

# Soil Recovery Facility, Kildare

## Natura Impact Statement (Final)

April 2020

[www.jbaconsulting.ie](http://www.jbaconsulting.ie)

**Environmental Efficiency Consultants (Ireland) Ltd**  
Parnell House  
19 Quinsboro Road  
Bray  
Co. Wicklow

## JBA Project Manager

Bernadette O'Connell  
 8 Greenogue Business Plaza  
 Greenogue Business Park  
 Rathcoole  
 Co. Dublin

## Revision History

Revision Ref/Date	Amendments	Issued to
07/04/2020	Draft Report	Richard Deeney
16/04/2020	Final Report	Richard Deeney

## Contract

This report describes work commissioned by Richard Deeney of Environmental Efficiency Consultant (Ireland) Ltd, on behalf of Sancom Ltd, by a letter dated 12-10-2018. JBA's representative for the contract was Bernadette O'Connell. William Mulville and Malin Lundberg of JBA Consulting carried out this work.

Prepared by ..... Malin Lundberg BSc MSc  
 Assistant Ecologist

Reviewed by ..... Niamh Burke BSc PhD CEnv MCIEEM  
 Principal Ecologist

## Purpose

This document has been prepared as a Final Report for Sancom Ltd. JBA Consulting accepts no responsibility or liability for any use that is made of this document other than by the Client for the purposes for which it was originally commissioned and prepared.

JBA Consulting has no liability regarding the use of this report except to Sancom Ltd.

## Copyright

© JBA Consulting Engineers and Scientists Limited 2020.

## Carbon Footprint

A printed copy of the main text in this document will result in a carbon footprint of 421g if 100% post-consumer recycled paper is used and 535g if primary-source paper is used. These figures assume the report is printed in black and white on A4 paper and in duplex.

JBA is aiming to reduce its per capita carbon emissions.

## Contents

1	Introduction	0
1.1	Background	0
1.2	Summary of the Screening Assessment	0
1.3	Legislative Context	0
1.4	Appropriate Assessment Process	1
1.4.1	Stage 1 - Screening for AA	2
1.4.2	Stage 2 – AA	2
1.4.3	Stage 3- Alternative Solutions	2
1.4.4	Stage 4 – IROPI	2
1.5	Methodology	2
1.6	Desktop Survey	3
1.7	Competent Persons	4
1.7.1	Limitations and Constraints	4
2	Project Description	5
2.1	The 'Project'	5
2.2	Site Location	5
2.3	Proposed Project	5
2.3.1	Duration of the Works:	7
2.4	Project Zone of Influence	7
3	Screening Assessment	8
3.1	Natura 2000 Sites	8
3.1.1	River Barrow and River Nore SAC (002162) Site synopsis	8
3.1.2	Qualifying Interests	9
3.1.3	Conservation Objectives	10
3.1.4	Site Vulnerability	20
3.1.5	Other Designations.	21
3.1.6	Slaney River Valley SAC (000781) Site Synopsis	21
3.1.7	Qualifying Interests	21
3.1.8	Conservation Objectives	22
3.1.9	Site Vulnerability	26
3.1.10	Other Designations	27
3.2	Summary of Natura 2000 Qualifying Interests in Zone of Influence	27
3.3	Screening Assessment	29
3.4	Project Summary	29
3.5	Screening Conclusion	31
4	Environmental Baseline	32
4.1.1	Baseline conditions	32
4.1.2	Flora	38
4.1.3	Fauna	38
4.2	Waterbodies in the Vicinity of the Proposed Site	39
5	Other Relevant Plans and Projects	41
5.1	Cumulative Effects	41
5.2	Plans	41
5.2.1	Kildare County Development Plan 2017-2023	41
5.2.2	River Basin Management Plan for Ireland 2018-2021	42
5.3	Other Projects	42
5.3.1	Summary	45
6	Appropriate Assessment	46
6.1	Introduction	46

6.2	Potential Sources of Impact via Surface Water Pathways	46
6.2.1	Construction Phase- Direct impacts:	46
6.2.2	Construction Phase - Indirect impacts:	51
6.2.3	Operational Impacts – Direct impacts	52
6.2.4	Operational Impacts – Indirect impacts	58
6.2.5	Do Nothing Impact	59
6.2.6	Significance of Cumulative and In-combination Impacts	59
6.3	Mitigation for Construction Phase	60
6.3.1	Site Compound	60
6.3.2	Water Quality	61
6.3.3	Pollution Control and Spill Prevention	61
6.3.4	Conservation of Otter Habitat	62
6.4	Mitigation for Operation Phase	62
6.4.1	Water Quality and Sediment Control	62
6.4.2	Dust Control	63
6.5	Residual Impact	64
7	Conclusions	90

## List of Figures

Figure 1-1: The Appropriate Assessment Process (from: Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities, DoEHLG, 2009)	2
Figure 2-1: Site location (Source: Open Street Map 2019)	5
Figure 3-1: Site proximity in relation to Natura 2000 sites (Source: NPWS 2019)	8
Figure 4-1: Habitat map of the proposed development.	33
Figure 4-2: WL2 - Treeline along the western boundary. A matrix of GA1 - Improved agricultural grassland, WS1 - Scrub and ED3 - Recolonising bare ground is visible within the site boundary.	34
Figure 4-3: ED3 - Recolonising bare ground and WL2 - Treelines	35
Figure 4-4: WS1 - Scrub	36
Figure 4-5: FL8 - Other artificial lakes and ponds	37
Figure 4-6: FW4 - Drainage ditches	38
Figure 4-7: Rivers within the vicinity of the proposed site (EPA 2020).	40

## List of Tables

Table 3-1: Conservation objectives for River Barrow and River Nore SAC	10
Table 3-2: Threats and pressures posed to River Barrow and River Nore SAC (NPWS 2017a)	20
Table 3-3: Conservation objectives for Slaney River Valley SAC	22
Table 3-4: Threats and pressures posed to Slaney River Valley SAC (NPWS 2017b).	26
Table 3-5: QI in River Barrow and River Nore SAC within the zone of influence of the proposed project and Conservation Objective (NPWS 2011b)	28
Table 3-6: QI in Slaney River Valley SAC within the zone of influence of the proposed project and Conservation Objective (NPWS 2011c)	28
Table 3-7: Summary of project elements relevant to ecology of River Barrow and River Nore SAC and Slaney River Valley SAC.	29
Table 4-1: Habitats recorded at the proposed site.	32
Table 6-1: Potential direct impacts on the attributes of the designated features of River Barrow and River Nore SAC within the zone of influence of the proposed project	46
Table 6-2: Potential indirect impacts on the attributes of the designated features of River Barrow and River Nore SAC within the zone of influence of the proposed project	51

Table 6-3: Potential direct impacts on the attributes of the designated features of River Barrow and River Nore SAC within the zone of influence of the proposed project during operation.	52
Table 6-4: Potential direct impacts on the attributes of the designated features of Slaney River Valley SAC within the zone of influence of the proposed project during operation.	57
Table 6-5: Potential indirect impacts on the attributes of the designated features of River Barrow and River Nore SAC within the zone of influence of the proposed project during operation	58
Table 6-6: Summary of potential impacts, mitigation measures and residual impacts on the attributes of the designated features of the Natura 2000 sites	65
Table 7-1: Integrity of Natura 2000 site checklist (DoEHLG, 2009)	91

## Abbreviations

AA	Appropriate Assessment
CIEEM	Chartered Institute of Ecology and Environmental Management
DoEHLG	Department of Environment, Heritage and Local Government
EC	European Communities
EcOW	Ecological Clerk of Works
EPA	Environmental Protection Agency
IROPI	Imperative Reasons of Over-riding Public Interest
NBDC	National Biodiversity Data Centre
NPWS	National Parks and Wildlife Service
QI	Qualifying Interest
SAC	Special Area of Conservation
SPA	Special Protection Area
WFD	Water Framework Directive
ZoI	Zone of Influence

# 1 Introduction

## 1.1 Background

JBA Consulting was appointed by Environmental Efficiency Consultant (Ireland) Ltd to undertake a Natura Impact Statement (NIS) to inform the Stage 2 Appropriate Assessment in relation to a proposed soil recovery facility at a worked-out quarry in Graney West, County Kildare.

A Screening for Appropriate Assessment (AA) has already been carried out (JBA 2020).

The Zone of Influence within which potential impacts from any proposed project must be considered for significance, depends a variety of factors. This includes the nature, location and extent of the proposed works, the ecological receptors present within the Natura 2000 sites within the area and the potential for in combination impacts (DoEHLG 2009).

The Natura 2000 sites identified as occurring within the Zone of Influence of the development are:

- River Barrow and River Nore SAC (002162)
- Slaney River Valley SAC (000781)

This NIS provides the results of the assessment conducted for the proposed remedial works at Leighlinbridge in accordance with Article 6(3) of the Habitats Directive (Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora).

## 1.2 Summary of the Screening Assessment

Following an initial Screening (See Section 3) and based upon best scientific judgement, it is concluded that there are likely significant effects from the project on River Barrow and River Nore SAC and Slaney River Valley SAC.

Full details of the Natura 2000 sites are given in Section 4. The likely significant effects screened into the NIS are:

- Potential release of pollutants from waste material into the water through surface water drainage and groundwater which could affect some of the designated features of River Barrow and River Nore SAC
- Potential increase of sedimentation load into the water through surface water drainage could affect some of the designated features of River Barrow and River Nore SAC
- Fragmentation of Otter habitat due to the construction of the new road which will cross River Graney and the potential for casualties due to traffic. Otter is a qualifying interest of River Barrow and River Nore SAC
- Potential dust release spread by wind and air could affect some of the designated features of Slaney River Valley SAC

## 1.3 Legislative Context

Directive 92/43/EEC on the Conservation of Natural Habitats and Wild Fauna and Flora, known as the 'Habitats Directive' - provides legal protection for habitats and species of European importance. Article 2 of the Directive requires the maintenance or restoration of habitats and species of European Community interest, at a favourable conservation status. Articles 3 - 9 provide the legislative means to protect habitats and species of Community interest through the establishment and

conservation of an EU-wide network of sites known as Natura 2000 sites. Natura 2000 sites are Special Areas of Conservation (SACs) designated under the Habitats Directive and Special Protection Areas (SPAs) designated under the Conservation of Wild Birds Directive (79 / 409 / EEC).

Articles 6(3) and 6(4) of the Habitats Directive set out the decision-making tests for plans or projects affecting Natura 2000 sites. Article 6(3) establishes the requirement for Appropriate Assessment:

“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 subject to appropriate assessment of its implications for the site in view of the site's conservation objectives. In the light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public.”

Article 6(4) deals with the steps that should be taken when it is determined, as a result of Appropriate Assessment, that a plan/project will adversely affect a Natura 2000 site. Issues dealing with alternative solutions, imperative reasons of overriding public interest and compensatory measures need to be addressed in this case.

Article 6(4) states:

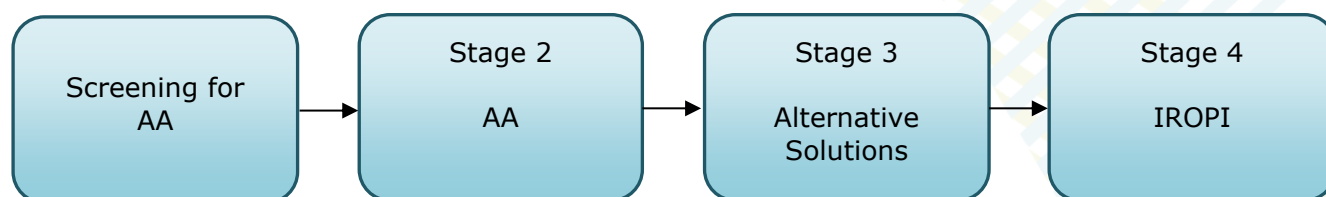
“If, in spite of a negative assessment of the implications for the site and in the absence of alternative solutions, a plan or project must nevertheless be carried out for imperative reasons of overriding public interest, including those of a social or economic nature, the Member States shall take all compensatory measures necessary to ensure that the overall coherence of Natura 2000 is protected. It shall inform the Commission of the compensatory measures adopted.

Where the site concerned hosts a priority natural habitat type and / or a priority species, the only considerations which may be raised are those relating to human health or public safety, to beneficial consequences of primary importance for the environment or, further to an opinion from the Commission, to other imperative reasons of overriding public interest.”

The requirements of Articles 6(3) and 6(4) of the Habitats Directive have been transposed into Irish legislation by means of the Habitats Regulations, 1997 (S.I. No. 94 of 1997) and the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 / 2011).

### 1.4 Appropriate Assessment Process

Guidance on the Appropriate Assessment (AA) process was produced by the European Commission in 2002, which was subsequently developed into guidance specifically for Ireland by the Department of Environment, Heritage and Local Government (DoEHLG) (2009). These guidance documents identify a staged approach to conducting an AA, as shown in Figure 1-1.



**Figure 1-1: The Appropriate Assessment Process (from: Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities, DoEHLG, 2009)**

**1.4.1 Stage 1 - Screening for AA**

The initial, screening stage of the Appropriate Assessment is to determine:

- a. whether the proposed plan or project is directly connected with or necessary for the management of the Natura 2000 site for nature conservation
- b. if it is likely to have a significant adverse effect on the Natura 2000 site, either individually or in combination with other plans or projects

For those sites where potential adverse impacts are identified, either alone or in combination with other plans or projects, further assessment is necessary to determine if the proposals will have an adverse impact on the integrity of a Natura 2000 site, in view of the sites conservation objectives (i.e. the process proceeds to Stage 2).

**1.4.2 Stage 2 – AA**

This stage requires a more in-depth evaluation of the plan or project, and the potential direct and indirect impacts of them on the integrity and interest features of the European designated site(s), alone and in-combination with other plans and projects, taking into account the site's structure, function and conservation objectives. Where required, mitigation or avoidance measures will be suggested.

The competent authority can only agree to the plan or project after having ascertained that it will not adversely affect the integrity of the site(s) concerned. If this cannot be determined, and where mitigation cannot be achieved, then alternative solutions will need to be considered (i.e. the process proceeds to Stage 3).

**1.4.3 Stage 3- Alternative Solutions**

Where adverse impacts on the integrity of Natura 2000 sites are identified, and mitigation cannot be satisfactorily implemented, alternative ways of achieving the objectives of the plan or project that avoid adverse impacts need to be considered. If none can be found, the process proceeds to Stage 4.

**1.4.4 Stage 4 – IROPI**

Where adverse impacts of a plan or project on the integrity of Natura 2000 sites are identified and no alternative solutions exist, the plan will only be allowed to progress if imperative reasons of overriding public interest can be demonstrated. In this case compensatory measures will be required.

The process only proceeds through each of the four stages for certain plans or projects. For example, for a plan or project, not connected with management of a site, but where no likely significant impacts are identified, the process stops at stage 1. Throughout the process, the precautionary principle must be applied, so that any uncertainties do not result in adverse impacts on a site.

This report is in support of a Stage 1 Screening for Appropriate Assessment.

**1.5 Methodology**

The Screening for Appropriate Assessment has been carried out with reference to the following documents:



- DoEHLG (2009 rev 2010) Appropriate Assessment of Plans and Projects in Ireland Guidance for Planning Authorities. Department of the Environment, Heritage and Local Government (DoEHLG 2009).
- European Communities (EC) (2000) Managing Natura 2000 Sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC, Office for Official Publications of the European Communities, Luxembourg. European Commission (European Commission and Office for Official Publications of the European Communities 2000).
- EC (2002) Assessment of Plans and Projects Significantly Affecting Natura 2000 Sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC, Office for Official Publications of the European Communities, Luxembourg. European Commission (EC 2002).
- EC (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 interest, compensatory measures, overall coherence, opinion of the commission. European Commission (EC 2007).
- CIEEM (2018) *Guidelines for Ecological Impact Assessment for the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine*.
- Fossitt, J. (2000). A Guide to Habitats in Ireland. The Heritage Council, Kilkenny

Three site visits were completed by JBA in 2019:

- An ecological walkover survey on 15<sup>th</sup> January 2019
- A preliminary ground level assessment of bat roost suitability, Otter survey, Badger survey, preliminary Sand Martin survey and an invasive species survey undertaken on 8<sup>th</sup> March 2019
- A Sand Martin survey on 11<sup>th</sup> June 2019

## 1.6 Desktop Survey

A desktop survey was conducted of available published and unpublished information, along with a review of data available on the NPWS and National Biodiversity Data Centre (NBDC) web-based databases, in order to identify key habitats and species that may be present within relevant 1km grid squares, in particular those protected by European and national legislation. The data sources this assessment has been collected in a range of formats, from a range of sources, including;

- NPWS website (<https://www.npws.ie/>), where site synopses, Natura 2000 data forms and conservation objectives were obtained.
- National Biodiversity Data Centre (NBDC) Maps (<http://maps.biodiversityireland.ie/#/Map>)
- Environmental Protection Agency (EPA) maps website (<https://gis.epa.ie/EPAMaps/>)
- River Basin Management Plans (RBMP) ([www.wfdireland.ie](http://www.wfdireland.ie))
- Planning website ([myplan.ie](http://myplan.ie))
- OPW website (<https://maps.opw.ie/drainage/map/>)
- Catchments ([www.catchments.ie](http://www.catchments.ie))

This report has been produced on currently available information, with the most up-to-date versions available at the time of issue used.

## **1.7 Competent Persons**

The assessment has been carried out by Malin Lundberg (BSc, MSc), with assistance from William Mulville (BSc (Hons), MSc). Both are experienced field ecologists with JBA and have undertaken numerous Appropriate Assessment Screenings and Natura Impact Statement (NIS) assessments.

The report has been reviewed by Dr Niamh Burke (BSc (Hons), PhD, CEnv MCIEEM). Niamh is a Principal Ecologist with JBA who has 12 years' experience of environmental and ecological assessment within both consultancy and academia.

### **1.7.1 Limitations and Constraints**

The NIS assessment necessarily relies on some assumptions and it was inevitably subject to some limitations. These would not affect the conclusion, but the following points are recorded in order to ensure the basis of the assessment is clear:

- Information on the works and conditions on site are based on current knowledge at the time of writing. Changes to the site since surveys were undertaken cannot be accounted for.
- Some slight variation in the works methodology may occur, but these will only be minor changes. Where changes to methodology could impact on ecological features, an ecologist will be consulted to determine if the project needs reassessment.
- Adverse weather can cause delays to the schedule and alter the timing of works. This has been accounted for using a worst-case scenario where necessary.
- The NIS addresses issues around designated sites and does not exempt works from responsibilities related to habitats and species covered under separate national legislation.
- The ecological survey was restricted to the proposed site only and did not take in any area of the River Barrow and River Nore SAC (002162) or Slaney River Valley SAC (000781).

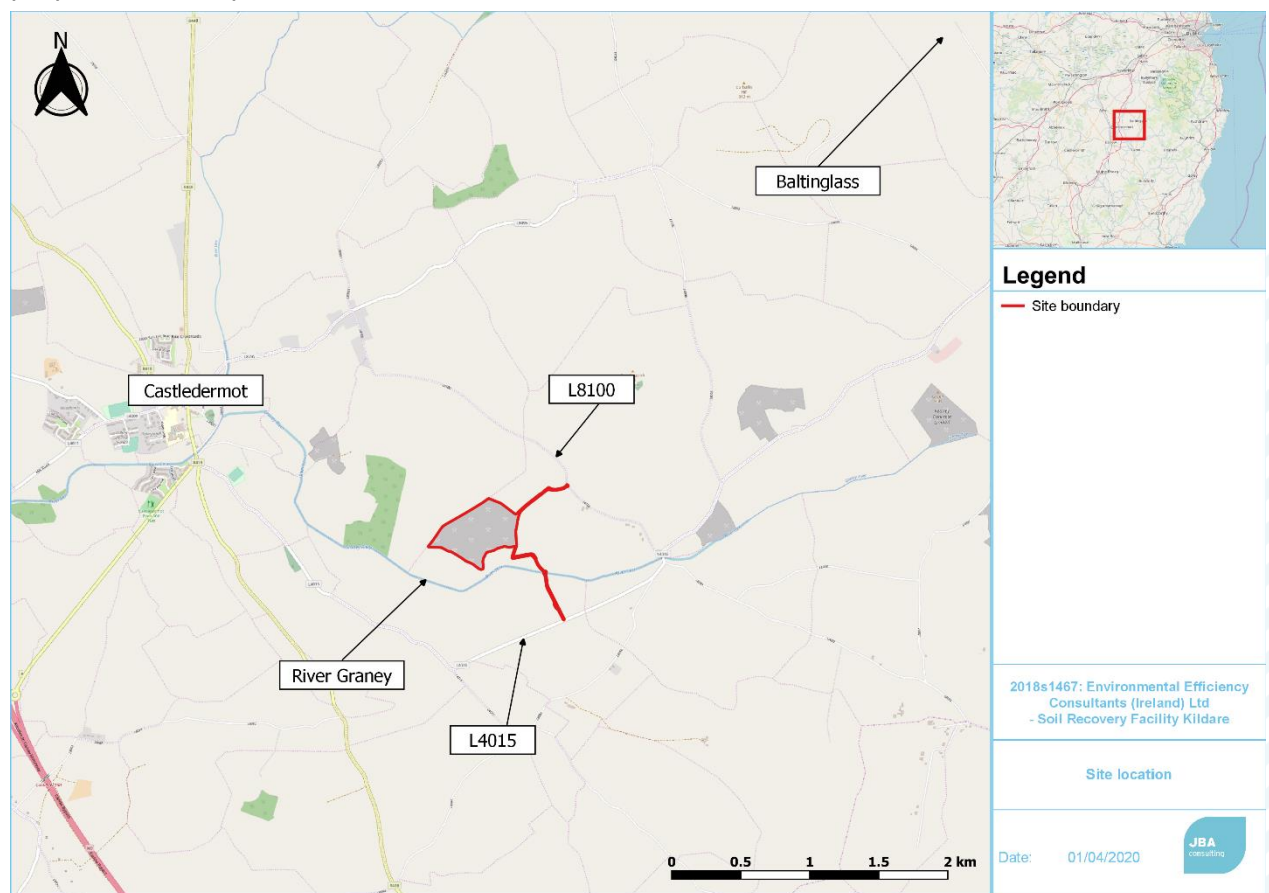
## 2 Project Description

### 2.1 The 'Project'

The proposed development meets the criteria of a 'Project' as defined in the Habitats Directive and is not directly connected with or necessary to the management of any Natura 2000 site. Therefore, the Project is subject to the requirements of the Appropriate Assessment process.

### 2.2 Site Location

The proposed development is an old quarry in Graney West, Co. Kildare (Figure 2-1). The site is located approximately 2 km east of Castledermot town and approximately 8 km west of Baltinglass village. Road L8100 is located north of the site and road L4015 is located to the south. River Graney is running south of the proposed development.



**Figure 2-1: Site location (Source: Open Street Map 2019)**

### 2.3 Proposed Project

Environmental Efficiency Consultant (Ireland) Ltd commissioned JBA Consulting as a sub-consultant to conduct ecological and environmental services for a proposed soil recovery of a worked-out quarry. The proposed project includes the construction phase of site preparatory works and the operational phase with the principal activity of backfilling a worked-out quarry using uncontaminated soil and stone from construction sites, to backfill and restore existing voids onsite.

#### *Construction Phase*

The site preparation works will involve the following:

- Construction of new access road in the south-east, coming off road L4015, to be used by Heavy Goods Vehicles (HGVs). The first 100m of road pavement will be hot rolled asphalt and the rest will be gravelled;
- Wheelwash facility located at the end of the 100m hard surfaced road. This will include a silt tank, petrol interceptor and rattle bars;
- A permeable car park area for employees and visitors, five parking locations for HGVs;
- Re-grading of ground surface in the stockpiling and sorting area;
- Extended concrete apron north of existing buildings on site;
- A concrete pad for re-fuelling of vehicles adjacent to bunded fuel storage area on-site. This will have a separate drainage system with silt trap, oil interceptor and soakaway;
- Bunded waste inspection/quarantine area on-site; and
- Erection of screening mounds and planting of trees along the north, east and south boundaries.

#### *Operation Phase*

The backfill operation of the worked-out quarry will accept inert material comprising subsoil, clay, gravels, topsoil, stone and mixtures of such. These materials will be sourced from construction sites in the Greater Dublin Area.

In addition to the principal waste activity described above, it is proposed to carry out the following secondary waste recovery activities:

- Intake of top-soil, screening at proposed screening plant and resale of such material;
- Intake of gravel and sands, washing at existing washing plant and resale of such materials;
- Intake of concrete, concrete crushing using concrete crushing equipment, mixing with sand and gravel before being fed to the washing plant to form aggregate, and resale of such material, and;
- Intake of garden waste, shredding and composting of this waste within a silage pit over an underground effluent storage tank, for use for agricultural land spreading.

Waste to be processed on site will be in the following quantities:

- 100,000 tonnes per annum of sand and gravel for processing at the sand and gravel plant;
- 100,000 tonnes per annum of concrete for processing at the concrete crushing plant;
- 4000 tonnes per annum of topsoil for screening at soil screening plant, and;
- 3000 tonnes per annum of Garden Waste for shredding and composting.

Water treatment measures on-site are as follows:

- Septic tank will be in place to manage domestic wastewater on-site
- Surface Water Settlement Lagoons will be in place for managing run-off from site and from gravel washing process

- Effluent tank (180,000 litres capacity) will be in place to manage run-off from composting area.
- Silt trap, Class 1 Full Retention Interceptor and Soakaway will be in place to deal with run-off from concrete hard standing areas
- Class 1 Interceptor will be in place serving the car parking area
- Integrated Oil Interceptor will serve the wheel wash along the site access road.

Water from the settlement lagoons will be pumped back to the washing plant via a pump house and recycled within the process. Overflow from the last of these lagoons is via a 300 mm diameter concrete pipe to the Graney River. Surface water also leaves the site by percolation through gravels to ground and underlying groundwater.

The site is 19.2 hectares in size and the area to backfill is 13.3 hectares.

The traffic will access the site from the south east via a new proposed access road.

The proposed final restoration of the site is to restore it into an agricultural grassland for livestock.

A site layout and drainage plan is provided in Appendix A.

#### 2.3.1 **Duration of the Works:**

The duration of the construction phase is proposed to be 6 to 9 months.

The operational phase is proposed to be 10-25 years. Final restoration will be carried out on a phased basis with planting of grass. After the site has been fully backfilled it will be used as an agricultural grassland.

#### 2.4 **Project Zone of Influence**

The project will primarily affect the site only, but a wider area of influence is used for impacts relating to noise disturbance (1km), air pollution (10km), surface water (15km) and any supporting habitat for SAC/SPA species (15km).

### 3 Screening Assessment

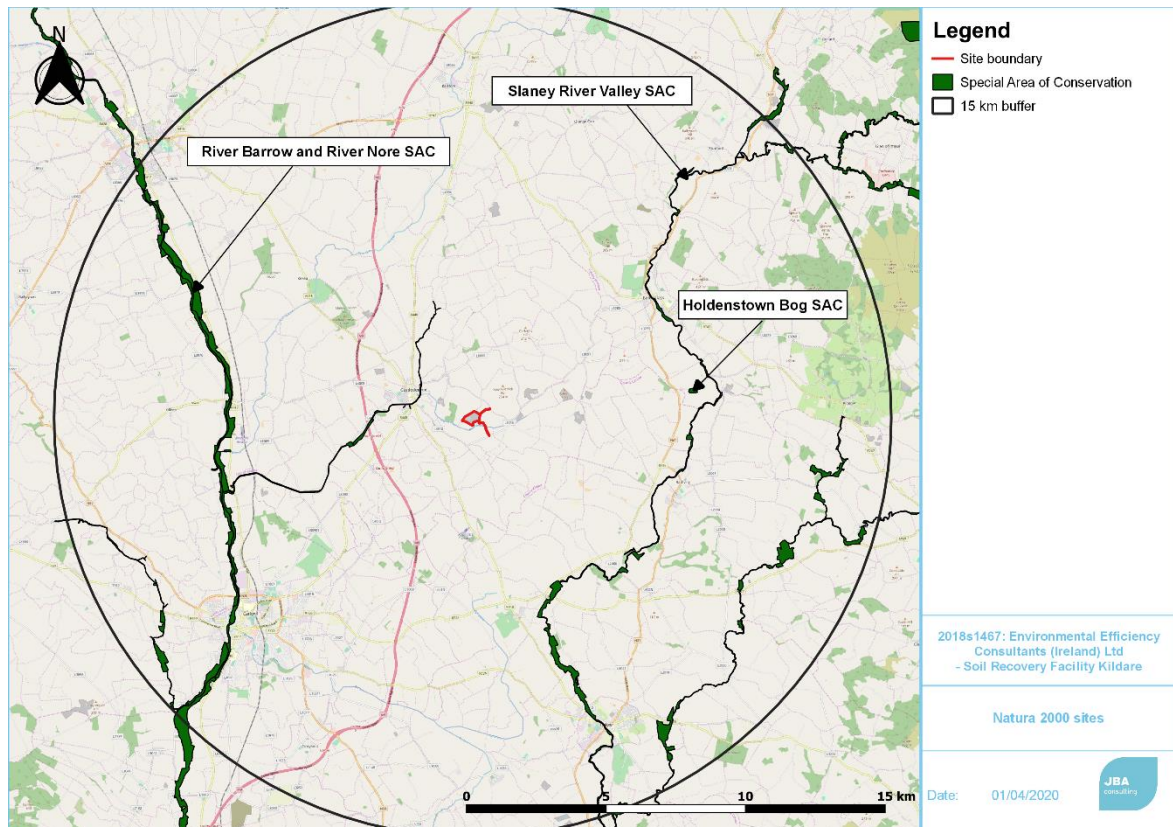
#### 3.1 Natura 2000 Sites

This section provides baseline information on the Natura 2000 sites within the Zone of Influence (ZoI) of the proposed works. A short description of the Natura 2000 site is provided, along with details of the qualifying interest/special conservation interests, conservation objectives, the attributes used to define favourable conservation status and site vulnerabilities.

The Natura 2000 sites identified as occurring within the ZoI (see Figure 3-1) of the proposed development are:

- River Barrow and River Nore SAC (002162)
- Slaney River Valley SAC (000781)

Even though Holdenstown Bog SAC (001757) lies within 15km of the site it is not anticipated to be within the ZoI due to the lack of pathways via surface water, groundwater, land and air.



**Figure 3-1: Site proximity in relation to Natura 2000 sites (Source: NPWS 2019)**

##### 3.1.1 River Barrow and River Nore SAC (002162) Site synopsis

This site includes the Barrow and Nore River Catchments all the way from Slieve Bloom Mountains in the north to Creadun Head in Waterford in the south. The Nore River, before joining the Barrow River, flows through limestone plains and intrusive rocks poor in silica. The upper parts of the Barrow also run through limestone, while the middle reaches and many of the eastern tributaries runs through Leinster Granite.

Within the site are several locations with alluvial forest, which is a priority Annex 1 habitat. Accessioned with the alluvial forests are eutrophic tall herb vegetation and elsewhere where the flood plain of the river is intact. Petrifying springs is another priority Annex 1 habitat found within this SAC along the Nore River. Old oak woodlands are found both along the Nore and the Barrow, including the Abbeyleix Woods which is one of the only remaining ancient woodlands in Ireland.

Floating river vegetation is well represented in the Barrow and in the many tributaries of the site. The water quality of the Barrow has improved since the vegetation survey was carried out in 1996. In pockets along the steep valleys of the rivers habitats of dry heath are occurring and is especially prominent in the Barrow Valley and along the tributaries at the foothills of the Blackstairs Mountains. The dry heath generally grades into wet woodland or swamp vegetation closer to the riverbank.

The southernmost area of the SAC is characterised by coastal habitats such as estuaries, mudflats and salt meadows.

The site is important for the presence of a number of E.U. Habitats Directive Annex II species, including Freshwater Pearl Mussel *Margaritifera margaritifera* and *M. m. durrovensis*, White-clawed Crayfish *Austropotamobius pallipes*, Salmon *Salmo salar*, Twaite Shad *Alosa fallax fallax*, three lamprey species – Sea Lamprey *Petromyzon marinus*, Brook Lamprey *Lampetra planeri* and River Lamprey *Lampetra fluviatilis*, the whorl snail *Vertigo moulinsiana* and Otter *Lutra lutra*. The site is also of ornithological importance for a number of E.U. Birds Directive Annex 1 species, including Greenland White-fronted Goose *Anser albifrons flavirostris*, Whooper Swan *Cygnus cygnus*, Bewick's Swan *Cygnus columbianus*, Bar-tailed Godwit *Limosa lapponica*, Peregrine *Falco peregrinus* and Kingfisher *Alcedo atthis*.

(Source: NPWS, 2016)

### 3.1.2 Qualifying Interests

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (\* = priority; numbers in brackets are Natura 2000 codes):

- Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*)\* [91E0]
- Atlantic salt meadows (*Glauco-Puccinellietalia maritima*) [1330]
- Brook Lamprey (*Lampetra planeri*) [1096]
- Desmoulin's Whorl Snail (*Vertigo moulinsiana*) [1016]
- Estuaries [1130]
- European dry heaths [4030]
- Floating River Vegetation [3260]
- Freshwater Pearl Mussel (*Margaritifera margaritifera*) [1029]
- Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430]
- Killarney Fern (*Trichomanes speciosum*) [1421]
- Mediterranean salt meadows (*Juncetalia maritimi*) [1410]
- Mudflats and sandflats not covered by seawater at low tide [1140]
- Nore Pearl Mussel (*Margaritifera durrovensis*) [1990]
- Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0]

- Otter (*Lutra lutra*) [1355]
- Petrifying springs with tufa formation (*Cratoneurion*)\* [7220]
- Reefs [1170]
- River Lamprey (*Lampetra fluviatilis*) [1099]
- Salicornia and other annuals colonising mud and sand [1310]
- Salmon (*Salmo salar*) [1106]
- Sea Lamprey (*Petromyzon marinus*) [1095]
- Twait Shad (*Alosa fallax fallax*) [1103]
- White-clawed Crayfish (*Austropotamobius pallipes*) [1092]

The qualifying interests (QI) that have the potential to occur in the vicinity of the proposed development site and that could be potentially significantly impacted through water quality include:

- Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*)\* [91E0]
- Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitriche-Batrachion* vegetation [3260]
- White-clawed Crayfish (*Austropotamobius pallipes*) [1092]
- Sea Lamprey (*Petromyzon marinus*) [1095]
- Brook Lamprey (*Lampetra planeri*) [1096]
- River Lamprey (*Lampetra fluviatilis*) [1099]
- Atlantic Salmon (*Salmo salar*) [1106]
- Otter (*Lutra lutra*) [1355]
- Freshwater Pearl Mussel (*Margaritifera margaritifera*) [1029]

### 3.1.3 Conservation Objectives

The conservation objectives for River Barrow and River Nore SAC (002162) below are taken from the NPWS Conservation Objectives Document (NPWS, 2011).

The conservation objectives document outlines specific objectives for the individual QIs within the ZoI and their respective attributes, measure and target aspects.

These aspects are detailed in Table 3-1.

**Table 3-1: Conservation objectives for River Barrow and River Nore SAC**

91E0 * Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> ( <i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i> )			
To restore the favourable conservation condition of Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> ( <i>Alno-Padion</i> ) in the Slaney River Valley SAC, which is defined by the following list of attributes and targets:			
Attribute	Measure	Target	Notes
Habitat distribution	Occurrence	No decline.	Distribution based on Perrin et al. (2008). NB further unsurveyed areas maybe present within the SAC
Habitat area	Hectares	Area stable or increasing, subject to natural processes, at least 181.54ha for sites	Minimum area, based on 16 sites surveyed by Perrin et al. (2008) - site codes 10, 15, 17,



		surveyed.	126, 127, 262, 282, 287, 511, 516, 517, 518, 520, 608, 1021; Coillte LIFE project and other sources. NB further unsurveyed areas maybe present within the SAC
Woodland size	Hectares	Area stable or increasing. Where topographically possible, "large" woods at least 25ha in size and "small" woods at least 3ha in size	The sizes of at least some of the existing woodlands need to be increased in order to reduce habitat fragmentation and benefit those species requiring 'deep' woodland conditions (Peterken, 2002). Topographical and land-ownership constraints may restrict expansion
Woodland structure: cover and height	Percentage and metres	Diverse structure with a relatively closed canopy containing mature trees; subcanopy layer with semimature trees and shrubs; and well-developed herb layer	Described in Perrin et al. (2008).
Woodland structure: community diversity and extent	Hectares	Maintain diversity and extent of community types	Described in Perrin et al. (2008); Browne et al. (2000).
Woodland structure: natural regeneration	Seedling: sapling: pole ratio	Seedlings, saplings and pole age-classes occur in adequate proportions to ensure survival of woodland canopy	Alder and oak regenerate poorly. Ash often regenerates in large numbers although few seedlings reach pole size
Hydrological regime: Flooding depth/height of water table	Metres	Appropriate hydrological regime necessary for maintenance of alluvial vegetation	Periodic flooding is essential to maintain alluvial woodlands along river floodplains but not for woodlands around springs/seepage areas
Woodland structure: dead wood	m <sup>3</sup> per hectare; number per hectare	At least 30m <sup>3</sup> /ha of fallen timber greater than 10cm diameter; 30 snags/ha; both categories should include stems greater than 40cm diameter (greater than 20cm diameter in the case of alder)	Dead wood is a valuable resource and an integral part of a healthy, functioning woodland ecosystem
Woodland structure: veteran trees	Number per hectare	No decline	Mature and veteran trees are important habitats for bryophytes, lichens, saproxylic organisms and some bird species. Their retention is important to ensure continuity of habitats/niches and propagule sources
Woodland structure: indicators of local distinctiveness	Occurrence	No decline	Includes ancient or long-established woodlands, archaeological and geological features as well as red-data and other rare or localised species. Perrin & Daly (2010) list site 10, 15, 17, 127, 282, 516, 517, 518, 608 as containing potential ancient/long established woodlands
Vegetation composition: native tree cover	Percentage	No decline. Native tree cover not less than 95%	Species reported in Perrin et al. (2008); Browne et al. (2000)

Vegetation composition: typical species	Occurrence	A variety of typical native species present, depending on woodland type, including ash ( <i>Fraxinus excelsior</i> ), alder ( <i>Alnus glutinosa</i> ), willows ( <i>Salix</i> spp) and, locally, oak ( <i>Quercus robur</i> )	Species reported in Perrin et al. (2008); Browne et al. (2000)
Vegetation composition: negative indicator species	Occurrence	Negative indicator species, particularly non-native invasive species, absent or under control	The following are the most common invasive species in this woodland type: sycamore ( <i>Acer pseudoplatanus</i> ), beech ( <i>Fagus sylvatica</i> ), rhododendron ( <i>Rhododendron ponticum</i> ), cherry laurel ( <i>Prunus laurocerasus</i> ), dogwood ( <i>Cornus sericea</i> ), Himalayan honeysuckle ( <i>Leycesteria formosa</i> ) and Himalayan balsam ( <i>Impatiens glandulifera</i> )
<p>Browne, A.; Dunne, F.; Roche, N. (2000). A survey of broadleaf woodlands in 3 SACs: Barrow-Nore, River Unshin &amp; Lough Forbes. Unpublished Report to NPWS</p> <p>Perrin, P.M.; Daly, O.H. (2010). A provisional inventory of ancient and long-established woodland in Ireland. Irish Wildlife Manuals No. 46.</p> <p>Perrin, P.; Martin, J.; Barron, S.; O'Neill, F.; McNutt, K.; Delaney, A. (2008). National Survey of Native Woodlands 2003-2008. Unpublished Report to NPWS.</p> <p>Peterken, G. (2002). Reversing the habitat fragmentation of British woodlands. WWF-UK, London.</p>			

**3260 Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation**

**To maintain the favourable conservation condition of Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation in the River Barrow and River Nore SAC, which is defined by the following list of attributes and targets:**

Attribute	Measure	Target	Notes
Habitat distribution	Occurrence	No decline, subject to natural processes	The full distribution of this habitat and its sub-types in this site is currently unknown. The basis of the selection of the SAC for the habitat is the presence of an excellent example of the vegetation community (nutrient-rich type) associated with extensive tufa deposits on the river bed in the Kings tributary of the Nore (Heuff, 1987). Other examples of this or other sub-types may be present within the SAC
Habitat area	Kilometres	Area stable or increasing, subject to natural processes	The full extent of this habitat in this site is currently unknown. See above
Hydrological regime: river flow	Metres per second	Maintain appropriate hydrological regimes	Due to regular disturbance (through variations in flow), river macrophytes rarely reach a climax condition but frequently occur as transient communities. A natural (relatively unmodified) flow regime is required for both plant communities and channel geomorphology to be in favourable condition, exhibiting typical dynamics for the river

			type (Hatton-Ellis and Grieve, 2003). For most of the sub-types of this habitat, high flows are required to maintain the substratum (see below) necessary for the characteristic species. Flow variation is particularly important, with high and flood flows being critical to the hydromorphology
Hydrological regime: groundwater discharge	Metres per second	The groundwater flow to the habitat should be permanent and sufficient to maintain tufa formation	This attribute refers to sub-types with tufa formations. Groundwater discharges to this habitat throughout the year
Substratum composition: particle size range	Millimetres	The substratum should be dominated by large particles and free from fine sediments	The tufaceous sub-types develop on relatively stable substrata such as bedrock, boulders and cobbles, where tufa can deposit and accumulate. Tufa deposition is believed to be biologically mediated, by algae and bryophytes. The substratum must remain free of fine sediments such as clay, silt and fine sand, which would adversely affect the growth of algae and mosses
Water chemistry: minerals	Milligrammes per litre	The groundwater and surface water should have sufficient concentrations of minerals to allow deposition and persistence of tufa deposits	The tufaceous sub-types require mineral- (typically calcium-) rich groundwaters to allow deposition of tufa. Surface water must also be sufficiently base-rich to prevent chemical erosion. Alkalinity and/or total hardness data may also be relevant
Water quality: suspended sediment	Milligrammes per litre	The concentration of suspended solids in the water column should be sufficiently low to prevent excessive deposition of fine sediments	See substratum composition above. Turbidity data may also be relevant
Water quality: nutrients	Milligrammes per litre	The concentration of nutrients in the water column should be sufficiently low to prevent changes in species composition or habitat condition	Phosphorus (MRP) is typically the limiting nutrient, however increased nitrogen (NO <sub>3</sub> <sup>-</sup> ) negatively impacts upon the N-fixing blue-green algal communities that frequently contribute to tufa deposition. Nutrient enrichment of the habitat typically leads to increased filamentous- green-algal biomass, and consequent changes in other algae, bryophyte and macrophyte species composition and abundance. Water quality should reach a minimum of Water Framework Directive good status, in terms of nutrient standards, and macroinvertebrate and phytobenthos quality elements

Vegetation composition: typical species	Occurrence	Typical species of the relevant habitat sub-type should be present and in good condition	The sub-types of this habitat are poorly understood and their typical species have not yet been defined. Typical species and appropriate targets may emerge to be site-specific. The typical species of the tufaceous sub-type in the Kings tributary of the Nore are identified in Heuff (1987). The typical species may include higher plants, bryophytes, macroalgae and microalgae
Floodplain connectivity	Area	The area of active floodplain at and upstream of the habitat should be maintained	River connectivity with the floodplain is essential for the functioning of this habitat. The site of the tufaceous sub-type in the King's River is within an area of floodplain, with further large floodplains upstream. Floodplains regulate fine sediment deposition within the channel. See substratum composition above

Heuff, H. (1987) The vegetation of Irish rivers. Unpublished Report.

**1092 White-clawed Crayfish (*Austropotamobius pallipes*)**  
**To maintain the favourable conservation condition of White-clawed crayfish in the River Barrow and River Nore SAC, which is defined by the following list of attributes and targets:**

Attribute	Measure	Target	Notes
Distribution	Occurrence	No reduction from baseline. See map	The crayfish is present almost throughout this SAC. The records extend as far downstream as Thomastown on the Nore and Graiguenamanagh on the Barrow
Population structure: recruitment	Percentage occurrence of juveniles and females with eggs	Juveniles and/or females with eggs in at least 50% of positive samples	See Reynolds et al. (2010) for further details
Negative indicator species	Occurrence	No alien crayfish species	Alien crayfish species are identified as major direct threat to this species and as disease vector. See Reynolds (1998) for further details
Disease	Occurrence	No instances of disease	Disease is identified as major threat and has occurred in Ireland even in the absence of alien vectors. See Reynolds (1998) for further details
Water quality	EPA Q value	At least Q3-4 at all sites sampled by EPA	Target taken from Demers and Reynolds (2002). Q values based on triennial water quality surveys carried out by the Environmental Protection Agency (EPA)
Habitat quality: heterogeneity	Occurrence of positive habitat features	No decline in heterogeneity or habitat quality	Crayfish need high habitat heterogeneity. Larger crayfish must have stones to hide under, or an earthen bank in which to

			burrow. Hatchlings shelter in vegetation, gravel and among fine tree-roots. Smaller crayfish are typically found among weed and debris in shallow water. Larger juveniles in particular may also be found among cobbles and detritus such as leaf litter. These conditions must be available on the whole length of occupied habitat
<p>Reynolds, J.D., O'Connor, W., O'Keeffe, C. and Lynn, D. (2010) A technical manual for monitoring white-clawed crayfish <i>Austropotamobius pallipes</i> in Irish lakes. Irish Wildlife Manuals No. 45.</p> <p>Reynolds, J.D. (1998) Conservation Management of the White-clawed Crayfish, <i>Austropotamobius pallipes</i>. Irish Wildlife Manuals No. 1</p>			

### 1095 Sea Lamprey (*Petromyzon marinus* L)

To restore the favourable conservation condition of Sea Lamprey in the River Barrow and River Nore SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution: extent of anadromy	% of river accessible	Greater than 75% of main stem and major tributaries down to second order accessible from estuary	Artificial barriers can block lampreys' upstream migration, thereby limiting species to lower stretches and restricting access to spawning areas. King (2006)
Population structure of juveniles	Number of age/size groups	At least three age/size present	Attribute and target based on survey information for the Barrow King (2006)
Juvenile density in fine sediment	Juveniles/m <sup>2</sup>	Juvenile density at least 1/m <sup>2</sup>	Juveniles burrow in areas of fine sediment in still water.
Extent and distribution of spawning habitat	m <sup>2</sup> and occurrence	No decline in extent and distribution of spawning beds	Lampreys spawn in clean gravels. Artificial barriers are currently preventing lamprey from accessing suitable spawning habitat.
Availability of juvenile habitat	Number of positive sites in 2nd order channels (and greater), downstream of spawning areas	More than 50% of sample sites positive	Artificial barriers are currently preventing juvenile lampreys from accessing the full extent of suitable habitat.

### 1096 Brook Lamprey *Lampetra planeri*

To restore the favourable conservation condition of Brook lamprey in the River Barrow and River Nore SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution	% of river accessible	Access to all watercourses down to first order streams	Artificial barriers can block lampreys' upstream migration, thereby limiting species to lower stretches and restricting access to spawning areas.
Population structure of juveniles	Number of age/size groups	At least three age/size groups of brook/river lamprey present	Attribute and target based on data from Harvey and Cowx (2003). King (2006) provides survey information for the Barrow. It is impossible to distinguish between brook and river lamprey juveniles in the field, hence they are

			considered together in this target
Juvenile density in fine sediment	Juveniles/m <sup>2</sup>	Mean catchment juvenile density of brook/river lamprey at least 2/m <sup>2</sup>	Juveniles burrow in areas of fine sediment in still water. Attribute and target based on data from Harvey and Cowx (2003) who state 10/m <sup>2</sup> in optimal conditions and more than 2/m <sup>2</sup> on a catchment basis
Extent and distribution of spawning habitat	m <sup>2</sup> and occurrence	No decline in extent and distribution of spawning beds	Attribute and target based on spawning bed mapping by Inland Fisheries Ireland (IFI). Lampreys spawn in clean gravels. Artificial barriers are currently preventing lamprey from accessing suitable spawning habitat.
Availability of juvenile habitat	Number of positive sites in 2nd order channels (and greater), downstream of spawning areas	More than 50% of sample sites positive	Artificial barriers are currently preventing juvenile lampreys from accessing the full extent of suitable habitat.
<p>Harvey, J. and Cowx, I. (2003) Monitoring the river, sea and brook lamprey, <i>Lampetra fluviatilis</i>, <i>L. planeri</i> and <i>Petromyzon marinus</i>. Conserving Natura 2000 Rivers Monitoring Series No. 5, English Nature, Peterborough.</p> <p>King, J.J. (2006) The distribution of Lamprey in the River Barrow SAC. Irish Wildlife Manuals No. 21</p>			

### 1099 River Lamprey (*Lampetra fluviatilis*)

To restore the favourable conservation condition of Brook lamprey in the River Barrow and River Nore SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution: extent of anadromy	% of river accessible	Greater than 75% of main stem and major tributaries down to second order accessible from estuary	Artificial barriers can block lampreys' upstream migration, thereby limiting species to lower stretches and restricting access to spawning areas. See King (2006),
Population structure of juveniles	Number of age/size groups	At least three age/size groups of river/brook lamprey present	King (2007) provides survey information for the Barrow. It is impossible to distinguish between brook and river lamprey juveniles in the field, hence they are considered together in this target
Juvenile density in fine sediment	Juveniles/m <sup>2</sup>	Mean catchment juvenile density of brook/river lamprey at least 2/m <sup>2</sup>	Juveniles burrow in areas of fine sediment in still water. Attribute and target based on data from Harvey and Cowx (2003) who state 10/m <sup>2</sup> in optimal conditions and more than 2/m <sup>2</sup> on a catchment basis
Extent and distribution of spawning habitat	m <sup>2</sup> and occurrence	No decline in extent and distribution of spawning beds	Attribute and target based on spawning bed mapping by Inland Fisheries Ireland (IFI). Lampreys spawn in clean gravels. Artificial barriers are currently preventing lamprey from accessing suitable spawning habitat.

Availability of juvenile habitat	Number of positive sites in 2nd order channels (and greater), downstream of spawning areas	More than 50% of sample sites positive	Artificial barriers are currently preventing juvenile lampreys from accessing the full extent of suitable habitat.
----------------------------------	--	--	--

### 1103 Twaite shad *Alosa fallax*

To restore the favourable conservation condition of Twaite shad in the River Barrow and River Nore SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution: extent of anadromy	% of river accessible	Greater than 75% of main stem length of rivers accessible from estuary	In some catchments, artificial barriers block twaite shads' upstream migration, thereby limiting species to lower stretches and restricting access to spawning areas
Population structure: age classes	Number of age classes	More than one age class present	Regular breeding has been confirmed in the River Barrow in recent years, but not in the Nore
Extent and distribution of spawning habitat	m <sup>2</sup> and occurrence	No decline in extent and distribution of spawning habitats	
Water quality: oxygen levels	Milligrammes per litre	No lower than 5mg/l	Attribute and target based on Maas, Stevens and Briene (2008)
Spawning habitat quality: Filamentous algae; macrophytes; sediment	Occurrence	Maintain stable gravel substrate with very little fine material, free of filamentous algal (macroalgae) growth and macrophyte (rooted higher plants) growth	See Maitland and Hatton-Ellis (2003) for further information

Maas, J.; Stevens, M. ; Breine, J. (2008). Poor water quality constrains the distribution and movements of Twaite shad *Alosa fallax fallax* (Lacepede, 1803) in the watershed of river Scheldt. *Hydrobiologia* 602, 129 - 143.

Maitland, P.S.; Hatton-Ellis, T.W. (2003). Ecology of the Allis and Twaite shad Conserving Natura 2000 Rivers Ecology Series No. 3. English Nature, Peterborough.

### 1106 Atlantic salmon (*Salmo salar*) (only in fresh water)

To restore the favourable conservation condition of Salmon in the River Barrow and River Nore SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution: extent of anadromy	% of river accessible	100% of river channels down to second order accessible from estuary	Artificial barriers are currently preventing juvenile lampreys from accessing the full extent of suitable habitat (King, 2006).
Adult spawning fish	Number	Conservation Limit (CL) for each system consistently exceeded	A conservation limit is defined by the North Atlantic Salmon Conservation Organisation (NASCO) as "the spawning stock level that produces long-term average maximum sustainable yield as derived from the adult to adult stock and recruitment relationship". The target is based on the Standing Scientific Committee of the National Salmon Commission's annual model

			output of CL attainment levels. See SSC (2010). Stock estimates are either derived from direct counts of adults (rod catch, fish counter) or indirectly by fry abundance counts. The Nore is currently exceeding its conservation limit (CL), while the Barrow is below its CL
Salmon fry abundance	Number of fry/5 minutes electrofishing	Maintain or exceed 0+ fry mean catchment-wide abundance threshold value. Currently set at 17 salmon fry/5 min sampling	Target is threshold value for rivers currently exceeding their CL
Out-migrating smolt abundance	Number	No significant decline	Smolt abundance can be negatively affected by a number of impacts such as estuarine pollution, predation and sea lice ( <i>Lepeophtheirus salmonis</i> )
Number and distribution of redds	Number and occurrence	No decline in number and distribution of spawning redds due to anthropogenic causes	Salmon spawn in clean gravels. Artificial barriers are currently preventing salmon from accessing suitable spawning habitat
Water quality	EPQ Q value	At least Q4 at all sites sampled by EPA	Q values based on triennial water quality surveys carried out by the Environmental Protection Agency (EPA)
SSC (2010) Report of the standing scientific committee to the DCENR. The status of Irish salmon stocks in 2010 and precautionary catch advice for 2011. Unpublished Report to Department of Communications, Energy and Natural resources (DCENR)			

### 1355 Otter *Lutra lutra*

To restore the favourable conservation condition of Otter in the River Barrow and River Nore SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution	Percentage positive survey sites	No significant decline	Measure based on standard otter survey technique. FCS target, based on 1980/81 survey findings, is 88% in SACs. Current range in south-east estimated at 73% (Bailey and Rochford, 2006)
Extent of terrestrial habitat	Hectares	No significant decline. Area mapped and calculated as 122.8ha above high water mark (HWM); 1136.0ha along river banks / around ponds	No field survey. Areas mapped to include 10m terrestrial buffer along shoreline (above HWM and along river banks) identified as critical for otters (NPWS, 2007)
Extent of marine habitat	Hectares	No significant decline. Area mapped and calculated as 857.7ha	No field survey. Area mapped based on evidence that otters tend to forage within 80m of the shoreline (HWM) (NPWS, 2007; Kruuk, 2006)
Extent of freshwater (river) habitat	Kilometres	No significant decline. Length mapped and calculated as 616.6km	No field survey. River length calculated on the basis that otters will utilise freshwater habitats from estuary to headwaters (Chapman and



			Chapman, 1982)
Extent of freshwater (lake) habitat	Kilometres	No significant decline. Area mapped and calculated as 2.6ha	No field survey. Area mapped based on evidence that otters tend to forage within 80m of the shoreline (NPWS, 2007)
Couching sites and holts	Number	No significant decline	Otters need lying up areas throughout their territory where they are secure from disturbance (Kruuk, 2006; Kruuk and Moorhouse, 1991)
Fish biomass available	Kilograms	No significant decline	Broad diet that varies locally and seasonally, but dominated by fish, in particular salmonids, eels and sticklebacks in freshwater (Bailey and Rochford, 2006) and wrasse and rockling in coastal waters (Kingston et al., 1999)
<p>Bailey and Rochford (2006) Otter Survey of Ireland 2004/2005. Irish Wildlife Manuals No. 23. NPWS.          NPWS (2007) Supporting documentation for the Habitats Directive Conservation Status Assessment - backing documents, Article 17 forms and supporting maps. Unpublished Report to NPWS.          Kruuk, H. (2006) Otters - ecology, behaviour and conservation. Oxford University Press.          Chapman, P.J. and Chapman, L.L (1982) Otter survey of Ireland. Unpublished Report to Vincent Wildlife Trust.          Kruuk, H. and Moorhouse, A. (1991) The spatial organization of otters (<i>Lutra lutra</i>) in Shetland. <i>J. Zool</i>, 224: 41-57.          Kingston, S., O'Connell, M. and Fairley, J.S. (1999) Diet of Otters <i>Lutra lutra</i> on Inishmore, Aran Islands, west coast of Ireland. <i>Biol &amp; Environ Proc R Ir Acad B</i> 99B:173-182</p>			

The status of the freshwater pearl mussel (*Margaritifera margaritifera*) as a qualifying Annex II species for the River Barrow and River Nore SAC is currently under review. The outcome of this review will determine whether a site-specific conservation objective is set for this species. However, the Barrow catchment has been designated as a *Margaritifera* sensitive area (DATA.GOV.IE 2017) and there is potential for the species to be within the zone of influence of the proposed project. The freshwater pearl mussel is therefore considered further in this assessment.

The attributes and measures below are based on conservation objectives for the freshwater pearl mussel within another Natura 2000 site (Lough Corrib SAC). No specific targets are set for the species within River Barrow and River Nore SAC.

<b>1029 Freshwater pearl mussel <i>Margaritifera margaritifera</i></b>	
<b>Attribute</b>	<b>Measure</b>
Distribution	Kilometres
Population size	Number of adult mussels
Population structure: recruitment	Percentage per size class
Population structure: adult mortality	Percentage
Suitable habitat: extent	Kilometres
Suitable habitat: condition	Kilometres
Water quality: macroinvertebrate and phytobenthos (diatoms)	Ecological quality ratio (EQR)
Substratum quality: filamentous algae (macroalgae); macrophytes (rooted higher plants)	Percentage
Substratum quality: sediment	Occurrence
Substratum quality: oxygen availability	Redox potential
Hydrological regime: flow variability	Metres per second
Host fish	Number
Fringing habitat: area and condition	Hectares

### 3.1.4 Site Vulnerability

A wide range of habitats associated with the rivers are included within River Barrow and River Nore SAC, including substantial areas of woodland (deciduous, mixed), dry heath, wet grassland, swamp and marsh vegetation, salt marshes, a small dune system, biogenic reefs and intertidal sand and mud flats. Areas of improved grassland, arable land and coniferous plantations are included in the site for water quality reasons (NPWS, 2015).

Threats, pressures and activities with impacts on the habitats of the River Barrow and River Nore SAC are listed in Table 3-2. These refer to the site as a whole, and not just to the impacts on the River Barrow near the proposed site. From looking at the table and taking into account the habitats recorded on the site visit, it appears that surface water pollution is the most important threat to the River Barrow and River Nore SAC at the proposed site at Graney West.

**Table 3-2: Threats and pressures posed to River Barrow and River Nore SAC (NPWS 2017a)**

Threats and pressures	Rank Low (L) Moderate (M) High (H)	Source- inside (i) outside (o) both (b)
Intensive cattle grazing	M	i
Pollution to surface waters (limnic, terrestrial, marine & brackish)	H	b
Water abstractions from surface waters	M	i
Use of fertilizers (forestry)	M	b
Forest and Plantation management & use	M	b
Changes in abiotic conditions	M	i
Removal of hedges and copses or scrub	L	i
Dykes and flooding defence in inland water systems	H	i
Peat extraction	M	o
Modifying structures of inland water courses	M	l
Sand and gravel quarries	L	b
Reduction in migration/ migration barriers	M	i
Invasive non-native species	M	i
Dredging/ removal of limnic sediments	M	i
Erosion	H	i
Industrial or commercial areas	L	o
Human induced changes in hydraulic conditions	M	b
Forestry activities (e.g. erosion due to forest clearing, fragmentation)	M	b
Agricultural intensification	H	b

### 3.1.5 Other Designations.

The Barrow catchment has been designated as a *Margaritifera* sensitive area (DATA.GOV.IE 2017). There are previous records of *Margaritifera* in the Barrow River, but current status is unknown. The status of the freshwater pearl mussel (*Margaritifera margaritifera*) as a qualifying Annex II species for the River Barrow and River Nore SAC is currently under review. The outcome of a review will determine whether a site-specific conservation objective is set for this species. (NPWS, 2011).

### 3.1.6 Slaney River Valley SAC (000781) Site Synopsis

The Slaney River Valley SAC comprises the River Slaney from the Wicklow Mountains in the north to Wexford Harbour in the south, including a number of tributaries. The upper and central regions of the site have a geology of granite, south of Kildavin the Slaney flows through an area of Ordovician slates and grits.

Among the habitats found within the site is floating river vegetation, which is found along much of the freshwater stretches. Wet woodland is found associated with Macmine marshes, along the banks of the Slaney and its tributaries, and within reed swamps. These woodlands are divided into two types, one is quite eutrophic, dominated by willow and subject to tidal influence, and the other is flushed of spring-fed, subject to water logging but not to flooding and dominated by Alder and Ash. Old oak woodlands are present throughout the site but are best represented at Tomnafinnoge. South of Enniscorthy there are several areas of mixed deciduous woodland with a diverse ground flora.

The south part of the site contains a good example of the extreme upper reaches of an estuary. Other habitats found include tidal reedbeds with wet woodland, mudflats, sandflats and saltmarshes.

The site supports populations of several species listed on Annex II of the E.U. Habitats Directive, including Sea Lamprey, River Lamprey, Brook Lamprey, Otter, Salmon, small number of Freshwater Pearl Mussel and Twaite Shad. It also supports regional significant numbers of Common Seal *Phoca vitulina*. The site is also of high ornithological importance with a high number of wintering waterfowl.

(Source: NPWS, 2015)

### 3.1.7 Qualifying Interests

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (\* = priority; numbers in brackets are Natura 2000 codes):

- Alluvial Forests\* [91E0]
- Atlantic Salmon (*Salmo salar*) [1106]
- Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330]
- Brook Lamprey (*Lampetra planeri*) [1096]
- Common (Harbour) Seal (*Phoca vitulina*) [1365]
- Estuaries [1130]
- Floating River Vegetation [3260]
- Freshwater Pearl Mussel (*Margaritifera margaritifera*) [1029]
- Mediterranean salt meadows (*Juncetalia maritimi*) [1410]
- Old Oak Woodlands [91A0]
- Otter (*Lutra lutra*) [1355]

- River Lamprey (*Lampetra fluviatilis*) [1099]
- Sea Lamprey (*Petromyzon marinus*) [1095]
- Tidal Mudflats and Sandflats [1140]
- Twaite Shad (*Alosa fallax*) [1103]

The QIs that could be potentially significantly impacted through air pathways include:

- Alluvial Forests\* [91E0]
- Floating River Vegetation [3260]

### 3.1.8 Conservation Objectives

The conservation objectives for Slaney River Valley SAC (000781) below are taken from the NPWS Conservation Objectives Document (NPWS 2011a).

The conservation objectives document outlines specific objectives for the individual QIs within the ZoI and their respective attributes, measure and target aspects. These aspects are detailed in Table 3-3.

**Table 3-3: Conservation objectives for Slaney River Valley SAC**

<b>91E0 * Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae)</b> <b>To restore the favourable conservation condition of Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion) in the Slaney River Valley SAC, which is defined by the following list of attributes and targets:</b>			
Attribute	Measure	Target	Notes
Habitat distribution	Occurrence	No decline.	Distribution based on Perrin et al. (2008). NB further unsurveyed areas maybe present within the SAC
Habitat area	Hectares	Area stable or increasing, subject to natural processes, at least 18.7ha for sites surveyed.	Minimum area, based on 7 sites surveyed by Perrin et al. (2008) - site codes 1, 157, 208, 209, 211, 875, 988. NB further unsurveyed areas maybe present within the SAC
Woodland size	Hectares	Area stable or increasing. Where topographically possible, "large" woods at least 25ha in size and "small" woods at least 3ha in size	The sizes of at least some of the existing woodlands need to be increased in order to reduce habitat fragmentation and benefit those species requiring 'deep' woodland conditions (Peterken, 2002). Topographical and land-ownership constraints may restrict expansion
Woodland structure: cover and height	Percentage and metres	Diverse structure with a relatively closed canopy containing mature trees; subcanopy layer with semimature trees and shrubs; and well-developed herb layer	Described in Perrin et al. (2008).
Woodland structure: community diversity and extent	Hectares	Maintain diversity and extent of community types	Described in Perrin et al. (2008).
Woodland structure: natural regeneration	Seedling:sapling:pole ratio	Seedlings, saplings and pole age-classes occur in adequate proportions to ensure survival of woodland canopy	Alder and oak regenerate poorly. Ash often regenerates in large numbers although few seedlings reach pole size

Hydrological regime: Flooding depth/height of water table	Metres	Appropriate hydrological regime necessary for maintenance of alluvial vegetation	Periodic flooding is essential to maintain alluvial woodlands along river floodplains
Woodland structure: dead wood	m <sup>3</sup> per hectare; number per hectare	At least 30m <sup>3</sup> /ha of fallen timber greater than 10cm diameter; 30 snags/ha; both categories should include stems greater than 40cm diameter (greater than 20cm diameter in the case of alder)	Dead wood is a valuable resource and an integral part of a healthy, functioning woodland ecosystem
Woodland structure: veteran trees	Number per hectare	No decline	Mature and veteran trees are important habitats for bryophytes, lichens, saproxylic organisms and some bird species. Their retention is important to ensure continuity of habitats/niches and propagule sources
Woodland structure: indicators of local distinctiveness	Occurrence	No decline	Includes ancient or long- established woodlands, archaeological and geological features as well as red-data and other rare or localised species. Perrin & Daly (2010) list site 1as containing potential ancient/long established woodlands
Vegetation composition: native tree cover	Percentage	No decline. Native tree cover not less than 95%	Species reported in Perrin et al. (2008)
Vegetation composition: typical species	Occurrence	A variety of typical native species present, depending on woodland type, including alder ( <i>Alnus glutinosa</i> ), willows ( <i>Salix</i> spp) and, locally, oak ( <i>Quercus</i> <i>robur</i> ) and ash ( <i>Fraxinus</i> <i>excelsior</i> )	Species reported in Perrin et al. (2008)
Vegetation composition: negative indicator species	Occurrence	Negative indicator species, particularly non-native invasive species, absent or under control	The following are the most common invasive species in this woodland type: sycamore ( <i>Acer pseudoplatanus</i> ) and Himalayan balsam ( <i>Impatiens</i> <i>glandulifera</i> )
<p>Perrin, P.M.; Daly, O.H. (2010). A provisional inventory of ancient and long-established woodland in Ireland. Irish Wildlife Manuals No. 46.</p> <p>Perrin, P.; Martin, J.; Barron, S.; O'Neill, F.; McNutt, K.; Delaney, A. (2008). National Survey of Native Woodlands 2003-2008. Unpublished Report to NPWS.</p> <p>Peterken, G. (2002). Reversing the habitat fragmentation of British woodlands. WWF-UK, London.</p>			

**3260 Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation**

**To maintain the favourable conservation condition of Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation in the Slaney River Valley SAC, which is defined by the following list of attributes and targets:**

Attribute	Measure	Target	Notes
Habitat distribution	Occurrence	No decline, subject to natural processes	The full distribution of this habitat and its sub-types in this site is currently unknown. The basis of the selection of the SAC for the habitat is the presence of an excellent example of the vegetation assemblage

			associated with tidal reaches of large rivers between Enniscorthy and Polladery townland. This sub-type is characterised by the presence of the rare and protected species short-leaved waterstarwort ( <i>Callitriche truncata</i> ) and Opposite-leaved pondweed ( <i>Groenlandia densa</i> ). Other sub-types of the habitat were recorded in two tributaries of the Slaney: <i>Scapanietum undulatae</i> and <i>Pellietum epiphyllae scapanietosum</i> (Derreen River) and <i>Callitricho-Batrachionthe</i> (Derreen and Derry Rivers) (Heuff, 1987). Other examples of these or other sub-types may be present within the SAC
Habitat area	Kilometres	Area stable at 12.6km or increasing, subject to natural processes.	The full extent of this habitat in this site is currently unknown. The target of 12.6km applies to the tidal sub-type only
Hydrological regime: river flow	Metres per second	Maintain appropriate hydrological regimes	Due to regular disturbance (through variations in flow), river macrophytes rarely reach a climax condition but frequently occur as transient communities. A natural (relatively unmodified) flow regime is required for both plant communities and channel geomorphology to be in favourable condition, exhibiting typical dynamics for the river type (Hatton-Ellis and Grieve, 2003). For most of the sub-types of this habitat, high flows are required to maintain the substratum (see below) necessary for the characteristic species. Flow variation is particularly important, with high and flood flows being critical to the hydromorphology
Hydrological regime: tidal influence	Daily water level fluctuations - metres	Maintain natural tidal regime	The disturbance associated with the tidal regime is the primary driver of the tidal sub-type and rare associated species
Substratum composition: particle size range	Millimetres	For the tidal sub-type, the substratum of the channel must be dominated by particles of sand to gravel, with silt at the river margins	Target applies to tidal sub-type only. The size and distribution of substratum particles is largely determined by the river flow and tidal regime. Short-leaved water-starwort ( <i>Callitriche truncata</i> ) has been recorded from gravel-dominated substratum in the centre of the channel, as well as muds in marginal inlets and at the rivers' edge (J. Ryan, pers. comm., NPWS Rare and Threatened Species Database, 2011). Opposite-leaved

			pondweed ( <i>Groenlandia densa</i> ) is typically found on silts, sometimes sands, while needle spike-rush ( <i>Eleocharis acicularis</i> ) requires the marginal fine muds
Water chemistry: minerals	Milligrammes per litre	The concentration of nutrients in the water column must be sufficiently low to prevent changes in species composition or habitat condition	The tufaceous sub-types require mineral- (typically calcium-) rich groundwaters to allow deposition of tufa. Surface water must also be sufficiently base-rich to prevent chemical erosion. Alkalinity and/or total hardness data may also be relevant
Water quality: suspended sediment	Milligrammes per litre	The concentration of suspended solids in the water column should be sufficiently low to prevent excessive deposition of fine sediments	See substratum composition above. Turbidity data may also be relevant
Water quality: nutrients	Milligrammes per litre	The concentration of nutrients in the water column should be sufficiently low to prevent changes in species composition or habitat condition	The Environmental Protection Agency (EPA) do not monitor the tidal stretch of the Slaney. However, the data from upstream of Enniscorthy suggest the water quality for the tidal stretch is at good status (2007-2009). It is likely that the rare species associated with the tidal sub-type are tolerant of some nutrient enrichment, but may be sensitive to severe enrichment (Preston, 2003). Consequently, water quality should reach Water Framework Directive good status, in terms of nutrient standards, and macroinvertebrate and phytobenthos quality elements
Vegetation composition: typical species	Occurrence	Typical species of the relevant habitat sub-type reach favourable status	The sub-types of this habitat are poorly understood and their typical species have not yet been defined. Additional typical species and appropriate targets may emerge. The typical species of the tidal sub-type in the Slaney include shortleaved water-starwort ( <i>Callitriche truncata</i> ), opposite-leaved pondweed ( <i>Groenlandia densa</i> ), spiked water-milfoil ( <i>Myriophyllum spicatum</i> ), other pondweeds ( <i>Potamogeton</i> spp.), as well as pioneer vegetation of bare mud, e.g. needle spike-rush ( <i>Eleocharis acicularis</i> ) (NPWS Rare and Threatened Species Database, 2011; NPWS, 1989; J. Ryan, pers. comm.). The tidal stretch also supports important reed beds (including common reed ( <i>Phragmites australis</i> ), greater pond-sedge ( <i>Carex riparia</i> ), reed canary-grass ( <i>Phalaris</i>

			<i>arundinacea</i> ) and common club-rush ( <i>Schoenoplectus lacustris</i> )), marginal swamp vegetation and freshwater marsh. The invasive macrophyte Nuttall's waterweed ( <i>Elodea nuttallii</i> ) is also known to occur in the tidal stretch of the Slaney (R. Goodwillie, pers. comm.). The typical species may include higher plants, bryophytes, macroalgae and microalgae
Floodplain connectivity	Area	The area of active floodplain at and upstream of the habitat must be maintained	River connectivity with the floodplain must be maintained. The site of the tidal sub-type in the Slaney River is within an area of floodplain. Floodplain connectivity is particularly important in terms of sediment sorting and nutrient deposition
<p>Hatton-Ellis, T.W.; Grieve, N. (2003) Ecology of Watercourses Characterised by Ranunculion fluitantis and Callitricho-Batrachion Vegetation. Conserving Natura 2000 Rivers Ecology Series No. 11. English Nature, Peterborough.</p> <p>Heuff, H. (1987) The vegetation of Irish rivers. Unpublished Report.</p> <p>NPWS (2011) NPWS Rare and Threatened Species Database. Unpublished NPWS Dataset.</p> <p>NPWS (1989) CORINE Biotopes Database - Ireland. Unpublished NPWS Dataset.</p> <p>Preston, C. D. (2003) Pondweeds of Great Britain and Ireland. BSBI Handbook, No. 8, London.</p>			

### 3.1.9 Site Vulnerability

Threats, pressures and activities with impacts on the habitats of the Slaney River Valley SAC are listed in Table 3-4. These refer to the site as a whole, and not just to the impacts on the SAC near the proposed site. From looking at the table and the pathways between the site and Slaney River Valley SAC being via air, it appears that pollution and siltation is the most important threat to the SAC in relation to the proposed site at Graney West.

**Table 3-4: Threats and pressures posed to Slaney River Valley SAC (NPWS 2017b).**

Threats and pressures	Rank Low (L) Moderate (M) High (H)	Source- inside (i) outside (o) both (b)
Leisure fishing (bait digging / collection)	M	i
Modifying structures of inland water courses	M	i
Water abstractions from surface waters	M	i
Removal of hedges and copses or scrub	M	i
Fishing harbours	L	i
Diffuse pollution to surface waters due to household sewage and waste waters	M	b
Forest and Plantation management & use	H	b
Erosion	M	i
Bridge, viaduct	M	i
Surface water abstractions for agriculture	M	i



Invasive non-native species	H	b
Storage of materials	L	i
Paths, tracks, cycling tracks (includes non-paved forest roads)	M	i
Predator control	M	i
Cultivation	H	b
Discharges	M	i
Diffuse pollution to surface waters due to agricultural and forestry activities	H	b
Pollution to surface waters (limnic, terrestrial, marine & brackish)	M	i
Siltation rate changes, dumping, depositing of dredged deposits	M	i
Pollution to surface waters by industrial plants	M	b
Dykes and flooding defence in inland water systems	M	i
Marine and Freshwater Aquaculture - Bottom culture (e.g. shellfish)	M	i
Sand and gravel extraction	M	i
Fertilisation	H	b
Irrigation	M	b

### 3.1.10 Other Designations

The Slaney Upper catchment has been designated as a *Margaritifera* sensitive area and is categorised as Catchments of other extant populations (DATA.GOV.IE 2017). The status of the freshwater pearl mussel as a qualifying Annex II species for the Slaney River Valley SAC is currently under review. The outcome of a review will determine whether a site-specific conservation objective is set for this species (NPWS 2011c).

### 3.2 Summary of Natura 2000 Qualifying Interests in Zone of Influence

The QIs known to be present, or are considered likely to be present within the ZoI of the proposed project are listed in Table 3-5 for River Barrow and River Nore SAC and Table 3-6 for Slaney River Valley SAC.

**Table 3-5: QI in River Barrow and River Nore SAC within the zone of influence of the proposed project and Conservation Objective (NPWS 2011b)**

Qualifying Interest	Conservation objective
Alluvial Forests [91E0]	To restore the favourable conservation condition
Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation [3260]	To maintain the favourable conservation condition
White-clawed Crayfish ( <i>Austropotamobius pallipes</i> ) [1092]	To maintain the favourable conservation condition
Sea Lamprey ( <i>Petromyzon marinus</i> ) [1095]	To restore the favourable conservation condition
Brook Lamprey ( <i>Lampetra planeri</i> ) [1096]	To restore the favourable conservation condition
River Lamprey ( <i>Lampetra fluviatilis</i> ) [1099]	To restore the favourable conservation condition
Atlantic Salmon ( <i>Salmo salar</i> ) [1106]	To restore the favourable conservation condition
Otter ( <i>Lutra lutra</i> ) [1355]	To restore the favourable conservation condition
Freshwater Pearl Mussel ( <i>Margaritifera margaritifera</i> ) [1029]	Under review

**Table 3-6: QI in Slaney River Valley SAC within the zone of influence of the proposed project and Conservation Objective (NPWS 2011c)**

Qualifying Interest	Conservation objective
Alluvial Forests [91E0]	To restore the favourable conservation condition
Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation [3260]	To maintain the favourable conservation condition

### 3.3 Screening Assessment

### 3.4 Project Summary

Table 3-7 presents a summary of the key elements of the Project that are relevant for ecology.

**Table 3-7: Summary of project elements relevant to ecology of River Narrow and River Nore SAC and Slaney River Valley SAC.**

Project Elements	Comment
Size and scale	<p>The site is 19.2 hectares in size and the area to be backfilled is 13. hectares in size. The construction activity will involve site preparation works, including:</p> <ul style="list-style-type: none"> <li>- Construction of new access road in the south-east to be used by Heavy Goods Vehicles (HGVs).;</li> <li>- Wheelwash facility;</li> <li>- A permeable car park area for employees and visitors, five parking locations for HGVs;</li> <li>- Re-grading of ground surface in the stockpiling and sorting area;</li> <li>- Extended concrete apron north of existing buildings on site;</li> <li>- A concrete pad for re-fuelling of vehicles with separate drainage system;</li> <li>- Bunded waste inspection/quarantine area on-site; and</li> <li>- Erection of screening mounds and planting of trees along the north, east and south boundaries.</li> </ul> <p>The operation phase includes the filling of the worked out quarry with waste soil and stone involving the use of subsoil and overburden sourced from construction sites, to backfill and restore existing voids onsite created by past extraction of materials.</p> <p>In addition to the principal waste activity described above, it is proposed to carry out the following secondary waste recovery activities:</p> <ul style="list-style-type: none"> <li>- Intake of top-soil, screening at proposed screening plant and resale of such material;</li> <li>- Intake of gravel and sands, washing at existing washing plant and resale of such materials;</li> <li>- Intake of concrete, concrete crushing using concrete crushing equipment, mixing with sand and gravel before being fed to the washing plant to form aggregate, and resale of such material, and;</li> <li>- Intake of garden waste, shredding and composting of this waste within a silage pit over an underground effluent storage tank, for use for agricultural land spreading.</li> </ul> <p>Waste to be processed on site will be in the following quantities:</p> <ul style="list-style-type: none"> <li>- 100,000 tonnes per annum of sand and gravel for</li> </ul>

	<p>processing at the sand and gravel plant;</p> <ul style="list-style-type: none"> <li>- 100,000 tonnes per annum of concrete for processing at the concrete crushing plant;</li> <li>- 4000 tonnes per annum of topsoil for screening at soil screening plant, and;</li> <li>- 3000 tonnes per annum of Garden Waste for shredding and composting.</li> </ul>
Land-take	There will be no land take from River Barrow and River Nore SAC or Slaney River Valley SAC.
Distance from Natura 2000 site or key features of the site	The Natura 2000 site of closest proximity to the proposed site is at a distance of approximately 2 km - River Barrow and River Nore SAC. Slaney River Valley SAC is at a distance of approximately 7km.
Resource requirements (water abstraction etc.)	Groundwater is abstracted for use in the gravel washing process and will be recycled within the process. There is no surface water abstraction.
Emissions (disposal to land, water or air)	<p>Temporary impacts:</p> <p><i>Water:</i></p> <p>Several potential pollutants will be utilised at the site during both construction and operation, including diesel and engine/hydraulic oils. Waste material from construction and demolition sites will be used to backfill the quarry. Pollutants from these sources could potentially leak into the groundwater. After heavy rain these could end up in the surface water drainage system and thereafter into the protected watercourses of the River Barrow and River Nore SAC.</p> <p><i>Air:</i></p> <p>The backfilling material will have to be crushed which will produce loose fine particles. As the wind in the area is generally blowing in a north east direction, it is possible that dust generated on site to be transported via air to the Natura 2000 site Slaney River SAC.</p> <p>Permanent impacts:</p> <p>No permanent impacts are anticipated.</p>
Excavation requirements	The existing excavation depth of the site is ca 12 m at the lowest point. No further excavations are required.
Transportation requirements	<p>Temporary impacts:</p> <p>Levels of traffic to the site during the construction phase will increase traffic to the area. Transportation requirements during construction will be short term and are not anticipated to affect any of the Natura 2000 sites.</p> <p>Permanent impacts:</p> <p>During operation, traffic to and from the proposed project will be on a new developed road south east of the site crossing River Graney. River Graney connects to River Lerr further downstream, which is part of River Barrow</p>

	and River Nore SAC. Otter, which is a QI of the SAC, has been recorded along River Graney and as such there is a potential that the project will impact on the conservations objectives of this QI.
Duration of construction, operation, decommissioning etc.	<p>The duration of the construction phase is proposed to be 6-9 months.</p> <p>The operational phase is proposed to be 10-25 years. Final restoration will be carried out on a phased basis with planting of grass. After the site has been fully backfilled it will be used as an agricultural grassland.</p>

### 3.5 Screening Conclusion

The Screening Assessment has determined that the works are likely to have significant effects, either alone or in-combination with other plans on the following European Sites:

- River Barrow and River Nore SAC (002162)
- Slaney River Valley SAC (000781)

Therefore, an Appropriate Assessment is required to assess in more detail the likely nature of the effects on the integrity of these sites. This is given below in Section 6.

## 4 Environmental Baseline

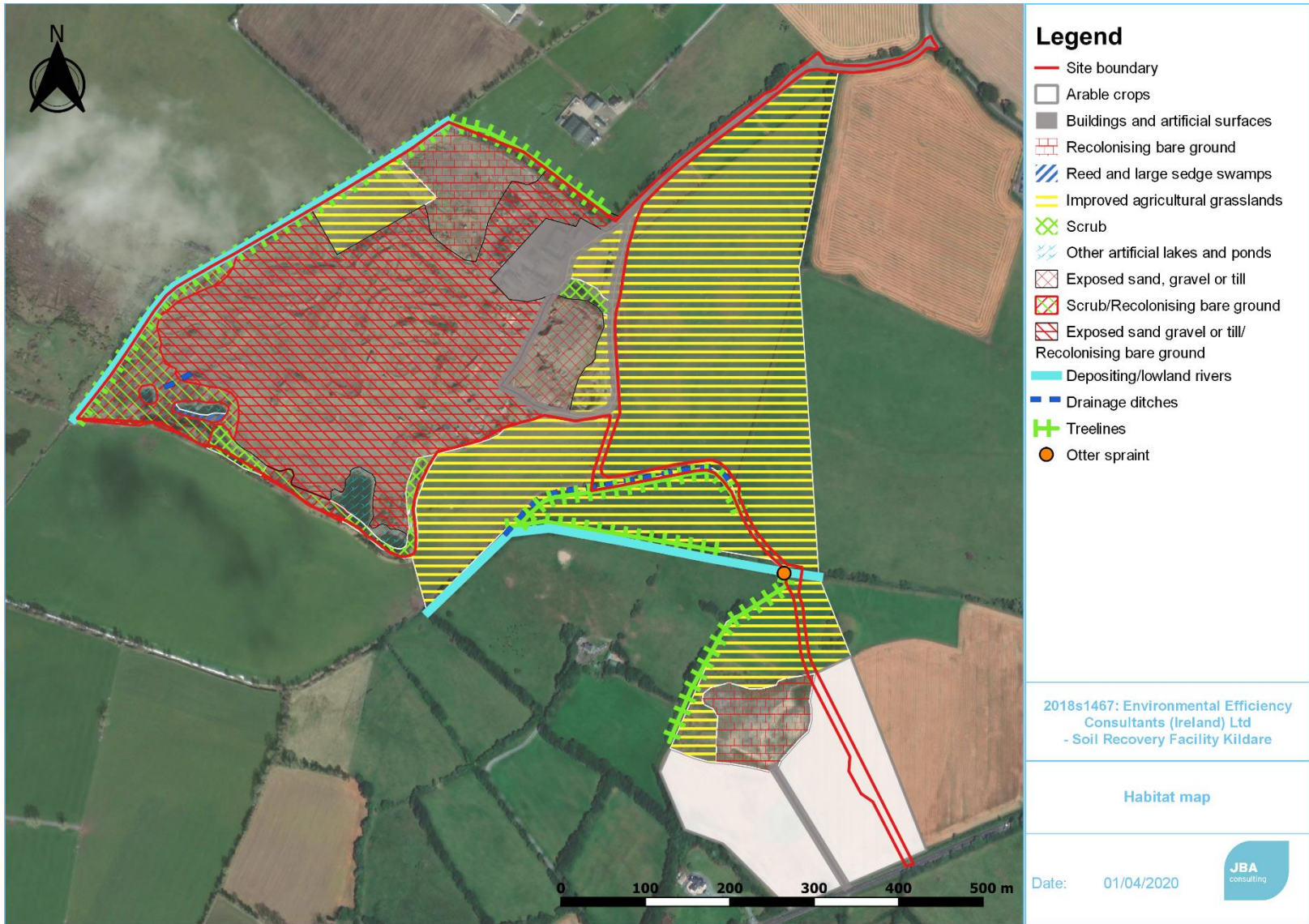
### 4.1.1 Baseline conditions

Several surveys have been carried out to inform this report. The first ecological walkover survey was conducted on 15th of January 2019 by JBA ecologist Malin Lundberg. The survey recorded habitats and flora in the area within the development site, and to detect the presence or likely presence of protected species, and the presence of good potential habitat for those species. A second survey was carried out on 8th of March 2019 by JBA ecologists Malin Lundberg and William Mulville. This survey included a preliminary Bat roost survey, an Otter survey, an invasive species survey and a preliminary Sand Martin survey. During this visit, plant species were recorded that were not yet visible at the time of the first site visit.

The site is a brownfield site of a worked-out quarry, which has previously been used for motorcycle racing. The ground is disturbed, consisting mostly of bare, exposed soil mixed with areas of recolonising vegetation. Trees and scrub bounds three sides and the existing access road bounds one side. Adjacent land to the site is composed of agricultural fields. The main habitats recorded are listed in Table 4-1 and shown in Figure 4-1. The individual habitats are outlined in detail below.

Table 4-1: Habitats recorded at the proposed site.

Habitat code	Habitat
WL2	Treelines
ED1	Exposed sand, gravel or till
ED3	Recolonising bare ground
ED1/ED3	Exposed sand, gravel or till/ Recolonising bare ground
WS1	Scrub
WS1/GA1	Scrub/Improved agricultural grassland
FL8	Other artificial lakes and ponds
FS1	Reed and large sedge swamps
FW4	Drainage ditches
FW2	Depositing/lowland rivers
GA1	Improved agricultural grassland
BL3	Buildings and artificial surfaces
BC1	Arable crops



**Figure 4-1: Habitat map of the proposed development.**

## **WL2 - Treelines**

The north and western site boundaries are defined by treelines (Figure 4-2 and Figure 4-3), located on a higher ground due to the excavations in the quarry. Dominating species are Hawthorn *Crataegus monogyna* and Ash *Fraxinus excelsior* covered with Ivy *Hedera hibernica*, some Willows *Salix* spp., Roses *Rosa* spp. and Brambles *Rubus fruticosus* agg are also present. Some of the trees are mature. Along the western side of the treeline, outside the site boundary, runs an open stream in a north-south direction.



**Figure 4-2: WL2 - Treeline along the western boundary. A matrix of GA1 - Improved agricultural grassland, WS1 - Scrub and ED3 - Recolonising bare ground is visible within the site boundary.**

### **ED1 - Exposed sand, gravel or till**

In the worked-out quarry there are still areas that are relatively disturbed with no colonising vegetation. The main area is in the east of the site, next to the farmyard where all the machinery is kept. The bare ground is made up of sand and gravel with some larger boulders as well.

### **ED3 - Recolonising bare ground**

The north part of the proposed site, which has also been excavated, is starting to get recolonised by vegetation (Figure 4-3). Recolonising bare ground is also found in the south east of the worked-out quarry, where excavations have previously been made. Vegetation such as Docks *Rumex* spp., Willowherbs *Epilobium* spp, Thistles *Cirsium* spp., Colt's-foot *Tussilago farfara*, Great Mullein *Verbascum thapsus*, mosses and some dandelions *Taraxacum officinale* agg. are mixed with gravel and stones.





**Figure 4-3: ED3 - Recolonising bare ground and WL2 - Treelines**

**ED1/ED3 - Exposed sand, gravel or till/Recolonising bare ground**

The main part of the proposed site is the worked out quarry itself. The ground has been excavated and the surrounding banks are several meters high. The ground is hilly and there is a matrix of exposed ground and areas being recolonised by vegetation. The exposed sand and gravel mainly occur in the tracks from where motorcycle racing has taken place, while vegetation is recolonising the surrounding ground. The vegetation includes Gorse *Ulex europaeus*, Docks and Willowherbs.

**WS1 - Scrub**

In the south part of the proposed site 3-5 m along the south boundary has been left untouched during the excavations of the quarry. An extensive area is dominated by scrub with the potential to support nesting and feeding habitat for birds. Dominating species are Gorse and Bramble, but also some Willows and Hawthorn occur. Mammal tracks are visible in the scrub.



**Figure 4-4: WS1 - Scrub**

**WS1/GA1 - Scrub/Improved agricultural grassland**

Next to the scrub habitat there is a matrix of scrub and improved grassland as the grassland is transitioning into scrub. There are scattered Gorse and Willows, the field layer includes Docks, Cock's Foot, Dandelions, Ribwort Plantain *Plantago lanceolata*, Germander Speedwell *Veronica chamaedrys*, Red Dead-nettle *Lamium purpureum*, mosses and grasses.

**FL8 - Other artificial lakes and ponds**

Within the site there are two artificial ponds in the south west corner and there is one more pond located outside the site boundary in the south est. These ponds have been created with relation to the quarry. They have a natural shape and wetland vegetation along the edges, such as Common Reed *Phragmites australis*, Bulrush *Typha latifolia*, Rushes *Juncus spp.* Willows, Alder *Alnus glutinosa* and Birch *Betula pubescens*.



**Figure 4-5: FL8 - Other artificial lakes and ponds**

**FS1 - Reed and large sedge swamps**

There is a small wetland area that is connected to the pond outside the site boundary, just below the bank in the south. Species include Common Reed and Bulrush.

**FW4 - Drainage ditches**

A drainage ditch of approximately 40 m with running water is feeding into the ponds in the south west. In water vegetation consists of Watercress *Rorippa nasturtium-aquatica* and Horsetails *Equisetum* spp. Along the banks there are some Willowherbs and grasses.



**Figure 4-6: FW4 - Drainage ditches**

**GA1 - Improved agricultural grassland**

In the north west there is an area of improved grassland bordering to the treeline in the west. The area is fenced off and grazed by horses at the time of the survey. The proposed access route in the south east will run along fields of improved grassland.

**BL3 - Buildings and artificial surfaces**

There are a couple of farm buildings and a farmyard in the north. The existing access road to the site splits up in two, where one road connects to the farmyard and the other road goes along the north east boundary and enters the site at the middle of the east border.

**BC1 - Arable crops**

The proposed access route is crossing an arable field in the south east, with an existing agricultural track.

4.1.2 **Flora**

The ecological walkover JBA surveyors did not record any protected floral species within or adjacent to the proposed site.

4.1.3 **Fauna**

**Badger**

JBA Ecologists recorded habitation signs of Badger present within the site close to the south western boundary. Out of seven burrows, two of the sett entrances showed signs of recent activity and snuffle holes were found at various locations along the boundary.

**Bats**

Eleven trees in the treelines bordering the site in the north and west, and the treeline to the south east bordering the proposed access route, showed a low/moderate bat roost potential. The trees were generally mature Ash and Hawthorne with features including thick Ivy growth and on some of the tree crevices were recorded.

The treelines have a high suitability as commuting and foraging habitats for bats as they are connected to the wider landscape of rivers and treelines/hedgerows.

#### **Otter**

There are two watercourses close to the proposed site, River Graney in the south and a tributary of River Graney directly west of the site boundary. Otter spraint was found along River Graney close to the proposed crossing of the access route, indicating that the river is used by otters. River Graney connects to River Lerr which is part of River Barrow and River Nore SAC.

#### **Sand Martin**

Sand Martins have been recorded nesting in the site during a previous survey undertaken in 2006. JBA Ecologists identified four places in the south end of the quarry where burrows were found in the sand banks. The follow up survey found that one of the four sites is not suitable for nesting Sand Martins due to erosion and collapsing burrows. The survey confirmed that one of the sites is occupied by nesting Sand Martins. The bank holds 33 potential burrows of which four were identified to be occupied during the time of survey

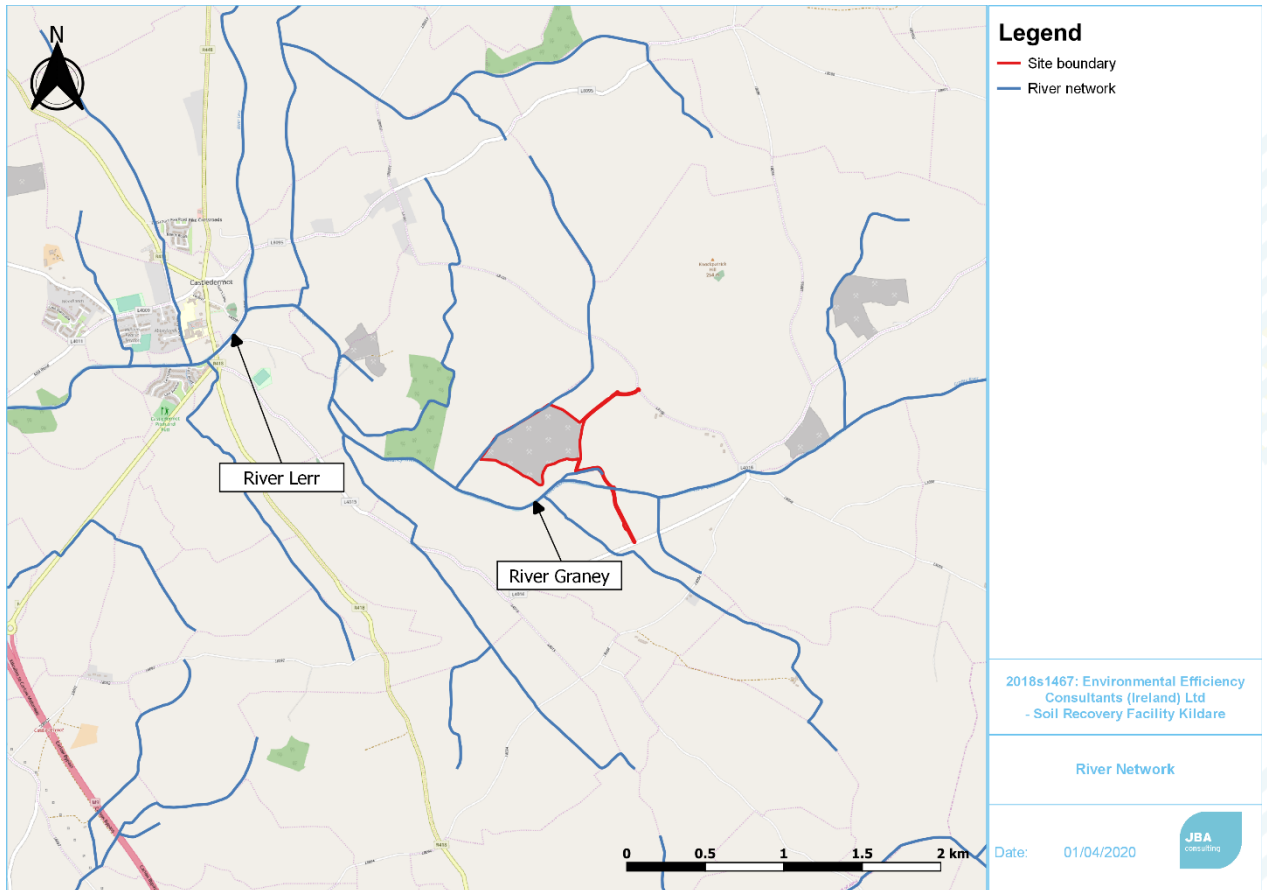
#### **Summary**

The protected species found on site are assessed in the Biodiversity Chapter of the Environmental Impact Assessment Report (EIAR) accompanying the planning application.

### **4.2 Waterbodies in the Vicinity of the Proposed Site**

The site lies within the Water Framework Directive (WFD) Barrow catchment and the sub-catchment Lerr\_SC\_010 (EPA 2020). There are several artificial ponds within the site, connected to a drainage ditch draining the area.

Figure 4-7 outlines the watercourses near the proposed development. The River Graney is located approximately 100 m south of the proposed site flowing in an east-west direction. There are several small tributaries to River Graney within the vicinity, of which one runs directly outside the western border to the site. River Graney is feeding into River Lerr which is located approximately 1,800 m west of the proposed site, passing through Castledermot town, running in a north-south-west direction feeding into River Barrow and is part of River Barrow and River Nore SAC (EPA 2020).



**Figure 4-7: Rivers within the vicinity of the proposed site (EPA 2020).**

## 5 Other Relevant Plans and Projects

### 5.1 Cumulative Effects

As part of the Screening for an Appropriate Assessment, in addition to the proposed works, other relevant projects and plans in the region that may induce cumulative impacts must also be considered at this stage.

The following projects or plans were identified as potential sources of cumulative impacts:

- Kildare County Development Plan 2017 - 2023
- River Basin Management Plan for Ireland 2018-2021
- Planning Applications

### 5.2 Plans

#### 5.2.1 Kildare County Development Plan 2017-2023

The County Development Plan aims to meet the challenges facing the county with a sustainable development and focus the planning for future growth. The core strategy includes consolidation of existing settlements, new developments focused in key locations to integrate with public transport provision and promotion of economic development and renewable energy. It should also support rural economy and its role as a key resource for a range of services in the county. The quality of the landscape and provision of open space and recreational recourses is to be preserved (Kildare County Council 2017a).

The county has a positive growth trend with an increase of 13% between the years 2006 to 2011. In 2011 the county had a population of 210,312 (Kildare County Council 2017a). The census of 2016 showed a population of 222,504 which means a continuing increase in population growth (CSO 2019), however this population growth is slower than anticipated by the Regional Planning Guidelines (Kildare County Council 2017a). County Kildare has a target to increase the population by the end of this plan giving rise to the need of building 32,497 new residential units by 2023.

In the Castledermot Small Town Plan it is stated that the town did not have a significant residential development during the period of the last plan. However, in 2011 the population was 1,389 persons, which is an increase with 58% since 2006. The town has a housing target of 162 units during the period 2011-2023 (Kildare County Council 2017b).

Tourism contributes to the county's economy and is set out as important to develop and promote. There is a strong potential for eco-tourism, which includes natural attractions such as the River Barrow (Kildare County Council 2017a).

Wastewater treatment is carried out in several plants across the county. The two largest are located at Leixlip and Osbertown, and there are several small plants, one located in Castledermot. The Council will work in conjunction with Irish water to protect drainage infrastructure and invest in the network to support environmental protection and facilitate a sustainable growth (Kildare County Council 2017a). The sewage network in Castledermot was upgraded in 2005 and has sufficient capacity for the needs of the town during the full period of this plan (Kildare County Council 2017b).

An Appropriate Assessment has been carried out on the County Development Plan which conclude that the risk of impact on any qualifying interests (QIs) and conservation objectives of the Natura 2000 sites have been addressed by the inclusion of mitigation measures. The mitigation measures are put in place to avoid impact and mitigate impacts where they cannot be avoided. Considering the mitigation measures, the Plan will not have an significant adverse effect on the Natura 2000 sites (Kildare County Council 2017a).

### 5.2.2 River Basin Management Plan for Ireland 2018-2021

The River Basin Management Plan (RBMP) for Ireland 2018-2021 sets out the actions that Ireland will take to improve water quality and achieve 'good' ecological status in water bodies (rivers, lakes, estuaries and coastal waters) by 2021 (DoHPLG 2018a). Changes from previous River Basin Management Plans is that all River Basin Districts are merged as one national River Basin District. The Plan provides a more coordinated framework for improving the quality of our waters — to protect public health, the environment, water amenities and to sustain water-intensive industries, including agri-food and tourism, particularly in rural Ireland.

The Graney and Lerr rivers are included amongst 190 prioritised areas for action where collaboration between the Government and the dairy industry aims to promote best agricultural practice in order to address existing environmental pressures (DoHPLG 2018a). The criteria for these prioritised areas for action is that they are identified as *At Risk* of not achieving their objectives or *Under Review* (DoHPLG 2018b). The River Graney has the WFD status Moderate and the River Lerr has the status Poor to Moderate. Both rivers are identified as being At Risk (EPA 2020).

### 5.3 Other Projects

As of January 2016, the projects listed below, which are not retention applications, home extensions and/or internal alterations, has been granted permission in the vicinity of the proposed development.

<b>Planning Application Reference</b>	191257
<b>Development address</b>	Knockpatrick, Castledermot, Co. Kildare
<b>Description:</b>	the construction of a grain store and ancillary works (i.e. concrete yards, gates and boundaries all for agricultural purposes only) in existing farmyard area utilising existing site entrance
Final Decision on Application	Grant with conditions
Decision Date	09/03/2020
Distance from proposed project	0.3km
<b>Planning Application Reference</b>	18518
<b>Development address</b>	Narraghbeg and Roscolvin, Castledermot, Co. Kildare
<b>Description:</b>	(A)Retention of existing machinery workshop as constructed on site. (B) Retention of existing agricultural straw bedded shed as constructed on site. (C) Change of use of existing agricultural straw bedded shed to a proposed milking parlour, dairy and ancillary rooms, handling facilities, calving pen and cow waiting yard. (D) Change of use of existing calving shed to an agricultural cubicle shed. (E) Permission for the construction of an extension to existing calving shed which will include cubicles and an underground slatted slurry tank. (F) Permission for the construction of an unroofed cow waiting yard and underground slatted soiled water tank. (G) Permission for the erection of a meal bin (H) Permission for the construction of 2 no. Silage pits and all associated site works
Final Decision on Application	Grant with conditions



Decision Date	25/07/2018
Distance from proposed project	3 km
<b>Planning Application Reference</b>	18400
<b>Development address</b>	Plunketstown Lower, Castledermot, Co. Kildare
<b>Description:</b> erect a farm building to include a milking facility, calving area, slatted underground effluent storage tank, meal storage bin and all associated site works.	
Final Decision on Application	Grant with conditions
Decision Date	23/05/2018
Distance from proposed project	900 m
<b>Planning Application Reference</b>	171387, 171388
<b>Development address</b>	Mullaghreelan, Castledermot, Co. Kildare.
<b>Description:</b> construction of a single storey dwelling, single storey garage, bored well, new domestic entrance off existing laneway, new wastewater treatment system, percolation area and all associated site works.	
Final Decision on Application	Grant with conditions
Decision Date	19/04/2018
Distance from proposed project	6 km
<b>Planning Application Reference</b>	171218
<b>Development address</b>	The Shamrock Bar, Main Street, Castledermot, Co. Kildare
<b>Description:</b> (a) Re-establishment of use and making good of public house and restaurant use of existing two-storey Shamrock Bar (previously burnt out) a protected structure Ref. No. B40-20; now a partially roofed shell and construction of new and refurbished buildings around an internal patio courtyard; (b) Installation of a mezzanine floor into the existing two storey shell and reinstatement of elevational treatment to Main Street; (c) Demolition of the existing single storey bathroom extension to northern rear end; (d) Construction of new two-storey range linked to adjoining gable to north containing bathrooms and administration offices with gated enclosed public entrance courtyard accessed off Main Street; (e) Demolition of the remains of existing two storey rear return adjoining National Wholesalers; (f) Construction of replacement double height return to include adjoining new conservatory, kitchen and service areas and glazed link to rear; (g) Demolition of existing Dutch barn corrugated shed; (h) Construction of two-storey staff accommodation over bottle store and service entrance accessed off new rear car-parking area; (i) Change of use and elevational modification and extension of the existing detached rear stone	

outbuilding for use as staff accommodation 2 No. bedrooms; (j) Provision of a surface carpark shared with National Electrical Wholesalers to the rear of the development with associated site works and boundary fence.

Final Decision on Application	Grant with conditions
Decision Date	08/06/2018
Distance from proposed project	2 km
<b>Planning Application Reference</b>	17813
<b>Development address</b>	Grangeford, Castledermot, Co. Kildare

**Description:** Permission and retention permission for development at existing premises, the proposed scheme seeks the retention of storage tanks / containers/ plant, office / packing / lab / airlock and bucket store buildings, hardcore yards / access road, concrete yards, landscaping works, concrete wall / palisade fencing, light stands, installation of a waste water treatment system and change of use from agriculture to storage area for food manufacturing and access road. Permission is sought for an extension to the existing processing building to comprise of prefill, packing, airlock, office and raw materials storage buildings, an extension to the existing office / packing building to provide additional packing space, an extension to the existing processing shed to provide a storage shed, a finished product storage building and a barrel / IBC storage building; concrete yards, gantry walkways, 5 No. car parking spaces, associated landscaping works including palisade fencing and crash barrier and all site development works above and below ground. It is also proposed to provide for a separate vehicular entrance to Bolton Biofuels Ltd. and install a wetland area to the south of the site to treat surface water runoff. The application site is c. 2.2 hectares.

Final Decision on Application	Grant with conditions
Decision Date	04/05/2018
Distance from proposed project	4 km
<b>Planning Application Reference</b>	16482
<b>Development address</b>	Horans Service Station, Main Street, Castledermot, Co. Kildare

**Description:** The demolition of an existing metal clad shed to the rear of the existing service station shop building and construction of a new single storey shop extension to include an increase of the retail area a from 100 sqm to 271 sqm, a food preparation area of 50.00 sqm, seating area of 30.00 sqm and an administration area of 142.00 sqm located within the existing building roof space. The development will include the installation of an external passive grease trap, the installation of stormwater attenuation and associated site works

Final Decision on Application	Grant with conditions
Decision Date	04/07/2016

Distance from proposed project

1.8 km

### 5.3.1 **Summary**

The County Development Plan, RBMP and projects near the proposed project are considered in combination with the currently proposed project in the Appropriate Assessment section below.

## 6 Appropriate Assessment

### 6.1 Introduction

This section presents a detailed assessment of the potential impact of the proposed project at Graney West on the qualifying interests of River Barrow and River Nore SAC and Slaney River Valley SAC. The screening report identified surface water pollution, habitat fragmentation and dust deposition as the main potential impact on qualifying interests of the Natura 2000 sites.

Section 6.2 assesses the screened in Natura 2000 sites in more detail and examines where potentially adverse impacts may arise from the sources of impact. Where potentially adverse impacts are identified, avoidance and mitigation measures are proposed. These are discussed in Section 6.3.

### 6.2 Potential Sources of Impact via Surface Water Pathways

This section further examines the source > pathway > receptor chains that could potentially result in adverse impacts arising on the River Barrow and River Nore SAC.

Habitats and species, and their attributes, likely to be impacted by surface or ground water pollution are listed in Table 6-1.

#### 6.2.1 Construction Phase- Direct impacts:

##### **Spill or leakage incidents leading to site materials entering River Barrow and River Nore SAC**

There is potential for impacts on the water-dependent qualifying interests to occur during the construction phase of the proposed project.

The construction phase of the project will entail construction of a new access road and a new permeable carpark area, regrading of ground surface, erection of screening mounds and construction of concrete pad for refuelling of vehicles. There is potential for surface water runoff to enter River Graney, in particular during the construction of the bridge, which is part of the new road, over the river.

This, along with the possible entry of pollutants, such as hydrocarbons, has the potential to impair the water quality of River Graney and River Lerr and may cause effects such as eutrophication, increased algal and macrophyte growth, increased turbidity and increased sedimentation of the river substrate. This may in turn adversely impact upon potential floating river vegetation or alluvial woodlands further down the river, as well as macroinvertebrate communities. It could also have an impact on the water and substrate quality requirements of Salmon, lamprey, White-clawed Crayfish and Freshwater Pearl Mussel.

##### **Habitat fragmentation impacting on Otters**

The proposed new road for traffic attending the site will cross River Graney, thus could impact on Otters by causing a barrier across the river. This could lead to fragmentation of the Otters habitat along the river and casualties if Otters try to cross the road. Therefore, there is potential for significant impact on this QI for which River Barrow and River Nore SAC is designated.

**Table 6-1: Potential direct impacts on the attributes of the designated features of River Barrow and River Nore SAC within the zone of influence of the proposed project**

Qualifying Interest	Attribute	Measure	Potential Direct Impacts
Alluvial forests	Habitat area	Hectares	Impacts on water quality from

with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> ( <i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i> )			discharges may affect the area and extent of this habitat
	Habitat distribution	Occurrence	Impacts on water quality from discharges may affect the distribution of this habitat
	Woodland size	Hectares	Impacts on water quality from discharges may affect the woodland size
	Woodland structure: cover and height	Percentage and metres	Impacts on water quality from discharges may affect the height structure by reduced regeneration of tree saplings.
	Woodland structure: Community diversity and extent	Hectares	Impacts on water quality from discharges may affect the diversity and extent of the woodland community.
	Woodland structure: natural regeneration	Seedling:sapling:pole ratio	Impacts on water quality from discharges may affect the regeneration of tree saplings.
	Hydrological regime: Flooding depth/height of water table	Metres	N/A
	Woodland structure: dead wood	m <sup>3</sup> per hectare; number per hectare	N/A
	Woodland structure: veteran trees	Number per hectare	Impacts on water quality from discharges may affect the regeneration of tree saplings and thus affect the number of future veteran trees.
	Woodland structure: indicators of local distinctiveness	Occurrence	Impacts on water quality from discharges may affect the distribution of these species.
	Vegetation composition: native tree cover	Percentage	Impacts on water quality from discharges may affect the distribution of these species.
	Vegetation composition: typical species	Occurrence	Impacts on water quality from discharges may affect the composition of these species.
	Vegetation composition: negative indicator species	Occurrence	Impacts on water quality from discharges may affect the composition of these species.

Qualifying Interest	Attribute	Measure	Potential Direct Impacts
Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation	Habitat distribution	Occurrence	Impacts on water quality from discharges may affect the distribution of these plants
	Habitat area	Kilometres	Impacts on water quality from discharges may affect the area and extent of these plants
	Hydrological regime: river flow	Metres per second	Impacts on water flows from discharges may affect species composition and habitat substratum
	Hydrological regime: groundwater discharge	Metres per second	NA Groundwater discharges are important for this habitat in King's tributary on the River Nore, but are not know from this section of the Barrow river
	Substratum	Millimetres	Impacts on water quality and flows

	composition: particle size range		from discharges may impact on substrate and species composition
	Water chemistry: minerals	Milligrammes per litre	NA Tufa deposition is not known to occur in this section of the River Barrow. Extensive tufa deposits recorded on the river bed in the King's tributary of the Nore River
	Water quality: suspended sediment	Milligrammes per litre	Impacts on water quality and flows from discharges may impact on substrate and species composition
	Water quality: nutrients	Milligrammes per litre	Impacts on water quality from nutrient discharges may affect species composition
	Vegetation composition: typical species	Occurrence	Impacts on water quality from nutrient discharges may affect species composition and impacts on water flows may also affect species compositions
	Floodplain connectivity	Area	N/A

Qualifying Interest	Attribute	Measure	Potential Direct Impacts
White-clawed crayfish <i>Austropotamobius pallipes</i>	Distribution	Occurrence	Impacts on water quality from discharges may affect populations noted throughout catchment
	Population structure: recruitment	Percentage occurrence of juveniles and females with eggs	Impacts on water quality from discharges may affect population structure and recruitment
	Negative indicator species	Occurrence	NA Works are not entering the water body -- no contamination possible
	Disease	Occurrence	NA Works are not entering the water body--no contamination possible
	Water quality	EPA Q value	Impacts on water quality from discharges may affect populations noted throughout catchment
	Habitat quality: heterogeneity	Occurrence of positive habitat features	Impacts on water quality and flows from discharges may impact on habitat quality

Qualifying Interest	Attribute	Measure	Potential Direct Impacts
Brook Lamprey <i>Lampetra planeri</i>	Population structure of juveniles	Number of age/ size groups	Impacts on water quality from discharges may affect populations noted throughout catchment
	Juvenile density in fine sediment	Juveniles/m <sup>2</sup>	Impacts on water quality from discharges may affect populations noted throughout catchment
	Extent and distribution of spawning habitat	m <sup>2</sup> and occurrence	Impacts on water quality from discharges may affect populations noted throughout catchment

	Availability of juvenile habitat	Number of positive sites in 2nd order channels (and greater), downstream of spawning areas	Impacts on water quality from discharges may affect populations noted throughout catchment
--	----------------------------------	--	--

Qualifying Interest	Attribute	Measure	Potential Direct Impacts
River Lamprey <i>Lampetra fluviatilis</i>	Distribution: extent of anadromy	% of river accessible	NA No barriers to fish migration
	Population structure of juveniles	Number of age/ size groups	Impacts on water quality from discharges may affect populations noted throughout catchment
	Juvenile density in fine sediment	Juveniles/m <sup>2</sup>	Impacts on water quality from discharges may affect populations noted throughout catchment
	Extent and distribution of spawning habitat	m <sup>2</sup> and occurrence	Impacts on water quality from discharges may affect populations noted throughout catchment
	Availability of juvenile habitat	Number of positive sites in 2nd order channels (and greater), downstream of spawning areas	Impacts on water quality from discharges may affect populations noted throughout catchment

Qualifying Interest	Attribute	Measure	Potential Direct Impacts
Sea Lamprey <i>Petromyzon marinus</i>	Distribution: extent of anadromy	% of river accessible	NA No barriers to fish migration
	Population structure of juveniles	Number of age/ size groups	Impacts on water quality from discharges may affect populations noted throughout catchment
	Juvenile density in fine sediment	Juveniles/m <sup>2</sup>	Impacts on water quality from discharges may affect populations noted throughout catchment
	Extent and distribution of spawning habitat	m <sup>2</sup> and occurrence	Impacts on water quality from discharges may affect populations noted throughout catchment
	Availability of juvenile habitat	Number of positive sites in 2nd order channels (and greater), downstream of spawning areas	Impacts on water quality from discharges may affect populations noted throughout catchment

Qualifying Interest	Attribute	Measure	Potential Direct Impacts
Atlantic Salmon <i>Salmo salar</i> (only in fresh water)	Distribution: extent of anadromy	% of river accessible	NA No barriers to fish migration
	Adult spawning fish	Number	Impacts on water quality from discharges may affect populations noted throughout catchment
	Salmon fry abundance	Number of fry/5 minutes electrofishing	Impacts on water quality from discharges may affect populations noted throughout catchment
	Out-migrating smolt abundance	Number	Impacts on water quality from discharges may affect populations noted throughout catchment

	Number and distribution of redds	Number and occurrence	Impacts on water quality from discharges may affect populations noted throughout catchment
	Water quality	EPQ Q value	Impacts on water quality from discharges may affect populations noted throughout catchment
	Distribution	Percentage positive survey sites	Impacts on water quality from discharges may affect populations noted throughout catchment

Qualifying Interest	Attribute	Measure	Potential Direct Impacts
Otter <i>Lutra lutra</i>	Distribution	Percentage positive survey sites	Fragmentation of riparian network due to road construction may impact on species distribution
	Extent of terrestrial habitat	Hectares	Fragmentation of terrestrial habitat due to road construction may impact the extent of the habitat
	Extent of marine habitat	Hectares	N/A
	Extent of freshwater (river) habitat	Kilometres	Fragmentation of terrestrial habitat due to road construction may impact on the extent of freshwater habitat utilised by Otter
	Extent of freshwater (lake) habitat	Hectares	N/A
	Couching sites and holts	Number	Fragmentation of terrestrial habitat due to road construction may impact on the number of available couching sites and holts
	Fish biomass available	Kilograms	N/A

Qualifying Interest	Attribute	Measure	Potential Direct Impacts
Freshwater Pearl Mussel ( <i>Margaritifera margaritifera</i> )	Distribution	Kilometres	Impacts on water quality from discharges may affect the distribution of populations noted throughout the catchment
	Population size	Number of adult mussels	Impacts on water quality from discharges may affect populations noted throughout the catchment
	Population structure: recruitment	Percentage per size class	Impacts on water quality from discharges may affect population structure throughout the catchment
	Population structure: adult mortality	Percentage	Impacts on water quality from discharges may affect population structure throughout the catchment
	Suitable habitat: extent	Kilometres	Impacts on water quality from discharges may affect the extent of suitable habitat
	Suitable habitat: condition	Kilometres	Impacts on water quality from discharges may affect the condition of suitable habitat
	Water quality: macroinvertebrate and phytobenthos (diatoms)	Ecological quality ratio (EQR)	Impacts on water quality from discharges may affect populations noted throughout the catchment
	Substratum quality:	Percentage	Impacts on water quality from



	filamentous algae (macroalgae); macrophytes (rooted higher plants)		discharges may affect populations noted throughout the catchment
	Substratum quality: sediment	Occurrence	Impacts on sediment load from discharges may affect populations noted throughout the catchment
	Substratum quality: oxygen availability	Redox potential	Impacts on water quality from discharges could lead to reduced oxygen levels may affect populations noted throughout the catchment
	Hydrological regime: flow variability	Metres per second	Discharges to surface water could impact on the hydrological regime and may affect populations noted throughout the catchment
	Host fish	Number	Impacts on water quality from discharges may affect the presence of host fish and thus could impact on freshwater pearl mussel populations noted throughout the catchment
	Fringing habitat: area and condition	Hectares	N/A Fringing habitats are not anticipated to be impacted

### 6.2.2 Construction Phase - Indirect impacts:

Impacts to the River Barrow and River Nore SAC via surface water pathways could impact on food supply available to Otter, a qualifying interest of River Barrow and River Nore SAC (Table 6-2).

**Table 6-2: Potential indirect impacts on the attributes of the designated features of River Barrow and River Nore SAC within the zone of influence of the proposed project**

Qualifying Interest	Attribute	Measure	Potential Impacts
Otter <i>Lutra lutra</i>	Distribution	Percentage positive survey sites	Impacts on water quality from discharges may affect quality of foraging habitat and therefore the distribution of Otter in the catchment
	Extent of terrestrial habitat	Hectares	N/A
	Extent of marine habitat	Hectares	N/A
	Extent of freshwater (river) habitat	Kilometres	Impacts on water quality from discharges may affect quality of foraging habitat and therefore its extent available to Otter noted throughout catchment
	Extent of freshwater (lake) habitat	Kilometres	N/A
	Couching sites and holts	Number	N/A
	Fish biomass available	Kilograms	Impacts on water quality from discharges may affect populations of fish and therefore availability of prey items for Otter

### 6.2.3 Operational Impacts – Direct impacts

#### Increased sediment load from surface water runoff entering River Barrow and River Nore SAC

During the operating period, waste soil and stones will be used to backfill the worked-out quarry, which could impact on surface water as a result of surface water runoff from heavy rainfall. The Settlement lagoons will collect surface water runoff, however, these are connected to River Graney via a concrete pipe. An increased water load could result in an increased sediment load to the watercourses of the River barrow and River Nore SAC. This, along with the possible entry of pollutants from unintentional spill, has the potential to impair the water quality of the River Lerr and River Barrow. This may in turn adversely impact potential floating river vegetation further down the river, as well as macroinvertebrate communities. It could also have an impact on the water and substrate quality requirements of Salmon, Lamprey and White-clawed Crayfish.

#### Dust release spread by wind and air

Dust generating activities during operation include haulage of materials to and from the site, internal material haulage and handling, infilling / site restoration, C&D material processing and stockpiling.

The EPA carried out an air monitoring programme during 2004 and 2005 in Carlow town, approximately 12km south of Castledermot. The monitoring found PM10 to have a mean daily value of 16.6 ug/m<sup>3</sup> during the measuring period (244 days), which is below the annual average for the protection of human health of 40ug/m<sup>3</sup> (EPA 2005). However, the upper assessment threshold (30 ug/m<sup>3</sup>) was exceeded on 13 occasions. Any dust arising from the project could potentially increase the daily average and could contribute to exceeding the upper assessment threshold.

Considering that Slaney River Valley SAC is located to the north-east, east and south-east of the proposed site and the prevailing wind at the proposed site is south south-west (Windfinder.com 2018), on average winds will blow in the direction of the SAC from the site. Dust from works during operation and vehicular emissions from operation traffic can potentially have a significant impact on the ambient air quality of the SAC and affect the floating river vegetation and alluvial forests by increased sedimentation and settle on the leaves and thus reducing their ability for photosynthesis.

**Table 6-3: Potential direct impacts on the attributes of the designated features of River Barrow and River Nore SAC within the zone of influence of the proposed project during operation.**

Qualifying Interest	Attribute	Measure	Potential Direct Impacts
Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> ( <i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i> )	Habitat area	Hectares	Impacts on water quality from discharges may affect the area and extent of this habitat
	Habitat distribution	Occurrence	Impacts on water quality from discharges may affect the distribution of this habitat
	Woodland size	Hectares	Impacts on water quality from discharges may affect the woodland size
	Woodland structure: cover and height	Percentage and metres	Impacts on water quality from discharges may affect the height structure by reduced regeneration of tree saplings.
	Woodland structure: Community diversity and extent	Hectares	Impacts on water quality from discharges may affect the diversity and extent of the woodland community.

	Woodland structure: natural regeneration	Seedling:sapling:pole ratio	Impacts on water quality from discharges may affect the regeneration of tree saplings.
	Hydrological regime: Flooding depth/height of water table	Metres	N/A
	Woodland structure: dead wood	m <sup>3</sup> per hectare; number per hectare	N/A
	Woodland structure: veteran trees	Number per hectare	Impacts on water quality from discharges may affect the regeneration of tree saplings and thus affect the number of future veteran trees.
	Woodland structure: indicators of local distinctiveness	Occurrence	Impacts on water quality from discharges may affect the distribution of these species.
	Vegetation composition: native tree cover	Percentage	Impacts on water quality from discharges may affect the distribution of these species.
	Vegetation composition: typical species	Occurrence	Impacts on water quality from discharges may affect the composition of these species.
	Vegetation composition: negative indicator species	Occurrence	Impacts on water quality from discharges may affect the composition of these species.

Qualifying Interest	Attribute	Measure	Potential Direct Impacts
Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation	Habitat distribution	Occurrence	Impacts on water quality from discharges may affect the distribution of these plants
	Habitat area	Kilometres	Impacts on water quality from discharges may affect the area and extent of these plants
	Hydrological regime: river flow	Metres per second	Impacts on water flows from discharges may affect species composition and habitat substratum
	Hydrological regime: groundwater discharge	Metres per second	NA Groundwater discharges are important for this habitat in King's tributary on the River Nore, but are not know from this section of the Barrow river
	Substratum composition: particle size range	Millimetres	Impacts on water quality and flows from discharges may impact on substrate and species composition
	Water chemistry: minerals	Milligrammes per litre	NA Tufa deposition is not known to occur in this section of the River Barrow. Extensive tufa deposits recorded on the river bed in the King's tributary of the Nore River
	Water quality: suspended sediment	Milligrammes per litre	Impacts on water quality and flows from discharges may impact on substrate and species composition
	Water quality: nutrients	Milligrammes per litre	Impacts on water quality from nutrient discharges may affect species composition

	Vegetation composition: typical species	Occurrence	Impacts on water quality from nutrient discharges may affect species composition and impacts on water flows may also affect species compositions
	Floodplain connectivity	Area	N/A

Qualifying Interest	Attribute	Measure	Potential Direct Impacts
White-clawed crayfish <i>Austropotamobius pallipes</i>	Distribution	Occurrence	Impacts on water quality from discharges may affect populations noted throughout catchment
	Population structure: recruitment	Percentage occurrence of juveniles and females with eggs	Impacts on water quality from discharges may affect population structure and recruitment
	Negative indicator species	Occurrence	NA Works are not entering the water body -- no contamination possible
	Disease	Occurrence	NA Works are not entering the water body- no contamination possible
	Water quality	EPA Q value	Impacts on water quality from discharges may affect populations noted throughout catchment
	Habitat quality: heterogeneity	Occurrence of positive habitat features	Impacts on water quality and flows from discharges may impact on habitat quality

Qualifying Interest	Attribute	Measure	Potential Direct Impacts
Brook Lamprey <i>Lampetra planeri</i>	Population structure of juveniles	Number of age/ size groups	Impacts on water quality from discharges may affect populations noted throughout catchment
	Juvenile density in fine sediment	Juveniles/m <sup>2</sup>	Impacts on water quality from discharges may affect populations noted throughout catchment
	Extent and distribution of spawning habitat	m <sup>2</sup> and occurrence	Impacts on water quality from discharges may affect populations noted throughout catchment
	Availability of juvenile habitat	Number of positive sites in 2nd order channels (and greater), downstream of spawning areas	Impacts on water quality from discharges may affect populations noted throughout catchment

Qualifying Interest	Attribute	Measure	Potential Direct Impacts
River Lamprey <i>Lampetra fluviatilis</i>	Distribution: extent of anadromy	% of river accessible	NA No barriers to fish migration
	Population structure of juveniles	Number of age/ size groups	Impacts on water quality from discharges may affect populations noted throughout catchment
	Juvenile density in	Juveniles/m <sup>2</sup>	Impacts on water quality from discharges may affect populations

	fine sediment		noted throughout catchment
	Extent and distribution of spawning habitat	m <sup>2</sup> and occurrence	Impacts on water quality from discharges may affect populations noted throughout catchment
	Availability of juvenile habitat	Number of positive sites in 2nd order channels (and greater), downstream of spawning areas	Impacts on water quality from discharges may affect populations noted throughout catchment

Qualifying Interest	Attribute	Measure	Potential Direct Impacts
Sea Lamprey <i>Petromyzon marinus</i>	Distribution: extent of anadromy	% of river accessible	NA No barriers to fish migration
	Population structure of juveniles	Number of age/ size groups	Impacts on water quality from discharges may affect populations noted throughout catchment
	Juvenile density in fine sediment	Juveniles/m <sup>2</sup>	Impacts on water quality from discharges may affect populations noted throughout catchment
	Extent and distribution of spawning habitat	m <sup>2</sup> and occurrence	Impacts on water quality from discharges may affect populations noted throughout catchment
	Availability of juvenile habitat	Number of positive sites in 2nd order channels (and greater), downstream of spawning areas	Impacts on water quality from discharges may affect populations noted throughout catchment

Qualifying Interest	Attribute	Measure	Potential Direct Impacts
Atlantic Salmon <i>Salmo salar</i> (only in fresh water)	Distribution: extent of anadromy	% of river accessible	NA No barriers to fish migration
	Adult spawning fish	Number	Impacts on water quality from discharges may affect populations noted throughout catchment
	Salmon fry abundance	Number of fry/5 minutes electrofishing	Impacts on water quality from discharges may affect populations noted throughout catchment
	Out-migrating smolt abundance	Number	Impacts on water quality from discharges may affect populations noted throughout catchment
	Number and distribution of redds	Number and occurrence	Impacts on water quality from discharges may affect populations noted throughout catchment
	Water quality	EPQ Q value	Impacts on water quality from discharges may affect populations noted throughout catchment
	Distribution	Percentage positive survey sites	Impacts on water quality from discharges may affect populations noted throughout catchment

Qualifying Interest	Attribute	Measure	Potential Direct Impacts
Otter <i>Lutra lutra</i>	Distribution		Fragmentation of riparian network due to road construction may impact on species distribution
		Hectares	Fragmentation of terrestrial habitat due to road construction may impact the extent of the habitat
		Hectares	N/A
		Kilometres	Fragmentation of terrestrial habitat due to road construction may impact on the extent of freshwater habitat utilised by Otter
		Hectares	N/A
		Number	Fragmentation of terrestrial habitat due to road construction may impact on the number of available couching sites and holts
		Kilograms	N/A

Qualifying Interest	Attribute	Measure	Potential Direct Impacts
Freshwater Pearl Mussel ( <i>Margaritifera margaritifera</i> )	Distribution	Kilometres	Impacts on water quality from discharges may affect the distribution of populations noted throughout the catchment
	Population size	Number of adult mussels	Impacts on water quality from discharges may affect populations noted throughout the catchment
	Population structure: recruitment	Percentage per size class	Impacts on water quality from discharges may affect population structure throughout the catchment
	Population structure: adult mortality	Percentage	Impacts on water quality from discharges may affect population structure throughout the catchment
	Suitable habitat: extent	Kilometres	Impacts on water quality from discharges may affect the extent of suitable habitat
	Suitable habitat: condition	Kilometres	Impacts on water quality from discharges may affect the condition of suitable habitat
	Water quality: macroinvertebrate and phytobenthos (diatoms)	Ecological quality ratio (EQR)	Impacts on water quality from discharges may affect populations noted throughout the catchment
	Substratum quality: filamentous algae (macroalgae); macrophytes (rooted higher plants)	Percentage	Impacts on water quality from discharges may affect populations noted throughout the catchment
	Substratum quality: sediment	Occurrence	Impacts on sediment load from discharges may affect populations noted throughout the catchment
	Substratum quality: oxygen availability	Redox potential	Impacts on water quality from discharges could lead to reduced oxygen levels may affect populations noted throughout the catchment

	Hydrological regime: flow variability	Metres per second	Discharges to surface water could impact on the hydrological regime and may affect populations noted throughout the catchment
	Host fish	Number	Impacts on water quality from discharges may affect the presence of host fish and thus could impact on freshwater pearl mussel populations noted throughout the catchment
	Fringing habitat: area and condition	Hectares	N/A Fringing habitats are not anticipated to be impacted

**Table 6-4: Potential direct impacts on the attributes of the designated features of Slaney River Valley SAC within the zone of influence of the proposed project during operation.**

Qualifying Interest	Attribute	Measure	Potential Direct Impacts
Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> ( <i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i> )	Habitat area	Hectares	Impacts on water quality from dust settlement may affect the area and extent of this habitat
	Habitat distribution	Occurrence	Impacts on water quality from dust settlement may affect the distribution of this habitat
	Woodland size	Hectares	Impacts on water quality from dust settlement may affect the woodland size
	Woodland structure: cover and height	Percentage and metres	Impacts on water quality from dust settlement and reduced photosynthesis may affect the height structure by reduced regeneration of tree saplings.
	Woodland structure: Community diversity and extent	Hectares	Impacts on water quality from dust settlement and reduced photosynthesis may affect the diversity and extent of the woodland community.
	Woodland structure: natural regeneration	Seedling:sapling:pole ratio	Impacts on water quality from dust settlement and reduced photosynthesis may affect the regeneration of tree saplings.
	Hydrological regime: Flooding depth/height of water table	Metres	N/A
	Woodland structure: dead wood	m <sup>3</sup> per hectare; number per hectare	N/A
	Woodland structure: veteran trees	Number per hectare	Impacts on water quality from dust settlement and reduced photosynthesis may affect the regeneration of tree saplings and thus affect the number of future veteran trees.
	Woodland structure: indicators of local distinctiveness	Occurrence	Impacts on water quality from dust settlement and reduced photosynthesis may affect the distribution of these species.
	Vegetation composition: native tree cover	Percentage	Impacts on water quality from dust settlement and reduced photosynthesis may affect the distribution of these species.
	Vegetation	Occurrence	Impacts on water quality from dust settlement and reduced photosynthesis

	composition: typical species		may affect the composition of these species.
	Vegetation composition: negative indicator species	Occurrence	Impacts on water quality from dust settlement and reduced photosynthesis may affect the composition of these species.

Qualifying Interest	Attribute	Measure	Potential Direct Impacts
Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation	Habitat distribution	Occurrence	Impacts on water quality from dust settlement may affect the distribution of these plants
	Habitat area	Kilometres	Impacts on water quality from dust settlement may affect the area and extent of these plants
	Hydrological regime: river flow	Metres per second	N/A
	Hydrological regime: groundwater discharge	Metres per second	N/A
	Substratum composition: particle size range	Millimetres	Impacts on water quality from dust settlement may impact on substrate and species composition
	Water chemistry: minerals	Milligrammes per litre	N/A Tufa deposition is not known to occur in this section of the River Barrow. Extensive tufa deposits recorded on the river bed in the King's tributary of the Nore River
	Water quality: suspended sediment	Milligrammes per litre	Impacts on water quality from dust settlement may impact on substrate and species composition
	Water quality: nutrients	Milligrammes per litre	N/A
	Vegetation composition: typical species	Occurrence	Impacts on water quality from dust settlement may affect species composition
	Floodplain connectivity	Area	N/A

#### 6.2.4 Operational Impacts – Indirect impacts

Impacts to the River Barrow and River Nore SAC via surface water pathways could impact on food supply available to Otter, a qualifying interest of River Barrow and River Nore SAC.

**Table 6-5: Potential indirect impacts on the attributes of the designated features of River Barrow and River Nore SAC within the zone of influence of the proposed project during operation**

Qualifying	Attribute	Measure	Potential Impacts
------------	-----------	---------	-------------------



Interest			
Otter <i>Lutra lutra</i>	Distribution		Impacts on water quality from discharges may affect quality of foraging habitat and therefore the distribution of Otter in the catchment
	Extent of terrestrial habitat	Hectares	N/A
	Extent of marine habitat	Hectares	N/A
	Extent of freshwater (river) habitat	Kilometres	Impacts on water quality from discharges may affect quality of foraging habitat and therefore its extent available to Otter noted throughout catchment
	Extent of freshwater (lake) habitat	Kilometres	N/A
	Couching sites and holts	Number	N/A
	Fish biomass available	Kilograms	Impacts on water quality from discharges may affect populations of fish and therefore availability of prey items for Otter

#### 6.2.5 Do Nothing Impact

If the proposed project does not go ahead there will be no impact from construction or operations on the River Barrow and River Nore SAC or Slaney River Valley SAC

#### 6.2.6 Significance of Cumulative and In-combination Impacts

Proposed and permitted developments in the area have the potential to have an in-combination effect with the proposed development upon the qualifying interests for which River Barrow and River Nore SAC is designated if no mitigation measures are implemented.

Potential impact would be from drainage from the developments in the vicinity. There are two permitted developments in Castledermot town located close to River Lerr, which is part of River Barrow and River Nore SAC, that could have a cumulative impact potentially increasing the sediment and nutrient load into the river.

Two other developments that could have a cumulative impact are constructions of farm buildings, within 1 km and 3 km respectively of the proposed development. These two developments will result in an increased livestock at the farms, which could result in an increased nutrient load into the River Lerr, thus having a cumulative impact.

There are no policies or objectives within Kildare County Development Plan that when considered with the proposed development could give rise to cumulative effects on the ecology of the site and the immediate environs.

The proposed development would have a significant cumulative impact on the River Barrow and River Nore SAC in combination with the above stated developments if no mitigation measures are implemented.

### 6.3 Mitigation for Construction Phase

The activities of the project for the construction phase shall remain within the boundary of the proposed site. Within this area, the mitigation measures outlined below shall be implemented.

- 1 A Construction and Environment Management Plan (CEMP) will be submitted to Kildare County Council for agreement prior to site works commencing. This CEMP will incorporate the mitigation measures listed here.
- 2 Construction method statements will be submitted to Kildare County Council for agreement prior to site works commencing.
- 3 There shall be no water abstraction from River Graney from the construction activities on the site.

#### 6.3.1 Site Compound

- The site compound shall be located within the site boundary
- The compound will be sited as far from the River Graney (>50m) as possible in order to minimise any potential impacts.
- Only plant and materials necessary for the construction of the works will be permitted to be stored at the compound location.
- Site establishment by the Contractor will include the following:
  - Site offices;
  - Site facilities (canteen, toilets, drying rooms, etc.);
  - Office for construction management team;
  - Secure compound for the storage of all on-site machinery and materials;
  - Temporary car parking facilities;
  - Temporary fencing;
  - Site Security to restrict unauthorized entry;
- Bunded storage of fuels and refuelling area. Bunds shall be 110% capacity of the largest vessel contained within the bunded area.
- A separate container will be located in the Contractors compound to store absorbents used to contain spillages of hazardous materials. The container will be clearly labelled and the contents of the container will be disposed of by a licenced waste contractor at a licenced site. Records will be maintained of material taken off site for disposal.
- A maintenance programme for the bunded areas will be managed by the site environmental manager. The removal of rainwater from the bunded areas will be their responsibility. Records will be maintained of materials taken off site for disposal.
- The site environmental manger will be responsible for maintaining all training records.
- The contents of any tank will be clearly marked on the tank, and a notice displayed requiring that valves and trigger guns be locked when not in use.
- Drainage collection system for washing area to prevent run-off into surface water system.
- All refuelling of vehicles will be carried out at the fuel stores within the main site compound and only ADR trained personnel will be permitted to operate fuel bowsers.

### 6.3.2 Water Quality

In order to protect all surface water during the works of the proposed project, the following relevant legislation and best practice guidance will be adhered to:

- NetRegs Guidance for Pollution Prevention for works and maintenance in or near water (NetRegs, 2017).
- Environment Agency Pollution Prevention Guidelines for construction and demolition sites (EA, 2012).
- Inland Fisheries Ireland Guidance on Protection of Fisheries During Construction Works In and Adjacent to Waters (IFI 2016).
- CIRIA Guidance C515: 'Control of groundwater for temporary works' (Somerville et al., 1986).
- CIRIA Guidance C750D: 'Groundwater control: design and practice' (Preene et al., 2016).

The above best practice mitigations will alleviate the risk associated with accidental spills and runoff events. In particular, the following measures will be implemented:

- No excavation shall take place below the water-table on the Application Site;
- All soil stockpiles shall be covered (i.e. vegetated) to minimise the risk of rain / wind erosion;
- An emergency spill kit (including absorbers) will be available for use in the event of an accidental spill on the quarry floor; and spill training will be provided to staff members;
- Daily checks will be carried out and records kept on a weekly basis and any items that have been repaired/replaced/rejected noted and recorded. Any items of plant machinery found to be defective should be removed from site immediately or positioned in a place of safety until such time that it can be removed;
- Refuelling shall only take place at designated hardstanding area next to bunded fuel storage area.

### 6.3.3 Pollution Control and Spill Prevention

Spill kits containing absorbent pads, granules and booms will be stored in the site compound with easy access for delivery to site in the case of an emergency. A minimum stock of spill kits will be maintained at all times and site foremen's vehicles will carry large spill kits at all times. Absorbent material will be used with pumps and generators at all times and used material disposed of in accordance with the Waste Management Plan. All used spill materials e.g. Absorbent pads will be placed in a bunded container in the contractor's compound. The material will be disposed of by a licenced waste contractor at a licenced facility. Records will be maintained by the environmental site manager.

Regular inspections and maintenance of plant and machinery checking for leaks, damage or vandalism will be made on all plant and equipment.

In the event of a spill the Contractor will ensure that the following procedure are in place:

- Emergency response awareness training for all Project personnel on-site works.
- Appropriate and sufficient spill control materials will be installed at strategic locations within the site. Spills kits for immediate use will be kept in the cab of mobile equipment.
- Spill kits will be stored in the site compound with easy access for delivery to site in the case of an emergency. A minimum stock of spill kits will be maintained at all times and site vehicles will carry spill kits at all times. Spill kits must include

suitable spill control materials to deal with the type of spillage that may occur and where it may occur. Typical contents of an on-site spill kit will include the following as a minimum;

- Absorbent granules;
  - Absorbent mats/cushions;
  - Absorbent booms.
- Spill kits will contain gloves to handle contaminated materials and sealable disposal sacks.
- Track mats, drain covers and geotextile material.
- All potentially polluting substances such as oils and chemicals used during construction will be stored in containers clearly labelled and stored with suitable precautionary measures such as bunding within the site compound.
- All tank and drum storage areas on the site will, as a minimum, be bunded to a volume not less than the following;
  - 110% of the capacity of the largest tank or drum within the bunded area, or
  - 25% of the total volume of substances which could be stored within the bunded area.
- The site compound fuel storage areas and cleaning areas will be rendered impervious and will be constructed to ensure no discharges will cause pollution to surface or ground waters.
- Designated locations for refuelling are within Site Compound.
- Potentially contaminated run off from plant and machinery maintenance areas will be managed within the site compound surface water collection system.
- Damaged or leaking containers will be removed from use and replaced immediately.

#### 6.3.4 **Conservation of Otter Habitat**

Mitigations for otters to be implemented during construction are incorporation of ledges under the access road where it crosses the River Graney to allow otters to safely cross. The ledges must be at least 500 mm wide, constructed at least 150 mm above the 1 in 5 year flood event and allow at least 600 mm headroom. Adequate access from riverbank shall be secured and a 50-100 m long section along the road where it crosses the river will be fenced with mammal resistant fence to prevent otters from crossing the road.

### 6.4 **Mitigation for Operation Phase**

#### 6.4.1 **Water Quality and Sediment Control**

- A series of settlement lagoons are situated on-site for the treatment of site surface water run-off containing elevated levels of particles. These settling lagoons will be cleaned and dredged as necessary.
- An existing bunded, roofed storage area has been provided for hazardous materials such as fuels, oils and concrete additives stored on-site. This area has been designed in accordance with EPA Guidance IPC Guidance Note on Storage and Transfer of Materials for Scheduled Activities, taking into account criteria for bund requirements (e.g. 110% of the capacity of the largest tank or drum within the bunded area; or 25% of the total volume of substance which could be stored within the bunded area, whichever is greater)

- Testing of bund integrity shall be conducted upon commencement of site operations and every three years thereafter in accordance with good practice to verify the water tightness and integrity of bunds on-site. Where bund testing fails a programme of works shall be established by a Chartered Engineer to fix the bund and ensure its water tightness and integrity.
- Good hazardous material practice on-site will be observed. Fuel, oil, chemical storage tanks and drums shall be labelled. Fuel pumps and attachments shall be located within bunded areas. Bunded areas are roofed to prevent rainwater accumulating in bunds.
- Re-fuelling shall take place in a designated, roofed hardstanding re-fuelling area which drains to a silt trap and an oil interceptor to protect against oil spills.
- The wheel wash unit will be served by an integrated silt tank and oil interceptor. The wheel wash unit on-site will be a self-contained unit that utilizes recycled water originating from a GW abstraction point (by way of bowser). The silt tank/oil interceptor will be in place for when excessive rainfall causes overflow from the system. The wheel wash system will be desludged and cleaned ca. every 6 months at a minimum or as needed by an appropriate provider. Waste sludge from the unit will be dispatched to an appropriate authorized destination waste facility.
- Emergency Response Procedures will be in place to ensure the prompt and thorough response to any spills of hazardous materials. Spill kits will be present on-site for this purpose.
- An interceptor maintenance and inspection programme will be implemented - the interceptors on-site should be inspected every 6 months by suitably qualified persons and should be cleaned and serviced regularly as necessary
- Composting curing/maturation will take place on a bunded area which drains to an 180,000 litre slatted effluent storage tank to prevent the discharge to the environment of potentially polluting materials associated with this process. This effluent storage tank will be regularly inspected and emptied, cleaned and serviced when necessary.
- Waste Acceptance Procedures will be in place to ensure that hazardous waste or putrescible waste are prevented from arriving on-site and, were found to be present on-site, temporarily stored in a bunded waste quarantine area prior to being dispatched off-site to an authorized waste facility within 24 hours.
- A surface water drainage inspection, maintenance and monitoring programme should be established and surface water emanating from at-risk site locations (e.g. re-fuelling area) and contained in receiving water bodies (e.g. lagoons) shall be monitored on a periodic basis.
- Where necessary, drainage channels will be dug around working areas on a phased basis to divert run-off away from these areas towards the settlement lagoons.
- Restoration of topsoil and overburden will be carried out on an on-going basis to reduce the vulnerability of the bedrock aquifer to possible contamination.
- The sowing of grassland species on a phased basis and additional planting of scrub and native trees along the perimeter will enhance the nutrient retention at the site and preventing further nutrient load into receiving surface and groundwater receptors.

#### 6.4.2 Dust Control

The following measures will be implemented to control dust on-site and prevent dust impacts upon sensitive receptors:

- Tall trees will be planted along the northern, eastern and south western boundaries of the site in order to minimize dust impacts and minimize the generation of wind-blown dust on-site. Existing vegetation along the western boundary of the site will also be retained. These trees will remain in place for the duration of the operational phase and will remain a part of the restored site as semi-mature trees.
- The maintenance of significant separation distances between material handling, storage and processing areas and surrounding sensitive receptors will significantly minimize the potential for any airborne dust associated with site activities to impact upon such receptors. It is proposed to locate dust generating activities such as unloading, sorting, stockpiling, soil screening, concrete crushing and sand and gravel washing at significant distances away from the application site boundary.
- The carrying out of operations at deeper than ground level within the fill area and behind earth mounds, quarry faces and natural raised topography will minimize potential dust impacts upon sensitive receptors. These topographical features as well as landscaping situated along the northern, eastern and southern site perimeter in the form of raised mounds and high treelines will minimize wind impacts on-site and reduce the potential for airborne dust.
- All waste material accepted on-site and all materials being transported off-site will be in sealed or covered vehicles only to prevent dust emissions on local roads and internally on-site.
- Roadsweeping will be carried out to ensure the access road to the site, internal haul roads and public roads are kept clean from dusty materials.
- Water spraying using water bowsers will take place on haul roads and stockpiles to dampen dust and prevent airborne dust generation, particularly during summer months where dry conditions potentially result in increased dust generation.
- A wheel wash will be installed on the site access road 100 metres from the site entrance to prevent tracking of dusty material and mud along the proposed site access road and public roads. The first 100 metres of the proposed site access road will be laid with asphalt.
- Long term exposed surfaces e.g. top soil and overburden storage mounds will be vegetated/planted to reduce dust emissions.
- A speed limit of 10 kph will be strictly enforced on-site to prevent the turning up of dust associated with traffic movements on-site.

## 6.5 Residual Impact

Table 6-6 summarises the potential impacts on the attributes of the designated features of the River Barrow and River Nore SAC and Slaney River Valley SAC, along with the mitigation measures and residual impacts.

**Table 6-6: Summary of potential impacts, mitigation measures and residual impacts on the attributes of the designated features of the Natura 2000 sites**

Qualifying Interest	Attribute	Measure	Potential Impacts	Cumulative Impacts	Mitigation Measures	Residual Impact
<b>Construction Phase</b>						
<b><i>River Barrow and River Nore SAC</i></b>						
Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> ( <i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i> )	Habitat area	Hectares	Impacts on water quality from discharges may affect the area and extent of this habitat	Impacts on water quality from diffuse and point discharges	Strict adherence to: <ul style="list-style-type: none"> <li>- The CEMP and all best practice guidance there with</li> <li>- Site compound location instructions ensuring that potential sources of pollution are kept at a minimum distance of 50m away from River Graney.</li> <li>- Site surface water and silt control, including pollution control and spill prevention methods, detailing suitable spill kit equipment and management on site</li> </ul>	No adverse effects
	Habitat distribution	Occurrence	Impacts on water quality from discharges may affect the distribution of this habitat	Impacts on water quality from diffuse and point discharges		No adverse effects
	Woodland size	Hectares	Impacts on water quality from discharges may affect the woodland size	Impacts on water quality from diffuse and point discharges		No adverse effects
	Woodland structure: cover and height	Percentage and metres	Impacts on water quality from discharges may affect the height structure by reduced regeneration of tree saplings.	Impacts on water quality from diffuse and point discharges		No adverse effects
	Woodland structure: Community diversity and extent	Hectares	Impacts on water quality from discharges may affect the diversity and extent of the woodland community.	Impacts on water quality from diffuse and point discharges		No adverse effects
	Woodland structure: natural regeneration	Seedling:sapling:pole ratio	Impacts on water quality from discharges may affect the regeneration of tree saplings.	Impacts on water quality from diffuse and point discharges		No adverse effects
	Hydrological regime: Flooding depth/height of water table	Metres	N/A	N/A	N/A	N/A
	Woodland structure: dead wood	m <sup>3</sup> per hectare; number per hectare	N/A	N/A	N/A	N/A

Qualifying Interest	Attribute	Measure	Potential Impacts	Cumulative Impacts	Mitigation Measures	Residual Impact
	Woodland structure: veteran trees	Number per hectare	Impacts on water quality from discharges may affect the regeneration of tree saplings and thus affect the number of future veteran trees.	Impacts on water quality from diffuse and point discharges	Strict adherence to: <ul style="list-style-type: none"> <li>- The CEMP and all best practice guidance there with</li> <li>- Site compound location instructions ensuring that potential sources of pollution are kept at a minimum distance of 50m away from River Graney.</li> <li>- Site surface water and silt control, including pollution control and spill prevention methods, detailing suitable spill kit equipment and management on site</li> </ul>	No adverse effects
	Woodland structure: indicators of local distinctiveness	Occurrence	Impacts on water quality from discharges may affect the distribution of these species.	Impacts on water quality from diffuse and point discharges		No adverse effects
	Vegetation composition: native tree cover	Percentage	Impacts on water quality from discharges may affect the distribution of these species.	Impacts on water quality from diffuse and point discharges		No adverse effects
	Vegetation composition: typical species	Occurrence	Impacts on water quality from discharges may affect the composition of these species.	Impacts on water quality from diffuse and point discharges		No adverse effects
	Vegetation composition: negative indicator species	Occurrence	Impacts on water quality from discharges may affect the composition of these species.	Impacts on water quality from diffuse and point discharges		No adverse effects
Water courses of plain to montane levels with the <i>Ranunculon fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation	Habitat distribution	Occurrence	Impacts on water quality from discharges may affect the distribution of these plants	Impacts on water quality from diffuse and point discharges	Strict adherence to: <ul style="list-style-type: none"> <li>- The CEMP and all best practice guidance there with</li> <li>- Site compound location instructions ensuring that potential sources of pollution are kept at a minimum distance of 50m away from River Graney.</li> <li>- Site surface water and silt control, including pollution control and spill prevention methods, detailing suitable spill kit equipment and management on site</li> </ul>	No adverse effects
	Habitat area	Kilometres	Impacts on water quality from discharges may affect the area and extent of these plants	Impacts on water quality from diffuse and point discharges		No adverse effects
	Hydrological regime: river flow	Metres per second	Impacts on water flows from discharges may affect species composition and habitat substratum	Impacts on water quality from diffuse and point discharges		No adverse effects
	Hydrological regime: groundwater discharge	Metres per second	N/A Groundwater discharge is not likely to be important to floating river	N/A	N/A	N/A



Qualifying Interest	Attribute	Measure	Potential Impacts	Cumulative Impacts	Mitigation Measures	Residual Impact
			vegetation in this section of the River Barrow			
	Substratum composition: particle size range	Millimetres	Impacts on water quality and flows from discharges may impact on substrate and species composition	Impacts on water quality from diffuse and point discharges	Strict adherence to: <ul style="list-style-type: none"> <li>- The CEMP and all best practice guidance there with</li> <li>- Site compound location instructions ensuring that potential sources of pollution are kept at a minimum distance of 50m away from River Graney.</li> <li>- Site surface water and silt control, including pollution control and spill prevention methods, detailing suitable spill kit equipment and management on site</li> </ul>	No adverse effects
	Water chemistry: minerals	Milligrammes per litre	N/A Tufa deposition is not known to occur in this section of the River Barrow	N/A	N/A	N/A
	Water quality: suspended sediment	Milligrammes per litre	Impacts on water quality and flows from discharges may impact on substrate and species composition	Impacts on water quality from diffuse and point discharges	Strict adherence to: <ul style="list-style-type: none"> <li>- The CEMP and all best practice guidance there with</li> <li>- Site compound location instructions ensuring that potential sources of pollution are kept at a minimum distance of 50m away from River Graney.</li> <li>- Site surface water and silt control, including pollution control and spill prevention methods, detailing suitable spill kit equipment and management on site</li> </ul>	No adverse effects
	Water quality: nutrients	Milligrammes per litre	Impacts on water quality from nutrient discharges may affect species composition	Impacts on water quality from diffuse and point discharges		No adverse effects
	Vegetation composition: typical species	Occurrence	Impacts on water quality from nutrient discharges may affect species composition and impacts on water flows may also affect species compositions	Impacts on water quality from diffuse and point discharges		No adverse effects
	Floodplain connectivity	Area	N/A	N/A	N/A	N/A

Qualifying Interest	Attribute	Measure	Potential Impacts	Cumulative Impacts	Mitigation Measures	Residual Impact
White-clawed crayfish <i>Austropotamobius pallipes</i>	Distribution	Occurrence	Impacts on water quality from discharges may affect populations noted throughout catchment	Impacts on water quality from diffuse and point discharges	Strict adherence to: <ul style="list-style-type: none"> <li>- The CEMP and all best practice guidance there with</li> <li>- Site compound location instructions ensuring that potential sources of pollution are kept at a minimum distance of 50m away from River Graney.</li> <li>- Site surface water and silt control, including pollution control and spill prevention methods, detailing suitable spill kit equipment and management on site</li> </ul>	No adverse effects
	Population structure: recruitment	Percentage occurrence of juveniles and females with eggs	Impacts on water quality from discharges may affect population structure and recruitment	Impacts on water quality from diffuse and point discharges		No adverse effects
	Negative indicator species	Occurrence	N/A Works are not entering the water body -- no contamination possible	N/A		N/A
	Disease	Occurrence	N/A Works are not entering the water body- no contamination possible	N/A	N/A	N/A
	Water quality	EPA Q value	Impacts on water quality from discharges may affect populations noted throughout catchment	Impacts on water quality from diffuse and point discharges	Strict adherence to: <ul style="list-style-type: none"> <li>- The CEMP and all best practice guidance there with</li> <li>- Site compound location instructions ensuring that potential sources of pollution are kept at a minimum distance of 50m away from River Graney.</li> <li>- Site surface water and silt control, including pollution control and spill prevention methods, detailing suitable spill kit equipment and management on site</li> </ul>	No adverse effects
	Habitat quality: heterogeneity	Occurrence of positive habitat features	Impacts on water quality and flows from discharges may impact on habitat quality	Impacts on water quality from diffuse and point discharges		No adverse effects
Brook Lamprey <i>Lampetra planeri</i>	Population structure of juveniles	Number of age/ size groups	Impacts on water quality from discharges may affect populations noted throughout catchment	Impacts on water quality from diffuse and point discharges	Strict adherence to: <ul style="list-style-type: none"> <li>- The CEMP and all best practice guidance there with</li> <li>- Site compound location instructions ensuring that potential sources of pollution are kept at a minimum distance of 50m away</li> </ul>	No adverse effects
	Juvenile density in fine sediment	Juveniles/m <sup>2</sup>	Impacts on water quality from discharges may affect populations noted	Impacts on water quality from diffuse and point		No adverse effects

Qualifying Interest	Attribute	Measure	Potential Impacts	Cumulative Impacts	Mitigation Measures	Residual Impact
			throughout catchment	discharges	<p>from River Graney.</p> <ul style="list-style-type: none"> <li>- Site surface water and silt control, including pollution control and spill prevention methods, detailing suitable spill kit equipment and management on site</li> </ul>	
	Extent and distribution of spawning habitat	m <sup>2</sup> and occurrence	Impacts on water quality from discharges may affect populations noted throughout catchment	Impacts on water quality from diffuse and point discharges		No adverse effects
	Availability of juvenile habitat	Number of positive sites in 2nd order channels (and greater), downstream of spawning areas	Impacts on water quality from discharges may affect populations noted throughout catchment	Impacts on water quality from diffuse and point discharges		No adverse effects
River Lamprey <i>Lampetra fluviatilis</i>	Distribution: extent of anadromy	% of river accessible	N/A No barriers to fish migration	N/A	N/A	N/A
	Population structure of juveniles	Number of age/ size groups	Impacts on water quality from discharges may affect populations noted throughout catchment	Impacts on water quality from diffuse and point discharges	<p>Strict adherence to:</p> <ul style="list-style-type: none"> <li>- The CEMP and all best practice guidance there with</li> <li>- Site compound location instructions ensuring that potential sources of pollution are kept at a minimum distance of 50m away from River Graney.</li> <li>- Site surface water and silt control, including pollution control and spill prevention methods, detailing suitable spill kit equipment and management on site</li> </ul>	No adverse effects
	Juvenile density in fine sediment	Juveniles/m <sup>2</sup>	Impacts on water quality from discharges may affect populations noted throughout catchment	Impacts on water quality from diffuse and point discharges		No adverse effects
	Extent and distribution of spawning habitat	m <sup>2</sup> and occurrence	Impacts on water quality from discharges may affect populations noted throughout catchment	Impacts on water quality from diffuse and point discharges		No adverse effects
	Availability of juvenile habitat	Number of positive sites in 2nd order channels (and greater), downstream of spawning areas	Impacts on water quality from discharges may affect populations noted throughout catchment	Impacts on water quality from diffuse and point discharges		No adverse effects
Sea Lamprey <i>Petromyzon marinus</i>	Distribution: extent of anadromy	% of river accessible	N/A No barriers to fish migration	N/A	N/A	N/A
	Population	Number of	Impacts on water quality	Impacts on water quality		No adverse

Qualifying Interest	Attribute	Measure	Potential Impacts	Cumulative Impacts	Mitigation Measures	Residual Impact
	structure of juveniles	age/ size groups	from discharges may affect populations noted throughout catchment	from diffuse and point discharges	Strict adherence to: <ul style="list-style-type: none"> <li>- The CEMP and all best practice guidance there with</li> <li>- Site compound location instructions ensuring that potential sources of pollution are kept at a minimum distance of 50m away from River Graney.</li> <li>- Site surface water and silt control, including pollution control and spill prevention methods, detailing suitable spill kit equipment and management on site</li> </ul>	effects
	Juvenile density in fine sediment	Juveniles/m <sup>2</sup>	Impacts on water quality from discharges may affect populations noted throughout catchment	Impacts on water quality from diffuse and point discharges		No adverse effects
	Extent and distribution of spawning habitat	m <sup>2</sup> and occurrence	Impacts on water quality from discharges may affect populations noted throughout catchment	Impacts on water quality from diffuse and point discharges		No adverse effects
	Availability of juvenile habitat	Number of positive sites in 2nd order channels (and greater), downstream of spawning areas	Impacts on water quality from discharges may affect populations noted throughout catchment	Impacts on water quality from diffuse and point discharges		No adverse effects
Atlantic Salmon <i>Salmo salar</i> (only in fresh water)	Distribution: extent of anadromy	% of river accessible	No barriers to fish migration	N/A	N/A	N/A
	Adult spawning fish	Number	Impacts on water quality from discharges may affect populations noted throughout catchment	Impacts on water quality from diffuse and point discharges	Strict adherence to: <ul style="list-style-type: none"> <li>- The CEMP and all best practice guidance there with</li> <li>- Site compound location instructions ensuring that potential sources of pollution are kept at a minimum distance of 50m away from River Graney.</li> <li>- Site surface water and silt control, including pollution control and spill prevention methods, detailing suitable spill kit equipment and management on site</li> </ul>	No adverse effects
	Salmon fry abundance	Number of fry/5 minutes electrofishing	Impacts on water quality from discharges may affect populations noted throughout catchment	Impacts on water quality from diffuse and point discharges		No adverse effects
	Out-migrating smolt abundance	Number	Impacts on water quality from discharges may affect populations noted throughout catchment	Impacts on water quality from diffuse and point discharges		No adverse effects
	Number and distribution of redds	Number and occurrence	Impacts on water quality from discharges may affect populations noted throughout catchment	Impacts on water quality from diffuse and point discharges		No adverse effects
						No adverse effects

Qualifying Interest	Attribute	Measure	Potential Impacts	Cumulative Impacts	Mitigation Measures	Residual Impact
	Water quality	EPQ Q value	Impacts on water quality from discharges may affect populations noted throughout catchment	Impacts on water quality from diffuse and point discharges	Strict adherence to: <ul style="list-style-type: none"> <li>- The CEMP and all best practice guidance there with</li> <li>- Site compound location instructions ensuring that potential sources of pollution are kept at a minimum distance of 50m away from River Graney.</li> <li>- Site surface water and silt control, including pollution control and spill prevention methods, detailing suitable spill kit equipment and management on site</li> </ul>	No adverse effects
	Distribution	Percentage positive survey sites	Impacts on water quality from discharges may affect populations noted throughout catchment	Impacts on water quality from diffuse and point discharges		No adverse effects
Otter <i>Lutra lutra</i>	Distribution	Percentage positive survey sites	Fragmentation of riparian network due to road construction may impact on species distribution  Impacts on water quality from discharges may affect quality of foraging habitat and therefore the distribution of Otter in the catchment	Impacts on water quality from diffuse and point discharges	Strict adherence to: <ul style="list-style-type: none"> <li>- Incorporation of ledges under bridge where access road crosses River Graney to allow Otter to cross safely. Adequate access from riverbank shall be secured and a 50-100 m long section will be fenced with mammal resistant fence</li> <li>- The CEMP and all best practice guidance there with</li> <li>- Site compound location instructions ensuring that potential sources of pollution are kept at a minimum distance of 50m away from River Graney.</li> <li>- Site surface water and silt control, including pollution control and spill prevention methods, detailing suitable spill kit equipment and management on site</li> </ul>	No adverse effects
	Extent of terrestrial habitat	Hectares	Fragmentation of terrestrial habitat due to road construction may impact the extent of the habitat	None anticipated		Incorporation of ledges under bridge where access road crosses River Graney to allow Otter to cross safely. Adequate access from riverbank shall be secured and a 50-100 m long section will be fenced with mammal resistant fence

Qualifying Interest	Attribute	Measure	Potential Impacts	Cumulative Impacts	Mitigation Measures	Residual Impact
	Extent of marine habitat	Hectares	N/A	N/A	N/A	N/A
	Extent of freshwater (river) habitat	Kilometres	<p>Fragmentation of terrestrial habitat due to road construction may impact on the extent of freshwater habitat utilised by Otter</p> <p>Impacts on water quality from discharges may affect quality of foraging habitat and therefore the distribution of Otter in the catchment</p>	Impacts on water quality from diffuse and point discharges	<p>Strict adherence to:</p> <ul style="list-style-type: none"> <li>- Incorporation of ledges under bridge where access road crosses River Graney to allow Otter to cross safely. Adequate access from riverbank shall be secured and a 50-100 m long section will be fenced with mammal resistant fence</li> <li>- The CEMP and all best practice guidance there with</li> <li>- Site compound location instructions ensuring that potential sources of pollution are kept at a minimum distance of 50m away from River Graney.</li> <li>- Site surface water and silt control, including pollution control and spill prevention methods, detailing suitable spill kit equipment and management on site</li> </ul>	No adverse effects
	Extent of freshwater (lake) habitat	Hectares	N/A	N/A	N/A	N/A
	Couching sites and holts	Number	Fragmentation of terrestrial habitat due to road construction may impact on the number of available couching sites and holts	None anticipated	Incorporation of ledges under bridge where access road crosses River Graney to allow Otter to cross safely. Adequate access from riverbank shall be secured and a 50-100 m long section will be fenced with mammal resistant fence	No adverse effects
	Fish biomass available	Kilograms	Impacts on water quality from discharges may affect populations of fish and therefore availability of prey items for Otter	Impacts on water quality from diffuse and point discharges	<p>Strict adherence to:</p> <ul style="list-style-type: none"> <li>- The CEMP and all best practice guidance there with</li> <li>- Site compound location instructions ensuring that potential sources of pollution are kept at a minimum distance of 50m away from River Graney.</li> </ul>	No adverse effects

Qualifying Interest	Attribute	Measure	Potential Impacts	Cumulative Impacts	Mitigation Measures	Residual Impact
					<ul style="list-style-type: none"> <li>- Site surface water and silt control, including pollution control and spill prevention methods, detailing suitable spill kit equipment and management on site</li> </ul>	
Freshwater Pearl Mussel ( <i>Margaritifera Margaritifera</i> )	Distribution	Kilometres	Impacts on water quality from discharges may affect the distribution of populations noted throughout the catchment	Impacts on water quality from diffuse and point discharges	Strict adherence to: <ul style="list-style-type: none"> <li>- The CEMP and all best practice guidance there with</li> <li>- Site compound location instructions ensuring that potential sources of pollution are kept at a minimum distance of 50m away from River Graney.</li> <li>- Site surface water and silt control, including pollution control and spill prevention methods, detailing suitable spill kit equipment and management on site</li> </ul>	No adverse effects
	Population size	Number of adult mussels	Impacts on water quality from discharges may affect populations noted throughout the catchment	Impacts on water quality from diffuse and point discharges		No adverse effects
	Population structure: recruitment	Percentage per size class	Impacts on water quality from discharges may affect population structure throughout the catchment	Impacts on water quality from diffuse and point discharges		No adverse effects
	Population structure: adult mortality	Percentage	Impacts on water quality from discharges may affect population structure throughout the catchment	Impacts on water quality from diffuse and point discharges		No adverse effects
	Suitable habitat: extent	Kilometres	Impacts on water quality from discharges may affect the extent of suitable habitat	Impacts on water quality from diffuse and point discharges		No adverse effects
	Suitable habitat: condition	Kilometres	Impacts on water quality from discharges may affect the condition of suitable habitat	Impacts on water quality from diffuse and point discharges		No adverse effects
	Water quality: macroinvertebrate and phytobenthos (diatoms)	Ecological quality ratio (EQR)	Impacts on water quality from discharges may affect populations noted throughout the catchment	Impacts on water quality from diffuse and point discharges		No adverse effects
	Substratum quality:	Percentage	Impacts on water quality from discharges may	Impacts on water quality from diffuse and point		No adverse effects

Qualifying Interest	Attribute	Measure	Potential Impacts	Cumulative Impacts	Mitigation Measures	Residual Impact	
	filamentous algae (macroalgae); macrophytes (rooted higher plants)		affect populations noted throughout the catchment	discharges			
	Substratum quality: sediment	Occurrence	Impacts on sediment load from discharges may affect populations noted throughout the catchment	Impacts on water quality from diffuse and point discharges	Strict adherence to: <ul style="list-style-type: none"> <li>- The CEMP and all best practice guidance there with</li> <li>- Site compound location instructions ensuring that potential sources of pollution are kept at a minimum distance of 50m away from River Graney.</li> <li>- Site surface water and silt control, including pollution control and spill prevention methods, detailing suitable spill kit equipment and management on site</li> </ul>	No adverse effects	
	Substratum quality: oxygen availability	Redox potential	Impacts on water quality from discharges could lead to reduced oxygen levels may affect populations noted throughout the catchment	Impacts on water quality from diffuse and point discharges		No adverse effects	
	Hydrological regime: flow variability	Metres per second	Discharges to surface water could impact on the hydrological regime and may affect populations noted throughout the catchment	Impacts on water quality from diffuse and point discharges		No adverse effects	
	Host fish	Number	Impacts on water quality from discharges may affect the presence of host fish and thus could impact on freshwater pearl mussel populations noted throughout the catchment	Impacts on water quality from diffuse and point discharges		No adverse effects	
	Fringing habitat: area and condition	Hectares	N/A Fringing habitats are not anticipated to be impacted	N/A		N/A	N/A
<b>Operation Phase</b>							
<b>River Barrow and River Nore SAC</b>							
Alluvial forests with	Habitat area	Hectares	Impacts on water quality	Impacts on water quality	Using existing settlement lagoons and	No adverse	



Qualifying Interest	Attribute	Measure	Potential Impacts	Cumulative Impacts	Mitigation Measures	Residual Impact
<i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> ( <i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i> )			from discharges may affect the area and extent of this habitat	from diffuse and point discharges	recycle the water within the process Hazardous material to be stored at existing bunded roofed storage area	effects
	Habitat distribution	Occurrence	Impacts on water quality from discharges may affect the distribution of this habitat	Impacts on water quality from diffuse and point discharges	Refuelling of vehicles will only take place at designated roofed hardstanding area draining to silt trap and oil interceptor	No adverse effects
	Woodland size	Hectares	Impacts on water quality from discharges may affect the woodland size	Impacts on water quality from diffuse and point discharges	The wheel wash system will use recycled water abstracted from groundwater. Silt trap and oil interceptor will treat any overflow caused by heavy rainfall	No adverse effects
	Woodland structure: cover and height	Percentage and metres	Impacts on water quality from discharges may affect the height structure by reduced regeneration of tree saplings.	Impacts on water quality from diffuse and point discharges	Incorporation of Emergency Response Procedures	No adverse effects
	Woodland structure: Community diversity and extent	Hectares	Impacts on water quality from discharges may affect the diversity and extent of the woodland community.	Impacts on water quality from diffuse and point discharges	The composting curing/maturation will be in bunded area and drained to a 180,000-litre slatted effluent tank which will be inspected and emptied regularly	No adverse effects
	Woodland structure: natural regeneration	Seedling:sapling:pole ratio	Impacts on water quality from discharges may affect the regeneration of tree saplings.	Impacts on water quality from diffuse and point discharges	Restoration of top-soil and overburden will be carried out on an on-going basis	No adverse effects
	Hydrological regime: Flooding depth/height of water table	Metres	N/A	N/A	N/A	N/A
	Woodland structure: dead wood	m <sup>3</sup> per hectare; number per hectare	N/A	N/A	N/A	N/A
	Woodland structure: veteran trees	Number per hectare	Impacts on water quality from discharges may affect the regeneration of tree saplings and thus affect the number of future veteran trees.	Impacts on water quality from diffuse and point discharges	Using existing settlement lagoons and recycle the water within the process Hazardous material to be stored at existing bunded roofed storage area	No adverse effects
	Woodland	Occurrence	Impacts on water quality	Impacts on water quality	Refuelling of vehicles will only take place at designated roofed hardstanding area draining to silt trap	No adverse

Qualifying Interest	Attribute	Measure	Potential Impacts	Cumulative Impacts	Mitigation Measures	Residual Impact
	structure: indicators of local distinctiveness		from discharges may affect the distribution of these species.	from diffuse and point discharges	and oil interceptor The wheel wash system will use recycled water abstracted from groundwater. Silt trap and oil interceptor will treat any overflow caused by heavy rainfall Incorporation of Emergency Response Procedures	effects
	Vegetation composition: native tree cover	Percentage	Impacts on water quality from discharges may affect the distribution of these species.	Impacts on water quality from diffuse and point discharges	The composting curing/maturation will be in bunded area and drained to a 180,000-litre slatted effluent tank which will be inspected and emptied regularly	No adverse effects
	Vegetation composition: typical species	Occurrence	Impacts on water quality from discharges may affect the composition of these species.	Impacts on water quality from diffuse and point discharges	Restoration of top-soil and overburden will be carried out on an on-going basis	No adverse effects
	Vegetation composition: negative indicator species	Occurrence	Impacts on water quality from discharges may affect the composition of these species.	Impacts on water quality from diffuse and point discharges		No adverse effects
Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation	Habitat distribution	Occurrence	Impacts on water quality from discharges may affect the distribution of these plants	Impacts on water quality from diffuse and point discharges	Using existing settlement lagoons and recycle the water within the process Hazardous material to be stored at existing bunded roofed storage area	No adverse effects
	Habitat area	Kilometres	Impacts on water quality from discharges may affect the area and extent of these plants	Impacts on water quality from diffuse and point discharges	Refuelling of vehicles will only take place at designated roofed hardstanding area draining to silt trap and oil interceptor	No adverse effects
	Hydrological regime: river flow	Metres per second	Impacts on water flows from discharges may affect species composition and habitat substratum	Impacts on water quality from diffuse and point discharges	The wheel wash system will use recycled water abstracted from groundwater. Silt trap and oil interceptor will treat any overflow caused by heavy rainfall Incorporation of Emergency Response Procedures The composting curing/maturation will be in bunded area and drained to a 180,000-litre slatted effluent tank which will be inspected and emptied regularly Restoration of top-soil and overburden will be carried out on an on-going basis	No adverse effects
	Hydrological regime: groundwater	Metres per second	N/A Groundwater discharge is not likely to be important	N/A	N/A	N/A

Qualifying Interest	Attribute	Measure	Potential Impacts	Cumulative Impacts	Mitigation Measures	Residual Impact
	discharge		to floating river vegetation in this section of the River Barrow			
	Substratum composition: particle size range	Millimetres	Impacts on water quality and flows from discharges may impact on substrate and species composition	Impacts on water quality from diffuse and point discharges	Using existing settlement lagoons and recycle the water within the process Hazardous material to be stored at existing bunded roofed storage area Refuelling of vehicles will only take place at designated roofed hardstanding area draining to silt trap and oil interceptor The wheel wash system will use recycled water abstracted from groundwater. Silt trap and oil interceptor will treat any overflow caused by heavy rainfall Incorporation of Emergency Response Procedures The composting curing/maturation will be in bunded area and drained to a 180,000-litre slatted effluent tank which will be inspected and emptied regularly Restoration of top-soil and overburden will be carried out on an on-going basis	No adverse effects
	Water chemistry: minerals	Milligrammes per litre	N/A Tufa deposition is not known to occur in this section of the River Barrow	N/A	N/A	N/A
	Water quality: suspended sediment	Milligrammes per litre	Impacts on water quality and flows from discharges may impact on substrate and species composition	Impacts on water quality from diffuse and point discharges	Using existing settlement lagoons and recycle the water within the process Hazardous material to be stored at existing bunded roofed storage area Refuelling of vehicles will only take place at designated roofed hardstanding area draining to silt trap and oil interceptor The wheel wash system will use recycled water abstracted from	No adverse effects
	Water quality: nutrients	Milligrammes per litre	Impacts on water quality from nutrient discharges may affect species composition	Impacts on water quality from diffuse and point discharges		No adverse effects
Vegetation	Occurrence		Impacts on water quality	Impacts on water quality		No adverse

Qualifying Interest	Attribute	Measure	Potential Impacts	Cumulative Impacts	Mitigation Measures	Residual Impact
	composition: typical species		from nutrient discharges may affect species composition and impacts on water flows may also affect species compositions	from diffuse and point discharges	groundwater. Silt trap and oil interceptor will treat any overflow caused by heavy rainfall Incorporation of Emergency Response Procedures The composting curing/maturation will be in banded area and drained to a 180,000-litre slatted effluent tank which will be inspected and emptied regularly Restoration of top-soil and overburden will be carried out on an on-going basis	effects
	Floodplain connectivity	Area	N/A	N/A	N/A	N/A
White-clawed crayfish <i>Austropotamobius pallipes</i>	Distribution	Occurrence	Impacts on water quality from discharges may affect populations noted throughout catchment	Impacts on water quality from diffuse and point discharges	Using existing settlement lagoons and recycle the water within the process Hazardous material to be stored at existing banded roofed storage area	No adverse effects
	Population structure: recruitment	Percentage occurrence of juveniles and females with eggs	Impacts on water quality from discharges may affect population structure and recruitment	Impacts on water quality from diffuse and point discharges	Refuelling of vehicles will only take place at designated roofed hardstanding area draining to silt trap and oil interceptor The wheel wash system will use recycled water abstracted from groundwater. Silt trap and oil interceptor will treat any overflow caused by heavy rainfall Incorporation of Emergency Response Procedures The composting curing/maturation will be in banded area and drained to a 180,000-litre slatted effluent tank which will be inspected and emptied regularly Restoration of top-soil and overburden will be carried out on an on-going basis	No adverse effects
	Negative indicator species	Occurrence	N/A Works are not entering the water body -- no contamination possible	N/A	N/A	N/A

Qualifying Interest	Attribute	Measure	Potential Impacts	Cumulative Impacts	Mitigation Measures	Residual Impact
	Disease	Occurrence	N/A Works are not entering the water body- no contamination possible	N/A	N/A	N/A
	Water quality	EPA Q value	Impacts on water quality from discharges may affect populations noted throughout catchment	Impacts on water quality from diffuse and point discharges	Using existing settlement lagoons and recycle the water within the process Hazardous material to be stored at existing bunded roofed storage area	No adverse effects
	Habitat quality: heterogeneity	Occurrence of positive habitat features	Impacts on water quality and flows from discharges may impact on habitat quality	Impacts on water quality from diffuse and point discharges	Refuelling of vehicles will only take place at designated roofed hardstanding area draining to silt trap and oil interceptor The wheel wash system will use recycled water abstracted from groundwater. Silt trap and oil interceptor will treat any overflow caused by heavy rainfall Incorporation of Emergency Response Procedures The composting curing/maturation will be in bunded area and drained to a 180,000-litre slatted effluent tank which will be inspected and emptied regularly Restoration of top-soil and overburden will be carried out on an on-going basis	No adverse effects
Brook Lamprey <i>Lampetra planeri</i>	Population structure of juveniles	Number of age/ size groups	Impacts on water quality from discharges may affect populations noted throughout catchment	Impacts on water quality from diffuse and point discharges	Using existing settlement lagoons and recycle the water within the process Hazardous material to be stored at existing bunded roofed storage area	No adverse effects
	Juvenile density in fine sediment	Juveniles/m <sup>2</sup>	Impacts on water quality from discharges may affect populations noted throughout catchment	Impacts on water quality from diffuse and point discharges	Refuelling of vehicles will only take place at designated roofed hardstanding area draining to silt trap and oil interceptor	No adverse effects
	Extent and distribution of spawning habitat	m <sup>2</sup> and occurrence	Impacts on water quality from discharges may affect populations noted throughout catchment	Impacts on water quality from diffuse and point discharges	The wheel wash system will use recycled water abstracted from groundwater. Silt trap and oil interceptor will treat any overflow caused by heavy rainfall	No adverse effects
	Availability of juvenile habitat	Number of positive sites in 2nd order	Impacts on water quality from discharges may affect populations noted	Impacts on water quality from diffuse and point discharges	Incorporation of Emergency Response Procedures	No adverse effects

Qualifying Interest	Attribute	Measure	Potential Impacts	Cumulative Impacts	Mitigation Measures	Residual Impact
		channels (and greater), downstream of spawning areas	throughout catchment		The composting curing/maturation will be in bunded area and drained to a 180,000-litre slatted effluent tank which will be inspected and emptied regularly Restoration of top-soil and overburden will be carried out on an on-going basis	
River Lamprey <i>Lampetra fluviatilis</i>	Distribution: extent of anadromy	% of river accessible	No barriers to fish migration	N/A	N/A	N/A
	Population structure of juveniles	Number of age/ size groups	Impacts on water quality from discharges may affect populations noted throughout catchment	Impacts on water quality from diffuse and point discharges	Using existing settlement lagoons and recycle the water within the process Hazardous material to be stored at existing bunded roofed storage area	No adverse effects
	Juvenile density in fine sediment	Juveniles/m <sup>2</sup>	Impacts on water quality from discharges may affect populations noted throughout catchment	Impacts on water quality from diffuse and point discharges	Refuelling of vehicles will only take place at designated roofed hardstanding area draining to silt trap and oil interceptor	No adverse effects
	Extent and distribution of spawning habitat	m <sup>2</sup> and occurrence	Impacts on water quality from discharges may affect populations noted throughout catchment	Impacts on water quality from diffuse and point discharges	The wheel wash system will use recycled water abstracted from groundwater. Silt trap and oil interceptor will treat any overflow caused by heavy rainfall	No adverse effects
	Availability of juvenile habitat	Number of positive sites in 2nd order channels (and greater), downstream of spawning areas	Impacts on water quality from discharges may affect populations noted throughout catchment	Impacts on water quality from diffuse and point discharges	Incorporation of Emergency Response Procedures The composting curing/maturation will be in bunded area and drained to a 180,000-litre slatted effluent tank which will be inspected and emptied regularly Restoration of top-soil and overburden will be carried out on an on-going basis	No adverse effects
Sea Lamprey <i>Petromyzon marinus</i>	Distribution: extent of anadromy	% of river accessible	N/A No barriers to fish migration	N/A	N/A	N/A
	Population structure of juveniles	Number of age/ size groups	Impacts on water quality from discharges may affect populations noted throughout catchment	Impacts on water quality from diffuse and point discharges	Using existing settlement lagoons and recycle the water within the process Hazardous material to be stored at existing bunded roofed storage area	No adverse effects
	Juvenile density in fine sediment	Juveniles/m <sup>2</sup>	Impacts on water quality from discharges may	Impacts on water quality from diffuse and point	Refuelling of vehicles will only take place at designated roofed	No adverse effects

Qualifying Interest	Attribute	Measure	Potential Impacts	Cumulative Impacts	Mitigation Measures	Residual Impact
			affect populations noted throughout catchment	discharges	hardstanding area draining to silt trap and oil interceptor	
	Extent and distribution of spawning habitat	m <sup>2</sup> and occurrence	Impacts on water quality from discharges may affect populations noted throughout catchment	Impacts on water quality from diffuse and point discharges	The wheel wash system will use recycled water abstracted from groundwater. Silt trap and oil interceptor will treat any overflow caused by heavy rainfall	No adverse effects
	Availability of juvenile habitat	Number of positive sites in 2nd order channels (and greater), downstream of spawning areas	Impacts on water quality from discharges may affect populations noted throughout catchment	Impacts on water quality from diffuse and point discharges	Incorporation of Emergency Response Procedures The composting curing/maturation will be in bunded area and drained to a 180,000-litre slatted effluent tank which will be inspected and emptied regularly Restoration of top-soil and overburden will be carried out on an on-going basis	No adverse effects
Atlantic Salmon <i>Salmo salar</i> (only in fresh water)	Distribution: extent of anadromy	% of river accessible	N/A No barriers to fish migration	N/A	N/A	N/A
	Adult spawning fish	Number	Impacts on water quality from discharges may affect populations noted throughout catchment	Impacts on water quality from diffuse and point discharges	Using existing settlement lagoons and recycle the water within the process Hazardous material to be stored at existing bunded roofed storage area	No adverse effects
	Salmon fry abundance	Number of fry/5 minutes electrofishing	Impacts on water quality from discharges may affect populations noted throughout catchment	Impacts on water quality from diffuse and point discharges	Refuelling of vehicles will only take place at designated roofed hardstanding area draining to silt trap and oil interceptor	No adverse effects
	Out-migrating smolt abundance	Number	Impacts on water quality from discharges may affect populations noted throughout catchment	Impacts on water quality from diffuse and point discharges	The wheel wash system will use recycled water abstracted from groundwater. Silt trap and oil interceptor will treat any overflow caused by heavy rainfall	No adverse effects
	Number and distribution of redds	Number and occurrence	Impacts on water quality from discharges may affect populations noted throughout catchment	Impacts on water quality from diffuse and point discharges	Incorporation of Emergency Response Procedures The composting curing/maturation will be in bunded area and drained to a 180,000-litre slatted effluent tank which will be inspected and emptied regularly	No adverse effects
	Water quality	EPQ Q value	Impacts on water quality from discharges may affect populations noted throughout catchment	Impacts on water quality from diffuse and point discharges	Restoration of top-soil and overburden will be carried out on an on-going basis	No adverse effects
	Distribution	Percentage	Impacts on water quality	Impacts on water quality		No adverse

Qualifying Interest	Attribute	Measure	Potential Impacts	Cumulative Impacts	Mitigation Measures	Residual Impact
		positive survey sites	from discharges may affect populations noted throughout catchment	from diffuse and point discharges		effects
Otter <i>Lutra lutra</i>	Distribution	Percentage positive survey sites	Impacts on water quality from discharges may affect quality of foraging habitat and therefore the distribution of Otter in the catchment	Impacts on water quality from diffuse and point discharges	Using existing settlement lagoons and recycle the water within the process Hazardous material to be stored at existing bunded roofed storage area Refuelling of vehicles will only take place at designated roofed hardstanding area draining to silt trap and oil interceptor The wheel wash system will use recycled water abstracted from groundwater. Silt trap and oil interceptor will treat any overflow caused by heavy rainfall Incorporation of Emergency Response Procedures The composting curing/maturation will be in bunded area and drained to a 180,000-litre slatted effluent tank which will be inspected and emptied regularly Restoration of top-soil and overburden will be carried out on an on-going basis	No adverse effects
	Extent of terrestrial habitat	Hectares	N/A	N/A	N/A	N/A
	Extent of marine habitat	Hectares	N/A	N/A	N/A	N/A
	Extent of freshwater (river) habitat	Kilometres	Impacts on water quality from discharges may affect quality of foraging habitat and therefore the distribution of Otter in the catchment	Impacts on water quality from diffuse and point discharges	Using existing settlement lagoons and recycle the water within the process Hazardous material to be stored at existing bunded roofed storage area Refuelling of vehicles will only take place at designated roofed hardstanding area draining to silt trap and oil interceptor The wheel wash system will use recycled water abstracted from groundwater. Silt trap and oil	No adverse effects



Qualifying Interest	Attribute	Measure	Potential Impacts	Cumulative Impacts	Mitigation Measures	Residual Impact
					<p>interceptor will treat any overflow caused by heavy rainfall</p> <p>Incorporation of Emergency Response Procedures</p> <p>The composting curing/maturation will be in bunded area and drained to a 180,000-litre slatted effluent tank which will be inspected and emptied regularly</p> <p>Restoration of top-soil and overburden will be carried out on an on-going basis</p>	
	Extent of freshwater (lake) habitat	Hectares	N/A	N/A	N/A	N/A
	Couching sites and holts	Number	N/A	N/A	N/A	N/A
	Fish biomass available	Kilograms	Impacts on water quality from discharges may affect populations of fish and therefore availability of prey items for Otter	Impacts on water quality from diffuse and point discharges	<p>Using existing settlement lagoons and recycle the water within the process</p> <p>Hazardous material to be stored at existing bunded roofed storage area</p> <p>Refuelling of vehicles will only take place at designated roofed hardstanding area draining to silt trap and oil interceptor</p> <p>The wheel wash system will use recycled water abstracted from groundwater. Silt trap and oil interceptor will treat any overflow caused by heavy rainfall</p> <p>Incorporation of Emergency Response Procedures</p> <p>The composting curing/maturation will be in bunded area and drained to a 180,000-litre slatted effluent tank which will be inspected and emptied regularly</p> <p>Restoration of top-soil and overburden will be carried out on an on-going basis</p>	No adverse effects
Freshwater Pearl Mussel ( <i>Margaritifera</i> )	Distribution	Kilometres	Impacts on water quality from discharges may affect the distribution of	Impacts on water quality from diffuse and point discharges	<p>Using existing settlement lagoons and recycle the water within the process</p> <p>Hazardous material to be stored at</p>	No adverse effects

Qualifying Interest	Attribute	Measure	Potential Impacts	Cumulative Impacts	Mitigation Measures	Residual Impact
<i>Margaritifera</i> )			populations noted throughout the catchment		<p>existing bunded roofed storage area</p> <p>Refuelling of vehicles will only take place at designated roofed hardstanding area draining to silt trap and oil interceptor</p> <p>The wheel wash system will use recycled water abstracted from groundwater. Silt trap and oil interceptor will treat any overflow caused by heavy rainfall</p> <p>Incorporation of Emergency Response Procedures</p> <p>The composting curing/maturation will be in bunded area and drained to a 180,000-litre slatted effluent tank which will be inspected and emptied regularly</p> <p>Restoration of top-soil and overburden will be carried out on an on-going basis</p>	
	Population size	Number of adult mussels	Impacts on water quality from discharges may affect populations noted throughout the catchment	Impacts on water quality from diffuse and point discharges		No adverse effects
	Population structure: recruitment	Percentage per size class	Impacts on water quality from discharges may affect population structure throughout the catchment	Impacts on water quality from diffuse and point discharges		No adverse effects
	Population structure: adult mortality	Percentage	Impacts on water quality from discharges may affect population structure throughout the catchment	Impacts on water quality from diffuse and point discharges		No adverse effects
	Suitable habitat: extent	Kilometres	Impacts on water quality from discharges may affect the extent of suitable habitat	Impacts on water quality from diffuse and point discharges		No adverse effects
	Suitable habitat: condition	Kilometres	Impacts on water quality from discharges may affect the condition of suitable habitat	Impacts on water quality from diffuse and point discharges		No adverse effects
	Water quality: macroinvertebrate and phytobenthos (diatoms)	Ecological quality ratio (EQR)	Impacts on water quality from discharges may affect populations noted throughout the catchment	Impacts on water quality from diffuse and point discharges		No adverse effects
	Substratum quality: filamentous algae (macroalgae); macrophytes (rooted higher plants)	Percentage	Impacts on water quality from discharges may affect populations noted throughout the catchment	Impacts on water quality from diffuse and point discharges		No adverse effects
	Substratum quality:	Occurrence	Impacts on sediment load from discharges	Impacts on water quality from diffuse and point		No adverse effects

Qualifying Interest	Attribute	Measure	Potential Impacts	Cumulative Impacts	Mitigation Measures	Residual Impact
	sediment		may affect populations noted throughout the catchment	discharges		
	Substratum quality: oxygen availability	Redox potential	Impacts on water quality from discharges could lead to reduced oxygen levels may affect populations noted throughout the catchment	Impacts on water quality from diffuse and point discharges	Using existing settlement lagoons and recycle the water within the process Hazardous material to be stored at existing bunded roofed storage area Refuelling of vehicles will only take place at designated roofed hardstanding area draining to silt trap and oil interceptor	No adverse effects
	Hydrological regime: flow variability	Metres per second	Discharges to surface water could impact on the hydrological regime and may affect populations noted throughout the catchment	Impacts on water quality from diffuse and point discharges	The wheel wash system will use recycled water abstracted from groundwater. Silt trap and oil interceptor will treat any overflow caused by heavy rainfall Incorporation of Emergency Response Procedures	No adverse effects
	Host fish	Number	Impacts on water quality from discharges may affect the presence of host fish and thus could impact on freshwater pearl mussel populations noted throughout the catchment	Impacts on water quality from diffuse and point discharges	The composting curing/maturation will be in bunded area and drained to a 180,000-litre slatted effluent tank which will be inspected and emptied regularly Restoration of top-soil and overburden will be carried out on an on-going basis	No adverse effects
	Fringing habitat: area and condition	Hectares	N/A Fringing habitats are not anticipated to be impacted	N/A	N/A	N/A
<b>Slaney River Valley SAC</b>						
Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> ( <i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i> )	Habitat area	Hectares	Impacts on water quality from dust settlement may affect the area and extent of this habitat	Impacts on water quality from diffuse and point discharges	Trees will be planted along the north, east and south-west boundary and the existing vegetation along the western boundary will be retained	No adverse effects
	Habitat distribution	Occurrence	Impacts on water quality from dust settlement may affect the distribution of this habitat	Impacts on water quality from diffuse and point discharges	Dust generating activities will be located away from the site boundary Waste material and material being transported off the site will be in sealed or covered vehicles	No adverse effects
	Woodland size	Hectares	Impacts on water quality	Impacts on water quality	Road sweeping will be carried out on a	No adverse

Qualifying Interest	Attribute	Measure	Potential Impacts	Cumulative Impacts	Mitigation Measures	Residual Impact
			from dust settlement may affect the woodland size	from diffuse and point discharges	regular basis Water spraying will be conducted to dampen dust and reduce emissions Wheel wash will be in place 100m from the site entrance Long term exposed surfaces will be vegetated/planted to reduce dust emissions	effects
	Woodland structure: cover and height	Percentage and metres	Impacts on water quality from dust settlement and reduced photosynthesis may affect the height structure by reduced regeneration of tree saplings.	Impacts on water quality from diffuse and point discharges		No adverse effects
	Woodland structure: Community diversity and extent	Hectares	Impacts on water quality from dust settlement and reduced photosynthesis may affect the diversity and extent of the woodland community.	Impacts on water quality from diffuse and point discharges		No adverse effects
	Woodland structure: natural regeneration	Seedling:sapling:pole ratio	Impacts on water quality from dust settlement and reduced photosynthesis may affect the regeneration of tree saplings.	Impacts on water quality from diffuse and point discharges		No adverse effects
	Hydrological regime: Flooding depth/height of water table	Metres	N/A	N/A	N/A	N/A
	Woodland structure: dead wood	m <sup>3</sup> per hectare; number per hectare	N/A	N/A	N/A	N/A
	Woodland structure: veteran trees	Number per hectare	Impacts on water quality from dust settlement and reduced photosynthesis may affect the regeneration of tree saplings and thus affect the number of future veteran trees.	Impacts on water quality from diffuse and point discharges	Trees will be planted along the north, east and south-west boundary and the existing vegetation along the western boundary will be retained Dust generating activities will be located away from the site boundary Waste material and material being transported off the site will be in sealed or covered vehicles Road sweeping will be carried out on a	No adverse effects
	Woodland structure: indicators of	Occurrence	Impacts on water quality from dust settlement and reduced photosynthesis	Impacts on water quality from diffuse and point discharges		No adverse effects

Qualifying Interest	Attribute	Measure	Potential Impacts	Cumulative Impacts	Mitigation Measures	Residual Impact
	local distinctiveness		may affect the distribution of these species.		regular basis Water spraying will be conducted to dampen dust and reduce emissions Wheel wash will be in place 100m from the site entrance Long term exposed surfaces will be vegetated/planted to reduce dust emissions	
	Vegetation composition: native tree cover	Percentage	Impacts on water quality from dust settlement and reduced photosynthesis may affect the distribution of these species.	Impacts on water quality from diffuse and point discharges		No adverse effects
	Vegetation composition: typical species	Occurrence	Impacts on water quality from dust settlement and reduced photosynthesis may affect the composition of these species.	Impacts on water quality from diffuse and point discharges		No adverse effects
	Vegetation composition: negative indicator species	Occurrence	Impacts on water quality from dust settlement and reduced photosynthesis may affect the composition of these species.	Impacts on water quality from diffuse and point discharges		No adverse effects
	Habitat area	Hectares	Impacts on water quality from dust settlement may affect the area and extent of this habitat	Impacts on water quality from diffuse and point discharges		No adverse effects
Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation	Habitat distribution	Occurrence	Impacts on water quality from dust settlement may affect the distribution of these plants	Impacts on water quality from diffuse and point discharges	Trees will be planted along the north, east and south-west boundary and the existing vegetation along the western boundary will be retained Dust generating activities will be located away from the site boundary Waste material and material being transported off the site will be in sealed or covered vehicles Road sweeping will be carried out on a regular basis Water spraying will be conducted to dampen dust and reduce emissions Wheel wash will be in place 100m from the site entrance Long term exposed surfaces will be	No adverse effects
	Habitat area	Kilometres	Impacts on water quality from dust settlement may affect the area and extent of these plants	Impacts on water quality from diffuse and point discharges		No adverse effects

Qualifying Interest	Attribute	Measure	Potential Impacts	Cumulative Impacts	Mitigation Measures	Residual Impact
					vegetated/planted to reduce dust emissions	
	Hydrological regime: river flow	Metres per second	N/A	N/A	N/A	N/A
	Hydrological regime: groundwater discharge	Metres per second	N/A	N/A	N/A	N/A
	Substratum composition: particle size range	Millimetres	Impacts on water quality from dust settlement may impact on substrate and species composition	Impacts on water quality from diffuse and point discharges	<p>Trees will be planted along the north, east and south-west boundary and the existing vegetation along the western boundary will be retained</p> <p>Dust generating activities will be located away from the site boundary</p> <p>Waste material and material being transported off the site will be in sealed or covered vehicles</p> <p>Road sweeping will be carried out on a regular basis</p> <p>Water spraying will be conducted to dampen dust and reduce emissions</p> <p>Wheel wash will be in place 100m from the site entrance</p> <p>Long term exposed surfaces will be vegetated/planted to reduce dust emissions</p>	No adverse effects
	Water chemistry: minerals	Milligrammes per litre	<p>N/A</p> <p>Tufa deposition is not known to occur in this section of the River Barrow. Extensive tufa deposits recorded on the river bed in the King's tributary of the Nore River</p>	N/A	N/A	N/A
	Water quality: suspended	Milligrammes per litre	Impacts on water quality from dust settlement may impact on substrate	Impacts on water quality from diffuse and point discharges	Trees will be planted along the north, east and south-west boundary and the existing vegetation along the western	No adverse effects

Qualifying Interest	Attribute	Measure	Potential Impacts	Cumulative Impacts	Mitigation Measures	Residual Impact
	sediment		and species composition		<p>boundary will be retained</p> <p>Dust generating activities will be located away from the site boundary</p> <p>Waste material and material being transported off the site will be in sealed or covered vehicles</p> <p>Road sweeping will be carried out on a regular basis</p> <p>Water spraying will be conducted to dampen dust and reduce emissions</p> <p>Wheel wash will be in place 100m from the site entrance</p> <p>Long term exposed surfaces will be vegetated/planted to reduce dust emissions</p>	
	Water quality: nutrients	Milligrammes per litre	N/A	N/A	N/A	N/A
	Vegetation composition: typical species	Occurrence	Impacts on water quality from dust settlement may affect species composition	Impacts on water quality from diffuse and point discharges	<p>Trees will be planted along the north, east and south-west boundary and the existing vegetation along the western boundary will be retained</p> <p>Dust generating activities will be located away from the site boundary</p> <p>Waste material and material being transported off the site will be in sealed or covered vehicles</p> <p>Road sweeping will be carried out on a regular basis</p> <p>Water spraying will be conducted to dampen dust and reduce emissions</p> <p>Wheel wash will be in place 100m from the site entrance</p> <p>Long term exposed surfaces will be vegetated/planted to reduce dust emissions</p>	No adverse effects
	Floodplain connectivity	Area	N/A	N/A	N/A	N/A

## 7 Conclusions

JBA Consulting Ireland Ltd. was commissioned by Environmental Efficiency Consultant (Ireland) Ltd to undertake a Natura Impact Statement in relation to the proposed soil recovery facility at a worked-out quarry in Graney West, County Kildare.

The proposed project is identified as occurring within the ZoI of the following Natura 2000 sites:

- River Barrow and River Nore SAC (002162)
- Slaney River Valley SAC (000781)

The development site lies 2km from River Barrow and River Nore SAC and has surface water connection to the SAC via a surface water drain which is discharging to River Graney. River Graney connects to River Lerr further downstream, which is part of the SAC.

The qualifying interests within the ZoI are: Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*) [91E0], Floating River Vegetation [3260], White-clawed Crayfish (*Austropotamobius pallipes*) [1092], Brook Lamprey (*Lampetra planeri*) [1096], River Lamprey (*Lampetra fluviatilis*) [1099], Sea Lamprey (*Petromyzon marinus*) [1095], Atlantic Salmon (*Salmo salar*) [1106], Otter (*Lutra lutra*) [1355] and Freshwater Pearl Mussel (*Margaritifera margaritifera*) [1029].

The potential impacts from the proposed project could arise both during construction and operation and relates to potential pollution of surface waters caused by runoff from bare soil and accidental spillage of diesel and oil, which could impact on the Annex 1 habitats and species. Habitat fragmentation and potential kill of individuals could impact on otters due to the construction of a new access road crossing River Graney which has been identified to be used by otter.

Slaney River Valley SAC lies approximately 7km east of the proposed development site and is within the ZoI for air pathways, with winds generally blowing in the direction towards the SAC.

The qualifying interests within the ZoI are: Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*) [91E0] and Floating River Vegetation [3260].

The potential impacts from the proposed project could arise during operation and relates to dust generating activities, such as haulage of materials to and from the site, internal material haulage and handling, infilling / site restoration, C&D material processing and stockpiling. This could impact on the Annex 1 habitats within the ZoI.

Mitigation measures have been proposed for the area of the site and for inclusion in pollution control measures, dust control measures, and the implementation of safe otter passage under the access road crossing River Graney, ensuring that no adverse effects in relation to surface water pollution, groundwater pollution or habitat fragmentation occur.

It is concluded **that provided the mitigation measures** outlined are upheld, **no adverse effects** are likely from the proposed soil recovery facility at Graney West, Co. Kildare in combination with other project and plans on the following Natura 2000 sites:

- River Barrow and River Nore SAC (002162)
- Slaney River Valley SAC (000781)

To confirm this conclusion, a checklist taken from DoEHLG (2009), has been completed in Table 7-1.



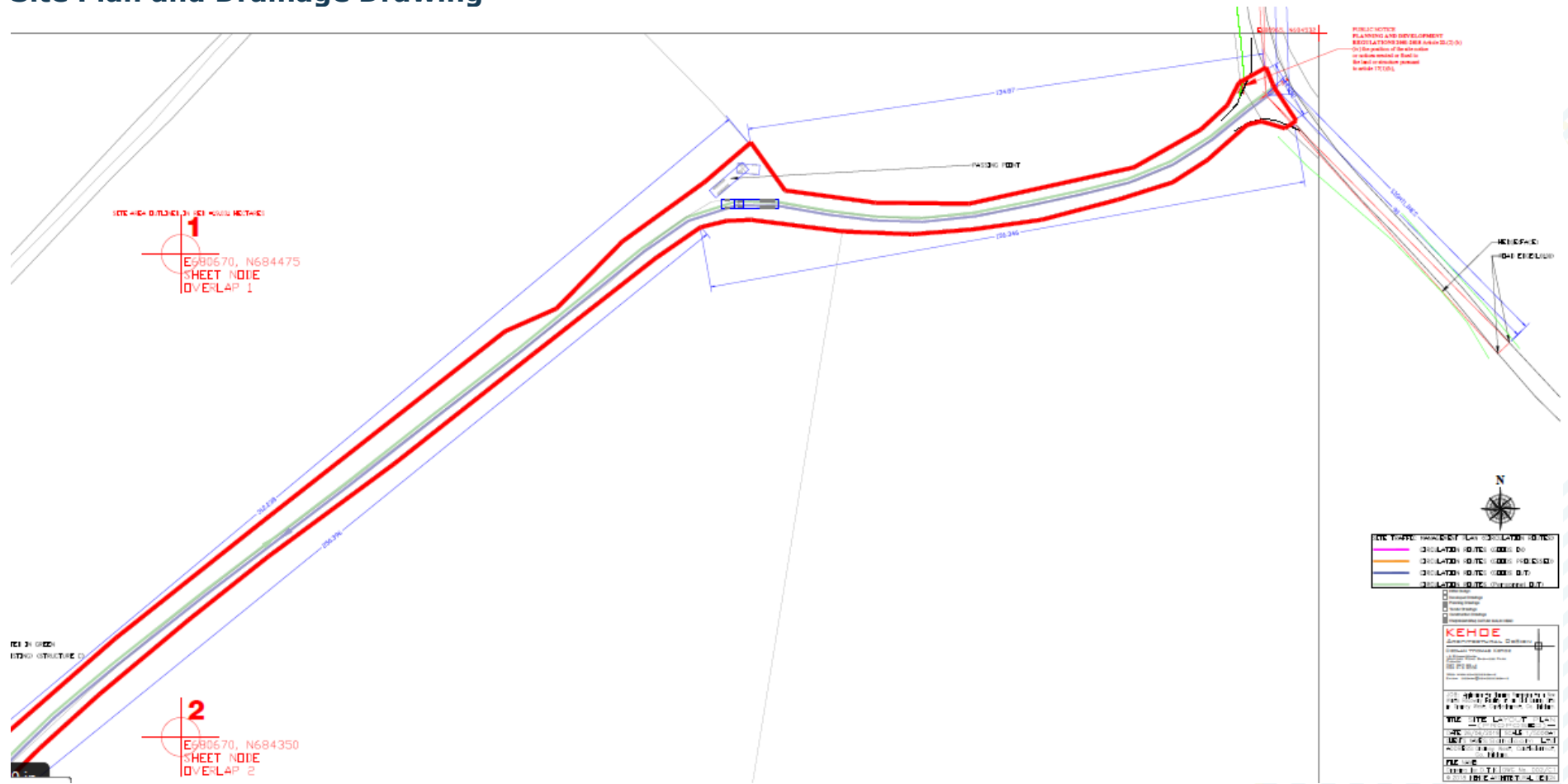
**Table 7-1: Integrity of Natura 2000 site checklist (DoEHLG, 2009)**

<b>Conservation objectives: does the project or plan have the potential to:</b>	<b>Y/N</b>
<b>Cause delays in progress towards achieving the conservation objectives of the sites?</b>	N - Following mitigation, no significant adverse residual impacts have been identified that will prevent achievement of the conservation objectives of the assessed sites.
<b>Interrupt progress towards achieving the conservation objectives of the sites?</b>	N - Following mitigation, no significant adverse residual impacts have been identified that will prevent achievement of the conservation objectives of the assessed site.
<b>Disrupt those factors that help to maintain the favourable conditions of the site?</b>	N - Potential adverse impacts via surface water; land and air; and groundwater pathways identified during the screening process can be mitigated against.
<b>Interfere with the balance, distribution and density of key species that are the indicators of the favourable condition of the site?</b>	N - Potential adverse impacts on the habitats and species of the SACs are not expected as impacts can be avoided by implementing the mitigation and avoidance measures detailed.
Other objectives: does the project or plan have the potential to:	
<b>Cause changes to the vital defining aspects (e.g. nutrient balance) that determine how the site functions as a habitat or ecosystem?</b>	N - Potential adverse impacts from suspended solid and nutrient release are not expected as measures can be included within working protocols to ensure potential impacts are effectively mitigated.
<b>Change the dynamics of the relationships (between, for example, soil and water or plants and animals) that define the structure and/or function of the site?</b>	N - Potential adverse impacts relating to hydrological status and water quality have been identified which could impact on the functioning and dynamics of the site, however, these are not expected to be significant given the mitigation measures detailed to ensure potential impacts are effectively mitigated.
<b>Interfere with predicted or expected natural changes to the site (such as water dynamics or chemical composition)?</b>	N - Potential adverse impacts from changes to the hydrological regime and suspended solid/nutrient/pollutant release are not expected as measures are included within working protocols to ensure potential impacts are effectively mitigated.
<b>Reduce the area of key habitats?</b>	N - Potential adverse impacts on the habitats of the SACs are not expected given the mitigation measures that have been detailed.
<b>Reduce the population of key species?</b>	N - Potential impacts to key species of the SACs, are not expected as impacts can be avoided by implementing the mitigation measures detailed.
<b>Change the balance between key species?</b>	N - Potential impacts to key species for which the SACs and are designated, are not expected as impacts can be avoided by implementing the mitigation measures detailed.
<b>Reduce diversity of the site?</b>	N - The identified mitigation measures to protect designated habitats and species will ensure that the current diversity of the sites is maintained.
<b>Result in disturbance that could affect population size or density or the balance between key species?</b>	N - Potential impacts to the population size, density or balance of key species are not expected as impacts can be avoided by implementing the mitigation measures detailed.
<b>Result in fragmentation</b>	N - Potential impacts resulting in fragmentation of species or habitats are not expected as impacts can be avoided by implementing the mitigation measures

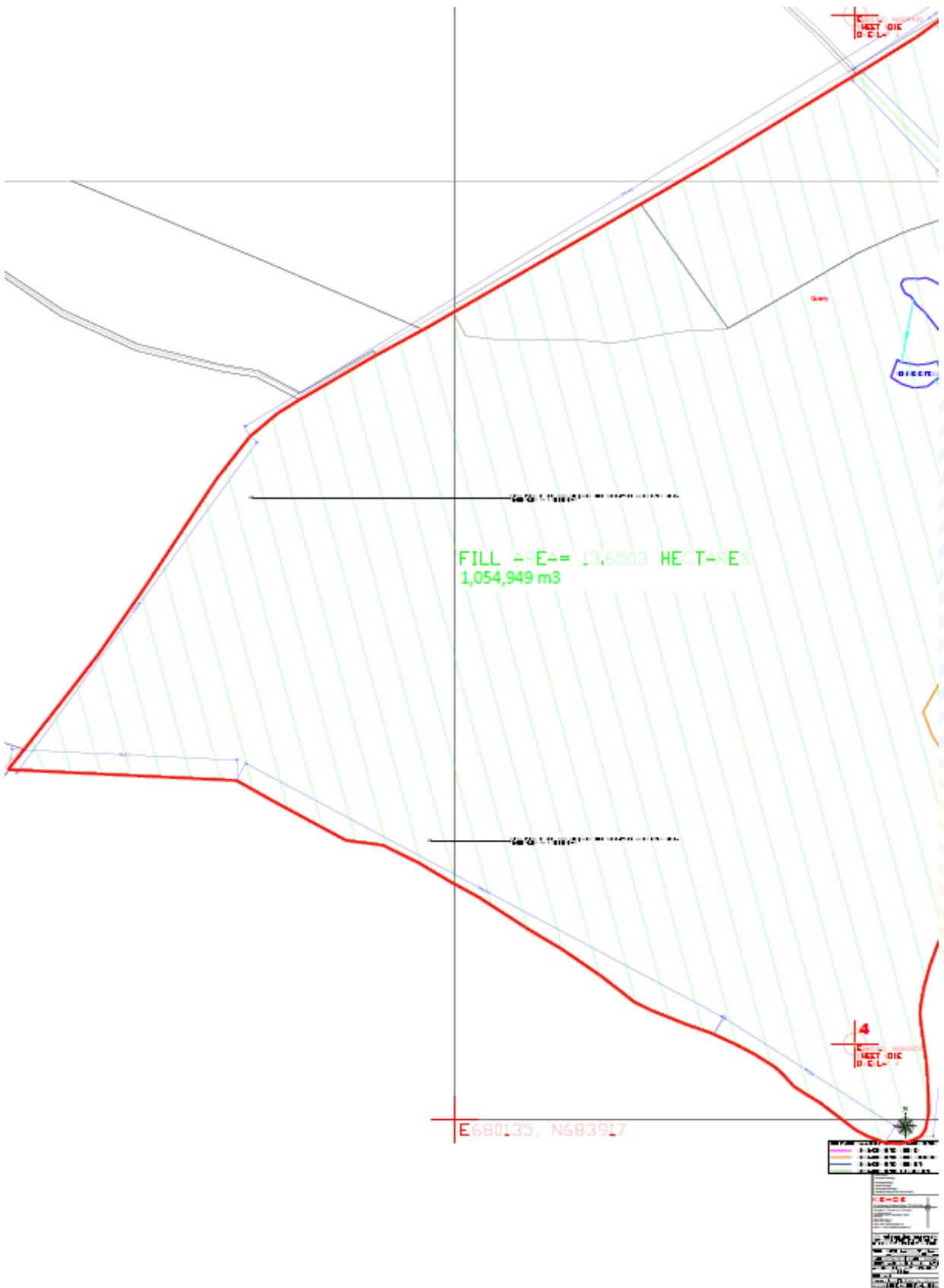
<p><b>Result in loss or reduction of key features (e.g. tree cover, tidal exposure, annual flooding etc.)?</b></p>	<p>detailed.</p> <p>N - Potential adverse impacts on SAC habitats are not expected as impacts can be avoided by implementing the mitigation measures detailed so there will be no loss of, or reduction of, key features.</p>
--	---

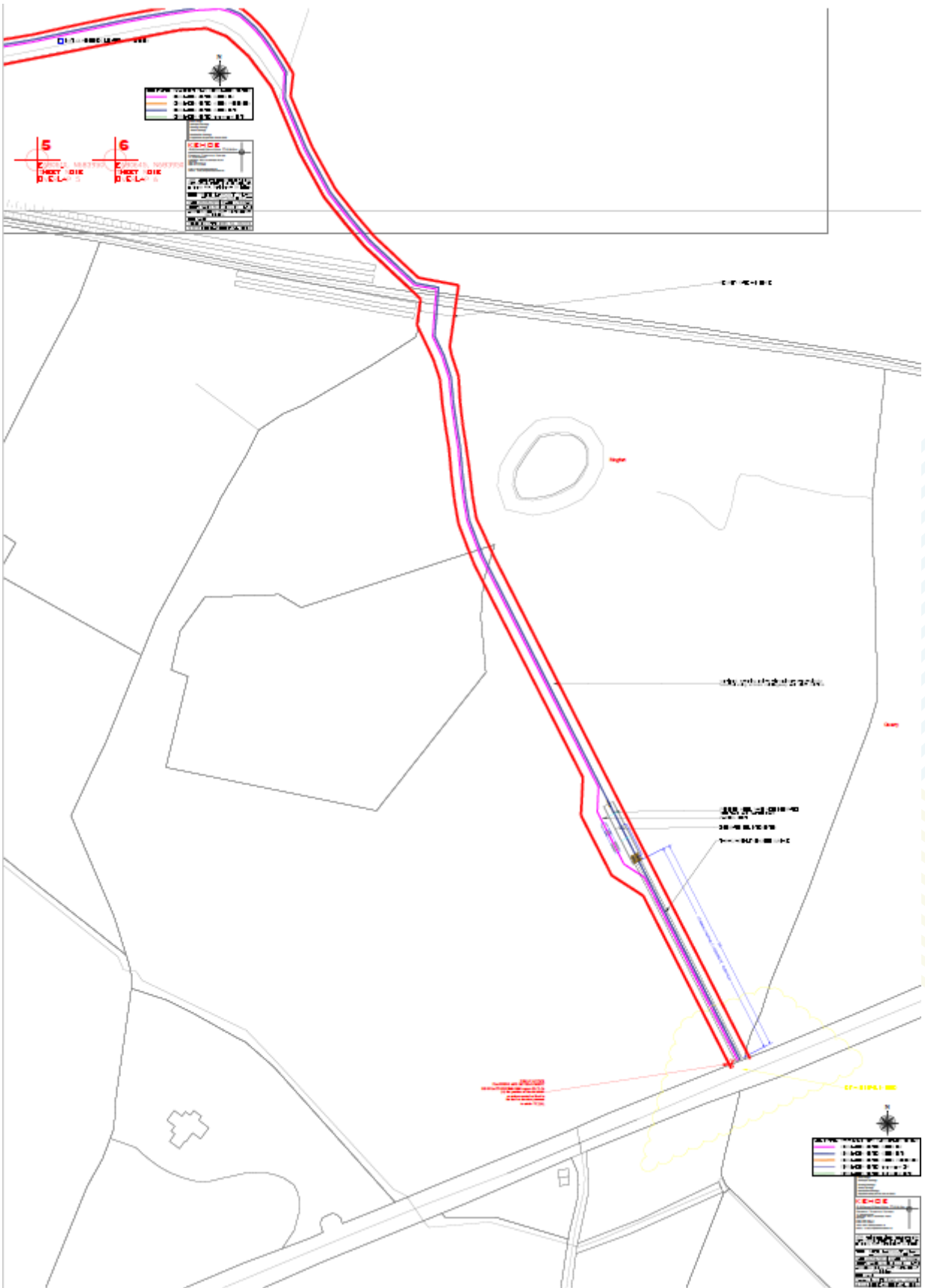
## Appendices

# A Site Plan and Drainage Drawing









## References

- CSO (2019) Population Change and Average Annual Rates 2011 to 2016 by Sex, County and City, CensusYear and Statistic [online], available: <https://www.cso.ie/px/pxeirestat/Statire/SelectVarVal/Define.asp?Maintable=E2011&Planguage=0> [accessed 26 Mar 2019].
- DATA.GOV.IE (2017) 'Margaritifera Sensitive Areas Map', available: <https://data.gov.ie/dataset/margaritifera-sensitive-areas-map> [accessed 18 Oct 2018].
- DEHLG (2009) Appropriate Assessment of Plans and Projects in Ireland. Guidance for Planning Authorities, available: [https://www.npws.ie/sites/default/files/publications/pdf/NPWS\\_2009\\_AA\\_Guidance.pdf](https://www.npws.ie/sites/default/files/publications/pdf/NPWS_2009_AA_Guidance.pdf) [accessed 31 Aug 2016].
- DoEHLG (2009) Appropriate Assessment of Plans and Projects in Ireland Guidance for Planning Authorities., Department of the Environment, Heritage and Local Government, available: <http://www.wicklow.ie/sites/default/files/Manager's%20report%20on%20submissions%20to%20the%20Proposed%20Amendments.pdf> [accessed 12 Jan 2017].
- DoHPLG (2018a) 'River Basin Management Plan for Ireland 2018-2021', available: [https://www.housing.gov.ie/sites/default/files/publications/files/rbmp\\_report\\_english\\_web\\_version\\_final\\_0.pdf](https://www.housing.gov.ie/sites/default/files/publications/files/rbmp_report_english_web_version_final_0.pdf) [accessed 22 Jan 2019].
- DoHPLG (2018b) Areas for Action for the River Basin Management Plan for Ireland 2018 - 2021 [online], Local Authority Waters Programme, available: <http://watersandcommunities.ie/areas-action-river-basin-management-plan-ireland-2018-2021/> [accessed 24 Jan 2019].
- EA (2012) Working at Construction and Demolition Sites PPG6. Pollution Prevention Guidelines, 2nd ed, Environment Agency: Bristol, England.
- EC (2002) Assessment of Plans and Projects Significantly Affecting Natura 2000 Sites: Methodological Guidance on the Provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC, EUR-OP: Luxembourg.
- EC (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 Interest, Compensatory Measures, Overall Coherence, Opinion of the Commission, available: [http://ec.europa.eu/environment/nature/natura2000/management/docs/art6/guidance\\_art6\\_4\\_en.pdf](http://ec.europa.eu/environment/nature/natura2000/management/docs/art6/guidance_art6_4_en.pdf) [accessed 31 Aug 2016].
- EPA (2005) Ambient Air Monitoring In Carlow 12th July 2004 - 14th March 2005, available: [http://www.epa.ie/pubs/reports/air/monitoring/EPA\\_air\\_assessment\\_carlow.pdf](http://www.epa.ie/pubs/reports/air/monitoring/EPA_air_assessment_carlow.pdf) [accessed 16 Oct 2018].
- EPA (2020) EPA Maps [online], Next Generation EPA Maps, available: <https://gis.epa.ie/EPAMaps/> [accessed 16 Jan 2020].
- European Commission, Office for Official Publications of the European Communities (Eds.) (2000) Managing Natura 2000 Sites: The Provisions of Article 6 of the 'Habitats' Directive 92/43/EEC, Office for Official Publications of the European Communities: Luxembourg.
- IFI (2016) 'Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters', available: <http://www.fisheriesireland.ie/fisheries-management-1/624-guidelines-on-protection-of-fisheries-during-construction-works-in-and-adjacent-to-waters/file> [accessed 7 Mar 2017].
- JBA (2020) Soil Recovery Facility Kildare - AA Screening, JBA Consulting Engineers and Scientists Ltd.
- Kildare County Council (2017a) 'Kildare County Development Plan 2017-2023 Volume 1', available: <http://www.kildare.ie/CountyCouncil/Planning/DevelopmentPlans/KildareCountyDevelopmentPlan2017-2023/Volume1/Volume%201.pdf> [accessed 21 Jan 2019].
- Kildare County Council (2017b) 'Kildare County Development Plan 2017-2023 Volume 2', available: <http://www.kildare.ie/CountyCouncil/Planning/DevelopmentPlans/KildareCountyDevelopmentPlan2017-2023/Volume2/Volume%202.pdf> [accessed 21 Jan 2019].



- NetRegs (2017) 'Guidance for Pollution Prevention. Works and maintenance in or near water: GPP5', available: <http://www.netregs.org.uk/media/1304/gpp-5-works-and-maintenance-in-or-near-water.pdf> [accessed 7 Apr 2018].
- NPWS (2011a) Conservation Objectives River Barrow and River Nore SAC 002162, Conservation Objectives, National Parks and Wildlife Service / Department of Arts, Heritage and Gaeltacht, available: [https://www.npws.ie/sites/default/files/protected-sites/conservation\\_objectives/CO002162.pdf](https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO002162.pdf) [accessed 10 Mar 2017].
- NPWS (2011b) Conservation Objectives River Barrow and River Nore SAC 002162, Conservation Objectives, National Parks and Wildlife Service / Department of Arts, Heritage and Gaeltacht, available: [https://www.npws.ie/sites/default/files/protected-sites/conservation\\_objectives/CO002162.pdf](https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO002162.pdf) [accessed 10 Mar 2017].
- NPWS (2011c) 'Conservation Objectives Slaney River Valley SAC 000781', available: [https://www.npws.ie/sites/default/files/protected-sites/conservation\\_objectives/CO000781.pdf](https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000781.pdf) [accessed 21 Jan 2019].
- NPWS (2015) 'Site Synopsis Slaney River Valley SAC 000781', available: <https://www.npws.ie/sites/default/files/protected-sites/synopsis/SY000781.pdf> [accessed 21 Jan 2019].
- NPWS (2016) Site Synopsis: River Barrow and River Nore SAC 002162, Site Synopsis, National Parks and Wildlife Service / Department of Arts, Heritage and Gaeltacht, available: <https://www.npws.ie/sites/default/files/protected-sites/synopsis/SY002162.pdf> [accessed 10 Mar 2017].
- NPWS (2017a) 'River Barrow and River Nore SAC Site Code: 002162 Natura 2000 Standard Data Form', available: <https://www.npws.ie/sites/default/files/protected-sites/natura2000/NF002162.pdf> [accessed 26 Sep 2018].
- NPWS (2017b) 'Natura 2000 Standard Data Form Slaney River Valley SAC 000781', available: <https://www.npws.ie/sites/default/files/protected-sites/natura2000/NF000781.pdf> [accessed 21 Jan 2019].
- NPWS (2019) Download Boundary Data | National Parks & Wildlife Service [online], available: <https://www.npws.ie/maps-and-data/designated-site-data/download-boundary-data> [accessed 11 Feb 2019].
- Preene, M., Roberts, T.O.L., Powrie, W. (2016) Groundwater Control: Design and Practise, Second Edition, Guidance document, CIRIA, London.
- Windfinder.com (2018) Windfinder.Com - Wind and Weather Statistic Carlow [online], Windfinder.com, available: <https://www.windfinder.com/windstatistics/carlow> [accessed 29 Jan 2019].

**JBA**  
consulting

Unit 8, Block 660  
Greenogue Business Plaza  
Greenogue Business Park  
Rathcoole  
DUBLIN  
D24 YN81  
Ireland

**+00 353 (0) 1 68 555 95**

**info@jbaconsulting.ie**  
**www.jbaconsulting.ie**

**Registered Office**

24 Grove Island  
Corbally  
LIMERICK  
V94 312N  
Ireland

+00 353 (0) 61 345 463

JBA Consulting Engineers and  
Scientists Limited  
Registered no: 444752

JBA Group Ltd is certified to:  
ISO 9001:2015  
ISO 14001:2015  
ISO 27001:2013  
OHSAS 18001:2007



JBA Consulting is part  
of the JBA Group