River Mall (Templemore) Drainage Scheme

Natura Impact Statement

January 2015

TOBIN CONSULTING ENGINEERS

TOBIN
Patrick J. Tobin & Co. Ltd.

REPORT

PROJECT: **River Mall (Templemore) Drainage Scheme**

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Revision	**Description & Rationale**	**Originated**	**Date**	**Checked**	**Date**	**Authorised**	**Date**
TOBIN Consulting Engineers							

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1 INTRODUCTION

This report details a Natura Impact statement (NIS) which relates to the proposed flood relief scheme on the Mall River at Templemore. This NIS is to inform the Appropriate Assessment (AA) process which is carried out by the appropriate planning authority (i.e. Tipperary County Council).

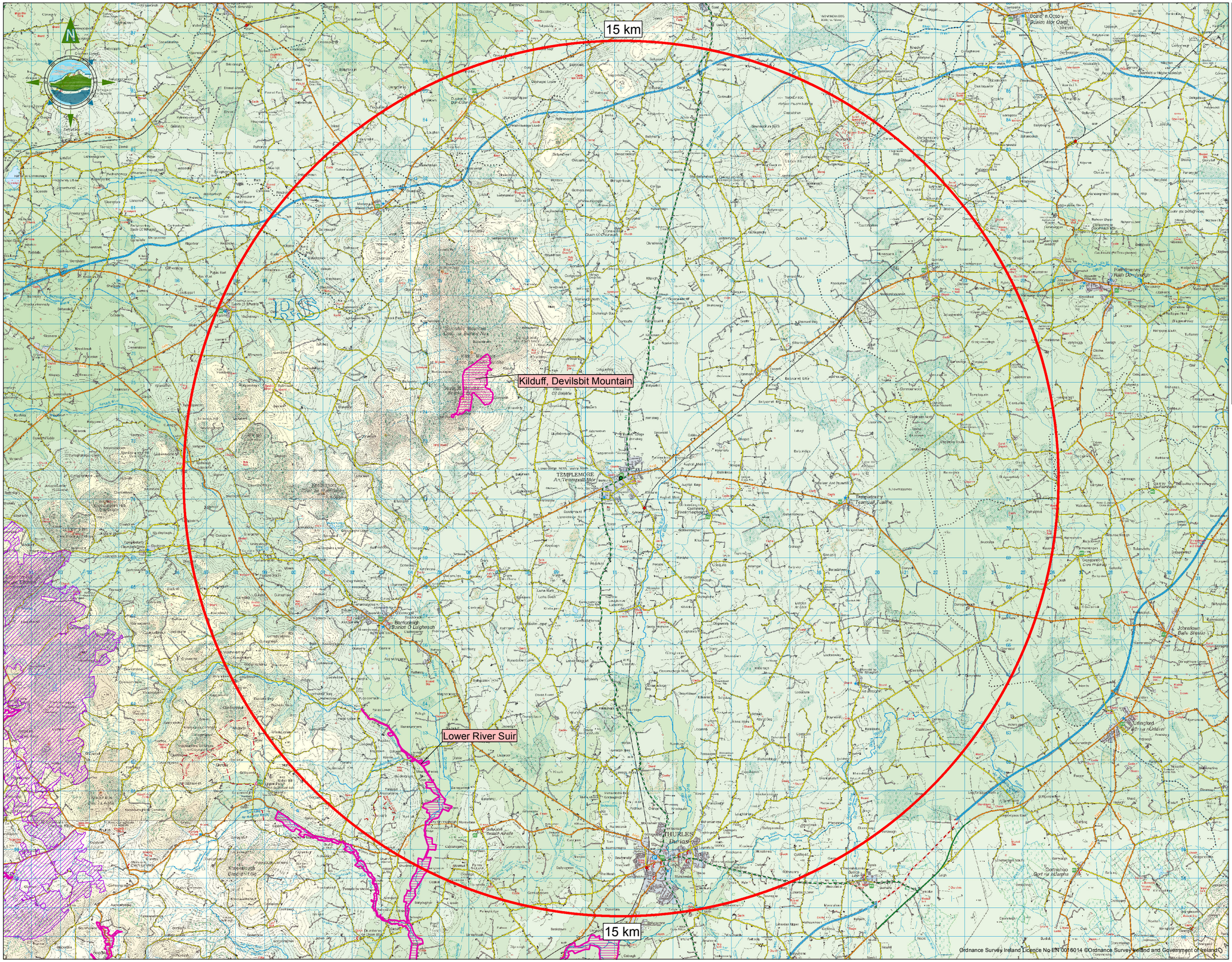
Appropriate Assessment is an assessment of the potential effects of a plan or project, in combination with other plans or projects, on a European Site (Natura 2000 site); refer to legislative context Section 1.1 below. An Environmental Impact Statement (EIS) has also been submitted for this development and this NIS is an Appendix report to provide detailed consideration specifically of Natura 2000 sites and in particular qualifying interests for these sites which are the primary consideration for AA.

The project design to date has been an iterative approach which has sought to, as far as possible; avoid impacts to Natura 2000 sites. This report considers the final carefully considered design. It determines if direct, indirect and in-combination effects arise; or if there is uncertainty regarding effects. Given the “precautionary principle” requirements of AA mitigation is detailed to reduce/ remove potential impacts; or possible uncertainty regarding potential impacts.

Given the nature of the works it was determined that an NIS should be completed for this project as in the absence of mitigation there is uncertainty whether the project alone or in combination with other plans and projects, is likely to have significant effects on the Lower River Suir Special Area of Conservation (SAC) (002137) in view of its conservation objectives. No other European sites are determined which are likely to be affected by the proposed scheme.

The location of the proposed scheme relative to Natura 2000 sites in the area is detailed in Figure 1 overleaf. A description of the Lower River Suir SAC is provided in Appendix A.

This report was drafted by experienced trained Ecologists from TOBIN Consulting Engineers with input from Ecofact Consultants regarding aquatic ecology impacts based on a review of their aquatic ecology assessment drafted for the project EIS. An experienced TOBIN Hydro-geologist, with a scientific background in determining potential water quality risk sources, was also consulted regarding potential impacts to water based ecological receptors.



Legend

- SAC - Special Area of Conservation
- SPA - Special Protection Area

0 0.5 1 2 3 4
Kilometres

NOTES

1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING
2. ALL DRAWINGS TO BE CHECKED BY THE CONTRACTOR ON SITE
3. ENGINEER TO BE INFORMED OF ANY DISCREPANCIES BEFORE ANY WORK COMMENCES
4. ALL LEVELS RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD

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A	16.07.14	Issued	G.F.	A.A.

Client: OPW — The Office of Public Works / Oifig na nOibreacha Poiblí

Project:
TEMPLEMORE
FLOOD RELIEF SCHEME
EIS

Title:
NATURA 2000
SITES

Scale @ A3: 1:120,000

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Figure 1 | A

1.1 Legislative Context

The AA process is an assessment of the potential adverse or negative effects of a plan or project, in combination with other plans or projects, on a European Site (Natura 2000 site). The Natura 2000 network is made up of Special Protection Areas (SPAs), established under the EU Birds Directive (79/409/EEC), and Special Areas of Conservation (SACs), established under the Habitats Directive (92/43/EEC). Ireland's contribution to Natura 2000 is being created under the European Communities (Natural Habitats) Regulations, 1997 (S.I. 94 of 1997 as amended by S.I. 233 of 1998 and S.I. 378 of 2005). These regulations transpose the EU directives into Irish national Law. The Natura 2000 network helps provide for the protection and long-term survival of Europe's most valuable and threatened species and habitats. Although not specifically required, it would be considered best practice to include Ramsar sites (classified under the Ramsar Convention 1971) in the assessment process.

The requirement of AA is outlined in Article 6(3) and 6(4) of the European Union Habitats Directive.

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. 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."*

And Article 6(4) of the Habitats Directive requires that:-

> *"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."*

The assessment should be based on best scientific knowledge and planning authorities should ensure that, for Stage 2 (Appropriate Assessment) in particular, ecological and hydrological expertise (if relevant) is utilised. This report details a NIS to inform the AA process which is finalised by the statutory authority. This NIS was informed by desk and field studies.

1.2 Guidance

This report 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 DEHLG (2009);
- 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);
- European Communities (Birds and Natural Habitats) Regulations, 2011 (S.I. No.477 of 2011); and
- Interpretation Manual of European Union Habitats. Version EUR 28. European Commission (EC, 2013).

The potential for impacts on nature conservation interests has been assessed in light of habitats and the species that are likely to be affected by the proposals. The approach takes into account the following guidance:

- A Guide to Habitats in Ireland (Fossitt, 2000);
- Best Practise Guidelines for Habitat Survey and Mapping in Ireland. Heritage Council (2011);
- 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);
- Habitat Survey Guidelines: A Standard Methodology for Habitat Survey and Mapping in Ireland; (The Heritage Council, 2005);
- Guidelines for the Crossing of Watercourses During the Construction of National Road Schemes (NRA, 2005);
- Guidelines for the treatment of Otters Prior to the Construction of National Roads Schemes; (NRA, 2006);
- Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes; (NRA, 2006);

- Guidelines for the Treatment of Bats during the Construction of National Roads Schemes (NRA, 2006);
- Guidelines for Ecological Impact Assessment (Institute of Ecology and Environmental Management (IEEM), 2006);
- Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA, 2006);
- Requirement for the Protection of Fisheries Habitat During the Construction and Development Works at River Sites (Eastern Regional Fisheries Board);
- Countryside Bird Survey Fieldwork Guidelines (BirdWatch Ireland and National Parks and Wildlife Service); and
- Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA, 2009).

In addition a review of online literature and mapping was conducted. This included a detailed review of the National Parks and Wildlife Service (NPWS) website (www.npws.ie) including a review of all mapping and available reports for relevant sites described.

The EPA Envision Map-viewer and available reports were also reviewed.

1.3 Approach

There are four main stages in the AA process; the requirements for each depending on likely impacts to Natura 2000 sites (cSAC/ SPA).

Stage One: Screening - This process identifies whether the proposed development is directly connected to or necessary for the management of a European Site(s) and identifies whether the project is likely to have significant impacts upon a European Site(s) either alone or in combination with other projects or plans.

Stage Two: Appropriate Assessment - The consideration of the impact of the project or plan on the integrity of the Natura 2000 sites defined, 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 stage is carried out by the planning authority and informed by a Natura Impact Statement (detailed herein). This stage is required where uncertainty of effect arises or a potential effect has been defined which requires further procedures/ mitigation to remove uncertainty or a defined impact.

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.

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.

This NIS report considers likely impacts on European Sites of the projects either alone or in combination and considers whether these effects are likely to be significant.

Based on the outcomes of the ecology assessments detailed precautionary mitigation is detailed as required.

The process was progressed as follows based on DoEHLG (2009) guidelines.

2 STAGE 1 - SCREENING FOR APPROPRIATE ASSESSMENT

2.1 Introduction

This stage of the process identifies any likely significant impacts upon European Sites from a project or plan, either alone or in combination with other projects or plans. The screening phase was progressed in the following stages.

A series of questions are asked during the Screening Stage of the AA process in order to determine:

- Whether a plan or project can be excluded from AA requirements because it is directly connected with or necessary to the management of a European Site; and
- Whether the project will have a potentially significant effect on a European Site, either alone or in combination with other projects or plans, in view of the site's conservation objectives or if residual uncertainty exists regarding potential impacts.

2.2 Description of Proposed Project

Those elements determined as requiring AA consideration are summarised as follows:

- A 60m-long inlet channel with Debris and Gravel Traps and a small Drop Weir.
- A new outflow from the lake to run under Blackcastle Road to the inlet channel.
- A flood-defence line north of the town, in line with a culvert over the new diversion.
- Relocating the river by constructing a new 805m long channel (with a 7.5m base width) that begins in Short's Field and finishes approximately 230m downstream of Small's Bridge.
- The road and access bridges will need to pass the full Climate Change flow of 21.63 m3/s.
- At Richmond Road and Church Avenue, separated by 8.4m, walls along both banks of the diversion both up and downstream.
- Starting at the confluence (approximately 230m downstream of Small's Bridge) with a bed level of 107.3m OD, the riverbed will be re-profiled to finish at 106.1m OD 480m further downstream. The riverbed will be widened to 7.5m base-width from the diversion for approximately 450m and from there a transition returns to the existing 4.5m base wide over a further 250m (or so).
- A 90m long embankment on the left bank (east side) below properties at Small's Bridge.
- A 320m long embankment to defend the Railway View Estate area.
- To improve aeration and fish movement along the excavated river and diversion, a fish channel (Thalweg) will be dug and partially backfilled with gravels. While this will likely be about 0.3m deep with a 2m wide bed and up to 5 to 1 side slopes, it will be designed and constructed in consultation with the region's Fishery Board and, along the channel, may be higher or lower and its width may vary.

- The channel from the upstream works to where the Mall discharges to the Suir is being designated for maintenance to prevent further growth by woody vegetation encroaching into the river or crowding out the flowing floodplain.
- Impacts to the landscape will be reduced by using high quality finishes to works, grassed finishes to embankments and open channel sections, and by planting replacement and new vegetation; including in-channel, where possible.

The final flood relief scheme is outlined on Drawings 2 and 3 overleaf.

Figure 2 Upstream Defences and the River Diversion

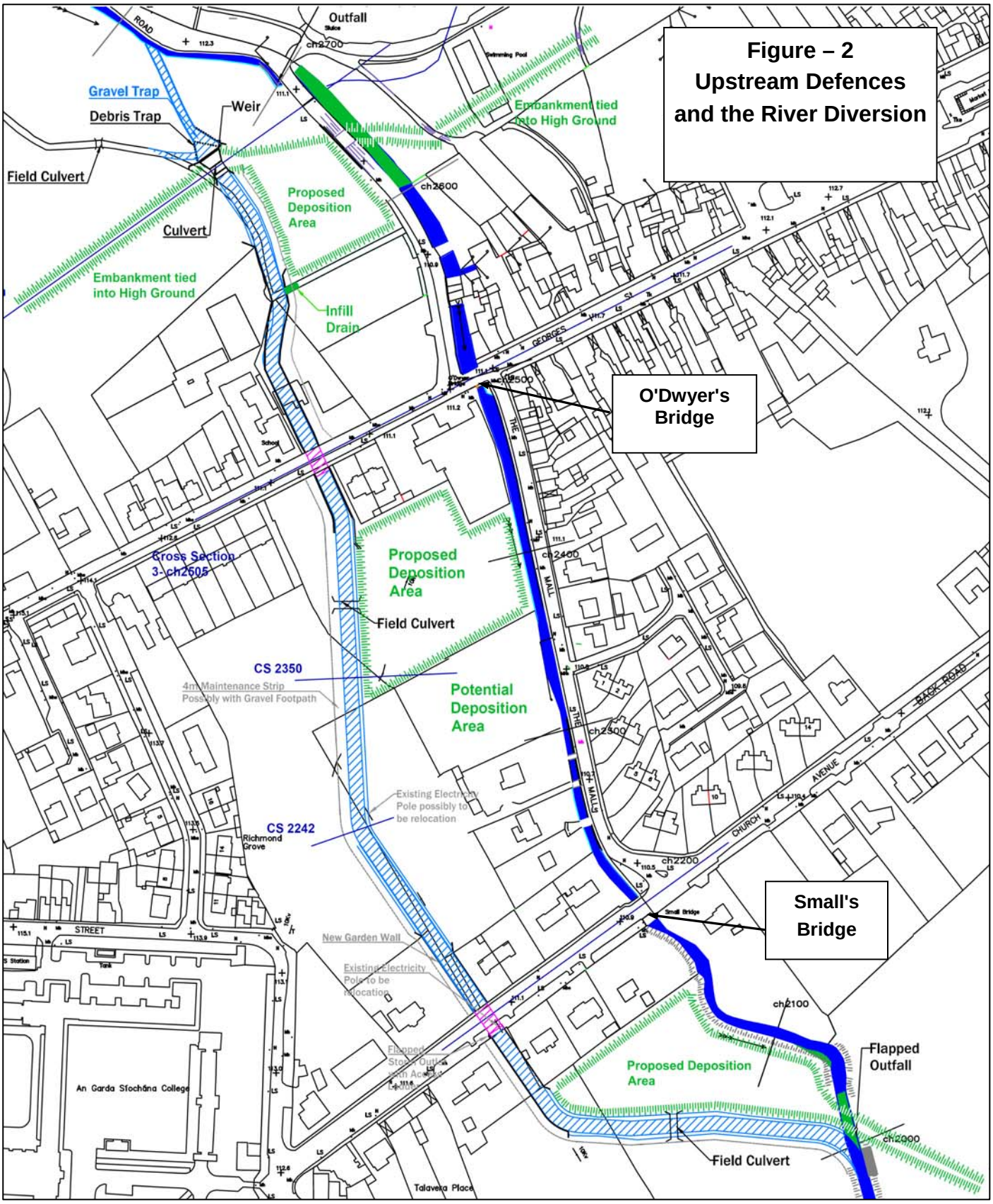

Figure 3 Downstream Works

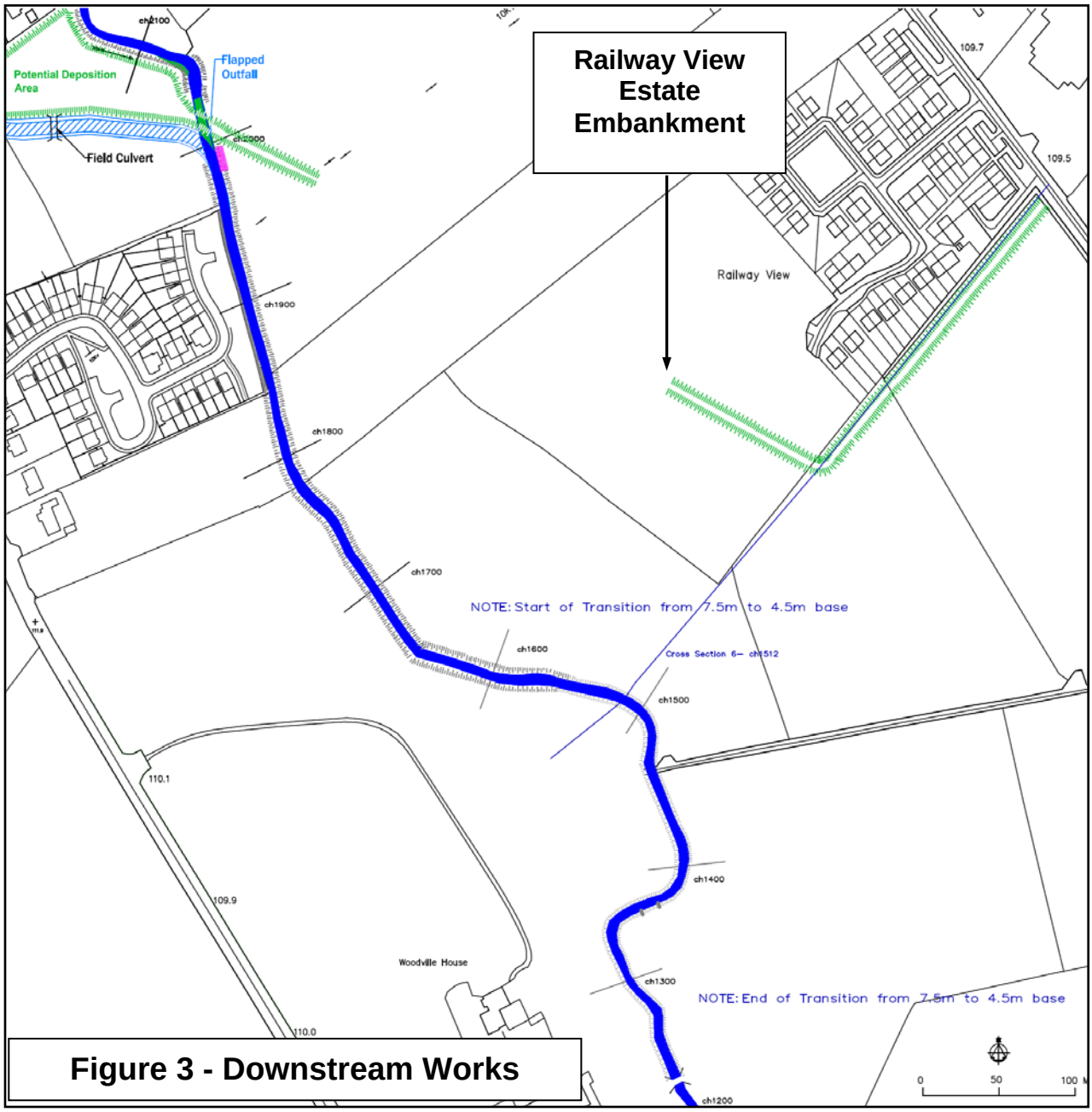

Figure 3 - Downstream Works

2.3 Description of Existing Environment

The town of Templemore lies on the Mall River. The Mall River is part of the Suir catchment and rises approximately 6km upstream of Templemore Town in the vicinity of the Devilsbit Mountains Special Area of Conservation (SAC). The River Suir is designated as a SAC downstream of Thurles, County Tipperary, approximately 22km downstream of the proposed works. The study area includes the Mall River in Templemore and surrounding agricultural and residential land. Habitats in the study area include the river, buildings/roads associated with the town, and agricultural grasslands (both improved and wet grassland) with associated drainage ditches and hedges/treelines. The Mall River is known to support otter, brook/river lamprey, white-clawed crayfish and Atlantic salmon. The proposed Templemore Woods Natural Heritage Area (pNHA) lies adjacent to Templemore Lake, directly north of Templemore Town. Habitats here include the lake, woodland parkland and scattered mature trees.

2.4 Identification of Relevant European Sites

The nearest Natura 2000 designated site is Kilduff, Devils Bit Mountain SAC (Site Code 000934), which is located approximately 2.4km northwest of the proposed scheme. Qualifying Features of Interest are as follows:

- Dry Heath [4030]; and
- Species –rich Nardus Grassland [6230].

The Lower River Suir SAC (Site Code 002137) is approximately 22km downstream of the development and hence is linked to activities including the proposed scheme works in its catchment.

Qualifying Features of Interest are as follows:

- Freshwater pearl mussel (*Margaritifera margaritifera*) [1029];
- White-clawed crayfish (*Austropotamobius pallipes*) [1092];
- Sea lamprey (*Petromyzon marinus*) [1095];
- Brook lamprey (*Lampetra planeri*) [1096];
- River lamprey (*Lampetra fluviatilis*) [1099];
- Twaite shad (*Alosa fallax*) [1103];
- Salmon (*Salmo salar*) [1106];
- Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330];
- Otter (*Lutra lutra*) [1355];
- Mediterranean salt meadows (*Juncetalia maritimi*) [1410];
- Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260];
- Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430];

- Old sessile oak woods with *Ilex* and *Blechnum* in British Isles [91A0];
- *Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae) [91E0]; and
- **Taxus baccata* woods of the British Isles [91J0].

2.5 Identification of Potential Impacts

Kilduff/Devils Bit Mountain SAC is designated for terrestrial upland habitats and is located upstream of the proposed works. There is no potential for impacts to the habitats for which his SAC is designated and so assessment of this site does not need to proceed to Stage 2.

The Lower River Suir SAC is approximately 22km downstream of the proposed works. Key relevant pressures noted for this site include reduction in water quality, in-stream works and drainage. Pollution from agriculture is also a threat listed which should be considered in potential cumulative impacts. Several species for which this site is designated migrate upstream as part of their life cycle (Atlantic salmon and lamprey species). There is a possibility that populations associated with the Lower River Suir utilise the Mall River for spawning. In addition the site is designated for otter which can hold very large territories and there is a possibility that the otter population associated with the Lower River Suir could utilise the Mall River and though this is unlikely given the distance from the site. Precautionary mitigation is proposed in any case. There is potential for indirect impacts to fish and lamprey species due to a reduction in water quality from suspended solids associated with construction work. There is potential for disturbance to otter populations in the Mall River.

Potential changes to the Lower River Suir SAC therefore include:

- Short term disturbance to otter;
- Short term changes in key indicators of conservation value (water quality);
- Reduction in species density (should spawning fish be impacted); and
- Sediments released from forestry and agricultural practices in the sub-catchment of the Mall River may lead to in-combination impacts.

2.6 Screening Conclusion

The Mall River is upstream of the Lower River Suir SAC and thus works here and possible effects to local aquatic ecology are linked to the downstream SAC. Proposed scheme works are to take place approximately 22km upstream of the Lower River Suir SAC. Following the precautionary principle it was considered that the potential for significant impacts could not be ruled out and that mitigation would be required, hence the requirement for a Stage 2 NIS. There is no potential for significant impacts to Kilduff/Devils Bit Mountain SAC and this is screened out at this stage.

3 STAGE 2 – NATURA IMPACT STATEMENT

3.1 Information Required

A range of sources were used to gather information to inform the assessment including:

- Consultation with National Parks and Wildlife Services (NPWS);
- Consultation with Inland Fisheries Ireland (IFI);
- Detailed Desk Studies; and
- Detailed Field Studies including fisheries assessment.

3.2 Consultation

Department of the Environment, Heritage and Local Government

A consultation letter was issued on the 4th June 2014 by TOBIN Consulting Engineers to the Development Applications Unit (DAU) of the Department of Arts, Heritage and the Gaeltacht (DAHG). No response has been received to date. A consultation response from the DAU to the previous proposed Templemore flood relief scheme in 2008 highlighted the following:

- Best practise with regard to pollution control and siltation prevention should be implemented;
- No protected flora records exist for the works area; and
- The works may potentially impact Templemore Lake and Wood proposed Natural Heritage Area (pNHA) and breeding and resting sites for otter. Suitable mitigation for adverse impacts to the pNHA and a survey for otter habitat are recommended.

A phone conversation was held with Stefan Jones, District Conservation Officer with NPWS, on 16th June 2014. He noted the potential to impact salmonids, crayfish, otter and lamprey and commented on the need for a salvage operation and mitigation measures such as silt curtains and fuel bunds to ameliorate downstream impacts. He further noted the presence of the pNHA and the potential to disturb the birds using the lake, and that there may be a possibility of kingfisher using the area. He raised concerns on the potential for impacts to the aquatic fauna of the Lower River Suir SAC.

Inland Fisheries Ireland (IFI)

A consultation letter was issued to IFI on the 4th June 2014 by TOBIN Consulting Engineers. A response was received from the IFI stating that in principle they support the proposal to establish a new river channel including the establishment of appropriate instream and riparian habitat. They state:

- The detailed design of the new channel will be agreed in consultation with the IFI;
- No works shall be carried out without prior consultation and agreement with the IFI:

- The IFI welcome the development of proposals for linear parkland / river walks, particularly in urban areas;
- The proposal for a new river walk, while well intended is inappropriate as it is immediately adjacent the proposed diversion channel;
- IFI is of the view that the proposal should include a riparian zone of approximately 10m;
- IFI requires at least two weeks notification of the intention to divert the Mall River to the new channel so that the removal and transfer of fish from the existing channel to the new channel can be planned; and
- Diversion into the new channel can only take place during the period July to September inclusive.

3.3 Desktop Study

The ecological desktop study completed for the proposed scheme comprised the following elements:

- Identification of all Natura 2000 Sites within 15km of the proposed scheme study area. Refer to Figure 1;
- Review of the NPWS site synopsis and conservation objectives for Natura 2000 sites with identification of potential pathways from the proposed scheme;
- Review of records of rare and protected flora and fauna including those available in NPWS reports and the National Biodiversity Data Centre (NBDC) website;
- Review of Aquatic Ecology Report conducted by Ecofact Consultants for the project;
- Review of Ordnance Survey maps and aerial photography in order to determine broad habitats that occur within the study area;
- Review of any other relevant ecological reports and literature (Bibliography detailed in Appendix 2);
- Review of surveys and reports produced as part of previous studies conducted for the proposed scheme; and
- A series of ecological desk and field studies were undertaken. This included collation of information on protected species including bats, otters, bird species (including Annex I species), Annex II habitat types, protected and Red Data Book flora species, invertebrates and amphibians; as relevant to Natura 2000 sites and their qualifying interests.

3.4 Field Studies

TOBIN Consulting Engineers undertook site visits to carry out habitat and general mammal assessments on the 9th May and 10th June 2014. A bat survey was carried out on the 2nd July 2014. Field studies were also carried out by TOBIN Ecologists in the study area during 2008.

3.5 Habitats and Flora

The habitat assessment was conducted within the site boundary and took in adjacent land in accordance with The Heritage Council's methodology, Best Practice Guidance for Habitat Survey and Mapping (Smith *et. al*, 2011) and habitats were classified according to The Heritage Council's *A Guide to Habitats in Ireland* (Fossitt, 2000). Plant identification and nomenclature principally follows Webb *et al.* (1996)[1]. Grass and fern identification and nomenclature was further assisted by Rose (1989)[2]. The predominant plant species for each habitat type were recorded in order to accurately determine habitats present on the site.

3.6 Otter

Specific surveys were conducted for otter which primarily involved searching the Mall River corridor and adjacent Templemore Lake, for evidence/signs of otter (e.g. tracks, spraints, holts and occasionally direct sightings). An assessment of the habitats within the works area in terms of their importance for otter was also made.

3.7 Aquatic Ecology

The aquatic ecology methods implemented by Ecofact Consultants in 2014 were as follows.

The survey methods consisted of a habitat assessment, electrical fishing, a white-clawed crayfish survey and biological sampling. An assessment of the aquatic habitat was carried out at the aquatic survey sites using the methodology given in the Environment Agency's '*River Habitat Survey in Britain and Ireland Field Survey Guidance Manual 2003*' (EA, 2003). Aquatic plants as well as rare and/or protected plant species and non-native flora were recorded at each site. Plant species nomenclature follows Stace '*New Flora of the British Isles*' (1997).

The results of the physical habitat study were used in conjunction with the leaflet '*The Evaluation of habitat for Salmon and Trout*' to assess habitat suitability for salmonids. An opinion of lamprey habitats was made within the study area with reference to NPWS Irish Wildlife Manuals lamprey surveys (O'Connor, 2004; O'Connor, 2006; and O'Connor, 2007). A bathyscope was used to aid underwater observation of habitats/substrates. The results of the physical habitat study were used in conjunction with the publication *'Ecology of the River, Brook and Sea Lamprey*' (Maitland, 2003) which details the life cycle of lampreys including their spawning habitat requirements.

Habitat for macroinvertebrates was assessed using Barbour and Stribling (1991) where bottom substrate, habitat complexity and various other physical features were considered in assessment of sites for their suitability for macroinvertebrate production.

[1] Webb, D.A., Parnell, J., & Doogue, D. 1996. *An Irish Flora*. Dundalgan Press (W. Tempest) Ltd., Dundalk.
[2] Rose, F. 1989. *Colour Identification Guide to the Grasses, Sedges, Rushes and Ferns of the British Isles and north-western Europe.* Viking

Electrical fishing was carried out during normal / low water levels during July 2014. Electrical fishing assessments were carried out under authorisation from the Department of Communication, Energy and Natural Resources under Section 14 of the Fisheries Act (1980). Electrical fishing specifically for salmonids was carried out at each site following the methodology outlined in the CFB guidance "Methods for the Water Framework Directive - Electric fishing in wadable reaches". Juvenile lamprey surveys generally followed the methodology for ammocoete surveys given in the manual 'Monitoring the River, Brook and Sea Lamprey, *Lampetra fluviatilis*, *L. planeri* and *Petromyzon marinus* by Harvey & Cowx (2003).

White-clawed crayfish surveys were carried out under licence from National Parks and Wildlife Service (NPWS) (Licence C059 / 2014). Methodology for White-clawed Crayfish surveying followed recognised procedures (hand searching and sweep netting) given in the manual 'A technical manual for monitoring white-clawed crayfish *Austropotamobius pallipes* in Irish lakes' by Reynolds *et al* (2010).

Semi-quantitative sampling of benthic (or bottom dwelling) aquatic macroinvertebrates was undertaken at selected sites using kick-sampling (Toner *et al*, 2005). Stone washings and vegetation sweeps were also undertaken to ensure a representative sample of the fauna present at each site was collected. The Quality Rating (Q) System (Toner *et al.*, 2005) was used to obtain a water quality rating for each site.

3.8 Existing environment

3.8.1 Qualifying habitats

The proposed works are to take place within Templemore Town and the surrounding residential area. Habitats identified during site visits/habitat surveys as possibly within the works area of the proposed scheme are as follows:

- Eroding/Upland Rivers (FW1);
- Drainage ditches (FW4);
- Wet Grassland (GS4);
- Improved Agricultural Grassland (GA1);
- Scattered trees and parkland (WD5);
- Hedgerows (WL1);
- Treelines (WL2);
- Re-colonising bare ground (ED3); and
- Buildings and artificial surfaces (BL3).

No qualifying habitat or flora in the Lower River Suir SAC will be affected by the scheme.

3.8.2 Qualifying Terrestrial Fauna

No otter signs were noted in 2014 surveys.

In 2008 otter signs were noted along the Mall River. An otter spraint and otter print was observed 50m upstream and immediately downstream of O'Dwyer's Bridge respectively. In addition an otter spraint and slide was noted close to where the Mall River passes under the Blackcastle Road, close to Patrick Street.

The site includes potential foraging habitat and a commuting corridor for otter. Given otters very widespread distribution it is likely that otter use the Mall River area at least on occasion.

3.8.3 Qualifying Aquatic Fauna

The Mall River was found to be of significant local importance for aquatic fauna and forms part of the overall habitat in the River Suir catchment linked to the SAC. Four species listed on Annex II of the EU Habitats Directive were recorded in 2008 and 2014 surveys. These include otter, brook/river lamprey, white-clawed crayfish and Atlantic salmon. The Mall River is thus of local significance in maintaining the favourable conservation status of these species. The protection of these species and the improvement of aquatic habitats and water quality within the river are considered to be the primary considerations in regard to the conservation aspects of the overall Lower River Suir SAC.

The nearest records of freshwater pearl mussel from the Multeen River from 2006, a tributary of the Suir approximately 30km south of Templemore (10km squares S04 and R94) in the National Biodiversity Data Centre database (EPA biologist data). This river is not significantly linked to possible effects from the proposed scheme.

Water quality is a key consideration for maintaining favourable conservation status for aquatic qualifying species in the Lower River Suir SAC detailed. The Mall River is within the Upper River Suir catchment (IE_SE_SuirUpper) and within the IE_SE_16_3997 waterbody. The Suir Upper Water Management Unit Action Plan highlights that the catchment is at risk mainly from agriculture and WWTPs, and states that it is not ask risk from forestry, quarries, mines or landfills. The Mall River channel is considered 'possibly at risk of not achieving good status' while the upper channel of the River Suir is considered 'at risk of not achieving good status'.

There are no monitoring stations in the Mall River. The nearest monitoring stations are located at Knocknageragh Bridge approximately 2.5km upstream of the confluence with the Mall River and Penane Bridge approximately 1km downstream of this confluence. Monitoring data results for 2005, 2008, 2011 for Knocknageragh and Penane Bridge stations is available and presented in Table 3-1.

The EPA water quality records (www.epa.ie/Envision) indicate the river water quality for the Knocknageragh Bridge and Penane Bridge to be of a moderate status, Q3-4, from 2004 to present day.

Table 3-1 EPA Water Quality Results

EPA Water Quality Results			
Station	**2005**	**2008**	**2011**
Knocknageragh Br (RS16S020300)	Q3-4	Q3-4	Q3-4
Penane Br (RS16S020300)	Q3	Q3	Q3-4

The Q values would suggest that water quality has improved slightly since a new WwTP plant in Templemore was opened in 2010.

Kick samples taken during the surveys for the proposed works in 2008 and 2014 indicate that the Mall River is moderately polluted with ratings of Q3/Q3-4. This indicates that the Mall River water quality is potentially improving which is a positive measure for maintaining favourable conservation status of described aquatic qualifying species.

3.8.4 Conservation Objectives

The first step is to determine key qualifying interests of relevant Natura 2000 sites requiring consideration. The proposed scheme must be considered in light of the conservation objectives for the site (qualifying interests) detailed below.

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the most vulnerable of them. These two designations are collectively known as the Natura 2000 network.

European and national legislation places a collective obligation on Ireland and its citizens to maintain habitats and species in the Natura 2000 network at favourable conservation condition. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.

A site-specific conservation objective aims to define favourable conservation condition for a particular habitat or species at that site.

The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level.

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

The favourable conservation status of a 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; 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.

3.8.5 Lower River Suir SAC

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 County Waterford and many tributaries including the Clodiagh in County Waterford, the Lingaun, Anner, Nier, Tar, Aherlow, Multeen and Clodiagh in County Tipperary. The Suir and its tributaries flow through the counties of Tipperary, Kilkenny and Waterford. The full site synopsis is included in Appendix 1.

The Lower River Suir SAC is designated for 15 Qualifying Interests, a mix of habitats and species, as detailed below with their current overall conservation status (NPWS, 2013). No specific conservation objectives have been publicised for this SAC therefore where applicable the conservation objectives for the River Nore and River Barrow the conservation objectives have been used and are referred to where relevant later in the report.

Qualifying Features of Interest include:

- Freshwater pearl mussel (*Margaritifera margaritifera*) [1029] - UNFAVOURABLE BAD;
- White-clawed crayfish (*Austropotamobius pallipes*) [1092] - UNFAVOURABLE INADEQUATE;
- Sea lamprey (*Petromyzon marinus*) [1095] – BAD;
- Brook lamprey (*Lampetra planeri*) [1096] – FAVOURABLE;
- River lamprey (*Lampetra fluviatilis*) [1099] – FAVOURABLE;
- Twaite shad (*Alosa fallax*) [1103] - INADEQUATE BAD;
- Salmon (*Salmo salar*) [1106] - UNFAVOURABLE INADEQUATE;
- Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] - UNFAVOURABLE INADEQUATE;

- Otter (*Lutra lutra*) [1355] – GOOD;
- Mediterranean salt meadows (*Juncetalia maritimi*) [1410] - UNFAVOURABLE INADEQUATE;
- Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] - UNFAVOURABLE INADEQUATE;
- Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] – BAD;
- Old sessile oak woods with *Ilex* and *Blechnum* in British Isles [91A0] - UNFAVOURABLE BAD;
- *Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae) [91E0] – UNFAVOURABLE BAD; and
- **Taxus baccata* woods of the British Isles [91J0] - UNFAVOURABLE BAD.

Pressures and threats to the SAC may include the following:

- Reduction in Water quality;
- Alteration of Estuarine processes;
- Pollution including agriculture, sewage and industrial waste;
- Infilling;
- Agricultural intensification;
- Angling pressure;
- Intensification of Aquaculture;
- Disturbances to intertidal sediments;
- In-stream works;
- Development;
- Habitat loss;
- Alteration of ground water;
- Dredging;
- Drainage; and
- Invasive species.

3.8.6 Qualifying interests excluded from the assessment

Qualifying interests (above) excluded from the assessment are considered overleaf in Table 3-2. This consideration identified their sensitivities based on conservation status and relevance to possible effects from the development. This consideration follows the precautionary principle i.e. if there a potential for adverse effects to this habitat/ species and hence it's overall conservation status from the proposed development. Features which have no potential of being impacted by the scheme, either because they do not occur within the area likely to be affected, or because they are not sensitive to changes in water quality, are excluded from assessment.

Table 3-2 Features Excluded from this Assessment

Qualifying Interest	Comment
Freshwater pearl mussel (*Margaritifera margaritifera*) [1029]	Freshwater pearl mussel is found in tributaries south of Thurles and not in the main channel of the River Suir. The proposed works do not have the potential to impact on populations in these tributaries.
Sea lamprey (*Petromyzon marinus*) [1095]	This species is found only in the lower reaches of the River Suir near Waterford. Given the distance involved the proposed works do not have the potential to impact this species.
Twaite shad (*Alosa fallax*) [1103]	This species is found only in the lower reaches of the River Suir. Given the distance involved the proposed works do not have the potential to impact this species.
Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330]	Coastal habitat with no potential to be impacted by the proposed works.
Mediterranean salt meadows (*Juncetalia maritimi*) [1410]	Coastal habitat with no potential to be impacted by the proposed works.
Water courses of plain to montane levels with the Ranunculion fluitantis and Callitrichio-Batrachion vegetation [3260]	The definition of this habitat is very broad and as such it is found in most watercourses in Ireland. This habitat would be more sensitive to nutrient loadings and direct disturbance. Given the nature of the works and the distance from the SAC there will be no impacts to this habitat.
Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430]	In lowland environments this habitat occurs as a community if slow-moving rivers and margins of lakes dominated by tall herbs, and also possibly occurs as a tall herb community of wetland borders. Pollution relating to agriculture and grazing are considered the main pressures/threats (NPWS Article 17 report 2013). Given the nature of the works and the distance from the SAC there will be no impacts to this habitat.
*Alluvial florests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae) [91E0]	This habitat is found in areas subject to flooding along watercourses and water bodies where species tolerant of periodic water logging such as alder *Alnus glutinosa*, ash *Fraxinus excelsior* and willow *Salix* sp. are found. Key threats relate to invasive alien species, and grazing (NPWS, 2008). Given the nature of the works and the distance from the SAC there will be no impacts to this habitat.
*Taxus baccata woods of the British Isles [91J0]	Yew woodland is a terrestrial habitat with a highly restricted distribution. Given the nature of the works and the distance from the SAC there will be no impacts to this habitat.
Old sessile oak woods with Ilex and Blechnum in British Isles [91A0]	A terrestrial habitat where key threats have been identified as non-native invasive and grazing. Given the nature of the works and the distance from the SAC there will be no impacts to this habitat.

3.8.7 Qualifying interests considered and their sensitivities

No detailed conservation objectives exist currently for the Lower River Suir SAC, therefore draft conservation objectives from the River Barrow and River Nore SAC have been used. Relevant qualifying interests are considered below regarding potential impacts and mitigation in this NIS.

Otter (Lutra lutra) [1355]

An otter survey was conducted which confirmed the presence of otter in the study area in 2008. No signs were noted in 2014 however it is still likely that otter forage along the Mall River and areas upstream of the proposed scheme. Given the extensive range of otter territories local individuals are likely to be linked to otter populations in the Lower River Suir SAC. The detailed conservation objectives for otter set a target of 'no significant decline' in extent of terrestrial/freshwater/lake habitat or of couching/holt sites. Otter is further considered regarding potential effects and mitigation.

Salmon (Salmo salar) [1106]

Salmon are present in the Lower River Suir SAC and the study area around Templemore was noted as having suitable spawning habitat during site surveys. Juvenile Salmon from the 1+ cohort were recorded in 2014 in the Mall River during electrical fishing surveys which indicates that the river is used by spawning salmon to some degree. This species conducts extensive movements within rivers and the study area includes spawning habitat and nursery areas. Salmon have different habitat requirements depending on the life stage (Hendry & Cragg-Hine, 2003). Juvenile salmon (fry and parr) require shallow, fast-flowing water with areas of cover such as overhanging tress, rocks, undercut banks and woody debris. Adult salmon require clean gravels for spawning with an adequate through-flow of water, and deep pools for resting. The detailed conservations objectives for salmon set a target for river water quality of Q4, and specify there should be no decline in the number and distribution of spawning redds due to anthropogenic causes. Salmon is further considered regarding potential effects and mitigation.

River lamprey (Lampetra fluviatilis) [1099]

No river lamprey was identified in 2014 surveys. River lampreys require clean gravels to spawn and the conservation objectives specify that there should be no decline in the extent and distribution of spawning beds. Potential spawning habitat was recorded within the study area. River lamprey is further considered regarding potential effects and mitigation.

Brook lamprey (Lampetra planeri) [1096]

Brook lamprey completes its life cycle in freshwater, spawning in gravels in the upper reaches of rivers, with larval development occurring in burrows in soft sediments in slower flowing waters downstream. It was recorded in the current study within the Mall River during aquatic surveys in 2014. The detailed conservation objectives for brook lamprey specify they should have access to all watercourses down to first order streams as currently artificial barriers are preventing juvenile lampreys from accessing the full extent of suitable habitat. Brook lamprey require clean gravels to spawn and the conservation objectives specify that there should be no decline in the extent and distribution of spawning beds. Brook lamprey is further considered regarding potential effects and mitigation.

White-clawed crayfish (Austropotamobius pallipes) [1092]

White-clawed crayfish were recorded from all sites surveyed within the Mall River study area in 2014. While the crayfish is present in the vicinity of the proposed works at Templemore the populations in the Lower River Suir are not likely to be impacted by the proposed scheme as this species does not conduct extensive movements and is non migratory. Localised impacts are nevertheless further considered given that populations in the study area potentially add favourably to the overall genetic viability of the River Suir population and for example complete removal of a local population (Mall River) could have uncertain effects on downstream populations in the SAC. White clawed crayfish is further considered regarding potential effects and mitigation.

3.9 Potential Impacts

Two scheme design scenarios are considered when assessing the potential impacts. Scenario A involves the creation of temporary flood diversion channel extending from above Templemore Town to below, and Scenario B involves the creation of new permanent diversion channel.

3.9.1 Alone

Ecological impact assessment of potential indirect impacts on Natura 2000 sites is conducted utilising a standard SOURCE-RECEPTOR-PATHWAY model, where, in order for an indirect impact to be established all three elements of this mechanism must be in place. The absence or removal of one of the elements of the mechanism is sufficient to conclude that a potential impact is of any relevance or significance.

Source – The proposed scheme works;

Pathway – Direct/ indirect linkage/ impact to habitat or species from works within the boundary of the Natura 2000 site or outside site but linked e.g. by river pathway; and

Receptor - The site qualifying interests and the related conservation objectives. The described Natura 2000 sites are potential receptors.

All three elements of this mechanism are in place. Hence based on this model a potential impact must be considered.

The assessment was undertaken in accordance with the guidance contained in the document *Guidelines for Ecological Impact Assessment in the United Kingdom* (IEEM, 2006), with reference to *Guidelines for Assessment of Ecological Impacts of National Roads Schemes* (NRA, 2009). These documents detail the procedure for establishing the 'value' of ecological habitats (i.e. international, national, regional, high local, moderate local, low local) and the criteria for assessing the significance of predicted impacts (i.e. severe, major, moderate, minor or no impact).

Potential impacts to relevant qualifying interests are described below.

3.9.2 Otter

The Mall River and Templemore Lake area is likely to be utilised by otters. Given the extensive range of otters there is a slight possibility that the individuals in the study area have linkage to populations in the Lower River Suir SAC. There is a potential for short term temporary disturbance to arise to otters during the construction phase of both scheme scenarios considered, particularly during instream and riparian vegetation removal works. This may possibly lead to temporary isolation of territories upstream and downstream of the works. However, otter are predominantly nocturnal and mobility should not be impacted as works will not take place at night. They are also adaptable and should be able to continue commuting along the Mall River corridor during the works phase. Following in-stream works riparian vegetation will redevelop and fish and other prey species will be accessible, as is the case in similar works of this nature. Precautionary mitigation is detailed to minimise short term disturbance impacts.

3.9.3 Salmon, River Lamprey Brook Lamprey & White Clawed Crayfish

The proposed river scheme would potentially result in the physical removal of both habitats (i.e. spawning gravels, lamprey nursery areas) and individual protected species (lampreys, crayfish, salmonids) from the Mall River. Such works would also potentially result in the loss of instream vegetation.

Lamprey and salmon are migratory species and the removal of spawning gravels/nursery areas in Templemore could measurably impact populations associated with the Lower River Suir SAC. Juvenile lamprey and salmon were recorded in the Mall River during electrical fishing surveys in 2014. The works are located within a river corridor used by salmonids and lampreys for spawning. For salmonids, the ova and early juvenile stages are most sensitive. Although spawning takes place in winter, fry do not emerge until mid-late May. Therefore any works during this period would have a significant impact on salmonids. Brook lampreys spawn in the spring and early summer months. Juvenile lampreys remain in their nursery areas (silt beds) for up to five years and would therefore be particularly vulnerable to the proposed works.

The physical river drainage works will potentially result in the removal of material containing large quantities of macroinvertebrates such as the legally protected white clawed crayfish which are present in the impact area. Larvae of mayflies, caddisflies, dragonflies and beetles as well as adult beetles, snails and freshwater shrimp would be removed from the ecosystem. This would reduce faunal biomass in the affected stretch and subsequently reduce the production capacity of higher organisms such as fish, otters and other predators. Sections of instream, bankside vegetation and hedgerows would also be cleared during the excavation leading to a loss of aquatic and riparian habitats that have naturalised within Templemore Town. The channel downstream to confluence with River Suir will only be affected by channel maintenance.

White Clawed Crayfish are considered much less sensitive as populations are less mobile and well upstream of the Lower River Suir SAC however direct habitat loss and individual mortality is considered as requiring mitigation consideration.

Scheme Scenario A will result in more localised impacts in terms of direct habitat removal as the original channel will be maintained and the main impacts will occur where the new diversion channel splits and rejoins.

Scheme Scenario B will result in the total loss of habitats in the original channel but a translocation program and design of the new channel would help mitigate impacts.

The two scenarios under consideration will impact flows in the river channels (new and old). If Scenario A is pursed then the diversion channel will be dry when not in flood. As the salmonids spawning season in winter coincides with typical seasonal flood events/high flows it is likely that salmonids will spawn in the diversion channel and thus become stranded during times of lower flows when the diversion is not active. If a sweetening flow was to be left in the diversion channel this could impact the main channel during periods of low flow potentially causing the same issue in the main channel. If Scenario B is pursed and a new permanent diversion channel created receiving full flows, then salmonids will spawn here with no impact.

The proposed flood relief scheme (both scenarios) would also potentially result in the pollution of the Mall River with suspended solids. This would be caused by the runoff of soil due to disturbance of sediments in the course of instream works and culvert construction. High levels of silt in this section of the Mall River could lead to significant potential for disturbance and the downstream transport of this material. This could have a potentially negative impact on the flora and fauna occurring in this survey section of river if it is not contained. The suspended solids if not contained would also potentially flow into the River Suir and subsequently the Lower River Suir SAC. There is also the potential impact of currently inert pollutants from road run-off or from waste discharges in the town that occur within the soft sediments of the substrate to be released into the water column.

Potential impacts from water quality deterioration due to sediment release or accidental spills during construction may include:

- Pollution spills – potential oil, fuel or other pollutant spillages are likely to impact aquatic animal species within receiving waters, causing mortality or other sub-lethal effects such as reduced birth rates and/or juvenile survival;
- Siltation - suspended solids have the potential to damage the gills of aquatic fauna including freshwater pearl mussel, salmon, lamprey and white-clawed crayfish;

- Sedimentation - deposition of silt can smother freshwater pearl mussel, fish eggs, fry and benthic invertebrate communities (food sources for fish and crayfish); and
- Interference with fish migration - anadromous species must be able to reach suitable spawning areas upstream and even a small stretch of poor water quality can block or interfere with migration.

There is also the potential for a range of other pollutants to enter the river during construction work. Such pollutants would include uncured concrete, oils and construction debris. Machinery working within and near the river has the potential to produce pollutants both directly (from leaking fuels, oil spills, etc.) and indirectly, as a result of the drainage maintenance work (i.e. suspended solids, leached pollutants etc.). Any pollutants or accidental spills could potentially run untreated into the Mall River and subsequently the River Suir with serious negative consequences.

There is potential for machinery working on the site to import non-native or invasive species from a previous work site into the river corridor.

It is possible that during the works fish and other aquatic life could become trapped behind the retaining wall or other structures (i.e. the culvert). A small weir is proposed upstream of the diversion. This could impede the passage of non salmonids species and design measures should be put in place to ensure species such as crayfish, lamprey and eel can continue to move upstream.

In conclusion there is the potential for short-medium term localised significant negative impacts to qualifying Annex II listed species described outside the SAC. This would lead to uncertain effects on these populations in the Lower River Suir SAC. Mitigation measures proposed for the conservation of sensitive aquatic ecological receptors are detailed below to minimise the predicted local impacts of the proposed works and avoid impacts on the Lower River Suir populations.

3.9.4 Potential in-combination effects

3.9.4.1 Agriculture

Agriculture is the dominant industry in the surrounding landscape. The main potential source of in-combination impact is on surface water quality. Aerial imagery of the land in the vicinity of the scheme (OSI Mapviewer) shows that the landscape predominantly consists of agricultural lands, both pasture and tillage. The cultivation of grassland for agricultural purposes typically involves the application of agricultural and artificial manures to promote sufficient grass growth. Runoff from agricultural land is likely to be high in nitrates and phosphates, and could potentially contribute to eutrophication of the River Suir. The potential impacts of the proposed scheme works in Templemore is more likely to relate

to sediment release rather than nutrient release, and there in combination with agricultural practices do not have the potential to significantly impact the surface water quality of the Lower River Suir SAC.

3.9.4.2 Forestry

Forestry management operations, including felling, have potential to result in in-combination impacts. Coillte forestry on Devils Bit Mountain from where the Mall River rises could potentially result in combined effects particularly with respect to siltation should felling occur. Devils Bit Forest Management Plan - Forest Code: TY07 covers 1,422ha of Coillte land over the years 2011-2015, was reviewed for potential in-combination impacts. It was noted that 11% of this forest is managed for biodiversity with other areas being converted from conifer plantations to broadleaf plantations over time. The plan indicates that there a total of 78 hectares will be felled between 2011-2015, with some thinning also proposed. Potential in-combination impacts on water quality, in particular during the forestry felling/construction works associated with the proposed development works as part of this project exist, however stringent guidelines are required for any works in Freshwater Pearl catchments. The plan provides the following risk mitigation:

At a planning level (FMP) all water courses marked on OS maps will be given a buffer zone management unit with a biodiversity objective, this buffer zone will be felled in conjunction with the adjoining management unit. The restocking rate is lower and species selected suitable to riparian zones (broadleaves). At site level an EIA is carried out on all sites outlining impacts and mitigation measures put in place. On sensitive sites a water management plan is put in place with water monitoring and water testing. Work on any site will be stopped where there is a risk of a pollution incident.

Combined with the distance downstream of Freshwater Pearl Mussel populations, hectarage of felling likely to be undertaken at the same time as forestry felling/construction works, potential adverse in-combination effects on water quality are considered unlikely.

3.9.4.3 WWTP's

As detailed earlier the Templemore WwTP has been recently upgraded and so in-combination impacts (in terms of suspended solids release) with the proposed works are unlikely.

3.9.4.4 Plans

Plans considered as part of the AA process included the North Tipperary County Development Plan 2010-2016. Policy ENV 5: Water Framework Directive states that '*It is the Council policy to implement the provisions of the River Management Plans, and any other water quality management plans prepared at a national, regional or local level*'. The South Eastern River Basin Management Plan 2009-2015 was also reviewed. The overall objective of the River Basin Management Plan is to achieve and maintain good water quality status. Given the policies in place to ensure there is no conflict with the

Water Framework Directive objectives then no in-combination impacts with the proposed works at Templemore are anticipated.

3.10 Mitigation Measures

Mitigation measures specific to preventing impacts to features of the Lower River Suir SAC are presented below. Further mitigation measures aimed at avoiding or reducing impacts to other ecological receptors in the study area are detailed in the Terrestrial and Aquatic Ecology chapters of the Environmental Impact Statement.

3.10.1 Otter – Both Scheme Scenarios

Otter potentially use the Mall River and Templemore Lake for foraging and commuting. During vegetation clearance along drains and the Mall River an Ecologist will resurvey this area. If a holt is found, appropriate mitigation following NRA *Guidelines for treatment of otters prior to construction of road schemes* (NRA 2006) will be implemented. These will include assessing breeding activity within the site and a license application to the NPWS, if required. The Mall River corridor will not be blocked off especially at night. This will allow otters to transit between areas north and south of the works. This is particularly important in Templemore Town as there will be increased risk of collision with cars if they cannot follow the river.

3.10.2 Salmon, River Lamprey Brook Lamprey & White Clawed Crayfish – Scheme Scenario A (using existing and new flood channel)

3.10.2.1 Mitigation by design

It is recommended that the flood channel will be designed to have a consistent gradient with no areas of pooled water where fish may become trapped after a flood event. It will also be designed to ensure that there is no flow during normal operating circumstances– it will empty in its entirety. Following a flood event any fish that may end up in the culvert can be expected to drop back to the main channel when flows recede. Although there will inevitably be some ongoing non-significant impacts in this regard.

The junction between the downstream end of the flood channel and the river should be designed to be spillway with a drop. This will aim to prevent / discourage salmonids, eels, lampreys and crayfish ascending into the flood channel. The use of a physical barrier (i.e. screens) in this area is not considered feasible as it would become clogged with debris. Likewise there would be technical and practical difficulties in employing an electrical barrier at this site.

Flows into the upstream end of the flood channel will be controlled using a spillway designed to be at flood level.

It is possible that fish would drop over such a structure during a flood event however if the above design is followed this would not result in standing of fish. The upper end of the flood channel will also be designed such a way that any fish accidently entering the flood channel (i.e. adult salmon jumping the drop spillway, or any fish descending into the culvert during flood conditions) will be able to ascend back through the upper spillway during a flood event. The provision of a physical, electrical or behavioural barrier in this area would also not be considered feasible. It is important that the detailed final designs be approved by Inland Fisheries Ireland (IFI) and NPWS.

Where appropriate, riprap will be used instead of gabions for bank armouring works. The provision of riprap has significant benefits for fish (O'Grady, 2006).

3.10.2.2 Mitigation by avoidance

The timing of the works would be agreed in advance with the NPWS and IFI. The works are located within a river corridor used by salmonids and lampreys for spawning. To protect salmon and trout it will be necessary to time works outside the window of October to May. Brook lampreys spawn in the spring and early summer months and the timing of works should also take this species into account.

Work areas will be limited as far as possible. No instream excavations or other works involving interference with the bed, bank or soil should take place outside of the immediate areas where the flood channel joins the Mall River.

No works are proposed for Templemore Lake and this area will be avoiding during all construction works.

3.10.2.3 Mitigation by remedy

The appointed contractor will be required to provide a detailed method statement showing how water quality impacts and habitat loss during the works will be minimised. The methodology will be approved by both the IFI and the NPWS prior to any works taking place. The requirement of any fish, lamprey and crayfish translocation operation will be discussed with a suitably qualified aquatic Ecologist. It is noted that crayfish cannot be captured by electrofishing and lampreys cannot be removed using standard IFI fish salvage methods. A specialist contractor will have to be engaged to do this work.

A suitable Environmental Management System will be used to control sediments during the works; this will include the installation of properly designed silt curtains and a monitoring programme for suspended solids in the river, to be agreed with the NPWS and IFI.

Measures to be used to protect aquatic ecology during the construction works will follow the relevant section of the NRA's documents *'Guidelines for the Crossing of Watercourses during the Construction*

of National Road Schemes' (NRA, 2005). The fisheries board documents "*Maintenance and protection of the inland fisheries resource during road construction and improvement works. Requirements of the Southern Regional Fisheries Board*" (Kilfeather, 2007) and '*Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites*' (Murphy, 2004) would also be followed where relevant.

Water quality impacts during the construction phase would be minimised / avoided by following a method statement agreed in advance with NPWS and the IFI. A silt fence (or equivalent barrier) would be used to surround the works area. This would be installed in the river prior to any works commencing on site. Material removed would be stockpiled within a bunded area / or within a geotextile barrier. All necessary measures would be taken to prevent the release of oil, fuels or other pollutants into the Mall River. The works will be carried out during dry weather and halted during heavy rainfall to reduce suspended solids in the river. Spoil and removed vegetation material from the river is to be stored no less than 5m back from the river and vegetation within this 5m buffer zone is to be retained, in order to reduce the run-off of suspended solids back into the water course.

No exotic invasive flora was recorded from the study site however as the machines being used to excavate the river may contain fragments of exotic invasive flora they will be cleaned at the start of the excavation of the river.

3.10.3 Salmon, River Lamprey Brook Lamprey & White Clawed Crayfish – Scheme Scenario B (new channel only)

3.10.3.1 Mitigation by design

The flood channel will be designed to be a physically diverse river corridor. Suitable guidance to follow is *'The New Rivers and Wildlife Handbook'* by Purseglove, J. (1995). The river channel should be designed with biodiversity in mind, and not just be aimed at salmonids. However guidance for designing / enhancing rivers for salmonids can be found in the book "*Channels & Challenges. Enhancing salmonid rivers* " by O'Grady (1996) and elements of this book should also be used to inform the design of the channel.

The 'old' channel will be modified to ensure that fish can no longer enter it and become trapped after a flood event.

Any piped waste water discharges will be assessed in terms of waste assimilation capacity of the receiving water and treatment such as oil/water separation will be provided.

The outflow of Templemore Lake will be connected to the new channel.

3.10.3.2 Mitigation by avoidance

The timing of the works would be agreed in advance with the NPWS and IFI. The works are located within a river corridor used by salmonids and lampreys for spawning. To protect salmon and trout it will be necessary to time works outside the window of October to May. Brook lampreys spawn in the spring and early summer months and the timing of works should also take this species into account.

Work areas will be limited as far as possible. No instream excavations or other works involving interference with the bed, bank or soil should take place outside of the immediate areas where the flood channel joins the Mall River.

No works are proposed for Templemore Lake and this area will be avoiding during all construction works.

3.10.3.3 Mitigation by remedy

The appointed contractor will be required to provide a detailed method statement showing how water quality impacts and habitat loss during the works will be minimised. The methodology will be approved by both the IFI and the NPWS prior to any works taking place.

There will be a requirement for a large-scale fish, lamprey and crayfish translocation operation on the 'old' river channel. It is noted that crayfish cannot be removed by electrical fishing and that lampreys cannot be removed by salmonid type electrical fishing operation. It will be therefore necessary to engage with specialist licensed aquatic Ecologists, in addition to the IFI. A translocation plan will need to designed and implemented prior to water being diverted into the new channel.

A suitable Environmental Management System will be used to control sediments during the works; this will include the installation of properly designed silt curtains and a monitoring programme for suspended solids in the river, to be agreed with the NPWS and IFI. Measures to be used to protect aquatic ecology during the construction works will follow the relevant section of the NRA's documents 'Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes' (NRA, 2005). The fisheries board documents "Maintenance and protection of the inland fisheries resource during road construction and improvement works. Requirements of the Southern Regional Fisheries Board" (Kilfeather, 2007) and 'Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites' (Murphy, 2004) would also be followed where relevant.

Water quality impacts during the construction phase would be minimised / avoided by following a method statement agreed in advance with NPWS and the IFI. A silt fence (or equivalent barrier) would be used to surround the works area. This would be installed in the river prior to any works commencing on site. Material removed would be stockpiled within a bunded area / or within a geotextile barrier. All

necessary measures would be taken to prevent the release of oil, fuels or other pollutants into the Mall River. The works will be carried out during dry weather and halted during heavy rainfall to reduce suspended solids in the river. Spoil and removed vegetation material from the river is to be stored no less than 5m back from the river and vegetation within this 5m buffer zone is to be retained, in order to reduce the run-off of suspended solids back into the water course.

No exotic invasive flora was recorded from the study site however as the machines being used to excavate the river may contain fragments of exotic invasive flora they will be cleaned at the start of the excavation of the river.

3.11 Predicted Impacts

It is clear that the new flood relief scheme can be constructed while avoiding significant impacts on aquatic ecology by adhering appropriate mitigation detailed herein.

3.12 Conclusion of Stage 2

This NIS concludes that following implementation of precautionary mitigation measures, it is considered that there would be no significant direct or indirect impacts, alone and/or in combination with other plans and projects on the integrity of relevant European Sites.

APPENDIX 1

Site Synopsis Lower River Suir SAC

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 flow 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 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*).

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 northfacing 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, Opposite leaved 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 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 northwest 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, fertilising 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.

APPENDIX 2

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