A0208-01

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Limerick County Council

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TMC/MD

09th March 2011

Administration
Environmental Licensing Programme
Office of Climate, Licensing & Resource Use
Environmental Protection Agency
Headquarters
P.O. Box 3000
Johnstown Castle Estate
Co. Wexford

Re: Appropriate Assessments-Tournafulla (A0221-01), Shanagolden (A0219-01), Templeglantine (A0205-01) and Galbally (A0208-01).

Dear Sir/Madam

I refer to your correspondence of the 28th of January, 2011, and the 3rd of February, 2011, regarding the above agglomerations.

Please find enclosed appropriate assessments for each agglomeration as requested.

Yours faithfully

Trevor Mc Kechnie

TREVOR MCKECHNIE
SENIOR EXECUTIVE ENGINEER
WATER SERVICES DEPARTMENT

ENVIRONMENTAL PROTECTION AGENCY
11 MAR 2011

Limerick County Council

EPA Waste Water Discharge Certificate of Authorisation for Galbally WWTP Agglomeration Galbally WWDC A0208-01

NATURA Impact Statement
Stage 2 – Appropriate Assessment

March 2011
Revision A

TOBIN CONSULTING ENGINEERS

TOBIN
Patrick J. Tobin & Co. Ltd.

NATURA IMPACT STATEMENT
Stage 2 Appropriate Assessment

PROJECT:

EPA Waste Water Discharge Certificate of Authorisation for Galbally WWTP Agglomeration

Galbally WWDC A0208-01

CLIENT:

Water Services Authority
Limerick County Council
Dooradoyle
Co. Limerick

COMPANY:

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DOCUMENT AMENDMENT RECORD

Client:	**Limerick County Council**
Project:	**EPA Waste Water Discharge Certificate of Authorisation for Galbally WWTP Agglomeration**
Title:	**NATURA Impact Statement – Stage 2 Appropriate Assessment**

PROJECT NUMBER: 6313				DOCUMENT REF: Galbally AA			
A	Issued	RM	25/02/11	CD	08/03/11	BD	08/03/11
Revision	**Description & Rationale**	**Originated**	**Date**	**Checked**	**Date**	**Authorised**	**Date**
TOBIN Consulting Engineers							

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APPENDICES

1 INTRODUCTION

This NATURA Impact Statement – Stage 2 Appropriate Assessment is to provide further detail following the conclusion of a screening assessment conducted (December 2010), which concluded that the proposed / existing waste water discharge may give rise to significant effects to the SAC (River Suir SAC). Therefore a Stage 2 Appropriate Assessment is required and detailed herein.

Potential impacts which could arise include negative impacts to ecological surface water quality from the existing and proposed (future discharge). This may lead to significant cumulative impact risks due to lower assimilative capacity (associated with waste water discharge); on downstream NATURA 2000 sites (River Suir), through eutrophication impacts in particular to aquatic based fauna (e.g. spawning salmon and Lamprey) whose conservation status must be retained as "favourable" as per requirements of the EU Habitats Directive.

The assessment process considers key specific aquatic features (species and habitats) of the SAC and determines if direct, indirect and cumulative adverse impacts (however minor) are likely. Where the potential for impacts may arise; appropriate mitigation is detailed.

This assessment and report was carried out by an experienced trained ecologist (>15 years experience) from TOBIN Consulting Engineers.

As part of the process a site visit and baseline aquatic ecological assessment was conducted of the River Aherlow upstream and downstream of the existing discharge on 17th February 2011.

2 APPROPRIATE ASSESSMENT - LEGISLATIVE CONTEXT & METHODOLOGY

2.1 LEGISLATIVE CONTEXT

Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora - '*The Habitats Directive'*, has been transposed into Irish law by The European Community (Natural Habitats) Regulations 1997 (S.I. No. 94/1997). The 1997 Regulations were updated in 1998 by The European Communities (Natural Habitats) (Amendment) Regulations 1998 (S.I. No. 233/1998) to include Council Directive 97/62/EC which served to update Council Directive 92/43/EEC, adapting it to technical and scientific progress made in the intervening years.

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

If, in spite of a negative assessment of the implications for the site and in the absence of alternative solutions, a plan or project must nevertheless be carried out for imperative reasons of overriding public interest, including those of a social or economic nature, the Member State shall take all compensatory measures necessary to ensure that the overall coherence of Natura 2000 is protected. It shall inform the Commission of the compensatory measures adopted. Where the site concerned hosts a priority natural habitat type and/or a priority species, the only considerations which may be raised are those relating to human health or public safety, to beneficial consequences of primary importance for the environment or, further to an opinion from the Commission, to other imperative reasons of overriding public interest.

2.2 GUIDANCE

This Appropriate Assessment has been carried out using the following guidance:

- Appropriate Assessment of Plans and Projects in Ireland, Guidance for Planning Authorities, Department of the Environment, Heritage and Local Government (2009)
- EPA Ireland guidelines[1]
- Managing Natura 2000 Sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC, Office for Official Publications of the European Communities, Luxembourg (EC 2000);
- Assessment of Plans and Projects Significantly Affecting Natura 2000 Sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC, Office for Official Publications of the European Communities, Luxembourg (EC 2001);
- Guidance document on Article 6(4) of the 'Habitats Directive' 92/43/EEC – Clarification of the concepts of: alternative solutions, imperative reasons of overriding public interest, compensatory measures, overall coherence, opinion of the commission. Office for Official Publications of the European Communities, Luxembourg (EC 2007).

Based on these documents, the assessment procedure as detailed in the guidelines is a four stage approach following pre screening. These stages are summarised below.

[1] http://www.epa.ie/downloads/forms/lic/wwda

Pre Screening
This stage follows the flow chart detailed in Appendix 1 of the 'Circular L8/08 - Water Services Investment and Rural Water Programmes - Protection of Natural Heritage and National Monuments', issued by Water Services Section, Department of Environment, Heritage and Local Government. If "Yes" is determined for any of the questions then a screening stage is required.

Stage One: Screening / Test of Significance - the process which identifies the likely impacts upon a Natura 2000 site of a project or plan, either alone or in combination with other projects or plans, and considers whether these impacts are likely to be significant; If significant than a stage 2 Appropriate Assessment stage is required.

This stage has been carried out already, refer to Galbally Appropriate Assessment Screening Report

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

This report details this stage only.

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

Stage Four: Assessment Where Adverse Impacts Remain - an assessment of compensatory measures where, in the light of an assessment of Imperative Reasons of Overriding Public Interest (IROPI), it is deemed that the project or plan should proceed.

2.3 APPROACH

An initial desk study was conducted for available information on the existing facility and surrounding developments

Information sources included:

- EPA websites including; a review of river map water quality data upstream and downstream of the development[2].
- EPA Mapviewer (http://maps.epa.ie/InternetMapViewer/mapviewer.aspx)
- Review of South Eastern River Basin Management Plan (2009-2015) and current ecological status of the discharge river (Aherlow River), which ultimately connects to the River Suir SAC
- Review NPWS website relevant documents: (http://www.npws.ie/en/)

A site visit was conducted on 17th February 2011 to biologically assess (EPA Q value assessment) the stream upstream and downstream of the existing discharge and determine if existing impacts to water quality are (likely to be) arising so as to consider in-combination/ cumulative impacts. Key Indicator group signs/ sightings were also recorded; including Otter, riparian bird species (Kingfisher, Dipper and grey wagtail), river vegetation and visual indicators of waste water pollution.

For the purpose of the local Authority discharge it is considered that provided no significant detectable impact can be deduced downstream of the site than SAC sites beyond 4 to 5 km will not be significantly impacted and current systems for treating, maintenance etc are adequate for this specific legislation.

[2] http://www.epa.ie/rivermap/data/N14.html

3 STAGE 2 - APPROPRIATE ASSESSMENT

The appropriate assessment phase was progressed in the following steps as per EPA guidelines.

Step 1: Information required
Step 2 and 3: Impact prediction and conservation objectives
Step 4: Mitigation

3.1 APPROPRIATE ASSESSMENT STEP ONE - INFORMATION REQUIRED

3.1.1 Description of Natura 2000 Site Affected

River Suir cSAC (Site Code 001879)
A detailed description of this site is provided in Appendix A. Key ecological features requiring consideration in the SAC are aquatic species (including Lamprey species and salmonids) which could potentially be impacted by reduction in water quality associated with the waste water discharge. The River Suir SAC is approximately 7km downstream of the discharge point on the Aherlow River.

3.1.2 Description of Habitats and Wildlife in the Affected Area of the SAC

Methods
An ecological survey was conducted on 17th February 2011 to determine ecological water quality upstream and downstream of the discharge and indicators of water quality and potential impacts from the waste water discharge.

Fish: Observations were made of salmonid species within water bodies described.

Ecological Water Quality: A general water quality assessment based broadly on the Q – value system (Toner *et al.*, 2005)[3] was conducted upstream and downstream of the discharge. Dominant macro invertebrate families identified and stream characteristics were noted.

Birds: Bird species can be key indicators of the biological status of a river. For example Dipper, Kingfisher and Grey wagtail are most likely to be detected where water quality is good. A general bird survey was conducted for the site. Species were noted particularly any of conservation concern (Lynas *et al.*, 2007)[4]. The site and areas close by were walked as far as possible and signs, such as Kingfisher nest sites on river bank sides, were checked for.

Otter: Otter are a key indicator of the biological status of a river (Moderate to Good) and a conservation objective of the SAC. Given their extensive territories (in and out of SAC areas) searches were made for signs of this species.

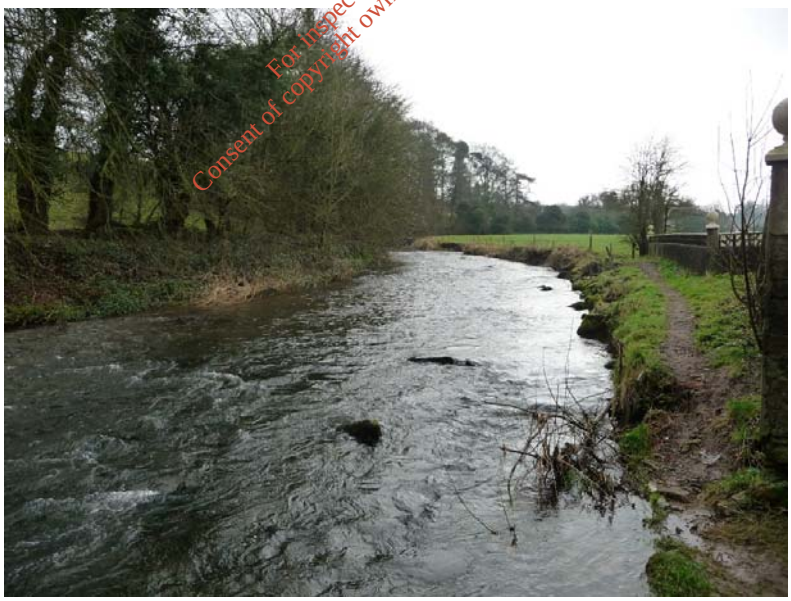
Survey Findings
A summary of the survey findings is provided in Table 1.

[3] *Toner et al. 2005. Water Quality in Ireland: 2001 – 2003' Appendix 1:'Biological and Physico-Chemical Surveillance and Water Quality Assessment of Rivers. EPA.*
[4] *Lynas P., Newton S.F. & Robinson J.A. 2007. The status of birds in Ireland: an analysis of conservation concern 2008-2013. Irish Birds 8 :149-166*

Table 1: Ecological Quality receiving waters (Aherlow River)

Location	Findings	Water Quality
Upstream Primary discharge point	Larger 2nd order river, Riffle area, stones cobbles. Patchy cladophera, Water crowsfoot (Floating River Vegetation), *Fontinalis antipyritica* (River Moss) Salmonids (species unidentified) present Macroinvertebrates: Flattened mayflies (A), Cased and cased caddis (P). Dipper Bird present Otter signs evident	Q4 – "Good" water Quality.
Downstream Primary Discaharge (20-50m)	Larger 2nd order river, Riffle area, stones cobbles. Patchy cladophera, Water crowsfoot (Floating River Vegetation), Salmonids (species unidentified) present Macroinvertebrates Cased and uncased caddis (P), baetidae (P), Flattened mayflies (A), Plecoptera (P). Dipper Bird present Otter signs evident	Q4 – "Good" water Quality.
Downstream Primary Discaharge (100 – 200m)	Larger 2nd order river, Riffle area, stones cobbles. Patchy cladophera, Water crowsfoot (Floating River Vegetation), Salmonids (species unidentified) present Macroinvertebrates Cased and uncased caddis, baetidae, Flattened mayflies (present), Gammarus. Dipper Bird present Otter signs evident	Q4 – "Good" water Quality.

Note: A = abundant, P = present



Aherlow River upstream of Primary Discharge Point

3.1.3 Details of Project Affecting the River Suir cSAC

Information related to the existing discharge and the performance of the existing treatment facilities

Waste Water Discharge for Galbally village: Primary treatment is provided by this system by means of an Inlet Screen, Stormwater Holding Tank, Settlement Tank, Sludge Pump and Sludge Drying Beds. The plant was commissioned in the 1970's. It is 7km upstream of the River Suir SAC.

Details of the Plan or Project affecting the River Suir SAC

Treated Waste Water discharges to River Aherlow during operation of the development

The element listed above is outside the Natura 2000 sites but as it lies upstream (7km) it could potentially impact the SAC.

3.2 APPROPRIATE ASSESSMENT STEP TWO AND THREE - IMPACT PREDICTION AND MITIGATION

3.2.1 Conservation Objectives of the Site

European and national legislation places a collective obligation on Ireland and its citizens to maintain at favourable conservation status areas designated as candidate Special Areas of Conservation. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites. According to the EU Habitats Directive, favourable conservation status of a habitat is achieved when:

- its natural range, and area it covers within that range, is stable or increasing, and
- the ecological factors that are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future, and
- the conservation status of its typical species is favourable as defined below.

The favourable conservation status of a species is achieved when:

- population data on the species concerned indicate that it is maintaining itself, and
- the natural range of the species is neither being reduced or 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.

Objective 1: To maintain the Annex I habitats for which the cSAC has been selected at favourable conservation status: Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae); Old sessile oak woods with *Ilex* and *Blechnum* in British Isles; *Taxus baccata* woods of the British Isles; Atlantic salt meadows (Glauco-Puccinellietalia maritimae); Mediterranean salt meadows (Juncetalia maritimi); Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation; Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels

Objective 2: To maintain the Annex II species for which the cSAC has been selected at favourable conservation status: *Petromyzon marinus, Lampetra planeri, Lampetra fluviatilis, Alosa fallax, Salmo salar, Lutra lutra, Austropotamobius pallipes, Margaritifera margaritifera*

Objective 3: To maintain the extent, species richness and biodiversity of the entire site

Objective 4: To establish effective liaison and co-operation with landowners, legal users and relevant authorities.

3.2.2 Predicted Impacts on the Qualifying Interests of River Suir cSAC

The findings of the ecological study and EPA surface water quality indicate that no current impacts are arising to the Aherlow River from the existing waste water discharge. The water quality upstream and downstream is good Q4. The Aherlow has abundant indicators of a “good” water quality including birds, otter, floating river vegetation and macroinvertebrate indicator groups. Based on the findings detailed in Table1 it is determined that no significant impact is arising to Aherlow River ecological quality associated with the waste water discharge.

Hence this assessment satisfies the requirements of the Habitats Directive and no impacts are arising to the River Suir SAC.

3.2.3 Mitigation Measures

No increases are proposed to existing waste water discharge volumes and concentrations of pollutants (e.g. Ammonia, phosphates etc).

The current management of the waste water treatment plant should be maintained as per existing licensing requirements.

Given the relatively limited existing treatment it would be recommended that at least yearly monitoring of ecological water quality downstreamof the discharge.

4 CONCLUSIONS AND RECOMMENDATIONS

Given the wider water quality issues throughout the River Suir catchment; mid to longer term plans for the waste water treatment plant should include treatment upgrade to secondary treatment though this is more relevant to Water Framework Directive legislation.

It is considered that no significant impacts will arise to European designated sites. Therefore, there is no requirement for Stages 3 and 4 of the appropriate assessment process.

Signed off by:

Mr. Roger McNaughton
Senior Ecologist

APPENDIX A

Screening Matrix of Potential Environmental Impact

(Based on Figure 1 Worked Example of the Screening Matrix contained in the Document Assessment of Plans and Projects significantly affecting Natura 2000 Sites)

Title	Response
Brief description of the project or plan	Waste Water Discharge for Galbally village: Primary treatment is provided by this system by means of an Inlet Screen, Stormwater Holding Tank, Settlement Tank, Sludge Pump and Sludge Drying Beds. The plant was commissioned in the 1970's. It is 7km upstream of the River Suir SAC.
Title	**Response**
Brief description of the Natura 2000 Site	The Site Synopsis for relevant Natura 2000 sites including River Suir SAC is detailed in Appendix B. Key relevant habitats to this development include; Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation Key relevant species include: *Petromyzon marinus, Lampetra planeri, Lampetra fluviatilis, Alosa fallax, Salmo salar, Lutra lutra, Austropotamobius pallipes, Margaritifera margaritifera*
Describe the individual elements of the project (either alone or in combination with other plans or projects) likely to give rise to impacts on the Natura 2000 site.	1. Treated Waste Water discharges to River during operation of the development The element listed above is outside the Natura 2000 sites but as it lies upstream (7km) it could potentially impact the SAC.
Title	**Response**
Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the Natura 2000 Site by virtue of : ▪ size and scale; ▪ land take; ▪ Distance from the Natura 2000 site or key features; ▪ Resource requirements; ▪ Emissions; ▪ Excavation requirements; ▪ Transportation requirements; ▪ Duration of construction, operation, decommissioning etc.;	1. The size and scale of the project, which is located outside the Natura 2000 Sites, is not expected to have significant impacts on the Natura 2000 sites. 2. The land take for the proposed development is outside the Natura 2000 Sites and will not impact on the area of the Natura 2000 Sites. 3. The waste water discharge is approximately 7km upstream of the SAC. Hence water quality requires consideration.

Title	Response
Describe any likely changes to the site arising as a result of: ▪ Reduction in Habitat area; ▪ Disturbance to key species; ▪ Habitat or species fragmentation; ▪ Reduction in species density; ▪ Changes in key indicators of conservation value (water quality etc.); ▪ Climate change;	Eutrophication impacts from WWTP may add to pollution load in river catchment and thus impact the favourable conservation status of described aquatic species. Following desk and field studies it is determined that no measurable impacts are arising to the River Suir SAC from the existing waste water discharge and assimilation capacity is adequate to retain existing "Good" water quality.
Title	**Response**
Describe any likely impacts on the Natura 2000 site as a whole in terms of : ▪ Interference with key relationships that define the structure of the site; ▪ Interference with key relationships that define the function of the site.	Eutrophication impacts from WWTP may add to pollution load in river catchment and thus impact the favourable conservation status of described aquatic species. Following desk and field studies it is determined that no measurable impacts are arising to the River Suir SAC from the existing waste water discharge and assimilation capacity is adequate to retain existing "Good" water quality.
Provide indicators of significance as a result of the identification of effects set out above in terms of: ▪ Loss; ▪ Fragmentation; ▪ Disruption; ▪ Disturbance; ▪ Change to key elements of the site (e.g., water quality etc)	1. There will be no loss of habitat as a result of the proposed project 2. There will be no fragmentation as a result of the proposed project as all construction works will be outside the NATURA 2000 site. 3. No disturbance will arise. 4. Pollution risks to the Aherlow River will be monitored ad subject to EPA licensing requirements.
Describe from the above those elements of the project or plan, or combination of elements, where the above impacts are likely to be significant or where the scale or magnitude of impacts is not known.	1. There are no current elements of the project that are likely to have significant impacts on the Natura 2000 sites.

APPENDIX B

Description of Relevant NATURA 2000 Site

SITE NAME : LOWER RIVER SUIR
SITE CODE : 002137

This site consists of the freshwater stretches of the River Suir immediately south of Thurles, the tidal stretches as far as the confluence with the Barrow/Nore immediately east of Cheekpoint in Co. Waterford and many tributaries including the Clodiagh in Co Waterford, the Lingaun, Anner, Nier, Tar, Aherlow, Multeen and Clodiagh in Co. Tipperary. The Suir and its tributaries flows through the counties of Tipperary, Kilkenny and Waterford. Upstream of Waterford city, the swinging meanders of the Suir crisscross the Devonian sandstone rim of hard rocks no less than three times as they leave the limestone-floored downfold below Carrick In the vicinity of Carrick-on-Suir the river follows the limestone floor of the Carrick Syncline. Upstream of Clonmel the river and its tributaries traverse Upper Palaeozoic Rocks, mainly the Lower Carboniferous Visean and Tournaisian. The freshwater stretches of the Clodiagh River in Co. Waterford traverse Silurian rocks, through narrow bands of Old Red Sandstone and Lower Avonian Shales before reaching the carboniferous limestone close to its confluence with the Suir. The Aherlow River flows through a Carboniferous limestone valley, with outcrops of Old Red Sandstone forming the Galtee Mountains to the south and the Slievenamuck range to the north. Glacial deposits of sands and gravels are common along the valley bottom, flanking the present-day river course. The site is a candidate SAC selected for the presence of the priority habitats on Annex I of the E.U. Habitats Directive - alluvial wet woodlands and Yew Wood. The site is also selected as a candidate SAC for floating river vegetation, Atlantic salt meadows, Mediterranean salt meadows, old oak woodlands 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, Crayfish, Twaite Shad, Atlantic Salmon and Otter. Alluvial wet woodland is declining habitat in Europe as a result of drainage and reclamation. The best examples of this type of woodland in the site are found on the islands just below Carrick-on-Suir and at Fiddown Island. Species occurring here include Almond Willow (*Salix triandra*), White Willow (*S. alba*), Grey Willow (*S. cinerea*), Osier (*S. viminalis*), with Iris (*Iris pseudacorus*), Hemlock Water-dropwort (*Oenanthe crocata*), Angelica (*Angelica sylvestris*), Pendulus Sedge (*Carex pendula*), Meadowsweet (*Filipendula ulmaria*) and Valerian (*Valeriana officinalis*). The terrain is littered with dead trunks and branches and intersected with small channels which carry small streams to the river. The bryophyte and lichen floras appear to be rich and require further investigation. A small plot is currently being coppiced and managed by National Parks and Wildlife. In the drier areas the wet woodland species merge with other tree and shrub species including Ash (*Fraxinus excelsior*), Hazel (*Corylus avellana*), Hawthorn (*Crataegus monogyna*) and Blackthorn (*Prunus spinosa*). This adds further to the ecological interest of this site. Eutrophic tall herb vegetation occurs in association with the various areas of alluvialforest 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*). Old oak woodlands are also of importance at the site. The best examples are seen in Portlaw Wood which lies on both sides of the Clodiagh River. On the south-facing side the stand is more open and the Oaks (mainly *Quercus robur)* are well grown and spreading. Ivy (*Hedera helix*) and Bramble (*Rubus fruticosus*) are common on the ground, indicating relatively high light conditions. Oak regeneration is dense, varying in age from 0-40 years and Holly (*Ilex aquifolium*) is fairly common but mostly quite young. Across the valley, by contrast, the trees are much more closely spaced and though taller are poorly grown on average. There are no clearings; large Oaks extend to the boundary wall. In the darker conditions, Ivy is much rarer and Holly much more frequent, forming a closed canopy in places. Oak regeneration is uncommon since there are as yet few natural clearings. The shallowness of the soil on the north-facing slope probably contributes to the poor tree growth there. The acid nature of the substrate has induced a “mountain” type Oakwood community to develop. There is an extensive species list present throughout including an abundance of mosses, liverworts and lichens. The rare lichen *Lobaria pulmonaria,* an indicator of ancient woodlands, is found. Inchinsquillib Wood consists of three small separate sloping blocks of woodland in a valley cut by the young Multeen River and its tributaries through acidic Old Red Sandstone, and Silurian rocks. Two blocks, both with an eastern aspect, located to the north of the road, are predominantly of Sessile oak (*Quercus petraea*) and Hazel, with Downy Birch (*Betula pubescens*), Ash and Holly. The ground flora is quite mixed with for example Wood

sedge (*Carex sylvatica*), Bluebell (*Hyacinthoides non-scriptus*), Primrose (*Primula vulgaris*), Wood-sorrel (*Oxalis acetosella*), Pignut (*Conopodium majus*) and Hard fern (*Blechnum spicant*). The base poor nature of the underlying rock is, to some extent masked by the overlying drift. The third block, to the south of the road, and with a northern aspect, is a similar although less mature mixture of Sessile Oak, Birch and Holly, the influence of the drift is more marked, with the occurrence of Wood anemone (*Anemone nemorosa*) amongst the ground flora. Floating river vegetation is evident in the freshwater stretches of the River Suir and along many of its tributaries. Typical species found include Canadian Pondweed (*Elodea canadensis*), Milfoil (*Myriophyllum* spp.), Fennel Pondweed (*Potamogeton pectinatus*), Curled Pondweed (*P. crispus*), Perfoliate Pondweed (*P. perfoliatus*), Pond Water-crowfoot (*Ranunculus peltatus*), other Crowfoots (*Ranunculus* spp.) and the moss *Fontinalis antipyretica.* At a couple of locations along the river, Oppositeleaved Pondweed (*Groenlandia densa*) occurs. This species is protected under the Flora (Protection) Order, 1999. The Aherlow River is fast-flowing and mostly follows a natural unmodified river channel. Submerged vegetation includes the aquatic moss *Fontinalis antipyretica* and Stream Water-crowfoot (*Ranunculus pencillatus*), while shallow areas support species such as Reed Canary-grass (*Phalaris arundinacea*), Brooklime (*Veronica beccabunga*) and Water Mint (*Mentha aquatica*). The river bank is fringed in places with Alder (*Alnus glutinosa*) and Willows (*Salix* spp.). The Multeen River is fast flowing, mostly gravel-bottomed and appears to follow a natural unmodified river channel. Water Crowfoots occur in abundance and the aquatic moss *Fontinalis antipyretica* is also common. In sheltered shallows, species such as Water-cress (*Rorippa nasturtium-aquaticum*) and Water-starworts (*Callitriche* spp.) occur. The river channel is fringed for most of its length with Alder, Willow and a narrow strip of marshy vegetation. Salt meadows occur below Waterford City in old meadows where the embankment is absent, or has been breached, and along the tidal stretches of some of the in-flowing rivers below Little Island. There are very narrow, non-continuous bands of this habitat along both banks. More extensive areas are also seen along the south bank at Ballynakill, the east side of Little Island, and in three large salt meadows between Ballynakill and Cheekpoint. The Atlantic and Mediterranean sub types are generally intermixed. The species list is extensive and includes Red Fescue (*Festuca rubra*), Oraches (*Atriplex* spp.), Sea Aster (*Aster tripolium*), Sea Couch Grass (*Elymus pycnanthus*), frequent Sea Milkwort (*Glaux maritima*), occasional Wild Celery (*Apium graveolens*), Parsley Water-dropwort (*Oenanthe lachenalii*), English Scurvygrass (*Cochlearia anglica*) and Sea Arrowgrass (*Triglochin maritima*). These species are more representative of the Atlantic sub-type of the habitat. Common Cord-grass (*Spartina anglica*), is rather frequent along the main channel edge and up the internal channels. The legally protected (Flora (Protection) Order, 1999) Meadow Barley (*Hordeum secalinum*) grows at the landward transition of the saltmarsh. Sea Rush (*Juncus maritimus*), an indicator of the Mediterranean salt meadows, also occurs. Other habitats at the site include wet and dry grassland, marsh, reed swamp, improved grassland, coniferous plantations, deciduous woodland, scrub, tidal river, stony shore and mudflats. The most dominant habitat adjoining the river is improved grassland, although there are wet fields with species such as Yellow Flag (*Iris pseudacorus*), Meadow Sweet (*Filipendula ulmaria*), Rushes (*Juncus* spp.), Meadow Buttercup (*Ranunculus acris*) and Cuckoo Flower (*Cardamine pratensis*). Cabragh marshes, just below Thurles, lie in a low-lying tributary valley into which the main river floods in winter. Here there is an extensive area of Common Reed (*Phragmites australis*) with associated marshland and peaty fen. The transition between vegetation types is often well displayed. A number of wetland plants of interest occur, in particular the Narrow-leaved Bulrush (*Typha angustifolia*), Bottle Sedge (*Carex rostrata*) and Blunt-flowered Rush (*Juncus subnodulosus*). The marsh is naturally eutrophic but it has also the nutritional legacy of the former sugar factory which discharged into it through a number of holding lagoons, now removed. Production is high which is seen in the size of such species as Celery-leaved Buttercup (*Ranunculus sceleratus*) as well as in the reeds themselves. Throughout the Lower River Suir site are small areas of woodland other than those described above. These tend to be a mixture of native and non-native species, although there are some areas of semi-natural wet woodland with species such as Ash and Willow. Cahir Park Woodlands is a narrow tract of mixed deciduous woodland lying on the flatlying floodplain of the River Suir. This estate woodland was planted over one hundred years ago and it contains a large component of exotic tree species. However, due to original planting and natural regeneration there is now a good mix of native and exotic species. About 5km north west of Cashel, Ardmayle pond is a long, possibly artificial water body running parallel to the River Suir. It is partly shaded by planted Lime (*Tilia*

hybrids), Sycamore (*Acer pseudoplatanus*) and the native Alder. Growing beneath the trees are shade tolerant species such as Remote sedge (*Carex remota*). The site is of particular conservation interest for the presence of a number of 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 species of Lampreys - Sea Lamprey (*Petromyzon marinus*), Brook Lamprey (*Lampetra planeri*) and River Lamprey (*Lampetra fluviatilis*) and Otter (*Lutra lutra*). This is one of only three known spawning grounds in the country for Twaite Shad. The site also supports populations of several other animal species. Those which are listed in the Irish Red Data Book include Daubenton's Bat (*Myotis daubentoni*), Natterer's Bat (*M. nattereri*), Pipistrelle (*Pipistrellus pipistrellus*), Pine Marten (*Martes martes*), Badger (*Meles meles*), the Irish Hare (*Lepus timidus hibernicus*), Smelt (*Osmerus eperlanus*) and the Frog (*Rana temporaria*). Breeding stocks of Carp are found in Kilsheelan Lake. This is one of only two lakes in the country which is known to have supported breeding Carp. Carp require unusually high summer water temperatures to breed in Ireland and the site may therefore support interesting invertebrate populations. Parts of the site have also been identified as of ornithological importance for a number of Annex I (EU Birds Directive) bird species, including Greenland White-fronted Goose (10), Golden Plover (1490), Whooper Swan (7) and Kingfisher. Figures given in brackets are the average maximum counts from 4 count areas within the site for the three winters between 1994 and 1997. Wintering populations of migratory birds use the site. Flocks are seen in Coolfinn Marsh and also along the reedbeds and saltmarsh areas of the Suir. Coolfinn supports nationally important numbers of Greylag Geese on a regular basis. Numbers between 600 and 700 are recorded. Other species occurring include Mallard (21), Teal (159), Wigeon (26), Tufted Duck (60), Pintail (4), Pochard (2), Little Grebe (2), Black-tailed Godwit (20), Oystercatcher (16), Lapwing (993), Dunlin (101), Curlew (195), Redshank (28), Greenshank (4) and Green Sandpiper (1). Nationally important numbers of Lapwing (2750) were recorded at Faithlegg in the winter of 1996/97. In Cabragh marshes there is abundant food for surface feeding wildfowl which total at 1,000 or so in winter. Widgeon, Teal and Mallard are numerous and the latter has a large breeding population - with up to 400 in summer. In addition, less frequent species like Shoveler and Pintail occur and there are records for both Whooper and Bewick's swans. Kingfisher, a species that is listed on Annex I of the EU Birds Directive, occurs along some of the many tributaries throughout the site. Landuse at the site consists mainly of agricultural activities including grazing, silage production, fertilizing and land reclamation. The grassland is intensively managed and the rivers are therefore vulnerable to pollution from run-off of fertilisers and slurry. Arable crops are also grown. Fishing is a main tourist attraction on stretches of the Suir and some of its 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. The Aherlow River is a designated Salmonid Water under the EU Freshwater Fish Directive. Other recreational activities such as boating, golfing and walking are also popular. Several industrial developments, which discharge into the river, border the site including three dairy related operations and a tannery. The Lower River Suir contains excellent examples of a number of Annex I habitats, including the priority habitat Alluvial Forest. The site also supports populations of several Annex II animal species and a number of Red Data Book animal species. The presence of two legally protected plants (Flora (Protection) Order, 1999) and the ornithological importance of the river adds further to the ecological interest of this site.
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