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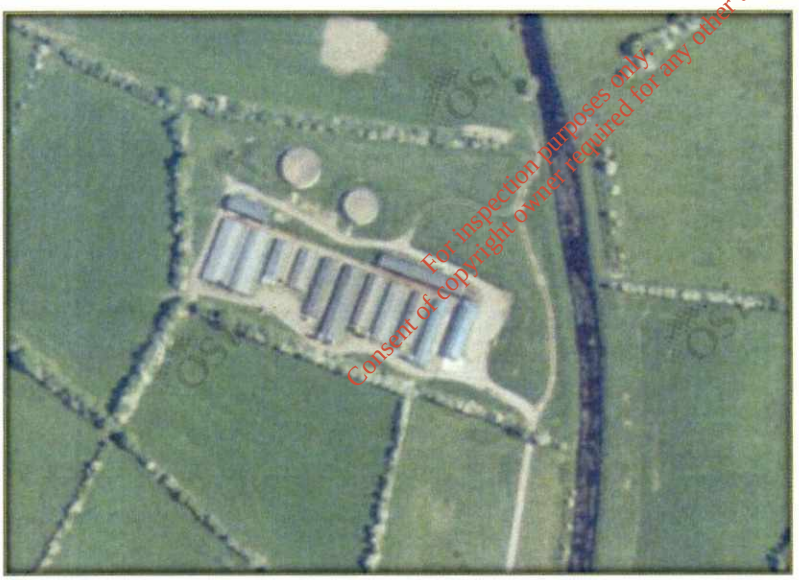
NATURA IMPACT STATEMENT
(TO SUPPORT THE APPROPRIATE ASSESSMENT PROCESS) OF A PROPOSED DEVELOPMENT AT ARDRA, BRACKNAGH, COUNTY OFFALY

IN LINE WITH THE REQUIREMENTS OF ARTICLE 6(3) OF THE EU HABITATS DIRECTIVE



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1 INTRODUCTION

1.1 BACKGROUND

This report follows on from request for a Natura Impact Statement from Offaly County Council regarding a proposed development at Ardra, Bracknagh, County Offaly. Having regard to the location of the proposed development site and its proximity to sites designated under the EU Habitats Directive and the EU Birds Directive, it was requested that the applicant submit a Natura Impact Statement of the proposed development in accordance with Article 6 of the Habitats Directive. A Statement of Screening for Appropriate Assessment (Stage I) has been previously submitted regarding this development. However, an evaluation of the development by Offaly Co. Co and a subsequent Request for Further Information determined that a Stage II Appropriate Assessment (Natura Impact Statement) would be required.

The purpose of this assessment is to determine the appropriateness of the proposed project, in the context of the conservation status of the site or sites. In Ireland, an Appropriate Assessment takes the form of a Natura Impact Statement (NIS), which is a statement of the likely impacts of the plan or project on a Natura 2000 site. The NIS comprises a comprehensive ecological impact assessment of the plan or project, it examines the direct and indirect impacts that the plan or project might have on its own or in combination with other plans or projects on one or more Natura 2000 sites in view of the sites' conservation objectives.

1.2 THE AIM OF THIS REPORT

This Natura Impact Statement (NIS) has been prepared in accordance with the current guidance (DoEHLG, 2009, Revised February 2010), and it provides an ecological impact assessment (EcIA) for a proposed development at Ardra, Bracknagh, County Offaly.

An NIS should provide the information required in order to establish whether or not a proposed development is likely to have a significant impact on certain Natura sites in the context of their conservation objectives and specifically on the habitats and species for which the Natura 2000 conservation sites have been designated.

Accordingly, a comprehensive assessment of the ecological impacts of this proposed development was carried out in February 2015 by Noreen McLoughlin, MSc, MCIEEM of Whitehill Environmental. This assessment allowed areas of potential ecological value and potential ecological constraints associated with this proposed development to be identified

and it also enabled potential ecological impacts associated with the proposed development to be assessed and mitigated for.

1.3 REGULATORY CONTEXT

RELEVANT LEGALISATION

The Birds Directive (Council Directive 79/409/EEC) implies that particular protection is given to sites (Special Protection Areas) which support certain bird species listed in Annex I of the Directive and that surveys of development sites should consider the status of such species.

The EU Habitats Directive (92/43/EEC) gives protection to sites (Special Areas of Conservation) which support particular habitats and species listed in annexes to this directive. Articles 6(3) and 6(4) of this Directive call for the undertaking of an Appropriate Assessment for plans and projects likely to have an effect on designated sites. This is explained in greater detail in the following section.

The Wildlife Act 1976 (and its amendment of 2000) provides protection to most wild birds and animals. Interference with such species can only occur under licence. Under the act it is an offence to "wilfully interfere with or destroy the breeding place or resting place of any protected wild animal". The basic designation for wildlife is the Natural Heritage Area (NHA). This is an area considered important for the habitats present or which holds species of plants and animals whose habitat needs protection. Under the Wildlife Amendment Act (2000) NHAs are legally protected from damage. NHAs are not part of the Natura 2000 network and so the Appropriate Assessment process does not apply to them.

The Water Framework Directive (WFD) (2000/60/EC), which came into force in December 2000, establishes a framework for community action in the field of water policy. The WFD was transposed into Irish law by the European Communities (Water Policy) Regulations 2003 (S.I. 722 of 2003). The WFD rationalises and updates existing legislation and provides for water management on the basis of River Basin Districts (RBDs). RBDs are essentially administrative areas for coordinated water management and are comprised of multiple river basins (or catchments), with cross-border basins (i.e. those covering the territory of more than one Member State) assigned to an international RBD. The aim of the WFD is to ensure that waters achieve at least good status by 2015 and that status doesn't deteriorate in any waters.

APPROPRIATE ASSESSMENT AND THE HABITATS DIRECTIVE

Directive 92/43/EEC on the Conservation of Natural Habitats and Wild Fauna and Flora – 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*. 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 sets 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 European 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 APPROPRIATE ASSESSMENT PROCESS

The aim of Appropriate Assessment is to assess the implications of a proposal in respect of a site's conservation objectives.

Appropriate Assessment is an assessment of the potential effects of a proposed plan - 'in combination' with other plans and projects - on one or more European sites. The 'Appropriate Assessment' itself is a statement which must be made by the competent authority which says whether the plan affects the integrity of a European site. The actual process of determining whether or not the plan will affect the site is also commonly referred to as 'Appropriate Assessment'.

If adverse impacts on the site cannot be avoided, then mitigation measures should be applied during the Appropriate Assessment process to the point where no adverse impacts on the site remain (European Commission, 2000, 2001).

The conclusions of the appropriate assessment report should enable the competent authority to ascertain whether the proposal would adversely affect the integrity of the site (European Commission, 2000, 2001).

Under the terms of the directive (European Commission, 2000, 2001), consent can only be granted for a project if, as a result of the appropriate assessment either (a) it is concluded that the integrity of the site will not be adversely affected, or (b) where an adverse effect is anticipated, there is shown to be an absence of alternative solutions, and there exists imperative reasons of overriding public interest for the project should go ahead.

2 METHODOLOGY

2.1 APPROPRIATE ASSESSMENT

This Natura Impact Statement has been prepared with reference to the following:

- European Commission (2000). Managing Natura 2000 Sites: The Provisions of Article 6 of the 'Habitats' Directive 92/43/EEC.
- European Commission (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.
- European Commission (2006). Nature and Biodiversity Cases: Ruling of the European Court of Justice.
- European Commission (2007). Clarification of the Concepts of: Alternative Solution, Imperative Reasons of Overriding Public Interest, Compensatory Measures, Overall Coherence, Opinion of the Commission.
- Department of Environment, Heritage and Local Government (2009). Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities.

The EC Guidance sets out a number of principles as to how to approach decision making during the process. The primary one is 'the precautionary principle' which requires that the conservation objectives of Natura 2000 should prevail where there is uncertainty.

When considering the precautionary principle, the emphasis for assessment should be on objectively demonstrating with supporting evidence that:

- There will be no significant effects on a Natura 2000 site;
- There will be no adverse effects on the integrity of a Natura 2000 site;
- There is an absence of alternatives to the project or plan that is likely to have an adverse effect to the integrity of a Natura 2000 site; and
- There are compensation measures that maintain or enhance the overall coherence of Natura 2000.

This translates into a four stage process to assess the impacts, on a designated site or species, of a policy or proposal.

The EC Guidance states that "each stage determines whether a further stage in the process is required". Consequently, the Council may not need to proceed through all four stages in undertaking the Appropriate Assessment.

The four stage process is:

Stage 1: Screening – The process which identifies the likely impacts upon a Natura 2000 site of a project or plan, either alone or in combination with other projects or plans, and considers whether or not these impacts are likely to be significant;

Stage 2: Appropriate Assessment – The consideration of the impact on the integrity of the Natura 2000 site of the project or plan, either alone or in combination with other projects or plans, with respect to the site's structure and function and its conservation objectives. Additionally, where there are adverse impacts, an assessment of the potential mitigation of those impacts;

Stage 3: Assessment of Alternative Solutions – The process which examines alternative ways of achieving objectives of the project or plan that avoid adverse impacts on the integrity of the Natura 2000 site;

Stage 4: Assessment where no alternative solutions exist and where adverse impacts remain – An assessment of the compensatory measures where, in the light of an assessment of imperative reasons of overriding public interest (IROPI), it is deemed that the project or plan should proceed.

In complying with the obligations set out in Articles 6(3) and following the guidelines described above, this Natura Impact Statement has been structured as a stage by stage approach as follows:

- Description of the proposed project;
- Identification of the Natura 2000 sites close to the proposed development;
- Identification and description of any individual and cumulative impacts on the Natura 2000 sites likely to result from the project;
- Assessment of the significance of the impacts identified above on site integrity. Exclusion of sites where it can be objectively concluded that there will be no significant effects;
- Description of mitigation measures.

2.2 DESK STUDIES

Information on the site and the area of the proposed development was studied prior to the completion of this statement. The following data sources were accessed in order to complete a thorough examination of all impacts:

- National Parks and Wildlife Service - aerial photographs and maps of designated sites, information on habitats and species within these sites and information on protected plant or animal species; conservation objectives, site synopses and standard data forms for relevant designated sites;
- Environmental Protection Agency (EPA)- Information pertaining to water quality, geology and licensed facilities within the area;
- National Biodiversity Data Centre (NBDC) – Information pertaining to protected plant and animal species within the study area;
- C.L.W. Environmental Planners Ltd – Information regarding the proposed development including site plans, specifications and an Environmental Impact Statement;
- Offaly County Council – Information on planning history in the area;
- Water Matters – Catchment based information.

3 STAGE I - SCREENING

3.1 DEVELOPMENT DESCRIPTION

This proposed development will consist of the demolition of ten existing houses and the construction of two new houses. In addition, an extension is proposed between two existing houses to form a third pig house. All works will be contained within the existing footprint of the facility. It is the intention of Rosderra Farms to upgrade the facility in order to comply more fully with current Department of Agriculture regulations and specifications. The upgrade of the facility will also lead to better environmental standards and animal welfare standards.

With the completion of the proposed developments, stock numbers will change from 550 Sow Integrated unit to a 1,250 sow breeding unit. However, there will be no change in the slurry volume produced. Other proposed design measures to increase the environmental standards on site include:

- An increase in slurry storage capacity (from 6 months capacity to 19 months capacity).
- The inclusion of storm-water attenuation measures – uncontaminated water from the roofs of the buildings and clean paved areas within the farm will be collected separately and discharged to the existing and / or upgraded storm water drainage system. Roof water from the proposed new structures will be directed to a storm-water attenuation tank of c. 940m^3. The applicant will monitor these discharge points on a regular basis. Any soiled water coming off pig-walkways etc, will be directed into the slurry storage tanks.
- The inclusion of flood risk mitigation measures – A site specific Flood Risk Assessment in accordance with The Planning System and Flood Risk Management Guidelines was undertaken by IE Consulting as part of the EIS submitted with the current application. This assessment identified a limited flood inundation in 2008 on the site, and it estimated that the 1 in 100 year and 1 in 1000 year flood levels as 61.56OD and 62.14m OD respectively. The floor levels of the existing structures on site are at or are just above ground level and they provide limited protection in the event of any flood situation. The levels for new structures proposed as part of the current application will be approximately 1.8m higher than existing floor levels, therefore they will be between 1.3m and 0.7m higher than the 1 in 100 year and 1 in 1000 year flood levels respectively.

- Underground leak detection facilities; surface, ground water and leak detection monitoring – Under the requirements of the current EPA license the applicant operates a surface water inspection programme which includes weekly monitoring and quarterly sampling of surface water discharge / inspection points. This monitoring will continue should this proposed development be approved. All surface water from this proposed development will discharge though a single storm water discharge point and the applicant will also follow the guidance on trigger values for storm water discharges as outlined by the EPA in their publication on trigger values for licensees (EPA, 2012);

- Animals will only be moved on slatted passageways with manure storage tanks underneath.

- Collection tanks and concrete areas will be provided at the slurry fill points to collect any spills / leaks that may occur when manure is being collected for transport off-site.

The pig farm at Ardra is operating under EPA License Number P0614-01. To minimise any potential ammonia emissions, the proposed design, operation and management of the farm will comply with the *Integrated Pollution Prevention and Control (IPPC) Reference Document on Best Available Techniques for Intensive Rearing of Poultry and Pigs* (July 2003) and *Best Available Techniques (BAT) Reference Document for the Intensive Rearing of Poultry and Pigs* (Draft 2, August 2013).

Pigs and pig slurry are the main output. The proposed organic fertiliser annual output from the facility will be 11,310m^3 (the current approved output is 11,330m^3). Records for the movement of the organic fertiliser have been submitted to the Department of Agriculture, Food and the Marine.

Due to the location of this pig farm, a significant number of the potential customer farmers will be located in County Offaly. A number of additional customer farmers (or parts thereof) may be located in adjoining counties such as Kildare and Laois, which are in relatively close proximity to the pig farm site. All customer farmers will utilise the pig manure to replace imported chemical fertiliser for efficient grass (grazing and forage conservation) and/or tillage production. This is primarily an agricultural area with low population densities.
It is anticipated that any potential customer farmers within a reasonable distance from this pig farm can be supplied with organic fertiliser for use in accordance with S.I. 31 of 2014.

S.I. 31 OF 2014

The European Union (Good Agricultural Practice for Protection of Waters) Regulations 2014 provides a basic set of measures to ensure the protection of waters, including drinking water sources, against pollution caused by nitrogen and phosphorus from agricultural sources, with the primary emphasis being on the management of livestock manures and other fertilisers. This directive outlines measures that must be followed during the land-spreading of manure. These measures are summarised in the points below.

- Livestock manure or slurry containing more than 170kg per hectare in a year must not be spread.
- The spreading of any organic fertiliser during certain times of the year is prohibited (The prohibited spreading period, generally between Mid-October and Mid-January).
- Farmers must keep within the overall maximum fertilisation rates for nitrogen and phosphorus.
- Farmers must have sufficient storage capacity to meet the minimum requirements of the regulations (storage for pig manure is 26 weeks).
- All storage facilities must be kept leak proof and structurally sound.
- Records for the movement of fertilisers
- Chemical fertilisers, livestock manure and other organic fertilisers, effluents and soiled water must be spread as accurately and as evenly as possible.
- An upward-facing splash plate or sludge irrigator on a tanker or umbilical system must not be used for the spreading of organic fertiliser or soiled water.
- Chemical fertilisers, livestock manure, soiled water or other organic fertilisers must not be spread when:
    - The land is waterlogged;
    - The land is flooded, or it is likely to flood;
    - The land is frozen, or covered with snow;
    - Heavy rain is forecast within 48 hours;
    - The ground slopes steeply and there is a risk of water pollution, when factors such as surface run-off pathways, the presence of land drains, the absence of hedgerows to mitigate surface flow, soil condition and ground cover are taken into account.
- Chemical fertilisers must not be spread on land within 2 metres of a surface watercourse.

Table 1 shows the buffer zones for various water bodies (lakes, rivers, wells etc.). Soiled water, effluents, farmyard manures or other organic fertilisers must not be spread inside these buffer zones.

Water Feature	Buffer Zone
Any water supply source providing 100m^3 or more of water per day, or serving 500 or more people	200m (or as little as 30m where a local authority allow)
Any water supply source providing 10m3 or more of water per day, or serving 50 people or more	100m (or as little as 30m where a local authority allows)
Any other water supply for human consumption	25m (or as little as 15m where a local authority allows)
Lake shoreline	20m
Exposed cavernous or karstified limestones features	15m
Any surface watercourse where the slope towards the watercourse exceeds 10%	10m
Any other surface waters	5m

Table 1 – Requirements for the Application of Fertilisers and Soiled Water as set out in S.I. 31 of 2014.

Rosderra Farms are fully aware of their obligations under S.I. 31 of 2014 and they will meet all the requirements under this Directive with the proposed application. The applicant will also continue to inform all customer farmers of their obligations under this Directive.

3.2 SITE LOCATION AND EXISTING ENVIRONMENT

THE APPLICATION SITE

The site of the proposed development is situated in the townland of Ardra. It is accessed by a cul-de-sac and it is just off a secondary road, the R149. The site is approximately 1km north-west of Bracknagh village and 7.8km west of Rathangan.

The site is located in an area where the dominant habitat is improved agricultural grassland. Other habitats surrounding the site include wet grassland, hedgerows, treelines, drains, streams and rivers (the Figile River). A site location map is shown in Figure 1 and an aerial photograph showing the site and its surrounding habitats is shown in Figure 2.

The site itself has few natural habitats remaining. The dominant habitat within is buildings and artificial surfaces, a habitat of very limited value. Boundaries along the southern, western and northern perimeters consist of hedgerows / treelines. The eastern boundary is open and faces onto the Figile River.

Information from the website of the National Biodiversity Data Centre reveals that there are no records of rare or protected species from within the 1km square (N5918) of the proposed development.

SURFACE WATER FEATURES AND QUALITY

The Figile River is adjacent to the proposed application site. This river rises in Lullymore West in the Bog of Allen. It flows through areas of raised bog, cutover bog and coniferous forest for much of its upper reaches, until it reaches Clonbulloge. It then flows through areas dominated by agricultural grassland. Just downstream of Bracknagh, it joins the Slate River and the Cushina River and it becomes the Black River. The Black then flows south until it reaches the River Barrow, just upstream of Monasterevin.

Fisheries in the Figile River is mixed, having good stocks of trout in parts as well as course fish, including pike and perch.

In their most recent biological water quality monitoring results (2011), the EPA assigned the Figile River as a Q3-4 in its upper reaches. At the Bridge in Clonbulloge, a Q4 was assigned (good status). Derrygarran Bridge, which is approximately 5km upstream of the proposed application site, also received a Q4 in 2011. The closest EPA station to the application site is Ardra Bridge, immediately downstream of the site. A Q4 was assigned here in 2011. Overall, according to the EPA, the Figile River is of moderate – good ecological status. Under the Water Framework Directive Good status must be achieved.

Information pertaining to the River Figile Catchment in the Bracknagh area was also obtained from the Water Maps section of the Water Matters website (www.wfdireland.ie). The Water Maps mapping information system was developed to support the River Basin Management Plan documentation in relation to Ireland's River Basin Districts. This information system presents data on waterbody status, risks, objectives and measures.

The Figile River in the Bracknagh area is defined by Water Matters as a tributary of the River Barrow. They define the overall status of this catchment as moderate and it is identified as being At Risk of not bring fully restored to good ecological status by the year 2015.

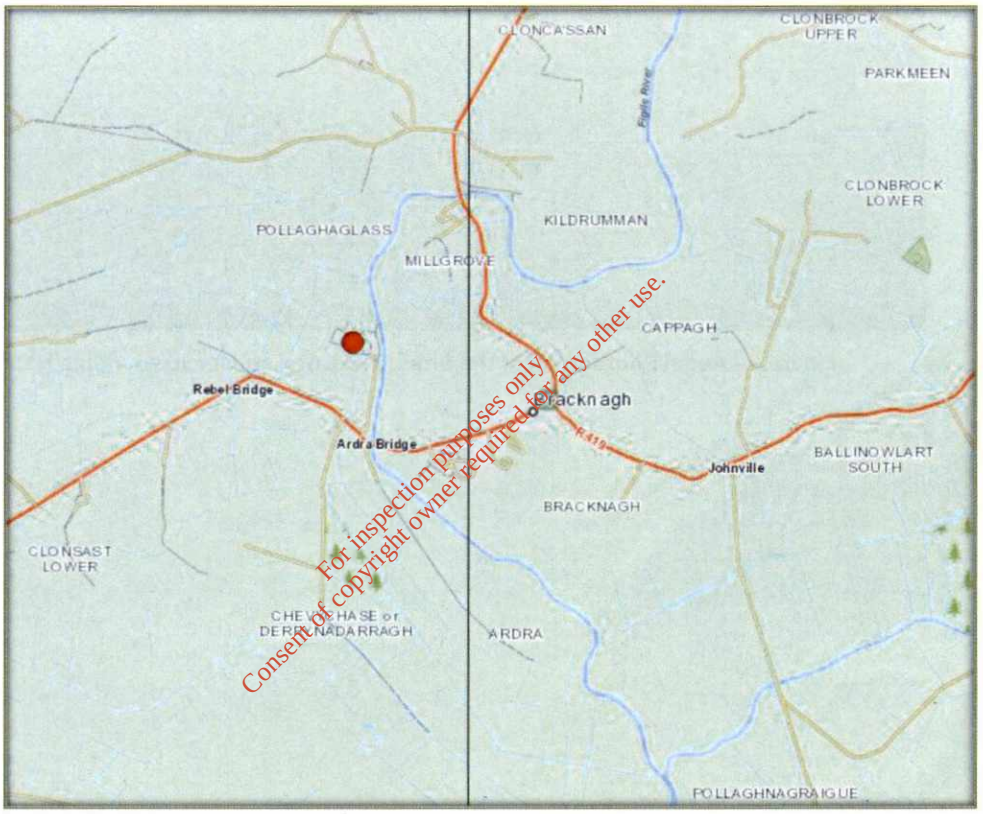

Figure 1 – Site Location Map (Sites Indicated with Red Dot)

Figure 2 – Aerial Photograph of the Sites (Red Dots) and its Surrounding Habitats

3.3 NATURA 2000 SITES IDENTIFIED

In accordance with the guidelines issued by the Department of the Environment and Local Government, a list of Natura 2000 sites within 10km of the proposed development have been identified and described according to their site synopsis, qualifying interests and conservation objectives. These guidelines give a recommended distance of 15km for plans whist the distance between Natura 2000 sites and proposed projects can be much less.

There is one Natura 2000 site within 10km of this proposed development. This is the *River Barrow and Nore* Special Area of Conservation (SAC 002162) and at its closest point it is **5.9km south** of the proposed development. There is also a source - pathway - receptor linkage between the two points, i.e., the Figile, Slate and Black Rivers. The upstream distance of the proposed development site from the SAC is **9.3km**. A full description of the River Barrow and Nore SAC can be viewed in Appendix I. A map showing the site in relation to these designated areas is shown in Figure 3.

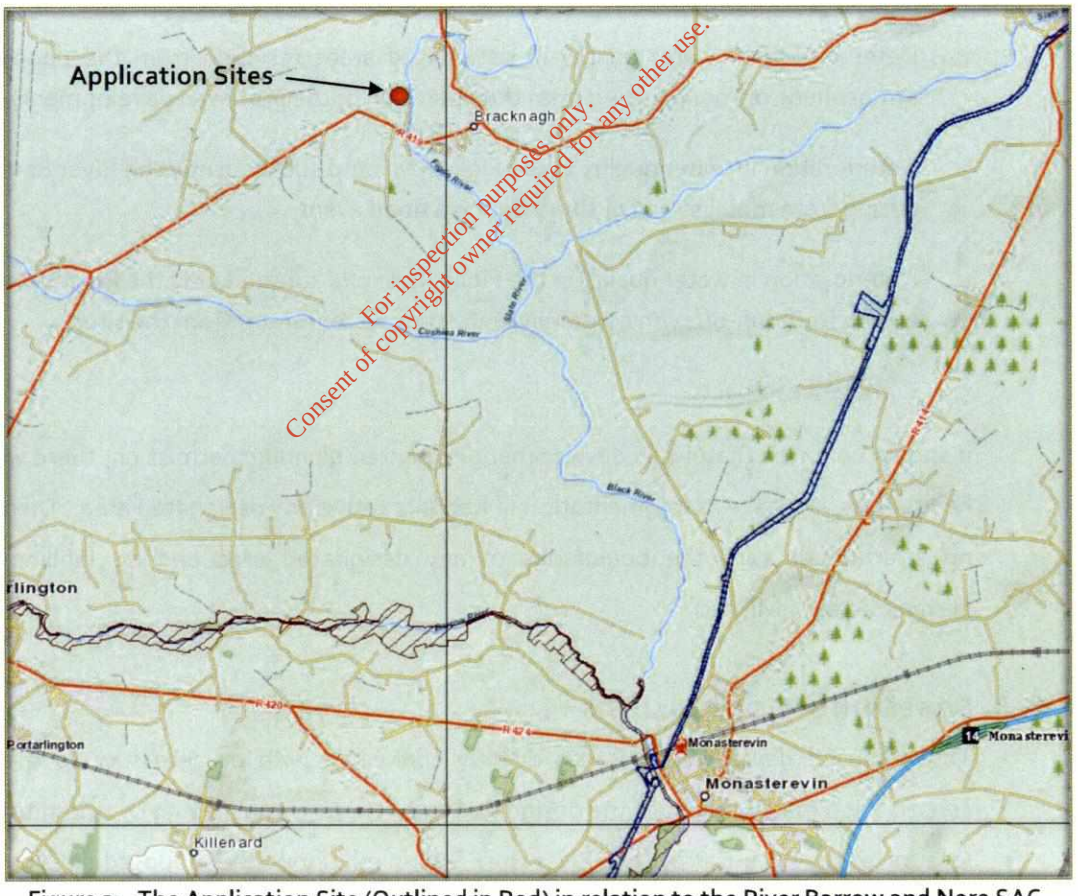

Figure 3 – The Application Site (Outlined in Red) in relation to the River Barrow and Nore SAC (Red Cross Hatching)

3.4 IDENTIFICATION OF POTENTIAL IMPACTS

The proposed upgrade of the pig farms at Ardra is within 10km of the River Barrow and River Nore SAC, therefore impacts arising from the construction and operation of this proposed development cannot be ruled out.

Only those features of the development that have the potential to affect the integrity and conservation objectives of the identified Natura sites and protected species have been considered. The following areas were examined in relation to potential impacts from the proposed development on the Natura 2000 sites identified – these potential impacts were raised by the Local Authority in their Request for Further Information regarding the proposed application:

1. Deterioration in water quality in designated areas resulting from pollution/eutrophication caused by the land-spreading of the manure produced at the site;

2. Deterioration of water quality in designated areas resulting from the deposition of atmospheric nitrogen arising from the operation of the proposed development;

3. Deterioration in water quality in the Figile River and subsequently the River Barrow SAC arising from mobilisation of slurry during a flood event;

4. Deterioration in water quality in the Figile River and subsequently the River Barrow SAC arising from run-off with contaminated storm-water run-off from the site;

5. Cumulative impacts.

It should be noted that if this development is granted planning permission, there will be no habitat loss, landtake or fragmentation of habitats within any designated area. There will be no interference with the boundaries of any designated area and no infilling of any designated area will occur.

3.5 SCREENING CONCLUSIONS

The proposed development is not directly connected with or necessary to the nature conservation management of the designated site. Therefore, following consideration of the location of the River Barrow and River Nore SAC in relation to the proposed development at Ardra, and the potential impacts that may occur, this project must proceed to the next stage of Appropriate Assessment, namely the Natura Impact Assessment.

4 STAGE II – APPROPRIATE ASSESSMENT (NIS)

4.1 INTRODUCTION

The main objective of this stage (Stage 2, Natura Impact Statement) in the Appropriate Assessment process is to determine whether the proposed development at Ardra (either alone or in combination with other plans, programmes and projects) will result in significant adverse impacts to the integrity of the Natura 2000 site identified in the previous section with respect to the site's structure, function and/or conservation objectives. This stage also outlines the mitigation measures that should be taken in order to avoid any negative impacts of this proposed development.

In this section, the Natura 2000 site identified in the previous section will be described in greater detail in terms of their characteristics and conservation objectives.

4.2 NATURA 2000 SITES IDENTIFIED

RIVER BARROW AND RIVER NORE (SAC SITE CODE 0002162)

This site consists of most of the freshwater stretches of the Barrow/Nore River catchments. The Barrow is tidal as far upriver as Graiguenamanagh, whilst the Nore is tidal as far upriver as Inishtioge. The site also includes the extreme lower reaches of the River Suir and the entire estuarine component of Waterford Harbour extending to Creadan Head. The larger of the many tributaries include the Lerr, Aushoge, Mountain, Aughavaud, Owenass, Boherbaun and Stradbally Rivers of the Barrow and the Delour, Dinin, Erkina, Owveg, Munster, Arrigle and King's Rivers on the Nore. Both rivers rise in the Old Red Sandstone of the Slieve Bloom Mountains. They traverse limestone bedrock for a good proportion of their routes, though the middle reaches of the Barrow and many of the eastern tributaries run through Leinster Granite. A wide range of habitats associated with the rivers are included within the site, including substantial areas of woodland (deciduous, mixed), dry heath, wet grassland, swamp and marsh vegetation, salt marshes, a small dune system and intertidal sand and mud flats. Areas of improved grassland, arable land and coniferous plantations are included in the site for water quality reasons.

The site supports many Annexed habitats including the priority habitats of alluvial woodland and petrifying springs. The quality of habitat is generally good. The site also supports a number of Annex II animal species - *Salmo salar, Margaritifera margaritifera, M.m. durrovensis, Alosa fallax fallax, Austropotamobius pallipes, Petromyzon marinus, Lutra lutra, Lampetra fluviatilis and L. planeri.* Annex I Bird species include *Anser albifrons flavirostris, Falco peregrinus, Cygnus cygnus, Cygnus columbianus bewickii, Limosa lapponica, Pluvialis*

apricaria and *Alcedo atthis*. A range of rare plants and invertebrates are found in the woods along these rivers and rare plants are also associated with the saltmarsh.

The main habitat types within this SAC include:

- Tidal rivers, Estuaries, Mud flats, Sand flats, Lagoons (20%)
- Salt marshes, Salt pastures, Salt steppes (1%)
- Shingle, Sea cliffs, Islets (1%)
- Inland water bodies (10%)
- Bogs, Marshes, Water fringed vegetation, Fens (10%)
- Heath, Scrub, Maquis and Garrigue, Phygrana (5%)
- Humid grassland, Mesophile grassland (17%)
- Improved grassland (15%)
- Other arable land (1%)
- Broad-leaved deciduous woodland (5%)
- Coniferous woodland (3%)
- Mixed woodland (5%)
- Inland rocks, Screes, Sands, Permanent Snow and ice (1%)
- Other land (1%)
- Coastal sand dunes, Sand beaches, Machair (1%)
- Extensive cereal cultures (4%)

The NPWS has generic conservation objectives for the River Barrow and River Nore SAC. There are described below:

Objective 1: To maintain or restore the favourable conservation condition of the Annex I habitat(s) and / or the Annex II species for which this SAC has been selected:

- *Vertigo moulinsiana*
- Freshwater pearl mussel (*Margaritifera margaritifera*)
- White-clawed crayfish (*Austropotamobius pallipes*)
- Sea lamprey (*Petromyzon marinus*)
- Brook lamprey (*Lampetra planeri*)
- River lamprey (*Lampetra fluviatilis*)
- Allis shad (*Alosa alosa*)
- Twaite shad (*Alosa fallax fallax*)
- Salmon (*Salmo salar*)
- Estuaries
- Mudflats and sandflats not covered by seawater at low tide
- Salicornia and other annuals colonizing mud and sand
- Spartina swards
- Atlantic salt meadows
- Otter (*Lutra lutra*)
- Mediterranean salt meadows

- Killarney fern (*Trichomanes speciosum*)
- Pearl mussel (*Margaritifera durrovensis*)
- Water courses of plain to montane levels with the *Ranunculion fluitantis* and Callitricho-Batrachion vegetation
- European dry heaths
- Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels
- Petrifying springs with tufa formation (Cratoneurion)
- Old sessile oak woods with Ilex and Blechnum in British Isles
- Alluvial forests with *Alnus glutinosa* and Fraxinus excelsior

Within this SAC, the favourable conservation status of a habitat is achieved when:

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

The Conservation Objectives of the Site are:

- To maintain the favourable conservation status of the Qualifying Interests (outlined above) of this SAC.
- To maintain the extent, species richness and biodiversity of the entire site.
- To establish effective liaison and co-operation with landowners, legal users and relevant authorities.

NON-RELEVANT QUALIFYING INTERESTS OF THE SITE

The River Barrow and River Nore SAC covers an extensive area of the south-east of Ireland. It passes through eight counties, therefore there are certain features within this SAC that will not be potentially impacted upon from this proposed development, either due to the distance involved or because they are features that are not sensitive to changes in water quality. These features and the reason for their exclusion are listed in Table 2.

Designated Feature	Reason for Exclusion
Allis shad (*Alosa alosa*)	It is considered that the Allis shad is an opportunistic spawner in Irish waters; and there is no evidence of an established breeding population being present in the Barrow system. It is generally considered a vagrant species (NPWS, 2013)
Desmoulin's Whirl Snail (*Vertigo moulinsiana*)	This species is found in wetlands (Swamps, marches and fens) on the verges or rivers, lakes, canals and ponds. The main threat to this species is drainage. The proposed development will not lead

	to the draining of any wetlands, therefore no impacts upon this species are predicted.
Freshwater pearl mussel (*Margaritifera margaritifera*)	The habitat of *Margaritifera margaritifera* is acid/neutral waters which flow over non-calcareous rocks (Moorkins, 1999). While it remains listed as a feature of the River Barrow and River Nore SAC, this is being reviewed as suitable conditions for this species don't occur within the lime rich Barrow / Nore catchments (NPWS, 2008, 2011)
Killarney Fern (*Trichomanes speciosum*)	This is a terrestrial species that occurs in the southern reaches of the Barrow/Nore system. No impacts upon this species are likely given the distances involved.
Nore Freshwater pearl mussel (*Margaritifera durrovensis*)	This species only occurs within the Nore system, upstream and downstream of Durrow. The proposed development will have no impacts upon this species.
Sea lamprey (*Petromyzon marinus*)	The sea lamprey is found only in the River Barrow downstream of Carlow town (King, 2006).
Twaite shad (*Alosa fallax fallax*)	This species is found only downstream of St. Mullins, in the South Co. Carlow.
Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior*	Any change in water quality will not impact upon this habitat.
Atlantic salt meadows	No impacts upon this habitat are predicted given the distances involved.
Estuaries	No impacts upon this habitat are predicted given the distances involved.
European dry heaths	Any change in water quality will not impact upon this habitat.
Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels	The distribution of this habitat type within the Barrow/Nore SAC is unknown. It is considered to occur in association with some riverside woodlands, unmanaged river islands and in narrow bands along the floodplain of slow-flowing stretches of river. This habitat requires winter inundation, which results in the deposition of nutrient-rich silt laden waters. This habitat is sensitive to changes in the hydrological regime of its associated river. The proposed development will not lead to any changes in water levels that could impact upon this habitat.
Mediterranean salt meadows	No impacts upon this habitat are predicted given the distances involved.

Mudflats and sandflats not covered by seawater at low tide	No impacts upon this habitat are predicted given the distances involved.
Old oak woodlands and dry heath	Any change in water quality will not impact upon this habitat.
Old sessile oak woods with Ilex and Blechnum in British Isles	Any change in water quality will not impact upon this habitat.
Petrifying springs with tufa formation (Cratoneurion)	Petrifying springs occur where lime-rich water emerges from below ground and deposits calcium carbonate or 'tufa' on the ground surface. Tufa appears as a whitish, crunchy coating on plants and on the ground surface. It may become consolidated into a porous rock, often forming a cascade down a hillside. There are no records of this habitat type near Clonaslee, therefore any impacts from the proposed development upon this habitat type are unlikely.
Salicornia and other annuals colonizing mud and sand	No impacts upon this habitat are predicted given the distances involved.
Spartina swards	No impacts upon this habitat are predicted given the distances involved.

Table 2 – The Qualifying Interests of the River Barrow and River Nore SAC (Non-Relevant to this Assessment

RELEVANT QUALIFYING INTERESTS OF THE SITE

Table 3 describes the qualifying interests of the River Barrow and River Nore SAC that have the potential to be impacted upon from the proposed development.

Designated Feature	Reason for Exclusion
River lamprey (*Lampetra fluviatilis*) & Brook lamprey (*Lampetra planeri*)	Although there are no official records for the river lamprey within the zone of influence of the proposed development, it is possible that may occur. Generally, it occurs in lower reaches of main channel rivers. It has been recorded from the Barrow previously (Kurz & Costello, 1999). River lamprey require clean gravels, fine sediments and free upstream migration to complete their life cycle
Salmon (*Salmo salar*)	The Atlantic salmon is known to occur within the Barrow system in the Clonaslee area. The requirements of salmon depend on their life stage but clean, unpolluted water is a requirement throughout the life cycle.

Otter (*Lutra lutra*)	The otter occurs throughout the Barrow system. The presence of this species is positively correlated with good water quality and deterioration of same will lead to impacts upon this species.
Water courses of plain to montane levels with the *Ranunculion fluitantis* and Callitricho-Batrachion vegetation	This habitat is also commonly known as floating river vegetation. It's definition is wide and *Ranunculus*, *Callitriche*, *Potamogeton* and *Myriophyllum* species are often present. Pressures on this habitat include eutrophication, overgrazing and alien species.

Table 3 – Qualifying Interests of the River Barrow and River Nore SAC that are Relevant to this Proposed Application

4.3 IDENTIFICATION AND ASSESSMENT OF POTENTIAL IMPACTS

INTRODUCTION

The identification of potential impacts and the assessment of their significance typically requires the identification of the type and magnitude of the impacts. For example, will the impacts be short term or long term, direct, indirect or cumulative and will they occur during construction or operation. This section will establish whether the impacts of the proposed development at Ardra that were identified in the previous section, are likely to occur and whether or not they are significant. These potential impacts will be examined with respect to the conservation objectives of the Natura 2000 site identified.

In the screening section of this report, the following possible impacts on the River Barrow and River Nore SAC were listed. These impacts are dealt with in greater detail below.

1. Deterioration in water quality in designated areas resulting from pollution/eutrophication caused by the land-spreading of the manure produced at the site;
2. Deterioration of water quality in designated areas resulting from the deposition of atmospheric nitrogen arising from the operation of the proposed development;
3. Deterioration in water quality in the Figile River and subsequently the River Barrow SAC arising from mobilisation of slurry during a flood event;
4. Deterioration in water quality in the Figile River and subsequently the River Barrow SAC arising from run-off with contaminated storm-water run-off from the site;
5. Cumulative impacts.

1. DETERIORATION IN WATER QUALITY IN DESIGNATED SITES ARISING FROM LAND-SPREADING OF THE MANURE

The impacts of land-spreading of the manure produced at the facility on designated sites have been considered carefully as part of this assessment. Inappropriate land-spreading of manure can lead to serious impacts upon the receiving waters in local catchments and it can result in eutrophication, algal blooms, fish kills and loss of biodiversity. Designated habitats and species can be impacted upon and it can take years for the eco-system to recover.

In reference to the request for Further Information (point a), it should be noted that the IPCC license was originally granted to Rosderra Farms in respect of their facility at Bracknagh in 2003, prior to the implementation of the Nitrates Directive in Ireland. Since the introduction of the EC Good Agricultural Practice for Protection of Waters Regulations, the legal

requirement for nutrient management planning rests with the customer farmers, and as such it is their responsibility to build in the use of organic fertiliser into their overall fertiliser plan for their own farm.

Records for the distribution of and movement of all the manure produced will be kept on site and presented to the EPA if needed. All organic fertiliser will replace the use of chemical fertiliser, therefore there will be no overall increase in the amount of nutrients, just fertiliser substitution.

All farmers that receive the manure from Rosderra Farms will do so under the European Union (Good Agricultural Practice for the Protection of Waters) Regulations 2014 (S.I. 31 of 2014). Upon the receipt of the manure, they will be informed of their obligation under this legalisation. However, these farmers are not subject to assessment/approval or otherwise under this current planning application. This matter (albeit in relation to S.I. 610 of 2010 - updated by S.I. 31 of 2014) has been referred to in previous decisions by An Bord Pléanala (PL02.240879) as follows; *"The spreading of slurry on land does not require planning permission but would also be subject to the said law. It is not normally useful or appropriate for a planning decision to attempt to regulate matters for which a separate, specific regulatory regime has been established by statute. The board is also under a general obligation to assume that a person will comply with their lawful obligations".*

The same report also highlights that *"The current application should therefore be assessed on the basis that the slurry generated in the development would be stored and disposed on in accordance with the 2010 regulations. In these circumstances it is considered that the proposed development would not cause any undue threat to the quality of ground or surface waters."*

In-combination effects arising from the operation of the existing and the proposed development have also been considered. The proposed development will not lead to an increase in the volume of slurry produced on the site, therefore in-combination effects on designated sites when considering land-spreading will be negligible.

It should be noted that records for all of the manure from this farm are submitted to the Department of Agriculture, Food and Marine on an annual basis. In-combination effects with other non-porcine agricultural activities in the area (such as beef, tillage and dairy farms) have also been considered, specifically as these activities are required to operate within the legalisation defined in S.I. 31 of 2014 regarding manure storage, minimisation of soiled water and general good agricultural practice, etc. Impacts from the allocation of

organic fertiliser will be controlled by the limit of 170kg organic N/Ha/year, which will be applicable to any farmer using pig manure from this farm as a source of fertiliser.

2. DEPOSITION OF ATMOSPHERIC NITROGEN

Following the request for Further Information and prior to the completion of this NIS, the document entitled "Nitrogen Deposition and Natura 2000, Science and Practice in Determining Environmental Impacts" by Hicks *et al.* (2011) was reviewed for information relevant to this current application.

The citation of a distance of 50 – 100km in this document would not be relevant to a development such as the one proposed in this current application. Rather, this distance would be relevant for projects where the products of combustion are released from high stack chimneys into the atmosphere where prevailing winds could carrying the products of combustion, such as ammonia, distances up to 100km.

Ireland has not yet produced any guidance documents for assessing the impacts of ammonia or nitrogen deposition on sensitive habitats. Therefore, guidance from practices in other European countries was sought from sources in Hicks *et al* (2011) and other sources referred to in this study. Many European countries have adopted approaches to assessing the threats to sensitive habitats from nitrogen deposition. These approaches include linking the designated features (habitats and species) and the empirical critical loads of these habitats for nitrogen, as well as assessments of whether a particular habitat / species is sensitive to nitrogen deposition.

Hicks at al. (2011) stresses the importance of localised impacts of nitrogen deposition, e.g., local sources of ammonia from intensive agricultural units, less than 2km from potentially affected sites. The proposed development at Bracknagh is 5.9km north of the River Barrow and River Nore SAC. In the UK, 10km and 15km are generally used as distances that require screening assessment of individual activities that are regulated under the IPPC Directive, whilst in Denmark and the Netherlands, thresholds of one and three km are used for assessment of farm activities.

Critical loads and levels are typically used for comparing threshold factors when it comes to nitrogen deposition. They serve both to identify likely significant effects to a Natura 2000 site, and to determine whether an adverse effect will occur. The principle of what is a significant effect is defined by what is *de minimis*, i.e., what is the level at which the contribution can be ignored. E.g., the <1% contribution of a critical load / level could be seen as *de minimis* have having no significant effect. In Germany, the extra nitrogen

deposition for a project or plan has been set to 10% of the critical load for the relevant habitats. In the UK, an acceptable process contribution of 20% (in combination) of the critical level / load has been used in the assessment of impacts from existing installations from intensive livestock sector (Hicks *et al.* 2011).

In the preparation of this NIS, a research poster presented at a recent conference in University College Dublin (Science and Solutions for a Sustainable Environment Conference -December 2014) was consulted for information pertaining to emissions from pig and poultry installations in Ireland and their interaction with the Natura 2000 network (Kelleghan et al., 2014). This poster is based on ongoing research in UCD regarding emissions from agriculture and their impact on designated sites.

This research has used data provided by the Central Statistics Office (2010) and the EPA in order to estimate ammonia emissions from intensive pig and poultry units on a per county basis. Using the populations of pigs as counted by the 2010 Agricultural Census and applying EPA emission factors, national NH_3 emissions for pigs were 0.39 kg/ha/year. Extrapolating this to the estimated numbers of pigs per county, a figure for the total NH_3 emissions in Co. Offaly from pig installations was generated at 1.19 – 2.64 kg/ha/year. This figure includes the existing emissions from the current operation of the Rosderra Farms at Bracknagh. The proposed application will not lead to the intensification of activities on the site, therefore total emissions for Co. Offaly will remain unchanged should this development be allowed to proceed.

The River Barrow and River Nore SAC designated habitat types relevant to the current application (based on their **likely** presence within 10km of the proposed application) include:

- Water courses of plain to montane levels with the *Ranunculion fluitantis* and Callitricho Batrachion vegetation
- Old sessile oak woods with Ilex and Blechnum in British Isles
- Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior*

There are no guidelines in Ireland for the estimation of critical loads for these habitats. Therefore, critical N loads for protected habitats were obtained from Van Dobben *et al.* (2013).

- Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation - Critical load of >34 kg N / ha / year.

- Old sessile oak woods with Ilex and Blechnum in British Isles – Nothing Specified
- Alluvial forests with Alnus glutinosa and Fraxinus excelsior - Critical load of >34 kg N / ha / year.

When considering the potential impacts of N deposition arising from the operation of the proposed development, the following criteria were taken into account:

- Slurry produced and stored on site will be either kept underground or in sealed over-ground containers. This will reduce the release of gaseous N and ammonia into the atmosphere;
- The livestock will be fed on low protein diets, which will minimise the levels of N and ammonia in the slurry;
- The proposed application is 5.9km south of the River Barrow and River Nore SAC – this distance is above what would be considered the threshold for screening (between 1km and 3km) in the Netherlands and Denmark;
- The prevailing wind in Bracknagh is from the south-west, i.e., in general atmospheric emissions from the facility will mainly be carried away from the direction of the River Nore and River Barrow SAC;
- The research poster by Kelleghan et al. (2014), has estimated that the total NH_3 emissions in Co. Offaly from pig installations is 1.19 – 2.64 kg/ha/year. The designated habitats of the River Barrow and River Nore SAC that are likely to be present within 10km of the proposed development all have critical N loads of 34kg N / ha / year. Using guidelines from Germany, where emissions from proposed developments have been set at 10% of critical loads, then the total emissions from pig farms in County Offaly are below this level (10% of the critical load for the relevant habitats is 3.4kg N / ha / year). They are also below the 20% in combination threshold set out in the UK guidelines.

In conclusion, taking the above into account it can be considered that the River Barrow and River Nore SAC will not be impacted upon by atmospheric emissions arising from the operation of the proposed development. It can also be considered that the habitats of the River Barrow and River Nore SAC have not being impacted from atmospheric depositions from past or current atmospheric emissions.

3. MOBILISATION OF SLURRY DURING A FLOOD EVENT

The proposed development, including the proposed slurry storage tanks (with 18 months capacity) is located within 70m of the Figile River. Therefore, the potential impacts arising from a major flood event on the Figile River and its downstream receptors must be considered. For the preparation of this NIS, consideration was given to the Flood Risk Assessment submitted with the EIS accompanying the current application (Appendix 19). This assessment estimated that the 1 in 100 year and 1 in 1000 year flood levels as 61.560D and 62.14m OD respectively. The levels for new structures proposed as part of the current application will be approximately 1.8m higher than existing floor levels, therefore they will be between 1.3m and 0.7m higher than the 1 in 100 year and 1 in 1000 year flood levels respectively.

Given the elevated levels of the proposed storage tanks above the estimated 1 in 100 and 1 in 1000 year flood levels, then the likelihood of the mobilisation of stored slurry during a flood event is negligible. In line with the Flood Risk Assessment report, the mobilisation of slurry during a flood event has been appropriately mitigated against by using levels and a design to ensure that mobilisation will not occur. All new structures will be re-inforced and built to Department of Agriculture, Food and Marine specifications with leak detection monitoring underneath. Therefore the risk to any designated site, in particular the River Barrow and River Nore SAC (9.3km downstream from the application site) from mobilisation of slurry during a flood event will be negligible.

4. IMPACTS FROM STORM WATER RUN-OFF

Following the request for Further Information, the storm water proposals for this currant application were consulted prior to the completion of this NIS. The measures for dealing with storm-water from the proposed development were outlined in detail in Appendix 19 of the EIA submitted with this application (as prepared by IE Consulting Engineers).

Any soiled water coming off pig-walkways etc, will be directed into the slurry storage tanks and only clean, surface water will be discharged to the storm-water system. It is proposed to manage the storm-water run-off from the proposed development via an adequately designed storm-water collection and attenuation system that has been designed in accordance with current Sustainable Drainage Guidelines and Codes of Practice and in accordance with current County Development Plan requirements.

It is proposed to collect all roof and hard-standing area runoff generated by the proposed structures into a single concrete tank (volume 784.5m3) located along the west and south

sides of the proposed facility. The tank will discharge attenuated flows to the Figile River via a drainage ditch, located to the south of the proposed structures, which flows eastwards and discharges into the Figile River. Outflow to the Figile River will be controlled by a hydrobrake fitted to a manhole located downstream of the attenuation tank. As long term storage is not being provided for the proposed development, discharges will be limited to2 l/s/ha.

Wastewater generated by staff on site during the operation of the proposed development will be directed into a holding tank (volume 48m^3). This will be transported offsite at regular intervals, via a registered contractor.

Having considered the separation of clean and slurry contaminated run-off, along with the attenuation and control measures incorporated into the design of the proposed development, and given the downstream distance between the site of the proposed development and the River Barrow and River Nore SAC (9.3km), it is highly unlikely that slurry contaminated storm-water run-off from the development will impact upon the SAC.

5. CUMULATIVE IMPACTS

Cumulative impacts or effects are changes on the environment that result from numerous human-induced, small-scale alterations. Cumulative impacts can be thought of as occurring through two main pathways: first, through persistent additions or losses of the same materials or resource, and second, through the compounding effects as a result of the coming together of two or more effects (Bowers-Marriott, 1997).

Cumulative impacts with other agricultural activities in the area (including pig, beef and dairy farms) have been considered. As these activities are required to operate within the legalisation defined in S.I. 31 of 2014 regarding manure storage, minimisation of soiled water and general good agricultural practice, etc., cumulative impacts arising from the combined operation of these activities with the operation of the pig farm at Ardra will be negligible.

Housing density in the Bracknagh area is typical of a village settlement and houses / businesses within this area are serviced by the Bracknagh agglomeration. This agglomeration operates under Waste Water Discharge Licence (WWDL A0172-01) and the discharge enters the Figile River, south of Ardra Bridge. The operation of this WWTP within its license requirements will ensure that there will be no cumulative impacts arising from this facility and the proposed application.

Houses not served by the agglomeration at Bracknagh are all serviced under private septic tanks or wastewater treatment systems. Owners of these systems are required to properly operate and maintain their systems as required under the Water Services Act, 2007 and Water Services (Amendment) Act 2012. There will be no cumulative impacts arising from the operation of the proposed development along with the operation of properly maintained septic tanks / treatment plants. Under the Water Services (Amendment) Act 2012, a nationwide programme of inspection of septic tanks has been initiated in order to identify inadequate septic tanks and treatment systems. This programme will help to reduce the impacts from inadequate septic tanks / treatment systems on local ground and surface water quality.

5 MITIGATION MEASURES

5.1 DESIGN CONCEPTS

The design concepts of the proposed development include certain best practice measures to reduce any potential risk to the surrounding environment, including emissions to surface water and air. These concepts include:

- All new structures will be constructed to Department of Agriculture, Food and Marine specifications with leak detection facilities underneath;
- The inclusion of storm-water attenuation measures – uncontaminated water from the roofs of the buildings and clean paved areas within the farm will be collected separately and discharged to the existing and / or ungraded storm water drainage system;
- Regular monitoring of all discharge points;
- The pigs will only be moved on slatted passageways with manure storage tanks underneath;
- The inclusion of flood risk mitigation measures – the levels for new structures proposed as part of the current application will be approximately 1.8m higher than existing floor levels, therefore they will be between 1.3m and 0.7m higher than the 1 in 100 year and 1 in 1000 year flood levels respectively;
- Collection tanks and concrete areas will be provided at the slurry fill points to collect any spills / leaks that may occur when manure is being collected for transport off-site;
- Pigs will be fed on an optimal low protein diet to reduce nitrogen / ammonia levels in the slurry;
- All handling of all manure on the farm and by customer farmers will be done in accordance with S.I. 31 of 2014;
- To minimise any potential ammonia emissions, the proposed design, operation and management of the farm will comply with the *Integrated Pollution Prevention and Control (IPPC) Reference Document on Best Available Techniques for Intensive Rearing of Poultry and Pigs* (July 2003) and *Best Available Techniques (BAT) Reference Document for the Intensive Rearing of Poultry and Pigs* (Draft 2, August 2013).

5.2 ADDITIONAL BEST PRACTICE MEASURES

Whilst the proposed development will have no impacts upon the integrity of any area that has been designated as a Natura 2000 site, it is usually best practice to undertake certain measures during the construction and operation of any development. These measures will help to protect the local biodiversity of the surrounding area and ensure the protection of local water quality and wildlife. Therefore it is recommended that the following measures are implemented:

CONSTRUCTION

- Site preparation and construction should adhere to best practice and should conform to the Inland Fisheries Ireland Requirements for the Protection of Fisheries Habitats during Construction and Development Works and River Sites (www.fisheriesireland.ie).

- It is vital that there is no deterioration in water quality in the watercourses in the vicinity of the development, in particular the Figile River. This will protect habitats, fish species and mammal species (such as the otter) that are sensitive to pollution. Therefore, strict controls of erosion, sediment generation and other pollutants associated with the demolition and construction process must be implemented, including the provision of attenuation measures, silt traps or geotextile curtains to reduce and intercept sediment release into any local watercourses. The protection of water quality in this area is of upmost importance.

- There should be no discharges of contaminated waters to ground or surface waters from these developments. Post construction surface water run-off from hardcore / concreted / tarmacadum areas should be directed into a soak-pit. If soak-pit disposal is not viable or practical, then surface water run-off from these areas should be treated via serviced sediment and oil interceptor traps, prior to discharge into any watercourse.

- The existing structures at Ardra that are to be retained should be surveyed and checked to make sure that they sufficiently sound and will not result in the release of effluent and slurry.

- There must be no disturbance to the banks or riparian habitats along the Figile River.

- Fuels, oils, greases and hydraulic fluids must be stored in bunded compounds well away from watercourses. Refuelling of machinery, etc., should be carried out in bunded areas.

- Any bulk fuel storage tank should be properly bunded with a bund capacity of at least 110% of that of the fuel tank.

- Stockpile areas for sands and gravel should be kept to a minimum size, well away from the drains and watercourses.

- The principles of Sustainable Urban Drainage Systems (SUDS) should be adhered to on site at all phases of construction and operation.

- The applicant must ensure that any excavated soil is used / disposed of responsibly. Its disposal should not lead to the loss or damage of any natural or semi-natural habitats elsewhere. It should not be spread close to any local watercourse as it may result in an increase in the sediment load of that watercourse.

- A Construction Management Plan for the construction and demolition works at the proposed development site should be prepared. Details on how proposed mitigation measures will be implemented should be detailed as part of this plan.

- An emergency response plan should also be prepared and approved prior to any construction. This will ensure that should any spill occur into Figile River, that a cohesive and fast response will ensue in order to limit damage.

- Should this development receive consent, then contractors should be made aware of the ecological sensitivity of the water receptors prior to the commencement of any works.

- All works associated with the development should be confined to the proposed development site.

- All waste associated with the development should be disposed of in an environmentally friendly manner. Registered contractors should only be used.

- Any landscaping should involve the planting of native Irish species that are indigenous to the site. The characteristics of newly planted hedgerows should mimic those in the surrounding area.

OPERATION

- The storage and handling of all wastes and fertilisers on site must be in accordance with S.I. 31 of 2014.

- Details of the storage and management of any feed stuffs on site should be provided. They must be stored away from any drains and watercourses and handling should also take into account their potential to act as a pollutant in watercourses.

- All employees of the facilities should be aware of the sensitivity of the drains and streams in the locality.

LAND-SPREADING

In order to avoid any reductions in water quality within the River Barrow catchment as a whole, all organic fertiliser should be allocated for use in accordance with S.I. 31 of 2014 European Communities (Good Agricultural Practice for Protection of Waters) Regulations, 2014). The following measures may be considered and should be advised to the customer farmers.

- Slurry should only be applied to fields with an N and P requirement.

- Fields *within* any area that has been designated as an SAC, SPA or NHA should be excluded from land-spreading.

- A minimum buffer zone of 20m should be put in place and adhered to for areas which are *adjacent* to any area that has been designated as an SAC, SPA or NHA. These buffer zones should be increased depending on the gradient of the land.

- To avoid contamination of the local watercourses in areas identified for land-spreading, a minimum buffer zone of 10m for any main river channels and 5m for smaller watercourses should be adhered to at all times during the application of effluent. Buffer zones should be increased depending on the gradient of the land. In addition, when the waterbody is with 1km upstream of a water dependent designated site the buffer for a river should be increased to 20m while a stream should be increased to 10m.

- Effluent should not be applied with within 3m of open field drains or ditches in accordance with Good Agricultural Practice for Protection of Water 2014 SI 31 of 2014.

- Land spreading should only take place when suitable climatic and environmental conditions exist. Spreading must be avoided on:

  - wet or waterlogged soils

  - land sloping steeply towards water courses

  - frozen or snow covered soils

- Effluent should not be applied in proximity of hedgerows and field margins. This will maintain the biodiversity of these areas and allow for a more natural ecological corridor.

- New technologies for spreading slurry that improve efficiency and minimize emissions should be considered, e.g., bandspreader, trailing shoe and the shallow injection technique.

- All spreading of organic fertiliser arising from the development must be in accordance with the European Communities (Good Agricultural Practice for Protection of Waters) Regulations, 2014).

6 FINDING OF NO SIGNIFICANT EFFECTS

Finding of No Significant Effects Report Matrix	
Name of project	Proposed Upgrade of a Pig Farm at Ardra, Bracknagh, Co. Offaly.
Name and location of Natura 2000 site	The River Barrow and Nore SAC is the closest site and is situated 5.9km south of the proposed development site.
Description of project	Upgrade of an existing agricultural facility which operates under License.
Is the project directly connected with or necessary to the management of the site?	No
Are there other projects or plans that together with project being assessed could affect the site?	Cumulative Impacts are discussed.
The Assessment of Significance of Effects	
Describe how the project is likely to affect the Natura 2000 site	Impacts from land-spreading, nitrogen deposition, pollution from storm water run-off and pollution during flood events.
Explain why these effects are not considered significant	Distance, design and mitigation will ensure that no impacts arise.
Describe how the project is likely to affect species designated under Annex II of the Habitats Directive.	If the mitigation measures outlined in Section 5 are attached to any grant of planning permission, then any direct, indirect or cumulative impacts upon these species will be negligible.
Data Collected to Carry out the Assessment	
Who carried out the assessment	Noreen McLoughlin, MSC, MCIEEM. Consultant Ecologist
Sources of data	NPWS, EPA, National Biodiversity Data Centre, Offaly County Council
Level of assessment completed	Stage2 Appropriate Assessment (NIS)
Where can the full results of the assessment be accessed and viewed	Full results included

APPENDIX I-NPWS SITE SYNOPSIS

Site Name: River Barrow and River Nore SAC

Site Code: 002162

This site consists of the freshwater stretches of the Barrow and Nore River catchments as far upstream as the Slieve Bloom Mountains, and it also includes the tidal elements and estuary as far downstream as Creadun Head in Waterford. The site passes through eight counties – Offaly, Kildare, Laois, Carlow, Kilkenny, Tipperary, Wexford and Waterford. Major towns along the edge of the site include Mountmellick, Portarlington, Monasterevin, Stradbally, Athy, Carlow, Leighlinbridge, Graiguenamanagh, New Ross, In istioge, Thomastown, Callan, Bennettsbridge, Kilkenny and Durrow. The larger of the many tributaries include the Lerr, Fushoge, Mountain, Aughavaud, Owenass, Boherbaun and Stradbally Rivers of the Barrow, and the Delour, Dinin, Erkina, Owveg, Munster, Arrigle and King's Rivers on the Nore.

Both rivers rise in the Old Red Sandstone of the Slieve Bloom Mountains before passing through a band of Carboniferous shales and sandstones. The Nore, for a large part of its course, traverses limestone plains and then Old Red Sandstone for a short stretch below Thomastown. Before joining the Barrow it runs over intrusive rocks poor in silica. The upper reaches of the Barrow also run through limestone. The middle reaches and many of the eastern tributaries, sourced in the Blackstairs Mountains, run through Leinster Granite. The southern end, like the Nore runs over intrusive rocks poor in silica. Waterford Harbour is a deep valley excavated by glacial floodwaters when the sea level was lower than today. The coast shelves quite rapidly along much of the shore.

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):

- [1130] Estuaries
- [1140] Tidal Mudflats and Sandflats
- [1310] Salicornia Mud
- [1330] Atlantic Salt Meadows
- [1410] Mediterranean Salt Meadows
- [3260] Floating River Vegetation
- [4030] Dry Heath
- [6430] Hydrophilous Tall Herb Communities
- [7220] Petrifying Springs*

- [91A0] Old Oak Woodlands
- [91E0] Alluvial Forests*
- [1016] Desmoulin's Whorl Snail (*Vertigo moulinsiana*)
- [1029] Freshwater Pearl Mussel (*Margaritifera margaritifera*)
- [1092] White - clawed Crayfish (*Austropotamobius pallipes*)
- [1095] Sea Lamprey (*Petromyzon marinus*)
- [1096] Brook Lamprey (*Lampetra planeri*)
- [1099] River Lamprey (*Lampetra fluviatilis*)
- [1103] Twaite Shad (*Alosa fallax*)
- [1106] Atlantic Salmon (*Salmo salar*)
- [1355] Otter (*Lutra lutra*)
- [1421] Killarney Fern (*Trichomanes speciosum*)
- [1990] Nore Freshwater Pearl Mussel (*Margaritifera durrovensis*)

Good examples of alluvial forest (a priority habitat on Annex I of the E.U. Habitats Directive) are seen at Rathsnagadan, Murphy's of the River, in Abbeyleix estate and along other shorter stretches of both the tidal and freshwater elements of the site. Typical species seen include Almond Willow (*Salix triandra*), White Willow (*S. alba*), Rusty Willow (*S. cinerea subsp. oleifolia*), Crack Willow (*S. fragilis*) and Osier (*S. viminalis*), along with Iris (*Iris pseudacorus*), Hemlock Water - dropwort (*Oenanthe crocata*), Wild Angelica (*Angelica sylvestris*), Thin - spiked Wood - sedge (*Carex strigosa*), Pendulous Sedge (*C. pendula*), Meadowsweet (*Filipendula ulmaria*), Common Valerian (*Valeriana officinalis*) and the Red Data Book species Nettle - leaved Bellflower (*Campanula trachelium*).

A good example of petrifying springs with tufa formations occurs at Dysart Wood along the Nore. This is a rare habitat in Ireland and one listed with priority status on Annex I of the E.U. Habitats Directive. These hard water springs are characterised by lime encrustations, often associated with small waterfalls. A rich bryophyte flora is typical of the habitat and two diagnostic species, *Cratoneuron commutatum var . commutatum* and *Eucladium verticillatum* , have been recorded.

The best examples of old oak woodlands are seen in the ancient Park Hill woodland in the estate at Abbeyleix; at Kyleadohir, on the Delour, Forest Wood House, Kylecorragh and Brownstown Woods on the Nore; and at Cloghristic Wood , Drummond Wood and Borris Demesne on the Barrow, though other patches occur throughout the site. Abbeyleix Woods is a large tract of mixed deciduous woodland which is one of the only remaining true ancient woodlands in Ireland. Historical records show that Park Hill has been continuously wooded since the 16th century and has the most complete written record of any woodland in the country. It supports a variety of woodland habitats and an exceptional diversity of species

including 22 native trees, 44 bryophytes and 92 lichens. It also contains eight indicator species of ancient woodlands. Park Hill is also the site of two rare plants, Nettle - leaved Bellflower and the moss *Leucodon sciuroides*. The rare Myxomycete fungus, *Licea minima* has been recorded from woodland at Abbeyleix.

Oak woodland covers parts of the valley side south of Woodstock and is well developed at Brownsford where the Nore takes several sharp bends. The steep valley side is covered by oak (*Quercus* spp.), Holly (*Ilex aquifolium*) , Hazel (*Corylus avellana*) and Downy Birch (*Betula pubescens*) , with some Beech (*Fagus sylvatica*) and Ash (*Fraxinus excelsior*) . All the trees are regenerating through a cover of Bramble (*Rubus fruticosus agg.*) , Foxglove (*Digitalis purpurea*) , Great Wood - rush (*Luzula sylvatica*) and Broad Buckler - fern (*Dryopteris dilatata*) .

On the steeply sloping banks of the River Nore, about 5 km west of New Ross, in Co. Kilkenny, Kylecorragh Woods form a prominent feature in the landscape. This is an excellent example of a relatively undisturbed, relict o ak woodland with a very good tree canopy. The wood is quite damp and there is a rich and varied ground flora. At Brownstown a small, mature oak dominated woodland occurs on a steep slope. There is younger woodland to the north and east of it. Regeneration throughout is evident. The understorey is similar to the woods at Brownsford. The ground flora of this woodland is developed on acidic, brown earth type soil and comprises a thick carpet of Bilberry (*Vaccinium myrtillus*) , Heather (*Calluna vulgaris*) , Hard Fern (*Blechnum spicant*) , Common Cow - wheat (*Melampyrum pratense*) and Bracken (*Pteridium aquilinum*) .

Borris Demesne contains a very good example of a semi - natural broad leaved woodland in very good condition. There is quite a high degree of natural re - generation of oak and Ash through the woodland. At the northern end of the estate oak species predominate. Drummond Wood, also on the Barrow, consists of three blocks of deciduous woods situated on steep slopes above the river. The deciduous trees are mostly oak species. The woods have a well established understorey of Holly, and the herb layer is varied, with Bramble abundant. The whitebeam *Sorbus devoniensis* has also been recorded here.

Eutrophic tall herb vegetation occurs in association with the various areas of alluvial forest and elsewhere where the flood plain of the river is intact. Characteristic species of the habitat include Meadowsweet , Purple Loosestrife (*Lythrum salicaria*), Marsh Ragwort (*Senecio aquaticus*), Ground Ivy (*Glechoma hederacea*) and Hedge Bindweed (*Calystegia sepium*). Indian Balsam (*Impatiens glandulifera*), an introduced and invasive species, is abundant in places.

Floating river vegetation is well represented in the Barrow and in the many tributaries of the site. In the Barrow the species found include water - starworts (*Callitriche* spp.), Canadian Pondweed (*Elodea canadensis*) , Bulbous Rush (*Juncus bulbosus*) , water - milfoils (*Myriophyllum* spp.), the pondweed *Potamogeton x nitens*, Broad - leaved Pondweed (*P. natans*) , Fennel Pondweed (*P. pectinatus*) , Perfoliated Pondweed *(P. perfoliatus*) and crowfoots (*Ranunculus* spp.). The water quality of the Barrow has improved since the vegetation survey was carried out (EPA, 1996).

Dry heath at the site occurs in pockets along the steep valley sides of the rivers especially in the Barrow Valley and along the Barrow tributaries where they occur in the foothills of the Blackstairs Mountains. The dry heath vegetation along the slopes of the river bank consists of Bracken and Gorse (*Ulex europaeus*) with patches of acidic grassland vegetation. Additional typical species include Heath Bedstraw (*Galium saxatile*) , Foxglove , Common Sorrel (*Rumex acetosa*) and Creeping Bent (*Agrostis stolonifera*) . On the steep slopes above New Ross the Red Data Book species Greater Broomrape (*Orobanche rapum - genistae*) has been recorded. Where rocky outcrops are shown on the maps Bilberry and Great Wood - rush are present. At Ballyhack a small area of dry heath is interspersed with patches of lowland dry grassland. These support a number of clover species, including the legally protected Clustered Clover (*Trifolium glomeratum*) - a species known from only one other site in Ireland. This grassland community is especially well developed on the west side of the mud - capped walls by the road. On the east of the cliffs a group of rock - dwelling species occur, i.e. English Stonecrop (*Sedum anglicum*), Sheep's - bit (*Jasione montana*) and Wild Madder (*Rubia peregrina*). These rocks also support good lichen and moss assemblages with *Ramalina subfarinacea* and *Hedwigia ciliata* .

Dry heath at the site generally grades into wet woodland or wet swamp vegetation lower down the slopes on the river bank. Close to the Blackstairs Mountains, in the foothills associated with the Aughnabrisky, Aughavaud and Mountain Rivers there are small patches of wet heath dominated by Purple Moor - grass (*Molinia caerulea*) with Heather, Tormentil (*Potentilla erecta*) , Carnation Sedge (*Carex panicea*) and Bell Heather (*Erica cinerea*) .

Salt meadows occur at the southern section of the site in old meadows where the embankment has been breached, along the tidal stretches of in - flowing rivers below Stokestown House, in a narrow band on the channel side of Common Reed (*Phragmites australis*) beds and in narrow fragmented strips along the open shoreline. In the larger areas of salt meadow, notably at Carrickcloney, Ballinlaw Ferry and Rochestown on the west bank; Fisherstown, Alderton and Great Island to Dunbrody on the east bank, the Atlantic

and Mediterranean sub types are generally intermixed. At the upper edge of the salt meadow in the narrow ecotonal areas bordering the grasslands where there is significant percolation of salt water, the legally protected species Borrer's Saltmarsh - grass (*Puccinellia fasciculata*) and Meadow Barley (*Hordeum secalinum*) are found. The very rare and also legally protected Divided Sedge (*Carex divisa*) is also found. Sea Rush (*Juncus maritimus*) is also present. Other plants recorded and associated with salt meadows include Sea Aster (*Aster tripolium*), Thrift (*Armeria maritima*), Sea Couch (*Elymus pycnanthus*), Spear - leaved Orache (*Atriplex prostrata*), Lesser Sea-spurrey (*Spergularia marina*), Sea Arrowgrass (*Triglochin maritima*) and Sea Plantain (*Plantago maritima*).

Glassworts (*Salicornia* spp.) and other annuals colonising mud and sand are found in the creeks of the saltmarshes and at the seaward edges of them. The habitat also occurs in small amounts on some stretches of the shore free of stones. The estuary and the other E.U. Habitats Directive Annex I habitats within it form a large component of the site. Extensive areas of intertidal flats, comprised of substrates ranging from fine, silty mud to coarse sand with pebbles/stones are present. Good quality intertidal sand and mudflats have developed on a linear shelf on the western side of Waterford Harbour, extending for over 6 km from north to south between Passage East and Creadaun Head, and in places are over 1 km wide. The sediments are mostly firm sands, though grade into muddy sands towards the upper shore. They have a typical macro - invertebrate fauna, characterised by polychaetes and bivalves. Common species include *Arenicola marina* , *Nephtys hombergii* , *Scoloplos armiger* , *Lanice conchilega* and *Cerastoderma edule* .

The western shore of the harbour is generally stony and backed by low cliffs of glacial drift. At Woodstown there is a sandy beach, now much influenced by recreation pressure and erosion. Behind it a lagoonal marsh has been impounded which runs westwards from Gaultiere Lodge along the course of a slow stream. An extensive reedbed occurs here. At the edges is a tall fen dominated by sedges (*Carex* spp.), Meadowsweet, willowherbs (*Epilobium* spp.) and rushes (*Juncus* spp.). Wet woodland also occurs.

The dunes which fringe the strand at Duncannon are dominated by Marram (*Ammophila arenaria*) towards the sea. Other species present include Wild Clary/ Sage (*Salvia verbenaca*), a rare Red Data Book species. The rocks around Duncannon ford have a rich flora of seaweeds typical of a moderately exposed shore and the cliffs themselves support a number of coastal species on ledges, including Thrift ,Rock Samphire (*Crithmum maritimum*) and Buck's - horn Plantain (*Plantago coronopus*).

Other habitats which occur throughout the site include wet grassland, marsh, reed swamp, improved grassland, arable land, quarries, coniferous plantations, deciduous woodland, scrub and ponds.

Seventeen Red Data Book plant species have been recorded within the site, most in the recent past. These are Killarney Fern (*Trichomanes speciosum*), Divided Sedge , Clustered Clover , Basil Thyme (*Acinos arvensis*) , Red Hemp - nettle (*Galeopsis angustifolia*) , Borrer's Saltmarsh - grass , Meadow Barley , Opposite - leaved Pondweed (*Groenlandia densa*) , Meadow Saffron/Autumn Crocus (*Colchicum autumnale*) , Wild Clary/ Sage , Nettle - leaved Bellflower , Saw - wort (*Serratula tinctoria*) , Bird Cherry (*Prunus padus*) , Blue Fleabane (*Erigeron acer*) , Fly Orchid (*Ophrys insectifera*), Ivy Broomrape (*Orobanche hederae*) and Greater Broomrape. Of these, the first nine are protected under the Flora Protection) Order , 1999. Divided Sedge was thought to be extinct but has been found in a few locations in the site since 1990. In addition plants which do not have a very wide distribution in the country are found in the site including Thin - spiked Wood - sedge , Field Garlic (*Allium oleraceum*) and Summer Snowflake . Six rare lichens, indicators of ancient woodland, are found including *Lobaria laetevirens* and *L. pulmonaria*. The rare moss *Leucodon sciuroides* also occurs.

The site is very important for the presence of a number of E. U. Habitats Directive Annex II animal species including Freshwater Pearl Mussel (both *Margaritifera margaritifera* and M. *m. durrovensis*), White - clawed Crayfish, Salmon, Twaite Shad, three lamprey species – Sea Lamprey , Brook Lamprey and River Lamprey , the tiny whorl snail *Vertigo moulinsiana* and Otter . This is the only site in the world for the hard water form of the Freshwater Pearl Mussel , *M. m. durrovensis* , and one of only a handful of spawning grounds in the country for Twaite Shad. The freshwater stretches of the River Nore main channel is a designated salmonid river. The Barrow / Nore is mainly a grilse fishery though spring salmon fishing is good in the vicinity of Thomastown and Inistioge on the Nore. The upper stretches of the Barrow and Nore, particularly the Owenass River, are very important for spawning.

The site supports many other important animal species. Those which are listed in the Irish Red Data Book include Daubenton's Bat , Badger, Irish Hare and Common Frog . The rare Red Data Book fish species Smelt (*Osmerus eperlanus*) occurs in estuarine stretches of the site. In addition to the Freshwater Pearl Mussel, the site also supports two other freshwater mussel species, *Anodonta anatina* and *A. cygnea* .

Three rare invertebrates have been recorded in alluvial woodland at Murphy's of the River. These are: *Neoascia obliqua* (Order Diptera: Syrphidae), *Tetanocera freyi* (Order Diptera:

Sciomyzidae) and *Dictya umbrarum* (Order Diptera: Sciomyzidae). The rare invertebrate, *Mitostoma chrysomelas* (Order Arachnida) , occurs in the old oak woodland at Abbeyleix and only two other sites in the country. Two flies (Order Diptera) *Chrysogaster virescens* and *Hybomitra muhlfeldi* also occur at this woodland.

The site is of ornithological importance for a number of E.U. Birds Directive Annex I species , including Greenland White - fronted Goose, Whooper Swan, Bewick's Swan, Bar - tailed Godwit, Peregrine and Kingfisher. Nationally important numbers of Golden Plover and Bar - tailed Godwit are found during the winter. Wintering flocks of migratory birds are seen in Shanahoe Marsh and the Curragh and Goul Marsh, both in Co. Laois , and also along the Barrow Estuary in Waterford Harbour. There is also an extensive autumnal roosting site in the reedbeds of the Barrow Estuary used by Swallows before they leave the country. The old oak woodland at Abbeyleix has a typical bird fauna including Jay, Long - eared Owl and Raven. The reedbed at Woodstow n supports populations of typical waterbirds including Mallard, Snipe, Sedge Warbler and Water Rail.

Land use at the site consists mainly of agricultural activities – mostly intensive in nature and principally grazing and silage production. Slurry is spread over much of the area. Arable crops are also grown. The spreading of slurry and fertiliser poses a threat to the water quality of the salmonid river and to the populations of E.U. Habitats Directive Annex II animal species within the site. Many of the woodlands along the rivers belong to old estates and support many non - native species. Little active woodland management occurs. Fishing is a main tourist attraction along stretches of the main rivers and their tributaries and there are a number of Angler Associations, some with a number of beats. Fishing stands and styles have been erected in places. Both commercial and leisure fishing takes place on the rivers. There is net fishing in the estuary and a mussel bed also. Other recreational activities such as boating, golfing and walking, particularly along the Barrow towpath , are also popular. There is a golf course on the banks of the Nore at Mount Juliet and GAA pitches on the banks at Inistioge and Thomastown. There are active and disused sand and gravel pits throughout the site. Several industrial developments, which discharge into the river, border the site. New Ross is an important shipping port. Shipping to and from Waterford and Belview ports also passes through the estuary. The main threats to the site and current damaging activities include high inputs of nutrients into the river system from agricultural run - off and several sewage plants, over - grazing within the woodland areas, and invasion by non - native species, for example Cherry Laurel (*Prunus laurocerasus*) and Rhododendron (*Rhododendron ponticum*). The water quality of the site remains vulnerable. Good quality water is necessary to maintain the populations of the Annex II animal species listed above.

Good quality is dependent on controlling fertilisation of the grasslands, particularly along the Nore. It also requires that sewage be properly treated before discharge. Drainage activities in the catchment can lead to flash floods which can damage the many Annex II species present. Capital and maintenance dredging within the lower reaches of the system pose a threat to migrating fish species such as lamprey and shad. Land reclamation also poses a threat to the salt meadows and the populations of legally protected species therein. Overall, the site is of considerable conservation significance for the occurrence of good examples of habitats and of populations of plant and animal species that are listed on Annexes I and II of the E.U. Habitats Directive. Furthermore it is of high conservation value for the populations of bird species that use it. The occurrence of several Red Data Book plant species including three rare plants in the salt meadows and the population of the hard water form of the Freshwater Pearl Mussel , which is limited to a 10 km stretch of the Nore, add further interest to this site.

APPPENDIX II - REFERENCES AND FURTHER READING

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