



GIL Power Generation Kilkenny

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Stage 2 Appropriate Assessment – Natura Impact Statement

October 2012

Greener Ideas Limited (GIL)

Mott MacDonald

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Content

Chapter	Title	Page
Executive Summary		i
1.	Introduction	1
1.1	Background	1
1.2	Findings of the Stage 1 Screening for Appropriate Assessment	1
1.3	Scope of the Stage 2 Appropriate Assessment	2
1.4	Methodology	3
1.5	Report Structure	3
2.	GIL Power Plant	5
2.1	Description of the Development	5
3.	Natura 2000 Sites	9
3.1	The River Barrow and River Nore SAC (*002162)*	9
3.1.1	Qualifying features	9
3.2	The River Nore SPA (004233)	10
3.2.1	Qualifying features	10
4.	Conservation Objectives	11
4.1	The River Barrow and River Nore SAC	11
4.1.1	Sensitivities and Conservation Status of the Qualifying Features	12
4.2	The River Nore SPA	14
4.2.1	Sensitivities and Conservation Status of the Kingfisher	15
5.	Impact Prediction	16
5.1	Introduction	16
5.2	Ecological Surveys	16
5.2.1	Flora and Fauna	16
5.3	Potential Impacts on the Natura 2000 Sites	19
5.3.1	In-Combination Effects	24
6.	Mitigation Measures	26
7.	Conclusions	27
8.	References	28
Appendix A.	Consultation Response from NPWS	29
Appendix B.	Ecological Survey Report	30

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Acronyms and Abbreviations

AA	Appropriate Assessment
CO	Carbon Monoxide
CO2	Carbon Dioxide
GIL	Greener Ideas Limited
HPC	High Pressure Compressor
HPT	High Pressure Turbine
HRA	Habitats Regulation Assessment
IPT	Intermediate Pressure Turbine
LCPD	Large Combustion Plant Directive
LPC	Low Pressure Compressor
NOx	Nitrogen Oxide
OCGT	Open Cycle Gas Turbine
SAC	Special Area of Conservation
SPA	Special Protection Area
SO2	Sulphur Dioxide
ZoI	Zone of Influence

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Executive Summary

Greener Ideas Limited (GIL) proposed the development of an Open Cycle Gas Turbine (OCGT) power plant in Purcellsinch, 3 kilometres east of Kilkenny city centre.

The proposed development site is located approximately 90m from the River Pococke and 140m from the River Nore, both part of The River Barrow and River Nore Special Area of Conservation (Site Code 002162). The River Nore also constitutes a Special Protection Area (SPA), (Site Code 0042330).

A Stage 1 Screening Assessment was conducted in accordance with Council Directive 92/43/EEC for the proposed development which concluded that it was uncertain if there would be significant effects on the qualifying features of the River Barrow and River Nore SAC or the River Nore SPA are likely from the proposed development.

As such, a Stage 2 Appropriate Assessment was undertaken. The conservation objectives of the Natura 2000 sites likely to be impacted upon by the proposed development (from construction through to operation and finally to decommissioning) were considered.

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The qualifying features of the Natura 2000 sites considered in terms of their potential to be impacted by:

- Deterioration in air quality due to emissions from the proposed facility;
- Disturbance by increases in noise levels, use of lighting and traffic movements;
- Habitat degradation / destruction during upgrade of pumphouse;
- Changes to the hydrology of the River Nore as a result of the proposed abstraction; and
- Water pollution of the River Nore.

When considering the potential impacts on the qualifying features, regard was had to the environmental impact mitigation which is inherent to the design of the proposed facility. The facility has been designed such that environmental impacts resulting from its operation are eliminated / reduced.

There is potential for environmental impact during the construction and decommissioning of the facility. An outline Construction Environmental Management Plan has been developed which aims to protect the environment when constructing the works. Similarly a Decommissioning Plan will be developed, in consultation with the Environmental Protection Agency (EPA), as the facility approaches the end of its operational life.

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The potential impact of localised refurbishment and vegetation clearance works in the River Nore, as may be necessary during the pumphouse upgrade, have the potential to impact on fish and macrophytes. Mitigation for the control of such pollution is provided.

It is considered that the potential adverse effects on the integrity of the Natura 2000 sites will be excluded through the implementation of the mitigation prescribed and that no further stage in the appropriate Assessment process is necessary.

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1. Introduction

1.1 Background

This Natura Impact Statement is provided in support of the new (2012) planning application to Kilkenny County Council for the proposed construction, by Greener Ideas Limited (GIL), of an Open Cycle Gas Turbine (OCGT) power plant in Purcellsinch, Kilkenny.

The site of the proposed plant occupies an area of approximately 1.35 hectares on a greenfield site, currently in agricultural use, and is situated 3 kilometres east of Kilkenny city centre in the townland of Purcellsinch. The surrounding land use is mixed agricultural and industrial with the site bounded by the IDA Business and Technology Park to the north, the Purcellsinch Wastewater Treatment Plant (WWTP) to the west and agricultural pastureland to the east and south. In addition, there is a saw mill located to the south of the site and a transport company located to the east. There is also one residential property immediately to the south of the site (on the opposite side of the Sion Road).

An existing pumphouse building with existing river abstraction facilities from the Pococke River is part of the proposed development. It is proposed that river water will be used, in combination with 'grey' water from the Purcellsinch Wastewater Treatment Plant to service the power plant. Grey water in the context of this project means wastewater which has passed through all the stages of treatment in the wastewater treatment plant and which is of a quality suitable for discharge directly to the River Nore. The pumphouse is located approximately 130 metres to the west of the main development site and has an area of approximately 0.2 hectares.

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The proposed development site is located approximately 90m from the River Pococke and 140m from the River Nore, both part of The River Barrow and River Nore Special Area of Conservation (SAC) (Site Code 002162). The River Nore also constitutes a Special Protection Area (SPA), (Site Code 0042330). These designated conservation sites are illustrated on both in Figure 1 *Designated Ecological Sites in Proximity of Development* and Figure 2 *Designated Conservation Sites* (in 15km radius).

The River Barrow and River Nore SAC is important for the presence of several Annex I habitats and Annex II species listed under the EU Habitats Directive (92/43/EEC as amended). Qualifying features include the habitats: alluvial wet woodlands, petrifying springs, old oak woodlands, floating river vegetation, estuary, tidal mudflats, *Salicornia* mudflats, Atlantic salt meadows, Mediterranean salt meadows, dry heath and eutrophic tall herbs. The site is designated also for the presence of the following species: sea lamprey *Petromyzon marinus*, river lamprey *Lampetra fluviatilis*, brook lamprey *Lampetra planeri*, freshwater pearl mussel *Margaritifera margaritifera*, Nore freshwater pearl mussel *Margaritifera durrovensis*, white-clawed crayfish *Austropotamobius pallipes* , Twaite and Allis shad *Alosa fallax* and *Alosa alosa* respectively, Atlantic salmon *Salmo salar*, otter *Lutra lutra*, Desmoulin's whorl snail, *Vertigo moulinsiana* and the plant Killarney fern *Trichomanes speciosum*.

The River Nore SPA is designated under the EU Birds Directive (79/409/EEC as amended) for the presence of Kingfisher *Alcedo Atthis.*

1.2 Findings of the Stage 1 Screening for Appropriate Assessment

The Stage 1 Screening for Appropriate Assessment found that significant environmental effects were not expected on a number of the qualifying features of the River Barrow and River Nore SAC or on the River Nore SPA. These finding was based on consideration of the following:

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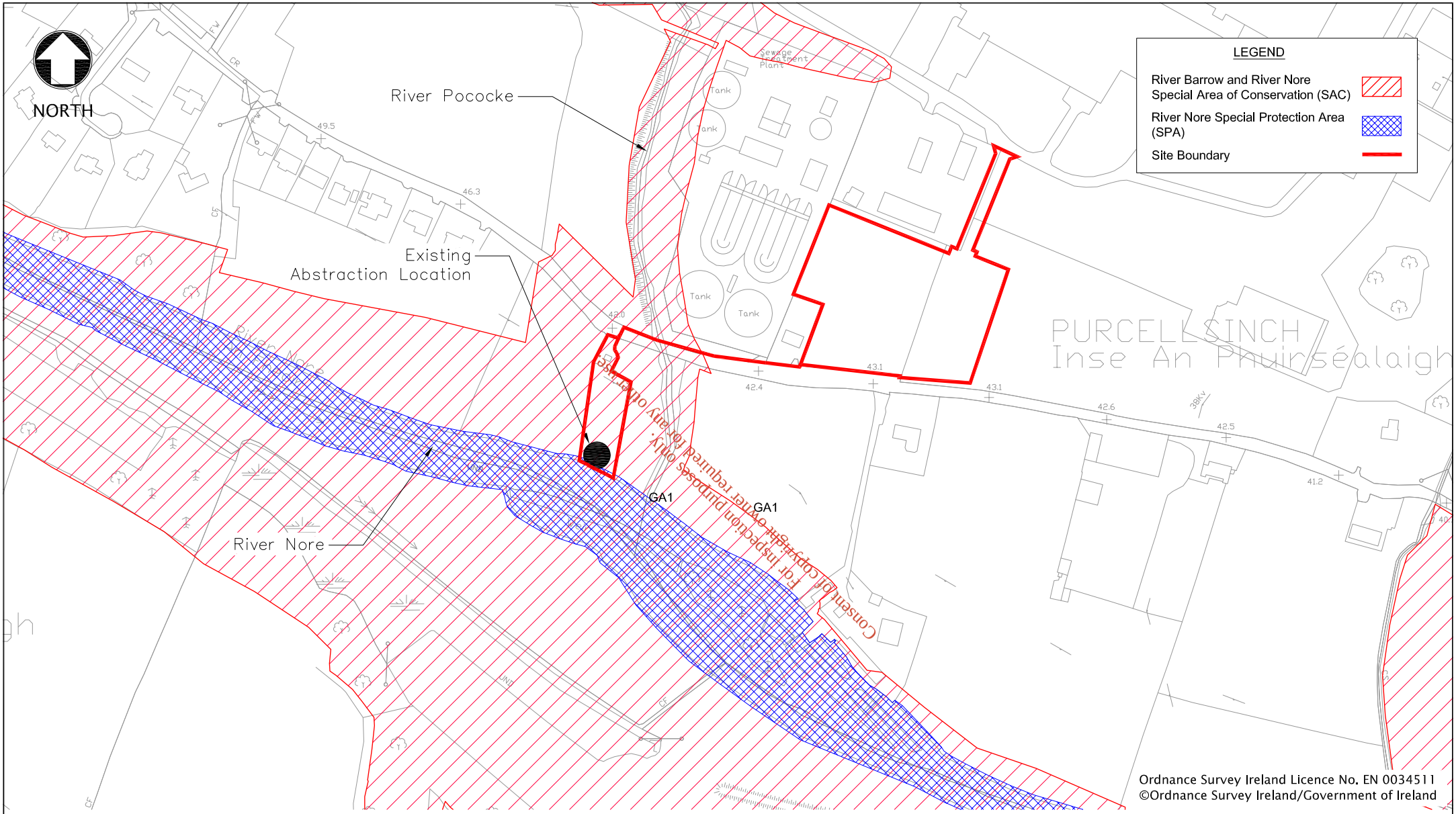

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Client
GIL POWER GENERATION PROJECT
KILKENNY

Rev	Date	Drawn	Description	Ch'k'd	App'd

Title
GIL Kilkenny
Figure 1

Designated Ecological Sites in Proximity of Development

Drawn	DGal
Checked	EBen
Approved	BKin
Scale at A3	1:2,500
Drawing Number	Figure 1
Status	PRE
Rev	-

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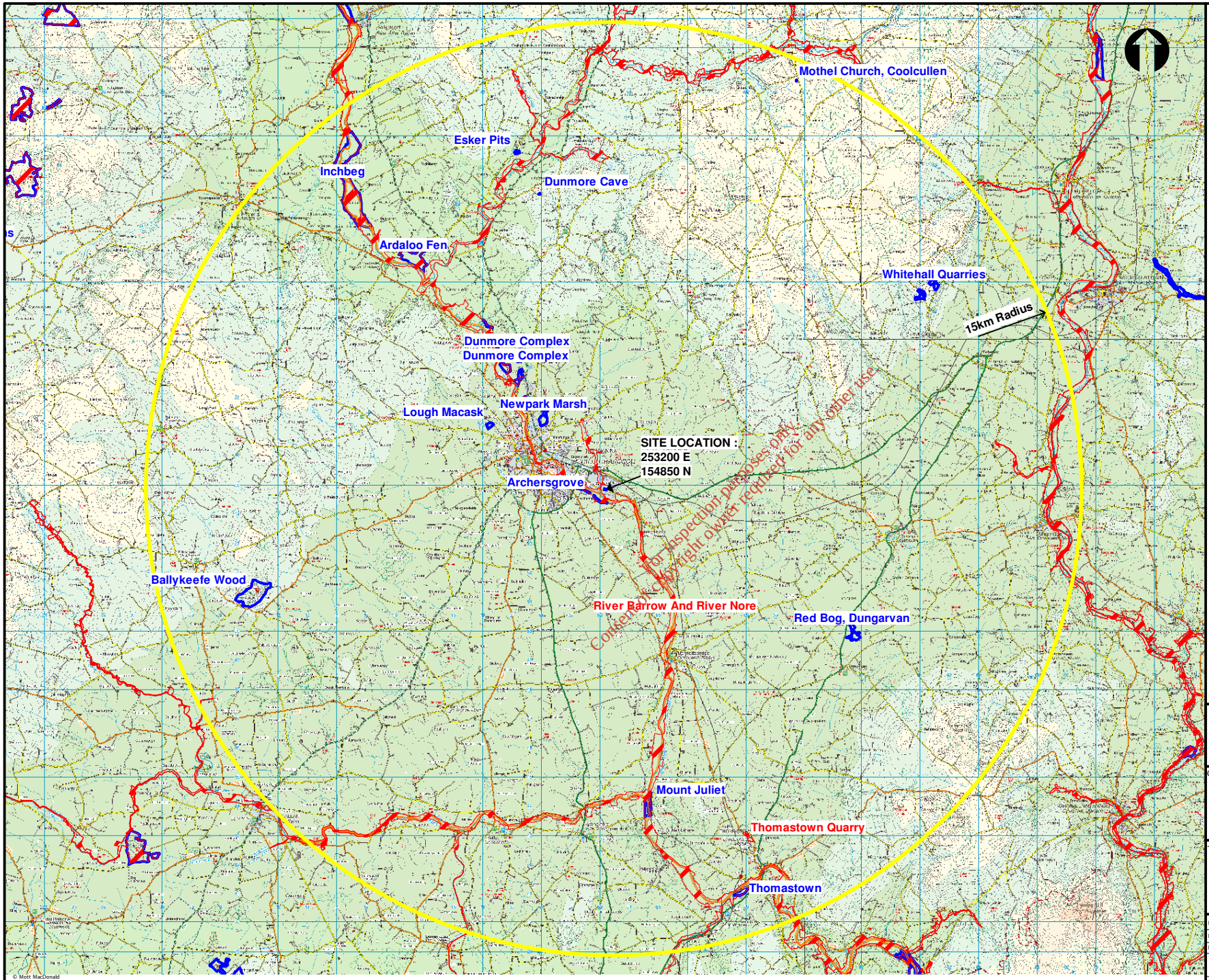

Notes:

All c-oordinates shown in metres to Irish National Grid

LEGEND

- Natural Heritage Areas (NHA)
- Proposed Natural Heritage Areas (pNHA)
- Special Area of Conservation (SAC)
- Special Protection Area (SPA)

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Client

GIL Power Generation Project
Kilkenny

Title

GIL Kilkenny
Figure 2
Designed Conservation Sites

Designed	-		Eng. Chk.	EBen
Drawn	DGal		Coordination	-
Drg. Chk.	-		Approved	MMcC
Scale at A3 1:125,000		Project	262872	Status INF
		Mapinfo file	262872-N-001	
Drawing Number	MMD-262872-N-MI-001			Rev P1

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P:\Dublin\MPD\262872 Greener Ideas Peaking Plants\Mapping\Workspaces\.

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- The main development site is outside the boundaries of the SAC or the SPA;
- Effects to air quality and potential increase in noise levels within the SAC and SPA boundaries are not considered negligible;
- Water quality in the River Nore and River Pococke will not be affected as surface water run-off and waste water from site activities will be discharged to the IDA sewer system and ultimately treated at the Purcellsinch WWTP. This WWTP was recently the object of a Stage 1 Screening for Appropriate Assessment which found no likely significant effects from the operation of this plant; and
- The proposed water abstraction required of 90m3/hr is insignificant in terms of the overall flow in the river and has been demonstrated to have No significant effect on water quality of the River Nore.

However there were some qualifying features where the potential for significant environmental effects is uncertain. It may be necessary to undertake a localised refurbishment of the existing river intake chamber on the site of the pumphouse. In addition, site clearance works on the site of the pumphouse may include agricultural grassland and areas of hedgerow, gorse and bramble scrub to be removed from the main development site. These types of activity has the potential to cause the release of silt / sediment into the watercourse which can have the impact of blocking fish gill and smothering macrophytes downstream.

Similarly, it may be necessary to intermittently remove vegetation from the vicinity of the abstraction inlet during the operation of the power plant. Fine screens and barriers will be used as necessary on such occasions to prevent the movement of sediment downstream and the maintenance should be carried out outside of the spawning and migratory season.

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Based on the overall findings of the Stage 1 Screening for Appropriate Assessment and the uncertainty in relation to potential impacts on qualifying features of the SAC and SPA resulting from localised refurbishment works, it was considered that a Stage 2 Appropriate Assessment - Natura Impact Statement was required from a precautionary perspective.

1.3 Scope of the Stage 2 Appropriate Assessment

The conservation objectives of the Natura 2000 sites likely to be impacted upon by the proposed development (from construction through to operation and finally to decommissioning) are considered at this stage in the Appropriate Assessment process.

Potential impacts may be direct or indirect and are dependant on the relationship between the action (the development and operation of the power plant) and the receptor (the qualifying features of the Natura 2000 sites). The pathway between the cause and effect of a direct impact is easily identifiable e.g. excavation of material during construction resulting in loss of habitat is a direct impact. It is more difficult to determine the pathway to receptor of indirect impacts. Indirect impacts are not immediately related to the action.

The significance of an impact is relative to the sensitivity, existing condition and conservation status of the qualifying features of the site and the scale of the impact in space and time.

Potential impacts on the qualifying features of the Natura 2000 sites are evaluated with respect to the scale, extent and nature of the impact, for example the area of habitat affected; changes in hydrodynamics;

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the percentage reduction in species density; potential changes in species distribution; the duration of the impact. The sensitivities of each of the qualifying features are also assessed.

Where adverse effects on a Natura 2000 site are identified, mitigation measures are proposed. In the absence of adequate mitigation alternative strategies are proposed.

1.4 Methodology

This Stage 2 Assessment has been formulated using the following approach:

- Detailed assessment of the construction, operation and decommissioning aspects of the proposed power plant development;
- Assessment of the Natura 2000 sites' characteristics and identification of their conservation objectives, including detailed review of habitat, bird and mammal surveys conducted in April and May 2012;
- Identification of the aspects of the proposed development that will significantly impact the conservation objectives of the Natura 2000 sites;
- Review of all formal and informal consultation responses from NPWS and the Department.

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This assessment has been undertaken in accordance with the following guidance documents:

- EC (2000) *Managing Natura 2000 Sites*. The provisions of Article 6 of the Habitats Directive 92/43/EEC;
- EC (2001) *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. Brussels (November 2001);
- Environment Heritage and Local Government (2009) *Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities*; and
- Minister for the Environment Heritage and Local Government (2009) Delivering Appropriate Assessment in Ireland: Meeting the Challenges of Article 6 of the Habitats Directive. Minister Speech.

1.5 Report Structure

The structure of this report follows the recommended guidance for undertaking Appropriate Assessments as follows:

- Section 2 presents a description of the proposed development;
- Sections 3 and 4 presents the River Barrow and River Nore SAC and the River Nore SPA, the qualifying features, conservation objectives and the sensitivity of these features;
- Section 5 presents the predicted impacts of the proposed development;

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- Section 6 presents mitigation measures; and
- Section 7 includes recommendations and presents conclusions.

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2. GIL Power Plant

2.1 Description of the Development

The proposed development will consist of a single 100 MW OCGT unit and ancillary site elements. The plant is a mid-merit plant which means that it is capable of responding quickly and efficiently to fluctuations in electricity demand. As a consequence mid-merit plants are considered more sustainable than fixed output plants as they avoid over-supply in times of low demand.

Access from the main development site to the external road network is proposed via an existing simple priority junction on the Dublin Road (R712), approximately 600 metres east of the roundabout at the N10 (Ring Road)/Dublin Road (R712). This priority junction currently serves the Purcellsinch Business and Technology Park. Traffic between this priority junction and the proposed development site will travel 800 metres through the Purcellsinch Business and Technology Park and through a gated entry. Direct access between the site and the private road network is proposed via a new simple priority junction located on the eastern property boundary of the existing Veolia business. This access road, which is proposed to be 6.0 metres wide, will be constructed prior to the commencement of construction. The pumphouse site will be accessed via an existing entrance on the Sion Road.

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2.1.1.1 Construction Phase

It is expected that construction of the facility will commence in 2014 with design, construction and commissioning activities lasting for approximately 14 months. Construction operations shall generally be confined to the hours of 08.00 to 20.00 Monday to Friday. The total number of construction staff on-site will vary during the construction phase of the works but are expected to peak at approximately 50 persons. It is estimated that 32 vehicles will arrive at the site between 08.00 and 09.00 and will depart site again between 17.00 and 18.00.

During peak construction, it is estimated that 15 deliveries, by heavy goods vehicle (HGV), will occur each day. It has been assumed that three deliveries will arrive and depart during the hours when staff arrive and depart the site therefore it is considered that a peak of 35 vehicle movements to and from the site will occur in the morning and evening.

Construction vehicles would access the site through the entrance in the northern boundary of the site, using the access roads in the IDA Business and Technology Park to gain access to the N10 to the north.

The principal construction activities are as follows:

- Site Clearance and Ground Preparation

  Activities will include preparation of the construction working area and topsoil stripping, as well as removal of walls, hedges, ditches and trees, other vegetation and services from the site as necessary to prepare the footprint of the works. The main development site will be elevated to between 43.2 metres to 47.2 metres AOD. The topography of the pumphouse site will not be altered.

- Civil Works

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Activities will include construction of foundations, concrete pouring and filling, and construction of power plant structures and ancillary structures. All civil works shall be fully controlled to ensure that cement bound materials do not present any pollution risk. Trucks, mixers and concrete pumps that have contained concrete will be washed out in a designated impermeable and bunded area to prevent pollution.

- Mechanical and Electrical Works

  Activities will include the installation of systems to operate the various plant items. Testing and commissioning of the gas turbine and auxiliary equipment will also be carried out.

  It is proposed to undertake a localised refurbishment of the existing pumphouse building on IDA lands approximately 130 metres west from the main development site for the provision of raw water to the power plant. It proposed to retro-fit the pumphouse with the following equipment: 2 no. Grundfos CR 120-2-1 vertical multistage centrifugal pumps; 3 no. 100mm power and telemetry ducts; internal control panel; replace existing wood twin panel doors with galvanised mild steel security doors; and repair the existing flat roof. The existing fence surrounding the pumphouse building will be retained where possible and a new fence erected where required. An area of reinforced grass will be installed to allow for periodic access by maintenance vehicles. Boundary planting will also be implemented.

A Construction Environmental Management Plan (CEMP) will be developed in advance of the works and shall be implemented on site during the construction phase.

Construction activities shall be carried out in accordance with all relevant health and safety legislation and with environmental protection legislation.

A Traffic Management Plan will be produced in advance of the works which should take account of the CEMP and ensure that any limitations on traffic movements, volumes or on times of operation are adhered to.

2.1.1.2 Operational Phase

The plant is expected to be fully operational by 2015. The plant is expected to be operational at least for 25 years. An Integrated Pollution Prevention and Control Licence (IPPC) will be required for the operation of the proposed power plant and an application for same has been submitted to the Environmental Protection Agency (EPA) (EPA ref: P0931-01). The plant will operate normally within the time period of 7.30am up to 9.30pm when demand is highest or when the electrical transmission system requires support in the area to meet increased demand.

The plant will operate on natural gas supplied by the Bord Gáis Eireann network grid and will use low sulphur diesel oil as a back-up fuel (e.g. in the event of interruption to the natural gas supply). The exact routing of the pipeline and interconnection point from the network will be determined by Bord Gáis who will also be responsible for design and construction of the pipeline.

The proposed development will require 90m^3/hr of raw feedwater which will be sourced from either river water abstracted from the River Nore (via the upgraded pumphouse) or 'grey' water from the Purcellsinch Wastewater Treatment Plant. The power plant will be designed such that it can operate by using either a

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combination of these sources or alternatively by operating entirely on one supply only, i.e. either abstracted river water or treated 'grey water from the Wastewater Treatment Plant.

A drinking water supply will be supplied from the public water mains.

The gas turbine for the power plant operates by drawing air from the atmosphere through an air inlet filter where it is directed to the low pressure compressor inlet. The air is then compressed over a number of compressor stages within the Low Pressure Compressor (LPC) before being bled off and cooled in an air-water heat exchanger. The cooled air is then re-circulated to the High Pressure Compressor (HPC) where it is compressed to reach the required combustion pressure. The compressed air then enters the combustion chamber where it is mixed with fuel (i.e. natural gas) and water injection for NOx control. The energy contained in the fuel-air mixture is released through the process of combustion with the resulting hot combustion gases expanding across the High Pressure Turbine (HPT), Intermediate Pressure Turbine (IPT) and Power Turbine (PT) sections.

The HPT and IPT generate sufficient shaft power to drive the compressor sections while the PT converts the remaining thermal energy in the hot combustion gases to mechanical energy. This mechanical energy is then used to drive the electrical generator which produces electrical energy.

The resulting exhaust gases exiting the gas turbine are discharged to atmosphere via a vertical exhaust stack.

Wastewater will be generated on site from the following sources: surface water run-off; process wastewater which comprises compressor/turbine washwater, neutralised backwash of the resins from the demineralisation process and cooling tower blowdown; and domestic effluent waste water. Wastewater will be discharged to Purcellsinch WWTP via the IDA Business and Technology Park sewer system.

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2.1.1.3 Decommissioning Phase

In the event that the facility is decommissioned the following programme will be implemented:

- All activity on site related to the operation of the facility shall cease;
- All plant equipment and machinery will be emptied and dismantled and stored under appropriate conditions until it can be sold. If a buyer cannot be found the material will be recycled or disposed of through licensed waste contractors and hauliers. If plant and machinery is required to be cleaned on site prior to removal all necessary measures will be implemented to prevent the release of contaminants;
- All chemicals, (including oils) and waste will be removed from the facility;
- The site and all associated buildings will be secured; and
- All associated licences and permits will be surrendered.

Waste will be recycled wherever possible. All waste movement, recycling and disposal operations will be controlled by licensed waste contractors.

A Decommissioning and Residuals Management Plan will be submitted to the EPA under the IPPC licence application regime so as to minimise the short-term and long-term effects of the operation on the environment after shut-down. Decommissioning will be carried out in accordance with EPA publication

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Guidance on Environmental Liability Risk Assessment, Residuals Management Plans and Financial Provision (2006).

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3. Natura 2000 Sites

3.1 The River Barrow and River Nore SAC (*002162)*

The River Barrow and River Nore SAC is important for the presence of several EU Habitats Directive Annex I habitats and Annex II species, as listed in *Sections 3.2.1* and *3.2.2*. This site includes freshwater stretches of the Barrow/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, Inistioge, 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 freshwater stretches of the River Nore main channel is a designated salmonid river. The upper stretches of the Barrow and Nore, particularly the Owenass River, are very important areas for spawning.

The site supports many other important animal species which are not qualified as EU Habitats Directive Annex II species. Those which are listed in the Irish Red Data Book include Daubenton's Bat (*Myotis daubentoni*), badger (*Meles meles*), Irish hare (*Lepus timidus hibernicus*) and frog (*Rana temporaria*).

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In addition to the freshwater pearl mussel (*Margaritifera margaritifera*), the population of the hard water form of the pearl mussel (*Margaritifera durrovensis*) is also present in the SAC and is limited to a 10 km stretch of the Nore between Poorman's Bridge and Lismaine Bridge.

Land use at the site consists mainly of agricultural activities (principally grazing and silage production). Slurry is spread over much of this 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 Habitats Directive Annex II animal species within the site.

The site is also important due to the presence of bird populations 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 pearl mussel which is limited to a 10 km stretch of the Nore, add further interest to this site.

The site synopsis for River Barrow and River Nore SAC is available through www.npws.ie.

3.1.1 Qualifying features

Annex I Habitats: Primary Reason for the Selection of the Site

The site is selected for alluvial wet woodlands and petrifying springs which are priority habitats on Annex I of the EU Habitats Directive. The SAC is also designated for old oak woodlands, floating river vegetation,

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estuary, tidal mudflats, *Salicornia* mudflats, Atlantic salt meadows, Mediterranean salt meadows, dry heath and eutrophic tall herbs, all habitats listed on Annex I of the EU Habitats Directive.

Annex II Species: Primary Reason for the Selection of this Site

Species present at this site and listed on Annex II of the E.C. Habitats Directive include: sea lamprey *Petromyzon marinus*, river lamprey *Lampetra fluviatilis*, brook lamprey *Lampetra planeri*, freshwater pearl mussel *Margaritifera margaritifera*, Nore freshwater pearl mussel *Margaritifera durrovensis*, white-clawed crayfish *Austropotamobius pallipes*, twaite and allis shad *Alosa fallax* and *Alosa alosa* respectively, Atlantic salmon *Salmo salar*, otter *Lutra lutra*, Desmoulin's whorl snail, *Vertigo moulinsiana* and the plant Killarney fern *Trichomanes speciosum*.

3.2 The River Nore SPA (004233)

The River Nore SPA extends from the bridge at Townparks, (north-west of Borris in Ossory) to Coolnamuck (approximately 3 km south of Inistioge) in Co. Kilkenny. The site also consists of a number of tributaries of the Nore including sections of the Delour River, the Erkina River, River Goul and the Kings River.

The River Nore is characterised as flowing through Coniferous Limestone Plains over much of its length, with a more limited area of old red sandstone south of Thomastown. For the most part, the River Nore is surrounded by improved agricultural habitats consisting of grassland based agriculture. Other land uses include areas of scrub and marginal land, broadleaf woodland, coniferous plantation, urban areas and areas of peatland.

The River Nore SPA is designated under the EU Birds Directive due to the presence of the Kingfisher (*Alcedo atthis*).

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3.2.1 Qualifying features

The Kingfisher is listed on Annex 1 of the EU Birds Directive. This species is considered to be present upstream of the proposed water abstraction location on the River Nore.

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4. Conservation Objectives

4.1 The River Barrow and River Nore SAC

The conservation objectives for the River Barrow and River Nore SAC have been outlined in *Conservation Objectives: River Barrow and River Nore SAC 002162* (NPWS, 2011). The conservation objectives of the qualifying features that may potentially be present in the zone of influence of the proposed development are provided hereunder. The potential for the qualifying features to be present within the ZOI has been determined through informal consultation with NPWS local rangers, reference to information held by the National Biodiversity Data Centre, reference to published and unpublished ecology reports, and observations made during filed surveys conducted in April and May 2012.

The NPWS *Conservation Objectives* document noted that the White Clawed Crayfish has previously been identified on the Pococke River in the vicinity of the confluence with the River Nore. In addition, the document identifies that *Alluvial Forest with Alnus Glutinosa and Fraxinus Excelsior* is located on the opposite side of the River Nore in the vicinity of the Pococke confluence.

Desmoulin's Whorl Snail have been recorded both upstream and downstream of Kilkenny city; however, there are no records for the species in the vicinity of the proposed development site. Notwithstanding this, suitable habitat for Whorl Snail exists in the vicinity of the pumphouse.

Otters are known to be present within the River Nore catchment. The average home range of a female otter is approximately 20km of a watercourse and that of a male is approximately 32km. An otter survey was carried out in April 2012 in support of the Environmental Impact Assessment for the proposed power plant development. Signs of otter were not observed during the field survey. It is highly likely however that otters will use the riparian zones in the vicinity of the proposed development site for foraging and as a habitat corridor.

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The River Nore is known to support lamprey and is recorded as having good gravel areas (particularly downstream of weirs) which are frequently used by spawning lamprey.

The freshwater stretches of the River Nore main channel is a designated salmonid river. Good spawning grounds are known to be utilised in the upper reaches of the river catchment.

While the River Barrow is known to support regularly breeding populations of Twaite shad, breeding populations are not known to occur the Nore. Suitable habitat to support the species does however occur in the Nore however artificial barriers are believed to be restricting the shad to the lower reaches, and away from suitable spawning areas. It is therefore considered that shad will not occur in the vicinity of the proposed development.

The freshwater pearl mussel *Margaritifera margaritifera* and the Nore freshwater pearl mussel *Margaritifera durrovensis* will not be considered in this assessment due to their current distribution i.e. they are not present within the zone of influence of the proposed development (as confirmed by conversation with NPWS local ranger). *Margaritifera margaritifera* in the Nore is confined to the upper stretches. This population is not recruiting and is not in favourable conservation status. *Margaritifera durrovensis* is limited to a 10km stretch of the river Nore between Poorman's Bridge (S407859) and Lismaine Bridge (S442660) and is a considerable distance from the proposed development (approximately 12km).

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It is considered that, due to the considerable distance between the proposed location for the development in relation to the River Nore tidal and estuary habitats, these are not likely to be affected by the GIL power plant.

Examples of petrifying springs, and Old sessile oak woods were not found in the vicinity and downstream of the proposed plant and for this reason these habitats are also not included in this assessment.

Negative indicator species (e.g. Indian balsam *Impatiens glandulifera*) for Hydrophilous tall herb fringe communities are prevalent in the vicinity of the proposed development.

The Killarney fern will not be considered in this assessment due to its current distribution, which is limited to areas close to Carlow in the River Barrow catchment and outside the ZoI.

The conservation objectives of the qualifying features of the River Barrow and River Nore SAC as relevant to the proposed development are therefore as follows:

- To maintain the favourable conservation condition of **Desmoulin's Whorl Snail** in the River Barrow and River Nore SAC;
- To maintain the favourable conservation condition of the **White-clawed crayfish** in the River Barrow and River Nore SAC;
- To restore the favourable conservation condition of **Sea lamprey** in the River Barrow and River Nore SAC;
- To restore the favourable conservation condition of **Brook lamprey** in the River Barrow and River Nore SAC;
- To restore the favourable conservation condition of **River lamprey** in the River Barrow and River Nore SAC;
- To restore the favourable conservation condition of **Atlantic Salmon** in the River Barrow and River Nore SAC;
- To restore the favourable conservation condition of **Otter** in the River Barrow and River Nore SAC;
- 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;
- To restore the favourable conservation condition of **Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior*** (*Alno Padion, Alnion incanae, Salicion albae*) in the River Barrow and River Nore SAC.

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4.1.1 Sensitivities and Conservation Status of the Qualifying Features

The main sensitivities of the qualifying features of the River Barrow and River Nore SAC are also outlined in Table 4.1. The conservation status plus the principal existing threats to the achievement or maintenance of favourable conservation status are also outlined.

Table 4.1 Sensitivities and Conservation Status of the Qualifying Features of the River Barrow and River Nore SAC

Species / Habitat	Description	Sensitivities	Threats	Conservation Status
Desmoulin's	In Ireland *Vertigo*	Desmoulin's whorl	Large-scale drainage.	Loss of habitat

EPA Export 30-11-2012:23:27:58

Species / Habitat	Description	Sensitivities	Threats	Conservation Status
Whorl Snail	*moulinsiana* is one of 8 species of whorl snail. It mainly inhabits calcareous, lowland wetlands. It requires a tall vegetation structure and requires a stable water-table. The Whorl Snail's main reproductive period is in the summer.	snail is particularly sensitive to changes in water levels and alteration / destruction of habitat.	Destruction of riparian vegetation through land management practices. Changes in vegetation structure by changes in grazing intensity and use of fertilisers. Changes in hydrology which cause flooding / changes in hydrology of whorl snail habitat.	nationally by anthropogenic activities and the associated decline in population and range of Whorl Snail: Unfavourable - Bad classification.
White-clawed crayfish	White-clawed Crayfish is the only crayfish species found in Ireland. It is classified as vulnerable and rare in the IUCN Red List of threatened animals and is listed under Annex II of the Habitats Directive. Breeding take place from September to November when water temperature drops below 10. They are found in heterogeneous habitats. Adults require larger stones and cobbles under which they can inhabit and have a preference for shallow riffles. Earth river bank into which they can burrow also forms a suitable habitat. Juveniles require gravels, tree roots and aquatic vegetation in which to inhabit. Crayfish also require a slow to moderate current with good water quality.	White-clawed Crayfish are susceptible to water pollution. They are sensitive to acidity and heavy metals. They require a biochemical oxygen demand (BOD) concentration of below 3mg/l and a dissolved oxygen (DO) of above 50% saturation. Turbidity is detrimental to the delicate gills of crayfish which are easily clogged by sediment.	Low water levels caused by natural droughts or over-abstraction can significantly increase their vulnerability to predation. Alteration to the river channel and therefore destruction of suitable habitat.	Conservation Status for future prospects of the White-clawed Crayfish is Unfavourable – Inadequate, due to the reduction of range and locality number and the continuing pressures
Sea Lamprey, River Lamprey and Brook Lamprey	Suitable Lamprey spawning grounds comprise clean gravel beds with areas of soft marginal silt/sand in shallow waters with moderate current. The adults breed in redds constructed from the gravels and the juveniles live buried in silt beds.	Lampreys are susceptible to disturbance and pollution at any stage during their life cycle.	Physical obstructions such as weirs impact on lamprey distribution. River cleaning and channel maintenance have the potential to significantly impact on lamprey as redd structures that may be constructed in gravelled areas of suitable particle diameter within the channel can be disrupted. Also, the removal and disturbance to areas of fine silt material, as may be used as habitat for juvenile lamprey or ammocoetes, can directly impact on lamprey population.	Sea lamprey is much more restricted in range than river and brook lamprey by flood barriers. Their range is therefore much reduced. Sea lamprey are at unfavourable conservation status.
Atlantic	Salmon utilise rivers for	Salmon are	Siltation of spawning	The conservation

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Species / Habitat	Description	Sensitivities	Threats	Conservation Status
salmon	reproductive and nursery phases, and the marine environment for adult development and rapid growth, migrating from the Atlantic Ocean to fresh water to spawn in areas of rivers with clean gravel. Salmon spawn in autumn or winter in excavated depressions in the river substrate.	susceptible to disturbance and pollution at any stage during their life cycle.	gravels by disturbance in river catchments. Presence of artificial migratory route obstructions which restrict access to spawning grounds. Pollution of waters by point and diffuse discharges.	status of the Atlantic Salmon is considered to be bad principally associated with population and in particular mortality rates at sea.
Otter	Otters have been recorded as exploiting virtually all types of water and waterways.	Otters have not been shown to be particularly sensitive to pollution, unless the pollution comprises toxic chemicals such as polychlorinated biphenols.	Removal of riparian vegetation, Disturbance by anthropogenic activity. Water pollution indirectly affecting food source.	The Otter Survey of Ireland 2004/2005 states that there has been a decline in the percentage occurrence at sites over the past 25 years. Conservation status is classified as Unfavourable – Inadequate due to population decline.
Ranunculion fluitantis and *Callitricho Batrachion* vegetation	Ireland has a very widespread distribution of this plant association in inland surface waters. This habitat is well represented in the River Barrow, but the extent and condition of this habitat in the River Nore is unknown. This habitat is sensitive to changes in river flows.	This habitat is sensitive to pollution and changes in hydrology which can affect the population dynamics.	Arterial drainage of rivers is a significant threat. Nutrient enrichment and sedimentation of rivers can lead to changes in DO and light and ultimately changes in plan populations. Eutrophication is the most significant threat. Changes in flow regime can lead to changes in river bed structure and can alter plant communities.	The conservation status of the future prospect of this habitat is Unfavourable-Bad
Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior*	This habitat is heavily fragmented throughout Ireland.	The habitat is sensitive to changes in hydrology.	Habitat destruction, grazing, introduction of invasive species and land management (drainage) pose a threat to this habitat	Habitat range status is considered to be in a favourable condition however the habitat extent is considered to be unfavourable-bad, mainly due to habitat loss due to drainage and clearance of wetlands

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4.2 The River Nore SPA

The conservation objectives for the River Nore SPA are to maintain or restore the favourable conservation condition of the kingfisher. Favourable conservation status of the species is achieved when:

- Population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats;

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- The natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future; and
- There is and will probably continue to be a sufficiently large habitat to maintain its populations on a long term basis.

A kingfisher survey of the River Nore was conducted in April 2012. Suitable habitat and kingfisher activity was observed 400 metres downstream of the existing pumphouse. At about 500 metres downstream of the pumphouse there were suitable nesting banks identified with one old and two new nest-tunnels. There were virtually no suitable nesting banks upstream of the pumphouse.

A pair of kingfishers was recorded approximately 800 metres downstream of the main development site.

4.2.1 Sensitivities and Conservation Status of the Kingfisher

Kingfishers are widespread in Ireland. They are resident on still or slow flowing Irish streams, rivers and canals across Ireland with the exception of parts of the extreme west coast. A recent study undertaken by the National parks and Wildlife Service and BirdWatch Ireland identified a relatively high density of Kingfishers on the River Nore, although the survey did not cover the study area relevant to this document.

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Kingfishers are very territorial with a territory size varying from 0.8-1.5km of waterway up to 13.8km in extreme cases. They lay their eggs in March-April (2-3 broods), with an incubation period of about 19-21 days and a fledgling period of about 23-27 days.

Kingfishers are vulnerable to severe winter weather conditions resulting in the death of birds due to exposure to cold or due to a lack of sufficient food. Populations can take many years to recover from a bad winter. Kingfishers are also prone to starvation during summer flooding as conditions making fishing difficult. Other threats include predation by domestic cats or by rats in some areas.

Anthropogenic threats to kingfishers include pollution of rivers resulting from agricultural run-off or industrial point source discharges. A reduction in water quality will result in reduced fish stocks on which the Kingfisher are dependent as their primary food source. Human disturbance of nesting birds is also a serious problem, whereby feeding routines of broods are interrupted for extended periods due to human presence. This can result in chicks becoming weakened or dying due to hunger. Finally, grading and clearing of banks and vegetation can result in the destruction of nests and removal of appropriate perches for fishing activity.

Kingfishers are most vulnerable to pollution and disturbance during breeding season. Kingfisher are Amber-listed in Ireland.

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5. Impact Prediction

5.1 Introduction

As indicated in the Stage 1 Screening for Appropriate Assessment a habitat survey was undertaken on the main development site in March 2011. Further consultations with the NPWS (refer *Appendix A*) identified a requirement to undertake additional specialist surveys. These included the following in the vicinity of the proposed pumphouse site:

- Protected flora;
- Otter; and
- Kingfisher.

The above specialised surveys were undertaken by Ecofact in April 2012. The findings from these surveys are discussed in the following sections and used to inform this Stage 2 Natura Impact Statement. A copy of Ecofact's report is included in *Appendix B.*

The Stage 1 Screening for Appropriate Assessment has previously found that noise and air quality impacts are not expected to have significant impacts on the qualifying features of designated sites.

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5.2 Ecological Surveys

5.2.1 Flora and Fauna

5.2.1.1 Protected Flora

A habitat survey of the study area was conducted during April 2012 following the Heritage Council publication '*Best Practice Guidance for Habitat Surveying and Mapping*' (Smith *et al.,* 2011).

The National Parks and Wildlife Service 'online map viewer' was referenced to establish the potential for protected species occurring in the study site based on records of species recorded from within the 10km grid square (S55). From the NPWS dataset two plant species were recorded; Autumn crocus *Colchium autumnale* and Small-white orchid *Pseudorchis albida*, neither of which have been recently recorded with records dating from the last century.

The Autumn crocus (*Colchium autumnale*) is listed on the Flora Protection Order (1999) and is typically found in damp meadows and river banks. Wet grassland habitat within the proposed development site was found to be species poor; however it is considered possible that this species may occur along the riparian margins of the River Nore within the study area.

The Small-white orchid is recorded from upland heaths and sand-dune habitats. Suitable habitat for this species was not recorded from within the study area and this species was not identified within the proposed development site.

In addition to the two Flora Protection Order (1999) species listed above, the Nettle-leaved bellflower (*Campanula trachelium*) has been recorded from with the Archersgrove woodland (pNHA) on the south bank of the River Nore, approximately 200m from the proposed development site. This species was

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previously protected under the Flora (Protection) Order 1987, but was removed under the 1999 Order. It is now recognised as a rare and endangered species on the Red Data list. This species has not been recorded from the proposed development site and suitable woodland habitat for this species does not occur within the footprint of the proposed development.

The proposed development site, including the proposed abstraction location (see Plate 1) and abstraction water pipeline route were searched for the presence of non-native invasive species. None were found within the footprint of the development site; however, Himalayan balsam was recorded from the riparian corridor of the River Nore downstream of the proposed abstraction location. It is recommended that the works area restricted to within the proposed site footprint and no tracking of machinery or earthworks are undertaken within the affected area where this species occurs. All appropriate measures will be taken to ensure that machinery does not facilitate the establishment and spread of non native species into or from the works area. Machinery which has been previously working along roadsides or in watercourses affected by invasive species will require appropriate cleaning and decontamination prior to entering the site. In addition, it is proposed that a pre-construction ecology survey will be undertaken to ensure the absence of protected flora and fauna. This mitigation measure has been proposed to cater for a scenario where there is a significant period of time between the final planning decision and the commencement of on site construction activities.

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Plate 1: Existing River Abstraction Intake Chamber



5.2.1.2 Otter

The otter is a legally protected species under the *Wildlife Act, 1976 (and Wildlife (Amendment) Act, 2000).* According to Marnell *et al*. (2009) the otter is listed as 'Near threatened' on the most recent Red Data list for mammals, taking account of its 'Near threatened' status at a European and Global scale. This species is listed under Annex II and IV of the EU Habitats Directive and under Annex II of the Berne Convention. It is listed as a qualifying interest of the River Barrow and River Nore cSAC.

An extensive search of the study area concentrated on the riparian corridors of the River Nore and Pococke River, and including the lands within the proposed development site was carried out during April 2012.

Specific attention was given to searching for otters *Lutra lutra* within the riparian corridors of the study area. This included searches for otter holts along the river banks and in proximity to the river and otter spraints / prints along the stretch of river corridor particularly at the bridge crossing and at the confluence of the

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Pococke River and the River Nore, following Chanin (2003). The Pococke River corridor was surveyed upstream of the existing tertiary road bridge crossing to approximately 150 metres and downstream from the road bridge to the confluence with the River Nore (approximately 150 metres channel length). The riparian corridor of the River Nore was surveyed to approximately 300 metres upstream of the proposed abstraction point and approximately 600 metres downstream. It is noted that there was no survey undertaken along the bank of the Nore at the existing mill-race due to access restrictions.

No signs of otter activity i.e. otter holts, spraints, tracks or slides were recorded during the current survey, despite optimal conditions for survey. It is considered inevitable that otter will utilise the river corridors of the River Nore and Pococke River within the study area for foraging and commuting, with good fish stocks presenting adequate foraging within both watercourses; however, otters may only pass through the lower reaches of the Pococke River due to water quality issues which limit foraging potential. The assessment considers that although no signs were recorded, otter do occur within the study area.

5.2.1.3 Kingfisher

The breeding bird survey was carried out over two days during early April 2012 and was focused on identifying Kingfisher activity within the study area. Water levels were low following a month of low rainfall in March 2012, so all suitable nesting banks were visible. The study area was searched thoroughly on foot and all riparian species using the site were recorded.

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The survey was carried out on both banks of the River Nore; from the bridge 800 metres upstream to 1200 metres downstream of the proposed abstraction point. The river bank near the dwelling house to the east of the proposed abstraction point was not surveyed due to access restrictions. About 100 metres of the River Pococke was also surveyed. Both banks, where accessible, were surveyed.

On the River Nore, starting about 400 metres downstream of the existing abstraction point, there is an abundance of vertical banks with perches nearby. This is where most of the Kingfisher activity was recorded. The area at the rear of the dwelling house near the existing abstraction point has several channels or old mill races which were not surveyed. The river immediately downstream of the existing abstraction point, below the weir, is fast moving and consists of gravel banks. The nearest suitable nesting banks are about 500 metres downstream. There is considerably less disturbance in this area. Single Kingfishers were seen on three occasions and a pair was recorded at a suitable bank approximately 800 metres downstream of the proposed development site. At about 500 metres downstream of the existing abstraction point there were suitable nesting banks identified with one old and two new nest-tunnels.

There were virtually no suitable nesting banks upstream of the existing abstraction point. These banks were either too low, or sloped, or were faced with stone. This area was used heavily by recreational walkers and joggers and people with dogs. The recreational use decreased further downstream from Kilkenny City.

While there is apparently no Kingfisher pair breeding in the footprint or direct vicinity of the proposed abstraction point it is considered that immature Kingfishers from neighbouring territories will start to disperse in August and September. All works requiring clearance of reed habitat and scrub within the abstraction location will be completed outside the bird breeding season to avoid disturbance.

The pipelaying works connecting the abstraction point to the proposed development site will require works on the existing road bridge over the Pococke River. The barrel of this bridge will not be closed at any time to facilitate passage of Kingfisher and riparian birds along the river corridor.

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5.3 Potential Impacts on the Natura 2000 Sites

The potential for the proposed power plant development to impact on the relevant qualifying features of the Natura 2000 sites is dependant on the specific construction, operation and decommissioning activities of the development, on the characteristics and sensitivities of the qualifying features and on the interaction of the two.

The main development site is outside the boundaries of the SAC and the SPA, therefore no direct impacts are likely. The existing pumphouse and ancillary infrastructure is located within the boundary of the SAC. Direct impacts are therefore possible.

The potential impacts of the proposed development on the Natura 2000 sites are as follows:

- Deterioration in air quality due to emissions from the proposed facility;
- Disturbance to protected species by increases in noise levels, use of lighting and traffic movements;
- Habitat degradation / destruction during upgrade of pumphouse;
- Changes to the hydrology of the River Nore as a result of the proposed abstraction; and
- Water pollution of the River Nore.

Potential direct and indirect impacts of the proposed works are identified hereunder in *Table 5.1: Potential Impacts of the Power Plant Development on the Natura* 2000 Sites.

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Table 5.1: Potential Impacts of the Power Plant Development on the Natura 2000 Sites

Element of Work	Potential Impact on Natura 2000 Site	Significance of Impact
	Construction Phase	
Mobilisation of construction materials and plant, and deliveries to site and general construction activities.	Construction activities have the potential to disturb otter which may be using the riparian corridor close to the site (particularly the generation of noise, use of artificial lighting, and the movement of plant and personnel). Similarly kingfishers, which are known to occur in proximity of the proposed site and which have a typical territory size of 0.8km to 1.5km, may be disturbed by noise and vehicle movements on the site.	Any potential disturbance by construction activity will be short term and temporary in nature. Construction activities will be conducted in accordance with noise limits to avoid disturbance. Lighting on site will be kept to a minimum and lighting with cowled or directional lighting to minimise disturbance while ensuring minimum standards for health and safety will be adhered to. Otter activity is most intense at dawn and dusk. Night-time construction work is not anticipated as part of this development therefore disturbance to otter less likely. The otter survey conducted in April 2012 did not identify any otter holts in the area. Any disturbance to otter, though unlikely, would be to foraging activity. Given the abundance of alternative suitable foraging habitat in the vicinity any disturbance to otter is deemed negligible. The kingfisher survey indicates the absence of suitable nesting locations and suitable perches for feeding in close proximity to the pumphouse site. Disturbance to kingfisher is therefore considered unlikely.
Plant and personnel moving outside the works footprint.	The presence of the non-native, invasive Himalayan balsam was recorded downstream of the pumphouse location along the riparian corridor of the River Nore. If plant and personnel move outside the works footprint and along the river corridor there is potential for the spread of this invasive species. Similarly, there is potential for the introduction of invasive species to site by plant used in other locations where it has not been properly washed down. There is potential damage to the alluvial forest protected habitat by trampling is plant and personnel move outside of the footprint of the works.	The introduction of invasive species can have a significant negative impact on the designated habitats and species of the SAC. It is of note that the works will be restricted to within the proposed site footprint and no tracking of machinery or earthworks will be undertaken in proximity to the location of the Himalayan balsam. Buffer zone fencing will be constructed in a continuous line on each side of the development to prevent access outside of the site, taking particular account of the sensitivity of the riparian margin and aquatic environments of the River Nore and the Pococke River. In the case of items of plant and equipment liable to be used in the vicinity of the River Nore and the River Pococke, such plant and equipment will be thoroughly cleaned and washed using high pressure steam cleaning before delivery to the works site, so as to prevent the spread of hazardous aquatic invasive species and pathogens. Given these measures, it is considered that

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Element of Work	Potential Impact on Natura 2000 Site	Significance of Impact
		the potential impact will not be realised.
Stockpiling of construction material and runoff from site	There is potential for the contamination of the nearby watercourses by runoff from the stockpiled materials if they are not properly stored. Deterioration in water quality can directly impact Atlantic salmon, shad, lamprey and crayfish. Water pollution has the potential to indirectly impact kingfisher and otter through the degradation of their food source. The release of nutrients and sediments to the river can also impact macrophytes communities in the river.	The release of oils, paints, cement or uncured concrete etc. to the watercourse in significant amounts can have detrimental impacts on aquatic ecology. A Construction and Environmental Management Plan (CEMP) shall be developed and implemented during construction which shall prescribe measures to ensure that the risk of uncontrolled discharges from site is reduced and shall also prescribe an Emergency Response Plan in the event of a pollution incident. It is considered that no further mitigation would be necessary and that impacts on water quality from the construction activities are unlikely.
Site clearance (main development site) and refurbishment works (at pumphouse and abstraction intake chamber)	Agricultural grassland and areas of hedgerow, gorse and bramble scrub will be removed from the main development site to accommodate the works. Gorse and scrub will be removed from around the pumphouse as necessary to carry out the remediation works. There is potential that the vegetation removed might form habitat to otter or kingfisher. It may be necessary to clear aquatic macrophytes / reed beds from the vicinity of the abstraction inlet pipe in the River Nore. This may require localised vegetation clearance works. The removal of the aquatic plants and associated in-stream works has the potential to disturb sediment on the river bed which can be detrimental to aquatic fauna (smothering / blocking gills) and macrophytes (blocking out light). In addition the movement of plant and personnel in-stream to carry out the works has the potential to damage the protected *Ranunculion fluitantis* and *Callitricho Batrachion* vegetation. Also in the in-stream / bankside works has the potential to disturb kingfisher and otter and deter them from using the area during the works.	The agricultural grassland and hedgerows to be removed from the main development site and at the boundaries of the pumphouse site are considered to be of low ecological value. There is potential however for the scrub to be a suitable resting habitat for otter and suitable perch for kingfisher. All works requiring clearance of habitat will be completed outside the bird breeding season to avoid disturbance. Given the availability of similar habitat in the vicinity it is considered that the clearance of scrub (as a habitat for otter and kingfisher) will have a negligible impact. In addition, a pre-construction ecology survey will be undertaken as part of the CEMP to ensure the absence of protected flora and fauna within the main development site and at the pumphouse. It should be noted that no protected flora and fauna were present at the time of Ecofact's survey in April 2012 there the additional survey is proposed as a precautionary measure only. A Method Statement for same will be agreed in consultation with the NPWS and will include provision for a Ministerial Order, as required. Reed beds may be cleared from the vicinity of the abstraction pipe. Reed beds may form suitable habitat for certain aquatic fauna, particularly juveniles who may use the reeds as cover. This is particularly the case where there is suitable adult habitat nearby (such as the gravel area downstream of the weir near the pumphouse). The release of silt / sediment into the watercourse can have significant negative impacts on aquatic fauna, particularly if conducted during the spawning season. The pre-construction ecology survey will confirm the absence of protected species before the disturbance and removal of reed bed. It should be noted that no protected flora and fauna were present at the time of Ecofact's survey in April 2012 there the additional survey is proposed as a

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Element of Work	Potential Impact on Natura 2000 Site	Significance of Impact
		precautionary measure only. A Method Statement for this survey will be agreed with the NPWS which will include a Ministerial Order, as required.
Upgrade of pumphouse intake chamber and ancillary services	The pumphouse building will be subject to refurbishment and will be fitted with new doors, a new roof, new pumps, and a new inlet screen. The intake chamber may also require localised refurbishment works. The Boundary fence near the pumphouse building shall also be upgraded in sections as required. Topsoil may need to be removed in order to gain access to the inlet pipe for upgrade requirements resulting in loss of habitat which may potentially form cover for otter using the site or for kingfisher using scrub to perch.	The habitat lost during the pumphouse refurbishment will be improved agricultural land and scrub which are of low ecological value. Boundary planting will be implemented which will form replacement and additional cover to that lost by the fencing works. The existing pumphouse site is quite open in terms of vegetation cover and it is considered that the loss of habitat will have a negligible impact given that the vegetation clearance shall be temporary in nature and replacement and additional cover will be provided. The localised refurbishment works associated with the intake chamber if required, may result in the release of silt / sediment in to the watercourse which can have significant negative impacts on aquatic fauna, particularly if conducted during the spawning season. The pre-construction ecology survey will confirm the absence of protected species before the disturbance and removal of reed bed. A Method Statement for this survey will be agreed with the NPWS which will include a Ministerial Order, as required.
Generation of dust associated with all above-listed elements if work	Construction activities have the potential cause the release, and subsequent deposition of dust, to the surrounding environment. The protected habitat *Alluvial Forest with Alnus Glutinosa and Fraxinus Excelsior* is located on the opposite side of the River Nore in the vicinity of the Pococke confluence. Deposition of dust on this habitat could have the effect of impeding photosynthesis which could result in the loss of habitat.	Dust reduction measures will be implemented on site during construction including dust dampening, use of sheeting on stockpiles, erection of barriers around dusty activities etc. which will prevent the realisation of the potential impact.
	Operation Phase	
Combustion of natural gas and diesel oil	Carbon dioxide (CO_2), Nitrogen oxides (NO_x), Particulates, and Carbon monoxide will be released from the power station as a result of the combustion of natural gas. Diesel oil will be used as a back up fuel. In addition to the above, combustion of diesel oil will result in the emission of sulphur dioxide (SO_2) in low concentrations.	Dispersion modelling carried out as part of the Environmental Impact Statement concluded that potential impacts on designated ecological sites as a result of atmospheric NO_x concentrations, acid deposition, and nitrogen deposition are significantly below the critical loads and are insignificant at all receptors.
	Emissions to air have the potential to damage vegetation and impede photosynthesis.	Potential impacts on vegetation by emissions to atmosphere are not anticipated to be realised.
Generation of noise by plant operations	A number of elements of the proposed power plant will generate noise including the main gas turbine, air inlet filters, heat exchanger and exhaust stack.	Potential impacts on baseline noise conditions due to the operation of the proposed power plant were modelled as part of the Environmental Impact Statement. The plant operation will adhere to EPA Guideline noise

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Element of Work	Potential Impact on Natura 2000 Site	Significance of Impact
	Noise may have the impact of deterring otter and kingfisher from frequenting the area.	levels. The assessment concluded that that noise levels would not be significant at nearby sensitive receptors, including the River Barrow and River Nore SAC and the River Nore SPA. In addition pumping and ancillary control systems will be selected so as to be inherently silent. Acoustic screening will also be used. Potential impacts on fauna by noise are not anticipated to be realised.
Abstraction of water from the River Nore	It is predicted that 90m^3/hr of raw water is required for the operation of the power plant, a percentage of which will be sourced from the River Nore utilising the existing abstraction intake chamber and pumphouse. The worst case scenario is that the full 90m^3/hr will be sourced from the River Nore. Potential impacts of the abstraction are: ▪ change in hydrology which can impact the ecology of the river; ▪ reduced dilution capacity for downstream point and diffuse pollution; ▪ entrapment of fish in abstraction pipe; and ▪ noise disturbance by the operation of the pumps.	The impact on the flow in the River Nore due to the abstraction of 100% of the raw water demand (90m^3/hr) was assessed as part of the Environmental Impact Assessment and will result in the 95th%ile flow in the River Nore being reduced by 0.66% and the Dry Weather Flow (DWF) reduced by 1.25%. It is considered that the slight change in hydrology will not significantly alter the flow regime of the river and in turn will not impact the stability of river substrata which supports local ecology. Assimilative capacity calculations were also conducted as part of the Environmental Impact Assessment which showed that nutrient and organic concentrations in the River Nore would not be significantly altered as a result in the slight reduction in available dilutions due to the abstraction. The intake chamber for the river abstraction will be screened, in accordance with the requirements of Inland Fisheries Ireland, so as to preclude entry of juvenile and adult salmonids and cyprinids. The design requirements for same will be outlined in a Method Statement to be agreed with both the Inland Fisheries and the NPWS. Silent pumps shall be used in the Pumphouse which shall mitigate against any potential noise impact from their operation.
Water discharge	Process and foul effluent arising from the proposed facility will be discharged to sewer and treated in the Purcellsinch waste water treatment plant before being discharged to the River Nore. Hard standing areas will drain by gravity to the IDA surface water collection system via kerbs and gullies. There is potential for water pollution whereby surface water becomes contaminated with polluting matter. In addition, where the greenfield site is developed and replaced with hard standing areas, the natural ability of the land to attenuate run off is reduced and can lead to flooding downstream which can negatively impact ecology.	There will be no direct foul / process water discharges to water. The discharge to sewer will be controlled under IPPC licence. The Purcellsinch waste water treatment plant is also operated under licence and is required to achieve emission limit values for the protection of the receiving environment. Both licences are regulated and monitored by the Environmental Protection Agency. It is considered that no further mitigation is required in this regard. Areas where there is the potential for surface water to be in contact with polluting substances or materials will be bunded to control and contain any contaminated run-off

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Element of Work	Potential Impact on Natura 2000 Site	Significance of Impact
		water. In addition petrol interceptors shall be used which will be alarmed to ensure that they are adequately maintained (which is most regularly the failing of using such systems). A surface run off discharge limit of 3l/s has been prescribed for the site and will be adhered to through the use of retention tanks.
Decommissioning Phase		
Decommissioning of the power plant.	Decommissioning of the plant will pose similar potential impacts on the surrounding ecology as construction activities. In addition, decommissioning poses the added risk of releasing unused chemicals / oils etc., which remain on site after operation, to the environment. Also plant, equipment and machinery which remains on site until sold could potentially become corroded or leak fuels if not stored properly. The longer the duration that the plant and materials are stored on site after operation has ceased, the higher the risk of environmental contamination.	All mitigation required for the protection of the environment during the construction stage should be equally implemented during decommissioning. A Decommissioning and Residuals Management Plan will be submitted to the EPA under the IPPC licence application regime so as to minimise the short-term and long-term effects of the facility on the environment after shut-down. It is considered that compliance with EPA requirements as they relate to decommissioning should be sufficient to mitigate against environment impact.

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Having assessed the potential impacts of the proposed power plant development with regard to the sensitivity of the receiving environment it is considered that localised refurbishment works at the river intake chamber and the removal of aquatic vegetation in the River Nore has the potential to have a significant impact on flora and fauna downstream. However it is expected that Method Statements for any such works, if required, will ensure there are no significant impacts on the qualifying features of the SAC and SPA.

All other potential impacts assessed are considered to be appropriately mitigated against through the design of the works or by construction management plans.

5.3.1 In-Combination Effects

Article 6(3) of the Habitats Directive requires that "*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*". The likely impacts on the integrity of the relevant Natura 2000 sites arising from the combination of the proposed power plant development with other plans and projects relevant to the area must therefore be assessed.

Kilkenny County Council submitted an application for statutory approval to An Bord Pleanála for the Purcellsinch Wastewater Treatment Plant upgrade and Sludge Management Hub Centre (An Bord Pleanála Planning Reference PL10. JA0011). The proposed development was granted statutory approval in September 2011 and includes a mechanical and electrical upgrade, provision for nutrient removal, and development of a sludge hub centre. The introduction of phosphorus and nitrogen removal at the plant will have a positive impact on the quality of the River Nore as it will result in an improvement in the final effluent quality.

The Environmental Impact Assessment (EIA) conducted in support of the planning permission for the power plant development considered the potential in combination impact of the abstraction from the River

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Nore (as part of the power plant development) and the upgrading of the Purcellsinch Wastewater Treatment Plant. The EIA assessed the combined impact on the assimilative capacity of the River Nore as a result of the abstraction from the river and the discharge to the river from the treatment plant (based on the effluent concentration limits specified by An Bord Pleanála in the statutory approval). The assessment found that the abstraction from the river will have an insignificant impact on the ability of the river to assimilate the treatment plant discharge.

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6. Mitigation Measures

Having considered the construction, operation, and decommissioning activities associated with the development of the proposed Open Cycle Gas Turbine (OCGT) power plant in Purcellsinch, it is concluded that many of the potential impacts on the River Barrow and River Nore Special Area of Conservation (Site Code 002162) and the River Nore Special Protection Area (SPA), (Site Code 0042330) have been mitigated against in the design of the facility e.g. use of inherently low emission components / limit on abstraction intake velocity etc.

It is recognised also that the Construction Environmental Management Plan and the Decommissioning and Residuals Management Plan aim to mitigate against all potential environmental impacts of the development. These Plans provide appropriate and sufficient environmental protection measures against the potential direct impacts of the proposed development on the qualifying features of the Natura 200 sites.

It may be necessary to undertake a localised refurbishment of the existing river intake chamber on the site of the pumphouse. In addition, site clearance works near the pumphouse building may be required. Such activity has the potential to cause the release of silt / sediment into the watercourse which can have the impact of blocking fish gill and smothering macrophytes downstream. The greatest potential for impact is during the period when aquatic species migrate upstream to spawn. Release of sediment into the watercourse can inhibit fish / lamprey from moving upstream to spawning grounds. Where spawning grounds are located downstream the release of sediment can have a devastating impact on the propagating capacity of the species

In the event that vegetation is to be removed from the river bed / banks, or in the event that localised refurbishment of the intake chamber is required, fine screens and barriers will be used as necessary to prevent the movement of sediment downstream. Such works will not be carried out during the migratory period / spawning season for Atlantic Salmon and lamprey. Similarly, it may be necessary to intermittently remove vegetation from the vicinity of the abstraction inlet during the operation of the works. Fine screens and barriers will be used as necessary on such occasions to prevent the movement of sediment downstream and the maintenance should be carried out outside of the spawning and migratory season. In the event that these works are required then a Method Statement for same will be agreed in consultation with the NPWS and will include provision for a Ministerial Order, as required.

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7. Conclusions

Environmental protection measures shall be incorporated into the design of the proposed power plant such that potential impacts on the qualifying features of the Natura 2000 sites are not anticipated.

- Effects to air quality and potential increase in noise levels within the SAC and SPA boundaries are considered negligible;
- Water quality in the River Nore and River Pococke will not be affected as surface water run-off and waste water from site activities will be discharged to the IDA sewer system and ultimately treated at the Purcellsinch WWTP which is operated under EPA licence; and
- The proposed water abstraction 90m^3/hr is insignificant in terms of the overall flow in the river and has been demonstrated to have no significant effect on water quality of the River Nore.

No direct impacts on the Natura 2000 sites from the construction, operation, or decommissioning of the development are likely to occur.

Aquatic flora and fauna may potentially be indirectly impacted by the disturbance of sediment on the river bed and the resultant release of sediment in to the downstream watercourse during the construction and operation of the works. Appropriate mitigations have been prescribed to mitigate against the potential impact of the release of sediment downstream. In the event that these works are required then a Method Statement for same will be agreed in consultation with the NPWS and will include provision for a Ministerial Order, as required.

It is considered that the potential adverse effects on the integrity of the Natura 2000 sites will be excluded through the implementation of the mitigation prescribed and that no further stage in the appropriate Assessment process is necessary.

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8. References

EC (2000) *Managing Natura 2000 Sites*. The provisions of Article 6 of the Habitats Directive 92/43/EEC;

EC (2001) *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. Brussels (November 2001);

Environment Heritage and Local Development (2009) *Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities*; and

James J. King (2006) The status and distribution of lamprey in the River Barrow SAC. Irish Wildlife Manuals No. 21. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.

Minister for the Environment Heritage and Local Government (2009) Delivering Appropriate Assessment in Ireland: Meeting the Challenges of Article 6 of the Habitats Directive. Minister Speech.

MM (2008) Purcellsinch WWTP Stage 1 Appropriate Assessment: Test of Likely Significance. Report prepared by Mott MacDonald for Kilkenny County Council

MM (2010a) *Air quality Assessment in Support of IPPC License Application*. Report prepared by Mott MacDonald for Greener Ideas Limited

MM (2010b) Noise Impact Assessment. Report prepared by Mott MacDonald for Greener Ideas Limited

NPWS (May 2007) Conservation Assessment of the White-clawed Crayfish *Austropotamobius pallipes* (Lereboullet, 1858) In Ireland.

NPWS (July 2007) Desmoulin's whorl snail (*Vertigo moulinsiana*) (1016) Conservation Status Assessment Report

NPWS (2007) River lamprey (*Lampetra fluviatilis*) (1099) / Brook lamprey (*L. planeri*) (1096) & Sea lamprey (*Petromyzon marinus*) (1095) Conservation Status Assessment Report

NPWS (2008) The Status of EU Protected Habitats and Species in Ireland. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

NPWS (2011) Conservation Objectives: River Barrow and River Nore SAC 002162. Version 1.0. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

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Appendix A. Consultation Response from NPWS

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McCarthy, Mark

From: Manager Dau [Manager.Dau@ahg.gov.ie]
Sent: 18 April 2012 19:05
To: McCarthy, Mark
Subject: Your Ref: GIL Kilkenny_DAU Consultation

Your Ref: GIL Kilkenny_DAU Consultation
Our Ref: G Pre00153/2012

18th April 2012

Mott MacDonald Ireland Ltd
FAO Mark McCarthy
South Block
Rockfield
Dundrum
Dublin 14

Re: EIS scoping request Power Plant at Purcellsinch

A Chara

I refer to your email dated 28th March 2012.

Please find below the recommendations of the Department of Arts, Heritage and the Gaeltacht in relation to nature conservation.

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With regard to any EIA for this proposed development an ecological survey should be carried out of the proposed development site to survey the habitats and species present. Such surveys should be carried out by suitably qualified persons at an appropriate time of the year depending on the species being surveyed for. The EIS should include the results of the surveys. With regard to any existing records the data of the National Parks and Wildlife Service (NPWS) should be consulted at www.npws.ie and the data of the National Biodiversity Data Centre at http://www.biodiversityireland.ie/ . Reference should be made to the National Biodiversity Plan and any relevant County Biodiversity Plan. The EIS should also address the issue of invasive alien species, such as Japanese Knotweeed, and detail the methods required to ensure they are not accidentally introduced or spread during construction.

The impact of the development on the flora, fauna and habitats present should be assessed. In particular the impact of the proposed development should be assessed with regard to:

- Natura 2000 sites, i.e. Special Areas of Conservation (SAC) designated under the EC Habitats Directive (Council Directive 92/42/EEC) and Special Protection Areas designated under the EC Birds Directive (Directive 2009/147 EC),
- Other designated sites, or sites proposed for designation, such as Natural Heritage Areas, Nature Reserves and Refuges for Fauna or Flora, designated under the Wildlife Acts of 1976 and 2000,
- Habitats listed on annex I of the Habitats Directive,
- Species listed on Annexes II and IV of the Habitats Directive,
- Habitats important for birds,

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- Birds listed on Annex I of the EC Birds Directive,
- Species protected under the Wildlife Acts including protected flora,
- Habitats that can be considered to be corridors or stepping stones for the purpose of article 10 of the Habitats Directive,
- Red data book species,
- and biodiversity in general.

In order to assess the above impacts it may be necessary to obtain hydrological and/or geological data. In particular any impact on water table levels or groundwater flows may impact on wetland sites some distance away. The EIA should assess cumulative impacts with other plans or projects if applicable. Where negative impacts are identified suitable mitigation measures should be detailed if appropriate.

Where there are impacts on protected species and their habitats, resting or breeding places, licenses may be required under the Wildlife Acts or derogations under the Habitats Regulations. In particular bats and otters are strictly protected under annex IV of the Habitats Directive and a copy of Circular Letter NPWS 2/07 entitled "Guidance on Compliance with Regulation 23 of the Habitats Regulations 1997 – strict protection of certain species/applications for derogation licences" can be found on our web site at
http://www.npws.ie/media/npws/publications/circulars/media,6686,en.pdf

In addition, licenses will be required if there are any impacts on other protected species or their resting or breeding places, such as on protected plants, badger setts or birds' nests. Hedgerows should be maintained where possible. Where trees or hedges have to be removed there should be suitable planting of native species in mitigation. Where possible hedges and trees should not be removed during the nesting season (i.e. March 1st to August 31st). Birds' nests can only be intentionally destroyed under licence issued under the Wildlife Acts of 1976 and 2000. In order to apply for any such licenses or derogations as mentioned above a detailed survey should be submitted to NPWS which should have been carried out by appropriately qualified person/s.

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In accordance with article 6.3 of the Habitats Directive, this project should be subject to appropriate assessment screening and if necessary appropriate assessment. We refer you to the Departmental guidance document on Appropriate Assessment, which is available on the NPWS web at
http://www.npws.ie/media/npws/publications/codesofpractice/AA%20Guidance%2010-12-09.pdf

You are also referred to the EU Commission guidance entitled "Assessment of plans and projects significantly affecting Natura 2000 sites. Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC"
which can be downloaded from
http://ec.europa.eu/environment/nature/natura2000/management/docs/art6/natura_2000_assess_en.pdf

In order to carry out the appropriate assessment screening and/or prepare a NIS you will need to collect information about the relevant Natura 2000 sites including their conservation objectives. Details of designated sites and species can be found on www.npws.ie while conservation objectives, if not yet available on our web site, can be obtained by requesting them by completing the data request form on our website at
http://www.npws.ie/media/npws/publications/Data%20request%20form.doc

The Department recommends that you consult with the relevant Local Authorities to determine if there are any projects or plans which alone or in combination could impact on any Natura sites.

The above observations and recommendations are based on the papers submitted to this Department on a pre-planning basis and are made without prejudice to any observations the Minister may make in the context of any consultation arising on foot of any development application referred to the Minister, by the planning authority,

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in his role as statutory consultee under the Planning and Development Act 2000, as amended.

Please acknowledge receipt and forward any other related correspondence to manager.dau@ahg.gov.ie

Further pre-planning consultation requests may be sent to devapp@ahg.gov.ie

Please note this office's address below in the event of sending hard copy material.

Mise, le meas

Muiris Ó Conchúir

_____
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****
Is faoi rún agus chun úsáide an té nó an aonán atá luaite leis, a sheoltar an ríomhphost seo agus aon comhad atá nasctha leis. Má bhfuair tú an ríomhphost seo trí earráid, déan teagmháil le bhainisteoir an chórais.

Deimhnítear leis an bhfo-nóta seo freisin go bhfuil an teachtaireacht ríomhphoist seo scuabtha le bogearraí frithvíorais chun víorais ríomhaire a aimsiú.

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Appendix B. Ecological Survey Report

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GIL Power Generation Project
Purcellsinch
Co. Kilkenny

Ecological Survey Report comprising:

- **Habitat and flora survey**
- **Kingfisher survey**
- **Otter survey**



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19th April 2012

Prepared on behalf of:
Mott MacDonald Ireland, Environment Division

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EPA Export 30-11-2012:23:27:59

TABLE OF CONTENTS

1 INTRODUCTION 3

2 METHODOLOGY 3

2.1 DESKTOP REVIEW 3
2.2 FIELD SURVEY 3
2.2.1 Habitats and Flora 3
2.2.2 Otters 4
2.2.3 Kingfisher survey 4
2.3 EVALUATION 4

3 RESULTS OF THE ECOLOGICAL SURVEYS 5

3.1 HABITATS AND FLORA SURVEY 5
3.1.1 Improved agricultural grassland (GA1) 5
3.1.2 Amenity grassland (GA2) 5
3.1.3 Wet grassland (GS4) 5
3.1.4 Scrub (WS1) 6
3.1.5 Hedgerows (WL1) 6
3.1.6 Treelines (WL2) 6
3.1.7 Buildings and artificial surfaces (BL3) 6
3.1.8 Eroding / upland watercourses (FW1) 6
3.1.9 Depositing lowland watercourses (FW2) 7
3.1.10 Riparian woodland (WN5) 7
3.1.11 Mixed broadleaved woodland (WD1) 7
3.1.12 Protected flora 7
3.1.13 Invasive non-native flora 8
3.2 KINGFISHER SURVEY 10
3.3 OTTER SURVEY 11

4 RECOMMENDATIONS AND MITIGATIONS 12

REFERENCES 13

PLATES 15

APPENDIX 1 NPWS DESIGNATED SITE SYNOPSES 24

APPENDIX 2 EVALUATION CRITERIA FOR ECOLOGICAL IMPORTANCE 29

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1 INTRODUCTION

Ecofact Environmental Consultants Ltd. have been commissioned by Mott MacDonald Ireland to undertake a series of ecological surveys at the proposed GIL Power Generation development site at Purcellsinch, Co. Kilkenny. These surveys were required taking account of the proposed development in close proximity to and within the River Barrow and River Nore cSAC and the River Nore SPA.

The potential for impacts affecting the qualifying interests of these designated Natura 2000 sites requires detailed assessment and on this basis Ecofact were commissioned to undertake baseline surveys for the following:

- Habitats and flora (Survey and habitat mapping to include Annex I habitats and protected flora listed as qualifying interests of the River Barrow and River Nore cSAC and nationally protected flora, where present)
- Otter (Annex II species listed as a qualifying interest of the River Barrow and River Nore cSAC)
- Kingfisher (Annex I species listed as the sole qualifying interest of the River Nore SPA)

2 METHODOLOGY

2.1 Desktop review

A desktop review was carried out to identify the presence of features of ecological importance within the proposed development site and environs, with regard to the specific surveys being undertaken. A review of the extent of designated conservation sites within the study was carried out by consulting the National Parks and Wildlife Service (NPWS). These sites included Special Areas of Conservation and Special Protection Areas for birds (both internationally important) as well as Natural Heritage Areas (of national importance). Other unpublished information, including records of protected species available on the NPWS website (www.npws.ie) and the National Biodiversity Data Centre (NBDC) was reviewed to establish a list of the protected species and habitats in the study site. The site synopses for designated conservation sites within the study area are presented in Appendix 1.

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A full bibliography of references is provided in the references section. The collation of this information, as well as examination of Ordinance Survey aerial photography and conservation designations from the NPWS online mapping allowed areas of potential ecological importance to be highlighted prior to the field survey.

2.2 Field survey

2.2.1 Habitats and Flora

A habitat survey of the study area was conducted during April 2012 following the Heritage Council publication '*Best Practice Guidance for Habitat Surveying and Mapping*' (Smith *et al.,* 2011). Habitats were classified using habitat descriptions and codes published in the Heritage Council's '*A Guide to Habitats in Ireland*' (Fossitt, 2000). Rare and/or protected flora and habitats were noted, if present. Elements from the manual by the Scottish Environmental Protection Agency '*River Habitat Survey in Britain and Ireland – Field Survey Guidance Manual*' (2003) were also implemented in the habitat survey of the study area along the affected river corridors. The current survey also followed the NRA guidance '*Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes*' (2009a), as a reference for all ecological surveys undertaken.

As the survey was undertaken during late spring, some plant species were dormant and may not have been recorded. However, it was possible to identify all habitats within the study area to Fossitt (2000) Level 3.

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2.2.2 Otters

Specific attention was given to searching for otters *Lutra lutra* within the riparian corridors of the study area. This included searches for otter holts along the river banks and in proximity to the river and otter spraints / prints along the stretch of river corridor particularly at the bridge crossing and at the confluence of the Pococke River and the River Nore, following Chanin (2003). The Pococke River corridor was surveyed upstream of the existing tertiary road bridge crossing to approximately 150m and downstream from the road bridge to the confluence with the River Nore (approximately 150m channel length). The riparian corridor of the River Nore was surveyed to approximately 300m upstream of the proposed abstraction point and approximately 600m downstream. It is noted that there was no survey undertaken along the bank of the Nore at the existing mill-race due to access restrictions.

Otter spraints are characteristic insofar as they are frequently found in raised or prominent sites along the banks of rivers, on large rocks or tree stumps on the bank (Bang & Dahlstrom, 2001) therefore sites such as these were checked. The survey was undertaken in April and is considered optimum for otter survey.

2.2.3 Kingfisher survey

Birds present along the river corridor were recorded during a dedicated bird survey undertaken along the river corridors within the study area. In particular activity of dippers and kingfishers were noted within the river corridors, while an assessment of the River Nore SPA and its importance for wild fowl was also undertaken. The survey was undertaken in April, during the bird breeding season and is considered optimum with regard to observing Kingfish activity.

The survey was carried out on both banks of the River Nore; from the bridge at S522 549 downstream as far as S542 540. This was roughly 800m upstream and 1200m downstream of the proposed abstraction point. The river bank near the dwelling house to the east of the proposed abstraction point was not surveyed. About 100m of the River Pococke was also surveyed. Both banks, where accessible, were surveyed and the number and location of all waterbirds were recorded. Particular attention was paid to the presence or absence of suitable Kingfisher nesting banks, taking account of the River Nore SPA designation along the corridor of the Nore within the study area. The location of current or former nest holes was noted and photographed where possible.

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2.3 Evaluation

It is necessary to identify the value of ecological features within the study area in order to evaluate the significance and magnitude of possible impacts. The results of the ecological survey were evaluated to determine the significance of identified features located in the study area on an importance scale ranging from international-national-county-local. The criteria used for evaluation are based on the NRA (2009) publication '*Assessment of the Ecological Impacts of National Road Schemes*'. The criteria for evaluation based on these NRA guidelines are presented in Appendix 2. The ecological field survey and impact assessment has been prepared in line with the following guidelines:

- Guidelines on the information to be contained in Environmental Impact Statements (EPA 2002);
- Advice Notes on current practice in the preparation of Environmental Impact Statements (EPA, 2003);
- Institute of Ecology and Environmental Management Guidelines for Ecological Impact Assessment (IEEM 2006);
- NRA (2009b) Assessment of the Ecological Impacts of National Road Schemes. National Roads Authority, Dublin

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3 RESULTS OF THE ECOLOGICAL SURVEYS

3.1 Habitats and flora survey

The habitat survey was undertaken following the Heritage Council guidelines (Smith *et al.*, 2011), with habitats recorded evaluated according to the NRA guidelines (2009b). The habitat types recorded from within the study area were classified according to Fossitt (2000) and were mapped according to their extents. The characteristic and dominant flora recorded from within each habitat is also presented. A summary list of habitats recorded from within the proposed development site and environs are presented in Table 1 and are described individually.

A habitat map for the lands within the proposed development site and its environs has been complied and is presented in Figure 1 below.

Table 1 List of the habitat types recorded from within the proposed development site and its environs (according to Fossitt, 2000). The ecological importance of each habitat is also presented (from NRA, 2009b).

Habitat Code	Habitat name	Ecological evaluation	Within or in proximity to the development site
GA1	Improved agricultural grassland	Low local importance	Within the site
GA2	Amenity grassland	Low local importance	Within the site
GS4	Wet grassland	Low local importance	Within the site
WS1	Scrub	High local importance	Within the site
WL1	Hedgerows	High local importance	Within the site
WL2	Treelines	High local importance	Within the site
BL3	Buildings and artificial surfaces	Low local importance	Within the site
FW1	Eroding / upland watercourse	International importance	Crossed by the proposed pipeline route
FW2	Depositing / lowland watercourse	International importance	River Nore at the proposed abstraction point within the site
WN5	Riparian woodland	International importance	Alluvial wet woodland outside of the site footprint
WD1	Mixed broadleaved woodland	High local importance	Outside of the site footprint

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3.1.1 Improved agricultural grassland (GA1)

The proposed development site adjacent to the existing Purcellsinch Wastewater Treatment Plant is characterised as Improved agricultural grassland, as is the majority of the proposed abstraction location. This habitat type within the study area was found to be dominated by Yorkshire fog (*Holcus lanatus*), perennial ryegrass (*Lolium perenne*) and timothy (*Phleum pratense*). Other herbaceous species present include thistles (*Cirsium* spp.), creeping buttercup (*Ranunculus repens*), nettle (*Urtica dioica*), dock (*Rumex* sp.), Cowslip (*Primula veris*), Yarrow (*Achillea millefolium*), White clover (*Trifolium repens*), and ribwort plantain (*Plantago lanceolata*). This habitat is of low ecological value and impacts on this habitat are limited to the local context.

3.1.2 Amenity grassland (GA2)

Landscaped grassland habitat to the north of the proposed development site within the existing industrial estate is classified as Amenity grassland (GA2) habitat. This habitat is of low ecological value and any impacts are limited to the local context.

3.1.3 Wet grassland (GS4)

Wet grassland habitat was recorded from the eastern portion of the proposed abstraction location extending to the bank of the Pococke River corridor at the confluence with the River

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Nore. This habitat was found to be of low diversity, being a feature of inundation and damp ground conditions within an improved agricultural grassland field. This habitat was dominated by Soft rush (*Juncus effusus*).

3.1.4 Scrub (WS1)

Bramble (*Rubus fruticosus*) and gorse (*Ulex europaeus*) scrub (WS1) was recorded within the main portion of the proposed development site. Additional scrub habitat within the study area was recorded from the riparian corridor of the Pococke River due north of the proposed development. This habitat within the proposed development site is identified as being of low ecological importance and impacts are limited to the local context. The scrub habitat along the Pococke River corridor is designated within the River Barrow and River Nore cSAC (as site of international importance) and is evaluated as being of high local importance in its own right; however, no element of the proposed development will affect this habitat.

3.1.5 Hedgerows (WL1)

A short section of degraded hedgerow was recorded along the southern boundary of the proposed development site adjacent to the tertiary road corridor; this habitat was dominated by hawthorn (*Crataegus monogyna*) and evaluated as being of low ecological importance, with any impacts limited to the local context.

3.1.6 Treelines (WL2)

Along the western boundary of the site are mature poplar trees (*Populus* sp.) trees. The southern boundary of the site is also dominated by tree species including hawthorn (*Crataegus monogyna*) and young ash (*Fraxinus excelsior*) and beech (*Fagus sylvatica*) trees. The south eastern field boundary consists of the remains of a stone wall in places with a treeline of ash, hawthorn and occasional oak (*Quercus* sp.). Treeline habitats within the study area were found to be of low local importance, with any impacts limited to the local context.

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3.1.7 Buildings and artificial surfaces (BL3)

Existing built structures and road corridors within the proposed development site and environs are classified within this habitat type. The road corridor connecting the proposed development site to the abstraction location, i.e. the route of the proposed abstraction pipeline, contains a very narrow grassy verge (GS2) characterised by Bent grass (Agrostis spp.), Cock's foot grass (*Dactylis glomerata*), Herb Robert (*Geranium robertianum*), Dandelion (*Taraxacum* spp. agg.), Creeping cinquefoil (*Potentilla reptans*), Ragwort (*Senico jacobea*), Sow-thistle (*Sonchus* sp.), Bramble (*Rubus fruiticosus* spp. agg.), Ivy (*Hedera helix*), Cleavers (*Galium aparine*), Ribwort plantain (*Plantago lanceolata*), Hogweed (*Heracleum sphondylium*), Polypody fern (*Polypodium* spp. agg.) and Maidenhair spleenwort (*Asplenium trichomanes*). The built environment habitats within the study area are evaluated as of low ecological importance and any impacts are limited to the local context.

3.1.8 Eroding / upland watercourses (FW1)

The Pococke River within the study area was found to be characterised by eroding conditions upstream of the tertiary road bridge crossing along the route of the proposed abstraction pipeline. Instream vegetation was dominated by water moss *Fontinalis* sp. with occasional plants of lesser water-parsnip *Berula erecta* and water-crowfoot *Ranunculus* spp. Small areas of deposited silts along the margins supported occasional marsh ragwort *Senecio aquaticus*, opposite-leaved golden saxifrage *Chrysosplenium oppositifolium*, lesser celandine *Ranunculus ficaria*, lady's smock *Cardamine pratensis* and hairy bittercress *Cardamine hirsuta*. This watercourse is designated within the River Barrow and River Nore cSAC and is evaluated as being of international importance.

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3.1.9 Depositing lowland watercourses (FW2)

The lower reaches of the Pococke River below the tertiary road bridge to the confluence with the River Nore is characterised as depositing. This stretch lies to the east of the proposed abstraction location site. Instream vegetation was limited within this stretch of the watercourse, with evidence of water quality issues where flow rates decreased upstream of the confluence. The Pococke River is within the River Barrow and River Nore cSAC and is evaluated as being of high local ecological importance in its own right.

The main channel of the River Nore is a depositing watercourse within the study area, both upstream and downstream of the proposed abstraction location. The river corridor and floodplain within the study area is designated within the River Barrow and River Nore cSAC. Instream vegetation within the river corridor includes branched bur-reed *Sparganium erectum*, common clubrush *Schoenoplectus lacustris* and reed canary-grass *Phalaris arundinacea*. Marginal vegetation comprised canary reed-grass, branched bur reed *Sparganium erectum*, creeping bent *Agrostis stolonifera* with occasional marsh marigold *Caltha palustris*, watermint *Mentha aquatica*, lady's smock *Cardamine pratensis*, meadowsweet *Filipendula ulmaria* and marsh ragwort *Senecio aquaticus*. The River Nore is evaluated as being of international ecological importance.

3.1.10 Riparian woodland (WN5)

The riparian margin of the Nore at the proposed abstraction location comprises an open bank; however downstream of the works site an area broadly corresponding to the priority Annex I habitat type 'Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) [91E0]', listed as a qualifying interest of the cSAC. This habitat is limited in extent and is dominated by willow *Salix* sp. with some ash *Fraxinus excelsior*. The non-native invasive species Himalayan balsam *Impatiens glandulifera* was found to be abundant and likely to be spreading along the riparian corridor at this location. Trees on the weir island on the River Nore, downstream of the proposed abstraction location, included ash *Fraxinus excelsior*, alder *Alnus glutinosa*, sycamore *Acer pseudoplatanus* and osier *Salix viminalis*; while blackthorn *Prunus spinosa* and elder *Sambucus nigra* were found as scattered shrubs.

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Riparian woodland within along the river corridor of the River Nore within the River Barrow and River Nore cSAC broadly corresponds to the priority Annex I habitat and is of international importance.

3.1.11 Mixed broadleaved woodland (WD1)

An area of mixed broadleaved woodland was recorded along the river corridor of the Pococke River from the existing tertiary road bridge crossing upstream, species recorded included Hazel *Corylus avellana*, sycamore *Acer pseudoplatanus*, beech *Fagus sylvatica*, hawthorn *Crataegus monogyna* and ash *Fraxinus excelsior*. This habitat does not occur within the footprint of the proposed development site. Mixed broadleaved woodland within Pococke River corridor is designated within the River Barrow and River Nore cSAC (as site of international importance) and is evaluated as being of high local importance in its own right; however, no element of the proposed development will affect this habitat.

3.1.12 Protected flora

The National Parks and Wildlife Service 'online map viewer' was referenced to establish the potential for protected species occurring in the study site based on records of species recorded from within the 10km grid square (S55). From the NPWS dataset two plant species were recorded; Autumn crocus *Colchium autumnale* and Small-white orchid *Pseudorchis albida*, neither of which have been recently recorded with records dating from the last century.

The Autumn crocus (*Colchium autumnale*) is listed on the Flora Protection Order (1999) and is typically found in damp meadows and river banks. Wet grassland habitat within the proposed development site was found to be species poor; however it is considered possible

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that this species may occur along the riparian margins of the River Nore within the study area. This plant flowers late in August and was not recorded during the botanical survey (April, 2012).

The Small-white orchid is recorded from upland heaths and sand-dune habitats. Suitable habitat for this species was not recorded from within the study area and this species was not identified within the proposed development site.

In addition to the two Flora Protection Order (1999) species listed above, the Nettle-leaved bellflower (*Campanula trachelium*) has been recorded from with the Archersgrove woodland (pNHA) on the south bank of the River Nore, approximately 200m from the proposed development site. This species was previously protected under the Flora (Protection) Order 1987, but was removed under the 1999 Order, it is now recognised as a rare and endangered species on the Red Data list. This species has not been recorded from the proposed development site and suitable woodland habitat for this species does not occur within the footprint of the proposed development.

3.1.13 Invasive non-native flora

The proposed development site, including the proposed abstraction location and abstraction water pipeline route were searched for the presence of non-native invasive species. None were found within the footprint of the development site; however, Himalayan balsam was recorded from the riparian corridor of the River Nore downstream of the proposed abstraction location.

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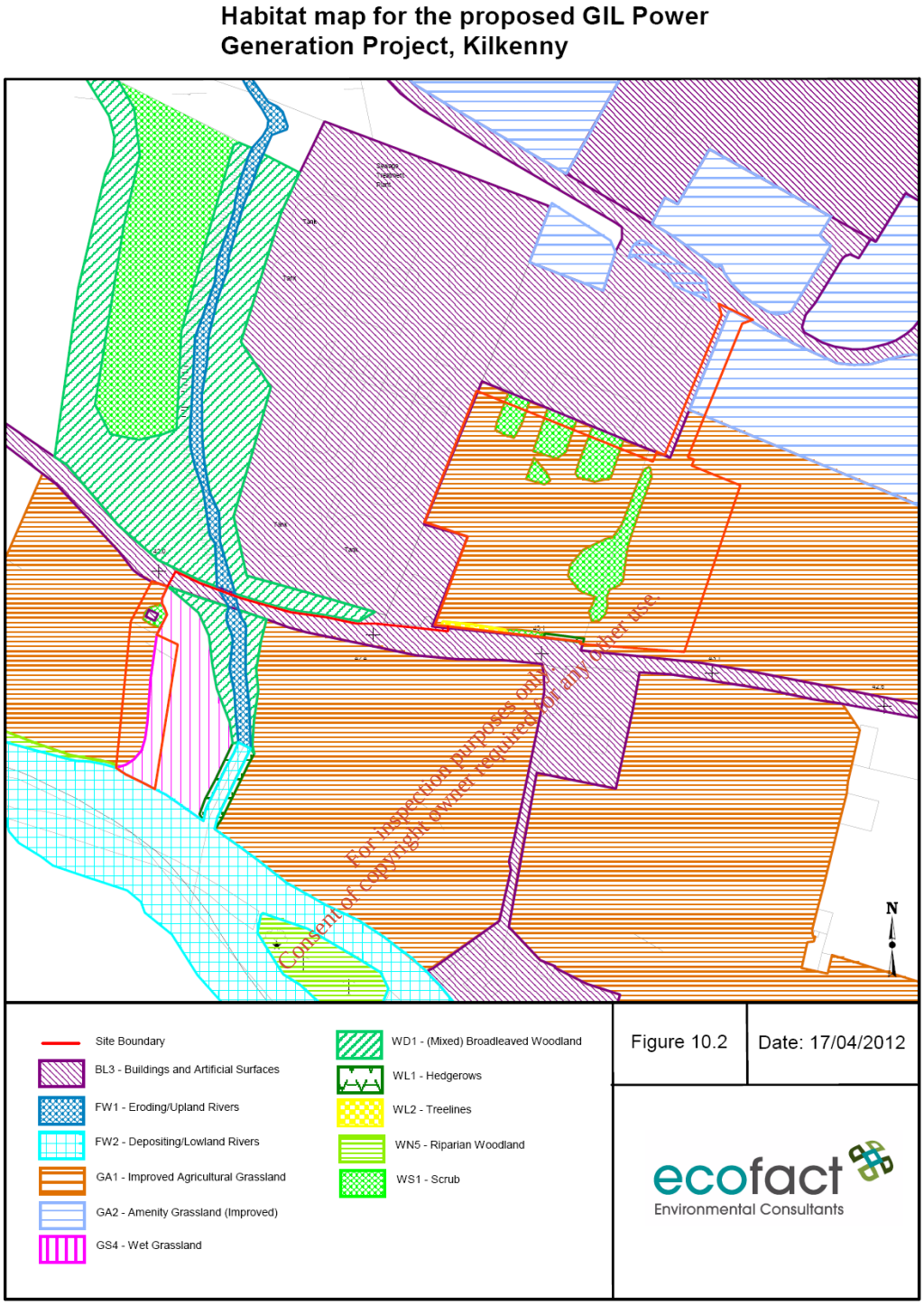

Figure 1 Habitat map of the study area at the proposed GIL Power Generation development, Purcellsinch, Co. Kilkenny. The proposed development site boundary is outlined in red.

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3.2 Kingfisher survey

The breeding bird survey was carried out over two days during early April 2012 and was focussed on identifying Kingfisher activity within the study area. Water levels were low following a month of low rainfall in March 2012, so all suitable nesting banks were visible. The study area was searched thoroughly on foot and all riparian species using the site were recorded. Figure 2 presents a map of the survey area and includes target notes of bird species recorded.

The Kingfisher *Alcedo atthis* is listed on Annex I of the EU Birds Directive (2009) and is the sole conservation interest (NPWS, 2011) of the River Nore SPA (site code 004233), a recently designated Natura 2000 site for the conservation of this species. It is noted that the SPA site boundary includes the River Nore and its immediate riparian corridor but does not include the floodplain lands or the Pococke River corridor which are designated within the River Barrow and River Nore cSAC. Kingfishers are also listed as an Amber species in the 'Birds of Conservation Concern in Ireland' (BOCCI) status report (Lynas *et al*., 2009).

Kingfishers require relatively shallow and slow-moving freshwater, with thriving populations of small fish on which to feed and vertical banks of fairly soft material where they can excavate their nesting burrows (Gibbons *et al*., 1993). All of these requirements are found on the River Nore. In a recent national study, the River Nore was found to support the highest numbers of Kingfishers, nests and territories (Crowe *et al*., 2010). Kingfishers are shy creatures and are easily disturbed with human disturbance of nesting birds identified as a serious problem frequently leading to brood failure (RSPB web-site).

On the River Nore, starting about 400m downstream of the existing abstraction point, there is an abundance of vertical banks with perches nearby. This is where most of the Kingfisher activity was recorded. The area at the rear of the dwelling house near the existing abstraction point has several channels or old mill races which were not surveyed. The river immediately downstream of the existing abstraction point, below the weir, is fast moving and consists of gravel banks. The nearest suitable nesting banks are about 500m downstream. There is considerably less disturbance in this area. Single Kingfishers were seen on three occasions and a pair was recorded at a suitable bank at S541 543, approximately 800m downstream of the proposed development site. At about 500m downstream of the existing abstraction point (S535 544) there were suitable nesting banks identified with one old and two new nest-tunnels.

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There were virtually no suitable nesting banks upstream of the existing abstraction point. These banks were either too low, or sloped, or were faced with stone. This area was used heavily by recreational walkers and joggers and people with dogs. The recreational use decreased further downstream from Kilkenny City.

The bird survey undertaken along the banks of the Pococke River and the River Nore recorded riparian species including Dipper *Cinclus cinclus*, Grey Wagtail *Motacilla cinerea*, Grey Heron *Ardea cinerea*, Cormorant *Phalacrocorax carbo*, Snipe *Gallinago gallinago*, Mallard *Anas platyrhynchos*, Kingfisher *Alcedo atthis* and Reed Bunting *Emberiza schoeniclus*. A pair of Dippers and a pair of Grey Wagtails were found to be nesting on the bridge over the River Pococke. A heronry with 6 active nests was located on the south bank of the River Nore (S530 544) at the Archersgrove woodland, due south of the proposed development. During the survey a single Cormorant was recorded flying downstream but this bird would not be breeding in the area. One Snipe flew up from a drainage ditch near the existing water abstraction point and it may be a late winter migrant. The proposed development site does not contain suitable habitat for wintering water birds.

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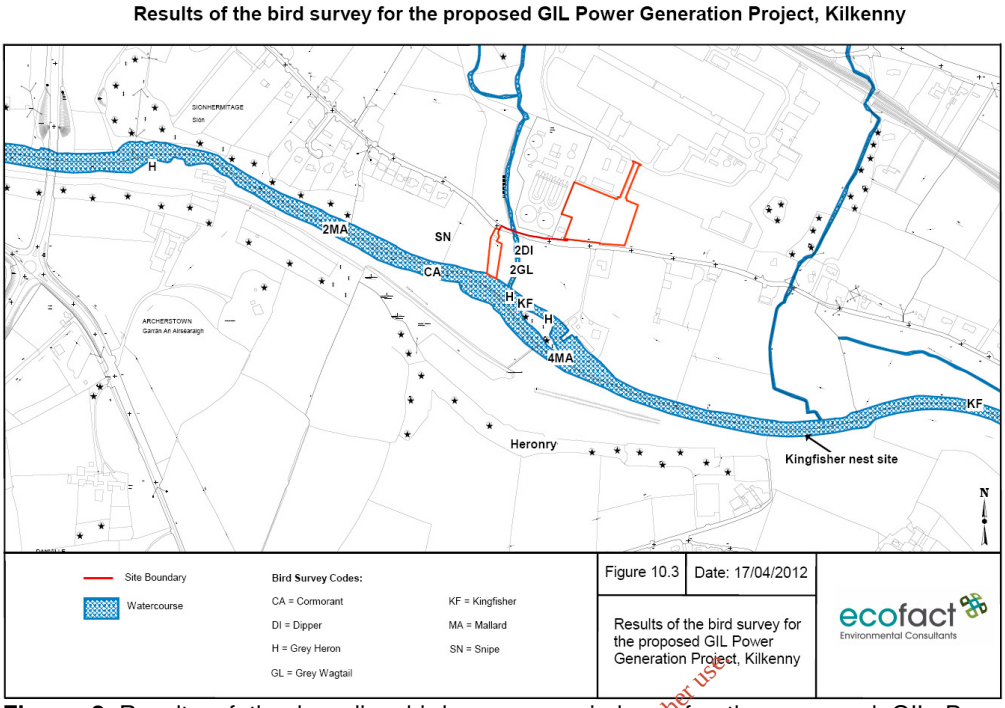

Figure 2 Results of the breeding bird survey carried out for the proposed GIL Power Generation Project, at Purcellsinch, Co. Kilkenny.

3.3 Otter survey

The otter is a legally protected species under the Wildlife Act, 1976 (and Wildlife (Amendment) Act, 2000). According to Marnell *et al.* (2009) the otter is listed as 'Near threatened' on the most recent Red Data list for mammals, taking account of its 'Near threatened' status at a European and Global scale. This species is listed under Annex II and IV of the EU Habitats Directive and under Annex II[1] of the Berne Convention. It is listed as a qualifying interest of the River Barrow and River Nore cSAC.

An extensive search of the study area concentrated on the riparian corridors of the River Nore and Pococke River, and including the lands within the proposed development site was carried out during April 2012. No signs of otter activity i.e. otter holts, spraints, tracks or slides were recorded during the current survey, despite optimal conditions for survey. It is considered inevitable that otter will utilise the river corridors of the River Nore and Pococke River within the study area for foraging and commuting, with good fish stocks presenting adequate foraging within both waterocurses; however, otters may only pass through the lower reaches of the Pococke River due to water quality issues which limit foraging potential. The current assessment considers that although no signs were recorded, otter do occur within the study area.

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[1]Annex II Berne Convention: Strictly protected fauna species.

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4 RECOMMENDATIONS AND MITIGATIONS

Pre-construction, the site access roads and footprint of the proposed works area will be cordoned and no plant movement or tree damage will take place outside of these areas. Buffer zone fencing will be constructed in a continuous line on each side of the development to prevent access outside of the site, taking particular account of the sensitivity of the riparian margin and aquatic environments of the River Nore and the Pococke River.

As part of the proposed development monitoring of the construction and operation of the scheme will be undertaken by qualified environmental professionals. During the construction stage Site Environmental Management Plans incorporating environmental mitigation measures and any such recommendations from the statutory authorities should be stipulated in the contract documents and contained in Construction Method Statements to be prepared by the appointed contractor.

The Site Environmental Management Plan will include a Schedule of Environmental Commitments to include the mitigation measures prescribed in the current EIS and any further requirements set out as conditions of the proposed planning, which will be used as an Environmental Audit Checklist tool to ensure compliance by the appointed contractor and will be completed during environmental monitoring of the works. It is recommended that an independent environmental consultant with experience in monitoring and managing works in sensitive aquatic environments is contracted to monitor the implementation of the agreed mitigation measures on site.

It is recommended that a specific survey for the protected plant species Autumn crocus (listed on the Flora Protection Order (1999)) be undertaken during the flowering season of this species to include the riparian corridor of the River Nore and the wet grassland habitat at the proposed abstraction location. Presence or absence of this species can be confirmed on this basis, with appropriate mitigation measures for the avoidance of impacts or translocation put implemented as required.

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The presence of the non-native, invasive Himalayan balsam was recorded downstream of the propose abstraction location along the riparian corridor of the River Nore. It is recommended that the works area restricted to within the proposed site footprint and no tracking of machinery or earthworks are undertaken within the affected area where this species occurs. All appropriate measures will be taken to ensure that machinery does not facilitate the establishment and spread of non native species into or from the works area. Machinery which has been previously working along roadsides or in watercourses affected by invasive species will require appropriate cleaning and decontamination prior to entering the site. A wide scale management plan for the control of Himalayan balsam along the River Nore corridor is beyond the remit of the current proposal.

Mitigation measures to protect water quality and aquatic ecology interests included in the relevant sections of the EIS will provide adequate protection for the foraging requirements of Otter and Kingfisher.

While there is apparently no Kingfisher pair breeding in the footprint or direct vicinity of the proposed abstraction point it is considered that immature Kingfishers from neighbouring territories will start to disperse in August and September. All works requiring clearance of reed habitat and scrub within the abstraction location should be completed outside the bird breeding season to avoid disturbance.

The pipelaying works connecting the abstraction point to the proposed development site will require works on the existing road bridge over the Pococke River. The barrel of this bridge should not be closed at any time to facilitate passage of Kingfisher and riparian birds along the river corridor.

Passage of otter should also be maintained through the bridge over the Pococke River at all times.

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PLATES



Plate 1 View north across the main portion of the proposed development site looking into the site from the south.



Plate 2 View of the main portion of the proposed development site from the north east corner, looking southwest. The site is dominated by improved agricultural grassland with some gorse scrub and soft rush (*Juncus effusus*) in parts.

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Plate 3 View of the eastern portion of the proposed development site, looking west. This area is also characterised as improved agricultural grassland with gorse and bramble scrub.



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Plate 4 The abstraction pipeline for the proposed development will follow the northern verge of the road corridor (left side of this image) from the development site, crossing the Pococke River at the existing bridge (shown).

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Plate 5 View of the site area at the proposed abstraction location. This improved agricultural grassland field contains a pumping station and existing abstraction and is designated within the River Barrow and River Nore cSAC site boundary.



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Plate 6 The footprint of the proposed abstraction site includes an area of improved agricultural grassland which is subject to flooding and is characterised by soft rush (*Juncus effusus*). The existing abstraction is visible in the background of this image.

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Plate 7 The River Nore corridor from the north bank looking south adjacent to the proposed abstraction location site. The bank is low and open at this location with a reed and large sedge fringe.



Plate 8 View of the River Nore north bank showing the existing water abstraction point within the footprint of the proposed development.

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Plate 9 Alluvial wet woodland dominated by Willow species and Ash to the west, i.e. downstream, of the proposed abstraction site on the north bank of the River Nore.



Plate 10 The non-native invasive species Himalayan balsam was found to be abundant and spreading within the alluvial woodland directly west (downstream) of the proposed abstraction point.

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Plate 11 The Pococke River was characterised as an eroding watercourse upstream of the road bridge (which will carry the proposed water pipeline) with depositing conditions downstream of the bridge to the confluence with the River Nore.



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Plate 12 Depositing character of the Pococke River directly upstream of the confluence with the River Nore.

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Plate 13 Pedestrian access and dog-walking are identified as limiting factors with regard to bird and otter activity within the study area (south bank of the River Nore near Archersgrove).



Plate 14 Adult Grey Heron fishing on the weir near the existing abstraction point.

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Plate 15 Suitable Kingfisher nesting bank on the River Nore (S541 543) upstream of the proposed development site.



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Plate 16 Suitable Kingfisher nesting habitat in exposed bank downstream of the proposed development site (S53603 54431).

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Plate 17 Kingfisher nest site on downstream right bank (S53603 54431).



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Plate 18 Active Kingfisher nest-site on River Nore at (S535 544).

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APPENDIX 1 NPWS Designated site synopses

SITE NAME: RIVER BARROW AND RIVER NORE
SITE CODE: 002162

This site consists of the freshwater stretches of the Barrow/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, Inistioge, 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 runs 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 candidate SAC selected for alluvial wet woodlands and petrifying springs, priority habitats on Annex I of the E.U. Habitats Directive. The site is also selected as a candidate CSAC for old oak woodlands, floating river vegetation, estuary, tidal mudflats, *Salicornia* mudflats, Atlantic salt meadows, Mediterranean salt meadows, dry heath and eutrophic tall herbs, all habitats listed on Annex I of the E.U. Habitats Directive. The site is also selected for the following species listed on Annex II of the same directive – Sea Lamprey, River Lamprey, Brook Lamprey, Freshwater Pearl Mussel, Nore Freshwater Pearl Mussel, Crayfish, Twaite Shad, Atlantic Salmon, Otter, *Vertigo moulinsiana* and the plant Killarney Fern.

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Good examples of Alluvial Forest 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*), Grey Willow (*S. cinerea*), Crack Willow (*S. fragilis*), Osier (*S. viminalis*), with Iris (*Iris pseudacorus*), Hemlock Water-dropwort (*Oenanthe crocata*), Angelica (*Angelica sylvestris*), Thin-spiked Wood-sedge (*Carex strigosa*), Pendulous Sedge (*C. pendula*), Meadowsweet (*Filipendula ulmaria*), Valerian (*Valeriana officinalis*) and the Red Data Book species Nettle-leaved Bellflower (*Campanula trachelium*). Three rare invertebrates have been recorded in this habitat at Murphy's of the River. These are: *Neoascia obliqua* (Diptera: Syrphidae), *Tetanocera freyi* (Diptera: Sciomyzidae) and *Dictya umbrarum* (Diptera: Sciomyzidae).

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 EU 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 sixteenth 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

EPA Export 30-11-2012:23:28:00

species of ancient woodlands. Park Hill is also the site of two rare plants, Nettle-leaved Bellflower and the moss *Leucodon sciuroides.* It has a typical bird fauna including Jay, Long-eared Owl and Raven. A rare invertebrate, *Mitostoma chrysomelas,* occurs in Abbeyleix and only two other sites in the country. Two flies *Chrysogaster virescens* and *Hybomitra muhlfeldi* also occur. 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 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*) 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 County Kilkenny, Kylecorragh Woods form a prominent feature in the landscape. This is an excellent example of a relatively undisturbed, relict Oak 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-dominant 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*), Cowwheat (*Melampyrum* spp.) 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 (*Ilex aquifolium*), and the herb layer is varied, with Brambles abundant. Whitebeam (*Sorbus devoniensis*) has also been recorded.

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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 (*Filipendula ulmaria*), 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*), Milfoil (*Myriophyllum* spp.), *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 (*Pteridium aquilinum*) and Gorse (*Ulex europaeus*) species with patches of acidic grassland vegetation. Additional typical species include Heath Bedstraw (*Galium saxatile*), Foxglove (*Digitalis purpurea*), Common Sorrel (*Rumex acetosa*) and Bent Grass (*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 (*Vaccinium myrtillus*) and Wood Rush (*Luzula sylvatica*) 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.

EPA Export 30-11-2012:23:28:00

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 (*Calluna vulgaris*), Tormentil (*Potentilla erecta*), Carnation Sedge (*Carex panicea*) and Bell Heather (*Erica cinerea*).

Saltmeadows 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*) 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*) (Flora Protection Order, 1987) are found. The very rare 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*), Sea 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*).

Salicornia 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.

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The estuary and the other 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, Willowherb (*Epilobium* spp.) and rushes (*Juncus* spp.). Wet woodland also occurs. This area supports populations of typical waterbirds including Mallard, Snipe, Sedge Warbler and Water Rail.

The dunes which fringe the strand at Duncannon are dominated by Marram grass (*Ammophila arenaria*) towards the sea. Other species present include Wild 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 (*Armeria maritima*), 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.

EPA Export 30-11-2012:23:28:00

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 (*Carex divisa*), Clustered Clover (*Trifolium glomeratum*), Basil Thyme (*Acinos arvensis*), Hemp nettle (*Galeopsis angustifolia*), Borrer's Saltmarsh Grass (*Puccinellia fasiculata*), Meadow Barley (*Hordeum secalinum*), Opposite-leaved Pondweed (*Groenlandia densa*), Autumn Crocus (*Colchicum autumnale*), Wild Sage (*Salvia verbenaca*), Nettle-leaved Bellflower (*Campanula trachelium*), Saw-wort (*Serratula tinctoria*), Bird Cherry (*Prunus padus*), Blue Fleabane (*Erigeron acer*), Fly Orchid (*Ophrys insectifera*), Broomrape (*Orobanche hederae*) and Greater Broomrape (*Orobanche rapum-genistae*). Of these the first nine are protected under the Flora Protection Order 1999. Divided Sedge (*Carex divisa*) 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 (*Carex strigosa*), Field Garlic (*Allium oleraceum*) and Summer Snowflake (*Leucojum aestivum*). 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 EU Habitats Directive Annex II animal species including Freshwater Pearl Mussel (*Margaritifera margaritifera* and *M. m. durrovensis*), Freshwater Crayfish (*Austropotamobius pallipes*), Salmon (*Salmo salar*), Twaite Shad (*Alosa fallax fallax*), three Lamprey species - Sea (*Petromyzon marinus*), Brook (*Lampetra planeri*) and River (*Lampetra fluviatilis*), the marsh snail *Vertigo moulinsiana* and Otter (*Lutra lutra*). This is the only site in the world for the hard water form of the 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 (*Myotis daubentoni*), Badger (*Meles meles*), Irish Hare (*Lepus timidus hibernicus*) and Frog (*Rana temporaria*). 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*.

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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, Bartailed 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.

Landuse at the site consists mainly of agricultural activities – many intensive, principally grazing and silage production. Slurry is spread over much of this 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 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.

EPA Export 30-11-2012:23:28:00

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, overgrazing within the woodland areas, and invasion by non-native species, for example Cherry Laurel 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 respectively. 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 Pearl Mussel which is limited to a 10 km stretch of the Nore, add further interest to this site.

SITE NAME: RIVER NORE SPA
SITE CODE: 004233

The River Nore SPA is a long, linear site that includes the following river sections: the River Nore from the bridge at Townparks, (north-west of Borris in Ossory) to Coolnamuck (approximately 3 km south of Inistioge) in Co. Kilkenny; the Delour River from its junction with the River Nore to Derrynaseera bridge (west of Castletown) in Co. Laois; the Erkina River from its junction with the River Nore at Durrow Mills to Boston Bridge in Co. Laois; a 1.5 km stretch of the River Goul upstream of its junction with the Erkina River; the Kings River from its junction with the River Nore to a bridge at Mill Island, Co. Kilkenny. The site includes the river channel and marginal vegetation. For a large part of its course the River Nore traverses Carboniferous limestone plains; it passes over a narrow band of Old Red Sandstone rocks below Thomastown.

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The site is a Special Protection Area (SPA) under the E.U. Birds Directive of special conservation interest for the following species: Kingfisher. A survey in 2010 recorded 22 pairs of Kingfisher (based on 16 probable and 6 possible territories) within the SPA. Other species which occur within the site include Mute Swan (35), Mallard (267), Cormorant (14), Grey Heron (45), Moorhen (14), Snipe (17) and Sand Martin (1,029) – all figures are peak counts recorded during the 2010 survey.

The River Nore SPA is of high ornithological importance as it supports a nationally important population of Kingfisher, a species that is listed on Annex I of the E.U. Birds Directive.

EPA Export 30-11-2012:23:28:00

APPENDIX 2 Evaluation criteria for ecological importance

Table A2.1 Criteria used in assessing the importance of ecological features (NRA 2009b).

Importance	Criteria

International	• 'European Site' including Special Area of Conservation (SAC), Site of Community Importance (SCI), Special Protection Area (SPA) or proposed Special Area of Conservation.
	• Proposed Special Protection Area (pSPA).
	• Site that fulfils the criteria for designation as a 'European Site' (see Annex III of the Habitats Directive, as amended).
	• Features essential to maintaining the coherence of the Natura 2000 Network.
	• Site containing 'best examples' of the habitat types listed in Annex I of the Habitats Directive.
	• Resident or regularly occurring populations (assessed to be important at the national level) of the following:
	  • Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; and/or
	  • Species of animal and plants listed in Annex II and/or IV of the Habitats Directive.
	• Ramsar Site (Convention on Wetlands of International Importance Especially Waterfowl Habitat 1971).
	• World Heritage Site (Convention for the Protection of World Cultural & Natural Heritage, 1972).
	• Biosphere Reserve (UNESCO Man & The Biosphere Programme).
	• Site hosting significant species populations under the Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animals, 1979).
	• Site hosting significant populations under the Berne Convention (Convention on the Conservation of European Wildlife and Natural Habitats, 1979).
	• Biogenetic Reserve under the Council of Europe.
	• European Diploma Site under the Council of Europe.
	• Salmonid water designated pursuant to the European Communities (Quality of Salmonid Waters) Regulations, 1988, (S.I. No. 293 of 1988).

National	• Site designated or proposed as a Natural Heritage Area (NHA).
	• Statutory Nature Reserve.
	• Refuge for Fauna and Flora protected under the Wildlife Acts.
	• National Park.
	• Undesignated site fulfilling the criteria for designation as a Natural Heritage Area (NHA); Statutory Nature Reserve; Refuge for Fauna and Flora protected under the Wildlife Act; and/or a National Park.
	• Resident or regularly occurring populations (assessed to be important at the national level) of the following:
	  • Species protected under the Wildlife Acts; and/or
	  • Species listed on the relevant Red Data list.
	  • Site containing 'viable areas' of the habitat types listed in Annex I of the Habitats Directive.

County	• Area of Special Amenity.
	• Area subject to a Tree Preservation Order.
	• Area of High Amenity, or equivalent, designated under the County Development Plan.
	• Resident or regularly occurring populations (assessed to be important at the County level) of the following:
	  • Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive;
	  • Species of animal and plants listed in Annex II and/or IV of the Habitats Directive;
	  • Species protected under the Wildlife Acts; and/or
	  • Species listed on the relevant Red Data list.
	• Site containing area or areas of the habitat types listed in Annex I of the Habitats Directive that do not fulfil the criteria for valuation as of International or National importance.
	• County important populations of species, or viable areas of semi-natural

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Importance	Criteria
	habitats or natural heritage features identified in the National or Local BAP, if this has been prepared. • Sites containing semi-natural habitat types with high biodiversity in a county context and a high degree of naturalness, or populations of species that are uncommon within the county. • Sites containing habitats and species that are rare or are undergoing a decline in quality or extent at a national level.

Local Importance (higher value)	• Locally important populations of priority species or habitats or natural heritage features identified in the Local BAP.
	• Resident or regularly occurring populations (assessed to be important at the Local level) of the following:
	  • Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive
	  • Species of animal and plants listed in Annex II and/or IV of the Habitats Directive;
	  • Species protected under the Wildlife Acts; and/or
	  • Species listed on the relevant Red Data list.
	• Sites containing semi-natural habitat types with high biodiversity in a local context and a high degree of naturalness, or populations of species that are uncommon in the locality;
	• Sites or features containing common or lower value habitats, including naturalised species that are nevertheless essential in maintaining links and ecological corridors between features of higher ecological value.

Local Importance (lower value)	• Sites containing small areas of semi-natural habitat that are of some local importance for wildlife; • Sites or features containing non-native species that are of some importance in maintaining habitat links.

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