sample public notice is attached). A site notice in accordance with the protocols set out in the Planning and Development Regulations, 2001-2011 must also be erected. The date of the erection of the site notice is to be inserted; otherwise it should contain the same information as the newspaper notices and should remain in place for the duration of the period during which the public can make submissions to the Board.

- The documentation relating to the application is to be available for public inspection at the offices of the relevant planning authority and the offices of An Bord Pleanála. In this regard the requirements in terms of the number of copies of the documentation to be lodged with the relevant planning authority and the Board is as follows:

    - Planning Authority – 5 hard copies and 2 electronic copies.

    - An Bord Pleanála – 3 hard copies and 7 electronic copies.

- The Board also requires the prospective applicant to provide a stand-alone website containing all of the application documentation. The address of this website is to be included in the public notice.

    - The public notice of the application is to indicate that the application documentation will be available for public inspection after the elapsment of at least 5 working days from the date of the publication of the notice so as to ensure that the documentation is in place for such inspection.

    - The time period for the making of submissions by the public is to be at least seven weeks from the date the documents become available for inspection (not from the date of publication of the public notices). The Board requires that the public notice must indicate the deadline time and date for the making of submissions to the Board. It was agreed that the prospective applicant would advise the Board's administrative personnel in advance of the details of its proposed public notice and that any further definitive advice on same including confirmation of dates/times could be communicated at that stage.

    - The service of notice of the application on any prescribed bodies must include a clear statement that the person served can make submissions to the Board by the same deadline as specified in the public notice.

    - The service letter on the planning authority with the necessary copies of the documents should be addressed to the Chief Executive and should also alert the authority to the Board's requirement that the application documentation be made available for public inspection/purchase by the planning authority in accordance with the terms of the public notice (copies of any newspaper/site notices should be provided to the planning authority). It is the Board's intention

that all of the application documentation will remain available for public inspection during the currency of the application.

- The depositing of the application documentation and the making of the application to the Board should take place immediately after the publication of the notice and the completion of the service requirements. It should not await the elapsment of the period for the public to make submissions. The application documentation should include a copy of all letters serving notice of the application on prescribed bodies and the local authority, copies of the actual newspaper notices as published and the site notice.

- The fee for lodging an application is €100,000. The fee for making a submission in respect of an application is €50 (except for certain prescribed bodies which are exempt from this fee). There is an existing provision enabling the Board to recover its costs for processing any application from the applicant. In addition, it was pointed out that the legislation also enables the Board direct payment of costs or a contribution towards same to the planning authority and third parties.

- The prospective applicant was also informed that the Board is in the process of updating its ICT system. In this regard, the prospective applicant was requested to submit the site location map in shape file format.

The sequencing of the making of the application was summarised as follows:

1. Publish newspaper notices.

2. Serve copy of relevant documents on bodies/persons required to be notified of the application. Deposit required number of copies with relevant planning authority.

3. Deposit required number of copies of application documentation with An Bord Pleanála and make an application to it.

The prospective applicant indicated its current intention to submit a formal planning application to the Board prior to the end of 2016.

Responding to the prospective applicant's query on the matter, the Board said that, typically, a two to four-week time period should be expected between the formal closure of the pre-application consultation process and the Board issuing its formal SID determination. This time period allows for the completion of the Inspector's report also.

With respect to public notices for the proposed development, the Board said that reference should be made for any application to the EPA for an Industrial Emissions Licence. This would also be the case if the site is a Seveso Site.

As regards the time period for members of the public to make written submissions/observations to the Board, the Board reminded the prospective applicant that the Christmas time period which is excluded under the legislation may have to be factored in in such calculations.

The Board said advice regarding GIS and shape files can be provided by it.

Conclusion:

Responding to the Board's query, the prospective applicant confirmed that it will be submitting a Traffic Impact Assessment (TIA) as part of the planning application. This, it said, will be informed by operational experience at the existing facility. In relation to the acceptance of IBA material at the proposed development, the prospective applicant said this would be in accordance with the existing facility's operating hours. Noting this, the Board said that any increase in traffic volumes related to the proposed development would need to be clearly set out and explained.

The Board enquired as to whether the prospective applicant has received any comments from the National Parks and Wildlife Service (NPWS) in relation to AA screening. The prospective applicant replied that it has written to the NPWS, but has to check if any response was received. The Board recommended that the prospective applicant liaise closely with the NPWS in this regard.

The Board said that a list of prescribed bodies to be formally notified of the application will be provided by it in its formal SID determination letter.

The Board also noted that it has discretion to hold an oral hearing in such cases; however, it reminded the prospective applicant not to rely on the holding of an oral hearing, particularly to expand on its case or for the submissions of any further information.

It was agreed that the prospective applicant will revert to the Board in respect of the matter of scale of drawings and comments, if any, that it wishes to make on the record of this meeting. Following this, it will be a matter for the prospective applicant to indicate if it requires a further meeting or a formal closure to the pre-application consultation process.

The meeting concluded at 12.10p.m.

Philip Green

Assistant Director of Planning

Our Ref: 17.PC0223
P.A.Reg.Ref:

Your Ref: Knockharley Landfill Limited

An Bord Pleanála

Private and Confidential
Derek Milton
Fehily Timoney & Company,
J5 Plaza,
North Park Business Park,
North Road,
Finglas, Dublin 11.

2nd October 2017

Re: Increased acceptance of non-hazardous wastes for recovery and disposal.
Knockharley Landfill, Co. Meath

Dear Sir,

I have been asked by An Bord Pleanála to refer further to the above-mentioned pre-application consultation request.

Please find enclosed a copy of the written record of the meeting of the 14th September, 2017 which is marked 'Private and Confidential'.

If you have any queries in relation to the matter please contact the undersigned officer of the Board.

Please quote the above-mentioned An Bord Pleanála reference number in any correspondence or telephone contact with the Board.

Yours faithfully,

Muiriosa Cassells

Muiriosa Cassells
Executive Officer
Direct Line:01-8737247

Tel (01) 858 8100
LoCall 1890 275 175
Fax (01) 872 2684
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Email bord@pleanala.ie

64 Marlborough Street
Dublin 1
D01 V902

Knockharley landfill

An Bord Pleanála

Recording of Meeting
17.PC0223 3rd meeting

Case Reference / Description	17.PC0223 Increased acceptance of non-hazardous waste for recovery and disposal, leachate plant and biological treatment facility Knockharley Landfill, Co. Meath.		
Case Type	Pre-application consultation		
1st / 2nd Meeting	3rd		
Date	14th September, 2017	**Start Time**	2.30 p.m
Location	Meeting room 3	**End Time**	3.30 p.m.
Chairperson	Philip Green	**Executive Officer**	Muiríosa Cassells

Attendees		
Representing An Bord Pleanála		
Staff Member	**Email Address**	**Phone**
Philip Green, Assistant Director of Planning		
Pauline Fitzpatrick, Senior Planning Inspector		
David Curran, Senior Executive Officer	d.curran@pleanala.ie	01-8737264

Muiríosa Cassells, Executive Officer	m.cassells@pleanala.ie	01-8737247
Representing the Prospective Applicant		
Derek Milton, Fehily Timoney and Company		
John O'Malley, Kiaran O'Malley and Co Ltd		

The meeting commenced at 2.30pm

The Board referred to the previous meeting which took place on the 25th October 2016 and asked the prospective applicant if it wished to make any comments on the record of this meeting. The prospective applicant replied that it had no comments to make.
The Board noted that revised drawings were submitted to the Board on the 16th and 20th February, 2017 (hard copy) for perusal by the Board. A request to close the pre app process was received on the 31st March, 2017. A report was then prepared by the Board's reporting inspector on the 12th April, 2017. A Board Direction then followed on the 5th May, 2017 instructing the reporting team to meet with the EPA and the Eastern-Midlands Regional Waste Office
On the 13th June, 2017 the prospective applicant issued a letter to the Board withdrawing their request for a Determination.

The Records of the Board's meeting with the EPA and the EMRWO were given to the prospective applicants. They had no comments to make.

Presentation by the prospective applicant: (See Document attached)

The prospective applicant began by providing an update on the status of the project involving increased landfilling of non-hazardous municipal solid waste (MSW recovery through long term storage of non hazardous incinerator bottom ash (IBA) and the development of leachate treatment/conditioning plant. It is also now proposed to provide for a 25,0000 tpa biological treatment (composting) facility for treatment of organic residual 'fines' . The development of a facility processing building for IBA processing or temporary baled MSW storage is not now being proposed. The 25,000 tpa capacity is not additional and will be from the 290,000 tpa capacity identified for the increased landfilling.

The prospective applicants stated there is a need for the biological treatment facility due to the increased market demand for treatment of organic fines produced from recovered fuel production and further demand expected as evidenced by a number of developments proposing increased recovered fuel consumptions. Regard is had to the continued Landfill Directive implementation. The proposal supports EMWMP 2015 – 2021 Policy E15a, where further thermal capacity to be provided may relate to recovered fuel production.

Comments

A discussion ensued regarding the Board's meeting's with the EPA and the EMRWO.

The prospective applicant was advised that the Board directed it's reporting team to examine in more detail the planning and environmental authorisations for the permitted energy from waste facilities at Carranstown and Poolbeg in respect of the proposed development and requirements for recovery or disposal of the bottom ash residues.

It also asked its representatives to meet with the EPA to discuss their perspective on strategic management of this waste stream in Ireland and whether any relevant considerations arise in terms of the IED licences for the above mentioned EFW facilities

The Boards reporting team met with the EPA via conference call on the 29th May 2017 regarding the above Direction. The EPA informed the Board that it is not aware of any specific plans or obligations at national or European level vis-à-vis the use or re-use of IBA but is cognisant generally of the Governments support for recycling. It is also stated that economics and economies of scale may be an important factor in the considerations of how viable re-use is.

A meeting was held with the Eastern Midlands Regional Waste Office on the 20th July, 2017. The Regional Waste Office noted that the regional plans make reference to the exploration of alternative uses for waste streams generally. It noted that a collective approach is needed with respect to the development of the market for IBA re-use but that there was no certainty at present as to how or where the market would develop. It said that the prudent strategy might be to allow for further re-appraisal with respect to the disposal of bottom ash, should re-use in Ireland become a viable option.

The Board acknowledged that there may need to be a policy making considerations from the relevant stakeholders (e.g. Gov/NRA/NSAI etc).

The prospective applicant was advised that the waste streams and sources and figures for such should be clearly stated and robustly supported and that alternative re-use /use of waste streams should be fully assessed.

The Board made reference to the Department of Housing, Planning, Community and Local Governments Circular letter which advises on the interim Implementation of Directive 2014/52/EU on the effects of certain public and private projects on the environment (EIA Directive) which is soon to be transposed into Irish law.

Conclusion:

The Board asked the prospective applicant if it considered this to be the final meeting in this particular pre-application case or if they had any further consultations to undertake. The prospective applicant said that it had no further consultations and it believed that this would be the final meeting. The prospective applicant noted this and indicated a planning application would be lodged by it at the end of the year.

The meeting concluded at 3.30 p.m.

Philip Green

Philip Green
Assistant Director of Planning

29/9/17

An Bord Pleanála

Record of Meeting
17.PC0223

Case Reference / Description	17.PC0223 Increased acceptance of non-hazardous waste for recovery and disposal, Knockharley Landfill, Co. Meath.		
Case Type	Pre-application consultation		
Meeting	Meeting with Eastern-Midlands Regional Waste Office		
Date	20/07/17	**Start Time**	11 a.m.
Location	Offices of EMRWO	**End Time**	11.45 a.m.
Chairperson	Philip Green	**Executive Officer**	Kieran Somers

Attendees		
Representing An Bord Pleanála		
Staff Member	**Email Address**	**Phone**
Philip Green, Assistant Director of Planning		
Pauline Fitzpatrick, Senior Planning Inspector		
Kieran Somers, Executive Officer	k.somers@pleanala.ie	01-8737107

Representing the EPA		
Hugh Coughlan		
Emma Cassin		

The meeting commenced at 11 a.m.

The Board said that the instant meeting with the EMRWO was an information-gathering exercise from its point of view pursuant to section 37C(4) of the Planning and Development Act 2000, as amended, whereby the Board can consult with any person it considers may have information relevant to the purposes of the consultation under section 37B. A record of the meeting would be taken which would be made public at the closure of the pre application consultation process. A copy of the instant record would be forwarded to the EMRWO.

The Board noted that the function of pre-application consultations generally is to determine whether or not a proposed development would constitute strategic infrastructure, to advise on procedural issues and any other matters pertaining to proper planning and sustainable development which, in the opinion of the Board, might have a bearing on any decision.

The Board set out the progress of pre-application consultations to date. It advised the EMRWO that two meetings have been held with the prospective applicant in relation to PC0223.

With respect to the Knockharley Landfill, the Board set out the constituent elements of the proposed development as follows:

- Increased landfilling of non-hazardous municipal solid waste up to 290,000 tonnes per annum.
- Recovery through long term storage of non-hazardous incinerator bottom ash up to 150,000 tonnes per annum.
- Facility processing building for incinerator bottom ash (IBA) processing or temporary baled municipal solid waste (MSW) storage.
- Leachate treatment/conditioning plant.

The EMRWO was also informed that the prospective applicant had sought formal closure to the pre-application consultation processes. The Inspector's report had been received by the Board, but, by Board Direction dated the 5th May, 2017, the Board had deferred consideration of the case and requested the pre-application consultation team to examine in more detail the planning and environmental authorisations for the permitted Carranstown and Poolbeg Energy from Waste facilities in respect of proposals and requirements for the recovery or disposal of bottom ash; to meet with representatives from the EPA and the EMRWO to discuss their perspective on strategic management of this waste stream in Ireland and as to

whether any relevant considerations arise in terms of the IED licences for the Poolbeg or Carranstown facilities.

As regards bottom ash, the Board noted that the prospective applicant in this pre-application consultation case proposes recovery by way of a dedicated storage area (where it will be stored and available subject to future market conditions).

The representatives from the EMRWO noted that they recently had a meeting with representatives of the prospective applicant.

Noting this, the Board's representatives said that a key area in relation to the need for the proposed development related to dealing with incinerator bottom ash. It was stated that the Board is seeking clarity in this area generally and as to whether there are any existing mechanisms in existence or being proposed for the potential recovery or reuse of this material. The Board noted for the record that it also recently had a meeting with representatives from the EPA in this regard.

With regard to regional plans, the Board enquired as to whether there are any specific references to the potential re-use of this waste stream at present or in the future. The EMRWO replied that the relevant plan does refer to exploring alternatives generally and does broadly support such an approach.

The Board asked if there are any policies at European level which are pertinent. The EMRWO noted that bottom ash has been used abroad with respect to building materials and as aggregate.

The representatives of the EMRWO noted that an end-of-waste status might have to be obtained with respect to such facilities; it added that such a process could potentially be lengthy and would involve a number of stakeholders. It also noted that in the absence of either End of Waste status or technical standards there is currently no substantive opportunity in Ireland for re-use of this material at present.

The Board's representatives asked the EMRWO if it had any opinion on the proposed use of bottom ash at Knockharley (i.e. storage and segregation). The EMRWO said that the viability of any proposed re-use of this material would be dependent on a variety of matters as outlined previously. The EMRWO said that a collective approach would be needed with respect to the development of this particular market. It added that there was no real certainty at present as to how or when the market would develop.

In a general context, it noted that alternative uses and approaches with regard to waste are coming on stream as time progresses.

The EMRWO noted that there are still a number of waste streams, including bottom ash, which currently do not have any alternative uses in Ireland other than export or landfill.

The Board's representatives said that any application consequent to this pre-application consultation process would have to be very clear with regard to volumes of waste and the categories of same which are included in a planning application. The EMRWO agreed with this.

Conclusion:

It was agreed that a copy of the record would be forwarded to the EMRWO. The record will be made available to the prospective applicant and will be on the public record when the pre-application consultation case is formally concluded. The EMRWO also agreed to forward on information relating to bottom ash.

The meeting concluded at 11.45 a.m.

Philip Green

Assistant Director of Planning

An Bord Pleanála

Record of Meeting
17.PC0223

Case Reference / Description	17.PC0223 Increased acceptance of non-hazardous waste for recovery and disposal, Knockharley Landfill, Co. Meath.		
Case Type	Pre-application consultation		
Meeting	Meeting with EPA via video conference		
Date	29/05/17	**Start Time**	3 p.m.
Location	Various incl. Offices of An Bord Pleanála	**End Time**	3.40 p.m.
Chairperson	Pauline Fitzpatrick	**Executive Officer**	Kieran Somers

Attendees		
Representing An Bord Pleanála		
Staff Member	**Email Address**	**Phone**
Pauline Fitzpatrick, Senior Planning Inspector		
Kieran Somers, Executive Officer	k.somers@pleanala.ie	01-8737107
Representing the EPA		
Brian Meaney	Environmental Licensing Programme	

Patrick Byrne	Office of Environmental Enforcement, Dublin	
Carol O' Sullivan	Office of Environmental Enforcement, Dublin	
Mary Frances Rochford	Office of Environmental Enforcement, South East	
Damien Masterson	Office of Environmental Enforcement, South East	

The meeting commenced via video conference at 3 p.m.

The Board said that the instant meeting with the EPA was an information-gathering exercise from its point of view pursuant to section 37C(4) of the Act whereby the Board can consult with any person it considers may have information relevant to the purposes of the consultation under section 37B. A record of the meeting would be taken which would be made public at the closure of the pre application consultation process. A copy of the record will be forwarded to the Agency.

The Board noted that the function of pre-application consultations generally is to determine whether or not a proposed development would constitute strategic infrastructure, to advise on procedural issues and any other matters pertaining to proper planning and sustainable development which, in the opinion of the Board, might have a bearing on any decision.

The Board set out the progress of pre-application consultations to date. It advised the Agency that two meetings have been held with the prospective applicant in relation to PC0223.

The Board set out the constituent elements of the proposed development as follows:

- Increased landfilling of non-hazardous municipal solid waste up to 290,000 tonnes per annum.
- Recovery through long term storage of non-hazardous incinerator bottom ash up to 150,000 tonnes per annum.
- Facility processing building for incinerator bottom ash (IBA) processing or temporary baled municipal solid waste (MSW) storage.
- Leachate treatment/conditioning plant.

The EPA was also informed that the prospective applicant had sought formal closure to the pre-application consultation process. The Inspector's report had been received by the Board, but, by Board Direction dated the 5th May, 2017, the Board

had deferred consideration of the case and requested the pre-application consultation team to examine in more detail the planning and environmental authorisations for the permitted Carranstown and Poolbeg Energy from Waste facilities in respect of proposals and requirements for the recovery or disposal of bottom ash; and to meet with representatives from the Agency to discuss their perspective on strategic management of this waste stream in Ireland and in a European context and as to whether any relevant considerations arise in terms of the IED licences for the Poolbeg or Carranstown facilities, or for the licensing regime for Knockharley Landfill.

As regards bottom ash, the Board noted that the prospective applicant in this pre-application consultation case proposes recovery by way of a dedicated storage area (where it will be stored and available subject to future market conditions).

The Board said that it was seeking to ascertain if the Agency is aware of any future plans at National or European level vis-à-vis the use or re-use of IBA. The Agency replied saying that it is not aware of any specific plans or obligations, but is cognisant generally of the Government's support for recycling; it added that economics and economies of scale may be an important factor in the consideration of how viable such re-use is.

The Agency referred to two applications which are before it for changes to existing licences to enable the acceptance of non-hazardous IBA. These are in respect of the Nurendale facility in County Meath and the Starrus Eco Holding Ltd facility in the Millennium Business Park. Recycling options are referred to in the licence applications

At a European level, the Agency said it was not aware of any specific plans as regards IBA. It noted for the record that the Industrial Emissions Directive (2010/75/EU) is the pertinent EU instrument in this regard. The Agency also drew the Board's attention to the revised Waste Incineration BREF which is currently at first draft stage.

Noting that the prospective applicant has advised of liaison with the Agency, the Board enquired as to the role of the Agency with respect to any future market development or requirement for IBA. The Agency stated that its remit is with regard to the end of waste criteria and that it is required to ensure that any waste residue has no environmental effects; the processes involved prior to this are a matter for the owner and operator of the facility in question.

With respect to the licensing of both the Carranstown and Poolbeg facilities, the Board enquired as to whether there are any conditions attached to these licences which would have an impact on the waste stream into the future. The Agency replied that there is a general requirement on the operators to reduce the quantity of waste; it added that this requires the operators to consider options with regard to use and re-use. Noting this, the Board asked how operators of facilities demonstrate compliance with this. The Agency replied that there is nothing specific in this latter regard, but that there would be a general requirement as part of an Environmental Management Programme. It also noted that the Carranstown facility has some metal removal involved. It also exports some of its bottom ash for backfilling of a mine in Northern Ireland. Poolbeg will not have metal removal and the material will be exported in its raw state.

In respect of the recently operational Waste-to-Energy plant at Poolbeg, the Agency noted that bottom ash produced will be presumed to be hazardous until such time as the operator can prove otherwise.

With regard to any differing opinions on the re-use of IBA, the Board asked if the Agency itself had any views on this. The Agency considered that any divergence may be explained by different economic analyses which have been carried out.

With regard to figures proposed as part of pre-application consultations on the existing facility, the Board said that it had sought to impress upon the prospective applicant the absolute need for clarity with regard to tonnages and the waste stream.

Conclusion:

A copy of the record will be forwarded to the Agency. The record will be made available to the prospective applicant and will be on the public record when the pre-application consultation case is formally concluded.

The meeting concluded at 3. 40 p.m.

Pauline Fitzpatrick

Senior Planning Inspector

Appendix 6.5

Public Consultation

Knockharley Landfill Ltd

NOTICE OF PUBLIC CONSULTATION EVENT

Knockharley Landfill Ltd., (Waste Licence W0146-02)

is holding a public consultation event on:

MONDAY, 14TH NOVEMBER FROM 3PM-6PM

at the **KNOCKHARLEY LANDFILL FACILITY,**

KENTSTOWN, NAVAN, CO. MEATH

to advise of its submission of a planning application

for development at the landfill facility.

All welcome.

Comment Card

Name (optional) Elizabeth Mc Ardle

Comment:

Thank you for your time

1) You have forgotten that this process omits the most important element of all – the earth. To be healthy we need a healthy earth. This proposal does not take this into account.

2) Do you ~~cons~~ propose reduction of packaging to reduce waste, so this process would not be needed.

3) Would you trade places with a local person and live here. If the answer is no, you have to think again

Date: _____

Knockharley Landfill
Kentstown

Visitor Sign in Sheet Knockharley

	Date	Name	Time in	Time out
1	Nov 14/11/16	Mary Morgan	3.00.	
2	" 14/11	Meadan Healy	3.00	
3	Nov 14/11/16	Theresa Clarke	3.35	
4	Nov 14/11/16	Emma McCormack Lyons	3.50 pm	041-9825294
5	"	Caitlin & Elizabeth McArdle	4.40	
6	"	Caitlin Lawless	5.02	
7	"	Sid M' Gowan	5.00.	
8	"	Angela Murray	5.25	
9	"	Gerald Hanly	5.25.	
10	"	Peter Corrigan	5.30	
11	"	Peter Corrigan	5.30	
12	14/11/16	Patsy Cleary	5.30	
13		Jessica McLoughlin		
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Linda -821-01

Appendix 7

Outline Construction and Environmental Management Plan

ENVIRONMENTAL BALANCE IN DESIGN AND CONSTRUCTION

KNOCKHARLEY LANDFILL LTD.

APPENDIX 2-0 OUTLINE CONSTRUCTION AND ENVIRONMENTAL MANAGEMENT PLAN FOR PROPOSED DEVELOPMENT AT KNOCKHARLEY LANDFILL LTD.

NOVEMBER 2018

Knockharley Landfill Ltd.
Kentstown, Navan,Co.Meath

FEHILY TIMONEY & COMPANY

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1. INTRODUCTION

1.1 General Introduction and Purpose

This document is the Outline Construction and Environmental Management Plan (CEMP) for the proposed development at the existing landfill facility at Knockharley and has been prepared for Knockharley Landfill Ltd to accompany the Environmental Impact Assessment Report (EIAR), Stage 1 Appropriate Assessment (AA) Screening Report and Natura Impact Statement (NIS) for the proposed development.

It sets out the key construction and environmental management issues associated with the proposed development.

This document should be read in conjunction with the Environmental Impact Assessment Report (EIAR) prepared for the proposed development, along with other relevant drawings and documentation. In the case of any ambiguity or contradiction between this Outline CEMP and the EIAR, the EIAR shall take precedence.

This Outline CEMP sets out the key environmental management issues associated with the construction of the proposed development, to ensure that during this phase of the development, the environment is protected and impacts on the environment are minimised.

The document is divided into six sections:

Section 1: *Introduction:* this section provides details on the existing site and the proposed development.

Section 2: *Existing Site Environmental Conditions:* this section provides details of the main existing geotechnical, hydrological, ecological and archaeological conditions on site. These conditions are to be considered by Knockharley Landfill Ltd in the construction, operation and decommissioning of this proposed development.

Section 3: *Overview of Construction Works:* this section provides an overview of the construction works proposed, including drainage and sediment controls to be installed.

Section 4: *Environmental Management Plan (EMP):* this section outlines the main requirements of the EMP and outlines operational controls for the protection of the environment including soil management, habitat and species, site drainage control, archaeology, construction traffic, site reinstatement and decommissioning, waste management.

Section 5: *Safety & Health Management Plan:* this section defines the work practices, procedures and management responsibilities relating to the management of safety and health during the design, construction and operation of the proposed facility.

Section 6: *Outline Emergency Response Plan:* this section contains predetermined guidelines and procedures to ensure the health, safety and welfare of everybody involved in the project and to protect the environment during the construction phase of proposed facility.

1.2 The Applicant

The applicant is Knockharley Landfill Ltd., the owner and operator of the existing landfill facility at Knockharley, Kentstown, Navan, Co Meath.

The facility was developed and previously owned and operated by Greenstar Holding Ltd. (previously known as Celtic Waste Ltd.). The site was acquired by Knockharley Landfill Ltd. in March 2014.

Knockharley Landfill is located approximately 1.5 km north of Kentstown village, Co. Meath in the functional area of Meath County Council.

The existing landfill operates under an Industrial Emission (IE) licence (Licence No: W0146-02) from the Environmental Protection Agency (EPA).

1.3 The Site

The existing facility comprises a landfill facility where waste disposal and recovery activities are undertaken. The landfill opened for waste acceptance in December 2004. The landfill accepts the residual fraction of, household, commercial and industrial wastes together with construction/demolition wastes and incinerator bottom ash (IBA) and is licensed by the EPA with an Industrial Emissions (IE) Licence W0146-02. The site is licensed to operate from 07:30 to 18:30 Monday to Saturday inclusive and is licensed to accept waste between 08:00 and 18:00 (excluding public holidays).

The landfill is accessed via the N2 national primary route which provides direct vehicular access to the national roads network, with access facilitated at a ghost island priority junction on the N2 at the facility entrance. The ghost island provides sheltered access for right turning vehicles travelling from the north.

This is complimented with an auxiliary left turn deceleration lane to facilitate access for vehicles coming from the south. Both turning facilities aid in preserving the flow, speed and therefore the capacity of through traffic on the N2.

The existing facility infrastructure comprises:

- Administration building
- Machinery/maintenance garage
- Four portable cabins for storage
- Weighbridge building
- Two weighbridges
- Inspection slab
- Quarantine slab
- Car parking
- Landfill gas treatment compound
- Leachate lagoon
- Surface water attenuation lagoon and wetland

The facility is located on a 135.2 hectare (333-acre site). The existing landfill footprint is positioned near the centre of the landholding and the current planning permission permits the development of approximately 25 hectares of landfill cells. The landfill is being developed in seven phases. To date, Phases 1-4 (Cell 1 to Cell 16 inclusive) of the seven planned cell phases have been fully constructed. As of November 2018, Cells 13, 14, 15 and 16 are operational.

A permanent cap has been placed on all cells in Phase 1 and Phase 2 (Cells 1-8 inclusive). In relation to Phase 3, Cells 9 and 10 and half of Cells 11 and 12 are fully capped. The permanent lining of the final cap on Cells 11 and 12 is complete, the soil placement will take place in 2019. There is an intermediate cap on the remainder on Cells 13 and 14. The landfill development and waste placement is in a northerly direction. The leachate storage lagoon is located to the south of the administrative buildings and the surface water attenuation pond and wetland is situated to the south of the landfill.

Knockharley Landfill Facility comprises the following development:

- Access road and internal road network
- Buildings, fencing and security
- Environmental monitoring infrastructure
- Existing Utilities
- An engineered lined landfill
- Groundwater management infrastructure
- Leachate management system (comprising collection and storage)

- Surface water management system (comprising collection, attenuation and wetland)
- Landfill gas management system (comprising collection pipework, wells and a landfill gas compound)
- Landfill capping system
- Landfill void
- Existing waste types
- Existing waste activities

Environmental emissions from the site are limited by a set of emission limit values and trigger values contained in facility licence (W0146-02) and these relate to noise, landfill gas, dust deposition, surface water and groundwater and stack emissions. The licence also sets the standard by which bio-stabilisation of the waste prior to its deposition in the landfill is measured and monitored.

The daily operation of the landfill facility is monitored as required and as a minimum the environmental monitoring schedule and frequency as defined in the IED licence is adhered to. Environmental monitoring programmes specified in the IED licence are for groundwater, surface water, leachate, landfill gas, stack emissions, noise, PM_{10} and dust deposition. In addition, an odour monitoring programme is in operation.

Environmental monitoring results are submitted to the EPA in accordance with the licence.

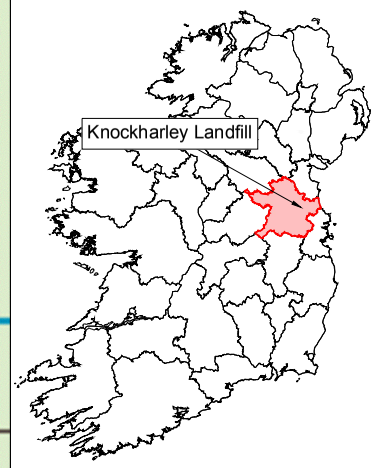
The facility was designed, constructed and is being operated in accordance with the EU Landfill Directive 1999/31/EC, EPA Industrial Emissions Licence (W0146-02) and EPA manuals on landfill selection, design, operation and monitoring and its relevant planning permissions.

LEGEND

Plan

Planning Boundary

Ownership Boundary



Knockharley

Curraghtown

Tuiterath

Flemings

Scale 1:10017

When Applicable : Ordnance Survey Ireland Licence No. EN 0001218 © Ordnance Survey Ireland and Government of Ireland Discovery Series Sheet 43

Rev.	Drawn	Chk'd	Appr'd	Date	Description
A	SK	CC	BG	Cork 02.03.18	Issue For Planning Application

Revision History: A — EIAR/EIS

Name of Client

KNOCKHARLEY LANDFILL LTD.

Name of Job

PROPOSED DEVELOPMENT
AT KNOCKHARLEY LANDFILL

Title of Drawing

1:10,000 REGIONAL SITE LOCATION MAP

Scales Used	This Drawing was printed to
1:10017	A3.

Dwg. No.	Rev.
LW14-821-01-P-0000-001	A

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1.4 The Proposed Development

The proposed development comprises:

- The acceptance of up to 435,000 tonnes per annum of non-hazardous wastes, which will comprise up to 150,000 tonnes of incinerator bottom ash (IBA), as well as household, commercial and industrial wastes including residual fines, non-hazardous contaminated soils, construction and demolition (C&D) wastes and baled recyclables. In addition, the acceptance of up to 5,000 tonnes per annum of stable non-reactive hazardous waste is proposed.
- The acceptance and placement within the existing permitted landfill footprint of incoming wastes for recovery or disposal as appropriate; the increase in height of the landfill body from the current permitted post settlement final contour height of 74 mOD to a post settlement contour height of 85 mOD – the proposed height increase will apply from the active landfill phase at the time of permission grant. Permission is sought for the acceptance of waste until the cells are full.
- The construction and operation of a dedicated IBA facility. Permission is sought to store IBA until recovery outlets are identified. Permission is sought for trials to prepare IBA for recovery and removal off site. The IBA facility will consist of 5 no. cells which will be constructed in accordance with the requirements of the Landfill Directive 99/31/EC for non-hazardous wastes. A final post settlement contour height of 85 mOD is proposed. Permission is sought for operation of the IBA facility until the cells are full and subsequent aftercare activities as may be required are complete. The development includes additional perimeter (haul) roads and screening berms.

  The IBA facility will comprise 1 no. portal frame building 76 m x76 m x 15.5 m to facilitate:
  - weathering
  - metals recovery trials
  - crushing and washing to facilitate recovery trials and processing

- The construction and operation of a building for:
  - The biological treatment of the organic fraction of MSW (otherwise known as MSW 'fines' material) and;
  - contingency storage of baled recyclables
  - contingency storage of baled MSW

  This facility shall comprise:
  - a processing building of 108 m in length, 50 m in width and up to 17 m in height, of portal frame construction with 13 no. vehicle roller shutter doors and 7 or more pedestrian access doors (subject to fire certification requirements)
  - internal storage bays as required
  - 12 no. concrete composting tunnels located within the processing building of c. 6 m in width, 25m in length and 5 m in height
  - a covered bio-filtration unit within the overall processing building footprint, with a stack of height of 20 m
  - access from the internal site road with a marshalling yard area with egress from the existing site road to the landfill gas compound
  - all other ancillary and associated works, including leachate storage in a below ground tank, bio-treatment system for sanitary wastewater drainage and fencing.
  - Permission is sought for the continued use of this building post filling of the landfill cells onsite.

- The construction and operation of a leachate management facility comprising:
  - 3 no. additional floating cover leachate storage lagoons (L2, L3 and L4) of c. 3,000 m^2 each
  - 2 no. bunded above ground tanks for raw leachate from IBA cells (S1 and S2) approximately 25 m diameter 6.0 m high.
  - 3 no. bunded above ground tanks:
    - 1 no. tank (S3) for treated leachate from landfill leachate approximately 22m diameter 6.0m high.

        - 1 no, tank for treated leachate from IBA approximately 25 m diameter 6.0 m high (S4).
        - 1 no. tank for leachate concentrate 16 m diameter by 6.0 m high (S5).
    - Modular - typically containerised plant units (C1 through C6), on concrete slab of c. 1,000 m^2 and 1 no. elevated tank 5 m diameter 10 m high (T1) with provision for 2 no. additional low level (<5.0 m high) bunded storage tanks for dosing and other compounds (T2 and T3).
    - Extension to existing loading area to accommodate 2 no. 25 tonne articulated tankers.
    - Loading area for 2 no. 25 tonne articulated tankers.
    - Permission is sought for the continued operation of this plant post filling of the landfill cells to facilitate continued leachate management.

- Construction of screening berms along the western boundary to a maximum of 10 m in height, on the eastern boundary to a maximum height of 10 m and on the northern boundary, to a maximum height of 6 m, with a total berm footprint of c. 11.3 ha. Haul roads for construction will be in or immediately adjacent to berm footprint.

- Construction of surface management infrastructure, with discharge to the adjacent Knockharley Stream to the northern end of the landfilling footprint and the proposed IBA cell development. Key elements will comprise:

    - holding pond for surface water runoff
    - storm water attenuation lagoon to maintain green field surface water discharges to Knockharley stream and to facilitate suspended solids management
    - wetland
    - flood compensation culvert to provide equivalent 1:1000-year flood plain storage
    - permitted stream diversion around permitted development

- Felling of c. 12.5 ha of the existing commercial broadleaf/conifer mix plantations to facilitate:
    - construction of the screening berms along the western boundary and to the north of the proposed IBA area, and
    - development of Phase 7 Cells 27 and 26 and the new northern surface water attenuation pond.
    - Replanting and new planting totalling (c.16.8 ha) will off-set loss of commercial forestry in the proposed development footprint at the following locations:

    - replanting over screening berms
    - new planting on the cap over cells 25, 26, 27 and 28 in what is currently the permitted development

- Relocation of an existing 20 kV overhead ESB powerline that provides power to the existing landfill facility administration buildings, that will be impacted by the development of the screening berm to the east of the proposed IBA cell area.

- Construction of an additional ESB sub-station and new overhead ESB supply to the north-western corner of the currently permitted landfill footprint to facilitate power provision for pumps and other infrastructure.

- Construction of a new ESB sub-station adjacent to the proposed building for biological waste treatment and storage with ESB connection to adjacent 20 kV power lines.

- Extension of existing below ground infrastructure (permitted development) and provision of additional below ground infrastructure. (Power, water, telemetry, leachate rising mains, drainage). Extension of the existing car park for the administration area (760m^2).

More detailed descriptions of the elements of the development are provided in Chapter 2 'Description of the Proposed Development' of Volume 2 of the EIAR.

1.5 Consultation

The scope for the Outline CEMP has been informed by pre-application consultation with An Bord Pleanála, Meath County Council, prescribed bodies and other interested parties as summarised in Chapter 5 of Volume 2 of the EIAR.

This CEMP considers these responses, regarding concerns relating to work practices, environmental management procedures and management responsibilities relating primarily to the construction phase of the proposed development.

The comments expressed in particular by Inland Fisheries Ireland (IFI), Irish Water, Office of Public Works (OPW), the Health Service Executive (HSE), An Taisce, and the Department of Agriculture, Food and the Marine in written consultations received from them as part of the EIA process were considered in the preparation of this Outline CEMP.

2. EXISTING SITE ENVIRONMENTAL CONDITIONS

This section of the Outline CEMP describes the existing site. The information contained in this section is an abridged version of the text contained in the EIAR. The EIAR should be consulted for a more extensive description of the existing site.

2.1 Geological Conditions

The Teagasc online mapping for the site indicates that the soils underlying the site and the surrounding area mainly comprise poorly drained acidic soils consisting of surface water gleys and groundwater gleys. Gley soils are derived from shale and sandstone parent material and are responsible for the poor drainage characteristics evident in this part of County Meath.

The GSI online Quaternary Geology mapping shows that the overburden consists of glacial till predominantly derived from the underlying Namurian shales and sandstones, with the southern part of the site being underlain by tills derived from Carboniferous limestone. Two narrow swathes of alluvium deposits are identified within the southern section of the site and along the northern boundary, with glacial till derived from the Limestone identified to the south of the site.

The site lies regionally within the south-eastern limb of a synclinal axis containing the Namurian aged Balrickard Formation. The dip of the rocks within the syncline are variable. The syncline is bounded to the east and west by two northwest-southeast trending faults.

The 1:100,000 scale bedrock map shows that the site is underlain by Carboniferous aged (Namurian) Balrickard Formation described by the GSI as *'coarse feldspathic micaceous sandstone with shale and argillaceous limestone and fossiliferous shale'*. The Balrickard Formation is underlain by similar strata to the north and south belonging to the Donore Formation and passes up into similar rocks of the Walshstown Formation to the northeast.

The GSI Online Irish Geological Heritage database indicates that the proposed development area is not located in an area of specific geological heritage interest. The nearest site of significant geological heritage features fields of megafluting, located approximately 800 m to the east of the site. This geological feature covers 115 km^2 area and forms part of the largest field of such features in Ireland.

The GSI online Aggregate Potential Mapping database indicates that the site is located within an area of high potential for crushed rock aggregate. No other geological features of economic significance were noted within a 2-km radius of the site. The operational Duleek Quarry is located 5.1 km east of the site.

2.2 Hydrological Conditions

The average annual rainfall (1981 – 2010) in the area of the proposed development is 929 mm[i].

The proposed development site lies within Hydrometric Area HA 08 known as the Catchment of Nanny-Delvin of the Irish River Network and is under the new single River Basin Management Plan for Ireland which is the responsibility of the Water Policy Advisory Committee. The Midlands and Eastern Water and Environment Committee will have responsibility for regional delivery and implementation. The site is situated within the waterbody catchment as defined by the EU Water Framework Directive (WFD - 2000/60/EC) (8), and as shown in Figure 12.1. Waterbody Catchment Map[1]. The risk status and water quality of riverbodies are taken from www,catchments.ie.

[1] Cycle 1 mapping is used from www.watermaps.wfd.ie as it provides more information on stream order than cycle 2 mapping from catchments.ie.

Under cycle 2, the relevant:

- Catchment is Nanny-Delvin IE_EA_08_352
- Sub catchment is Nanny Meath SC 010,
- Riverbody is Flemingstown 08_010

Under cycle 1, the relevant:

- River Waterbody is Veldonstown IE_EA_08_352EA_Nanny160_NannyTRIB_Veldonstown.

The river body associated with the proposed development is described in more detail below.

The WFD risk status of the Flemingstown riverbody is "review". The water quality is high.

The northern boundary of the landholding within the site boundary is on the boundary of a second waterbody catchment:

- under Cycle 2 the Boyne SC_10 and the riverbody Roughgrange (Main Channel) 010, and
- under Cycle 1, the river body IE_EA_07_583EA_Boyne159Main_BoyneTRIB_Rathdrinagh2_Upper.

The WFD risk status of the Roughgrange riverbody is "review" and the risk score is subject to review (meaning further investigation is required to assign status as "at risk" or "not at risk". The river water quality status is unassigned.

2.3 Ecological Conditions

Ecology is described in more detail in Volume 2 Chapter 10 'Biodiversity' of this EIAR Summary details are presented below.

While the proposed development site is not located within a site designated for environmental conservation, there are three European Sites and twelve pNHAs within 15 km of the site, as detailed in Table 10-3 and illustrated on Figure 10-2. An appraisal of the potential impacts of the proposed development on the constitutive characteristics of European sites within 15km of the proposed development at the Knockharley landfill is set out in the AA Screening Statement and Natura Impact Statement which accompany this application for permission. Accordingly, whilst all fifteen designated sites (European sites and pNHAs) are detailed below, the appraisals for the purposes of Appropriate Assessment are set out in the AA Screening Statement and Natura Impact Statement.

Designated sites within 15km of the proposed development:

- River Boyne and River Blackwater cSAC
- River Boyne and River Blackwater SPA
- Boyne Estuary SPA
- Balrath Woods pNHA
- Thomastown Bog pNHA
- Rossnaree Riverbank pNHA
- Crewbane Marsh pNHA
- Boyne Woods pNHA
- Duleek Commons pNHA
- Slane Riverbank pNHA
- Dowth Wetland pNHA

- King William's Glen pNHA
- Boyne River Islands pNHA
- Cromwell's Bush Fen pNHA
- Melfont Abbey Woods pNHA

The proposed development is not contained within any designated conservation site and, as far as the pNHAs are concerned, there is no potential for direct impacts on any designated conservation site, as there is no ecological link between the sites. There are no NHAs within 15km of the development. There are 12 pNHAs within 15km of the proposed development, however, there is only linkage to Balrath Woods pNHA, as the Knockharley Stream (Flemingstown Stream) flows through part of this site. However, this site is designated for woodland which will not be affected by the proposed development. There is no ecological pathway between the remainder of the pNHAs and the proposed development. The proposed development site is ecologically connected to the River Nanny Estuary and Shore SPA (Site Code: 004158) via a tributary (Flemingstown Stream) of the River Nanny. This SPA is located ca. 21.6km (instream distance) to the east of the proposed development. Again, it should be noted that an AA Screening Statement and Natura Impact Statement accompany this application for permission.

The NPWS website and National Biodiversity Data Centre (NBDC) website were searched for records of protected species from the 10km grid (NPWS data) and for the 2km grid squares in which the proposed development is located (NBDC data). Table 10-4 illustrates the results of the data searches. No records were available on the NPWS website for the 10km Gird N96 and no records of protected fauna or flora were available on the NBDC website for the 2km Grid Square N96T in which the proposed development is located.

The following records of protected species in N96 were identified on site during the surveys:

- West European Hedgehog
- Irish Hare
- European Otter
- Eurasian Badger
- Irish Stoat
- Common Frog
- Eurasian Pygmy Shrew

A total of 11 dominant habitats were recorded on the site during the habitat survey (Fossitt, 2000) conducted in 2010 (FT, 2010) and ground truthed in 2015 and 2016. These are listed below, together with their Fossitt (2000) habitat codes:

- Hedgerow (WL1)
- Treeline (WL2)
- Scrub (WS1)
- Immature Woodland (WS2)
- Improved Agricultural Grassland (GA1)
- Mosaic of Improved Agricultural Grassland and Wet Grassland (GA1/GS4)
- Wet Grassland (GS4)
- Artificial Lakes or ponds (FL8)
- Eroding/Upland River (FW1)
- Reed and Large Sedge Swamps (FS1)
- Buildings and Artificial Surfaces (BL3)

In addition to the above the following habitats were noted as present in March 2015:

- Dry meadows and Grassy Verges (GS2)
- Mixed Broadleaved Woodland (WD1)
- Mixed broadleaved/coniferous woodland (WD2)
- Planted Shrubs (WS3)
- Drainage ditches (FW4)

The habitats on the site have been modified as part of the existing landfill site development. The site surrounding the active landfill site is dominated by mixed broadleaved/coniferous woodland (WD2) which has been planted as part of the development of the site. In the interim since 2010, where some of this woodland had been classified as immature woodland (WS2) has matured and is now classified as mixed broadleaf and conifer woodland (WD2). The trees are largely less than 4-5 m in height. In the immature sections comprise of a mixture of Alder, Silver Birch, Beech and Willow species (among others).

The more mature compartments comprise of trees up to 10m in height though wet conditions underfoot have restricted growth in some locations. The more mature areas are largely in the northwest of the site. The width between planted rows of trees has also allowed the herb layer to remain largely intact with no understorey vegetation visible in compartments visited in March 2015. In the area east of the adjacent forestry compartment, previously classified as immature woodland (WS2) is now best classified as deciduous woodland (WD1) due to the increased canopy height. In some parts of the planted areas Gorse dominates and these areas have been classified as scrub (WS1). In the south of the site a number of screening berms have been constructed. These have been planted with young trees and are included in the immature woodland habitat.

While the mixed broadleaved/coniferous woodland (WD2) and deciduous woodland (WD1) located within the site have been planted and have undergone some improvement, these habitats provide both shelter and foraging habitats for local wildlife and are therefore evaluated as Local Importance (Higher Value).

The remainder of the site which has not been planted is dominated by wet grassland (GS4) and a mosaic of wet grassland and improved agricultural grassland (GS4/GA1). Areas of improved agricultural grassland (GA1) are located around the administration buildings, landfill gas compound and in the northeast area of the site. The wet grassland and mosaics with improved agricultural grassland are evaluated as Local Importance (Higher Value) due to the higher diversity of flora species present. Agricultural grassland is evaluated as Local Importance (lower value) due to it being a monoculture, with limited ecological value.

The field boundaries on the site comprise hedgerows (WL1) predominantly with some treelines (WL2) occurring in the northern and eastern portion of the site. Hedgerow and treelines are relatively unmanaged and contain a number of mature trees. The hedgerows (WL1) and treelines (WL2) within the site are evaluated as Local Importance (Higher Value), as they provide habitat for mammals, birds and invertebrates.

Two artificial ponds (FL8) are located in the south of the site. These comprise a surface water attenuation pond and a constructed wetland. The constructed wetland is surrounded by a Reed and Large Sedge Swamp (FS1). These ponds, while manmade are surrounded by reeds which are of some ecological value and are evaluated as of Local Importance (lower value).

The remainder of the site comprises the active landfill area and associated site tracks and buildings (Buildings and artificial surfaces, BL3). Along the entrance road to the site the sloping embankments on either side of the access road have been planted with ornamental shrubs and are classified as ornamental/ non-native shrubs (WS3). These habitats are evaluated as being of negligible ecological value.

The site is surrounded almost exclusively by improved agricultural grassland and arable fields.

2.4 Archaeological Conditions

Archaeology is described in more detail in Volume 2 Chapter 14 'Archaeology, Architecture and Culture' of this EIAR. Summary details are presented below.

There are no Recorded Monuments within the proposed development area or the 1 km study area (www.archaeology.ie). The closest Recorded Monument (RMP ME026-030) is located approximately 1.3 km west of the landfill site boundary and takes the form of a possible ringfort.

There was no evidence of any archaeological, architectural or cultural heritage features recorded on aerial photographs within the proposed development area or the surrounding landscape.

No archaeological, architectural or cultural heritage features were revealed within the proposed development area or the surrounding landscape as a result of carrying out the walkover survey.

3. OVERVIEW OF CONSTRUCTION WORKS

3.1 Description of the Proposed Development

The proposed development is described in Section 1.4 of this Outline CEMP. There is more detail in Chapter 2 of Volume 2 of the EIAR.

3.2 Site Layout

The proposed site layout is shown in Drawing LW14-821-01-P-0000-003 Proposed Site Layout Plan in Volume 4 of this EIAR. Key elements of the proposed works key are shown in Drawing LW14-821-01-P-050-0005 Proposed Site Layout Plan with Infrastructure Locations in Volume 4 of this EIAR and are described below and the numbering notation is also presented in the above drawing to indicate approximate locations.

1. Proposed waste acceptance types, activities & quantities
    a. Non-stabilised residual including biodegradable
    b. IBA
    c. Non-hazardous and non-biodegradable stabilised and inert
2. Proposed changes to current permitted cell development
    a. Increased profile
    b. Revised cell layout and additional working faces
3. Proposed dedicated IBA cells
    a. Cell layout
    b. IBA road access
    c. IBA wheel wash
    d. Suspended solids management at side risers
    e. Side risers and rising mains
    f. Suspended solids management
    g. Weathering area including weathering building
4. Proposed biological treatment plant
5. Proposed leachate storage and treatment
    a. Bunded storage
    b. Floating cover lagoons
    c. Tanker loading areas
    d. Leachate treatment / conditioning area
6. Proposed surface water/drainage infrastructure
    a. Additional surface water attenuation lagoon
    b. Surface water outfall
    c. Flood compensation lands
    d. Surface water holding pond
7. Earth balance and proposed berms
    a. Cell development
    b. Berm phasing
8. Proposed tree felling & replanting
9. Relocation of ESB powerline

10. Ancillary infrastructure
    a. Additional ESB substation
    b. Additional ESB substation
    c. Additional drainage
    d. New overhead ESB line

An application will also be made to the EPA to facilitate the licensing of the proposed development. The existing facility is licensed to operate by the EPA by IE W0146-02.

3.3 Construction Period and Program of Works

The proposed cell layout and phasing for the permitted and proposed developments are presented in Table 3-1. Drawing LW14-821-01-P-0050-011 Cut and Fill Phasing in Volume 4 of this EIAR shows the proposed construction cut locations and phasing of screening berms associated with key mile stone developments. This drawing should also be read in conjunction with Drawing no. LW14-821-01-P-0050-003 Existing Forestation Proposed Felling and New Planting in Volume 4 of this EIAR as programming was designed to facilitate replanting / new planting within 2 years following felling as may be required.

It is preferable, from a construction viewpoint, that construction of the facility take place during the summer months to take advantage of longer daylight hours and drier weather. However, this is dependent on a number of factors including the implementation of appropriate mitigation measures in relation to the ecology of the development locations (refer to Chapter 11, 'Lands Soils and Geology of Volume 2 of this EIAR).

Upon appointment of a contractor for the works, a programme will be developed taking account of the required mitigation factors.

Table 3-1: Proposed Construction Phasing

Infrastructure	Cell Construction Programme (years post grant of permission)	Screening Berm
Cells 19, 20, 21, 22, 28, 29 and cell weathering area 32	0 through 2	Berms A and B
Advance works, security, felling, suspended solids management, site clearance, haul roads, services	0 through 1	Berm A
Surface water management infrastructure	0 through 1	Berm A
Screening Berms	1 through 8	Berms A through D
Leachate infrastructure	1 through 5	Berms A through D
Miscellaneous infrastructure	1 through 5	Berms A through D
Cells 24, 26 and 27	3 through 4	Berm C
Cells 23. 25 and 30	5 though 6	Berm D
Cells 31 and remainder 32	7 through 8	Berm E
Capping	1 through 8	

Infrastructure provision (access roads, power, telemetry, gas, leachate, surface water) will be developed concurrent with cell construction.

3.4 Construction Working Hours

Construction work will generally be carried out during daylight hours. Construction work will generally be confined to 08:00 to 18:30 Monday to Saturday.

3.5 Overview of the Construction Sequence (Preliminary Only)

The key construction elements are as follows:

1. advance works
2. general earthworks and associated concrete works
3. internal roads
4. deforestation
5. screening berms
6. access Roads
7. IBA storage facility
8. additional above ground and below ground floating cover lagoons to store incoming and treated leachates
9. leachate management facility
10. a weathering / future reprocessing area within the IBA cells
11. an additional wheel wash to clean vehicles leaving the IBA cell development
12. additional leachate rising mains and associated suspended solids management systems tanks
13. additional below ground ducting for water, telemetry and power
14. biological treatment facility
15. upgrading of leachate management facility
16. new underground ESB power supplies and remove existing overhead power supplies

3.5.1 Outline Construction Methodology

3.5.1.1 Advance Works

The key construction related deliverables required prior to development of the proposed Cells and associated Infrastructure will be as follows:

- Establishment of site security, fences and Works compound (s) with appropriate welfare provision.
- Establishment of temporary surface water management measures requiring construction of silt fences and or localised settlement ponds to contain suspended solids associated with dig and deposition areas.
- Site clearance for screening berms.
- Installation of site access roads requiring stripping and stockpiling of topsoil and installation of granular formations atop separation geomembranes.
- Felling in accordance with the Felling Act 2014.
- Relocation / exposing of existing services to facilitate connection to proposed works.

Temporary surface water management

Prior to any earthworks or forestry works taking place, measures to mitigate potential impact on surface water from suspended solids will be implemented. Where permanent measures are not in place temporary settlement ponds and or silt fences will be established to mitigate the risk of suspended solids entering water courses.

Settlement ponds will typically have below ground excavation facilitating gravity flows where possible lined with a synthetic material and a discharge pipe system with appropriate downstream protection in the receiving water using concrete or rip rap to dissipate energy and prevent downstream erosion.

Prior to cell development works taking place, the northern catchment storm water infrastructure will be constructed.

Excavated materials will be removed to screening berms. Clay barrier material won from underlying boulder clays to produce engineered clay will be placed in layers and compacted to 98% maximum dry density.

Thereafter a 2mm textured HPPE liner will installed with welding being monitored by independent CQA.

Inlet and outlet structures and associated protection works will constructed using reinforced concrete.

Construction Compound

A temporary Contractors Compound will be required for the duration of the construction cycles. It will consist of a hardcore area surrounded by secure fencing, comprising site office, canteen, toilet facilities, storeroom and staff parking areas. Fuel/oil storage areas will be bunded in accordance with best practice. The compound will move around site to accommodate the cycles of construction.

Temporary toilet facilities will be required for construction workers. These will consist of temporary 'portaloo' type chemical toilets located within the construction site compound.

3.5.1.2 Earthworks and Associated Concrete Works

The construction element will broadly fall under two categories for earthworks related operations; earthworks and structures.

Bulk dig and construction of stockpiles and screening berms

An earth balance (see Drawing LW14-821-01-P-0050-011 Cut and Fill Phasing in Volume 4 of this EIAR) will define excavation locations and fill (typically screening berms), locations subject to construction program considerations and detailed design.

Prior to earthworks taking place, the advance works described above will require construction of haul roads, silt ponds and installation silt fences to mitigate impact of suspended solids on adjacent watercourses.

Thereafter overburden material will be excavated using tracked 360^{o} excavators and transported in off road dump trucks to screening berm locations where material will be placed, compacted in layers, profiled, top soiled planted with trees and grass seed. In the event that boulder clay (at depth) is encountered it will be stockpiled for reuse as engineered clay in lining systems, see below.

Where ground water is present gravity and or pumped drainage will be provided with outlets via suspended solids pond into receiving surface waters.

In all lagoons engineered clay will be installed in layers and compacted using a sheep's foot roller or similar in layers to ensure compliance with permeability specifications after which 2.00 mm welded HDPE lining materials will be installed.

Production of engineered clay

Following removal of overburden to screening berms or stockpiles, in-situ boulder clay will be excavated, passed through trommels to remove boulders exceeding 50 mm diameter and stockpiled or placed within excavations to form a 1.0 m engineered clay barrier.

Boulders will be used on site as granular fill in haul roads.

Engineered clay (with boulders removed) will be placed and compacted in layers not exceeding 250 mm typically to a proctor maximum dry density of 98% or more subject to permeability testing.

Concrete works

Concrete works will typically require local excavations, drainage and suspended solids management for dig and concrete pours and into which structures will be built requiring placement of blinding, shutters, reinforcement and final concrete pour. Where possible precast concrete (e.g. culvert) to mitigate the risk will be used.

Swales and inlet structures will be excavated, profiled and seeded asap to mitigate development of suspended solids.

A designated concrete wash-down area will be constructed at the temporary compound. Every concrete truck delivering concrete to the site will use this facility prior to leaving the site. A settlement lagoon will be provided to receive all run-off from the concrete wash down area.

3.5.1.3 Internal Roads

Internal roads will comprise:

- Haul roads during construction. These will typically comprise stone aggregate compacted using vibrating rollers on separation membranes.
- Paved roads in the IBA facility constructed using reinforced concrete over IBA formations.
- Asphalt perimeter roads using conventional barber greens, vibrating (granular) and dead rollers (asphalt) for:
    - IBA cells
    - Permitted development.

3.5.1.4 Screening Berms

Screening berms will be constructed on a phased basis concurrent with overburden from cell excavation works. Prior to berm installation, top soil will be stripped back formation compacted and soils as may become available placed and compacted in layers.

Layers will be overfilled and once berms are at the final height is reached will have side slopes profiled receive and allow subsequent placement of topsoil, seeding and tress as required.

To minimise erosion, storm drainage will be installed prior to bulk earth moves and silt fences will be placed around screening berms until a grass cover has become established.

Prior to earthworks taking place temporary haul roads will also be installed.

3.5.1.5 IBA Cells

Overburden will be removed and placed in the screening berms. In-situ boulder clays will be engineered via screening to remove boulders. A ground water drainage system will be installed to accommodate prevailing site conditions upon which the engineered clay barrier will be installed and compacted to 95% maximum dry density.

Thereafter, a 2mm textured HPPE liner will be installed with welding being monitored by an independent CQA. Upon this, a protection geotextile will be placed prior to installation of a 500 mm drainage stone blanket within which will be a HDPE drain pipe network will terminate in HDPE sider risers.

Headwalls and valve chambers associated with leachate pumping will be constructed using reinforced concrete and pipework and telemetry ducts will be constructed using HDPE welded pipework.

3.5.1.6 IBA Weathering Facility

The construction of the IBA Weathering Facility is described as follows:

The storage area will be constructed within the IBA facility footprint in cell 32. Following completion of the cells, a level formation will be established using IBA materials to facilitate acceptance of IBA materials. A single span portal frame building (76 m x 76 m) will be constructed on concrete pad foundations within the IBA weathering footprint.

Initially IBA material will be placed in thin layers above a thermal protection barrier to mitigate elevated temperatures damaging the liner.

To facilitate weathering, once a level platform of weathered IBA is in place, a central access road will be constructed using reinforced concrete.

Clay barrier material will be won from underlying boulder clays excavated to form cells. Boulders within the excavated clay will be removed via screening and engineered clay will be placed in layers and compacted to 96% maximum dry density.

Thereafter a 2mm textured HPPE liner will installed with welding being monitored by independent CQA.

Inlet and outlet structures and associated protection works will be constructed using reinforced concrete.

3.5.1.7 Leachate Management Facility

The primary elements associated with the leachate management facility will comprise:

- Floating cover lagoons excavated below ground and lined with 1.0 m clay barrier. Clay barrier material will be won from underlying boulder clays excavated to form cells. Boulders within the excavated clay will be removed via screening and engineered clay will be placed in layers and compacted to 96% maximum dry density. The floating cover will be constructed using LLDPE.
- Overground tanks constructed using glass lined prefabricated steel tanks founded on a reinforced concrete foundation with reinforced concrete bund walls to facilitate emergency containment.
- Leachate tanker loading facility constructed with reinforced concrete bays and associated HDPE pipe drainage to adjacent tanks to accommodate spills. Pipework from tanks and lagoons will be below ground welded HDPE.
- Reinforced concrete area on granular fill to accommodate containerised treatment modules as may be required for future treatment and or conditioning of leachate road.
- Asphalt surfaced access road on granular formation facilitating access to the facility.

3.5.1.8 Biological Treatment Facility

The biological treatment facility will be a portal frame building surrounded by a concrete working area to facilitate access and egress of vehicles.

Prior to building construction, the topsoil will be stripped back under the footprint of the buildings. Additional excavation will be carried out to the formation level of foundations and underground tanks, where required. The foundations will be ground bearing reinforced concrete pads/strips on a suitable stratum. Once the foundations are poured, rising walls will be constructed. These will be comprised of a mixture of concrete blockwork walls and reinforced concrete retaining "push walls" in material handling areas in the form of tunnels. Push walls will be designed to retain the weight of stockpiled material and pushing forces from loading vehicles. Due to site topography, import of fill material to raise the levels to the underside of floor will be required. Imported fill shall be a granular engineered fill, compacted to provide a suitable subgrade for the building floors. Floors will be steel, or fibre reinforced concrete industrial floors on a suitable depth of compacted granular fill.

The steel frame will be erected on the reinforced concrete substructure. The frame will consist of rolled steel columns and rafters at 5-7m typical spacing. Cold rolled light gauge steel purlins and cladding rails will be fixed to the main columns and rafters.

The frame will be cladded with corrugated coated steel cladding, to match the existing building. Access to the building will be by fast acting industrial roller shutter doors, with personnel access/fire escape doors as required to comply with Fire Regulations.

The walls and roof of the composting tunnels will be entirely of reinforced concrete construction.

External cladding will be affixed to the steel frame when completed.

Roof drainage will consist of gutters and downpipes draining the pitched roofs, the roof of the composting tunnels will be "flat" with a nominal fall. The concrete surface of the tunnel roof will be made waterproofed by means of a bonded membrane system. All roof water will be collected for harvesting.

Proposed Rainwater Harvesting and Storage Systems

Some of the non-potable water requirements of the biological treatment facility along with floor wash-down and vehicle wash-down requirements will be met through utilisation of rain water harvesting.

Two 40 m^3 rain water harvesting tanks (80 m^3 combined capacity) are proposed. Rainwater from the roofs will be collected in a tank and stored for re-use as grey water in the treatment facility, and for supply to a water storage tank as required. This is regarded as a source control technique also. Two systems will be provided, one for each side of the treatment facility, these will be located under the open space area adjacent to the fire tender turning area to the north of the site and the other system will be located under the loading area to the south of the facility. The locations of these systems are shown in Planning Drawings LW14-821-01-P-1700-003 in Volume 4 of the EIAR.

All of the SuDS designs described above will be installed in accordance with the CIRIA guidance. All of the elements of the drainage system are designed to gravitate towards one of the two attenuation ponds.

4. ENVIRONMENTAL MANAGEMENT PLAN

4.1 Introduction

This Environmental Management Plan (EMP) defines the work practices, environmental management procedures and management responsibilities relating primarily to the construction phase of the proposed development at Knockharley Landfill, Kentstown, Navan, Co Meath.

This EMP describes how the Contractor for the main construction works will implement a site Environmental Management System (EMS) on this project to meet the specified contractual, regulatory and statutory requirements and environmental impact assessment report mitigation measures. This plan will be further developed and expanded following the grant of planning permission and appointment of the Contractor for the main construction works. Please note that some items in this plan can only be finalised with appropriate input from the Contractor who will carry out the main construction works and once the planning conditions attached to any grant of planning are known. It is the Contractor's responsibility to implement an effective environmental management system to ensure that Knockharley Landfill Ltd environmental requirements for the construction of this project are met and are in accordance with planning permission and the IE licence.

All site personnel will be required to be familiar with the environmental management plan's requirements as related to their role on site. The plan describes the project organisation, sets out the environmental procedures that will be adopted on site and outlines the key performance indicators for the site.

- The EMP is a controlled document and will be reviewed and revised as necessary.
- A copy of the EMP will be located at the site office.
- All employees, suppliers and Contractors whose work activities cause/could cause impacts on the environment will be made aware of the EMP and its contents.

4.2 Project Obligations

In the construction of the proposed development there are numerous environmental management obligations on the developer and the Contractor. As well as statutory obligations, there are numerous specific obligations set out in the EIAR. These obligations are set out below. When planning is granted, there are also likely to be planning conditions, with which the developer must comply. The Outline CEMP will be updated following the completion of the planning phase to incorporate these obligations. The Contractor and all its sub-Contractors are to be fully aware of and in compliance with these environmental obligations.

4.2.1 EIA Obligations

The EIAR has identified mitigation measures that will be put in place to mitigate the potential environmental impacts arising from construction of the proposed project.

4.2.2 Planning Permission Obligations

Should the proposed development be granted planning permission, the conditions of the planning grant issued will be adhered to.

4.2.3 Industrial Emissions Licence

As outlined in the EIAR, the facility will also require an EPA Industrial Emissions licence for which a separate application will be made. The Industrial Emissions licence that will relate to the proposed development will condition environmental monitoring and reporting.

4.2.4 Other Obligations

The developer and/or contractor for the main construction works will liaise directly with the appropriate persons in relation to securing any necessary permits to allow the works to take place, including for example commencement notice.

4.3 Environmental Management Programme

4.3.1 Noise, Light, Dust and Air Control

Noise Control

Noise will be generated from construction related plant and machinery during the construction works.

The noise impact for construction works traffic will be mitigated by restricting movements along access routes to the standard working hours and exclude Sundays, unless specifically agreed otherwise.

The construction works on-site will be carried out in accordance with the guidance set out in BS 5228:2009+A1:2014, and the noise control measures set out in Appendix 2.0 Construction Environmental Management Plan (CEMP) in Volume 3 of this EIAR.

The hours of construction activity will be limited to avoid unsociable hours. Construction operations shall be restricted to between 08:00 hours and 18:30 hours Monday to Saturday in accordance with the operating hours in the IE licence, unless specifically agreed otherwise.

Mitigation measures shall be implemented to reduce impacts related to construction noise and vibration. BS 5228-1:2009+A1:2014 provides a detailed list of mitigation measures to minimise the noise impact from construction activities and these recommendations should be implemented:

- It is recommended that construction activities shall be carried out during normal working hours;
- A site representative responsible for matters relating to noise should be appointed; and
- Noise monitoring at noise sensitive locations should be performed during critical periods.

There are many general measures that will be taken to reduce noise levels:

- Avoid unnecessary revving of engines and switch off equipment when not required;
- Keep internal haul routes well maintained and avoid steep gradients;
- Select equipment conforming to international standards on noise and vibration;
- Select equipment with quiet and low vibration emissions, and ensure equipment is regularly maintained ensuring it operates in an efficient manner. If possible, all mechanical plant will be fitted with effective exhaust silencers;
- Compressors will be of the "sound reduced" models fitted with properly lined and sealed acoustic covers which will be kept closed whenever the machines are in use and all ancillary pneumatic tools shall be fitted with suitable silencers; and
- Locate equipment as far away as noise sensitive receivers as possible within constraints of the site.

Construction noise levels were predicted under Chapter 9 'Noise and Vibration' of Volume 2 of this EIAR, and the predicted noise levels from each activity as well as the cumulative noise level from the construction phase is below the 65 dB $L_{Aeq,1hr}$ noise limit.

Operational noise monitoring will be carried out in compliance with the requirements of the Industrial Emissions licence.

Complaints regarding construction noise will be entered the site complaints log and the relevant site environmental officer will arrange to meet with those affected. The situation will be acted upon immediately and reviewed by the Construction/Environmental Manager. If nuisance is occurring, then the project manager will decide what action is necessary to reduce to acceptable levels or eliminate the disturbance.

Other management practices, in line with the recommendations of the Final Draft BAT Guidance Note for the landfill activities, will be incorporated during facility development:

- Construct a buffer zone between the facility and the external environment.
- Selection of equipment that conforms to EU Noise Standards.
- Limiting activities with noise potential to certain hours.

Lighting Control

In determining the lighting arrangements for the worksite, consideration will be given to residents and other sensitive receptors that may experience a nuisance by the light. Where appropriate, measures will be implemented to reduce obtrusive light (including consideration of hours of lighting, provisions for dimming or switching off light, equipment to be used and lighting position).

Reference to and consideration of the Bat Conservation Trust's best practice guide shall be made (Bats and Lighting in the UK, Bats and the Built Environment Series).

Where possible, a daylight only construction schedule will be adopted to minimise adverse lighting effects as different phases are completed. If construction takes place during winter months, it may be unavoidable that works are carried out during the hours of darkness in consideration of shorter daylight availability.

Where appropriate the following measures will be considered for implementation:

- do not "over" light
- dim or switch off lights
- use specifically designed equipment
- keep glare to a minimum
- position lights sensibly

Dust and Air Quality Control

The principal source of air emissions during the construction phase will be dust, PM_{10} and vehicle emissions.

The amount of dust generated and emitted from the proposed development at the Knockharley landfill facility and the potential impact on surrounding areas will vary according to the following:

- the type and quantity of material and working method
- distance between site activities and sensitive receptors
- climate/local meteorology and topography

An assessment undertaken in the Volume 2 Chapter 7 'Air Quality and Climate' of this EIAR identified with regard to dust (dust soiling) and PM_{10} (human health), the risk from earthworks, construction and trackout activities during the construction phase is deemed to be Low Risk.

The following control measures have been identified and will be implemented during the construction phase:

- The developer in association with the contractor will develop and implement a dust control plan. This plan will address aspects such as excavations, filling activities & temporary stockpiling. The plan will be prepared prior to any construction activities and will be established and maintained through the construction period. Dust controls will be as per the CEMP in Appendix 2.0 of Volume 3 of this EIAR.

The dust control plan will include the following mitigation measures:

- All vehicles will comply with the onsite speed limit. The speed limit will be reduced appropriately on internal haul routes in extremely dusty environments
- Stockpiles (soil) during the construction phase will be sprayed during periods of dry weather in order to suppress dust migration from the site.
- The earthen berms will be replanted in forestry immediately following construction in order to establish vegetated cover to prevent windblown erosion and associated dust emissions.
- Availability of a water bowser to spray work areas and haul road. The amount of water sprayed will be sufficient to suppress the dust and not be such as to allow any run-off into watercourses.
- The earthworks foreman will inspect internal haul roads as part of his daily supervision of the site. If dust is causing a problem a water bowser will be engaged.
- Site roads shall be regularly cleaned and maintained as appropriate. Hard surface roads shall be swept to remove mud and aggregate materials from their surface while any un-surfaced roads shall be restricted to essential site traffic only. Furthermore, any road that has the potential to give rise to fugitive dust shall be regularly watered, as appropriate, during dry and/or windy conditions.
- Public roads outside the site shall be regularly inspected for cleanliness and cleaned as necessary. Material handling systems and site stockpiling of materials shall be designed and laid out to minimise exposure to wind. Water misting, or sprays shall be used as required if particularly dusty activities are necessary during dry or windy periods.
- Vehicles exiting the site will use the wheel wash at the administration area to mitigate track out onto the public road.
- All loads which could cause a dust nuisance will be covered to minimise the potential for fugitive emissions

- In the event of dust complaints, they will be recorded and actioned in accordance with the licence for the facility and the complaints procedure.
- A monitoring programme at the site will continue to measure dust and PM_{10} in accordance with the IE licence for the facility. The results of monitoring will inform the licensee of the effectiveness of dust control and mitigation.

Predicted vehicle emissions associated with the proposed development are within the relevant air quality guidelines and therefore will have a neutral impact on ambient air quality. No mitigation measures are therefore required.

4.3.2 Outline Site Drainage Management Plan

As with any civil engineering project of this nature it is vital to ensure that prior to works commencing on site, adequate mitigation measures are put in place. All such mitigation measures as detailed within this Outline CEMP will be implemented by the appointed Civil Works Contractor (CWC) covering the actions required to complete the project in a safe secure manner with respect to the environment. The Project/Site manager representing the CWC is responsible for enforcing the technical and contractual requirements of the project.

This site drainage plan will set out the tasks required to complete the project under a number of headings and outline the mitigation measures proposed to curtail any environment pollution.

Note, this Outline Site Drainage Management Plan should be read in conjunction with Volume 2 Chapter 12 of this EIAR. The Site Drainage Management Plan shall be finalised in accordance with this outline plan following the appointment of the CWC for the main construction works.

3.5.1.9 Sustainable Urban Drainage System

A sustainable urban drainage system (SuDS) approach was applied to storm water management where appropriate and possible within the site, the overall strategy aims to provide an effective system to mitigate the adverse effects of urban storm water runoff on the environment by reducing runoff rates, volumes and frequency, reducing pollutant concentrations in storm water, contributing to amenity, aesthetics and biodiversity enhancement and allow for the maximum collection of rainwater for re-use where possible. In addition, SuDS features will replicate the natural characteristics of rainfall runoff for the site by providing control of run-off at source.

SuDS is a requirement of Meath County Council under the Greater Dublin Regional Code of Practice for Drainage Works (21) and Greater Dublin Strategic Drainage Study (GDSDS) (2). Additionally, these systems are recommended under the new guidelines, The Planning System and Flood Risk Management Guidelines for Planning Authorities (22).

3.5.1.10 Sedimentation and Erosion Control

Suspended solids as a result of earthworks, excavations and temporary storage of excavated materials represents a potential source of impact.

In addition, there is a possibility that pollutants associated with construction equipment could spill/leak, thereby representing a potential source of impact. Mitigation measures relating to fuels, oils and materials are discussed in the following sections.

Control of both erosion and sediment entrainment in runoff will be a key undertaking for the duration of the project. A silt management plan will be implemented onsite utilising silt fences, swales, settlement ponds and diversion drains, as required to remove suspended materials from any surface water runoff within the construction zones. Details of this plan and the measures taken for the control of erosion and sediments are presented in the sections below. The performance of sediment control measures will be assessed through frequent inspections and measurements by the team put in place by the CWC and the Client's Representative. There are a number of SuDS features proposed which have been designed in accordance with CIRIA Design document '*The SUDS Manual C697'*.

Permanent Attenuation Pond & Wetland

In order to avoid an increase in hydrographic peaks due to the proposed development the existing "Southern" attenuation pond (managing surface runoff south of the water shed divide) will be supplemented with a new "Northern" Attenuation Pond. For details of the watershed dividing the site refer to Chapter 12 of Volume 2 of the EIAR.

The attenuation ponds together with adjacent wetlands, will also operate as settlement areas. The efficiency of the attenuation ponds to settle out suspended solids have been estimated to reduce the outflow concentration of suspended solids to less than 25 mg/l. This is below the waste licence limit of 35 mg/l and is within the limits set out in the European Directive 2006/44/EC on the quality of fresh waters needing protection or improvement in order to support fish life. The "Southern" attenuation pond and wetland are already in place at the site. The proposed "Northern" attenuation pond and wetland will be the first element of constuction within the "Northen" catchment. Any disturbance during construction will not increase the suspended solids concentration above the allowable limits. Calculations for attenuation and settlement and the criteria applied are included in Appendix 12-4 of Volume 3 of the EIAR.

Checks on the pond size were undertaken with regard to the efficiency of the removal of pollutants as recommended by CIRIA B14 (23) and GDSDS guidelines (2) and these are included in the pond calculations.

Both attenuation ponds were designed to fully attenuate a 1 in 20-year flow and to contain a 1 in 100-year flow preventing it from overtopping the banks of the pond, in accordance with the GDSDS guidelines (2). An overflow weir in the "Southern" storm water management system is in place to take the flows in excess of the 1 in 20- year flow. An overflow weir in the proposed "Northern" attenuation pond will discharge via a baffled chute structure to the Knockharley stream. Normal outflows from both attenuation ponds (existing and proposed) will gravitate through wetlands before reaching the Knockharley Stream at their respective locations. The normal outflow is controlled to the green field (pre-development) flow rates by an outlet control valve.

It is proposed to adjust the outflow control to cater for the additional volumes associated with the proposed development south of the water shed in the "Southern" storm water attenuation pond. The modifications will not impact on the design philosophy outlined which limits the flows from the ponds to greenfield rates and also provides suspended solids treatment for all the discharges and runoff from paved areas. The proposed "Northern" attenuation pond will employ a floating outflow structure or similar approved to maintain greenfield rates. The ponds and wetland locations are shown on Drawing No. LW14-821-01-P-0000-005 Proposed Site Layout Plan Sheet 2 of 8 in Volume 4 of the EIAR and are also illustrated in Figure 12.9 of Chapter 12 of Volume 2 of the EIAR. Calculations for the design are included in Appendix 12-4 of Volume 3 of this EIAR.

All drainage will be put in place ahead of construction such that any part of the proposed development will have a functioning drainage system in place.

Diversion Drains

To mitigate any impact of the drainage in adjoining lands, the following drainage systems will be employed:

- The maximum depth of excavation is approximately 3m at the location of the proposed new attenuation pond and 7m at the IBA holding facility.
- The excavations will be pumped into the site drainage system (including attenuation ponds), after which permanent *in situ* dewatering will be implemented during operations. As historically there is little evidence of high inflows, it is anticipated that pumped flows from excavations will be very low. Bio-degradable silt bags (or equivalent approved) will be used during dewatering of excavations.

Cross-drainage pipes of 450mm minimum diameter will be provided to prevent a risk of clogging for conveying flows from agricultural drains and forestry drains across the access roads.

A minimum buffer of 10m from watercourses has been adopted for the proposed works.

Details of how uncontaminated surface water runoff will be diverted away from construction areas through the installation of interceptor drains up gradient of construction areas are included in the Volume 4 Figure 12.6 of this EIAR.

Filter strips (vegetated buffers):

These are vegetated strips of land over which flows are treated at low velocities, as shown in the typical details in Figure 2.3 and Figure 2.4. They are appropriate according to The SuDS Manual as pre-treatment devices for SuDS components receiving sheet flow from adjacent impervious areas. The filter strips provided will be wide, gently sloping areas of grass treating runoff from adjacent impermeable areas and roofs, at source, running over its surface. Filter strips also have an attenuating effect on runoff and can allow some infiltration to the ground where the sub-grade is suitable.

These are located adjacent to hard-standing areas. These filter strips will be located post construction where gentle strips are achieved for example adjacent to the existing administration building, as shown in the Figure below.

Figure 4.1: Typical Filter Strip

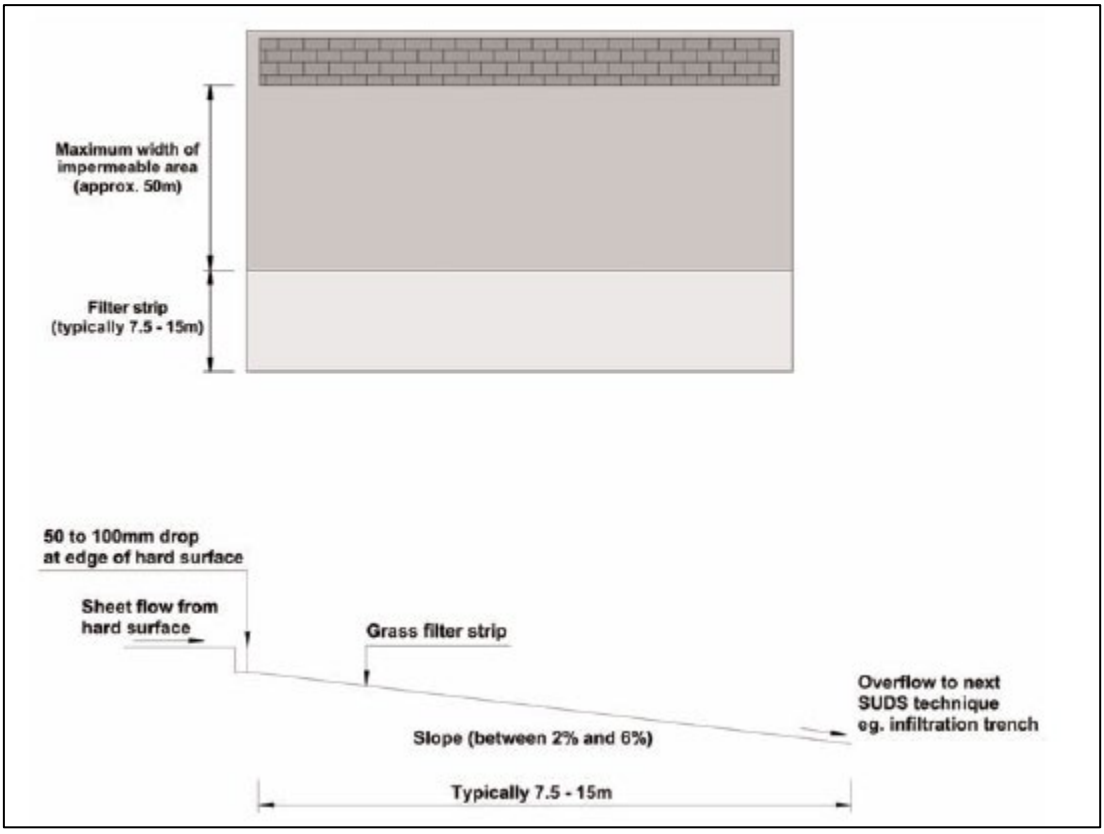

Figure 4.2: Typical Plan and Elevation of Filter Strip

Filter drain:

Filter drains are trenches filled with permeable material with a perforated collection pipe at the invert to collect and convey the water, as shown in Figure 2.5. They may have an optional permeable 'sandy' topsoil at surface. Surface water from the edge of paved areas flows into the trenches, is filtered and conveyed to other parts of the site. The filter drains can treat, convey and attenuate runoff, at source, and can infiltrate to the ground where the sub-grade is suitable.

These systems will allow some form of storage for small rainfall events and can result in water evaporation and adsorption in small quantities, therefore there will be less run-off from these areas in small rainfall events thus mimicking the natural response for this catchment. The filter drains proposed for this site will be located adjacent to the access road to the loading areas as shown in Drawings LW14-821-01-P-0000-003 to LW14-821-01-P-0000-011 in Volume 4 of the EIAR.

Figure 4.3: Typical Filter Drain

4-Stage Treatment Plan

Details of how drainage waters originating in construction areas will be collected and treated prior to controlled release are included in Volume 4 of this EIAR drawings nos. LW14-821-01-0000-003 through to LW14-821-01-0000-011.

A four-stage treatment train (swale – holding pond - attenuation pond – wetland) will cater for the proposed raised landfill area and will retain and treat the discharges from this area to mitigate any suspended solids that may be released during construction in the surface water run-off. A new swale and "Northern" attenuation lagoon will also drain and provide surface water management of ground and surface water arising from all development in the northern catchment area of the facility including permitted cells and the proposed IBA facility. Refer also to the Outline Surface Water Management Plan in Volume 3, Appendix 12.2 of Volume 3 this EIAR. Drawings showing details of the "Northern" storm water management infrastructure are presented in included Volume 4 of this EIAR drawing LW14-821-01-0500 series.

Swales

Swales leading to an attenuation facility are proposed in the drainage of the development as outlined in Volume 2 Chapter 12 of this EIAR Sections 12.6. These swales are of approximate depth 600 mm with a bottom width of 1000 mm and side slopes at 1 in 3.

The swales will be constructed in accordance with CIRIA C698 Site Handbook for the Construction of SUDS. The attenuation facility will also serve to treat the incoming flows and settle any suspended solids before out falling at restricted rates to the stream which runs through the site. The swale will not be part of the permanent drainage for the development and its location has been chosen based on the site topography.

Silt Fencing

Silt Protection Controls (SPCs) for the proposed development are planned as described above in Volume 2 Chapter 12 of this EIAR and in Volume 4 Drawing LW14-821-01-P-0500-005 of this EIAR and will be put in place in advance as construction progresses across the site and will be regularly maintained during the construction phases. Silt traps and silt fencing are proposed at the location of watercourse crossings and where access roads pass close to watercourses during construction and at stockpiles and or screening bunds during construction. Silt fencing will be used to mitigate any contamination of streams with silt.

The rate of absorption following tree felling, and therefore rate of run-off, is expected to be slightly higher than that of a forested site, however it is expected to develop a vegetation ground cover relatively quickly. Thus, no significant increase in the rate of run-off is anticipated as a result of felling or risk of downstream flooding. Additional silt fencing will be kept on site in case of an emergency break out of silt laden run-off.

All stockpile material will be bunded adequately and protected from heavy rainfall to reduce silt run-off, where necessary. A typical details of a silt fence is also provided below.

Figure 4.4: Typical Silt Fence[2]

Wheel Wash & Concrete Washout Area

There is an existing wheel wash at the entrance to the site which will be used during the construction period.

A designated concrete wash-down area will be constructed at the temporary site compound. Every concrete truck delivering concrete to the site must use this facility prior to leaving the site. A settlement lagoon will be provided to receive all run-off from the concrete wash down area.

A new wheel wash is also proposed at the exit of the IBA facility and this will be used for vehicles leaving the IBA facility during and post construction.

3.5.1.11 Emergency Silt Control and Spillage Response Procedures

To mitigate against impacts from fuel storage and re-fuelling, a single area shall be designated for refuelling and all refuelling shall take place at this location. The refuelling area shall be protected by bunding to contain any potential spillages either from tank rupture or from spillages during re-fuelling.

All personnel working on site will be trained in pollution incident control response. An emergency response plan will be prepared which will ensure that appropriate information will be available on site outlining the spillage response procedure and a contingency plan to contain silt. A regular review of weather forecasts of heavy rainfall is required, and a contingency plan will be prepared, if necessary, for before and after such events.

Emergency drip trays and spill kits will be kept available on site for use in emergencies to ensure that any spills from vehicles are contained and removed off site. Each refuelling station will be fully equipped for a spill response.

3.5.1.12 General Preparation in Advance of Implementing Site Drainage Management Plan

All site personnel will be made aware of their environmental responsibilities at the site induction prior to being allowed to work on site, and through the production of a Method Statement, outlining environmental requirements for sub-contractors (where applicable), which will include environmental emergency response procedures to deal with spillages, should they occur.

[2] Courtesy Thrace Synthetic

In principle, soil excavation will be undertaken during dry periods. However, it is noted that other factors may affect working timeframes. Therefore, working only during dry weather will not always be practicable or feasible.

Long range weather forecasts should be examined, and the construction phases planned to take cognisance of expected weather conditions. Regular meetings should be held to re-assess construction phases with weather conditions as the project progresses.

Cessation of operations during an extreme rainfall events may be required in areas which are sensitive to silt pollution, and any other areas where silt will be quickly carried into receiving watercourses. Extreme weather conditions will be monitored, and a contingency plan prepared in advance of construction. An extreme rainfall event will be classified as an event that corresponds to the Met Éireann Orange – Weather Alert for rainfall.

3.5.1.13 Personnel Qualifications and Key Contacts

All those carrying out work on site must have a Solas Safe Pass Card. All works must be supervised by a competent supervisor. Workers must be adequately trained in the tasks they are required to carry out. The key contact names and contact details should be supplied to all personnel entering the site. All site staff should be informed of the emergency procedures for the site.

4.3.3 Watercourse Diversion and Construction of Watercourse Crossings

The IFIs '*Guidelines on the Protection of Fisheries During Construction Works in and Adjacent to Waters'* (2015) has been consulted in the preparation of the stream diversion design.

Although the stream running through the site is not fisheries sensitive, cognisance of the sensitivity of watercourses downstream will be taken into account. The precise timing and duration will be discussed with IFI in relation to in-stream works in the Knockharley Stream, including the proposed stream diversion and short sections of culverting which will be required, to define the closed season for in-stream works prior to construction. Generally, in-stream works will only take place during the period **July-September** (IFI, 2015). Any in-stream works will be undertaken in consultation with the Planning Authority and Inland Fisheries Ireland (IFI) and subject to Section 50 approval from the OPW

Box or piped culverts will only be used over very short stretches i.e. at track or berm crossings, to avoid any loss of valuable habitat.

Rock armour will be used to provide bank protection works upstream and downstream of new structures, to ensure no undercutting or destabilisation of either the structure or riparian bank areas occurs.

The new watercourse diversion will maintain the same cross-sectional profile as the existing stream.

The diversion was modelled as part of the flood risk assessment and it was found to be capable of passing the design flow for a 1 in 100-year flood. Details of the sizing of the culverts and the profile of the watercourse diversion are included in the Flood Risk Assessment in Appendix 12.5, EIAR Volume 3.

In order to monitor the proposed development during construction, a system of monitoring and maintenance of the drainage network will be implemented during and after the construction phases. The measure should include but not be limited to the items listed in Section 4.3.4 below.

4.3.4 Maintenance and Monitoring

Facility management as part of licence compliance will implement maintenance and monitoring criteria which will require:

- Inspection and maintenance of the surface water management system including swales, culverts, rainwater harvesting tanks and outfalls will be undertaken regularly, to ensure no blockages have occurred and the system is operating correctly.
- Adequate access will be provided to all swale areas for inspection and maintenance.

- The landfill operator shall have responsibility for ensuring that all the mitigation and maintenance measures included in the surface water management plan are put in place.
- Water quality monitoring will be carried out in accordance with the licence during the construction and operation and aftercare stages.
- An emergency plan which will include the requirement for the shutting off the outfall from the attenuation pond during the construction period, if contamination is detected.

4.3.5 Archaeological Management

Due to fieldwork previously carried out for the phased development of the Knockharley landfill site revealing substantial archaeological remains within the immediate vicinity of the proposed development area, it is proposed that a programme of pre-development licensed geophysical surveying will be carried out in all suitable areas of land take.

It is proposed that a programme of pre-development test trenching will be carried out after the geophysical survey has been completed and within all areas of proposed land take. Test trenching will take in to account the results of the geophysical survey and will be carried out under licence to the Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs and the National Museum of Ireland. Further archaeological mitigation measures, which may include preservation in situ or preservation by record, may be made pending the results of the test trenching programme, and in agreement with the Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs and the National Museum of Ireland.

There will be no direct or indirect operational impact on the archaeological, architectural or cultural heritage resource. As such there are no operational mitigation measures required.

There will be no residual impacts on archaeological, architectural or cultural heritage remains after mitigation measures have taken place.

There are no Recorded Monuments, Protected Structures, Architectural Conservation Areas, NIAH structures or NIAH historic gardens or designed landscapes within the proposed development area. As a result, there will be no direct or indirect construction impact on the recorded archaeological, architectural or cultural heritage resource.

4.3.6 Outline Construction Waste Management Plan

This Outline Construction Waste Management Plan has been prepared for the proposed development in line with "Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects" (2006) as published by the Department of the Environment, Community and Local Government.

The Construction Waste Management Plan shall be finalised in accordance with this plan following the appointment of the Contractor for the main construction works. This plan should be read in conjunction with the EIAR.

It is an objective of this plan to prevent, reduce, reuse and recover as much of the waste generated on site as practicable and to ensure the appropriate transport and disposal of residual waste off site. This is in line with the relevant National Waste Management Guidelines and the European Waste Management Hierarchy.

Assignment of Responsible Personnel

It will be the responsibility of the Contractor for the main construction works (when appointed) to nominate a suitable site representative such as a Project Manager, Site Manager or Site Engineer as Waste Manager who will have overall responsibility for this waste management plan. The waste manager will have overall responsibility to instruct all site personnel including sub-Contractors to comply with the specifications of this plan.

They will ensure that at an operational level, crew foreman/gangers are assigned direct responsibility for its implementation.

Waste Generated

The wastes/spoils likely to be generated during the construction phase are presented in Table 4-1 below:

Table 4.1: Potential wastes generated during construction phase

Waste	Source
Hardcore, stone, gravel, concrete and plaster	Materials used during construction
Timber	Temporary supports, concrete shuttering and product deliveries
Miscellaneous building materials	Left over from construction of the site buildings
Waste from chemical toilets	Chemical toilets
Plastics	Packaging of material
Lubricating oils, diesel	Unused quantities at end of construction period

All wastes will be collected at the end of the construction phase, taken off site, and reused, recycled and disposed of according to best practice through waste facilities. Lubricating oils and diesel will be removed from the site and disposed of in accordance with the European Communities (Waste Oil) Regulations, 1992. (S.I. No. 399 of 1992).

Waste Reduction

All efforts will be made by site management to minimise the creation of waste throughout the project. This will be done by:

- Materials ordering will be optimised to ensure only the necessary quantities of materials are delivered to site.
- Materials storage areas will be of a suitable design and construction to adequately protect all sorted materials to ensure no unnecessary spoilage of materials occurs which would generate additional waste.
- All plant will be serviced before arriving on site. This will reduce the risk of breakdown and the possible generation of waste oil/hydrocarbons on site.
- Prefabrication of design elements will be used where suitable to eliminate waste generation on site.
- If materials such as concrete are being ordered, great care will be practiced in the calculation of quantities to reduce wastage.

Waste Reuse

When possible (and following appropriate testing), materials shall be re-used on site for other suitable purposes, e.g.

- Re use of excavated materials for screening, berms, etc.
- Re use of excavated materials as suitable fill elsewhere on site for the new site tracks, the hardstanding areas and embankments, where possible.

Waste Recovery

In accordance with national waste policy, source separation of recyclable material will take place. This will include the provision of receptacles for the separation and collection of dry recyclables (paper, cardboard, plastics, etc.), biological waste (canteen waste) and residual waste.

Receptacles will be clearly labelled, signposted and stored in dedicated areas.

The following sourced segregated material containers will be made available on site at a suitable location:

- Timber
- Ferrous Metals
- Aluminium
- Dry Mixed Recyclables
- Packaging Waste
- Food waste

Waste Disposal

Residual waste generated on site will require disposal. This waste will be deposited in dedicated receptacles and collected and transported to waste facilities for disposal. All waste movements will be recorded, of which records will be held by the waste manager on site.

Training

Copies of the waste management plan will be made available to all relevant personnel on site. All site personnel and sub-contractors will be instructed about the objectives of the Project Waste Management Plan and informed of the responsibilities that fall upon them as a consequence of its provisions.

It will be the responsibility of the Contractors' appointed Waste Manager to ensure that all personnel are made aware of their responsibilities under the plan via a toolbox talk or otherwise.

4.3.7 Outline Construction Traffic Management Plan

4.3.7.1 Introduction

The Construction Traffic Management Plan (CTMP) for the proposed development shall be finalised in accordance with this Outline Plan following the appointment of the Contractor for the main construction works.

Please note that some items in this plan can only be finalised with appropriate input from the Contractor who will actually carry out and schedule the works. Furthermore, it is appropriate that the Project Supervisor Construction Stage (PSCS), when appointed, should have an active role in the preparation/review of the Traffic Management Plan. This plan should be read in conjunction with Chapter 8 Roads, Traffic and Transportation of Volume 2 of the EIAR.

The Contractor will be required to prepare the necessary Site-Specific Traffic Management Plans prior to the construction works commencing in accordance with Chapter 8 of the Traffic Signs Manual and subject to load permits. The Contractor will be responsible for the implementation of all requirements of the Roads Authority.

This Outline CTMP deals with the traffic generated during the construction of the proposed development. It concentrates on the traffic arising from each element of the works which includes the site clearance works and the building construction works.

Construction traffic will require regular access to the site at varying times throughout the construction phase. The aim of this Outline CTMP is to put in place procedures to manage traffic effectively on site and in the immediate vicinity of the development, to ensure the continued movement of traffic on the public roads and to minimise disturbance during transportation of materials. The correct implementation of this Outline CTMP will ensure that appropriate procedures are in place to minimise any effects on the safety and movement of the general public.

4.3.7.2 Traffic Impact during Construction

As with any construction development project, the transport of materials onto the site will give rise to increased traffic and associated impacts. However, due to the very nature of construction these impacts will be temporary. The facility's construction will lead to construction-related traffic on the roads in the proximity of the development. It will include:

- Site personnel driving to the work site and site compounds (by car, van and 4x4)
- Delivery of liner materials, tanks, steel, cladding and other construction materials by van and HGV
- Movement of construction equipment and refuelling trucks to and around the site
- Import of fill material and concrete

Public perception of the construction phase will be influenced primarily from the impact of traffic movements. The degree of traffic disturbance caused by the construction phase depends on the volume of material imported/exported, the associated civil engineering requirements and the length of the construction period.

Prior to the commencement of construction, the CTMP will be reviewed by the main Contractor (and any sub-contractors) and will be updated as necessary.

4.3.7.3 Construction Staging

Construction commencement dates are yet to be confirmed at this stage; these will be made known to the Planning Authority by way of a formal Commencement Notice.

In terms of traffic impacts, it is proposed to carry out the project in a number of phases, with an overall construction programme of nine months expected for Phase 1. Subsequent phases are expected to be rolled out in two-year intervals as per Table 3-1, Section

Construction operations shall generally be restricted to between 08:00 to 18:30 Monday to Saturday.

4.3.7.4 Road Improvements, Modifications and Access to/from the National Road Network

The site is situated in the townland of Knockharley, approximately 6km south of Slane on the west side of the N2 National Primary Route. Navan is located approximately 13km to the west of the site via Balrath Cross and the R153 Regional Road.

To the north, the site is bounded by the CR384 County Road running east-west. To the east the site is bounded by the CR384 running north-south between the N2 and R150. The CR384 in this location runs almost parallel to the N2. To the south, the site is bounded by farmland, which is generally located adjacent to the R150 on the Kentstown side of the N2. To the west, the site is bounded by mainly gently sloping farmland, mostly in large fields generally defined by mature hedgerows with some groups of trees.

The N2 has a posted speed limit of 100kph near the site. This road is one of the main traffic arteries in the country and is the primary access route to the site.

Save for the CR384, the general road infrastructure in the immediate vicinity of the development site is of a relatively good standard in terms of road alignment, surfacing and cross-section.

The existing site enjoys direct vehicular access to the national roads network with primary access facilitated at a ghost island priority junction on the N2. The ghost island provides sheltered access for right turning vehicles travelling from the north. This is complimented with an auxiliary left turn deceleration lane to facilitate access for vehicles coming from the south. Both turning facilities aid in preserving the flow, speed and therefore the capacity of through traffic on the N2. The junction has been designed and constructed in accordance with the NRA: Design Manual for Roads and Bridges (DMRB) and has been the subject of Roads Safety Auditing (Stages 1, 2 and 3) in accordance with procedures set out in the relevant NRA guidelines.

The access road to the site runs due west through arable lands, thereafter running under the CR384 County Road.

The entrance proper to the site is located approximately 80 to 100 metres west of the underpass of the CR384. A security gate with closed circuit television is located on the access road. This aids site security staff in preventing unauthorised traffic from entering the site.

The original grant of permission conditioned the site operator to provide a traffic management plan. The traffic management plan includes provisions for prohibiting traffic directly associated with the landfill from travelling along the R150 between its junctions with the N2 and the R153 in Kentstown. After the opening of the landfill site it was found at subsequent planning forums that the traffic management system of prohibiting landfill traffic by means of a contracted arrangement functions successfully and to the satisfaction of the Planning Authority. It should be noted nonetheless that other HGVs including waste industry related vehicles generated by nearby waste treatment facilities are not prohibited from using the R150.

4.3.7.5 Road Cleaning

Public roads shall be kept free of mud, dust, spillages and debris from the construction site, construction plant or haulage vehicles. All vehicle existing the facility will be required to pass through the existing or proposed site wheel washes. Road sweeping vehicles will be used if required to ensure that the public road network remains clean.

4.3.7.6 Construction Plant and Vehicles

The typical construction plant and vehicles accessing the development site may include:

- Site personnel driving to the work site and site compounds (by car, van and 4x4)
- Delivery of plant, materials, structural and re-enforcing steel and other construction materials by van and HGV
- Movement of construction equipment and refuelling trucks to and around the site
- Import of fill material and concrete
- Traffic associated with delivery of ESB Networks equipment

It should be noted however that final selection of construction plant and vehicles may vary depending on suitability, availability, contractor's choice, etc.

Landfill operators will be responsible for the upkeep and maintenance of construction plant and vehicles, ensuring good working order prior to use. Should emergency maintenance need to be carried out on site, this will be carried out at a designated area away from sensitive receptors and it will be ensured that a spill kit is nearby.

Parking for all site staff vehicles during the Construction phase will be provided adjacent to the construction compound. Parking of construction related vehicles (or queuing) will not be permitted outside the facility gate. This will be achieved using a combination of signage, suitable bollards (if required) and enforcement by site management

4.3.7.7 Consultation and Notification

<u>Traffic Management Co-ordinator</u>

The Contractor will appoint a dedicated competent Traffic Management Coordinator for the duration of this project and this person will be the main point of contact for all matters relating to traffic management on the project.

<u>Induction</u>

Prior to the works commencing, the Traffic Management Coordinator will carry out an induction for the materials haulage contractor staff to inform them of the traffic requirements in relation to vehicle movements. Traffic consideration shall form part of the induction process for all site staff also.

An Garda Síochána

Following the appointment of the successful Contractor for the main construction works for this project, this Outline CTMP shall be finalised. The Traffic Management Coordinator will liaise directly with An Garda Síochána in relation to the plan and any concerns/requirements they have will be incorporated in to the plan.

County Council

The Contractor will liaise directly with Meath County Council Roads Department in relation to the plan in the event that any permits are required and if so shall be applied for and obtained from the Roads Department.

4.4 Environmental Management Team – Structure and Responsibility

A preliminary organisation chart is included in Figure 4.2. Revisions to the project organisation chart shall be controlled independently of this plan following the appointment of the Contractor for the main construction works.

The Contractor's Project Manager will be responsible for the delivery of all elements of the Environmental Management Plan.

The Contractor's Project Manager will retain all responsibility for issuing, changing and monitoring the Environmental Management Plan throughout.

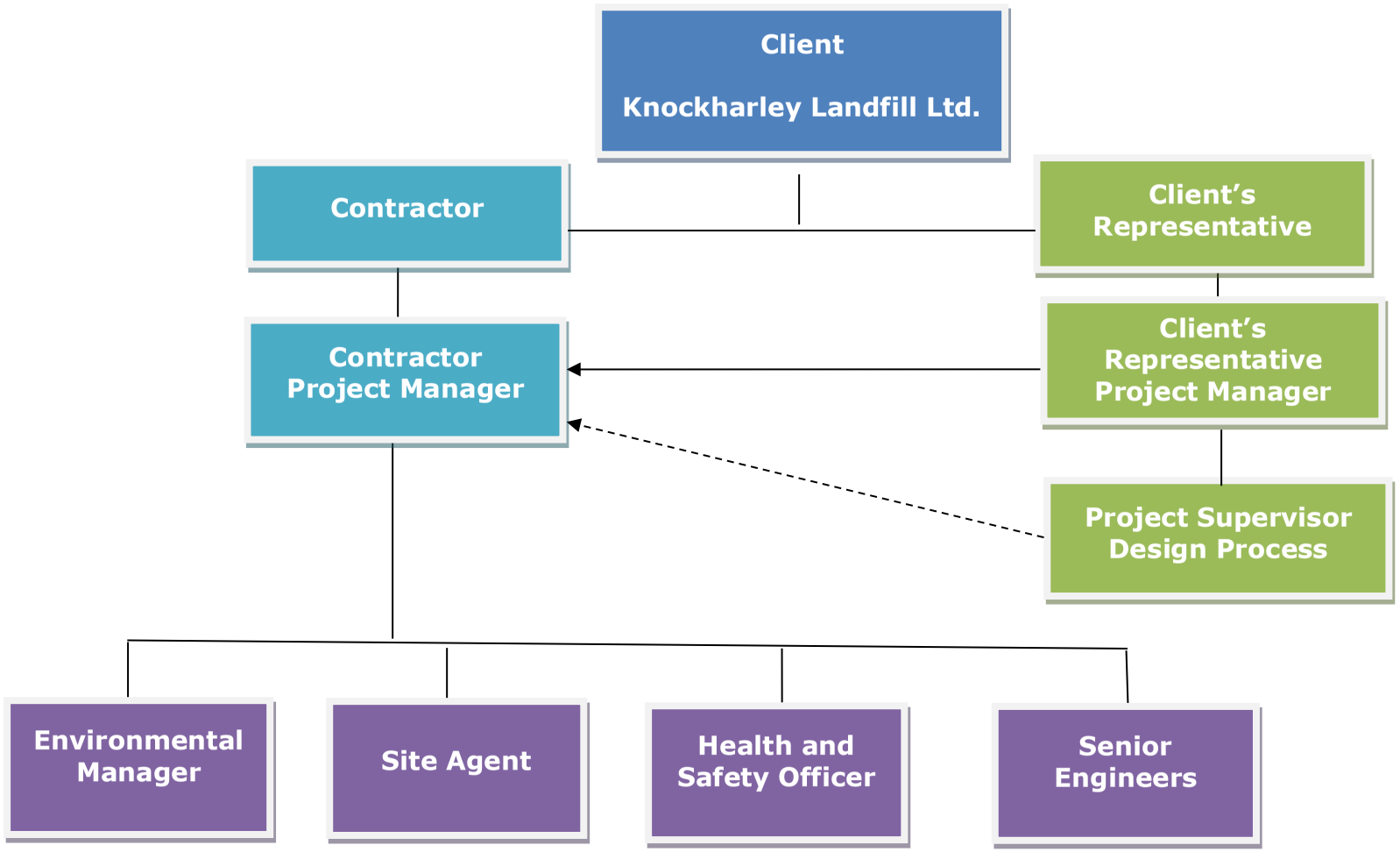

Figure 4.5: Project Management Team Organogram

- **Note – the Contractor PM may fulfil one or all of the sub roles identified**

4.5 Training, Awareness and Competence

All site personnel will receive environmental awareness information as part of their initial site briefing. The detail of the information should be tailored to the scope of their work on site. The Contractor for the main construction works may decide to conduct the environmental awareness training at the same time as health and safety training (often referred to as Site Inductions).

This will ensure that personnel are familiar with the environmental aspects and impacts associated with their activities, the procedures in place to control these impacts and the consequences of departure from these procedures.

The CEMP will be retained in the management office during the project. The environmental performance at the site will be on the agenda of the monthly project management meetings for the project.

Elements of the CEMP will be discussed at these meetings including objectives and targets, the effectiveness of environmental procedures, etc. Two-way communication will be encouraged by inviting all personnel to offer their comments on environmental performance at the site.

4.6 Environmental Policy

The Contractor will be responsible for preparing and maintaining an Environmental Policy for the site. The policy should be appropriate to the project, commit to continuous improvement and compliance with legal requirements and provide a framework for objectives and targets. This will be communicated to all site personnel and will be available on-site notice boards.

4.7 Register of Environmental Aspects

The Contractor will be responsible for preparing and maintaining a *Register of Environmental Aspects* pertaining to the site. This register will identify the environmental aspects associated with activities onsite and determine which aspects have or can have a significant impact on the environment.

4.8 Register of Legislation

The Contractor will be responsible for preparing and maintaining a register of key environmental legislation pertaining to the site. This register will reference all current environmental legislation and will be inspected, reviewed and updated regularly to ensure compliance.

4.9 Objectives and Targets

Objectives and targets will be set by in Contract Documents to ensure that the project will be constructed and operated in full accordance with the EIAR, planning conditions, waste licence and legislative requirements, with minimal impact on the environment.

Environmental objectives are the broad goals that the Contractor must set in order to improve environmental performance. Environmental targets are set performance measurements (key performance indicators or KPI's) that must be met in order to realise a given objective.

The Contractor will be required to manage objectives based on each significant environmental impact. Key objectives are likely to include the following:

- To ensure that nearby rivers and streams are not negatively impacted by construction works
- To ensure that humans are not negatively impacted by dust generated by construction works
- To ensure that humans are not negatively impacted by noise generated by construction works

- To ensure that impacts to habitats and wildlife are minimised during works
- To ensure that a waste management plan for this site will be fully implemented
- To ensure that the visual impact during the construction work is minimised
- To ensure that the proposed development is constructed in compliance with the EIAR.

Performance in relation to each of these objectives will be reviewed on a regular basis by means of inspections, audits, monitoring programmes, etc.

In addition, the requirement of the Industrial Emissions licence to be applicable to the site will define the specific environmental objectives and targets during the construction phase.

4.10 Non-Conformance, Corrective and Preventative Action

Non-conformance notices will be issued where there is a situation where limits associated with activities on the project are exceeded, or there is an internal/external complaint associated with environmental performance.

Non-conformance is the situation where essential components of the EMS are absent or dysfunctional, or where there is insufficient control of the activities and processes to the extent that the functionality of the EMS in terms of the policy, objectives and management programmes, is compromised. A non-conformance register should be controlled by the Contractor.

The EMS and all its components must conform to the EMP, objectives and targets and the requirements of the ISO 14001 management standard.

In the event of non-conformance with any of the above, the following must be undertaken:

- Investigate cause of the non-compliance;
- Develop a plan for correction of the non-compliance;
- Determine preventive measures and ensure they are effective;
- Verify the effectiveness of the correction of the non-compliance;
- Ensure that any procedures affected by the corrective action taken are revised accordingly.

Responsibility must be designated for the investigation, correction, mitigation and prevention of non-conformance.

4.11 EMS Documentation

The Contractor is required to keep the following documentation in relation to the environmental management of the project (as a minimum):

- Construction Environmental Management Plan for the proposed development
- Register of Environmental Impacts
- Register of Planning Conditions
- Monitoring Records
- Minutes of Meetings
- Training Records
- Audit and Review Records.

All of these documents and records are to be available for inspection in the site office. The documentation shall be up to date and shall be reviewed on a regular basis with revisions controlled in accordance with the site quality plan.

It will be a requirement of the EPA Industrial Emissions licence applicable to the site to develop and maintain an Environmental Management programme for the facility.

4.12 Control of Documents

The Contractor will establish, implement and maintain a procedure to control CEMP documents and records so they are clearly identifiable, organised, current, easily located and revised when necessary.

5. SAFETY & HEALTH MANAGEMENT PLAN

5.1 Introduction

This Safety and Health Management Plan (SHMP) will define the work practices, procedures and management responsibilities relating to the management of health and safety during the design, construction and operation of the proposed materials transfer and processing facility at the Millennium Business Park and shall be read in conjunction with the Preliminary Safety & Health Plan prepared for the project by the Project Supervisor for the Design Process. The Safety and Health Management Plan shall be finalised in accordance with this Outline plan following the appointment of the contractor for the main construction works.

This SHMP will describe how the contractor for the main construction works will implement a site safety management system (SMS) on this project to meet the specified contractual, regulatory and statutory requirements, environmental impact assessment report mitigation measures and planning conditions. It is the contractor's responsibility to implement an effective safety management system to ensure that the developer's safety requirements for the construction of this project are met.

All site personnel will be required to be familiar with the requirements of the safety management plan as related to their role on site. The plan describes the project organisation and sets out the health and safety procedures that will be adopted on site.

- The Safety and Health Plan will be a controlled document and will be reviewed and revised as necessary.
- A copy of the Safety and Health Plan will be located on/near the site H&S notice board.
- All employees, suppliers and contractors whose work activities cause/could cause impacts on the environment will be made aware of the SHMP and its contents.

5.2 Project Obligations

The construction of the proposed development will impose numerous safety management obligations on the developer, designer and contractor. As well as statutory obligations, there are a number of specific obligations set out in the EIAR and will be set out in the planning conditions for the proposed development, should it be granted consent. These obligations are set out below. The contractor for the main construction works and all of its sub-contractors will be required to ensure that they are fully aware of and in compliance with these safety obligations.

5.2.1 EIA Obligations

The EIAR for the proposed development identifies mitigation measures that will be put in place to mitigate the potential impacts arising from construction of the project.

5.2.2 Planning Permission Obligations

Should the proposed development be granted consent, the planning conditions will be complied with and should be read in conjunction with this CEMP and other related reports prepared by and on behalf of the developer.

5.2.3 Statutory Obligations

The Safety, Health and Welfare at Work Act 2005 and the Safety, Health and Welfare at Work (Construction) Regulations 2013 place a responsibility on the Developer as the "Client", the Designer, the Project Supervisors and the Contractor.

The Client must:

- Appoint a competent and adequately resourced Project Supervisor for the Design Phase (PSDP)
- Appoint a competent and adequately resourced Supervisor for the Construction Stage (PSCS)
- Be satisfied that each designer and contractor appointed has adequate training, knowledge, experience and resources for the work to be performed
- Co-operate with the project supervisor and supply necessary information
- Keep and make available the safety file for the completed structure
- Provide a copy of the safety and health plan prepared by the PSDP to every person tendering for the project
- Notify the Authority of the appointment of the PSDP.

Designers must:

- Identify any hazards that their design may present during construction and subsequent maintenance
- Eliminate the hazards or reduce the risk
- Communicate necessary control measures, design assumptions or remaining risks to the PSDP so they can be dealt with in the safety and health plan
- Co-operate with other designers and the PSDP or PSCP
- Take account of any existing safety and health plan or safety file
- Comply with directions issued by the PSDP or PSCS.

The PSDP must:

- Identify hazards arising from the design or from the technical, organisational, planning or time related aspects of the project
- Where possible, eliminate the hazards or reduce the risks
- Communicate necessary control measure, design assumptions or remaining risks to the PSCS so they can be dealt with in the safety and health plan
- Ensure that the work of designers is coordinated to ensure safety
- Organise co-operation between designers
- Prepare a written safety and health plan for any project and deliver it to the client prior to tender
- Prepare a safety file for the completed structure and give it to the client.

The PSCS must:

- Co-ordinate the identification of hazards, the elimination of the hazards or the reduction of risks during construction
- Develop the Safety and Health Plan initially prepared by the PSDP before construction commences
- Co-ordinate the implementation of the construction regulations by contractors
- Organise cooperation between contractors and the provision of information
- Co-ordinate the reporting of accidents to the Authority
- Notify the Authority before construction commences
- Provide information to the site safety representative
- Co-ordinate the checking of sage working procedures
- Co-ordinate measures to restrict entry on to the site
- Co-ordinate the provision and maintenance of welfare facilities
- Co-ordinate arrangements to ensure that craft, general construction workers and security workers have a Safety Awareness card, e.g. Safe Pass and a Construction Skills card where required

- Co-ordinate the appointment of a site safety representative where there are more than 20 persons on site
- Appoint a safety adviser where there are more than 100 on site
- Provide all necessary safety file information to the PSDP
- Monitor the compliance of contractors and others and take corrective action where necessary;
- Notify the Authority and the client of non-compliance with any written directions issued.

The Contractor must:

- Co-operate with the PSCS
- Promptly provide the PSCS with information required for the safety file
- Comply with directions of the project supervisors
- Report accidents to the Authority and to the PSCS where an employee cannot perform their normal work for more than 3 days
- Comply with site rules and the safety and health plan and ensure that your employees comply
- Identify hazards, eliminate the hazards or reduce risks during construction
- Facilitate the site safety representative
- Ensure that relevant workers have a safety awareness card and a construction skills card where required
- Provide workers with site specific induction
- Appoint a safety officer where there are more than 20 on site or 30 employed
- Consult workers with site specific induction
- Monitor compliance and take corrective action.

Consequently, at all stages of the project there are statutory requirements for the management of safety, health and welfare of all involved in or affected by the development. As previously outlined, this CEMP and specifically the Safety and Health Management Plan addresses key construction management issues associated with the proposed development. This plan will be developed further at the construction stage, on the appointment of the Contractor for the main construction works.

5.2.4 The Management of Health and Safety during the Design Process

Fehily Timoney & Company (FT) has been appointed Project Supervisor for the Design Process (to prepare the Environmental Impact Assessment Report and planning application for the proposed development) and is competent to fulfil this role in accordance with the Safety, Health and Welfare at Work (Construction) Regulations, 2013. Health and safety are a major priority for FT and FT adopts health and safety practices that are an inherent part of a safe and sustainable business. FT's objective is to provide a safe and healthy work environment for all and to meet our duties to clients, contractors and members of the public.

It is FT's policy to comply fully with all health and safety legislation, in particular the Safety, Health and Welfare at Work Act, 2005, Safety, Health and Welfare at Work (General Application) Regulations 2007, and the Safety, Health and Welfare at Work (Construction) Regulations 2013.

FT has developed in-house procedures to ensure, so far as is reasonably practicable, that all projects:

- are designed to be capable of being constructed to be safe/without risk to health;
- can be operated and maintained safely and without risk to health during use; and
- comply in all respects, as appropriate, with the relevant statutory enactments and instruments.

These procedures include effective risk management procedures involving the identification and evaluation of risks and the development of mitigation measures to eliminate (where possible) or reduce those risks during the life-cycle of the project. The FT team is committed to health and safety and shares responsibility for managing risk at all stages of a project.

All work by FT is undertaken in a competent and efficient manner taking account of the general principles of prevention to safeguard the safety, health and welfare of construction & maintenance workers and other third parties.

The FT procedures for the management of safety during the design process are outlined in the in-house procedure PP09 "Health and Safety Requirements in Design Projects" and is adhered to on all design projects.

The purpose of this procedure is to define the requirements for the management of health & safety during design projects, to ensure compliance with The Safety, Health and Welfare at Work (Construction) Regulations 2013.

The procedure includes standard forms which are used to communicate health and safety considerations within the design team and also guidelines which develop the company's health and safety procedure and outline the company's responsibilities for health and safety during the design process.

The procedure addresses health and safety issues at all stages of a project, from the preliminary design through to commissioning and operation. By establishing a chain of responsibility, each party is clear on their role and obligations from a health and safety perspective. Risk assessments are carried out, at preliminary and detailed design stages by every discipline involved in the design. Each risk assessment is prepared by the designers and reviewed by the Health and Safety Facilitator for the project.

Risk assessments are used to identify hazards and assess risk at all stages during the life of the project including the construction & maintenance stages.

A Health and Safety Facilitator for the Design Process (HSF) is appointed on all projects where FT are the Project Supervisor for the Design Process (PSDP). Health & Safety Facilitators are selected from the senior ranks of FT design staff to ensure they have the required knowledge, experience and training to carry out the role.

Meetings will be held between the HSF and relevant design personnel to collate all the risk assessments and other pertinent information and to discuss any issues relating to health and safety and ensure the constructability of the designs. The minutes of these meetings are circulated to the entire design team complete with actions allocated to the designers as appropriate. At such a meeting a "Construction Risk Analysis" form is completed which forms the basis for the Preliminary Safety & Health Plan. This document outlines the particular, significant and residual risks and in addition specific construction methods or sequences assumed during the design. Special requirements for maintenance envisaged at design stage are also included.

A Designers Safety File shall be kept and maintained during the design. All design criteria adopted, and safety & health information required for the Safety File shall be kept in this file which is maintained by the HSF and is the pre-cursor to the Safety File. The information required from the Contractor/PSCS for inclusion in the Safety File is specified at tender stage in the Preliminary Safety and Health Plan.

This information from the PSCS & Contractor(s) and the Designers Safety File is used to compile the Safety File in the latter stages of a contract and formally issued to the Client on completion of the contract.

FTC promotes a collaborative approach to health and safety on site where the Client, PSDP, Designers, Contractors and PSCS co-operate with each other and share information. Joint site safety audits and/or walk-downs are carried out as part of this collaboration and safety is monitored and addressed on site on an ongoing basis. The regular safety meetings are held to document this ongoing co-operation, get an over-view of works currently in hand onsite and about to commence and share information.

5.2.5 The Preliminary Safety and Health Plan

In accordance with the requirements of the Safety, Health & Welfare at Work (Construction) Regulations 2013, a Preliminary Safety & Health Plan will be required as part of the design process. This plan will be further developed by the PSCS on appointment and maintained as a live document during construction and commissioning of the proposed development.

The safety and health plan is required to include the following information:

- a general description of the project;
- details of other work activities taking place on site;
- works involving particular risks;
- the timescale for the project and the basis on which the time frame was established;
- conclusions drawn by designers and the PSDP having taken into account the General Principles of Prevention and any relevant Safety and Health Plan or Safety File;
- the location of electricity, water and sewage connections so as to facilitate early establishment of welfare facilities.

In accordance with the PSDP's procedures, the Preliminary Safety & Health Plan for the proposed development should include the following sections and subsections to ensure that the PSCS is aware of the health and safety issues at tender stage and enable them to price accordingly:

Preamble:

1 General Project Information:
- 1.1 Title
- 1.2 Description of Project
- 1.3 Employer
- 1.4 Designers/Other Consultants
- 1.5 Project Supervisor Design Process
- 1.6 Drawings, Specifications and Other Documents
- 1.7 Intended Contract Commencement Date
- 1.8 Intended Contract Completion Date
- 1.9 Basis for Contract Duration
- 1.10 Restrictions on Working Hours
- 1.11 Notification of Project
- 1.12 Termination of the PSCS Appointment

2 The Existing Environment:
- 2.1 Site Location
- 2.2 Relevant Adjoining Land Uses
- 2.3 Site Restrictions
- 2.4 Restrictions on Access
- 2.5 Hazardous Area Classification
- 2.6 Existing Services
- 2.7 Ground Conditions
- 2.8 Existing Hazards
- 2.9 Liaison with Statutory Bodies

3 Other Work Activities:
- 3.1 Other Contracts Which May Affect Work
- 3.2 Occupation of Site
- 3.3 Building Activities
- 3.4 Other Work Activities
- 3.5 Emergency Procedures in Place on Site

4 Particular and Residual Risks:
- 4.1 Works Which Puts Persons at Work at Risk
- 4.2 Work Which Puts Persons at Risk from Chemical or Biological Substances
- 4.3 Work with Ionising Radiation

4.4 Work near High Voltage Power Lines
4.5 Work Exposing Persons at Work to the Risk of Drowning
4.6 Work on Wells, Underground Earthworks and Tunnels
4.7 Work Carried Out by Divers at Work Having a System of Air Supply
4.8 Work Carried Out in a Caisson with a Compressed Air Atmosphere
4.9 Work Involving the Use of Explosives
4.10 Work Involving the Assembly or Dismantling of Heavy Prefabricated Components
4.11 Work Involving Hazardous Material
4.12 Residual Risks

5 Additional Information:
5.1 Existing Documents
5.2 Site Possession
5.3 Site Rules
5.4 Site Specific Safety Objectives
5.5 Phasing of Works
5.6 Permits/Authorisation Required
5.7 Maintenance
5.8 Continuing Liaison
5.9 Specific Recommendations

6 Information Required for Safety File:
6.1 Information Required for Safety File from PSCS

5.2.6 The Management of Health and Safety during the Construction Phase

The selection criteria for the Contractor for the works will be based on the ability to construct the works in a manner that will not endanger the safety, health and welfare of any parties and competence to fulfil the role of PSCS.

The contract will be awarded on the basis of assessment of the candidates against relevant health and safety criteria including experience of similar projects, knowledge of the construction processes involved and training of their management and staff who will be involved in carrying out the works.

5.2.7 The Construction Stage Safety and Health Plan

In accordance with the requirements of the Safety, Health & Welfare at Work (Construction) Regulations 2013, the preliminary Safety & Health Plan prepared by the PSDP will be further developed by the PSCS before the commencement of the construction work and updated on a regular basis during the construction phase of the project.

The document will include the following sections and subsections to ensure the management of health and safety during the construction phase of the project:

1. Description of Project:

- project description and programme details
- details of client, PSDP and PSCS, designers
- main contractor and other consultants
- extent and location of existing records and plans
- arrangements for communicating with Contractors, PSDP and others as appropriate

2. Communication and Management of the Work:

- management structure and responsibilities
- safety and health goals for the project and arrangements for monitoring and review of safety and health performance

- arrangements for:
  - regular liaison between parties on site
  - consultation with the workforce
  - the exchange of design information between the Client, Designers, Project Supervisor for the Design Process, Project Supervisor Construction Stage and Contractors on site
  - handling design changes during the project
  - the selection and control of contractors
  - the exchange of safety and health information between contractors
  - security, site induction, and on-site training
  - welfare facilities and first aid
  - the production and approval of risk assessments and method statements
  - the reporting and investigation of accidents and other incidents (including near misses)
- site rules
- fire and emergency procedures

3. Arrangements for Controlling Significant Site Risks:

- safety risks
  - services, including temporary electrical installations
  - preventing falls
  - work with or near fragile materials
  - control of lifting operations
  - dealing with services (water, electricity and gas)
  - the maintenance of plant and equipment
  - poor ground conditions
  - traffic routes and segregation of vehicles and pedestrians
  - storage of hazardous materials
  - dealing with existing unstable structures
  - accommodating adjacent land use
  - other significant safety risks

- health risks:
  - dealing with contaminated land
  - manual handling
  - use of hazardous substances
  - reducing noise and vibration
  - other significant health risks

The construction stage safety and health plan will be maintained on site by the PSCS and will be communicated to all relevant parties on an ongoing basis through inductions, site safety meetings and tool box talks etc. as required.

6. OUTLINE EMERGENCY RESPONSE PLAN

6.1 Introduction

This chapter of the Outline CEMP presents an Outline Emergency Response Plan for the contractor during the construction phase proposed Knockharley Landfill development. The Emergency Response Plan shall be finalised in accordance with this Outline plan following the appointment of the contractor for the main construction works and following detailed design development. There is an existing Emergency Response Plan for the operational licensed facility as approved by the EPA.

This Outline Emergency Response Plan contains predetermined guidelines and procedures to ensure the safety, health and welfare of everybody involved in the project and to protect the environment during the construction phase of the proposed development. This outlines the immediate response to an emergency or disaster situation and will be developed by the main construction works contractor and PSCS as part of their construction stage Safety and Health Plan.

An emergency is any disruptive or harmful event that endangers people, environment, property or assets. Emergencies can be small, as in a fire contained by employees using firefighting equipment or large, as in a disaster resulting from a storm.

In the context of the proposed development at the Knockharley Landfill, examples of Emergency Response Plan emergency events are:

- medical emergency
- explosion
- overheated equipment
- chemical and fuel spill
- fire
- loss of power
- vehicle incidents

Example sources of emergency or disaster events are:

- unstable/inappropriate stockpiles on site
- faulty or incorrect use of equipment
- falls from height
- smoking
- storm/adverse weather
- power failure
- fuel spill
- road failure
- serious vehicle collisions or overturning

6.2 Emergency Response Plan

An emergency response plan deals with the immediate physical effects of a disaster and outlines the initial response.

6.2.1 Emergency Response Liaison

The contractor/PSCS will designate an individual to serve as the Emergency Response Liaison for this project. The emergency response liaison will coordinate the emergency response for the duration of any emergency at or nearby the project site.

Meath County Council, An Garda Síochána and the HSE Ambulance Co-ordinator will be provided with the construction programme and the onsite contact information from the Emergency Response Liaison prior to construction.

The Emergency Response Liaison will be immediately reachable at all times during project construction. The Liaison will coordinate with the above agencies to establish emergency procedures for access to and within the site in the event of an emergency.

6.2.2 Reporting Emergencies

In the event of fire, storm, flood, serious injury or other emergency, contact:

ALL ON SITE EMERGENCIES DIAL 999

6.2.3 Designated Responder

A map depicting the location with the emergency meeting point will be furnished to Meath County Fire & Rescue Service and HSE ambulance co-ordinators.

Upon arrival on the scene, the senior EMS Officer will set up the incident command structure. The Emergency Response Liaison and all contractor's personnel will cooperate with directions of the incident commander and assist as directed.

The nearest emergency services, ambulance and Accident & Emergency (A&E) facilities are:

Service:	Contact Details:	
Accident & Emergency (A&E)	Our Lady of Lourdes Hospital, Drogheda	041 983 7601
Ambulance Service	Dial 112 or 999	
Fire Services	Dial 112 or 999	
Garda Station	Slane Garda Station	041 982 4202

Each member of the contractor's site team who are First-Aid and Cardiopulmonary Resuscitation (CPR) trained personnel will be identifiable with a hard hat sticker indicating their training.

6.2.4 Emergency Alarm

The emergency alarm will be raised on site as soon as an emergency situation is detected, the alarm will be identified (contractor to check those that apply):

Air Horn		Radio		Voice		Hand Signals		Siren	

6.2.5 Emergency Reporting

In the event of an emergency the nearest supervisor with radio equipment/mobile phone will be notified. The degree of emergency will be reported to the Emergency Response Liaison who will contact the Emergency Services and request the appropriate emergency service.

6.2.6 Medical Protocol

In the event of a major medical emergency, the emergency centre (999) will be notified and an ambulance and emergency medical team will respond to the scene. All major medical cases require professional (ambulance) transportation. In the event of a minor medical case, the affected employee can be transported via company vehicle in the escort of a foreman or site engineer (with first aid training).

6.2.7 Emergency Response

Upon notification, the Emergency Response Liaison will respond to the emergency scene and manage emergency operations:

1. Assess hazards and make the area safe – If you cannot enter the area without risking your safety, don't do it, call the Emergency Services immediately and wait for them. If you think you can safely enter the area, look around the emergency scene for anything that can be dangerous or hazardous to you, the casualty, or anyone else at the scene. Bystanders can help with making the area safe. First aid kits will be available on site. Operators that have been first aid/CPR/AED trained will be listed on site and easily identifiable by a hard hat sticker.

2. Take charge of the situation – if you are the first-aid provider on the scene act fast. If someone is already in charge, briefly introduce yourself and see if that person needs any help. If there is any chance the casualty could have a head or spinal injury, tell them not to move.

3. Get Consent – always identify yourself as a first-aid provider and offer to help. Always ask for consent before touching a conscious adult casualty and always ask for consent from a parent or guardian before touching an unconscious or conscious child or infant. With an unconscious adult casualty consent is implied as it is generally accepted that most people want to live. Remember to protect yourself first by wearing gloves and eye protection.

4. Assess Responsiveness – is the casualty conscious or unconscious? Note their response while you are asking them for their consent. If they respond, continue with the primary survey, and if they don't respond, be aware that an unconscious casualty is or has the potential of being a breathing emergency.

5. Call out for help – this will attract bystanders. Help is always useful in an emergency situation. Someone can be called over the phone for medical help. Others can bring blankets if needed, get water, etc. A bystander can help with any of the following:

- Make the area safe.
- Find all the casualties.
- Find the first aid kit, or any useful medical supplies.
- Control the crowd.
- Call for medical help.

- Help give first aid, under your direction.
- Gather and protect the casualty's belongings.
- Take notes, gather information, be a witness.
- Reassure the casualty's relatives.
- Lead the ambulance attendants to the scene of the emergency.
- Notify Emergency Services as soon as you can. Either send a bystander or call yourself.

In the event of a major medical emergency, the Emergency Response Liaison, as the person-in-charge of the emergency scene, will dispatch someone to the site access point nearest the emergency scene to direct and lead arriving outside responders to the emergency scene.

The designated meeting point will be agreed prior to the commencement of construction. Emergency personnel will be met at this meeting point which has been communicated by management during the 999 call. The emergency personnel escort will use the hazard lights on their vehicle so they are easily identified.

6.2.8 Escape and Evacuation Procedure

Dependent upon the degree of the emergency and if safe to do so, employees will evacuate to the designated assembly area where the designated wardens shall account for all employees and determine if anyone still remains within the emergency scene.

Should a wild land fire or peat slippage occur, and the designated assembly area is compromised, other locations will be designated as secondary assembly areas.

6.2.9 Prevention of Illness/Injury due to Weather/Elements

1. All employees will have access to shelter and heat in the event of inclement weather.
2. Employees will have access to at least a litre of water at all times.
3. Weather forecast will be discussed every morning with the crews. Weather conditions and forecast will be monitored regularly by management.
4. No Employee will work alone. A buddy system will be used so employees can contact a supervisor in case of an emergency.

6.2.10 Environmental Emergency Procedure

An emergency preparedness and response procedure is required to prevent environmental pollution incidents. Emergency Silt Control and Spillage Response Procedures are included in Section 4.3.2 of this Outline CEMP.

Suitable spill kits and absorbent material for dealing with oil spills will be maintained on site. In the event of pollution or potential risk of pollution, the Local Authority should be informed immediately.

6.2.11 Emergency Response Plan – Haul Routes

Emergency Response Procedure relating to transportation of plant, equipment and materials to the site will be developed by the main contractor during the construction phase of the development.

[i] www.met.ie

Appendix 8

Surface Water Management Plan

ENVIRONMENTAL BALANCE IN DESIGN AND CONSTRUCTION

APPENDIX 8

SURFACE WATER MANAGEMEN PLAN FOR KNOCKHARLEY LANDFILL

NOVEMBER 2018

Knockharley Landfill Ltd.
Kentstown, Navan,Co.Meath

FEHILY TIMONEY & COMPANY

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1. SURFACE WATER MANAGEMENT PLAN

1.1 Background

Fehily Timoney & Company was commissioned by Knockharley Landfill Limited to update the surface water management plan for the proposed development at Knockharley Landfill, Co. Meath. The surface water management plan was prepared in accordance with CIRIA C698 (1) and Greater Dublin Strategic Drainage Study (GDSDS) (2).

1.2 Scope

The surface water management plan was prepared taking into consideration the preliminary drainage information already included as part of the environmental impact assessment undertaken for the Environmental Impact Assessment Report (EIAR).

This surface water management plan provides for the site layout as set out in Drawing No. LW14-821-01 P000-003 Proposed Site Layout included in Volume 4 of this EIAR.

This report addresses how surface water will be managed on site in terms of infrastructure, operational procedures, monitoring and reporting.

There is an existing surface water attenuation pond on site and Appendix 12-1 of Volume 3 of the EIAR concluded that the size of the attenuation pond (with slight adjustment to the outlet control) would be adequate to provide for the new development in the southern catchment (leachate management and biological treatment facilities) in accordance with current guidance on such facilities in GDSDS (2).

A review of the proposed development also concluded the need for an additional storm water management system to accommodate surface water runoff from the "Northern" catchment within the facility boundary. Details of the "Northern" storm water management system are presented in Chapter 12 of Volume 2 of the EIAR and sizing calculations are included in Appendix 12-4 of Volume 3 of this EIAR.

The following guidelines were also considered in the development of this report:

- The SuDs Manual (3)
- CIRIA Environmental good practice on site Construction Industry Research and Information Association (4)
- Best Practice Guide BPGCS005 Oil Storage Guidelines (5)
- Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Watercourses (6)
- Control of Water Pollution from Linear Construction Sites (C648) (7)
- Control of Water Pollution from Construction Sites. Guidance for Consultants and Contractors (8)
- Sustainable Construction Procurement. A Guide to Delivering Environmentally Responsible Projects (9)
- UK Pollution Prevention Guidelines (PPG):
  - PPG1: Understanding your environmental responsibilities – good environmental practice, 2013 (10)
  - GPPG: Above ground oil storage tanks, 2011 (11)
  - PPG3: Pollution Prevention Guidelines (12)
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  - GPP21: Pollution incident response plans (18)
  - PPG22: Dealing with Spills, 2011 (19)
  - PPG26: Drums and intermediate bulk containers (20)

The purpose of this surface water management plan is to provide a fully informed drainage design to the developer which will satisfy the planning requirements. The surface water management plan will consider the construction, operation and maintenance phases. The decommissioning phase requires the same precautionary measures as the construction phase and is therefore not discussed separately.

The run-off characteristics of the site and the consequent effects on the receiving waters downstream namely the Knockharley Stream, which is a tributary of the River Nanny was examined.

While the proposed development site is not located within a site designated for environmental conservation, four designated sites and one area of scientific interest are located within 5 km of the site, including Balrath Woods (Site Code No. 001579, proposed natural heritage area), Thomastown Bog (Site Code No. 001593, proposed natural heritage area), Rossnaree Riverbank (Site Code No. 001589, proposed natural heritage area), River Boyne and River Blackwater (Site Code 002299, special area of conservation) and Painestown Quarry (Site Code No. 789, area of scientific interest). Chapter 10 of Volume 2 the EIAR shows the location of these designated sites in relation to Knockharley Landfill. It should be noted that Balrath Woods pNHA is located downstream of the site, however none of the other designated sites receive drainage from the existing site.

2. DRAINAGE OF LANDFILL DEVELOPMENT

Knockharley Stream flows east from the western boundary of the facility, through the northern portion of the site where the proposed northern attenuation pond will discharge via a wetland, it then turns south and follows the boundary of the site to the south and continuing south away from the facility to the River Nanny. The stream crosses the boundary and flows into the site in two locations at the east and south east of the facility. The existing southern attenuation pond discharges via a wetland on the southern boundary. A second tributary, the Kentstown Stream flows east along the southern boundary before turning south and joining the Veldonstown Stream, just upstream of its confluence with the Knockharley Steam. The Knockharley Stream is also referred to as the Flemingstown Stream.

The existing and proposed surface water quality and biological monitoring points are shown on Drawing No's LW14-821-01-P-050-001 and LW14-821-01-P-050-002 in Volume 4 of the EIAR. Baseline monitoring was carried out prior to any development on site and monitoring has been carried out throughout the operational phase to date. There is therefore an established database of water quality parameters for the Knockharley Stream in the northern portion of the site where the proposed new attenuation pond will discharge to.

Water quality is monitored upstream and downstream of the site and is compared to the baseline pre-construction to demonstrate that the facility is not impacting on water quality. Water quality monitoring reports are submitted to the EPA in compliance with the licence, any incidents are reported to the EPA in accordance with the licence. A summary of the existing water quality is included in Chapter 12 of the EIAR.

2.1 Existing Surface Water Drainage

Drainage from adjoining lands onto the site is directed around the property and flows into the local drainage network at the southern boundary of the facility.

Surface water from the landfill is drained via the main landfill swale to a purpose-built "Southern" storm water attenuation pond and constructed wetland. Swales are vegetated channels over which flows are treated at low velocities. They are appropriate according to The SuDS Manual (3) as pre-treatment devices for SUDS components receiving point source inflows. The existing swales drain the surface water on the embankments surrounding the landfill cells. These swales are of approximate depth 600 mm with a bottom width of 1000 mm and side slopes at 1 in 3 as shown in Figure 2.1. The swales have been constructed in accordance with CIRIA C698 (1). As the landfill cells develop, the surface water swale will continue to be constructed around the landfill embankments.

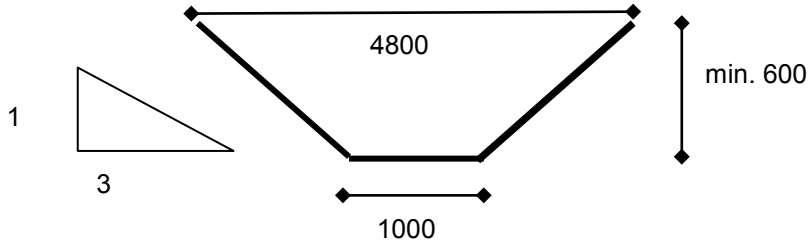

Figure 2.1: Typical Swale Design

The "Southern" storm water attenuation pond is lined with an engineered lining system, comprising a HDPE membrane (permeability $1X10^{-9}$ m/s) and layer of engineered clay to the same specification as the landfill cells. The constructed wetland comprises a shallow clay-lined pond both naturally colonised and planted with appropriate species. The outflow from the constructed wetland flows into the local drainage network at the south-eastern corner of the site.

Surface water arising from all roads and hardstandings is diverted to the main surface water sewer. This surface water trunk sewer serves the overall landfill site and runs from north to south adjacent to the landfill access road to the west of the proposed biological waste treatment facility. This sewer varies from a 225mm diameter up to a 750 mm diameter where it runs through the site of the proposed biological treatment facility.

There is also a 450mm diameter spur from this trunk sewer which runs from east to west and connects to the trunk sewer.

The trunk sewer discharges to an existing attenuation pond and wetland serving the overall site, via a Class 1 bypass proprietary oil/water separator. This petrol interceptor will prevent hazardous chemical and petroleum products from entering the attenuation and wetland system downstream.

This attenuation system was designed to manage the runoff from the development for up to a 1 in 100-year design return period storm event.

Existing Groundwater Drains:

Groundwater drains are built at the bottom of the landfill cells to drain the maximum estimated groundwater flows (3 m^3 per day-see Section 2.5 of this report)) which are expected to be encountered on the site. The groundwater drains consist of trenches of 1000 mm deep and 1000 mm wide below the bottom of the cells. These are filled with filter material and wrapped in geotextile, as shown in Figure 2.2.

150 mm diameter open jointed concrete pipe are installed at the base of the trench. Flows are collected in this pipe and conveyed to the attenuation pond on site.

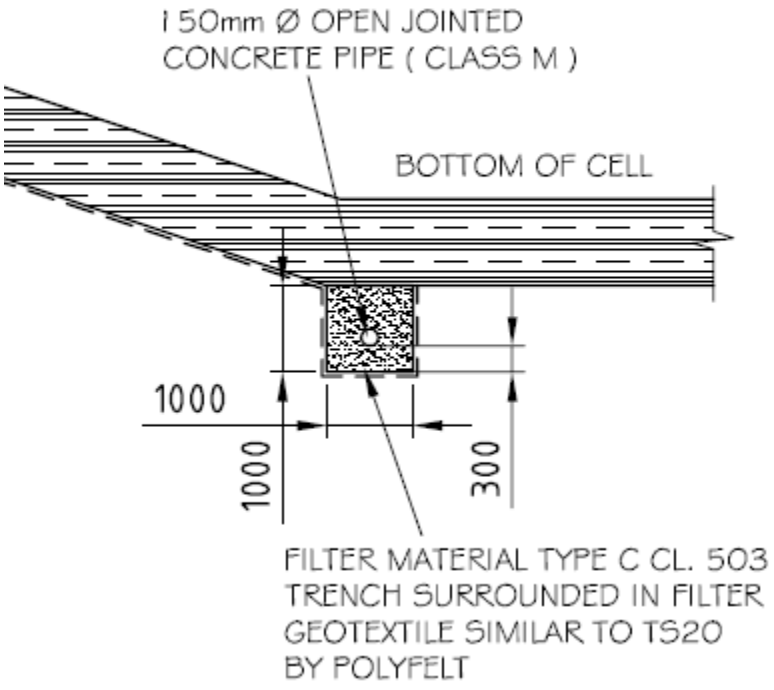

Figure 2.2: Detail of Groundwater Drain

2.2 Proposed Surface Water Drainage

A sustainable urban drainage system (SuDS) approach was applied to storm water management where appropriate and possible within the site, the overall strategy aims to provide an effective system to mitigate the adverse effects of urban storm water runoff on the environment by reducing runoff rates, volumes and frequency, reducing pollutant concentrations in storm water, contributing to amenity, aesthetics and biodiversity enhancement and allow for the maximum collection of rainwater for re-use where possible. In addition, SuDS features will replicate the natural characteristics of rainfall runoff for the site by providing control of run-off at source.

SuDS is a requirement of Meath County Council under the Greater Dublin Regional Code of Practice for Drainage Works (21) and Greater Dublin Strategic Drainage Study (GDSDS) (2). Additionally, these systems are recommended under the new guidelines, The Planning System and Flood Risk Management Guidelines for Planning Authorities (22).

There are a number of SuDS features proposed which have been designed in accordance with The SuDS Manual (3) as follows:

Filter strips (vegetated buffers):

These are vegetated strips of land over which flows are treated at low velocities, as shown in the typical details in Figure 2.3 and Figure 2.4. They are appropriate according to The SuDS Manual (3) as pre-treatment devices for SuDS components receiving sheet flow from adjacent impervious areas. The filter strips provided will be wide, gently sloping areas of grass treating runoff from adjacent impermeable areas and roofs, at source, running over its surface. Filter strips also have an attenuating effect on runoff and can allow some infiltration to the ground where the sub-grade is suitable.

These are located adjacent to hard-standing areas. These filter strips will be located post construction where gentle strips are achieved for example adjacent to the existing administration building, as shown in the Figure below.

Figure 2.3: Typical Filter Strip

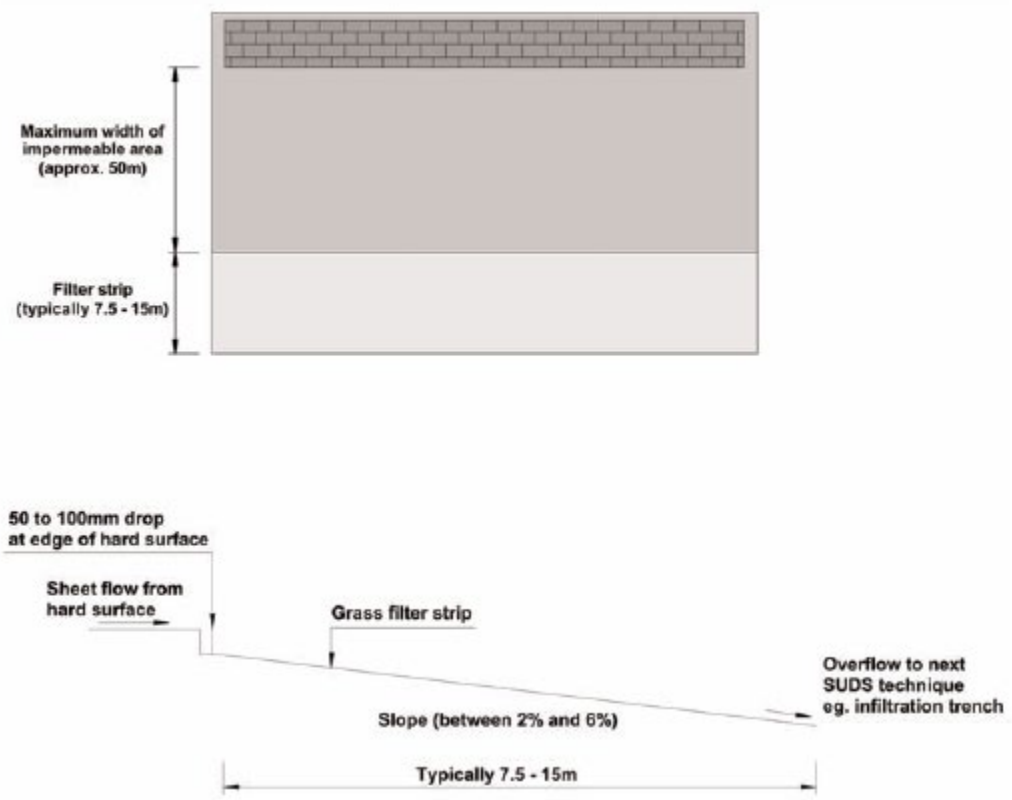

Figure 2.4: Typical Plan and Elevation of Filter Strip

Filter drain:

Filter drains are trenches filled with permeable material with a perforated collection pipe at the invert to collect and convey the water, as shown in Figure 2.5. They may have an optional permeable 'sandy' topsoil at surface. Surface water from the edge of paved areas flows into the trenches, is filtered and conveyed to other parts of the site. The filter drains can treat, convey and attenuate runoff, at source, and can infiltrate to the ground where the sub-grade is suitable. These systems will allow some form of storage for small rainfall events and can result in water evaporation and adsorption in small quantities, therefore there will be less run-off from these areas in small rainfall events thus mimicking the natural response for this catchment. The filter drains proposed for this site will be located adjacent to the access road to the loading areas as shown in Drawings LW14-821-01-P-0000-003 to LW14-821-01-P-0000-011 in Volume 4 of the EIAR.

Figure 2.5: Typical Filter Drain

Silt fences:

Silt fences or similar approved will be provided adjacent to and/or surrounding earthworks and forestry operations to support suspended solids management practised during construction works. Typical details are shown in Drawing LW14-821-01-P-0500-005 of Volume 4 of the EIAR.

Proposed rainwater harvesting and storage systems

Some of the non-potable water requirements of the biological treatment facility along with floor wash-down and vehicle wash-down requirements will be met through utilisation of rain water harvesting.

Two 40 m^3 rain water harvesting tanks (80 m^3 combined capacity) are proposed. Rainwater from the roofs will be collected in a tank and stored for re-use as grey water in the treatment facility, and for supply to a water storage tank as required. This is regarded as a source control technique also. Two systems will be provided, one for each side of the treatment facility, these will be located under the open space area adjacent to the fire tender turning area to the north of the site and the other system will be located under the loading area to the south of the facility. The locations of these systems are shown in Planning Drawings LW14-821-01-P-1700-0003 in Volume 4 of the EIAR.

All of the SuDS designs described above will be installed in accordance with the CIRIA guidance (1). All of the elements of the drainage system are designed to gravitate towards one of the two attenuation ponds .

2.3 Quantity of Surface Water to be used as Process Water

As stated above rainwater harvesting will meet some of the requirements of the non-potable water for office and amenity building (toilets), floor wash-down and vehicle wash-down in the proposed biological treatment facility. At full capacity the expected surface water consumption for process water is estimated as follows:

Floor Wash-down:	50 m^3/month
Vehicle Wash-down:	116 m^3/month
Total:	**166 m^3/month**

The facility will be serviced by the two 40 m^3 rain water harvesting tanks (80 m^3 combined capacity). The total roof area is 5,400 m^2. The annual rainfall for Mullingar, Co. Westmeath[1] provided by Met Éireann is 929 mm. The annual volume of rainwater which can be collected assuming 100% collection efficiencies is therefore 5016.6 m^3. The monthly volume collected will be approximately 416 m^3. On this basis it is expected that the wash down requirements for the facility of 166 m^3 per month will be serviced by the rain water harvesting system. In the event of drought conditions (<34.8 mm in 14 days), it is proposed to pump clean water from the storm water attenuation pond to supplement the rainwater harvesting thus effectively removing the need for potable water within the process, i.e. wash down etc.

When the rain water harvesting tanks are full the incoming flows will be diverted back into the drainage system, which is routed to the attenuation pond. The attenuation ponds are sized to take all the surface water run-off from the site including from the roofs, to allow for a period of shut down at the facility, where the greywater usage will be suspended and the rain water harvesting tanks will remain full (worst case scenario).

[1] Nearby met station

2.4 Attenuation and Sediment Control

In order to avoid an increase in hydrographic peaks due to the proposed development the existing "Southern" attenuation pond (managing surface runoff south of the water shed divide) will be supplemented with a new "Northern" Attenuation Pond. For details of the watershed dividing the site refer to Chapter 12 of Volume 2 of the EIAR.

The attenuation ponds together with adjacent wetlands, will also operate as settlement areas. The efficiency of the attenuation ponds to settle out suspended solids have been estimated to reduce the outflow concentration of suspended solids to less than 25 mg/l. This is below the waste licence limit of 35 mg/l and is within the limits set out in the European Directive 2006/44/EC on the quality of fresh waters needing protection or improvement in order to support fish life. The "Southern" attenuation pond and wetland are already in place at the site. The proposed "Northern" attenuation pond and wetland will be the first element of constuction within the "Northen" catchment. Any disturbance during construction will not increase the suspended solids concentration above the allowable limits. Calculations for attenuation and settlement and the criteria applied are included in Appendix 12-4 of Volume 3 of the EIAR.

The greenfield discharge for respective catchments was calculated using the following equation:

$$QBAR = 0.00108 (Area^{0.89})(SAAR^{1.17})(Soil^{2.17})$$

The 20 year growth factor of 1.52 was then applied to QBAR for the greenfield site. The permitted outflow rate for a 20 year storm was determined as 0.255 m^3/s and 0.284 m^3/s for the northern and southern ponds respectively.

Checks on the pond size were undertaken with regard to the efficiency of the removal of pollutants as recommended by CIRIA B14 (23) and GDSDS guidelines (2) and these are included in the pond calculations.

Both attenuation ponds were designed to fully attenuate a 1 in 20-year flow and to contain a 1 in 100-year flow preventing it from overtopping the banks of the pond, in accordance with the GDSDS guidelines (2). An overflow weir in the "Southern" storm water management system is in place to take the flows in excess of the 1 in 20- year flow. An overflow weir in the proposed "Northern" attenuation pond will discharge via a baffled chute structure to the Knockharley stream. Normal outflows from both attenuation ponds (existing and proposed) will gravitate through wetlands before reaching the Knockharley Stream at their respective locations. The normal outflow is controlled to the green field (pre-development) flow rates by an outlet control valve.

It is proposed to adjust the outflow control to cater for the additional volumes associated with the proposed development south of the water shed in the "Southern" storm water attenuation pond. The modifications will not impact on the design philosophy outlined which limits the flows from the ponds to greenfield rates and also provides suspended solids treatment for all the discharges and runoff from paved areas. The proposed "Northern" attenuation pond will employ a floating outflow structure or similar approved to maintain greenfield rates. The ponds and wetland locations are shown on Drawing No. LW14-821-01-P-0000-005 Proposed Site Layout Plan Sheet 2 of 8 in Volume 4 of the EIAR and are also illustrated in Figure 12.9 of Chapter 12 of Volume 2 of the EIAR. Calculations for the design are included in Appendix 12-4 of Volume 3 of this EIAR.

All drainage will be put in place ahead of construction such that any part of the proposed development will have a functioning drainage system in place.

The proposed development will impact surface water runoff from both the Northern and Southern catchments of the site. The surface water inputs to the respective site drainage systems are set out in Table 2.1.

As each phase of the landfill is constructed, groundwater seeps may be encountered. Under- cell drainage has been installed which discharges to the surface water system. This drainage system effectively depresses the overburden water table to the underside level of the landfill liner.

The actual flow was measured on 4th May 2011 at just under 1 m^3 per day. Since 16 of 28 landfill cells are fully developed and construction of two more is nearly complete, the groundwater catchment currently draining to the groundwater drain is 50% of the total. It is estimated that full development at the current levels would result in twice the current discharge at 2 m^3 per day.

For the proposed development it is proposed to construct the IBA cells above the level of the existing landfill cells on average by approximately 3 to 4 m (for cells 29 through to 32). The groundwater drainage will be connected by gravity to the lower adjacent groundwater system underlying cell 16. An estimate for the long-term combined flow from the groundwater drainage system of 3 m^3 per day is deemed to be conservative. The groundwater flows will be accommodated in the storm water pond. In the context of the overall hydrological regime, this flow is of very low significance.

Table 2.1: Surface Water Input to the Site Drainage System

Catchment	Site Area	Capped area	Impermeable Area	Greenfield Area
	ha	ha	ha	ha
Northern	73.74	13.43	6.95	56.27
Southern	66.19	19.63	3.31	43.25

The following assumptions were made in the determination of the quantity of surface water to be discharged to the on-site drainage system:

- The new roads, hardstanding and buildings all have an impermeability factor of 1.0
- Rainwater harvesting has not been taken into account in this calculation (conservative assessment).
- Capped landfill cells/green areas have an impermeability factor of 0.25, based on the recommended range of values for the impermeability factor for parks (0.1 - 0.3) in Waste and Wastewater Engineering Systems (24). The impermeability factor takes account of infiltration and evapotranspiration at the capped landfill.
- Groundwater flows, estimated at 3 m^3 per day are conveyed to the pond which has the capacity to cater for these flows.

Appendix 12.1 of Volume 3 of the EIAR shows the existing "Southern" stormwater attenuation lagoon has sufficient attenuation and suspended solids managmet capacity to accommodate additional loading from the propoosed leachate managment and biological treatment facilities.

Appendix 12.4 of Volume 3 of the EIAR provides details of runoff from the "Northern" catchment and capacities of the proposed holding pond and attenuation lagoon.

In Appendix 12.6 Hydrological Study of Volume 3 of the EIAR, the Knockharley Stream was assessed for its capacity to accommodate the catchment 100-year flow, as well as the maximum attenuated discharge from the overall site development ("Northern" and "Southern" catchment outfalls). A maximum outflow of 1.83 m^3/s was determined from the model for a 100-year flood event. For the purposes of modelling the stream post development, the area contributing to the southern attenuation pond was excluded from the catchment flows for Q100 as appropriate along the route of the stream and the pond outflow for Q100 was inputted at the pond outfall to the stream. The hydraulic model of the Knockharley Stream did not indicate that any increase in flood risk would occur downstream as a result of the proposed works. Conversely, the controlled outflow from the proposed attenuation pond indicated that a lag is introduced in the system which will result in a slight decrease in flood flows downstream.

2.5 Proposed Mitigation during Construction

Mitigation measures proposed during the construction phase are outlined in Chapter 12 and in in Appendix 2-0 Construction and Environmental Management Plan (CEMP) of Volume 3 of the EIAR.

Key objectives in the CEMP to prevent runoff and consequent sediment release into the nearby watercourses receiving flow from the proposed development site are summarised below as follows:

- During the permitted stream diversion and culverting, in-stream sedimentation traps will be positioned prior to construction, and maintained for the duration. All diverted water /run-off can be sent to the onsite surface water attenuation lagoon to minimise sediment entering the stream, if required.
- Additional silt fencing and silt-prevention measures will be kept on site for use in emergencies. All silt fencing as required will be installed in advance of the works.
- No work will take place on site during severe weather conditions.
- All fuels will be kept in bunded areas. Any diesel or fuel oils stored on site will be bunded to 110 % of the capacity of the storage tank in accordance with the facilities waste licence. Design and installation of fuel tanks to be in accordance with best practice guidelines BPGCS005, oil storage guidelines.
- Re-fuelling of plant during construction will be carried out in a designated refuelling area.
- During construction, daily visual inspections will be performed. If sediment appears to be entering streams, work will stop immediately and measures to identify the source will be undertaken and measures undertaken to stop further sediment entering the stream.
- The proposed berms will be re-planted as either compensatory forestry or. with a suitable mix of native tree and shrub species and should be akin to the existing planting scheme.

2.6 Proposed Mitigation During Operation and Maintenance

The existing landfill facility was designed to ensure surface water discharges to receiving waters are not detrimental to water quality. Rainfall on the undeveloped parts of the site discharge directly to the surface water drainage system. Rainfall on active fill and waste storage areas is collected in the leachate collection system. The surface drainage from all roads, capped areas and hard standing areas is directed to the surface water attenuation pond via an oil interceptor. Drainage from the existing waste inspection and quarantine bays is directed to the leachate lagoon. Drainage from the biological treatment facility will be directed to an underground leachate tank.

In addition:

- All surface water run-off from the permitted development will flow through an existing class 1 interceptor. This petrol interceptor will prevent chemical and petroleum products from entering the attenuation and wetland system downstream. Surface water will discharge from the interceptor to the existing attenuation pond and wetland provided for the landfill. Additional Class 1 interceptors will be provided for the proposed development at outfalls from filter drains surrounding the IBA facility.
- Bypass chambers in the road drainage system surrounding the IBA facility will direct contaminated storm runoff into the adjacent IBA facility cell 32 at two locations during IBA operations.
- Both (existing "Southern" and proposed "Northern") surface water attenuation ponds are / will be sized to manage a 1 in a 100-year storm, in accordance with the GDSDS guidelines (2).
- Constructed wetlands downstream of the existing "Southern" and proposed "Northern" attenuation ponds will receive surface water discharges to further attenuate flows and 'polish' storm water suspended solids before discharge to the Knockharley Stream.
- A combination of roof and pavement storm water will be managed to provide an effective system to mitigate the adverse effects of storm water runoff on the environment. There are a number of SuDS features proposed such as filter strips, filter drains and rainwater harvesting from the roof of the biological treatment facility and stored in tanks, for grey water usage.

- All fuels are to be kept in bunded areas. Any diesel or fuel oils stored on site will be bunded to 110 % of the capacity of the storage tank in accordance with the facilities waste licence. Design and installation of fuel tanks to be in accordance with best practice guidelines BPGCS005, oil storage guidelines.
- There is continuous monitoring of total organic carbon, pH and conductivity on the "Southern" surface water attenuation pond discharge and there is an automated shut-off of discharge in the event of exceedance of the trigger level for TOC which is 20 mg/l.
- There will be continuous monitoring of total organic carbon, pH, turbidity and conductivity on the "Northern" surface water holding pond discharge and there will be an automated shut-off of discharge in the event of an exceedance of the trigger level which will be initially set at 20 mg/l TOC
- Ongoing biannual surface water physio-chemical and annual biological monitoring will be undertaken in accordance with the licence conditions. Comparison of upstream and downstream monitoring locations will ensure there is no long-term impact on the surface quality in waters receiving drainage from the site.
- In the event of a pollution incident onsite, the discharge from the existing "Southern" surface water pond can be shut down to prevent pollution entering the watercourse. In the event of a pollution incident on the proposed "Northern" development the discharge from the holding pond and attenuation pond can be shut down to prevent pollution entering the watercourse.
- In the event of an upstream pollution event off-site, there is also a diversion device at the "Southern" outfall on the Knockharley stream to allow the stream to be diverted into the sites pollution control infrastructure, if required.
- Inspection and maintenance of the surface water management system including swales, culverts, rainwater harvesting tank filters and outfalls will be undertaken regularly, to ensure no blockages have occurred and the system is operating correctly

2.7 Proposed Mitigation during Decommissioning

In the event of decommissioning of the development, activities would take place in a similar fashion to the construction phase. There would be disturbance to underlying soils and therefore a risk again of silt laden run-off entering the receiving watercourse. The mitigation applied will therefore be as for the mitigation during construction as outlined in Section 2.6 above.

2.8 Proposed Flood Compensation Culvert

It is proposed to replace the existing culvert at CH4695 with a new flood compensation culvert at CH4814 where the stream flows through the site. The proposed "Southern" storm water attenuation pond is shown in Drawing LW14-821-01-P-0500-000 with details in Drawings 001 through 004 in Volume 4 of the EIAR

The proposed flood compensation culvert location at CH4814 is designed to facilitate two primary functions:

- conveyance of 1:100-year events, and
- throttling of 1:1000-year flood events to provide compensation storage.

The preliminary sizing of the orifice to facilitate upstream flood compensation during a 1:1000-year flood events is 825 mm diameter. The orifice will be placed on the headwall of a 1500 mm culvert which will convey both 1:100 and 1:1000-year flood events. The orifice will facilitate passing of 1:100-year flood events with minimal impacts on upstream levels. The orifice will throttle 1:1000-year flood events, cause upstream levels to rise to c. 60.5 mAOD and provide compensatory flood protection for the receiving downstream catchment. The flood compensation volume will be greater than the volume lost through placing the "Northern" storm water management system within a 1:1000-year flood plain.

If the flood compensation culvert becomes blocked an overflow spill will be provided to accommodate a 1:1000-year flood event.

Compensatory flood storage will be provided within the development area if the 1 in 100-year flood is exceeded. In such an event, when the attenuation pond has reached its 1 in 100-year flood event capacity, the inlet into the pond will be closed and surface water held in a holding pond upstream of the northern attenuation pond.

A Section 50 application will be submitted to the Office of Public Works (OPW) at detailed design stage for approval for the proposed culvert.

2.9 Permitted Stream Diversion

Permission was granted in the original planning permission to divert a section of the Knockharley Stream at the north western corner of the landfill footprint. The design of the proposed stream diversion at CH5113 (part of the development) will increase the flow path by approximately 8 m. The bed slope between these two points will change from 1:124 over the original 130 m to 1:171 over the new length of 171 m. The impacts of the increase in length and change in grade was re-examined in the 2016 HECRAS hydraulic model as part of the Hydrological Study (Appendix 12.6 of Volume 3 of the EIAR). The model showed that, the existing stream channel along this section of the reach of the stream had adequate capacity to contain the design flood flow between these two points and the new length showed no decrease in that capacity. The cross-section of the diverted stream will remain unchanged.

A Section 50 application will be submitted to the Office of Public Works (OPW) at detailed design stage for approval for the proposed stream diversion.

2.10 Maintenance and Monitoring

- Inspection and maintenance of the surface water management system including swales, culverts, rainwater harvesting tanks and outfalls will be undertaken regularly, to ensure no blockages have occurred and the system is operating correctly.
- Adequate access will be provided to all swale areas for inspection and maintenance.
- The landfill operater shall have responsibility for ensuring that all the mitigation and maintenance measures included in the surface water management plan are put in place.
- Water quality monitoring will be carried out in accordance with the licence during the construction and operation and aftercare stages.
- The CEMP details the emergency plan for a surface water incident during construction.

Appendix 9

Conservation Objectives

ISSN 2009-4086

National Parks and Wildlife Service

Conservation Objectives Series

River Nanny Estuary and Shore SPA 004158

An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

National Parks and Wildlife Service,
Department of Arts, Heritage and the Gaeltacht,

7 Ely Place, Dublin 2, Ireland.

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Introduction

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the most vulnerable of them. These two designations are collectively known as the Natura 2000 network.

European and national legislation places a collective obligation on Ireland and its citizens to maintain habitats and species in the Natura 2000 network at favourable conservation condition. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.

A site-specific conservation objective aims to define favourable conservation condition for a particular habitat or species at that site.

The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level.

Favourable conservation status of a habitat is achieved when:

- its natural range, and area it covers within that range, are stable or increasing, and
- the specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future, and
- the conservation status of its typical species is favourable.

The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Notes/Guidelines:

1. The targets given in these conservation objectives are based on best available information at the time of writing. As more information becomes available, targets for attributes may change. These will be updated periodically, as necessary.
2. An appropriate assessment based on these conservation objectives will remain valid even if the targets are subsequently updated, providing they were the most recent objectives available when the assessment was carried out. It is essential that the date and version are included when objectives are cited.
3. Assessments cannot consider an attribute in isolation from the others listed for that habitat or species, or for other habitats and species listed for that site. A plan or project with an apparently small impact on one attribute may have a significant impact on another.
4. Please note that the maps included in this document do not necessarily show the entire extent of the habitats and species for which the site is listed. This should be borne in mind when appropriate assessments are being carried out.
5. When using these objectives, it is essential that the relevant backing/supporting documents are consulted, particularly where instructed in the targets or notes for a particular attribute.

Qualifying Interests

**** indicates a priority habitat under the Habitats Directive***

004158 River Nanny Estuary and Shore SPA

A130	Oystercatcher *Haematopus ostralegus*	wintering
A137	Ringed Plover *Charadrius hiaticula*	wintering
A140	Golden Plover *Pluvialis apricaria*	wintering
A143	Knot *Calidris canutus*	wintering
A144	Sanderling *Calidris alba*	wintering
A184	Herring Gull *Larus argentatus*	wintering
A999	Wetlands	

Supporting documents, relevant reports & publications (listed by date)

Supporting documents, NPWS reports and publications are available for download from: www.npws.ie/Publications

Title: River Nanny Estuary and Shore SPA (004158). Conservation objectives supporting document [Version 1]

Year: 2012

Author: NPWS

Series: Unpublished Report to NPWS

A130 Oystercatcher *Haematopus ostralegus*

To maintain the favourable conservation condition of Oystercatcher in River Nanny Estuary and Shore SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Waterbird population trends are presented in part four of the conservation objectives supporting document
Distribution	Range, timing and intensity of use of areas	There should be no significant decrease in the range, timing or intensity of use of areas by oystercatcher other than that occurring from natural patterns of variation	As determined by regular low tide and other waterbird surveys. Waterbird distribution from the 2011/2012 waterbird survey programme is discussed in part five of the conservation objectives supporting document

A137 Ringed Plover *Charadrius hiaticula*

To maintain the favourable conservation condition of Ringed Plover in River Nanny Estuary and Shore SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Waterbird population trends are presented in part four of the conservation objectives supporting document
Distribution	Range, timing and intensity of use of areas	There should be no significant decrease in the range, timing or intensity of use of areas by ringed plover other than that occurring from natural patterns of variation	As determined by regular low tide and other waterbird surveys. Waterbird distribution from the 2011/2012 waterbird survey programme is discussed in part five of the conservation objectives supporting document

A140 Golden Plover *Pluvialis apricaria*

To maintain the favourable conservation condition of Golden Plover in River Nanny Estuary and Shore SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Waterbird population trends are presented in part four of the conservation objectives supporting document
Distribution	Range, timing and intensity of use of areas	There should be no significant decrease in the range, timing or intensity of use of areas by golden plover other than that occurring from natural patterns of variation	As determined by regular low tide and other waterbird surveys. Waterbird distribution from the 2011/2012 waterbird survey programme is discussed in part five of the conservation objectives supporting document

A143 Knot *Calidris canutus*

To maintain the favourable conservation condition of Knot in River Nanny Estuary and Shore SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Waterbird population trends are presented in part four of the conservation objectives supporting document
Distribution	Range, timing and intensity of use of areas	There should be no significant decrease in the range, timing or intensity of use of areas by knot other than that occurring from natural patterns of variation	As determined by regular low tide and other waterbird surveys. Waterbird distribution from the 2011/2012 waterbird survey programme is discussed in part five of the conservation objectives supporting document

A144 Sanderling *Calidris alba*

To maintain the favourable conservation condition of Sanderling in River Nanny Estuary and Shore SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Waterbird population trends are presented in part four of the conservation objectives supporting document
Distribution	Range, timing and intensity of use of areas	There should be no significant decrease in the range, timing or intensity of use of areas by sanderling other than that occurring from natural patterns of variation	As determined by regular low tide and other waterbird surveys. Waterbird distribution from the 2011/2012 waterbird survey programme is discussed in part five of the conservation objectives supporting document

A184 Herring Gull *Larus argentatus*

To maintain the favourable conservation condition of Herring Gull in River Nanny Estuary and Shore SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Waterbird population trends are presented in part four of the conservation objectives supporting document
Distribution	Range, timing and intensity of use of areas	There should be no significant decrease in the range, timing or intensity of use of areas by herring gull other than that occurring from natural patterns of variation	As determined by regular low tide and other waterbird surveys. Waterbird distribution from the 2011/2012 waterbird survey programme is discussed in part five of the conservation objectives supporting document

A999 Wetlands

To maintain the favourable conservation condition of the wetland habitat in River Nanny Estuary and Shore SPA as a resource for the regularly-occurring migratory waterbirds that utilise it. This is defined by the following attribute and target:

Attribute	Measure	Target	Notes
Wetland habitat	Area (ha)	The permanent area occupied by the wetland habitat should be stable and not significantly less than the area of 230ha, other than that occurring from natural patterns of variation	The wetland habitat area was estimated as 230ha using OSi data and relevant orthophotographs. For further information see part three of the conservation objectives supporting document

An Roinn Ealaíon, Oidhreachta agus Gaeltachta
Department of Arts, Heritage and the Gaeltacht

MAP 1:
RIVER NANNY ESTUARY AND SHORE SPA
CONSERVATION OBJECTIVES SPA DESIGNATION

Map to be read in conjunction with the NPWS Conservation Objectives Document.

SITE CODE:
SPA 004158 Version 2.03

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Map Version 1
Date: Aug 2012