Lobinstown Quarry

Environmental Impact Assessment Report

Appendix 11

Report for the purposes of

Appropriate Assessment Screening

2024

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Report for the purposes of Appropriate Assessment Screening

Lobinstown Quarry Extension

Prepared by: Moore Group – Environmental Services

13December 2023

On behalf of Lagan Materials Ltd. t/a Breedon Ireland

Project Proponent	Lagan Materials Ltd. t/a Breedon Ireland
Project	Lobinstown Quarry Extension
Title	Report for the purposes of Appropriate Assessment Screening Lobinstown Quarry Extension

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Abbreviations

AA	Appropriate Assessment
ABP	An Bord Pleanála
CEMP	Construction Environmental Management Plan
EEC	European Economic Community
EPA	Environmental Protection Agency
EU	European Union
FWPM	Freshwater Pearl Mussel
GIS	Geographical Information System
LAP	Local Area Plan
NHA	Natural Heritage Area
NIS	Natura Impact Statement
NPWS	National Parks and Wildlife Service
OSI	Ordnance Survey Ireland
pNHA	proposed Natural Heritage Area
SAC	Special Area of Conservation
SPA	Special Protection Area
SuDS	Sustainable Drainage System
UÉ	Uisce Éireann
WFD	Water Framework Directive

1. Introduction

1.1. General Introduction

This report for the purposes of Appropriate Assessment (AA) Screening contains information required for the competent authority to undertake screening for Appropriate Assessment (AA) in respect of a proposed development at Heronstown, Lobinstown, Navan, Co. Meath, to determine whether it is likely individually or in combination with other plans or projects to have a significant effect on any European sites, in light of best scientific knowledge. The development will consist of the continuance of operation of the existing permitted quarry and associated infrastructure (ABP Ref. 17.QD.0017; P.A. Ref. LB200106 & ABP Ref. 309109-21), deepening of the quarry extraction area by 1 no. 15 metre bench from 50m OD to 35m OD, a lateral extension to the quarry over an area of c. 4.8 ha to a depth of 35m OD, provision for aggregates and overburden storage, and restoration of the site to natural habitat after uses following completion of extraction, within an overall application area of c. 18.5 hectares. An extraction capacity of up to 300,000 tonnes per annum is sought to provide the applicant with the ability to respond to demand for aggregates in the region. Permission is sought for a period of 20 years.

Having regard to the provisions of the Planning and Development Act 2000 – 2021 (the "Planning Acts") (section 177U), the purpose of a screening exercise under section 177U of the PDA 2000 is to assess, in view of best scientific knowledge, if the proposed development, individually or in combination with other plans or projects is likely to have a significant effect on a European site.

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 then it is necessary to carry out a Stage 2 appropriate assessment under section 177V of the Planning Acts.

When screening the project, there are two possible outcomes:

- the project poses no potential for the possibility of a significant effect and as such requires no Stage 2 assessment; or

- the project has potential to have a significant effect (or this is uncertain and therefore cannot be excluded) and therefore a Stage 2 Appropriate Assessment of the project is necessary.

This report has been prepared by Moore Group – Environmental Services to enable the competent authority to carry out AA screening in relation to the Proposed Development. The report was compiled by Ger O'Donohoe B.Sc. Applied Aquatic Sciences (ATU Galway, 1993) & M.Sc. Environmental Sciences (TCD, 1999), who has 30 years' experience in environmental impact assessment and has completed numerous Appropriate Assessment

Screening Reports and Natura Impact Statements on terrestrial and aquatic habitats for various development types.

1.2. Legislative Background - The Habitats and Birds Directives

Article 6(3) and 6(4) of the Habitats Directive are transposed into Irish Law inter alia by the Part XAB of the Planning Acts (in particular section 177U and 177V), which governs the requirement to carry out appropriate assessment screening and appropriate assessment, where required, per Section 1.1 above.

The Habitats Directive (Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora) is the main legislative instrument for the protection and conservation of biodiversity in the European Union (EU). Under the Habitats Directive, Member States are obliged to designate Special Areas of Conservation (SACs) that contain habitats or species considered important for protection and conservation in an EU context.

The Birds Directive (Council Directive 2009/147/EC on the conservation of wild birds), transposed into Irish law by the Bird and Natural Habitats Regulations 2011, as amended, and the Wildlife Act 1976, as amended, is concerned with the long-term protection and management of all wild bird species and their habitats in the EU. Among other things, the Birds Directive requires that Special Protection Areas (SPAs) be established to protect migratory species and species that are rare, vulnerable, in danger of extinction, or otherwise require special attention.

SACs designated under the Habitats Directive and SPAs, designated under the Birds Directive, form a pan-European network of protected sites known as Natura 2000. The Habitats Directive sets out a unified system for the protection and management of SACs and SPAs. These sites are also referred to as European sites.

Articles 6(3) and 6(4) of the Habitats Directive set out the requirement for an assessment of proposed plans and projects likely to have a significant effect on Natura 2000 sites.

Article 6(3) establishes the requirement to screen all plans and projects and to carry out an appropriate assessment if required (Appropriate Assessment (AA)). Article 6(4) establishes requirements in cases of imperative reasons of overriding public interest:

> ***Article 6(3):*** *"Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subjected to an appropriate assessment of its implications for the site in view of the site's conservation objectives. In 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."*

2. Methodology

The Commission's methodological guidance (EC, 2002, 2018, 2021; see Section 2.1 below) promotes a four-stage process to complete the AA and outlines the issues and tests at each stage. An important aspect of the process is that the outcome at each successive stage determines whether a further stage in the process is required.

Stages 1 and 2 deal with the main requirements for assessment under Article 6(3). Stage 3 may be part of Article 6(3) or may be a necessary precursor to Stage 4. Stage 4 is the main derogation step of Article 6(4).

Stage 1 Screening: This stage examines the likely effects of a project either alone or in combination with other projects upon a Natura 2000 site and considers whether it can be objectively concluded that these effects will not be significant. In order to screen out a project, it must 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.

Stage 2 Appropriate Assessment: This stage examines whether it is likely that the project, either alone or in combination with other projects or plans, will have a significant effect upon a European site. In order to 'screen out' a project (i.e., in order to conclude that it is not necessary to move to the 'Stage 2' appropriate assessment stage (see directly below), the possibility that the Proposed Development (individually or in combination with other plans or projects) will have a significant effect on a European site must be excluded on the basis of objective information.

Stage 3 Assessment of Alternative Solutions: This stage examines alternative ways of implementing the project that, where possible, avoid any adverse impacts on the integrity of the Natura 2000 site.

Stage 4 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 sites will be necessary.

To ensure that the Proposed Development complies fully with the requirements of Article 6 of the Habitats Directive and all relevant Irish transposing legislation, this report has been compiled by Moore Group to enable the competent authority to carry out AA screening in relation to the Proposed Development to determine whether it can 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(s).

2.1. Guidance

This report has been compiled in accordance with guidance contained in the following documents:

- Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities. (Department of Environment, Heritage and Local Government, 2010 rev.).
- Appropriate Assessment under Article 6 of the Habitats Directive: Guidance for Planning Authorities. Circular NPWS 1/10 & PSSP 2/10.
- Managing Natura 2000 Sites: The Provisions of Article 6 of the Habitat's Directive 92/43/EEC (EC, 2018).
- Guidance Document on the Strict Protection of Animal Species of Community Interest under the Habitats Directive (EC, 2021).
- Assessment of Plans and Projects in relation to Natura 2000 sites: Methodological Guidance on Article 6(3) and (4) of the Habitats Directive 92/43/EEC (EC, 2021).
- OPR Practice Note PN01: Appropriate Assessment Screening for Development Management (Office of the Planning Regulator (OPR), 2021).

2.2. Data Sources

Sources of information that were used to collect data on the Natura 2000 network of sites, and the environment within which they are located, are listed below:

- The following mapping and Geographical Information Systems (GIS) data sources, as required:
    - National Parks & Wildlife (NPWS) protected site boundary data;
    - Ordnance Survey of Ireland (OSI) mapping and aerial photography;
    - OSI/Environmental Protection Agency (EPA) rivers and streams, and catchments;
    - Digital Elevation Model over Europe (EU-DEM);
    - Google Earth and Bing aerial photography 1995-2023;
- Online data available on Natura 2000 sites as held by the National Parks and Wildlife Service (NPWS) from www.npws.ie including:
    - Natura 2000 - Standard Data Form;
    - Conservation Objectives;
    - Site Synopses;
- National Biodiversity Data Centre records;
    - Online database of rare, threatened and protected species;
    - Publicly accessible biodiversity datasets.
- Status of EU Protected Habitats in Ireland (National Parks & Wildlife Service, 2019);
- Lobinstown Quarry, Heronstown, Lobinstown, Navan, Co. Meath. EIAR (December 2023); and
- Relevant Development Plans;
    - Meath County Development Plan 2021-2027

3. Description of the Proposed Development

The proposed development at Heronstown, Lobinstown, Navan, Co. Meath will consist of the continuance of operation of the existing permitted quarry and associated infrastructure (ABP Ref. 17.QD.0017; P.A. Ref. LB200106 & ABP Ref. 309109-21), deepening of the quarry extraction area by 1 no. 15 metre bench from 50m OD to 35m OD, a lateral extension to the quarry over an area of c. 4.8 ha to a depth of 35m OD, provision for aggregates and overburden storage, and restoration of the site to natural habitat after uses following completion of extraction, within an overall application area of c. 18.5 hectares. An extraction capacity of up to 300,000 tonnes per annum is sought to provide the applicant with the ability to respond to demand for aggregates in the region. Permission is sought for a period of 20 years.

Blasting will continue to be used as the method of extraction, to fragment the rock prior to crushing and screening using mobile plant on the quarry floor, and aggregate washing within the site boundary using mobile wash plant. The existing site infrastructure includes site entrance with c. 350 m long paved internal roadway, internal access roads, weighbridge, wheelwash, portacabin office, car park, mobile crushing, screening and wash plant, settlement lagoon system, and other ancillaries, which will be retained for the duration of the works. An effluent treatment system also exists on-site.

Discharge of water from the settlement lagoon at the northern boundary of the existing quarry into the adjacent Killary Stream and ultimately the Dee River is undertaken in compliance with a current, valid trade effluent discharge licence consent (Ref. 20/01) which is included as Appendix 1. Screening for appropriate assessment (AA Screening) was undertaken as part of the discharge licence application process for discharge licence Ref. 20/01. The AA Screening concluded that a stage two appropriate assessment (Natura Impact Statement, (NIS)) was not required.

The licence permits the following maximum discharge rates:

- Daily maximum flow = 1,728 m^3/d.
- Hourly maximum flow = 72 m^3/hr.

The licence is subject to certain conditions, with items relevant to this assessment specified as follows:

- The treatment shall comprise a main settlement pond area of 2,000 m^2, water depth 1.5 m, a settlement pond of area 100 m^2 at the western boundary which connects to the main settlement pond, a Class I hydrocarbon interceptor after the outlet of the main settlement pond (ref: conditions 1.3 & 1.5).
- In the event of a prolonged period of heavy or sustained rainfall the licencee shall cease to discharge water from the quarry site where it appears that the discharge from the quarry is causing or is likely to cause flooding of lands downstream of the quarry (ref. condition 1.11).
- The licencee shall install an in-line flow measuring device in order to measure discharge flow rate of the final treated effluent (ref. condition 1.16).
- Effluent as discharged shall comply with the quality standards set out hereunder in respect of the following determinants (ref. condition 2.2):
  - BOD = 2 mg/l
  - COD = 50 mg/l
  - Suspended solids = 20 mg/l
  - pH = 6.0 – 9.0
  - Orthophosphate as P = 0.050 mg/l
  - Nitrates as N = 10 mg/l
  - Ammonium, as N = 0.10 mg/l
  - BTEX Compounds = 10 µg/l
  - Total Petroleum Hydrocarbons = 50 µg/l
- The licencee shall arrange for quarterly sampling and analysis of the discharge for the determinants listed above (ref: condition 3.1).

The site specific flood risk assessment (FRA) undertaken by Envirologic confirms that there is no potential for flooding impacts at the maximum discharge rates permitted under the discharge licence. The application site is not located in the floodplain of the river running east to west outside the northern boundary (named by the EPA as the Killary Water_010). A copy of the FRA is enclosed in Appendix 2 of this AA Screening.

Field drilling, pump tests, response tests, hydrogeological modelling using the field results suggests that the average daily discharge volume from the entire application area, i.e. the current permitted working quarry extended one bench deeper (to 35m OD) and the lateral extension proposed for the eastern greenfield application area, can be accommodated by the existing infrastructure. Hence, a review of the existing discharge licence is not required.

The existing surface water management system has been assessed as being appropriate and may be considered in the AA Screening under recent ECJ determination (Case Ref. C-721/21[1]) as an existing design measure in the consideration of hydrology and the source-pathway-receptor model. It is addressed comprehensively in Chapter

[1] Court of Justice of the European Union. 15 June 2023. Eco Advocacy v. An Bord Pleanála

7 of the EIAR accompanying the planning application (Lobinstown Quarry EIAR, 2024). A summary of the aspects of the water chapter that may have hydroecological significance is included as Appendix 3 to this AA Screening. The salient points of the summary are reiterated here.

On the basis of the EPA Envision published HydroTOOL low flow (NATQ95) values for the rivers of the catchment (Hydrometric Area) feeding into Dundalk Bay, the following is true:

1. The total NATQ95 low flow volume of waters entering Dundalk Bay SAC and SPA, *via* all of its rivers, is 204,682 m^3/d.

2. The site's Section 4 Discharge licence permits a maximum daily discharge volume of 1,728 m^3/d.

3. In the event that the maximum permitted discharge volume was simultaneously discharged from the application site at the same time that all rivers were in the low flow condition, which is a highly unlikely scenario, the site's discharge waters would represent 0.8% of the total waters contributing to Dundalk Bay. This value of <1% is considered by all techniques for impact assessment as presenting no potential for impact.

With respect to hydrochemistry, sample results presented for the site's discharge quality show that the discharge is compliant with the Conditions of the Discharge Licence Ref: 20/01. It is noted that the Conditions of the Discharge Licence are specified so as to protect all downstream receptors. In particular, the following comments can be made with respect to the quality of water discharged from the site under the requirements of the current discharge licence:

a) The discharge is relatively neutral pH with the 6-9 pH ELV always being complied with.
b) Suspended Solids (SS) concentrations are very low, with respect to the 20mg/l ELV. All current discharge licence SS results concentration are below <3mg/l.
c) Orthophosphate as P concentrations are continuously less than the Limit of Detection of the laboratory. The results are always a small fraction of the ELV for MRP-P.
d) The discharge does not present a Biochemical Oxygen Demand (BOD), in general. Results are usually less than the Limit of Detection of the laboratory for BOD. A slight exceedance in April 2023 is not considered a breach of ELV. Results remain compliant for five subsequent sampling events.
e) The discharge does not present a Chemical Oxygen Demand (COD), in general. Results are usually less than the Limit of Detection of the laboratory for COD. The results are always a small fraction of the ELV for COD.
f) Ammonium-N concentrations are an order of magnitude lower than specified in the ELV of the Licence.
g) Nitrate-N concentrations in the discharge are less that the 10mg/l NO3-N ELV.
h) There are no detections of petroleum hydrocarbons in the discharge.
i) There are no detections of BTEX compounds in the discharge.

It is therefore concluded that the site's discharge complies with the hydrochemical ELVs of Condition 2.2 of the current Discharge Licence Ref. 20/01.

The water management components already established include, as follows:

- The floor sump in the south of the working bedrock extraction area.
- A western lagoon that collects rainfall runoff water from the road that is used by trucks entering and leaving the site.
- A fully functioning, high engineered, wheel wash and associated sump.
- A final lagoon, which receives water pumped from the floor sump and the western sump.
- A Class 1 oil separator.
- A flow meter.
- A discharge pipe with concrete plinth to diffuse and aerate discharge water as it is delivered to the receiving water.

With respect to the ability of the site's existing infrastructure to treat the future proposed total area's waters to the satisfaction of the Conditions of the existing Section 4 Discharge Licence, the only parameter that has the potential to change is the Suspended Solids concentrations arising. All other parameters will average the same for the working area. Suspended solids can change with blasting and workings. The site discharges an average Suspended Solids (SS) concentration of 3mg/l SS. The permitted ELV for SS is 20 mg/l (DL Ref 20/01). Therefore, the site uses 15% of the ELV limit as mg/l. However, if one were to consider that 1,728m^3/d is permitted at 20 mg/l then the LOAD of SS permitted is 34.56 kg/d. The site discharges, on average, 174 m^3/d at 3 mg/l = 0.52 kg/d. Therefore, the site discharges 1.5% of the permitted load of SS. Therefore, there is treatment function and hydraulic capacity in the systems already in place on the site. The significant capacity available in the Discharge Licence Conditions, underutilised treatment capacity and treatment function in the as built settlement lagoons, is such that the chemistry of all the water anticipated to be encountered by the proposed extension can be accommodated and treated by the existing infrastructure. The proposed development's waters will be adequately treated and appropriately attenuated in compliance with the existing site discharge licence without the need for any additional water treatment infrastructure.

It should be noted that Screening for appropriate assessment (AA Screening) was undertaken as part of the discharge licence application process for discharge licence Ref. 20/01. The AA Screening concluded that a stage two appropriate assessment (Natura Impact Statement, (NIS)) was not required.

The main settlement pond has a footprint of 2,000 m^2 and is fully functional. Surface water level in the settlement pond was measured to be 86.1m OD in November 2023, with a bank top of 86.5m OD, above a pond base elevation of 85m OD, approximately. The depth capacity of this main settlement lagoon is therefore 1.5m.

Given the dimensions of the final settlement lagoon, the hydraulic capacity is 3,105m^3. On the basis that the maximum discharge rate is 1,728 m^3/d, there is a guaranteed 1.75 day retention time in the settlement lagoons. This retention time is significantly greater than best practice specifications for retention times for settlement of solids.

Figure 1 shows the Proposed Development location and Figure 2 shows a detailed view of the Proposed Development boundary on recent aerial photography.

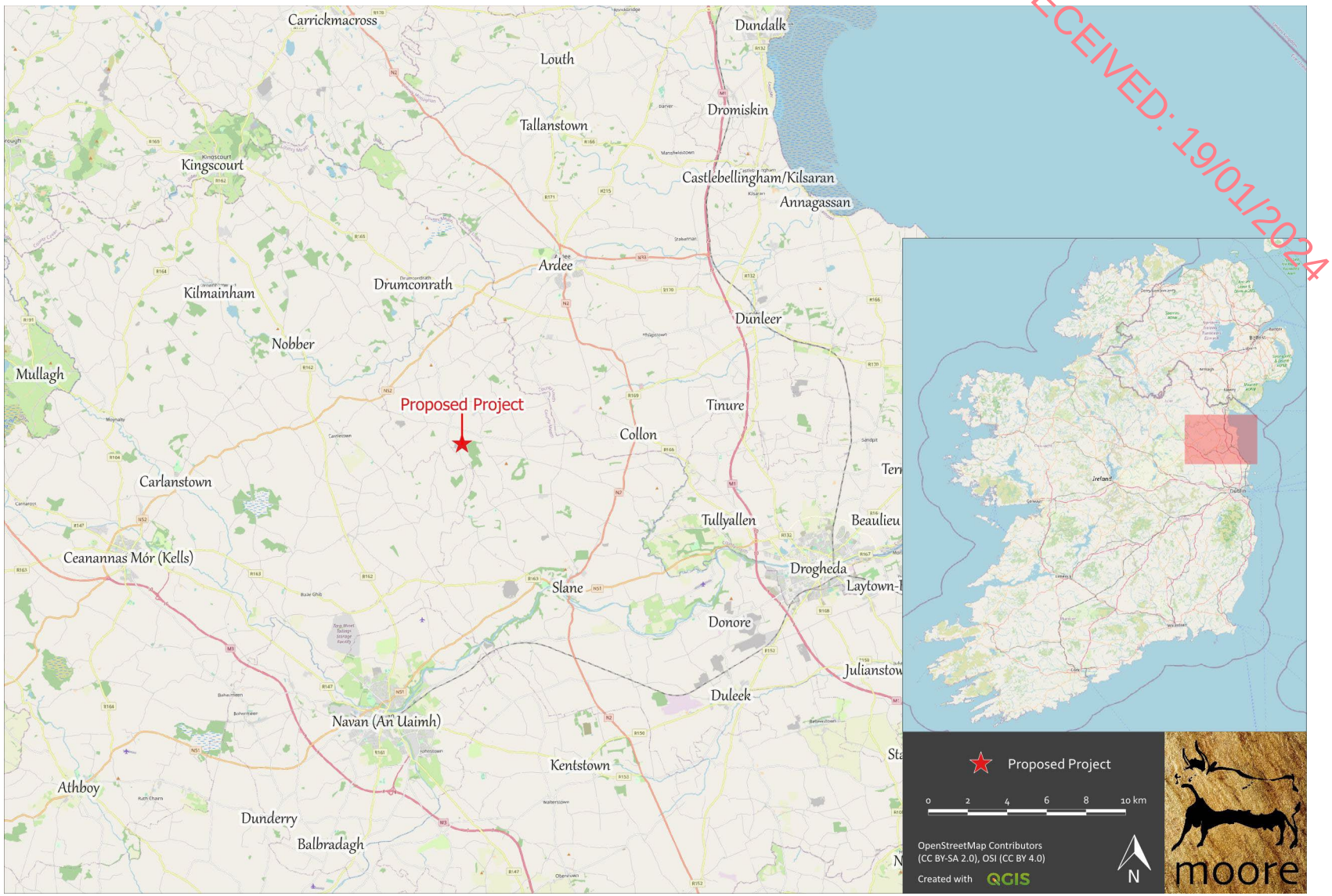


Figure 1. Showing the Proposed Development location at Lobinstown, Co. Meath.

Figure 2. Showing the Proposed Development Boundary on recent aerial photography.

4. Identification of Natura 2000 Sites

4.1. Description of Natura Sites Potentially Significantly Affected

A Zone of Influence (ZoI) of a proposed development is the geographical area over which it could affect the receiving environment in a way that could have significant effects on the Qualifying Interests of a European site. In accordance with the OPR Practice Note PN01 (2021), the ZoI should be established on a case-by-case basis using the Source- Pathway-Receptor framework.

The European Commission's "*Assessment of plans and projects in relation to Natura 2000 sites guidance on Article 6(3) and (4) of the Methodological Habitats Directive 92/43/EEC*", published 28 September 2021, states at section 3.1.3, that:

"Identifying the Natura 2000 sites that may be affected should be done by taking into consideration all aspects of the plan or project that could have potential effects on any Natura 2000 sites located within the zone of influence of the plan or project. This should take into account all of the designating features (species, habitat types) that are significantly present on the sites and their conservation objectives. In particular, it should identify:

- *any Natura 2000 sites geographically overlapping with any of the actions or aspects of the plan or project in any of its phases, or adjacent to them;*
- *any Natura 2000 sites within the likely zone of influence of the plan or project Natura 2000 sites located in the surroundings of the plan or project (or at some distance) that could still be indirectly affected by aspects of the project, including as regards the use of natural resources (e.g. water) and various types of waste, discharge or emissions of substances or energy;*
- *Natura 2000 sites in the surroundings of the plan or project (or at some distance) which host fauna that can move to the project area and then suffer mortality or other impacts (e.g. loss of feeding areas, reduction of home range);*
- *Natura 2000 sites whose connectivity or ecological continuity can be affected by the plan or project".*

The range of Natura 2000 sites to be assessed, i.e., the zone in which impacts from the plan or project may arise, will depend on the nature of the plan or project and the distance at which effects may occur. For Natura 2000 sites located downstream along rivers or wetlands fed by aquifers, it may be that a plan or project can affect water flows, fish migration and so forth, even at a great distance. Emissions of pollutants may also have effects over a long distance. Some projects or plans that do not directly affect Natura 2000 sites may still have a significant impact on them if they cause a barrier effect or prevent ecological linkages. This may happen, for example, when plans affect features of the landscape that connect Natura 2000 sites or that may obstruct the

movements of species or disrupt the continuity of a fluvial or woodland ecosystem. To determine the possible effects of the plan or project on Natura 2000 sites, it is necessary to identify not only the relevant sites but also the habitats and species that are significantly present within them, as well as the site objectives.

The Zone of Influence may be determined by considering the Proposed Development's potential connectivity with European sites, in terms of:

- Nature, scale, timing and duration of all aspects of the proposed works and possible impacts, including the nature and size of excavations, storage of materials, flat/sloping sites, etc.;
- Distance and nature of potential pathways (dilution and dispersion; intervening 'buffer' lands, roads, etc.); and
- Location of ecological features and their sensitivity to the possible impacts.

The potential for source pathway receptor connectivity is firstly identified through GIS interrogation and detailed information is then provided on sites with connectivity. European sites that are located within a potential Zone of Influence of the Proposed Development are listed in Table 1 and presented in Figures 3 and 4 below. Spatial boundary data on the Natura 2000 network was extracted from the NPWS website (www.npws.ie) on 14 November 2023. This data was interrogated using GIS analysis to provide mapping, distances, locations and pathways to all sites of conservation concern including pNHAs, NHA and European sites.

Table 1 European Sites located within the potential Zone of Influence[2] of the Proposed Development.

Site Code	Site name	Distance (km)[3]
000455	Dundalk Bay SAC	21.47
002299	River Boyne And River Blackwater SAC	7.96
004026	Dundalk Bay SPA	21.47
004232	River Boyne and River Blackwater SPA	8.34

The Proposed Development is located within the hydrological catchment of the Killary Water, a tributary of the River Dee, within an agricultural area of north Co. Meath.

The nearest European sites to the Proposed Development are associated with the River Boyne and include the River Boyne and River Blackwater SAC (Site Code 002299), which is located almost 8 km to the southeast, and the River Boyne and River Blackwater SPA (Site Code 004232), which is located approximately 8.3 km to the southeast. However, the Proposed Development lies in a separate hydrological catchment to the River Boyne and the associated sites referenced above, and there is no connectivity to these sites and the River Boyne.

[2] All European sites potentially connected irrespective of the nature or scale of the Proposed Development.
[3] Distances indicated are the closest geographical distance between the Proposed Development and the European site boundary, as made available by the NPWS.

The Killary Water flows into the River Dee almost 10 river kilometres downstream, which discharges into Dundalk Bay a further 30 river kilometres downstream.

The Qualifying Interests (QIs) and Special Conservation Interests (SCIs) of the European sites in the Zone of influence of the Proposed Development are provided in Table 2 below.

*Table 2 Identification of relevant European sites using Source-Pathway-Receptor model and compilation of information on QIs and conservation objectives. *Priority Habitats*

European Site name, Site code and Conservation Objectives	**Location Relative to the Proposed Development Site**	**Connectivity – Source-Pathway-Receptor**	**Considered further in Screening – Y/N**
Dundalk Bay SAC (000455) The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest: 1130 Estuaries 1140 Mudflats and sandflats not covered by seawater at low tide 1220 Perennial vegetation of stony banks 1310 *Salicornia* and other annuals colonizing mud and sand 1330 Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) 1410 Mediterranean salt meadows (*Juncetalia maritimi*) NPWS (2011) Conservation Objectives: Dundalk Bay SAC 000455 and Dundalk Bay SPA 004026. Version 1.0. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.	21.4km to the northeast of the Proposed Development	There are no direct pathways to this site. The Killary Water flows into the River Dee almost 10 river kilometres downstream, which discharges into Dundalk Bay a further 30 river kilometres downstream. (Refer to Section 3 above)	Yes, see Table 3 below.
Dundalk Bay SPA (004026) The overall aim of the Birds Directive is to maintain or restore the favourable conservation status of habitats and species of community interest: A005 Great Crested Grebe *Podiceps cristatus* wintering A043 Greylag Goose *Anser anser* wintering A046 Light-bellied Brent Goose *Branta bernicla hrota* wintering A048 Shelduck *Tadorna tadorna* wintering A052 Teal *Anas crecca* wintering	21.4km to the north of the Proposed Development	The Killary Water flows into the River Dee almost 10 river kilometres downstream, which discharges into Dundalk Bay a further 30 river kilometres downstream. (Refer to Section 3 above)	Yes, see Table 3 below.

European Site name, Site code and Conservation Objectives	Location Relative to the Proposed Development Site	Connectivity – Source-Pathway-Receptor	Considered further in Screening – Y/N
A053 Mallard *Anas platyrhynchos* wintering A054 Pintail *Anas acuta* wintering A065 Common Scoter *Melanitta nigra* wintering A069 Red-breasted Merganser*Mergus serrator* wintering A130 Oystercatcher *Haematopus ostralegus* wintering A137 Ringed Plover *Charadrius hiaticula* wintering A140 Golden Plove *Pluvialis apricaria* wintering A141 Grey Plover *Pluvialis squatarola* wintering A142 Lapwing *Vanellus vanellus* wintering A143 Knot *Calidris canutus* wintering A149 Dunlin C*alidris alpina* wintering A156 Black-tailed Godwit *Limosa limosa* wintering A157 Bar-tailed Godwit *Limosa lapponica* wintering A160 Curlew *Numenius arquata* wintering A162 Redshank *Tringa totanus* wintering A179 Black-headed Gull *Chroicocephalus ridibundus* wintering A182 Common Gull *Larus canus* wintering A184 Herring Gull *Larus argentatus* wintering A999 Wetlands & Waterbirds NPWS (2011) Conservation Objectives: Dundalk Bay SAC 000455 and Dundalk Bay SPA 004026. Version 1.0. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.			

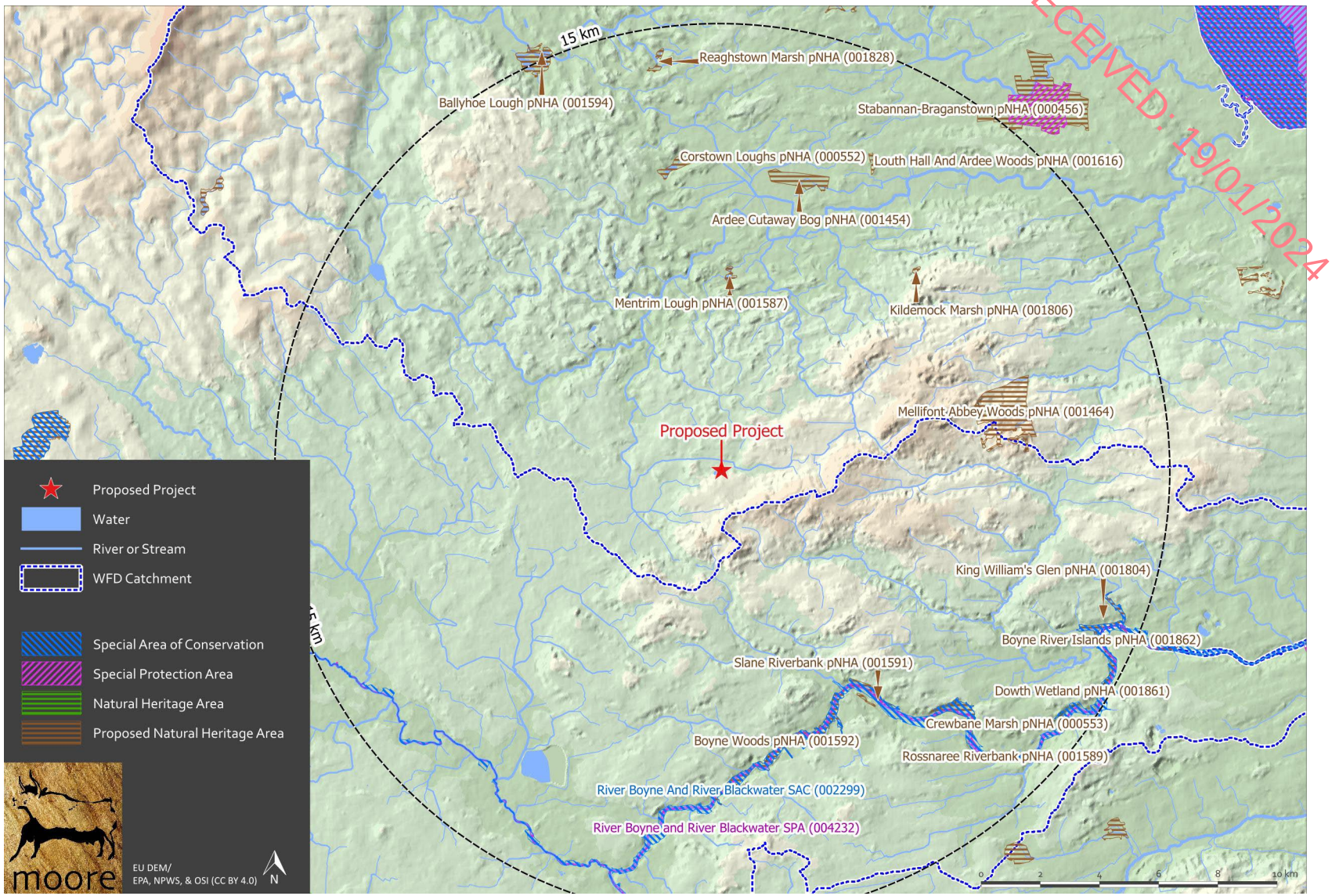


Figure 3. Showing European sites and NHAs/pNHAs within the wider (15 km) Potential Zone of Influence of the Proposed Development.

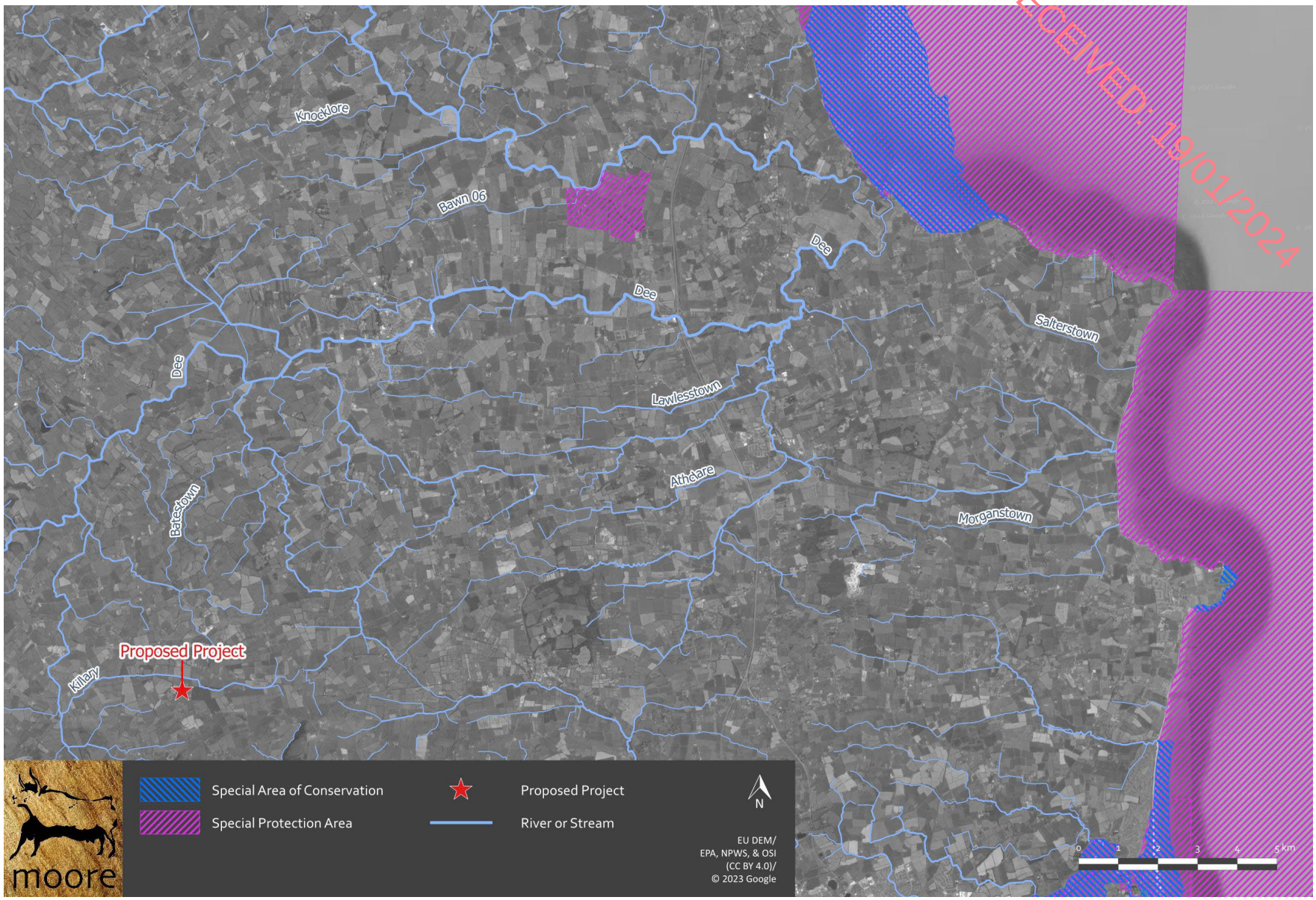


Figure 4. Detailed view of European sites in the nearer Potential Zone of Influence of the Proposed Development.

4.2. Ecological Network Supporting Natura 2000 Sites

A concurrent GIS analysis of the proposed Natural Heritage Areas (pNHA) and designated Natural Heritage Areas (NHA) in terms of their role in supporting the species using Natura 2000 sites was undertaken along with GIS investigation of European sites. These supporting roles mainly relate to mobile fauna, such as mammals and birds, which may use pNHAs and NHAs as ecological corridors or "stepping stones" between Natura 2000 sites.

Article 10 of the Habitats Directive and the Habitats Regulations 2011 place a high degree of importance on such non-Natura 2000 areas as features that connect the Natura 2000 network. Features such as ponds, woodlands and important hedgerows were taken into account in the decision process and during the preparation of this AA Screening report.

It is noted that there is a European site; Stabannan-Braganstown SPA (Site Code004091) 5.7 km to the west of the southern portion of Dundalk Bay SAC and SPA. The hydrogeologists for this assessment advise that the application site has no hydrological connectivity to Stabannan-Braganstown SPA by virtue of the fact that the EPA maps the catchment of the Stabannan-Braganstown SPA to be part of the Glyde River. The application site is mapped by the EPA to be part of a completely different river, named the Dee. Thus, there is no connectivity to this site.

The NHAs and pNHAs identified in Figure 4 are located outside the Zone of Influence of the proposed development.

5. Identification of Potential Impacts & Assessment of Significance

The Proposed Development is not directly connected with or necessary to the management of the sites considered in the assessment and therefore potential impacts must be identified and considered.

5.1. Assessment of Likely Significant Effects

The consideration of all potential direct and indirect impacts that may result in significant effects on the conservation objectives of a European site, taking into account the size and scale of the Proposed Development are presented in Table 2.

Table 2. Assessment of Likely Significant Effects.

Identification of all potential direct and indirect impacts that may result in significant effects on the conservation objectives of a European site, taking into account the size and scale of the project.	
Impacts:	**Significance of Impacts:**
Construction phase e.g. Vegetation clearance Demolition Surface water runoff from soil excavation/infill/landscaping (including borrow pits) Dust, noise, vibration Lighting disturbance Impact on groundwater/dewatering Storage of excavated/construction materials Access to site Pests	None The Proposed Development site includes lands located within the boundary of improved grassland. A minor stream tributary of the Killary Stream has been excluded from the proposed extension area and there is no direct connectivity to the River Dee downstream. Given the very large distance of removal from Dundalk Bay at over 40 km downstream, the possibility of a significant effect can be excluded due to the large volume of intervening dilution which has been determined by the project hydrologists and included in Section 3 above and in Appendix 3 to this report. Field drilling, pump tests, response tests, chemical analyses and hydrogeological modelling using the field results suggests that the average daily discharge from the entire application area, i.e. the operational consented working quarry brought one bench deeper and the excavations proposed for the eastern greenfield application area, can be accommodated by the existing infrastructure and the existing discharge licence in terms of expected water quantity and water quality. Again, detail on this is provided by the project hydrologists and included in Section 3 above and in Appendix 3 to this report.
Operational phase e.g. Direct emission to air and water Surface water runoff containing contaminant or sediment Lighting disturbance Noise/vibration Changes to water/groundwater due to drainage or abstraction Presence of people, vehicles and activities	There is no real likelihood of any significant effects on European Sites in the wider catchment area. The Proposed Development is located at a distance of removal such that there will be no disturbance to qualifying interest species in any European sites. This system of water management will continue to operate during the extension construction and operational phases in compliance with the requirements of the existing discharge licence (Ref. 20/01). Screening for appropriate assessment (AA Screening) was undertaken as part of the discharge licence application process. The AA Screening concluded that a stage two appropriate assessment (Natura Impact Statement, (NIS)) was not required.

Physical presence of structures (e.g. collision risks)	Field drilling, pump tests, response tests, chemical analyses and hydrogeological modelling using the field results suggests that the average daily discharge from the entire application area, i.e. the operational consented working quarry brought one bench deeper and the excavations proposed for the eastern greenfield application area, can be accommodated by the existing water management infrastructure and the existing discharge licence in terms of expected water quantity and water quality. The existing water management system is considered appropriate and may be considered in the AA Screening under recent ECJ determination (Case Ref. C-721/21) as an existing design measure in the consideration of hydrology and the source-pathway-receptor model. It is addressed comprehensively in the summary of EIAR Chapter 7 Water Aspects with hydroecological significance document which is included as Appendix 3 to this AA Screening with salient points of the summary reiterated in Section 3 of this report.
Describe any likely changes to the European site:	
Examples of the type of changes to give consideration to include: Reduction or fragmentation of habitat area Disturbance to QI species Habitat or species fragmentation Reduction or fragmentation in species density Changes in key indicators of conservation status value (water quality etc.) Changes to areas of sensitivity or threats to QI Interference with the key relationships that define the structure or ecological function of the site Climate change	None. The Proposed Development site is not located adjacent or within a European site, therefore there is no risk of habitat loss or fragmentation or any effects on QI habitats or species directly or ex-situ.

5.2. Assessment of Potential In-Combination Effects

In-combination effects are changes in the environment that result from numerous human-induced alterations. In-combination effects can be thought of as occurring through two main pathways: first, through persistent additions or losses of the same materials or resource, and second, through the compounding effects as a result of the coming together of two or more effects.

As part of the Screening for an Appropriate Assessment, in addition to the Proposed Development, other relevant plans and projects in the area must also be considered at this stage. This step aims to identify at this early stage any possible significant in-combination effects of the Proposed Development with other such plans and projects on European sites.

A review of the National Planning Application Database was undertaken. The database was then queried for developments granted planning permission within 1,000 m of the Proposed Development within the last three years, these are presented in Table 3 below.

Table 3. Planning applications granted permission in the vicinity of the Proposed Development.

Planning Ref.	Description of development	Comments
LB201976	the construction of new 1.5 storey dwelling with proprietary waste water treatment system and percolation area, new entrance onto public road and all associated site works. Significant further information/revised plans submitted on this application	The planning authority concluded that the proposed development (entire project), by itself or in combination with other plans and developments in the vicinity, would not likely to have a significant effect on European site(s).
211266	dwelling house, detached domestic garage, wastewater treatment system and percolation area and all associated site works. Significant further information/revised plans submitted on this application	The planning authority concluded that the proposed development (entire project), by itself or in combination with other plans and developments in the vicinity, would not likely to have a significant effect on European site(s).
211304	permission consequent on a grant of outline permission ref no. LB/181553 for dwelling house, wastewater treatment system and percolation area and all associated site works	The planning authority concluded that the proposed development (entire project), by itself or in combination with other plans and developments in the vicinity, would not likely to have a significant effect on European site(s).
211445	outline permission for dwelling house, detached domestic garage, wastewater treatment system and percolation area and all associated site works	The planning authority concluded that the proposed development (entire project), by itself or in combination with other plans and developments in the vicinity, would not likely to have a significant effect on European site(s).
211729	the construction of a single storey dwelling, packaged wastewater treatment system with polishing filter, domestic garage, new entrance and all ancillary site works. Significant Further information/Revised plans submitted on this application	The planning authority concluded that the proposed development (entire project), by itself or in combination with other plans and developments in the vicinity, would not likely to have a significant effect on European site(s).
211801	planning permission for a prefab classroom and all associated site works	The planning authority concluded that the proposed development, by itself or in combination with other plans and developments in the vicinity, would not likely to have a significant effect on European site(s).
22328	the installation and operation of a readymix concrete batching plant, closed circuit water management system, hardstanding area, aggregate storage bays and all ancillary works within an application area of c.0.8 hectares	The planning authority concluded that the proposed development (entire project), by itself or in combination with other plans and developments in the vicinity, would not likely to have a significant effect on European site(s).
23917	a) construction of a new single storey office building and associated ancillary works (c. 189 sq. m gross), b) proposed new viewing deck to the north of the office building overlooking existing	The planning authority concluded that the proposed development (entire project), by itself or in combination with other plans and developments in

Planning Ref.	Description of development	Comments
	quarry (c. 30 sq.m), c) installation of 9 no. car parking spaces, d) installation of sheltered bicycle parking. The development also consists of e) retention of existing wastewater treatment system and associated percolation area (c. 30 sq. m) that will serve the proposed new office building, all within an application area of c. 0.29 hectares	the vicinity, would not likely to have a significant effect on European site(s).
221279	the construction of a new single-storey extension to the front of the existing school and all associated site works	The planning authority concluded that the proposed development (entire project), by itself or in combination with other plans and developments in the vicinity, would not likely to have a significant effect on European site(s).

The Meath County Development Plan 2021-2027, in complying with the requirements of the Habitats Directive, requires that all plans and projects that could affect the Natura 2000 sites in the same potential Zone of Influence of the Proposed Development site would be initially screened for Appropriate Assessment, and if requiring Stage 2 AA, that appropriate employable mitigation measures would be put in place to avoid, reduce or ameliorate negative impacts. In this way any, in-combination impacts with Plans or Projects for the Proposed Development area and surrounding townlands in which the Proposed Development site is located, would be avoided.

The listed developments have been granted permission in most cases with conditions relating to sustainable development by the consenting authority in compliance with the relevant Local Authority Development Plan and in compliance with the Local Authority requirement with regard to the Habitats Directive. The development cannot have received planning permission without having met the consenting authority requirement in this regard.

There are no predicted in-combination effects given that it is predicted that the Proposed Development will have no effect on any European site.

Any new applications for the Proposed Development area will be assessed on a case by case basis *initially* by Meath County Council, which will determine the requirement for AA Screening as per the requirements of Article 6(3) of the Habitats Directive.

6. Conclusions

There is no connectivity to the River Boyne or to the River Boyne associated European sites.

There are no predicted effects on any European sites given:

- A minor stream tributary of the Killary Stream has been excluded from the proposed extension area and there is no direct connectivity to the River Dee downstream.

- The existing water management system is considered appropriate and may be considered in the AA Screening under recent ECJ determination (Case Ref. C-721/21) as an existing design measure in the consideration of hydrology and the source-pathway-receptor model. It is addressed comprehensively in the summary of EIAR Chapter 7 aspects with hydroecological significance which is included as Appendix 3 to this AA Screening with salient points of the summary reiterated in Section 3 of this report.
- Given the very large distance of removal from Dundalk Bay at over 40 km downstream, the possibility of a significant effect can be excluded (see again, Appendix 3).
- There are no predicted emissions to air, water or the environment during the construction or operational phases that would result in significant effects.

It has been objectively concluded by Moore Group Environmental Services beyond reasonable scientific doubt that:

1. The Proposed Development is not directly connected with, or necessary to the conservation management of the European sites considered in this assessment.
2. The Proposed Development is not likely to either directly or indirectly significantly affect the Qualifying interests or Conservation Objectives of the European sites considered in this assessment.
3. The Proposed Development, either alone or in combination with other plans or projects, is not likely to have significant effects on a European site.
4. It is possible to conclude that significant effects can be excluded at the screening stage.

It can 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 any European site.

An appropriate assessment is not, therefore, required.

A final determination will be made by the competent authority in this regard.

7. References

Department of the Environment, Heritage and Local Government (2010) Guidance on Appropriate Assessment of plans and projects in Ireland (as amended February 2010). Department of the Environment, Heritage and Local Government, Dublin.

European Commission (2007) Guidance document on Article 6(4) of the 'Habitats Directive '92/43/EEC: Clarification of the concepts of: alternative solutions, imperative reasons of overriding public interests, compensatory measures, overall coherence and opinion of the Commission. European Commission, Brussels.

European Commission (2018) Managing Natura 2000 sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC. European Commission, Brussels.

European Commission (2021) Assessment of plans and projects in relation to Natura 2000 sites - Methodological guidance on Article 6(3) and (4) of the Habitats Directive 92/43/EEC, European Commission, Brussels, 28.9.21.

European Commission (2021) Guidance document on the strict protection of animal species of Community interest under the Habitats Directive, European Commission, Brussels, 12.10.21.

Lobinstown Quarry, Heronstown, Navan, Co. Meath. Environmental Impact Assessment Report, December 2023.

NPWS (2019) The Status of EU Protected Habitats and Species in Ireland. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin.

NPWS (2023) Metadata available online at https://www.npws.ie/maps-and-data, National Parks and Wildlife Service (NPWS), Dublin.

Office of the Planning Regulator (2021) Appropriate Assessment Screening for Development Management. OPR Practice Note PN01. Office of the Planning Regulator, Dublin, March 2021

Appendices

Appendix 1

Current Discharge Licence Ref. 20/01

Appendix 2

Flood Risk Assessment (FRA)

Appendix 3

Summary of EIAR Chapter 7 Aspects with Hydroecological Significance.

Appendix 1

Current Discharge Licence Ref. 20/01

MEATH COUNTY COUNCIL

LOCAL GOVERNMENT(WATER POLLUTION) ACTS, 1977 TO 2007, LOCAL GOVERNMENT(WATER POLLUTION) REGULATIONS 1978 AND 1992

LICENCE TO DISCHARGE TRADE EFFLUENT TO WATERS

To:/ **Lagan Materials Limited**
Rosemount Business Park
Ballycoolin Road
Dublin 11

Ref. No. In Register: 20/01

Meath County Council in exercise of the powers conferred on it by the Local Government (Water Pollution) Acts 1977 and 2007 and the Local Government (Water Pollution) Regulations 1978 and 1992, hereby grants a licence to Lagan Materials Limited, for its quarry at Heronstown, Lobinstown, Navan, Co Meath in respect of discharge of trade effluent to waters subject to the following conditions:

1 General Layout and Operations

1.1. This Licence shall be in respect of the discharge to surface waters of treated effluent arising from quarry operations at Lagan Materials Ltd, Heronstown, Lobinstown, Navan, Co. Meath.

1.2. In the event of pollution of any waters arising from the Licensee's activities, whether due to accidental discharge or discharge other than in accordance with the terms and conditions of this licence, the Licensee shall make good all damage resulting from such pollution, including, if necessary:

(i) the replacement of fish stocks,
(ii) the restoration of spawning grounds,
(iii) the removal of polluting matter from waters
(iv) the modification of its discharge regime to prevent re-occurrence,
(v) or such other measures as may be directed by the Licensing Authority.

1.3 All effluent generated by quarry operations shall be directed through the treatment system, constructed as per details submitted to Meath County Council in the discharge licence application dated 03/06/2020, except where otherwise required by conditions in this licence. The treatment system shall comprise a main settlement pond of area 2000 m2, water depth 1.5m, a settlement pond of area 100 m2 at the western boundary which connects to the main settlement pond, a Class I hydrocarbon interceptor installed after the outlet of the main settlement pond. Each settlement pond shall be lined with impermeable material, either

compacted clay or other suitable liner. There shall be a single point of discharge to surface waters.

1.4 The treatment system shall be constructed and commissioned within 6 months of the date of grant of this licence, unless otherwise agreed in writing with the Licensing Authority.

1.5 The hydrocarbon interceptor installed on the discharge channel shall be a Class I oil interceptor of suitable capacity for the maximum discharge rate.

1.6 The settlement ponds shall be inspected regularly, maintained, and de-silted at a frequency required to maintain effective minimum volume for settlement treatment. The Licensee shall ensure that the oil interceptor is serviced regularly to ensure that its treatment efficacy is maintained. Records of all maintenance, servicing and de-silting on all parts of the treatment system shall be maintained on site for inspection by Officers of the Licensing Authority.

1.7 The Licensee shall ensure that the effluent treatment system is operated and maintained in such a manner as to ensure the discharge of effluent is in accordance with the volume and emission limit values set out in this licence.

1.8 The Licensee's site shall be laid out, operated and maintained in such a manner as to prevent the discharge of any quarry effluent to the receiving waters other than *via* the treatment system.

1.9 A visual examination of the discharge to surface waters shall be carried out during each day that effluent is being discharged from the site. A log of all such examinations shall be maintained for inspection by officers of the licensing authority.

1.10 In the event that any observations made on the quality or appearance of the surface water discharge should indicate that contamination has taken place, the Licensee shall:

(i) carry out an immediate investigation to identify and isolate the source of contamination,
(ii) put in place measures to prevent further contamination and to minimise the effects of any contamination on the environment, and
(iii) notify the Local Authority and Inland Fisheries Ireland as soon as practicable.

1.11 In the event of a prolonged period of heavy or sustained rainfall the Licensee shall cease to discharge water from the quarry site where it appears that the discharge from the quarry is causing or is likely to cause flooding of lands downstream of the quarry.

1.12 In the event of a prolonged period of heavy or sustained rainfall, the Licensing Authority shall so direct if required, that the discharge from the quarry shall cease and shall determine when the discharge can re-commence.

1.13 The Licensee shall ensure that the site is at all times stocked with suitable oil spill kits including booms and suitable absorbent materials and that staff are trained in the appropriate use and deployment of such equipment.

1.14 All fuel oil storage tanks and any chemical storage shall be provided with bunding. The capacity of the bunding shall be at least 110% of the capacity of the largest tank or 25% of the total volume which could be stored within the bunded area, whichever is greater.

1.15 The Licensee shall provide a discharge sampling and inspection point for the treated discharge and shall ensure that this is laid out, operated and maintained in such manner as to provide safe access for inspection and sampling.

1.16 The Licensee shall install an in-line flow-measuring device in order to measure discharge flow rate of the final treated effluent. The flow-measuring device shall be calibrated and maintained to ensure the accuracy of measurements. Evidence of flow measurement calibration shall be submitted to the Licensing Authority upon request. Records of daily flow rates (total volume discharged per day) shall be maintained and submitted to the Licensing Authority on a quarterly basis.

1.17 Where after 3 years from the date of grant of this discharge licence no discharge of the type authorised by the licence has been made, or where such a discharge has ceased for a period of 3 years, the licence shall cease to have effect.

2 Effluent Characteristics

2.1 The total volume of effluent to be discharged shall not exceed 72 m^3 per hour and 1728 m^3 per day.

2.2 Effluent as discharged shall comply with the quality standards set out hereunder in respect of the following determinants:

Parameter:	Units:	Maximum Limit Value:
BOD_5	**mg/l**	**2**
COD	**mg/l**	**50**
Suspended Solids	**mg/l**	**20**
pH	**pH units**	**6.0 – 9.0**
Ortho-phosphate, as P	**mg/l**	**0.050**
Nitrates, as N	**mg/l**	**10**
Ammonium, as N	**mg/l**	**0.10**
BTEX Compounds	**µg/l**	**10**
Total Petroleum Hydrocarbons	**µg/l**	**50**

2.3 No substance shall be discharged in a manner which, or at a concentration which, following initial dilution, causes tainting of fish, interferes with normal patterns of fish migration, or which accumulates in sediments or biological tissues to the detriment of fish, wildlife or their predators.

2.4 Oils and grease shall not be present in the effluent in such quantities as to:

(i) form visible films on the surface of the water;
(ii) form coatings on the river bed, benthic biota or food resources;
(iii) cause deleterious effects on aquatic life; or
(iv) impart a detectable taste or odour or edible aquatic species.

3 Monitoring Regime

3.1 The Licensee shall arrange for quarterly sampling and analysis of the discharge for the determinants listed in Condition 2.2 above, during all periods that discharges occur. The analysis shall be carried out by an independent laboratory which can demonstrate competence to undertake the relevant tests through accreditation and/or participation in relevant external proficiency testing schemes.

3.2 Records of daily flow rates (total volume of treated effluent discharged per day) shall be maintained and submitted to the Licensing Authority on a quarterly basis.

3.3 Copies of the results of monitoring and analysis in respect of Conditions 3.1 and 3.2 above shall be submitted to the Licensing Authority every quarter. The results shall be submitted within a month of the end of each quarterly period. A copy of the original Certificates of Analysis produced by the analysing laboratory shall be included in respect of results submitted under Conditions 3.1. The sample identification on the certificates of analysis shall clearly identify the origin, sampling date and sampling time of the samples. The records shall also be made available for inspection at the site office during normal working hours by Authorised Officers of the Licensing Authority, and any other person authorised under Section 28 of the Local Government (Water Pollution) Act 1977, as amended.

3.4 The Licensing Authority may direct that discharge sampling frequency is increased to monthly frequency, in the event of non-compliance with licence condition 2.2. The frequency of discharge sampling may revert to quarterly frequency, on the written agreement of the Licensing Authority, subject to satisfactory compliance with licence condition 2.2 in a 6 month period of continuous operation of the treatment system.

3.5 The Licensee shall arrange for a biological (macroinvertebrate) survey on the receiving waters (tributary of Killary River at Heronstown) u/s and d/s of the discharge location, in line with EPA methodology for kick sampling and biological assessment, at an annual frequency. The sampling and assessment shall be carried out by a suitably qualified ecologist. The biological survey report shall document sampling locations, sampling and assessment methodology, macro invertebrate sampling results and shall be submitted to the Licensing Authority within 1 month of sampling.

4 Access by Authorised Personnel

4.1 Details of emergency contact personnel, including addresses and telephone numbers, shall be made available to the Licensing Authority within one month of the date of grant of this licence.

At least one such person shall be available for contact at all reasonable times, having due authorisation from the Licensee to expedite emergency measures as may be required.

4.2 Authorised Officers of the Licensing Authority, or its agents, or any other person authorised under Section 28 of the Local Government (Water Pollution) Act, 1977 shall have access to the site at all reasonable times, including if necessary, times other than normal working hours.

5 Change of Use of the Development

5.1 The Licensee shall notify the Licensing Authority of any proposed change in the operation of the premises, which would cause, or be likely to cause, a material alteration in the nature, or increase in the volume of effluent discharged.

5.2 No changes in relation to the discharge (flow rates, effluent concentrations) shall take place without the prior written agreement of the Licensing Authority.

5.3 The Licensing Authority shall interpret whether any such change is material or not, and whether a review of the Licence is required as a result.

5.4 Where the trade effluent discharge from the site has ceased permanently, the Licensee shall notify the Licensing Authority, within 3 months of cessation.

6 Contributions to the Licensing Authority

6.1 The Licensee shall pay to the Licensing Authority an annual contribution of € 1209 or such sum as the Licensing Authority from time to time determines, towards the costs incurred by the Licensing Authority of monitoring the discharge. For 2020, the Licensee shall pay a *pro rata* amount from the date of grant of this licence to the 31st of December 2020. This amount shall be paid to the Licensing Authority within one month of the date of grant of this licence. The Licensee shall in 2021 and subsequent years, pay to the Licensing Authority such revised annual contribution as the Licensing Authority determines for the monitoring of the discharge and all such payments shall be made within 1 month of the date upon which demanded.

6.2 In the event that the frequency or extent of monitoring, investigations or testing carried out by the Licensing Authority needs to be increased, the Licensee shall contribute such sums as determined by the Licensing Authority to defray its costs in relation to the additional monitoring, investigations or testing.

Dated this the 16/11/20

SIGNED: _____
Senior Executive Officer

Environment Order No: 12205/2020

See Schedule No. 1 (attached) for appeal procedure.

Appendix 2

Flood Risk Assessment (FRA)

1 INTRODUCTION

The following flood risk assessment has been prepared by Colin O'Reilly PhD (Hydrology) and Eoin Moorhouse (BSc) of Envirologic Ltd. It is intended to assess potential flood risk to a proposed extension to an existing quarry operated by Lagan at Heronstown, Lobinstown.

In addition, sustainable quarry operation requires that the local natural surface water drainage network has adequate capacity to receive and safely transmit the maximum potential discharge rates. The ability of the natural watercourse system to receive the discharge in terms of hydraulic (flood potential) and hydrochemical (Surface Water Regulations compliance) perspectives is assessed below. The hydrological evaluations include an assessment as to whether quarry discharge has the potential to increase the risk of flooding in downstream receptors and adjoining lands.

As per the Flood Risk Management Guidelines (2009), where flood risk may be an issue for any proposed development, a flood risk assessment (FRA) should be carried out that is appropriate to the scale and nature of the development and the risks arising. The flood risk assessment outlined herein is intended to be sufficiently detailed to quantify the risks and effects of any flooding, necessary mitigation measures, together with recommendations on how to best manage any residual risks. As per the document 'The Planning System and Flood Risk Management (2009)' the flood risk assessment will consist of the following sections:

1. Site description;
2. Site layout;
3. S-P-R model;
4. Sequential approach;
5. Justification test;
6. Determination of flood level;
7. Mitigation measures;
8. Conclusions.

Hydrological surveying was performed by Envirologic in November 2023.

1.1 APPLICATION AREA & EXISTING DISCHARGE

The proposed quarry extension adjoins the eastern perimeter of the existing quarry excavation. Existing ground levels across the proposed quarry extension range from 86 mOD on the northern boundary to 110 m close to the southern boundary. As quarrying progresses rainfall-runoff and groundwater ingress will collect in the existing quarry sump. From here it is pumped to settlement pond for removal of sediment before being released by gravity to the Killary Stream, approximately midway along the northern boundary of ownership.

Maximum discharge rates are limited to 1,728 m^3/d (72 m^3/hr) under the terms of an existing discharge license (Ref. 20/01).

Figure 1: Site Layout and Discharge Point

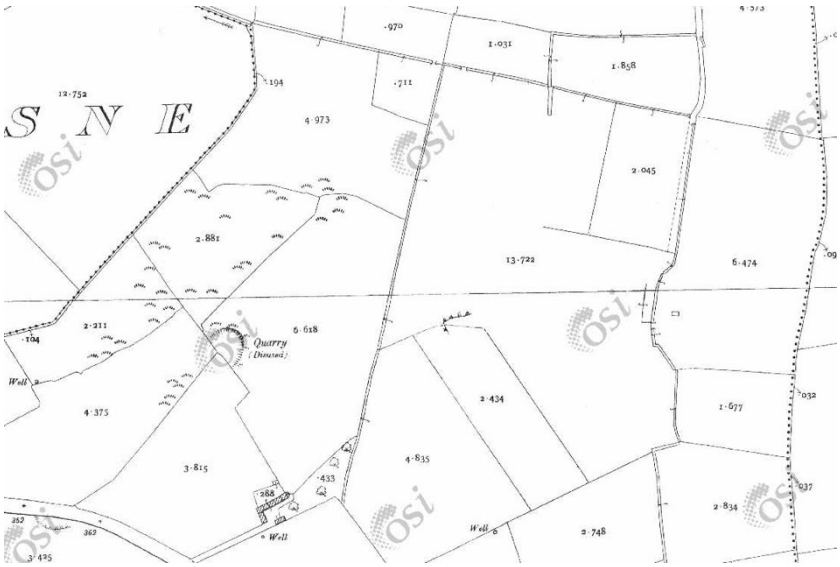
2 FLOOD RISK

2.1 HISTORICAL OSI MAPS

The historical 6" OSI maps, dated c. 1830–1840 (Plate 1) and 25" OSI maps, dated c. 1888–1913 (Plate 2) show a high density of drainage channels and watercourses on low-lying lands, suggesting these areas are poorly-drained. In the earlier map a Corn Mill is indicated approximately 500 m east of the proposed extension area. The Mill Race appears to flow eastwards. The later 25" map shows that the Mill Race had been re-routed to flow westwards. There are no mapped watercourses within the application area.

Plate 1 – OSI historical 6" maps

Plate 2 – OSI historical 25" maps



2.2 OPW HISTORICAL FLOODING DATABASE

The OPW database contains historical records of flood events, typically over the last 30 years. The closest historical flood records to the site are as follows:

- Lobinstown, 1.6 km northwest of application site – '*low-lying area floods every year after heavy rain*'. This appears to be pluvial flooding and not sourced from the Killary Stream.
- Deyinstown, 2.1 km north of application site – '*river overflows its banks after exceptional heavy rain*'. The watercourse referred to is the Footstown Great Stream which is in a different catchment to the application site.

2.3 BENEFITTING LAND MAPS

Plate 3 shows that all of the mapped watercourses in the area are maintained as part of the Glyde and Dee Arterial Drainage Scheme and that extensive areas of land have benefitted from these arterial drainage works. The watercourse that runs adjacent to the northern boundary of ownership, and receives discharge, is listed as segment C2(28F1).

Plate 3 - OPW Benefitting Lands Map (OPW)

2.4 CATCHMENT FLOOD RISK ASSESSMENT AND MANAGEMENT (CFRAM)

Detailed CFRAM modelling has not been performed on the Killary Stream or Killary Waters.

2.5 NATIONAL INDICATIVE FLOOD MAPPING (NIFM)

The OPW has generated National Indicative Flood Maps (NIFM) which utilise topographical data to indicate areas potentially at risk of flooding. These maps are not intended to be used for decision making at site-specific scale.

The polygon presented in Plate 4 represents the low probability (i.e. 0.1% AEP or Q_{1000}) and moderate probability (i.e. 1% AEP or Q_{100}) fluvial extents under a Mid-Range Future Scenario (MRFS, i.e. 20% growth due to climate change). The proposed extension area is indicated to not be at risk of flooding.

Plate 4 – NIFM Low Probability (Grey) and Medium Probability (Purple) Mid-Range Future Scenario (MRFS) (OPW)

3 CATCHMENT FLOWS

The first step in hydraulic capacity assessment is to calculate the existing stream flows that arise during extreme return period events (Q_{100} and Q_{1000}). Calculations are first presented for flood flows in the Killary Stream to the discharge point. These rates will be input into a hydraulic model to predict flood levels at various locations along the drainage network.

In order to assess the impact posed by potential dewatering at the site, two separate flood risk scenarios have been considered:

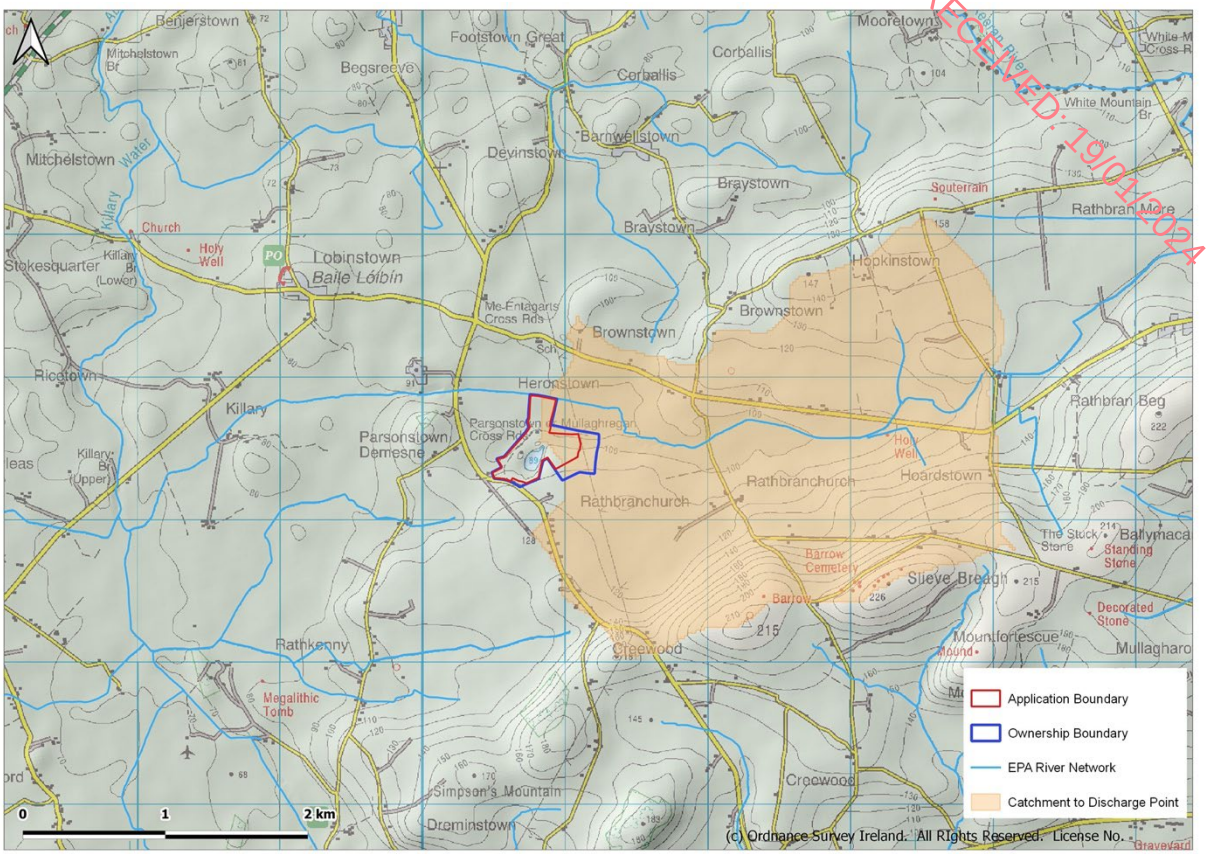
1. Pre-development - The channel was modelled in their existing form using natural catchment flood flows.
2. Post-development - The channel was modelled using the cross sections as per (1) plus the inclusion of an additional flow input to the model. This additional flow is intended to represent future proposed dewatering activities during development of the quarry and will be used to assess the remaining hydraulic capacity of the stream during a Q_{1000} flood event.

3.1 CATCHMENT FLOWS

The contributing catchment area of the Killary Stream to the point at which the quarry discharge enters the waterbody has been calculated using the OPW Flood Studies Update Portal as approximately 6.63 km^2 (see Figure 2).

Extreme flood flows generated within the upstream catchment of the Brogheen Stream were calculated using suitable formulae. These rates were then input into the hydraulic model at the upgradient boundary. The model simulation returns predicted flood levels at various locations along the channel reach upstream and downstream of the discharge outfall.

Figure 2: Quarry Site Location and Killary Stream Catchment to Discharge Point



3.2 STREAM FLOOD FLOW ESTIMATION

The first step in hydraulic capacity assessment is to calculate Killary Stream flows that arise during extreme return period events (Q_{100} and Q_{1000}).

3.2.1 OPW Advice

In selecting appropriate formulae, reference has been made to an advisory response from OPW Hydrology Section and Work Package 4.2 (see Appendix A):

1. *'For catchments between 5 km^2 and 25 km^2 the preferred equation is the 'FSU small catchments' equation. When using the small catchment equation we generally advocate not using a pivotal site adjustment seeing as there is a very small pool of other small catchments from which to source a pivotal site.*
2. *For catchments less than 25 km^2 we would always say that at least three methods should be explored and that the choice of the flow to be used is up to the practitioner.*
3. *The WP4.2 report is intended to provide a further methodology for small catchment flood estimation. As far as we are concerned, it is the preferred method.*
4. *For catchments less than 5 km^2 there is no FSU method applicable. For such 'small' catchments we would suggest that maybe the rational method or modified rational method could be used.'*

Given the catchment size of 6.6 km^2 is relatively small options 1 and 2 above will be explored for selecting a suitable flood flow rate.

3.2.1.1 OPW FSU – Standard 7 Variable Equation

The ungauged method can be used to determine flood flows at the site using catchment characteristics, which are then corrected using a correlation against descriptors for gauged catchments. The median annual maximum flood magnitude, QMED, as outlined in the Flood Studies Update (FSU) (Nicholson & Bree, 2013) is now preferred over the mean annual flood flow rate (Qbar) parameter described in the Flood Studies Report (FSR) (NERC, 1975). The preferred median is less sensitive to large extreme floods and to flood measurement error in general. The estimation method for ungauged locations is based on a regression analysis relating observed QMED to physical catchment descriptors (PCDs) at gauged locations in Ireland, given by the following equation:

$$QMED_{rural} = 1.237x10^{-5} . AREA^{0.937} . BFI_{soil}^{-0.922} . SAAR^{1.306} . FARL^{2.217} . DRAIND^{0.341} . S^{0.185} . (1 + ARTDRAIN2)^{0.408}$$

The PCDs applicable to the subject site are shown in Table 1.

Table 1 - Physical catchment descriptors applicable to quarry catchment (standard OPW FSU equation)

PCD	Description	Units	Value
AREA	Catchment area	km^2	6.63
SAAR	Average annual rainfall	mm	888
BFIsoil	Baseflow index derived from soils data		0.55
FARL	Flood attenuation from reservoirs and lakes		1
DRAIND	Ratio of river network to catchment area	km/km^2	0.72
S_{1085}	Slope of the main stream between the 10 and 85 percentiles	m/km^2	10.90
ARTDRAIN2	Proportion of river network included in drainage schemes		0.777
URBEXT			0
QMED		m^3/s	1.578

A principal of the FSU is the concept of a pivotal site, which is defined as the gauging station that is considered most relevant to a particular flood estimation problem at the subject site and is used to adjust the QMED rural estimate. In this case the gauging station at Burley (06025) shall be used. The procedure is to infer an adjustment factor to the $QMED_{rural}$ estimate by examining the performance of the regression model at the pivotal site. This adjustment is derived from the ratio between $QMED_{urban}$ at the gauging station, and the median annual maxima value and in this instance results in a 29% decrease to QMED:

QMED at gauging station = 18.69 m^3/s

Median annual maxima at gauging station / QMED at gauging station = 26.145 / 18.69 = 0.713

$QMED_{rural.adjusted}$ at site = 1.578 m^3/s x 0.713 = 1.124 m^3/s

The return-period flood flow (Q_T) is determined by an index flood method, whereby a growth factor as determined from an EV1 distribution plot is applied. In this case:

$$Q_T = QMED \times gf$$

$$Q_{100} = 1.124\ m^3/s \times 2.69$$

$$Q_{100} = 3.03\ m^3/s$$

Finally, a climate change growth factor of 20 % is applied:

$$Q_{100} = 3.03 \times 1.2$$

$$Q_{100} = 3.63\ m^3/s$$

Repeating the methodology for Q_{1000} yields the following:

$$Q_{1000} = 1.124\ m^3/s \times 3.61$$

$$Q_{1000} = 4.06\ m^3/s$$

$$Q_{1000} = 4.06 \times 1.2$$

$$Q_{1000} = 4.87\ m^3/s$$

3.2.2 OPW FSU - Small Catchments Equation

The updated Flood Studies Update (Nicholson & Bree 2013) presents a revised formula more suited to catchments less than 25 km^2:

$$QMED_{rural} = 2.0951x10^{-5} \cdot AREA^{0.9245} \cdot BFI_{soil}{}^{-0.9030} \cdot SAAR^{1.2695} \cdot FARL^{2.3163} \cdot S^{0.2513}$$

This yields a $QMED_{rural}$ value of 0.628 m^3/s.

As per the OPW Guidelines, a pivotal site adjustment factor is not applied to the outcome of the small catchments equation. The return-period flood flow (Q_T) is again determined by an index flood method, whereby a growth factor as determined from an EV1 distribution plot is applied. In this case:

$$Q_T = QMED \times 2.69$$

$$Q_{100} = 0.628\ m^3/s \times 2.69$$

$$Q_{100} = 1.69\ m^3/s$$

Finally, a climate change growth factor of 20 % is applied:

$$Q_{100} = 1.69 \times 1.2$$

$$Q_{100} = 2.03\ m^3/s$$

Repeating the methodology for Q_{1000} yields a climate change adjusted flow of 2.25 m^3/s.

3.2.3 OPW FSU - 3 Variable Method

The FSU 3-variable equation was developed as part of the FSU. It was developed as a 'short cut' equation for the estimation of flow in ungauged catchments.

$$QMED = 0.000302.AREA^{0.829} \cdot SAAR^{0.898} \cdot BFI^{1.539}$$

$$QMED = 0.255\ m^3/s$$

Application of the relevant growth factors as per above and 20% climate change adjustment factor results in:

Q_{100} = 0.824 m^3/s

Q_{1000} = 0.928 m^3/s

3.2.4 Flood Studies Report, FSR (NERC 1974)

This is the original FSR method, with the regression coefficient for Ireland. Estimates from this equation should be treated with extreme caution. It is recommended that these equations should be used only for preliminary flood estimates.

$$QBAR = 0.0172.AREA^{0.94} . STMFRQ^{0.27} . S1085^{0.16} . SOIL^{1.23} . RSMD^{1.03} . (1 + LAKE)^{-0.85}$$

Table 2 Calculations of Q_{100} – FSR ungauged catchments

Area, km^2	STMFRQ, jn/km^2	S1085, m/km	SOIL	RSMD	LAKE	Q_{BAR}, m^3/s	Q_{BAR} x 1.96 gf, m^3/s	Q_{100} x 1.47 sfe m^3/s	Q_{100} x cc (1.2), m^3/s
6.63	0.15	10.91	0.35	33.90	0.0	0.93	1.81	2.67	3.21

Using this approach the climate change adjusted Q_{1000} is equal to 4.25 m^3/s.

3.2.5 Institute of Hydrology Report 124 (1994)

Report No. 124 derives an equation to estimate flood flows for small rural catchments (less than 25 km^2). The equation has a standard factorial error (SFE) of 1.65.

$$Qbar_{rural} = 0.00108 (AREA^{0.89} x\ SAAR^{1.17} x\ SOIL^{2.17})$$

Table 3 Calculation of Q_{100} using IH124

Area, km^2	SAAR	SOIL	Q_{BAR} m^3/s	Q_{BAR} x 1.96 gf m^3/s	Q_{100} x 1.65 sfe m^3/s	Q_{100} x cc (1.2), m^3/s
6.63	888.01	0.35	1.68	3.29	5.42	6.51

This method was developed for small catchments (< 25 km^2) in the UK. It's derivation did not include any Irish catchments. The equation tends to overestimate QBAR for the smallest of the UK catchments used.

Without implementing the SFE, the Q_{100} rate plus 20 % climate change factor was reduced to 3.95 m^3/s. This value is generally within a similar range to results derived from the FSU Standard Variable formulae.

Using this approach the climate change adjusted Q_{1000} is equal to 8.60 m^3/s.

3.2.6 Modified IH 124 (Cawley & Cunnane 2003)

$$Qbar_{rural} = 0.000036 (AREA^{0.94} x\ SAAR^{1.58} x\ SOIL^{1.87})$$

Table 4 Calculations of Q_{100} using modified IH124

Area, km^2	SAAR	SOIL	Q_{BAR}, m^3/s	Q_{BAR} x 1.96 gf m^3/s	Q_{100} x 1.65 sfe m^3/s	Q_{100} x cc (1.2), m^3/s
6.63	888.01	0.35	1.36	2.67	4.40	5.29

Without implementing the SFE, the Q_{100} rate plus 20 % climate change factor was reduced to 3.20 m^3/s. Again, the unadjusted value is closer to the FSU Standard Variable formulae results above.

3.2.7 TRRL & ADAS

Agricultural Development and Advisory Service (ADAS) , which is a precursor to Transport and Road Research Laboratory (TRRL), is only applicable for catchments smaller than 0.4 km^2. This methodology shall not, therefore, be applied.

3.2.8 Summary of Flood Flow Calculations

Results from the OPW recommended methods are summarised below in Table 5. Q_{100} results were in the range 0.82 and 6.51 m^3/s. This high range illustrates the difficulty in selecting a representative value. For example, it is clearly not appropriate here to apply the method recommended by the OPW for catchments between 5 and 25 km^2.

Hence for this site it is considered appropriate to apply the average from the 6 approaches.

Table 5 Summary of calculated flood flows (including 20% climate change factor), m^3/s unless stated

Approach	Q_{100}	Q_{1000}
FSU Standard	5.09	5.74
FSU small catchments	2.03	2.29
FSU – 3 variables	0.82	0.93
FSR 6 – including SFE	3.21	4.25
IH124 – including SFE	6.51	8.60
Modified IH124 – including SFE	5.29	6.98
Average	3.83	4.80

3.3 HYDRAULIC MODEL

3.3.1 Model Build

A site-specific hydraulic model was compiled using *Flood Modeller Pro* software, which was then used to simulate water levels at different points along the Killary Stream.

The model consists of 12 cross sections that were surveyed by Envirologic using Trimble RTK VRS technique. Cross section locations are shown in Figure 3 and extended upstream and downstream of the discharge point by

350 and 150 m, respectively. Surveying outside this reach was not feasible due to access permissions to third party lands.

Manning's coefficient of 0.03 was applied to open river channel bed sections and a value of 0.045 was applied to riverbanks. Examples of cross-sectional profiles are provided at CS004 (adjacent to the midpoint of the quarry extension area) and CS008 (immediately upstream of the existing discharge point) are shown in Plate 5 and Plate 6 respectively, with the view looking through the upgradient to downgradient plane. All surveyed sections were unimpeded open channels, with the majority of these passing through a mixture of forestry and low-lying agricultural land.

Figure 3: Cross Sections as used to compile Hydraulic Model

Plate 5 – Cross Section Profile at CS004 under Q_{1000} river flow conditions

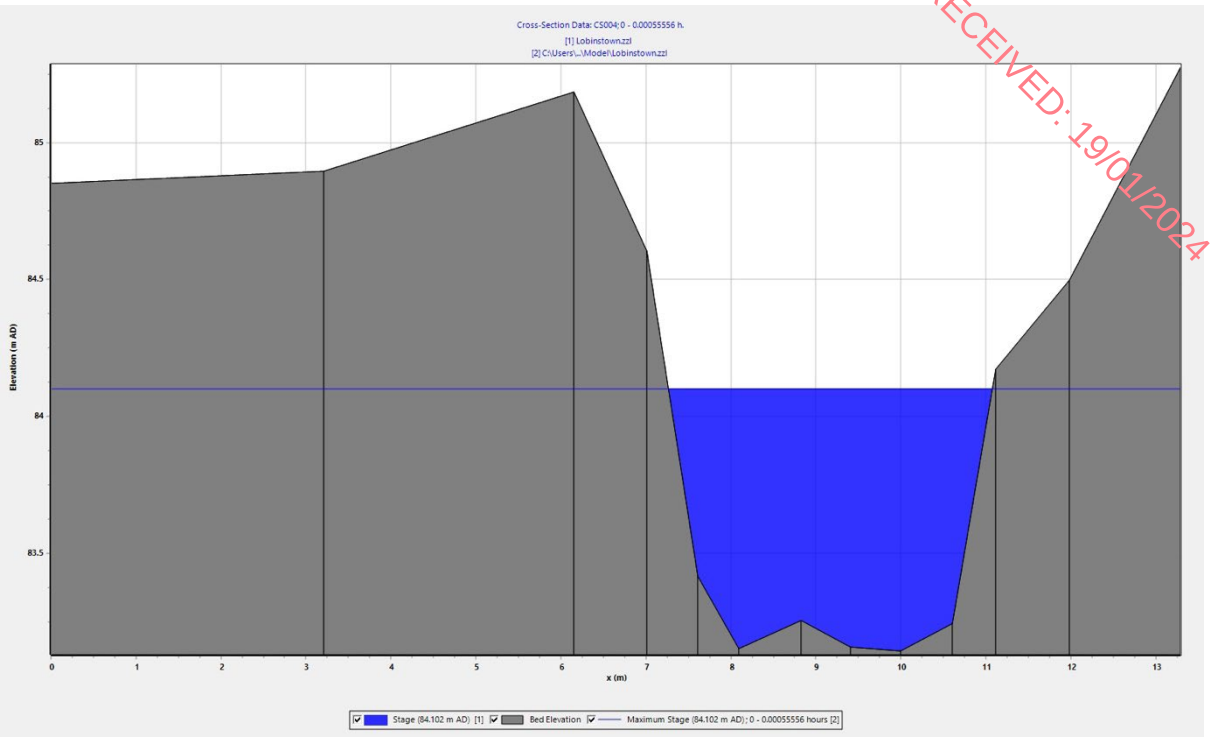
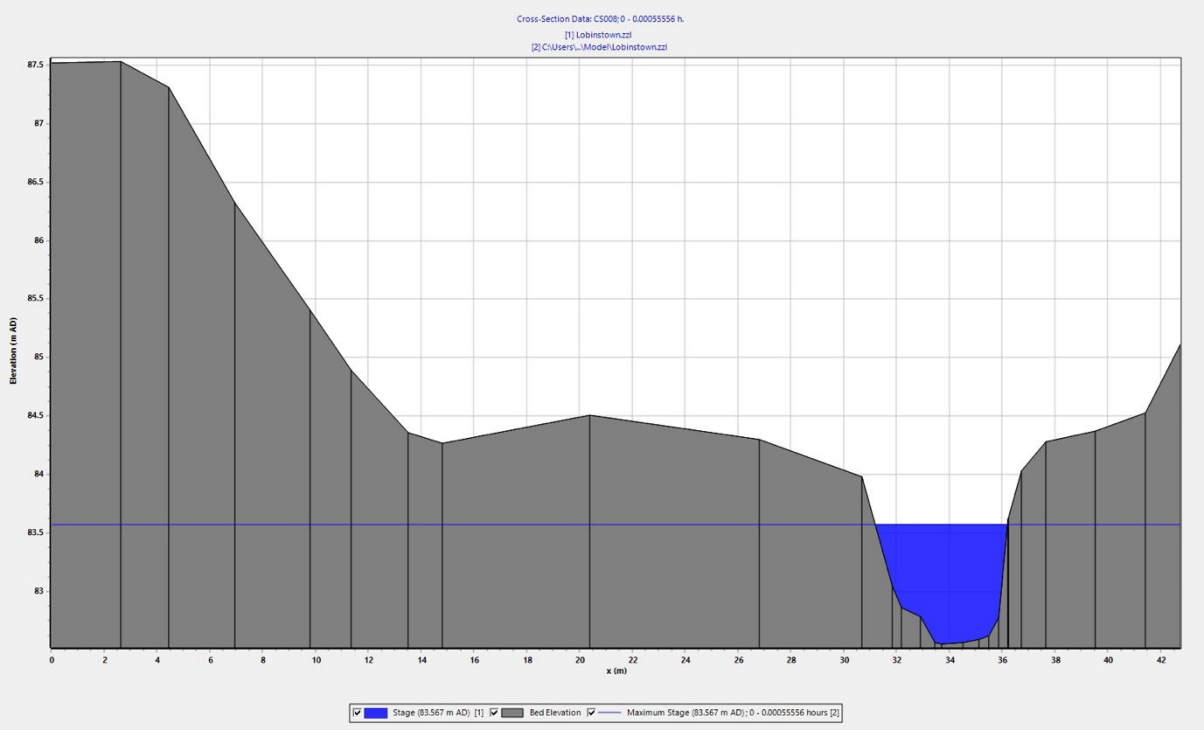


Plate 6 – Cross Section Profile at CS008 under Q_{1000} river flow conditions



3.3.2 Validation

A flow of 0.01 m^3/s was adopted for the validation procedure and based on field work this is a reasonable estimate for validation of the simulation. Surface water levels as observed on 18th November 2023 are presented in Table

6 with the Envirologic Model outputs in the adjacent column. The model error is the difference between the predicted and observed water levels.

Under this flow scenario, the predicted river level error on the Killary Stream was up to 250 mm, with the error only this high where there was heavy canopy cover. Error at the discharge point was below 20 mm and for the purposes of this assessment the model is considered to be valid and accurate.

Table 6 Summary of Validation

Section	Gradient, m/m	Validation, 18/11/23, validation flow = 0.1 m^3/s		
		Observed Surface water level 18/11/23, mOD	Envirologic Model Output, mOD	Difference, m
CS001	0.0031	84.23	84.35	0.12
CS002	0.0014	83.96	84.01	0.05
CS003	0.0036	83.90	83.75	-0.15
CS004	0.0063	83.78	83.53	-0.25
CS005	0.0055	83.47	83.33	-0.14
CS006	0.0055	83.16	83.14	-0.02
CS007	0.0207	83.16	83.09	-0.07
CS008	0.0021	83.02	83.03	0.01
CS009	0.0085	83.00	83.02	0.02
CS010	0.0085	82.73	82.98	0.25
CS011	0.0031	nr	82.89	n/a
CS012	0.0031	82.50	82.43	-0.07

3.3.3 Model Outputs

The conveyance capacity of all surveyed cross sections along the stream were assessed for suitability to transmit Q_{100} and Q_{1000} flood flows, with an allowance included for climate change. The predicted surface water elevations are presented in Table 7.

The final column of Table 7 presents the river elevation at each cross section when the conservative estimate of maximum quarry discharge rate (1,728 m^3/d; 0.02 m^3/s) is added to the Q_{1000} catchment based river flow flood flows, which includes a 20% climate change factor.

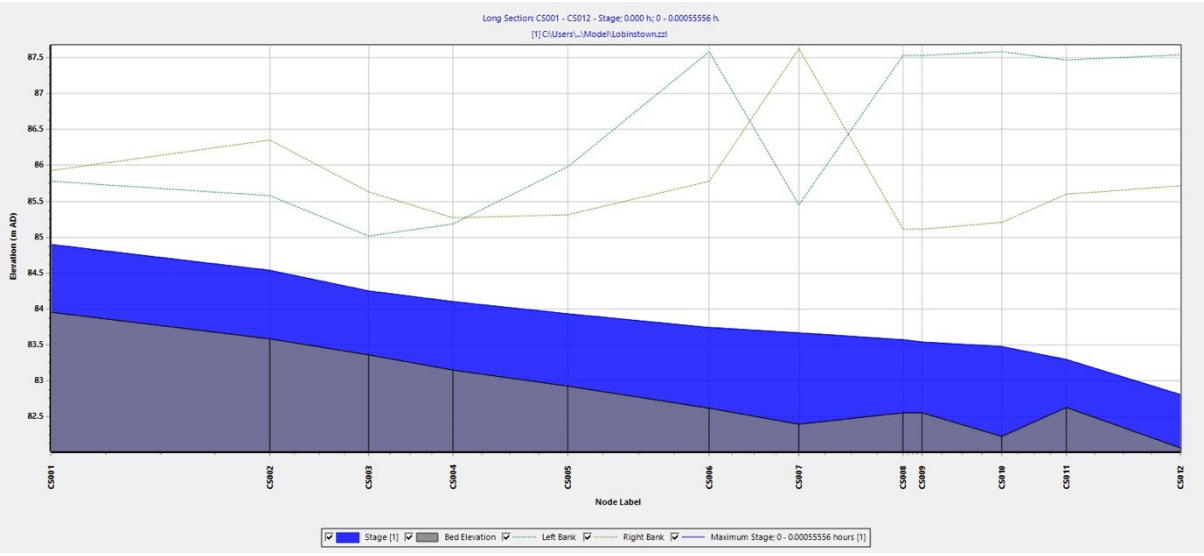
Table 7 Summary of Model Flow Simulation Outputs

Section	Greenfield Conditions		Greenfield Conditions plus Discharge	
	Q_{100} (3.83 m^3/s)	Q_{1000} (4.80 m^3/s)	Q_{100} plus max. discharge (3.85 m^3/s)	Q_{1000} plus max. discharge (4.82 m^3/s)
Quarry area CS002	84.43	84.53	84.43	84.53
CS003	84.15	84.26	84.15	84.26
CS004	83.98	84.10	83.98	84.10
CS005	83.82	83.93	83.82	83.93
CS006	83.63	83.74	83.63	83.74
CS007	83.55	83.66	83.55	83.66
CS008	83.46	83.57	83.46	83.57
CS009	83.44	83.54	83.44	83.55
CS010	83.37	83.47	83.37	83.48
CS011	83.21	83.29	83.21	83.30
CS012	82.73	82.81	82.73	82.81

Under pre-development conditions, a Q_{1000} flood event is maintained within the Killary Stream channel as surveyed. Flood waters naturally spill onto the lower-lying forestry lands which makes up the natural flood plain of the stream.

The longitudinal section along the discharge route for the climate change adjusted Q_{100} plus quarry discharge is included below as Plate 7.

Plate 7 – Cross Longitudinal profile of discharge route under Q_{1000} flood conditions



The quarry extension area passes adjacent to the Killary Stream between Sections CS001 to CS006. Maximum predicted flood elevations along this channel reach are in the range 83.74 to 84.90 mOD. Minimum ground elevations on the quarry extension area are 86 mOD. Hence the quarry extension area does not lie within the active floodplain serving the Killary Stream.

The discharge point is between CS008 and CS009. The maximum quarry discharge does not cause any perceptible increase in Q_{1000} flood levels downstream of the discharge point. Although the model did not extend far downstream it is unlikely that the discharge will cause perceptible increases in flood risk further downstream. Lands downstream are in agricultural/forestry use for 470 m downstream of the downgradient (western) boundary of ownership.

4 SUMMARY

With respect to an existing bedrock quarry at Heronstown, Lobinstown, Co. Meath, the two primary aims of the model and simulation runs were:

1. to quantify the capacity of the stream route to receive maximum permitted quarry discharge waters;
2. to ascertain whether a proposed quarry extension area is within the active floodplain serving the Killary Stream.

Hydraulic modelling was used predict river water levels under various flow regimes. Results of these simulations showed that during a Q_{1000} event the Killary Stream is not at risk of flooding. Addition of the maximum quarry discharge (0.02 m^3/sec) to the river when it is under flood conditions does not cause any discernible increase in flood elevations downstream of the discharge point. The proposed discharge from the quarry will not cause any increase in flood risk to downstream receptors during flood conditions. Hence upgrade works are not deemed necessary on the route to facilitate the predicted discharge during a storm event. The input from the quarry discharge is small relative to the stormflows and will become smaller as the catchment size increases progressing downstream.

5 REFERENCES

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Institute of Hydrology, Wallingford. Nicholson, O. and Bree, T. 2013. The Flood Studies Update - What are the improvements since the 1975 Flood Studies Report. National Hydrology Conference 2013.

OPW, 2009. Report of the Flood Policy Review Group. Office of Public Works, Dublin. OPW, 2012.

APPENDIX A – OPW GUIDANCE

From: info@envirologic.ie
Subject: Re: flood estimation query
Date: 29 March 2019 at 13:51
To: Colin O'Reilly info@envirologic.ie

From: Oliver Nicholson <oliver.nicholson@opw.ie>
Sent: 05 March 2019 13:35
To: Geraldine Murtagh <geraldine.murtagh@opw.ie>
Cc: Jamie Keogh <jamie.keogh@opw.ie>; Shane Hayes <shane.hayes@opw.ie>; Paul Kiernan <paul.kiernan@opw.ie>; Fasil Gebre <fasil.gebre@opw.ie>
Subject: RE: flood estimation query

Hello Geraldine,
The following response can be sent to both Colin and Meath County Council.
It is more or less our stock response for people looking for advice on small catchment flood estimation:
****
The FSU methodology for index flood estimation (as contained in WP 2.3) is applicable to catchments greater than 25km^2.

For catchments between 5km^2 and 25^km the preferred equation is the 'FSU small catchments' equation and is contained in Work Package 4.2 of the FSU. The relevant equation is on page 27 of that report.
Work Package 4.2 gives a good comparison between the methods that Colin has mentioned. The 3 variable and 6 variable methods are almost 45 years old (From 1975) and based on a maximum of 15 years of data.
When using the small catchment equation we generally advocate not using a pivotal site adjustment seeing as there is a very small pool of other small catchments from which to source a pivotal site.
We would however ask the designer to give due regard to the uncertainty bounds associated with the equation.

For catchments less than 25km^2 we would always say that at least three methods should be explored and that the choice of the flow to be used is up to the designer/practitioner.
The WP4.2 report is intended to provide a further methodology for small catchment flood estimation. As far as we are concerned, it is the preferred method.

For catchment sizes less than 5km^2 there is no FSU method applicable. For such 'small' catchments we would suggest that maybe the rational method or a modified rational method could be used.
****

Regards,
Oliver Nicholson
Civil Engineer MLitt, BE, Dip, CEng, MIEI

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Appendix 3

Summary of EIAR Chapter 7 Aspects with Hydroecological Significance.

7 SUMMARY OF EIAR CHAPTER 7 ASPECTS WITH HYDROECOLOGICAL SIGNIFICANCE.

SAC Connectivity

The application area and Lobinstown Quarry itself are neither hydrologically nor hydrogeologically connected to the River Boyne And River Blackwater SAC (002299) and SPA (004232). The site is not mapped by the EPA as part of the River Boynes Hydrometric Area (07). There is therefore no connection between the proposed development and the River Boyne and River Blackwater SAC and SPA.

The application area and Lobinstown quarry are in the mapped catchment (Hydrometric Area) of Dundalk Bay SAC (Site Code 000455) and SPA (004026). The site is mapped by the EPA as part of Hydrometric Area 06, which is named the "Newry, Fane, Glyde and Dee". Dundalk SAC and SPA is the coastal receiver of water from this entire Hydrometric Area. The EPA (2021) 3rd Cycle Catchment Assessment states "*This catchment includes the area drained by the Newry, Fane, Glyde and Dee rivers, and by all streams entering tidal water between Murlough Upper and The Haven, Co. Louth. This is a cross border catchment with a surface area of 2,125 km², 1390 km² of which is located within the Republic of Ireland (RoI). The largest urban centre is Dundalk. The other main urban centres are Carrickmacross, Ardee, Kingscourt, Dunleer and Castleblaney and the total population (in the RoI) is approximately 115,900, with a population density of 83 people per km². The catchment is characterised by the upland area of the Carlingford Peninsula, which is underlain by granites and other igneous rocks, and undulating land to the south, and a heavily drumlinised (lenticular, steep sloped hills) landscape in the western half of the catchment. There are extensive gravel deposits along much of the coast in this catchment, which are an important local groundwater resource.*"

With respect for the potential for the application proposed to impact Dundalk Bay SAC and SPA, the take home points from the EPA's description of the Hydrometric Area AND the application site under consideration, the catchment numbers of significance to scale include, as follows:

A. The catchment draining to Dundalk Bay and SAC has a land surface area of 2,125 km^2.

B. The catchment area of the application site's lands draining to the river that receives the site's discharge is mapped as c. 5km^2.

C. The proportion of Dundalk Bay SAC and SPA's catchment that could be affected by site activities is a fraction of 1%, *i.e.,* 0.2%.

D. There is 40 km of water flow stream length between the application site and Dundalk Bay SAC and SPA.

E. Whilst there is a tentative hydrological pathway to European sites Dundalk Bay SAC and SPA via the Killary Water_010 and its downstream Dee River, potential impacts to the European sites are highly unlikely given the distance of water and potential contaminant assimilation and removal over 40km downstream and the freshwater and estuarine water

bodies between which would involve dilution to the extent that a pollution event would be imperceptible at 1km from the application site boundary. Monitoring results suggest that the Section 4 Compliant discharge is completely assimilated within 100m of the site. Therefore, a pollution event would be assimilated within 1km.

Upon review of the EPA Envision mapping by the project's hydrologist (Dr. Colin O'Reilly) and hydrogeologist (Dr. Pamela Bartley), Dundalk Bay SAC and SPA receives water from ELEVEN EPA mapped and named surface waters, as follows:

1) Big Louth river on the Cooley Peninsula to the north east of Dundalk.
2) Rockmarshal stream on the Cooley Peninsula to the north east of Dundalk.
3) Flurry river on the Cooley Peninsula to the north east of Dundalk.
4) Ballymacscanlan stream on the Cooley Peninsula to the north east of Dundalk.
5) Ranskeagh river north of Dundalk.
6) Castletown north river flowing from the north west and through Dundalk
7) Castletown south through Dundalk
8) Ramparts river flowing through southern Dundalk.
9) Hagerstown stream to the south of Dundalk.
10) The Fane river south of Dundalk.
11) Drumeenagh stream north of Castlebellingham.
12) The Glyde river flowing through Castlebellingham.
13) The Dee river flowing through Ardee and discharging to the coast at Annagassan.

It is the thirteenth river, named 'The Dee', that tentatively connects the application site with Dundalk Bay SAC and SPA. The site's licensed receiver of the treated discharge water is the surface water named the Killary Water_010. The Killary_Water_010 merges with the Killary_Water_020 and then joins the Dee River. The first protection to the River Dee is the water management system already in place, which has capacity to protect the receiving waters for the current and future proposed development. The discharge from the site is itself of higher hydrochemical quality than the receiving water. The discharge acts to reduce some concentrations in the receiving water. The discharge causes no change in many parameters of the receiving water.

EPA Envision mapping allows HydroTOOL model evaluation of the expected low flow rates (NATQ95) at model nodes along each river in the country. The HydroTOOL values for low flow at the final node on each river prior to its discharge at the coast to Dundalk SAC and SPA are presented in Table 7.26.

Table 7.26 HydroTOOL values for low flow in rivers discharging to Dundalk SAC and SPA.

NATQ95	Node	Catchment Area (km2)	NATQ95 (m3/s)	NATQ95 (m3/d)	
Big Louth NATQ95 =	06_595	22.282	0.068	5875.2	
Rockmarshal NATQ95 =	N/A	not published		-	
Flurry NATQ95 =	06_599	25.416	0.076	6566.4	
Ballymacscanlan NATQ95 =	N/A	not published		-	
Ranskeagh NATQ95 =	06_1081	7.778	0.2	17280	
Castletown North NATQ95 =	06_1085	35.509	0.091	7862.4	
Castletown South NATQ95 =	06_1087	6.309	0.016	1382.4	
Ramparts NATQ95 =	06_1091	22.217	0.055	4752	
Hagerstown NATQ95 =	N/A	not published		-	
The Fane NATQ95 =	06_940	275.247	0.631	54518.4	
Drumeenagh NATQ95 =	N/A	-	-	-	
The Glyde NATQ95 =	06_1097	359.937	0.63	54432	
The Dee NATQ95 =	06_1099	389.066	0.602	52012.8	
NATQ95 Total flowing into Dundalk Bay SAC and SPA				**204,682**	**m3/d**

On the basis of the EPA Envision published HydroTOOL low flow (NATQ95) values for the rivers of the catchment (Hydrometric Area) feeding into Dundalk Bay SAC and SPA, the following is true:

1. The total NATQ95 low flow volume of waters entering Dundalk Bay SAC and SPA, *via* all of its rivers, is 204,682 m3/d.
2. The site's Section 4 Discharge licence permits a maximum daily discharge volume of 1,728 m3/d.
3. Even if the maximum permitted discharge volume was being discharged from the application site at the same time as all rivers were in the low flow condition, which is a highly unlikely scenario, the site's discharge waters represent 0.8% of the waters contributing to Dundalk Bay SAC and SPA. This <1% value is considered in all assessment techniques for impact as presenting no potential for impact.

With respect to hydrochemistry, sample results presented for the site's discharge quality suggest that the discharge is compliant with the Conditions of the Discharge Licence Ref: 20/01. It is noted that the Conditions of the Discharge Licence are specified so as to protect all downstream receptors. In particular, the following comments can be made with respect to the quality of water discharged under licence from the site:

a) The discharge is relatively neutral pH with the 6-9 pH ELV always being complied with.

b) Suspended Solids (SS) concentrations are very low, with respect to the 20mg/l ELV. On average, the SS concentration is generally <3mg/l.

c) Orthophosphate as P concentrations are always less than the Limit of Detection of the laboratory. The results are always a small fraction of the ELV for MRP-P.

d) The discharge does not present a Biochemical Oxygen Demand (BOD), in general. Results are usually less than the Limit of Detection of the laboratory for BOD. There is a slight exceedance in April 2023. This is not repeated in the results for five subsequent sampling events.

e) The discharge does not present a Chemical Oxygen Demand (COD), in general. Results are usually less than the Limit of Detection of the laboratory for COD. The results are always a small fraction of the ELV for COD.

f) Ammonium-N concentrations are an order of magnitude lower than specified in the ELV of the Licence.

g) On average, Nitrate-N concentrations in the discharge are less that the 10mg/l NO3-N ELV.

h) There are no detections of petroleum hydrocarbons in the discharge.

i) There are no detections of BTEX compounds in the discharge.

It is therefore concluded that the site's discharge generally complies with the hydrochemical ELVs of Condition 2.2 of the Discharge Licence.

With respect to impact on the ecological quality of the receiving waters, the Biological Q Rating of the receiving water upstream and downstream of the discharge are monitored each year and they are the same. As the Q Value is identical downstream of the quarry discharge relative to upstream, it can be inferred that the discharge from the quarry at Lobinstown is not having a deleterious effect on the biological quality of the stream.

As previously stated, the site's Section 4 Discharge licence permits a maximum daily discharge volume of 1,728 m3/d. The discharge meter on the discharge continuously records daily flow volume. The average discharge rate is 174m3/d and the maximum observed was 454 m3/d. The site is also fitted with a Rain Gauge so that the discharge pattern can be better evaluated and understood. The site's monitoring data suggests that the discharge is >90% rainfall runoff. There is very little groundwater in this high PSV bedrock type. There is zero discharge from the site when there is no rainfall. This means that there is no groundwater baseflow to the river system.

The dominant water balance component is surface water runoff. This is what the GSI have published for the groundwater body and this is what the site investigation results reveal. The GSI apply a groundwater recharge CAP of 100 mm/yr to the amount of effective rainfall that can move into groundwater. The bedrock is almost impermeable (10^{-8} m/s hydraulic conductivity). This means that in the pre-development condition, all of the rainfall runoff that would be flowing off the land would enter the river. The site maintains this water balance system, returning rainfall runoff to the river system. The site treats the water before discharge, removes suspended solids. There is no ortho-P, no ammonium and no BOD or COD load being sent to the river. Under agricultural land usage there would be nutrients and suspended solids going to the river.

The significance of the recorded flows is that the site discharges, on average, 10% of the volume permitted. The maximum volume permitted was determined by MCC in 2020 to be a safe volume that will enable conservation of all river and fish life quality and, by default, also protects Dundalk Bay SAC and SPA.

On a very simple basis, consider that the total quarry void area proposed is 9.7 ha and the lateral extension part of that total area is 4.8 ha. Those values for the current area and the increase to the full proposed 9.7ha area essentially suggest that the footprint of the excavation area will be doubled. Considering that the site discharges an average of 174 m3/d, even if that were doubled the discharge would be 348 m3/d. This is still only 20% of the maximum permitted ELV for volume. Remember the ELV for maximum volume in the Discharge Licence is the volume that has been set as the safe amount to protect WFD Status, to ensure no presentation of risk to the rivers, protection of fish life and all downstream European sites. The peak rainfall response in the discharge was 454 m3/d. Even if this doubled, the peak storm response at the site would be c. 900 m3/d. This is still only c. 50% of the available and permitted maximum daily discharge volume. It is therefore concluded, beyond any doubt whatsoever, that the site's existing infrastructure can accommodate, attenuate and treat the waters that will arise from the proposed deepening by one bench the existing site and the proposed extension to the east.

On a more academic basis, the site's drilling, pump testing and hydraulic response testing enabled calculations of potential future dewatering volumes that could be encountered based on academic empirical hydrogeological equations. Two empirical academic methods were employed and both methods suggest that the future total volume arising from the proposed future extraction area and rainfall runoff will be c. 200m3/d. The value returned by the academic calculations is close to the current average value because there will be little extra groundwater encountered in the application bedrock and the rainfall runoff value for the site already includes some contribution from the eastern lands. In addition, the empirical calculations seem to have difficulty with such a low permeability bedrock. On a worst-case Factor of Safety (FOS) basis, the c. 200 m3/d could be multiplied by a 2, 3, 4, 5, 6, 7, or 8 x FOS and the site's water management systems will still have the capacity to attenuate and treat the future waters arising over the entire application area.

There is an extensive array of established, proven, water management components already in use at the site. These water management components were specified in the Section 4 Discharge Licence (Ref: 20/01) issued by MCC in November 2020. The water management components were specified in the Discharge Licence because they were designed by SLR to retain waters, attenuate for the required duration to remove solids, intercept contaminants (oil interceptor) and provide a mechanism of discharge (diffuse on the plinth) that would ensure protection of the receiving water. There are four components separating the site from the receiving water: the sump, the western lagoon, the final lagoon and the oil separator.

The water management components already established include, as follows:

- The floor sump in the south of the working bedrock extraction area.
- A western lagoon that collects rainfall runoff water from the road that is used by trucks entering and leaving the site.
- A fully functioning, high engineered, wheel wash and associated sump.

- A final lagoon, which receives water pumped from the floor sump and the western sump.
- A Class 1 oil separator.
- A flow meter.
- A discharge pipe with concrete plinth to diffuse and aerate discharge water as it is delivered to the receiving water.

With respect to the ability of the site's existing infrastructure to treat the future proposed total area's waters to the satisfaction of the Conditions of the existing Section 4 Discharge Licence, the only parameter that has the potential to change is the Suspended Solids concentrations arising. All other parameters will average the same for the working area. Suspended solids can change with blasting and workings. The site discharges an average Suspended Solids (SS) concentration of 3 mg/l SS. The permitted ELV for SS is 20 mg/l (DL Ref 20/01). Therefore, the site uses 15% of the ELV limit as mg/l. However, if one were to consider that 1,728m3/d is permitted at 20 mg/l then the LOAD of SS permitted is 34.56 kg/d. The site discharges, on average, 174 m3/d at 3 mg/l = 0.52 kg/d. Therefore, the site discharges 1.5% of the permitted load of SS. Therefore, there is treatment function and hydraulic capacity in the systems already in place on the site. There is so much unused capacity available in the Discharge Licence Conditions and so much underutilised treatment capacity and treatment function available in the as built settlement lagoons that the proposed expansion can be accommodated in the existing infrastructure. The proposed development's waters will be adequately treated and appropriately attenuated without the need for any more water treatment infrastructure.

The main settlement pond has a footprint of 2,000 m^2 and is fully functional. Surface water level in the settlement pond was measured to be 86.1 m OD in November 2023, with a bank top of 86.5 m OD, above a pond base elevation of 85 m OD, approximately. The depth capacity of this main settlement lagoon is therefore 1.5m.

Given the dimensions of the final settlement lagoon, the hydraulic capacity is 3,105m^3. On the basis that the maximum discharge rate is 1,728 m3/d, there is a guaranteed 1.75 day retention time in the settlement lagoons. This retention time is far greater than the usual specification for settlement of solids. Mathematics supporting the adequate design capacity are presented later in the Water Management Section of the EIAR.

It is noted that there is a European site Stabannan-Braganstown SPA (Site Code 004091) 5.7 km to the west of the southern portion of Dundalk Bay SAC and SPA. The hydrogeologists for this assessment advise that the application site has no hydrological connectivity to Stabannan-Braganstown SPA by virtue of the fact that the EPA maps the catchment of the Stabannan-Braganstown SPA to be part of the Glyde River. The application site is mapped by the EPA to be part of a completely different river, named the Dee.