



Morell River

Flood Management Scheme

Screening for Appropriate Assessment

July 2017

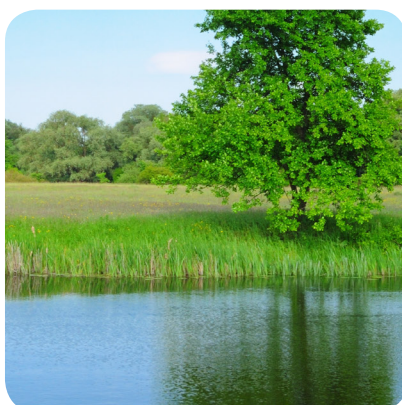


TABLE OF CONTENTS

1	INTRODUCTION	1
1.1	BACKGROUND	1
1.2	LEGISLATIVE BACKGROUND FOR APPROPRIATE ASSESSMENT	1
1.3	STAGES OF APPROPRIATE ASSESSMENT	2
2	METHODOLOGY	4
2.1	GUIDANCE DOCUMENTS ON APPROPRIATE ASSESSMENT	4
2.2	GUIDING PRINCIPLES AND CASE LAW	5
2.3	INFORMATION CONSULTED	5
2.4	SCREENING PROTOCOL	5
3	SCREENING OF EUROPEAN SITES	6
3.1	BRIEF DESCRIPTION OF THE RECEIVING ENVIRONMENT	6
3.2	DESCRIPTION OF THE PROJECT	7
3.3	KEY CHARACTERISTICS OF THE PROPOSED SCHEME	9
3.4	CONSULTATION	11
3.5	BRIEF DESCRIPTION OF THE EUROPEAN SITES	11
4	ASSESSMENT CRITERIA	21
4.1	IS THE PROJECT NECESSARY TO THE MANAGEMENT OF EUROPEAN SITES?	21
4.2	DIRECT, INDIRECT OR SECONDARY IMPACTS	21
4.3	CUMULATIVE AND IN-COMBINATION IMPACTS	22
4.4	LIKELY CHANGES TO EUROPEAN SITES	23
5	SCREENING CONCLUSION AND STATEMENT	25
6	REFERENCES	26

APPENDICES

Appendix A European Sites Conservation Objectives

Appendix B Outline Construction and Environmental Management Plan

LIST OF FIGURES

Figure 3-1 – Morell Catchment Area	8
Figure 3-2 – Proposed Flood Management Scheme	10
Figure 3-3 – European Sites within the Liffey Catchment	20

LIST OF TABLES

Table 3.1 – European Sites within the Zone of Influence.....	12
Table 4.1 – Likely Effects on European Sites	24

1 INTRODUCTION

This report comprises information in support of screening for Appropriate Assessment in line with the requirements of the Planning and Development (Amendment) Act 2010-2015 and the European Union (Birds and Natural Habitats) Regulations 2011 as amended for the Morell Flood Management Scheme (FMS).

1.1 BACKGROUND

The Morell River catchment in County Kildare experiences significant flooding and the Morell Flood Management Scheme (FMS) Study was undertaken by RPS, on behalf of Kildare County Council, to identify flood risk management options to address flood risk in the catchment and prepare all of the relevant documentation in order to submit a FMS for planning application. Ecological surveys in respect of the earlier version of the EIS were conducted in 2014/2015. The EIS was not finalised at that time as the project was put on hold. More recently the documentation required for the planning process has been updated in terms of findings from consultations, additional ecological fieldwork and legislative changes.

1.2 LEGISLATIVE BACKGROUND FOR APPROPRIATE ASSESSMENT

The Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora, better known as the “Habitats Directive” provides legal protection for habitats and species of European importance. Articles 3 to 9 provide the legislative means to protect habitats and species of Community Interest through the establishment and conservation of an EU-wide network of sites known as the Natura 2000 network. These are Special Areas of Conservation (SACs) designated under the Habitats Directive; and Special Protection Areas (SPAs) designated under the Conservation of Wild Birds Directive (79/409/ECC), as codified by Directive 2009/147/EC.

Articles 6(3) and 6(4) of the Habitats Directive set out the decision-making tests for plans and projects likely to affect European Sites (Annex 1.1). Article 6(3) establishes the requirement for AA:

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

Article 6(4) states:

If, in spite of a negative assessment of the implications for the [European] 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, Member States shall take all compensatory measures necessary to ensure that the overall coherence of Natura 2000 is protected. It shall inform the Commission of the compensatory measures adopted.

The Habitats Directive has been transposed into Irish law by the Planning and Development Act 2000 (as amended) and the European Union (Birds and Natural Habitats) Regulations 2011 as amended. The governing legislation is principally Part XAB (s. 177S) of the Planning and Development Act which requires that a Competent Authority (in this case Kildare County Council) *must take appropriate steps to avoid the deterioration of natural habitats and the habitats of species as well as the disturbance of species for which the site has been designated, in so far as such disturbance could be significant in relation to the objectives of the Habitats Directive.*

1.2.1 Role of the Competent Authority

Kildare County Council, in its role as the Competent Authority, is obliged to examine the likely significant effects individually or in combination, of the proposed development on European Sites in light of their specific qualifying interests and conservation objectives. If AA screening determines that there is likely to be significant effects on a European Site, then full AA must be carried out for the proposed works, including the compilation of a Natura Impact Statement to inform the decision making.

1.3 STAGES OF APPROPRIATE ASSESSMENT

The AA process progresses through four stages. If at any stage in the process it is determined that there will be no adverse effect on the integrity of a European Site in view of the sites conservation objectives, the process is effectively completed. The four stages are as follows:

- Stage 1 – Screening of the proposed plan or project for AA;
- Stage 2 – An AA of the proposed plan or project;
- Stage 3 – Assessment of alternative solutions; and
- Stage 4 – Imperative Reasons of Overriding Public Interest (IROPI)/ Derogation.

Stages 1 and 2 relate to Article 6(3) of the Habitats Directive; and Stages 3 and 4 to Article 6(4).

Stage 1: Screening for AA

The aim of screening is to assess firstly if the plan or project is directly connected with or necessary to the management of European Site(s); or in view of best scientific knowledge, if the plan or project, individually or in combination with other plans or projects, is likely to have a significant effect on a European Site. This is done by examining the proposed plan or project and the conservation objectives of any European Sites that might potentially be affected. If screening determines that there is potential for significant effects or there is uncertainty regarding the significance of effects then it will be recommended that the plan or project is brought forward to the next stage of the AA process.

Stage 2: Appropriate Assessment

The aim of stage 2 of the AA process is to identify any adverse impacts that the plan or project might have on the integrity of relevant European Sites. As part of the assessment, a key consideration is ‘in combination’ effects with other plans or projects. Where adverse impacts are identified, mitigation measures can be proposed that would avoid, reduce or remedy any such negative impacts and the plan or project should then be amended accordingly, thereby avoiding the need to progress to Stage 3.

Stage 3: Assessment of Alternative Solutions

If it is not possible during Stage 2 of the AA process to conclude that there will be no adverse effects on site integrity, Stage 3 of the process must be undertaken which is to objectively assess whether alternative solutions exist by which the objectives of the plan or project can be achieved. Explicitly, this means alternative solutions that do not have adverse impacts on the integrity of a European Site. It should also be noted that EU guidance on this stage of the process states that, *‘other assessment criteria, such as economic criteria, cannot be seen as overruling ecological criteria’* (EC, 2001). In other words, if alternative solutions exist that do not have adverse impacts on European Sites; they should be adopted regardless of economic considerations. This stage of the AA process should result in the identification of the least damaging options for the plan or project.

Stage 4: Imperative Reasons of Overriding Public Interest (IROPI)/Derogation

This stage of the AA process is undertaken when it has been determined that a plan or project will have adverse effects on the integrity of a European Site, but that no alternatives exist. At this stage of the AA process, it is the characteristics of the plan or project itself that will determine whether or not the competent authority can allow it to progress. This is the determination of ‘over-riding public interest’.

It is important to note that in the case of European Sites that include in their qualifying features ‘priority’ habitats or species, as defined in Annex I and II of the Directive, the demonstration of ‘over-riding public interest’ is not sufficient and it must be demonstrated that the plan or project is necessary for ‘human health or safety considerations’. Where plans or projects meet these criteria, they can be allowed, provided adequate compensatory measures are proposed. Stage 4 of the process defines and describes these compensation measures.

2 METHODOLOGY

2.1 GUIDANCE DOCUMENTS ON APPROPRIATE ASSESSMENT

The AA requirements of Article 6 of the Habitats Directive 92/43/EEC (European Communities, 2001) follow a sequential approach as outlined in the following legislation and guidance documents/ Departmental Circulars, namely:

European and National Legislation

- Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (also known as the ‘Habitats Directive’);
- Council Directive 2009/147/EC on the conservation of wild birds, codified version (also known as the ‘Birds Directive’);
- European Communities (Birds and Natural Habitats) Regulations 2011 as amended; and
- Planning and Development Act 2000 as amended.

Guidance

- *Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities.* Department of Environment, Heritage and Local Government, 2010 revision.
- *Appropriate Assessment under Article 6 of the Habitats Directive: Guidance for Planning Authorities.* Circular NPWS 1/10 and PSSP 2/10.
- *Assessment of Plans and Projects Significantly Affecting Natura 2000 Sites: Methodological Guidance on the provisions of Article 6(3) and 6(4) of the Habitats Directive 92/43/EEC* (European Commission Environment Directorate-General, 2001).
- *Managing Natura 2000 Sites: The provisions of Article 6 of the Habitat’s Directive 92/43/EEC* (European Commission Environment Directorate-General, 2000)¹.
- *Guidance Document on Article 6(4) of the ‘Habitat’s Directive 92/43/EEC. Clarification of the Concepts of Alternative Solutions, Imperative Reasons of Overriding Public Interest, Compensatory Measures, Overall Coherence.* Opinion of the European Commission (European Commission January 2007).
- *Communication from the Commission on the precautionary principle.* European Commission (2000).
- EC study on evaluating and improving permitting procedures related to Natura 2000 requirements under Article 6.3 of the Habitats Directive 92/43/EEC. (European Commission, 2013).

Department/NPWS Circulars

- *Appropriate Assessment under Article 6 of the Habitats Directive: Guidance for Planning Authorities.* Circular NPWS 1/10 and PSSP 2/10.
- *Appropriate Assessment of Land Use Plans.* Circular Letter SEA 1/08 & NPWS 1/08.
- *Water Services Investment and Rural Water Programmes – Protection of Natural Heritage and National Monuments.* Circular L8/08.
- *Guidance on Compliance with Regulation 23 of the Habitats Directive.* Circular Letter NPWS 2/07.

¹ The Commission has notified its intent to revise this guidance and a draft revised document was published in April 2015. It would appear that this has not been finalised to date, with no revised guidance document available on the Commissions website.

- *Compliance Conditions in respect of Developments requiring (1) Environmental Impact Assessment (EIA); or (2) having potential impacts on Natura 2000 sites. Circular Letter PD 2/07 and NPWS 1/07.*

2.2 GUIDING PRINCIPLES AND CASE LAW

Over time legal interpretation has been sought on the practical application of the legislation concerning AA as some terminology has been found to be unclear. European and National case law has clarified a number of issues and some aspects of the published guidance documents have been superseded by case law. Case law has been considered in the preparation of this document.

2.3 INFORMATION CONSULTED

The screening exercise is based on a desktop study, that has been informed by site visit as part of the ecological assessment and which utilised the following sources of information:

- Preliminary information on the location, nature and design of the proposed works supplied by the RPS design team;
- As yet unpublished results of the Ecological Impact Assessment studies 2015 and 2017 (RPS);
- Department of Housing, Planning, Community and Local Government – online land use mapping www.myplan.ie/en/index.html;
- National Parks and Wildlife Service – online European Site information www.npws.ie;
- National Parks and Wildlife Service – Information on the status of EU protected habitats and species in Ireland (NPWS, 2013a & 2013b);
- National Biodiversity Data Centre – www.biodiversityireland.ie;
- Ordnance Survey of Ireland – Mapping and aerial photography www.osi.ie;
- GeoHive online mapping - <http://map.geohive.ie/mapviewer.html>;
- Environmental Protection Agency – Water quality www.epa.ie;
- Geological Survey of Ireland – Geology, soils and hydrogeology www.gsi.ie;
- Information on the conservation status of birds in Ireland (Colhoun & Cummins 2013);
- Information on the Eastern River Basin District - www.erbd.ie;
- *Kildare County Development Plan 2011-2017*
- *Draft Kildare County Development Plan 2017 – 2023: Chief Executive’s Report;*
- *Sallins Local Area Plan 2015-2021; and*
- Office of Public Works flood mapping – www.floodmaps.ie

2.4 SCREENING PROTOCOL

2.4.1 Screening Sequence

- Determine whether a project or plan is directly connected with or necessary to the conservation management of a European Site(s);
- Describe the project or plan;
- Identify the European Sites potentially affected by the project or plan;
- Identify and describing any potential effects of the project or plan on European Sites, alone, in-combination and cumulatively with other plans/projects; and
- Assess the likelihood of significant effects on European Sites.

3 SCREENING OF EUROPEAN SITES

3.1 BRIEF DESCRIPTION OF THE RECEIVING ENVIRONMENT

Located north-west of Sallins, the area is largely rural. Ecological survey of the entire scheme route was originally carried out in August 2014, with some additional survey work carried out in June 2015. Further surveys were undertaken on January 24th, 25th and 26th 2017 in light of further design modifications.

The proposed flood management scheme is applicable to the Morell catchment in County Kildare. It is situated within the Eastern River Basin District (ERBD) and Hydrometric Area (HA)/Unit of Management (UoM) 9 (**Figure 3-1**). The landscape is largely characterised by grassland habitats although hedgerow and patchily distributed woodland vegetation was also noted. Other obvious habitats (*sensu* Fossit, 2000) include roads, railway and canals as well as scattered dwellings/farmhouses.

A considerable percentage of the receiving lands are characterised by improved grasslands – largely agricultural but also including transitions to wet grassland and marsh, owing to the influence of waterlogged or flooded soils. There are some areas of drier grassland habitat notably associated with verges or amenity lands such as golf-courses.

Vegetation dominated by extensive woodland is not common although boundary delineation between most land parcels comprises hedgerows (in various degrees of upkeep). There are a number of treelines across the catchment. In terms of woodland vegetation a number of distinct habitats were noted. These include riparian woodland along the north eastern bank of the Slane River, a small parcel of Scot's pine (*Pinus sylvestris*) dominated mixed conifer woodland at Killeenmore and patchily distributed bands, typically small in nature, of mixed broadleaf woodland.

None of the terrestrial habitats surveyed in the study area correspond to Annex I habitats, and the ecological evaluation of most is ranked at the lower end of the 'local value' (as per the NRA scheme). This reflects their widespread nature and the lower floristic diversity. That is not to discount their inherent value as refuges or stepping stones for wildlife.

The main rivers in the catchment are the Morell River (itself a tributary of the River Liffey) and its tributaries the Painstown, Slane and Kill rivers. The Grand Canal flows through the catchment from north-east to south-west. Historically, sections of land within the Morell River Catchment have been prone to considerable waterlogging which has influenced the extent and composition of the habitats. The importance of these watercourses is recognised owing to the salmonid nursery habitat and potential presence of Otter (*Lutra lutra*).

In terms of overall ecological sensitivity, it is the watercourses and associated riparian vegetation including hedgerows that are the sensitive features within the study area. It is in these areas that the bulk of the disturbance/change will occur as a result of the proposed flood relief scheme.

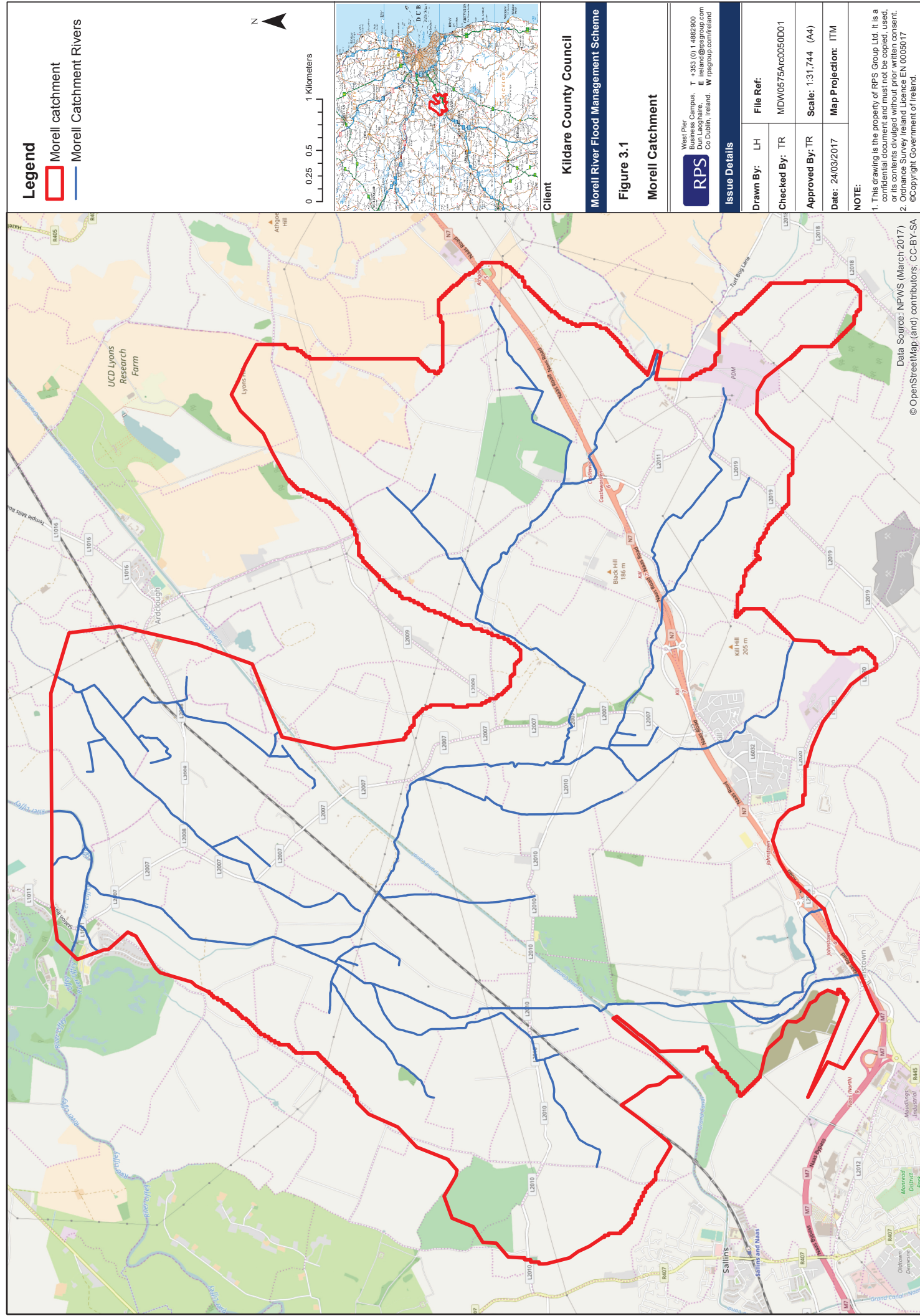
3.2 DESCRIPTION OF THE PROJECT

This section describes the basis of design for the proposed scheme and the main features of the proposed scheme. This description is based on the outline design of the scheme, which includes comprehensive information on all aspects of the works and which is considered sufficient to allow a robust impact assessment of the works to be undertaken.

The works proposed for the flood management scheme will include the construction of culverts, embankments, flood walls, stream realignment works and tie-ins to existing structures. A detailed description of the activities required to construct the proposed development, including temporary works, is provided in Chapter 4 of the EIS and a summary provided in **Section 3.3** of this document.

The basis of the scheme design was informed by the preferred design standards identified by the OPW (i.e. flood event probabilities that the Scheme and risk management measures and options should address), and that the scheme has been designed to alleviate flooding to properties for the 1% AEP (Annual Exceedance Probability), with provision for future adaptability to the Mid-Range Future Scenario for climate change.

The proposed scheme works will involve the construction of just over 7.4km of embankments that will have to be constructed or remediated in addition to 0.5km of wall for construction in order to redirect flood waters away from high risk areas. Several walls and embankments are also proposed to tie into existing culverts.



3.3 KEY CHARACTERISTICS OF THE PROPOSED SCHEME

A detailed description of the key characteristics of the proposed works is contained in Chapter 4 of the EIS report. Below is a brief summary of the extent of the works:-

- The proposed scheme involves the construction of approximately 7,423 metres of new embankments. These new embankments will consist of clay core with surrounding fill materials covered in topsoil. Once completed embankments will be seeded with grass.
- There are approximately 1,842m of existing embankments that may require restoration works to be carried out in order to meet the minimum standard of protection required under the scheme. These embankments will be/have been assessed for structural integrity prior to the scheme's detailed design. The report on this integrity will determine the level and extent of the restoration required.
- The scheme will require c. 474m of new flood walls, ranging in height from 1.0m to 2.0m. All walls will be constructed from reinforced concrete poured in situ.
- The scheme also includes works at several existing culverts. One culvert (C22), beneath the N7 which is currently throttled to reduce flow, will have its throttle opened to increase flows. Two culverts which cross beneath the Dublin-Cork railway line (C4, C4a) will be throttled to reduce flows.
- Two culverts have been identified as requiring in-stream works for the installation of scour protection measures (C5 & C10). One culvert (C9) is in a poor state of repair and will require remediation.
- A further five culverts (C1, C2, C7, C18 & C19) will have tie-ins with embankments. These culverts will be structurally assessed at the detailed design stage to determine if they require scour protection measures or underpinning. Where such works are found to be required, the same mitigation protocols as per culverts C5, C10 and C9 will be adhered to.
- Stream realignment works (approximately 100 metres) are also proposed at two locations, namely **Slane 8** and **Morr 8** in Tuckmilltown and Killeenmore.

A number of protective measures have been built into the design phase and construction methodology of the proposed project (see the outline Construction Environmental Management Plan included in **Appendix B** of this document).

It is also noted that Chapter 11 of the EIS on Biodiversity- Aquatic Ecology (Section 11.4.1.5.2) includes further details of protective measures which will be required for the proposed stream realignments. It is proposed that the plant required can operate from the river bank without need to enter the stream. Protective measures, described in more detail in Chapters 11 (Biodiversity- Aquatic Ecology), 12 (Hydrology & Drainage) and 13 (Soil, Geology and Hydrogeology) of the EIS report, include methods to prevent silt runoff. A detailed method statement for the realignment will be discussed and agreed with the relevant authorities in advance of the works commencing.



3.4 CONSULTATION

In June 2015, a letter was issued by Kildare County Council to the following organisations informing them of the work of the Morell FMS and inviting submissions. Submissions and observations, via letter and over the phone, were received from several of the organisations.

- Department of Environment, Community and Local Government (DECLG)²;
- Department of Communications, Energy and Natural Resources (DCENR)³;
- Department of Agriculture, Food and the Marine (DAFM);
- Department of Arts, Heritage and the Gaeltacht (DAHG)⁴;
- Environmental Protection Agency (EPA);
- National Parks and Wildlife Service (NPWS);
- Inland Fisheries Ireland (IFI);
- Waterways Ireland; and
- Irish Rail.

The results of consultation with IFI are detailed in Chapter 11 Biodiversity- Aquatic Ecology of the EIS, which assesses impacts on aquatic flora and fauna, including water quality and fisheries. Consultation with the NPWS was sought on 23rd June 2015 and they responded on 28th July 2015. A summary of the correspondence is contained in Chapter 2 of the EIS, along with further details of the consultations undertaken for the proposed scheme.

3.5 BRIEF DESCRIPTION OF THE EUROPEAN SITES

European Sites comprise (a) Special Areas of Conservation (SACs) that are designated under the Habitats Directive as requiring the conservation of important, rare or threatened habitats and species (other than birds) and (b) Special Protection Areas (SPAs), which are designated under the Birds Directive to conserve certain migratory or rare birds and their habitats. Collectively, these sites form the Natura 2000 network. In accordance with DEHLG Guidance (2009), the AA also takes into account transboundary impacts where it is identified that the proposed project has the potential to impact on European Sites in Northern Ireland.

A buffer of 15km is typically taken as the initial zone of influence (Zoi) extending beyond the reach of the footprint of a plan or project, as per Ministerial guidance (DoEHLG, 2010), although there may be scientifically appropriate reasons for extending this Zoi further afield depending on the pathway of potential impacts. Owing to the hydrological connectivity between the Morell catchment and the River Liffey system, consideration was given to European Sites within Dublin Bay (as the River Liffey discharges directly into Dublin Bay, at Dublin Port). Therefore, for clarity and comprehensiveness, an extension of the Zoi to include these sites is considered necessary in this case. It was decided that the Zoi would be taken as the Liffey Catchment area (see **Figure 3.3**) as this boundary is accurately delineated and encompasses the Morell and Liffey river systems.

The European Sites (twelve SACs and nine SPAs) that have been assessed are listed in **Table 3.2** and shown in **Figure 3.3**. The spatial boundary for the European Sites shown in this figure is the most recently issued by NPWS (March 2017).

² Since 2016 known as the Department of Housing, Planning and Local Government (DHPLG).

³ Since 2016 known as the Department of Communications, Climate Action and Environment (DCCAE).

⁴ Since 2016 known as the Department of Arts, Heritage, Regional Rural and Gaeltacht Affairs (DAHRRGA).

Table 3.1 – European Sites within the Zone of Influence.

Site Name	Qualifying Interest Habitats and Species (*=Priority Habitat)	Distance ⁵ from Proposed Works (km)	Connectivity
Special Areas of Conservation (SACs)			
Red Bog, Kildare SAC (000397)	Conservation Objectives Generic Version 5.0 (15/08/2016) Annex I Habitats <ul style="list-style-type: none"> Transition mires and quaking bogs* [7140] 	ca. 4 km	No. There is no connectivity between the proposed works and the European Site due to the distance and the lack of hydrological connectivity between them.
Rye Water Valley/Carton SAC (001398)	Conservation Objectives Generic Version 5.0 (15/08/2016) Annex I Habitats <ul style="list-style-type: none"> Petrifying springs with tufa formation (<i>Cratoneurion</i>)* [7220] Annex II Species <ul style="list-style-type: none"> Narrow-mouthed Whorl Snail (<i>Vertigo angustior</i>) [1014] Desmoulin's Whorl Snail (<i>Vertigo moulinsiana</i>) [1016] 	ca. 8 km	No. There is no connectivity between the proposed works and the site due to the distance and the lack of hydrological connectivity between them. The Rye Water joins the Liffey near Leixlip, with the designated site immediately upstream of the confluence.
Glenasmole Valley SAC (001209)	Conservation Objectives Generic Version 5.0 (15/08/2016) Annex I Habitats <ul style="list-style-type: none"> Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco Brometalia</i>)(*)important orchid sites) [6210] <i>Molinia</i> meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinion caeluleae</i>) [6410] Petrifying springs with tufa formation (<i>Cratoneurion</i>)* [7220] 	ca. 9.5 km	No. There is no connectivity between the proposed works and the European Site due to the distance and the lack of hydrological/hydrogeological connectivity between them. Petrifying springs with tufa formation are a groundwater dependent habitat; the European Site for which they are designated is not hydrogeologically connected to the proposed works and therefore the works are not likely to impact this habitat.
Wicklow Mountains SAC (002122)	Conservation Objectives Generic Version 5.0 (15/08/2016) Annex I Habitats <ul style="list-style-type: none"> Oligotrophic waters containing very few minerals of sandy plains (<i>Littorelletalia uniflorae</i>) [3110] 	ca. 11 km	No. There is no connectivity between the proposed works and the SAC owing to the distance and the lack of hydrological connectivity between them. Otter territory

⁵ Distance measured 'as the crow flies'.

Site Name	Qualifying Interest Habitats and Species (*=Priority Habitat)	Distance ⁵ from Proposed Works (km)	Connectivity
	<ul style="list-style-type: none"> Natural dystrophic lakes and ponds [3160] Northern Atlantic wet heaths with <i>Erica tetralix</i> [4010] European dry heaths [4030] Alpine and Boreal heaths [4060] Calaminarian grasslands of the <i>Violetalia calaminariae</i> [6130] Species-rich <i>Nardus</i> grasslands, on siliceous substrates in mountain areas (and sub-mountain areas, in Continental Europe)* [6230] Blanket bogs (*active only) [7130] Siliceous scree of the montane to snow levels (<i>Androsacetalia alpinae</i> and <i>Galeopsietalia ladani</i>) [8110] Calcareous rocky slopes with chasmophytic vegetation [8210] Siliceous rocky slopes with chasmophytic vegetation [8220] Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in British Isles [91A0] <p>Annex II Species</p> <ul style="list-style-type: none"> Otter (<i>Lutra lutra</i>) [1355] 		can range between 1km and 40km (with about 18km being usual). As there is no aquatic corridor between the SAC and the Morell catchment for Otter to utilise, they will not be affected by the works in the Morell catchment.
Mouds Bog SAC (002331)	<p>Conservation Objectives Version 1.0 (20/11/15)</p> <p>Annex I Habitats</p> <ul style="list-style-type: none"> Active raised bogs* [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the Rhynchosporion [7150] <p>Conservation Objectives Version 1.0 (06/12/16)</p> <p>Annex I Habitats</p> <ul style="list-style-type: none"> Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] 	ca. 9 km	No. There is no connectivity between the proposed works and the European Site due to the distance and the lack of hydrological connectivity between them.
Howth Head SAC (000202)	<p>Conservation Objectives Version 1.0 (06/12/16)</p> <p>Annex I Habitats</p> <ul style="list-style-type: none"> Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] 	ca. 30km	Yes. There is hydrological connectivity between this European Site and the proposed works. The Morell River drains into the River Liffey system which drains into

Site Name	Qualifying Interest Habitats and Species (*=Priority Habitat)	Distance ⁵ from Proposed Works (km)	Connectivity
North Dublin Bay SAC (000206)	<ul style="list-style-type: none"> European dry heaths [4030] <p>Conservation Objectives Version 1.0 (06/11/13)</p> <p>Annex I Habitats</p> <ul style="list-style-type: none"> Mudflats and sandflats not covered by seawater at low tide [1140] Annual vegetation of drift lines [1210] <i>Salicornia</i> and other annuals colonising mud and sand [1310] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Embryonic shifting dunes [2110] Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) [2120] Fixed coastal dunes with herbaceous vegetation (grey dunes)* [2130] Humid dune slacks [2190] <p>Annex II Species</p> <ul style="list-style-type: none"> Petalwort (<i>Petalophyllum ralfsii</i>) [1395] 	ca. 26km	<p>Dublin Bay, which this European Site is located within.</p> <p>Yes.</p> <p>There is hydrological connectivity between this European Site and the proposed works. The Morell River drains into the River Liffey system which drains into Dublin Bay, which this European Site is located within.</p>
South Dublin Bay SAC (000210)	<p>Conservation Objectives Version 1.0 (22/08/13)</p> <p>Annex I Habitats</p> <ul style="list-style-type: none"> Mudflats and sandflats not covered by seawater at low tide [1140] 	ca. 21km	<p>Yes.</p> <p>There is hydrological connectivity between this European Site and the proposed works. The Morell River drains into the River Liffey system which drains into Dublin Bay, which this European Site is located within.</p>
Rockabill to Dalkey Island SAC (003000)	<p>Conservation Objectives Version 1.0 (07/05/13)</p> <p>Annex I Habitats</p> <ul style="list-style-type: none"> Reefs [1170] <p>Annex II Species</p>	ca. 28km	<p>Yes.</p> <p>There is hydrological connectivity between the proposed works and this European Site. The Morell River drains into the River Liffey system which drains into Dublin Bay,</p>

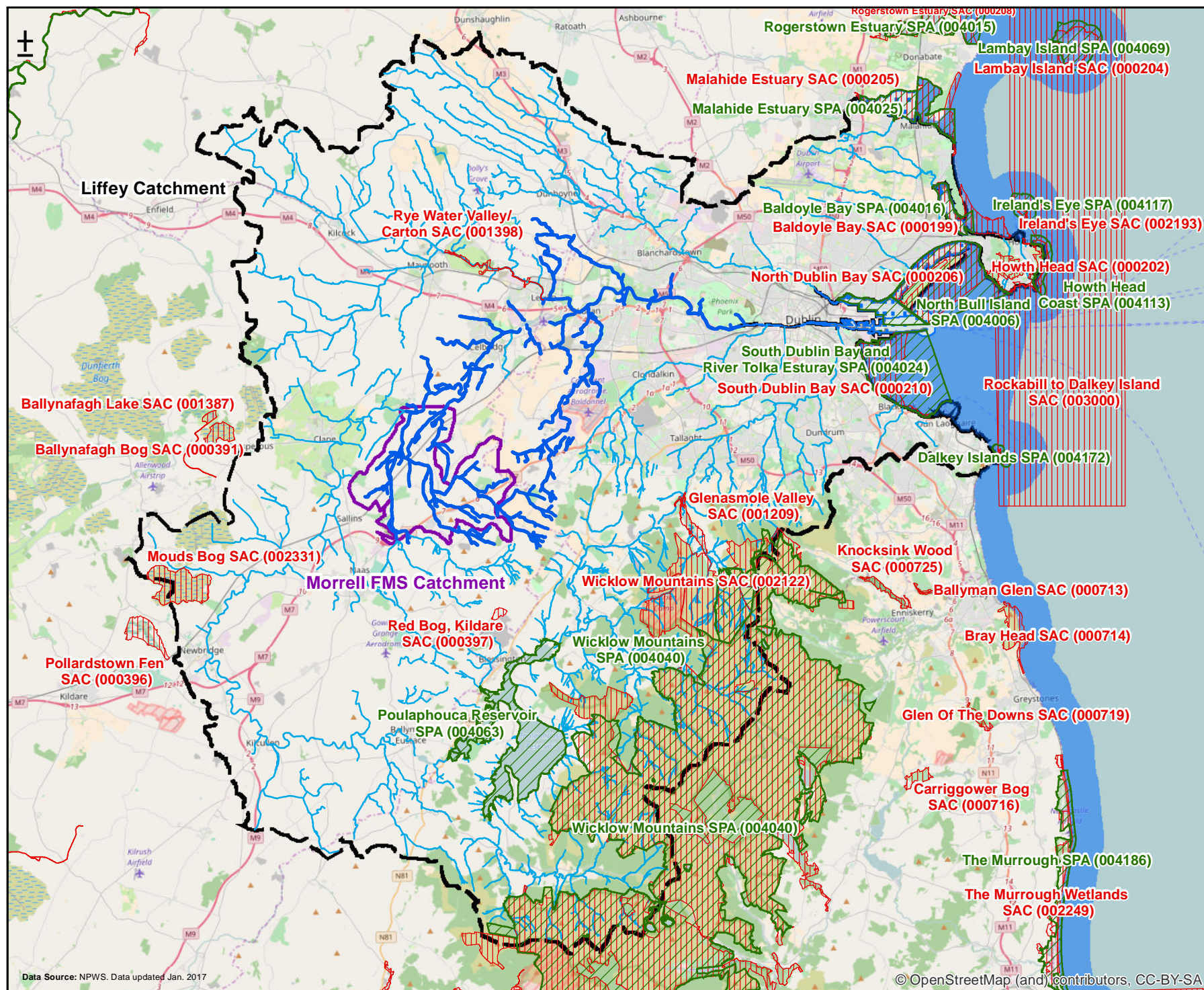
Site Name	Qualifying Interest Habitats and Species (*=Priority Habitat)	Distance ⁵ from Proposed Works (km)	Connectivity
Baldoyle Bay SAC (000199)	<ul style="list-style-type: none"> Harbour porpoise (<i>Phocoena phocoena</i>) [1351] <p>Conservation Objectives Version 1.0 (19/11/12)</p> <p>Annex I Habitats</p> <ul style="list-style-type: none"> Mudflats and sandflats not covered by seawater at low tide [1140] <i>Salicornia</i> and other annuals colonizing mud and sand [1310] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330] Mediterranean salt meadows (<i>Uncetalia maritimi</i>) [1410] 	ca. 29km	<p>No.</p> <p>While the proposed works are contained within the Liffey catchment and this European Site shares a terrestrial boundary within the Liffey catchment there is no connectivity between the proposed works and the site due to the distance and marine open water buffer between them.</p>
Malahide Estuary SAC (000205)	<p>Conservation Objectives Version 1.0 (27/05/13)</p> <p>Annex I Habitats</p> <ul style="list-style-type: none"> Mudflats and sandflats not covered by seawater at low tide [1140] <i>Salicornia</i> and other annuals colonizing mud and sand [1310] <i>Spartina</i> swards (<i>Spartinion maritima</i>) [1320] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330] Mediterranean salt meadows (<i>Uncetalia maritimi</i>) [1410] Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) [2120] Fixed coastal dunes with herbaceous vegetation (grey dunes)* [2130] 	ca. 30km	<p>No.</p> <p>There is no connectivity between the proposed works and the site due to the distance and marine open water buffer between them.</p>
Ireland's Eye SAC (002193)	<p>Conservation Objectives Version 1.0 (27/01/17)</p> <p>Annex I Habitats</p> <ul style="list-style-type: none"> Perennial vegetation of stony banks [1220] Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] 	ca. 34km	<p>No.</p> <p>There is no connectivity between the proposed works and the site due to the distance and marine open water buffer between them.</p>

Site Name	Qualifying Interest Habitats and Species (*=Priority Habitat)	Distance ⁵ from Proposed Works (km)	Connectivity
Special Areas of Protection (SPAs)			
Poulaphouca Reservoir SPA (004063)	Conservation Objectives Generic Version 5.0 (15/08/16) <ul style="list-style-type: none"> ▪ Greylag Goose (<i>Anser anser</i>) [A043] ▪ Lesser Black-backed Gull (<i>Larus fuscus</i>) [A183] 	ca. 5 km	<p>No.</p> <p>There is no connectivity between the proposed works and the European Site due to the distance and the lack of hydrological connectivity between them.</p> <p>The Greylag Goose, a migratory bird, can be found in a varied range of habitats. Though it is mostly likely to be found in wetland habitats in Ireland, it can utilise lowland farmland during the non-breeding season. However, it is considered unlikely that the works in the Morell catchment will have any impact on the SCI birds associated with this site, due to the distance between this European Site and the proposed works.</p> <p>The Lesser Black-based Gull is predominantly a coastal species but can be associated with large lakes and rivers. This SCI species is unlikely to be found in the Morell catchment, an inland catchment without large rivers or lakes, and therefore this species would not be impacted by the proposed works.</p>
Wicklow Mountains SPA (004040)	Conservation Objectives Generic Version 5.0 (15/08/16) <ul style="list-style-type: none"> ▪ Merlin (<i>Falco columbarius</i>) [A098] ▪ Peregrine (<i>Falco peregrinus</i>) [A103] 	ca. 12 km	<p>No.</p> <p>There is no connectivity between the proposed works and the European Site due to the distance and the lack of hydrological connectivity between them.</p> <p>Merlins typically breed in upland moorland but can favour coastal sites in winter. SCI species from this site are unlikely to be found in the Morell catchment due to the distance between this European Site and the proposed works and therefore would not be impacted by the proposed works.</p> <p>Peregrine falcons breed on coastal and inland cliffs and</p>

Site Name	Qualifying Interest Habitats and Species (*=Priority Habitat)	Distance ⁵ from Proposed Works (km)	Connectivity
North Bull Island SPA (004006)	<p>Conservation Objectives Version 1.0 (09/03/15)</p> <ul style="list-style-type: none"> ▪ Light-bellied Brent Goose (<i>Branta bernicla hrota</i>) [A046] ▪ Shelduck (<i>Tadorna tadorna</i>) [A048] ▪ Teal (<i>Anas crecca</i>) [A052] ▪ Pintail (<i>Anas acuta</i>) [A054] ▪ Shoveler (<i>Anas clypeata</i>) [A056] ▪ Oystercatcher (<i>Haematopus ostralegus</i>) [A130] ▪ Golden Plover (<i>Pluvialis apricaria</i>) [A140] ▪ Grey Plover (<i>Pluvialis squatarola</i>) [A141] ▪ Knot (<i>Calidris canutus</i>) [A143] ▪ Sanderling (<i>Calidris alba</i>) [A144] ▪ Dunlin (<i>Calidris alpina</i>) [A149] ▪ Black-tailed Godwit (<i>Limosa limosa</i>) [A156] ▪ Bar-tailed Godwit (<i>Limosa lapponica</i>) [A157] ▪ Curlew (<i>Numenius arquata</i>) [A160] ▪ Redshank (<i>Tringa totanus</i>) [A162] ▪ Turnstone (<i>Arenaria interpres</i>) [A169] ▪ Black-headed Gull (<i>Chroicocephalus ridibundus</i>) [A179] 		<p>favour coastal sites in winter. SCI species from this site are unlikely to be found in the Morell catchment and therefore would not be impacted by the proposed works.</p> <p>Yes. There is hydrological connectivity between this European Site and the proposed works. The Morell River drains into the River Liffey system which drains into Dublin Bay, which this European Site is located within.</p>
South Dublin Bay and River Tolka SPA (004024)	<p>Conservation Objectives Version 1.0 (09/03/15)</p> <ul style="list-style-type: none"> ▪ Light-bellied Brent Goose (<i>Branta bernicla hrota</i>) [A046] ▪ Oystercatcher (<i>Haematopus ostralegus</i>) [A130] ▪ Ringed Plover (<i>Charadrius hiaticula</i>) [A137] 	ca. 21km	<p>Yes. There is hydrological connectivity between this European Site and the proposed works. The Morell River drains into the River Liffey system which drains into</p>

Site Name	Qualifying Interest Habitats and Species (*=Priority Habitat)	Distance ⁵ from Proposed Works (km)	Connectivity
	<ul style="list-style-type: none"> ▪ Grey Plover (<i>Pluvialis squatarola</i>) [A141] ▪ Knot (<i>Calidris canutus</i>) [A143] ▪ Sanderling (<i>Calidris alba</i>) [A144] ▪ Dunlin (<i>Calidris alpina</i>) [A149] ▪ Bar-tailed Godwit (<i>Limosa lapponica</i>) [A157] ▪ Redshank (<i>Tringa totanus</i>) [A162] ▪ Black-headed Gull (<i>Chroicocephalus ridibundus</i>) [A179] ▪ Roseate Tern (<i>Sterna dougallii</i>) [A192] ▪ Common Tern (<i>Sterna hirundo</i>) [A193] ▪ Arctic Tern (<i>Sterna paradisaea</i>) [A194] 		Dublin Bay, which this European Site is located within.
Baldoye Bay SPA (004016)	Conservation Objectives Version 1.0 (27/02/13) <ul style="list-style-type: none"> ▪ Ringed Plover (<i>Charadrius hiaticula</i>) [A137] ▪ Light-bellied Brent Goose (<i>Branta bernicla hrota</i>) [A046] ▪ Shelduck (<i>Tadorna tadorna</i>) [A048] ▪ Grey Plover (<i>Pluvialis squatarola</i>) [A141] ▪ Golden Plover (<i>Pluvialis apricaria</i>) [A140] ▪ Bar-tailed Godwit (<i>Limosa lapponica</i>) [A157] 	ca. 29km	No. While the proposed works are contained within the Liffey catchment and this European Site shares a terrestrial boundary within the Liffey catchment there is no connectivity between the proposed works and the site due to the distance and marine open water buffer between them.
Dalkey Islands SPA (004172)	Conservation Objectives Generic Version 5.0 (15/08/16) <ul style="list-style-type: none"> ▪ Roseate Tern (<i>Sterna dougallii</i>) [A192] ▪ Common Tern (<i>Sterna hirundo</i>) [A193] ▪ Arctic Tern (<i>Sterna paradisaea</i>) [A194] 	ca. 28km	No. There is no connectivity between the proposed works and the site due to the distance, marine open water buffer between them.
Howth Head Coast SPA (004113)	Conservation Objectives Generic Version 5.0 (15/08/16) <ul style="list-style-type: none"> ▪ Kittiwake (<i>Rissa tridactyla</i>) [A188] 	ca. 33km	Yes. There is hydrological connectivity between this European Site and the proposed works. This European Site is located downstream of the proposed works in Dublin Bay.

Site Name	Qualifying Interest Habitats and Species (*=Priority Habitat)	Distance ⁵ from Proposed Works (km)	Connectivity
Malahide Estuary SPA (004025)	Conservation Objectives Version 1.0 (16/08/13) <ul style="list-style-type: none"> Great Crested Grebe (<i>Podiceps cristatus</i>) [A005] Light-bellied Brent Goose (<i>Branta bernicla hrota</i>) [A046] Shelduck (<i>Tadorna tadorna</i>) [A048] Pintail (<i>Anas acuta</i>) [A054] Goldeneye (<i>Bucephala clangula</i>) [A067] Red-breasted Merganser (<i>Mergus serrator</i>) [A069] Grey Plover (<i>Pluvialis squatarola</i>) [A141] Golden Plover (<i>Pluvialis apricaria</i>) [A140] Oystercatcher (<i>Haematopus ostralegus</i>) [A130] Bar-tailed Godwit (<i>Limosa lapponica</i>) [A157] Dunlin (<i>Calidris alpina</i>) [A149] Knot (<i>Calidris canutus</i>) [A143] Black-tailed Godwit (<i>Limosa limosa</i>) [A156] Redshank (<i>Tringa totanus</i>) [A162] 	ca. 30km	No. There is no connectivity between the proposed works and the site due to the distance, marine open water buffer between them.
Ireland's Eye SPA (004117)	Conservation Objectives Version 1.0 (15/08/16) <ul style="list-style-type: none"> Cormorant (<i>Phalacrocorax carbo</i>) [A017] Herring Gull (<i>Larus argentatus</i>) [A184] Kittiwake (<i>Rissa tridactyla</i>) [A188] Guillemot (<i>Uria aalge</i>) [A199] Razorbill (<i>Alca torda</i>) [A200] 	ca. 34km	No. There is no connectivity between the proposed works and the site due to the distance and marine open water buffer between them.



Legend

- Liffey Catchment
- Morrell FMS Catchment
- Rivers Downstream of the FMS
- Transitional Waterbodies Downstream of FMS (Liffey Catchment)
- Coastal Waterbodies Downstream of FMS (Liffey Catchment)
- Rivers in the Liffey Catchment
- Special Protection Area
- Special Area of Conservation

Project River Morrell FMS

Title European Sites within the Liffey Catchment

Figure 3.3

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Issue Details

Drawn By: NON	Project No. MDW0575
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Date: 21/03/2017	

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4 ASSESSMENT CRITERIA

4.1 IS THE PROJECT NECESSARY TO THE MANAGEMENT OF EUROPEAN SITES?

The proposed project is not directly connected with or necessary to the management of any European Site.

4.2 DIRECT, INDIRECT OR SECONDARY IMPACTS

The potential impacts that could arise due to implementation of the proposed scheme and that could have a negative effect on the qualifying interests (QI)/special conservation interests (SCIs) of European Sites, in the absence of mitigation, include:-

- Habitat and species loss, disturbance or fragmentation;
- Water quality impacts (pollution, suspended solid release and sedimentation); and
- Hydromorphological impacts (changes to hydrological and morphological regime).

The likelihood of these impacts to significantly affect the QIs/SCIs and conservation objectives of the European Sites are considered in this Appropriate Assessment Screening report.

Table 3.1 lists the European Sites within and adjoining the ZOI of the proposed works (i.e. the Liffey catchment), whilst **Figure 3-3** illustrates the European Sites within and adjoining the ZOI of the proposed works. Whilst the Liffey catchment is considered the appropriate ZOI with regards to the proposed works, a number of proximal coastal European Sites have been included in the assessment owing to potential hydrological connectivity, for example some of the coastal sites of County Dublin. The proposed works do not lie within any European Site nor is it adjoining to or immediately contiguous with any European Sites. Therefore, no direct impacts are envisaged through land-take or fragmentation of habitats.

A source – pathway – receptor approach has been used as part of this assessment process. The pathway identified is the Morell River which drains into the River Liffey at the northern boundary of the Morell Catchment (see **Figure 3-1**). The Rye Water River also enters the River Liffey, at its confluence at Leixlip, Co. Kildare. The Rye Water River runs through the Rye Water Valley/Cartron SAC. However, there is no connectivity between the Morell Catchment and this European Site as the European Site lies immediately upstream of the River Liffey and Rye Water River confluence. There is however hydrological connectivity to other European Sites, downstream of the proposed works within Dublin Bay.

As stated above, the Morell River drains into the River Liffey. Thereafter the Liffey discharges into the Liffey Estuary at Island Bridge weir (CFB, 2008). The Liffey Estuary extends downstream to coastal/open waters past both the Bull Wall and Great South Wall. The Liffey estuary is a transitional water body approximately 5km² in size and provides a dilution zone for inputs upstream of the estuary, before reaching Dublin Bay. Dublin Bay is located approximately 38km downstream of the confluence of the Morell River and the River Liffey, at Leixlip. Therefore, there is hydrological connectivity between the Morell Catchment and Dublin Bay by virtue of the fact that the Morell River

flows into the River Liffey. There are fourteen European Sites within the greater Dublin coastal area with hydrological connectivity to the proposed scheme; 7 SACs and 7 SPAs.

Although there is hydrological connectivity between the proposed works and these European Sites in the Dublin Bay area, the potential effects are not considered significant. It is extremely unlikely that during the construction phase of the proposed works, a pollution incident would occur of such a magnitude as to have any negative effects on water quality or the Qualifying Interest/Special Conservation Interests of the European sites in Dublin Bay, due to:

- The protective measures built into the project design in accordance with best practice design and construction practice (see outline CEMP, **Appendix B**);
- the significant distance and volume of water separating the proposed works and Dublin Bay; and
- the potential for dilution within the Morell/Liffey system and the Liffey estuary, before entering Dublin Bay.

Therefore, any impacts to water quality are unlikely to have a significant effect on the European Sites.

4.3 CUMULATIVE AND IN-COMBINATION IMPACTS

This step aims to identify any likely significant in-combination or cumulative effects/impacts of the proposed scheme with other plans and projects on the identified European Sites.

4.3.1 Other Plans and Projects

The following plans and projects are specific to the relevant European Sites:

4.3.1.1 Catchment Flood Risk Assessment Management Plans

The National CFRAM project commenced in 2011. The programme delivers on the core components of 2004 National Flood Policy and on the later EU 'Floods' Directive (2010). The Office of Public Works is the lead agency working in conjunction with Local Authorities in delivering the objectives of the CFRAM Program and implementing it with regard to the requirements of the EU Water Framework Directive and the current River Basin Management Plans. As a final stage of the CFRAM project, draft flood risk management plans have been prepared detailing flood risk management measures. The statutory public consultation for these plans is currently closed.

The CFRAM project is likely to result in future flood management plans, similar in nature to the Morell River FMS. These future developments may therefore result in potential impacts to water quality as a result of construction related activities, e.g. release of sediments, fuel spillages. Therefore, these plans have potential for cumulative impacts in relation to water quality, if both the Morell FMS and CFRAM projects resulted in impacts to same.

4.3.1.2 M7 Naas Newbridge Bypass Upgrade

This scheme was awarded to a Contractor by Kildare County Council (Q3 2016) to complete phase five services for the M7 Naas-Newbridge bypass upgrade. A review of the online project drawings suggests that a part of this scheme may occur within the southernmost section of the Morell

catchment and that 2 sections of the Morell River (Upper River Morell and Hartwell River) may be impacted.

This proposed development could result in potential impacts to water quality as a result of construction related activities, e.g. release of sediments, fuel spillages and operation. Therefore, there is potential for cumulative impacts in relation to water quality, if both projects resulted in impacts to same. The road upgrade project will need to be cognisant of the measures included in the Morell FMS for the area to ensure no deterioration in water quality.

4.3.1.3 Local Authority Planning Register

Planning applications contained within the online planning register at Kildare County Council were examined for developments that are currently under way or for which planning has been granted but have not yet started. Without providing an exhaustive listing, the developments are typically small scale.

Such projects are relatively small in comparison to the level of works involved in the current proposal. There is potential for impacts to water quality as a result of construction and/or operation. Therefore, there is potential for cumulative impacts in relation to water quality, if such projects resulted in impacts to same. The projects would be subject to requirements of the planning authority. Therefore, there is no likelihood of significant in-combination effects as a result of the local developments.

4.3.2 In-combination Impacts Conclusion

There is potential for in-combination impacts to European Sites as a result of the Morell FMS and plans/projects listed above, mainly in relation to water quality, if both the Morell FMS and the plans/projects resulted in impacts to same. However, due to the measures incorporated into the outline CEMP for the Morell FMS to ensure protection of all waterbodies and water quality, it is not anticipated that the proposed works will result in any in-combination impacts on any SACs or SPAs.

As detailed in **Table 3.1** it is not anticipated that the proposed scheme will result in any likely significant effects on European Sites due to the distance between the proposed scheme area and any European Site (4km at closest point). No other pathway has been identified by which any plan or project could have a significant in-combination effect on any of the European Sites. There is therefore no potential for cumulative or in-combination impacts.

4.4 LIKELY CHANGES TO EUROPEAN SITES

The likely changes that could arise from the proposed Morell FMS have been examined in the context of a number of factors that could potentially lead to likely significant effects on European Sites. It is considered that the implementation of the proposed Morell FMS works will not lead to likely significant effects on any European Sites, see **Table 4.1**.

Table 4.1 – Likely Effects on European Sites

Site Name	Site Code	Reduction of 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
Special Area of Conservation (SACs)							
Red Bog, Kildare SAC	000397	None	None	None	None	None	None
Rye Water Valley/Carton SAC	001398	None	None	None	None	None	None
Glenasmole Valley SAC	001209	None	None	None	None	None	None
Wicklow Mountains SAC	002122	None	None	None	None	None	None
Mouds Bog SAC	002331	None	None	None	None	None	None
Howth Head SAC	000202	None	None	None	None	None	None
North Dublin Bay SAC	000206	None	None	None	None	None	None
South Dublin Bay SAC	000210	None	None	None	None	None	None
Rockabill to Dalkey Island SAC	003000	None	None	None	None	None	None
Baldoye Bay SAC	000199	None	None	None	None	None	None
Ireland's Eye SAC	002193	None	None	None	None	None	None
Malahide Estuary SAC	000205	None	None	None	None	None	None
Special Area of Protection (SPAs)							
Poulaphouca Reservoir SPA	004063	None	None	None	None	None	None
Wicklow Mountains SPA	004040	None	None	None	None	None	None
North Bull Island SPA	004006	None	None	None	None	None	None
South Dublin Bay and River Tolka SPA	004024	None	None	None	None	None	None
Baldoye Bay SPA	004016	None	None	None	None	None	None
Dalkey Islands SPA	004172	None	None	None	None	None	None
Howth Head Coast SPA	004113	None	None	None	None	None	None
Malahide Estuary SPA	004025	None	None	None	None	None	None
Ireland's Eye SPA	004117	None	None	None	None	None	None

5 SCREENING CONCLUSION AND STATEMENT

The proposed Morell Flood Management Scheme has been examined to identify any potential likely significant effects on European Sites, in the context of their qualifying interests and conservation objectives.

It is concluded that the proposed works associated with the Morell River Flood Management Scheme will have no likely significant effects on any European Sites, either alone or in combination with other plans and projects. For this reason, it is concluded that an Appropriate Assessment is not required.

6 REFERENCES

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RPS (2017). Morell River Flood Management Scheme EIS.

APPENDIX A

European Sites Conservation Objectives

Site Name	Site Code	Conservation Objectives (Generic or Specific)	Version Number	Date of Issue
Baldoyle Bay SAC	000199	Specific	1.0	19/11/12
Howth Head SAC	000202	Specific	1.0	06/12/16
Malahide Estuary SAC	000205	Specific	1.0	27/05/13
North Dublin Bay SAC	000206	Specific	1.0	06/11/13
South Dublin Bay SAC	000210	Specific	1.0	22/08/13
Red Bog, Kildare SAC	000397	Generic	5.0	15/08/16
Glenasmole Valley SAC	001209	Generic	5.0	15/08/16
Rye Water Valley/Carton SAC	001398	Generic	5.0	15/08/16
Wicklow Mountains SAC	002122	Generic	5.0	15/08/16
Ireland's Eye SAC	002193	Specific	1.0	27/01/17
Mouds Bog SAC	002331	Generic	1.0	20/11/15
Rockabill to Dalkey Island SAC	003000	Specific	1.0	07/05/13
North Bull Island SPA	004006	Specific	1.0	09/03/15
Baldoyle Bay SPA	004016	Specific	1.0	27/02/13
South Dublin Bay and River Tolka SPA	004024	Specific	1.0	09/03/15
Malahide Estuary SPA	004025	Specific	1.0	16/08/13
Wicklow Mountains SPA	004040	Generic	5.0	15/08/16
Poulaphouca Reservoir SPA	004063	Generic	5.0	15/08/16
Howth Head Coast SPA	004113	Generic	5.0	15/08/16
Ireland's Eye SPA	004117	Generic	5.0	15/08/16
Dalkey Islands SPA	004172	Generic	5.0	15/08/16

Appendix B

Morell River FMS Outline CEMP

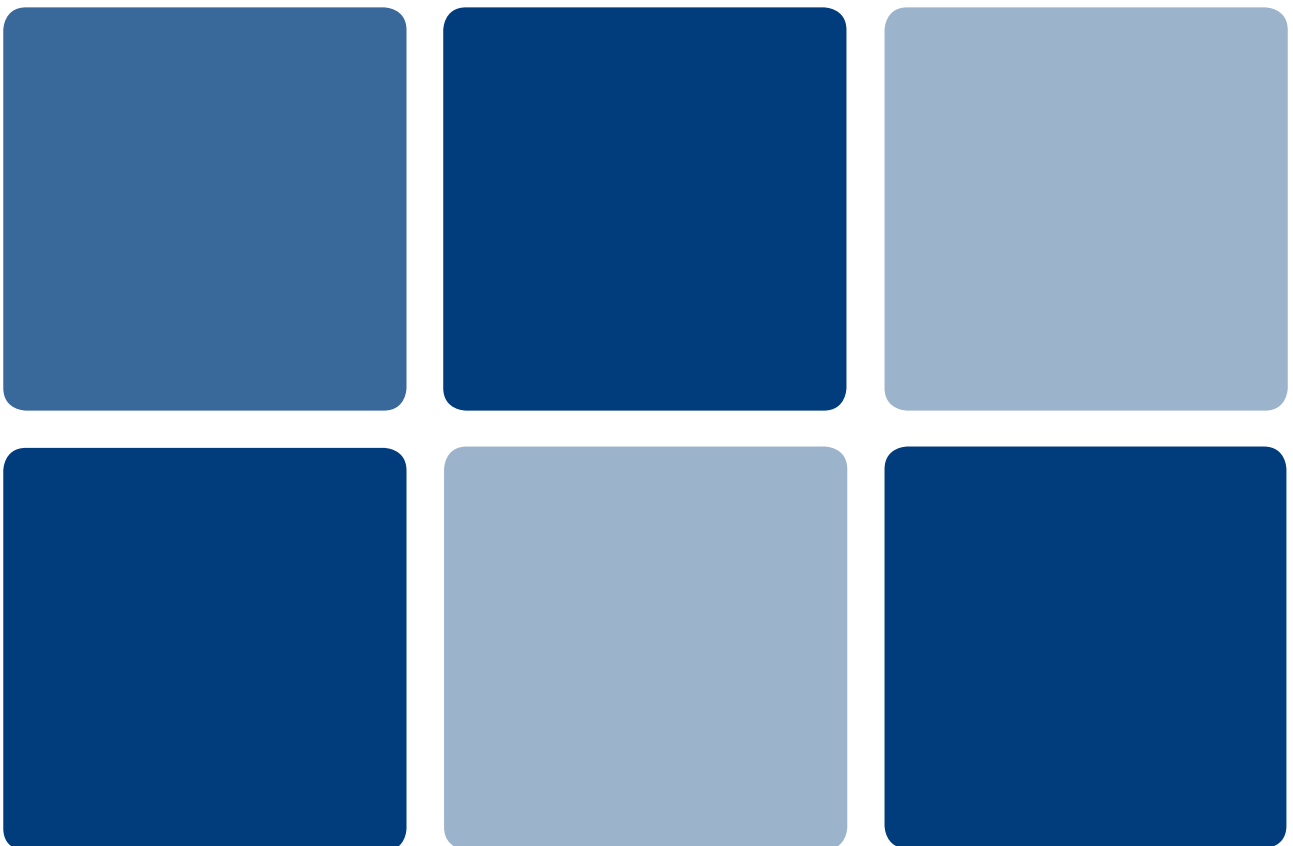


TABLE OF CONTENTS

1	INTRODUCTION	1
1.1	PROJECT SUMMARY.....	2
2	ENVIRONMENTAL MANAGEMENT PLAN.....	4
3	ENVIRONMENTAL ASPECTS AND RELEVANT LEGISLATION.....	5
3.1	INTRODUCTION	5
3.2	ENVIRONMENTAL ASPECTS	5
3.3	ENVIRONMENTAL LEGISLATION.....	5
3.4	ENVIRONMENTAL RISK	6
	3.4.1 Construction Phase Environmental Management Plans	7
4	ENVIRONMENTAL ROLES AND RESPONSIBILITIES.....	8
4.1	POLICY STATEMENT	8
4.2	PROJECT TEAM STRUCTURE	8
5	CONSTRUCTION AND SITE OPERATION DETAILS	10
5.1	PHASING AND TIMESCALES	10
5.2	HOURS OF WORKING.....	10
5.3	SITE ESTABLISHMENT	10
	5.3.1 Temporary Crossings	12
5.4	EMBANKMENTS	13
5.5	WALLS	14
5.6	STREAM RE-ALIGNMENT.....	14
5.7	CULVERT WORKS	16
5.8	CONSTRUCTION TRAFFIC	17
	5.8.1 Site Access.....	17
	5.8.2 Construction Traffic Routing.....	17
	5.8.3 Construction Parking	17
6	ENVIRONMENTAL MITIGATION MEASURES	18
6.1	GENERAL ENVIRONMENTAL PROTECTION	18
	6.1.1 Flood Warnings.....	18
	6.1.2 Summary Tables of Mitigation Measures.....	19
6.2	CONSTRUCTION WASTE MANAGEMENT PLAN.....	49
6.3	AIR AND DUST MANAGEMENT	49

6.4	WATER QUALITY MONITORING	49
6.4.1	Water Quality Monitoring Plan.....	49
6.4.2	Emergency Spill Response Plan	50
7	SITE SAFETY	51

LIST OF FIGURES

Figure 1:	Proposed Scheme - Location of Works.....	3
Figure 2:	Team Structure	8

LIST OF TABLES

Table 6.1:	In-Stream Works Restriction Periods for Aquatic Protected Species of the Morell Catchment	18
Table 6.2:	Standard Pollution Prevention Control Measures.....	19
Table 6.3:	Human Beings: Summary of Mitigation Measures	21
Table 6.4:	Traffic, Transport and Infrastructure: Summary of Mitigation Measures	24
Table 6.5:	Air Quality: Summary of Mitigation Measures	26
Table 6.6:	Noise: Summary of Mitigation Measures	28
Table 6.7:	Landscape and Visual: Summary of Mitigation Measures.....	30
Table 6.8:	Terrestrial Ecology: Summary of Mitigation Measures	31
Table 6.9:	Aquatic Ecology and Environment: Summary of Mitigation Measures.....	38
Table 6.10:	Hydrology and Drainage: Summary of Mitigation Measures.....	44
Table 6.11:	Soils, Geology and Hydrogeology: Summary of Mitigation Measures.....	46
Table 6.12:	Cultural Heritage: Summary of Mitigation Measures	48

APPENDIX A	OUTLINE DUST MANAGEMENT PLAN
APPENDIX B	OUTLINE WATER QUALITY MONITORING PLAN
APPENDIX C	OUTLINE EMERGENCY POLLUTION SPILL RESPONSE PLAN

1 INTRODUCTION

This document comprises a high-level outline Construction Environmental Management Plan (CEMP) for the Morell River Flood Management Scheme for which Kildare County Council (KCC) is the developer. KCC will seek to achieve the highest possible standards of environmental management during both the construction and operation of the proposed scheme.

The purpose of a CEMP is to ensure the contractor maintains an approved environmental and construction management plan for the construction works. No statements in this document shall supersede those or be taken to replace the terms of the contract, or the design description issued with the contract tender. Similarly the items covered within this document may be amended or added to by the contractor.

The main aims of the outline CEMP are to:

- Provide a mechanism for ensuring that measures to mitigate potentially adverse impacts identified in the EIS are implemented;
- Ensure that best construction practices are adopted throughout the construction of the proposed development;
- Provide a framework for mitigating unexpected impacts during construction;
- Provide assurance to third parties that their requirements with respect to minimising project impacts will be met;
- Provide a mechanism for ensuring compliance with environmental legislation and statutory consents;
- Provide a framework for compliance auditing and inspection to enable KCC to meet their environmental performance objectives.

The potential environmental impacts of the project are documented in the Environmental Impact Statement for the Morell Flood Management Scheme (hereafter referred to as the EIS). The Outline CEMP does not aim to re-assess those impacts, but to develop and outline controls to manage them during construction and operation.

This outline plan will be developed and updated by the appointed Contractor as required into the full CEMP in advance of the construction phase. The final CEMP can only be produced after planning permission is received, in order to be able to address any conditions imposed by the planning authority.

It is intended that revisions to this document will be circulated and agreed with Kildare County Council, the Office of Public Works (OPW) and any other relevant consultees, such as Inland Fisheries Ireland (IFI) and the National Parks and Wildlife Service (NPWS), as additional details are incorporated.

1.1 PROJECT SUMMARY

The Morell River Flood Management Scheme involves the construction of approximately 7,423 metres of new flood embankments and approximately 474 metres of flood walls in the catchment of the Morell River and its tributaries the Slane, Kill and Painestown rivers. The scheme also involves structural examination and potential remediation of up to 1,842 metres of existing embankments along the Morell, Painestown and Slane Rivers. Figure 1 overleaf shows the locations of the proposed works.

The scheme also includes works at several existing culverts. One culvert (C22), beneath the N7 which is currently throttled to reduce flow, will have its throttle opened to increase flows. Two culverts which cross beneath the Dublin-Cork railway line (C4, C4a) will be throttled to reduce flows.

Two culverts have been identified as requiring in-stream works for the installation of scour protection measures (C5 & C10). One culvert (C9) is in a poor state of repair and will require remediation.

A further five culverts (C1, C2, C7, C18 & C19) will have tie-ins with embankments. These culverts will be structurally assessed at the detailed design stage to determine if they require scour protection measures or underpinning. Where such works are found to be required, the same mitigation protocols as per culverts C5, C10 and C9 will be adhered to.

In order to accommodate seasonal constraints, including the requirement for low river flows for instream works and spawning/migration periods for aquatic species, the project is expected to be constructed predominantly during summer months and will thus take place in phases over a total period of up to four years. However, it should be recognised that other constraints, including the bird nesting season and restrictions on the disturbance of mammals such as bats, badgers and otters will be applicable during summer months.

Figure 1: Proposed Scheme - Location of Works

The map displays the proposed scheme location of works, including various features and locations. The legend identifies the following elements:

- Proposed Scheme:**
 - Proposed Embankment (Red line)
 - Proposed Wall (Green line)
 - Existing OPW Embankment (Blue line)
 - Stream Diversion (Yellow line)
 - Existing Landowner Defence (Potential Upgrade) (Orange line)
- Culvert Works:**
 - Repetitive/Source Protection (Red circle)
 - Throttling/Unthrottling (Yellow circle)
 - Tie-in (Orange circle)
 - Potential Temporary Materials Stockpiling / Site (Red shaded area)
 - Compound Area (Orange shaded area)
 - River Centreline (Blue line)
 - Study Area (Red dashed line)

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 - Compound Area (Orange shaded area)
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2 ENVIRONMENTAL MANAGEMENT PLAN

As the proposed development is an EIA project and is being advanced by a local authority that is a planning authority, the application for planning approval has been made to An Bord Pleanála in accordance with Part X of the Planning and Development Act, 2000, as amended.

This Outline Construction Environmental Management Plan (Outline CEMP) specifies the environmental management controls to be employed to mitigate potential environmental impacts during the construction of the proposed development. The Outline CEMP has collated the mitigation measures specified in the Environmental Statement (EIS) and also the specific requirements of the various statutory and non-statutory bodies that made submissions during the pre-planning stage of the project.

The requirements detailed are binding between the scheme's developer and the appointed contractor. It shall be the responsibility of the contractor to ensure that the requirements of this specification are met by themselves and by any approved sub-contractors on the site.

The CEMP, which will be developed from this Outline CEMP, will be available to all personnel working on this project. All personnel working on the project are responsible for the environmental control of their own work and should perform their duties in accordance with the requirements of the outline CEMP and in compliance with the procedures referenced within.

The Outline Construction Environmental Management Plan is set out as follows:

- | | |
|------------------|---|
| Chapter 1 | Provides a general project summary and introduction to the Outline CEMP |
| Chapter 2 | Gives an overview of the planning regime and those that will be responsible for administering the final CEMP. |
| Chapter 3 | Provides a summary of the relevant environmental legislation which applies to a project of this type. |
| Chapter 4 | Describes the proposed project team and their responsibilities |
| Chapter 5 | Provides information on the construction methodology |
| Chapter 6 | Describes the mitigation measures and safeguards which will be implemented to provide environmental protection. This section will also cover how wastes arising from the site will be dealt with. |
| Chapter 7 | Provides a summary of site safety |

3 ENVIRONMENTAL ASPECTS AND RELEVANT LEGISLATION

3.1 INTRODUCTION

It is expected that the Client's Representative, Principal Contractor and all Sub-contractors and other parties involved in the development will comply with the requirements of this Outline CEMP, associated documentation and all applicable environmental, health and safety legislation as a minimum standard.

3.2 ENVIRONMENTAL ASPECTS

'Environmental Aspect' is defined as an element of an organisation's activities, products or services that can interact with the environment. Environmental Aspects are activities on site which can lead to an Environmental Impact.

At the outset of this project the Client's Representative and Principal Contractor will need to identify the Environmental Aspects associated with the construction of the proposed development.

3.3 ENVIRONMENTAL LEGISLATION

The CEMP and associated sub-plans (e.g. Water Quality Monitoring Plan, Dust Minimisation Plan) will be prepared in compliance with the relevant environmental quality standards and will be agreed with relevant authorities, including Kildare County Council and the NPWS.

The CEMP will be based on mitigation measures presented in the Environmental Statement (summarised in Chapter 15 thereof). The monitoring programme will include requirements for best practice and adherence to relevant legislation and guidelines including (but not limited to) the following:

Title	Relevance to Project
Flora (Protection) Order 2015 (S.I. No. 356/2015)	Enforces the protection of rare and endangered plants. Derived from Section 21 of the Wildlife Act, objectives include it being illegal to alter, damage or interfere in any way with named flora species or their habitats. This protection applies wherever the plants are found and is not confined to sites designated for nature conservation.
The Wildlife Act 1976 (S.I. No. 39/1976) and The Wildlife (Amendment) Act 2000 (S.I. No. 38/2000) (as amended)	The principal national legislation for the protection of wildlife species and habitats in Ireland.
European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477/2011) as amended 2015	Transposes the EU Habitats Directive into Irish national law. Consolidates the European Communities (Natural Habitats) Regulations 1997 to 2005 and the European Communities (Birds and Natural Habitats)(Control of Recreational Activities) Regulations 2010, as well as addressing transposition failures identified in judgments of the Court of Justice of the European Union (CJEU).
The Fisheries Acts, 1959 to 2007 (S.I. No. 14 of 1959 and No. 17 of 2007) and the Inland Fisheries Act 2010 (No. 10 of 2010) Local Government Water Pollution Acts 1977 (S.I. No. 1/1977) & 1990 (S.I. No. 21/1990)	Provide for the efficient and effective management, conservation, protection, development and improvement of fisheries, hatcheries and fish farms. The species protected include all freshwater fish, sea bass and certain molluscs. IFI is empowered to enforce the Water Pollution Acts 1977 & 1990, and at fisheries sensitive locations where industrial, local authority and agricultural discharges have resulted in a serious deterioration in water quality, including fish kills, successful prosecutions have been taken.
Local Government (Water Pollution) Act 1977 (S.I. No. 1/1977) as amended 2010	Aims to manage and protect water at catchment based level in cases where Integrated Pollution Prevention Control (IPPC) is not applicable,

	the control of water pollution is exercised through the Local Government (Water Pollution) Acts 1977-1990 and Water Services Act 2007-2013. Local authorities are responsible for the issuing of effluent discharge licences for effluents discharged
European Communities Environmental Objectives (Groundwater) Regulations 2010 S.I. No. 9 of 2010 as amended European Communities Environmental Objectives (Surface Waters) Regulations 2009 S.I. No. 272 of 2009 as amended	Give effect to the measures needed to achieve the environmental objectives established for groundwater and surface water by the EU Water Framework Directive.
S.I. No. 684 of 2007 Waste Water Discharge (Authorisation) Regulations, 2007, as amended (S.I. 231 of 2010).	These Regulations implement Community legislation aiming at preventing and reducing the pollution of waters by waste water discharges
S.I. No. 278 of 2007 European Communities (Drinking Water) (No.2) Regulations.	Basic standards governing the quality of drinking water intended for human consumption.
European Communities (Renewable Energy) Regulations 2011 (S.I. No. 147/2011)	Sets renewable energy targets which the FMS should have regard for achieving.
European Communities (Environmental Liability) Regulations S.I. No. 457 of 2008 as amended	Establishes a framework of environmental liability based on the 'polluter-pays' principle, to prevent and remedy environmental damage.
The National Monuments Acts (1930 to 2004) (S.I. No. 2/1930 & No. 22/2004) The Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act 1999 (S.I. No. 119/1999)	Establishes measures for the protection of monuments of national importance by virtue of the historical, architectural, traditional, artistic or archaeological interest attaching to them. Includes the site of the monument, the means of access to it and any land required to preserve the monument from injury or to preserve its amenities. Includes requirements for licensing of excavations and guidelines for licensees on strategies and method statements, reports and publications.
Arterial Drainage Act, 1945 (S.I. No 3/1945) as amended and extended 1995 (S.I. No. 14/1995)	Sets out the roles and responsibilities of the OPW in maintaining all rivers, embankments and urban flood defences on which it has executed works since the 1945 Act in "proper repair and effective condition".
Safety, Health and Welfare at Work Act 2005 Safety, Health and Welfare at Work (Construction) Regulations 2013 (S.I. No. 291 of 2013)	Prescribe the main requirements for the protection of the safety, health and welfare of persons working on construction sites.
Environmental Protection Agency Act 1992 (S.I. No. 7 of 1992), Waste Management Act 1996 (S.I. No. 10 of 1996), (as amended) Protection of the Environment Act 2003 (S.I. No. 27 of 2003)	Forbids the handling, transportation, recovery or disposal of waste when it is done in a manner which causes environmental pollution. The Waste Acts also require that, when waste is to be transferred, the waste passes to a body that falls within the legal concept of an "appropriate person". There is a duty to inform a local authority if there is any loss, spillage or accident involving non-hazardous waste that may cause environmental pollution to arise. Where hazardous waste is involved, both the local authority and the EPA must be informed.
BS 5228-1: 2009: Code of Practice for Noise and Vibration Control	Guidance on the control of noise and vibration from demolition and construction activities
TA Luft (German Government 'Technical Instructions on Air Quality')	Guidelines for limits of 350 mg/m ² /day for the deposition of non-hazardous dusts from construction activities.

3.4 ENVIRONMENTAL RISK

Each of the elements of the construction works will be evaluated for risks by the Contractor in advance of any works commencing on site and will be incorporated into the CEMP. The Contractor will be expected to undertake an individual risk assessment of all the construction elements and propose mitigation measures based on the control measures highlighted in Tables 6.1-6.12 below and included in the EIS. The risk assessment should include the severity of impact which can be derived from the impact assessments included in the EIS and the risk of occurrence.

The Contractor will be required to evaluate aspects of the construction and impacts on a continual basis and these will be deemed significant if:

- They breach legislative or contractual compliance;
- The impact could cause a prolonged or long term nuisance or environmental impact during the contract period;
- The impact could have a long term effect to the environment outside of the footprint of the works; or
- The impact could adversely impact the flora and fauna within the footprint of the proposed works and adjacent areas.

3.4.1 Construction Phase Environmental Management Plans

A suite of Construction Phase Environmental Management Plans will be prepared in association with the Contractor. These Management Plans will reflect any conditions imposed by the Planning Authority and will be agreed with Kildare County Council, the OPW and the relevant competent authorities in advance of works commencing.

These will include:

- Dust Minimisation Plan (outline example provided in Appendix A)
- Fuelling Procedure (prepared by contractor in accordance with mitigation measures in Tables 6.7, 6.8 and 6.9)
- Water Quality Monitoring Plan (outline example provided in Appendix B)
- Emergency Response Plan (outline example provided in Appendix C)
- Traffic Management Plan
- Waste Management Plan

4 ENVIRONMENTAL ROLES AND RESPONSIBILITIES

4.1 POLICY STATEMENT

Kildare County Council recognises that environmental impacts relating to nature conservation may be created as a result of the activities associated with the construction of this scheme and that it has a responsibility to mitigate and manage these impacts appropriately. This involves consultation with both statutory and non-statutory organisations, detailed desk studies, ecological assessments and the production of a CEMP. The baseline information contained within the Environmental Statement for the Morell River FMS has been used to develop site-specific mitigation to minimise damage to the nature conservation value of the site and disturbance to key habitats and species.

4.2 PROJECT TEAM STRUCTURE

The proposed team structure for the construction of the proposed scheme is shown in Figure 2 below.

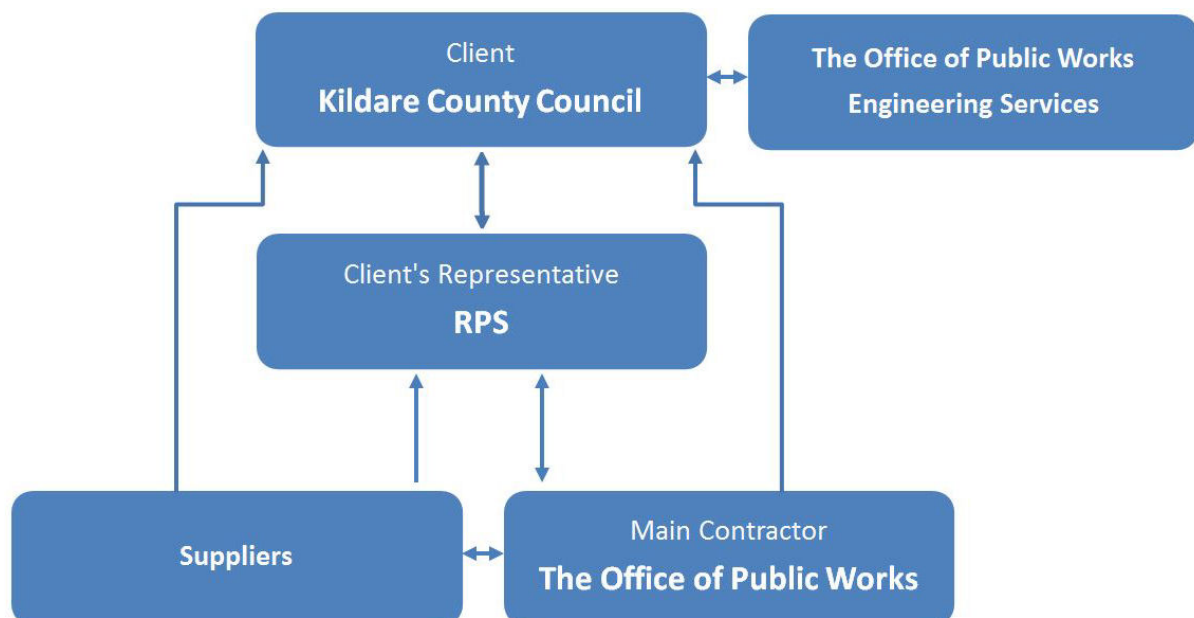


Figure 2: Team Structure

The outline CEMP will be developed by the Client's Representative and the Contractor to fulfil all relevant planning conditions.

It is currently anticipated that the OPW will undertake the role of Contractor via direct labour. The contract between KCC and the OPW will allocate the responsibility for compliance with the terms of the CEMP during the construction phase of the scheme.

KCC will appoint a suitably qualified person, or persons, to the role of Environmental Clerk of Works (EnCoW) to monitor the construction works. The EnCoW will work closely with the Contractor's site supervisors to monitor activities and ensure that all relevant environmental legislation is complied with and that the requirements of the CEMP are implemented. The EnCoW will have the authority to

review method statements, oversee works and instruct action, as appropriate, including the authority to require the temporary cessation of works, where necessary.

The CEMP (having been developed into a full CEMP by the Contractor and agreed by the relevant authorities) will be made available along with other Plans (Noise, Dust and Traffic Management, etc.) to all relevant personnel in their place of work to direct, guide and assist in their activities. All personnel working on the project will be responsible for the environmental control of their own work and will perform their duties in accordance with the requirements of the CEMP and in compliance with the controls referenced therein. No deviations will be permitted without the written authority of the Construction Manager and the relevant consenting authorities.

The Construction Manager is responsible for ensuring that the contents of the outline CEMP are satisfactorily circulated and explained to site supervisory staff for implementation during construction. Any problems or disputes arising from such will be brought to the attention of the Construction Manager and the Client Representative.

5 CONSTRUCTION AND SITE OPERATION DETAILS

5.1 PHASING AND TIMESCALES

The nature of the works dictate that they should be undertaken in settled weather, without flood risk. As such, the construction of the scheme may take 61 weeks, phased over three years (but potentially taking up to four years dependent on weather conditions).

The “best case” scenario, based on completing all works within three years, considers the following groupings of works:

- **Group One:** The section from the confluence of the River Morell/River Liffey to Killeenmore (Morr 1 to 3 and Paines 1 to 3) which should hopefully be completed as a single phase.
- **Group Two:** The second phase consists of the embankments, walls, culverts and stream diversions from Morr 4 to 23 and may be divided across two years, depending on construction delivery time, if this is the case Morr 4 to Morr 19 would most likely be completed as phase 2A in year one and Morr 20 to 23 as phase 2B in year two.
- **Group Three:** encompasses Paines 4 & 5, Kill 1 and Slane 1 to 10.

The construction works are proposed to commence at the confluence of the Rivers Morell and Liffey and from there the works will progress upstream, subject to the availability of suitable construction material. Within the works, the main artery of the scheme will be prioritised from embankments and associated tie-ins and culverts.

5.2 HOURS OF WORKING

The normal working hours for the construction of this scheme will be 7.30am – 4:30pm Monday to Friday. On occasion, working hours may be extended to 7.00am - 7.00pm Monday to Friday; and 9.00am and 4.00pm on Saturdays. There will be no activity on Sundays or Bank Holidays.

Where additional or alternative working hours outside those stated above are required, these will require notification to Kildare County Council and to be agreed in advance.

5.3 SITE ESTABLISHMENT

A central base construction compound will be established for of the construction of the project. Each embankment, wall and culvert upgrade will be a small satellite site for the project.

The base compound will be centrally located for the phase of the works being undertaken, it will be secure with controlled access and egress and will provide the following amenities for the Contractor’s staff and agents;

- Adequate materials drop-off and storage area
- Canteen complete with tables, chairs, sink, fridge, kettle etc.
- Drying area
- Toilets and washing facilities

- Adequate Parking
- Offices
- First aid room (stocked)
- Bunded fuel storage

Perimeter hoarding or fencing will be provided around the base compound to provide a barrier against unauthorised access from the public. Controlled access points to the compound, in the form of gates or doors, will be kept locked for any time that these areas are not monitored (e.g. outside working hours). All hoarding or fencing will be kept well maintained.

A satellite site will be established for each embankment, wall or culvert; this will consist of the temporary working area adjacent to the works (15m approx.) and will include the following amenities;

- Staff welfare facilities, i.e. portable toilets
- Adequate materials drop-off and storage area for new construction material
- Stock piling area for excavated material
- Internal turning area for trucks

Where appropriate, fencing and barriers will be provided within the central base site and within satellite sites as a safety barrier around areas where the public may have access, or to prevent livestock from entering the site. The locations of the temporary fencing will change during the course of the project, but will generally be surrounding excavations.

As the works are progressive, satellite amenities will be transferred from the first site to the second and so on, with the central base providing all other required amenities. Landscaping, such as the removal of scrub and trees that are not being retained, will be completed as part of the establishment of each satellite site, having regard for relevant seasonal constraints (see bullet points below). Prior to the commencement of vegetation clearance the services of a qualified arboriculturist will be sought to perform a tree survey of the proposed scheme. The trees should be assessed to quantify their age, condition and amenity value and existing trees which are to be retained tagged with metal tags. Trees which are to be retained will be protected by erection of timber post and wire fence to ensure no works are carried out under reach of their canopies. Unstable trees should be removed under direction of the arboriculturist.

At each site, the proposed works area will be clearly marked out with temporary fencing or a suitable alternative method to ensure that plant and vehicles remain within the working area and do not extend the site footprint unnecessarily.

Prior to undertaking any works along the scheme measures or setting up central base compounds, the Contractor shall engage a suitably qualified ecologist (or surveyor) to carry out the following surveys:

- badger survey of the proposed scheme measure areas, temporary compounds and all access routes;
- otter survey of the proposed scheme measure areas, temporary compounds and all access routes;

- visual inspection by a suitably qualified and licenced bat surveyor of any trees requiring removal to facilitate construction works, to identify potential bat roosts;
- invasive plant species survey, in the appropriate botanical season (April through to September) of the proposed scheme measure areas, temporary compounds and all access routes;
- if vegetation removal/trimming is required during the bird nesting season (1st March to 31st August inclusive) a suitably qualified ecologist with experience in nest-finding will be required to check all vegetation for nests (under licence from NPWS to permit potential disturbance to nesting birds) prior to removal/trimming.

Where excavation or embankments are occurring on or adjacent to a riverbank (within a distance of 10 metres), the river will be protected by the installation of a sediment barrier which will extend beyond the ends of the feature being worked on. This sediment barrier will function to prevent silt run-off into the river and will run the length of the embankment or flood wall where it is adjacent to the watercourse. The sediment barrier construction will be a priority during site setup and will remain in situ until the works have been completed.

During construction, the Construction Manager Engineer and Project Ecologist shall also maintain a watching brief for frog spawn and frogs.

5.3.1 Temporary Crossings

For the majority of the construction activity, the working areas will be accessed via existing farm tracks and it will not be necessary for plant machinery to cross any rivers or streams within the temporary working areas.

The measures at Morr 4 - Morr 8 will require temporary bridging to allow vehicles travelling along the temporary working area to cross the watercourse at Culvert 4 and the Painestown tributary stream at Morr 8. The works at Culvert 10 and Morr 9 are also likely to require a temporary crossing over the Painestown River, upstream of Culvert 10, to facilitate their construction. At the conclusion of stream diversion works at Slane 8, plant will be required to cross the newly-diverted Slane River to exit the working area.

Each temporary crossing will be included in the Method Statement for its associated works area agreed in advance with IFI personnel in advance of construction works. The design of each crossing will take into account the recommendations on temporary crossing structures in '*Guidelines on Protection of Fisheries during Construction works in or adjacent to Waters*' (IFI, 2016). Clear-span bridges, such as Bailey bridges are IFI's preferred approach for crossing rivers with fisheries and fish habitat (e.g. the Painestown River) but the use of a piped ford/causeway may be proposed for the smaller watercourses.

If instream works are required for the installation of a temporary crossing at the Painestown River or Slane river, these will be subject to the same timing restrictions for aquatic protected species of the Morell Catchment (Table 7.1) as other instream works.

A key issue of the temporary crossing will be preventing silty or sediment laden run-off from the temporary crossing and the adjacent haul route from entering the watercourse.

Any piped temporary crossing will be designed and constructed so that:

- It is perpendicular to the river/watercourse, ensuring the crossing is as short as possible;
- The pipes are adequately sized to convey the expected range of flows for the period of use, including flood flows, without overtopping;
- The pipe invert should be level with the watercourse bed to allow the passage of water during low flows;
- Pipes should extend 1.0 to 2.0 metres beyond the running track and should be covered with clean inert material such as to allow the safe crossing of the widest items of plant and equipment without cover material being dislodged and falling into the watercourse;
- The deck should have an edge upstand (eg steel plate, timber, straw bales, sandbags, geotextile);
- The crossing's surface should be on a slight gradient/graded to ensure that surface water is not shed into the watercourse, and is instead routed beyond the top of the river bank into site drainage which has the appropriate form of treatment.

5.4 EMBANKMENTS

The construction of each embankment will commence at the downstream end, the site will be cleared during establishment and the height and extents of the sediment barrier (where applicable, see 5.3 above) verified before ground is broken.

- Access routes will be agreed with landowners and stabilised where required by laying down a track of compacted granular material.
- Scrub and debris will be stripped from the work area and disposed of correctly.
- The entire length of the embankment and temporary work area (TWA) will be clearly marked out.
- There will be two teams involved in the works. Team 1 will commence the excavation for the embankment at the downstream end
- Embankment works will be undertaken using tracked vehicles which, for those measures sited adjacent to watercourses, will only travel along the temporary works area on the side of the embankment furthest away from the watercourse, or on top of the embankment itself.
- The excavated material will be sorted into types (Topsoil, Subsoil Unsuitable for re-use) and stockpiled in the TWA for re-use or removal. Stockpiling locations will be away from the river or watercourse.
- As Team 1 progresses down the site Team 2 will fall in behind, Team 2 will install the clay core and re-fill the area forming the embankment with the required slopes
- This will continue down the length of the embankment, once the embankment is complete the fencing will be removed but the sediment barrier (where required, see 5.3 above) will be left in-situ to allow the embankment to settle in. The sediment barrier will be removed only after inspection of the embankment confirms that the topsoil is stable.

5.5 WALLS

The construction of the wall will commence at the downstream end, the site will be cleared during establishment and the height and extents of the sediment barrier verified before ground is broken.

- Access routes will be agreed with landowners and stabilised where required by laying down a track of compacted granular material.
- Where walls are being constructed on or adjacent to the river bank (i.e. within a distance of 10m), the length of the proposed wall in proximity to the watercourse will have a sediment barrier installed on the river side.
- Scrub and debris will be stripped from the work area and disposed of correctly.
- The entire length of the wall and temporary work area (TWA) will be clearly marked out.
- There will be two teams involved in these works, works Team 1 will commence the excavation for the footing and foundations of the wall at the downstream end
- For those measures sited adjacent to watercourses, construction vehicles will only travel along the temporary works area on the side of the wall furthest away from the watercourse.
- Excavated material will be sorted into types (Topsoil, Subsoil Unsuitable for re-use) stockpiled in the TWA for re-use or removal
- As Team 1 progresses down the site Team 2 will fall in behind, Team 2 will construct the wall and reinstate the site as they progress upstream
- Wall construction will adopt best practice in bulk-liquid concrete management, in respect of pouring and handling, secure shuttering / form-work and allowing adequate curing times
- Where shuttering is used, measures should be put in place to prevent against shutter failure and to control storage, handling and disposal of shutter oils
- Construction will progress down the length of the wall. Once the wall has been completed, the site markings will be removed but the sediment barrier (where applicable) will be left in-situ to allow the reinstated ground around the wall to settle in. The sediment barrier will be removed only after inspection of the reinstated ground confirms that it is stable.

5.6 STREAM RE-ALIGNMENT

The plant required will operate from the river bank without need to enter the stream. The new channels will be open cut through the existing bends, the streams will be diverted through this new channel and the old channel will be filled in. The opening of the new channels will be completed from the field, it will start at the centre point and move progressively in both directions until it reaches the stream banks. Once it reaches the banks, both banks will be opened and the upstream section of the stream diverted in a controlled manner by restricting flow down the old channel, the down stream section will also have flow restriction to minimise backflow, this will allow the old section to drain slowly. The old channel will be backfilled from the upstream side starting with the new upstream bank around the bend to the downstream section where the second new bank will be created.

The filling in of the old channels will be from the temporary island that the new channel will have created. During re-alignment the temporary work areas will be set up in the field, this is where the excavated material will be stock piled for use when backfilling the old channel. The machinery will traverse the stream twice, once to access the island to fill in the old channel and the second time to exit the works area upon completion.

There is the potential for significant sediment disturbance and run-off during this operation. A detailed design and Method Statement will be drawn up by the contractor for each of the diversions and agreed in advance with IFI personnel in advance of construction works.

- Access routes will be agreed with landowners and stabilised where required by laying down a track of compacted granular material;
- Stream realignments shall be carried out in accordance with the recommendations within the IFI document '*Requirements for the protection of Fisheries Habitat during construction and Development Works at River Sites*' (ERFB, 2003). Method Statements will be prepared by the Contractor and approved;
- Scrub and debris will be stripped from the route of the realignment and disposed of correctly;
- The entire length of the re-alignment will be clearly marked out, including the Temporary work area (TWA);
- Excavation works to construct the new channel alignment will be carried out in dry conditions, without connection to the existing watercourse;
- The banks and bed of the new channel will be lined with a biodegradable geotextile;
- Effective silt management measures should be placed in stages downstream of the new channel in advance of opening the channel. These will be specified by the Contractor in the Method Statement and agreed with IFI, but the currently proposed measure would be triple silt curtains derived from Terram or other similar material, to first filter out the heaviest of materials and subsequently the finer material. These would need to be checked on a regular basis with the heavy material removed from the first silt curtain thereby keeping it functional. A procedure will need to be included in the Method Statement for the removal of the silt fences on a staged basis, as even these preventative measures will lead to a build up behind the curtain. The curtain nearest to the point of works should be removed first followed by the others;
- The connection of the new stream channel to the existing watercourse shall only be made during a timing window agreed with IFI for in-stream works;
- Fish will need to be removed from the impacted section of the existing channel in advance. The fish removal must be completed by IFI or persons authorised under Section 14 of the Fisheries Consolidation Acts 1959 (as amended);
- During realignment works on the Slane River, contractor SOPs will be applied to respond in the case white-clawed crayfish are present and emerge from refuges at the times of stream realignment. In the event that significant populations of white clawed crayfish emerge, advice will be sought from IFI and NPWS to facilitate any necessary rescue and relocation;
- During the diversion operation, bungs should be fixed at both ends of the channel and removed in a controlled manner at IFI's direction ensuring the river flow remains uninterrupted from above to below the works. As the ends of the new channel are opened, flow will be restricted down the old channel; the downstream section will also have flow restriction to minimise backflow, this will allow the old section to drain slowly;
- To assist with reinstatement of the river bed in the new channel, if suitable, the existing bed material from the original channel should be removed and kept clean, then placed on the bed of the new channel at the conclusion of the diversion works.
- Once the diversion is complete the old channel will be backfilled from the upstream side;

- At Slane 08 filling in of the old channel will be from the temporary island that the new channel will have created;
- During re-alignment, a temporary work area will be set up, this is where the excavated material will be stock piled for use when backfilling the old channel. Stockpiles will be kept away from both the old and new river alignments;
- At Slane 08 the excavator will be required to cross the newly diverted stream to exit the works area upon completion of backfilling. The Method Statement for Slane 08 will incorporate mitigation measures to protect the newly constructed river bank during the crossing and prevent the entrainment of sediment into the watercourse.

5.7 CULVERT WORKS

In-channel works for upgrades on Culverts 6, 9, 10 and 22 and, where relevant, at Culverts 1, 2, 4, 4a, 7, 18 & 19 will use cofferdam-type construction whereby flow can be restricted, allowing the civil engineering works to be undertaken in dry conditions. A cofferdam is a temporary watertight enclosure that is pumped dry to expose the bottom of a body of water so that construction can occur. A Method Statement will be prepared for each site of culvert alterations and will be agreed in advance with IFI personnel ahead of commencing the culvert alteration.

All instream works should adhere to timing restrictions for aquatic protected species of the Morell Catchment (Table 6.1).

- Any culvert alterations must be designed to ensure the unimpeded passage of fish at all times;
- Morell River (Cul 5) and Painestown River (Cul 9 & 10) should be electro fished downstream of the proposed works area in advance of any works to assess whether there are any fish or lamprey ammocoetes in the affected channels, as advised by IFI. The fish removal must be completed by IFI or persons authorised under Section 14 of the Fisheries Consolidation Acts 1959 (as amended);
- Headwalls for Cul 5, Cul 9 and Cul 10 should be pre-fabricated and inserted or assembled on site without the use of bulk liquid concrete;
- For proposed works on Cul 5, Cul 9 and Cul 10, and, where relevant, at Culverts 1, 2, 4, 4a, 7, 18 & 19 effective silt management measures should be placed in stages downstream of the new channel in advance of commencing culvert alterations. These will be specified by the Contractor in the Method Statement and agreed with IFI, but the currently proposed measure would be triple silt curtains derived from Terram or other similar material, to first filter out the heaviest of materials and subsequently the finer material. These would need to be checked on a regular basis with the heavy material removed from the first silt curtain thereby keeping it functional. A procedure will need to be included in the Method Statement for the removal of the silt fences on a staged basis, as even these preventative measures will lead to a build up behind the curtain. The curtain nearest to the point of works should be removed first followed by the others.

If there is significant water ingress into the cofferdam (dependant on river levels), an approved pumping and settlement system will be set up. Pumps will transfer accumulated standing water into a settlement tank, or tanks, which in turn will discharge into a 'silt buster' or 'dirt bag' prior to being returned to the watercourse, to minimise the discharge of suspended solids into the watercourse. Measures for transferring water during instream works will be subject to approval within the Contractor's Method Statement.

5.8 CONSTRUCTION TRAFFIC

5.8.1 Site Access

As outlined previously all construction traffic will enter and leave the satellite sites via access routes agreed with landowners.

The entrances to the satellite sites will be kept free from obstruction to ensure construction traffic can drive straight into the site. Special consideration will have to be given to deliveries to ensure no vehicles are left waiting outside of the site causing potential obstructions.

5.8.2 Construction Traffic Routing

Construction traffic will be confined to designated and planned haul routes in the vicinity each of the satellite sites. The heavy goods vehicles (HGVs) routes to and from the site will be planned and provided with the designated haul route for delivery and egress from each site.

Proposed Haul routes and expected truck numbers are described in Chapter 6 of the EIS. A Traffic Management Plan will be prepared in advance of the proposed works to minimise any impacts on other road users and to maximise road safety along the haulage route.

5.8.3 Construction Parking

Staff Parking will be in the central base site, staff will carpool from here to the satellite sites to ensure minimum traffic impact on the satellite site. Plant and delivery trucks will have sufficient parking within the temporary work area.

6 ENVIRONMENTAL MITIGATION MEASURES

Chapters 5 to 14 of the EIS assess the likely significant impacts arising from the proposed development. Tables 6.2 to 6.11 below summarise the potential impacts identified and the mitigation measures required, where necessary.

A Method Statement will be prepared by the Contractor for each works area (e.g. Morr 1, Morr 2, Paines 1, etc.). This Method Statement is to be strictly adhered to by staff and contractors involved in the works and will be overseen by the contractor's representative/foreman. The Environmental Management Protocols and Standard Operating Procedures (SOPs) will form the backbone of the Method Statements, which will incorporate the mitigation measures proposed below.

A robust mechanism for reporting of pollution incidents will be agreed in advance between the OPW, Kildare County Council, the IFI and other relevant statutory agencies. An outline emergency spill response plan is included in Appendix C.

6.1 GENERAL ENVIRONMENTAL PROTECTION

6.1.1 Flood Warnings

The works are proposed to take place during settled weather which should reduce the risk of a flood event occurring during construction. However, should a flood warning be raised during the construction phase, every effort will be made to make any active working areas safe, e.g. removal of plant machinery and all stores of fuels, oils and wastes from areas within range of flood waters. Open excavations will be backfilled and compacted to replicate the original condition insofar as is possible. Measures to be taken in the event of a flood warning for each of the works area will be described within the Method Statement.

Table 6.1: In-Stream Works Restriction Periods for Aquatic Protected Species of the Morell Catchment

Species	Period of no instream disturbance (inclusive)	Likelihood of presence in the affected areas and comments	Period instream works allowed (inclusive)
Salmon (<i>Salmo salar</i>)	October to April - spawning, nursery (IFI).	Distributed throughout study area.	May to September
Brook (<i>Lampetra planeri</i>) and River Lamprey (<i>Lampetra fluviatilis</i>)	March to May - spawning / hatching	Distributed throughout study area, depending on localised habitat, i.e. spawning in riffles, nursery in silty deposits.	June to February.
Sea Lamprey (<i>Petromyzon marinus</i>)	Mid June – July	Distributed throughout study area, depending on localised habitat i.e. Spawning and juvenile nursery habitat abundant throughout the study area, depending on localised habitat, i.e. spawning in riffles, nursery in silty deposits.	August to April.

Species	Period of no instream disturbance (inclusive)	Likelihood of presence in the affected areas and comments	Period instream works allowed (inclusive)
White Clawed Crayfish (<i>Austropotamobius pallipes</i>)	November to late June (breeding / berried females + hatching) .	Distributed throughout study area but populations particularly abundant on Slane River .	July - October
Trout (<i>Salmo Trutta</i>)	October to May - spawning, nursery (IFI).	Distributed throughout study area.	June to September
Combined/ overall timing restrictions.	No instream works allowed between October and July.	-	Instream works allowed August to September.

6.1.2 Summary Tables of Mitigation Measures

Table 6.2: Standard Pollution Prevention Control Measures

Potential Impact	Mitigation Measure
General	<ul style="list-style-type: none"> ▪ Prior to any works, all construction personnel will receive an on-site induction relating to operations within and adjacent to watercourses and the environmentally sensitive nature of working within and in proximity to the watercourses within the Morell catchment and re-emphasise the precautions that are required as well as the mitigation measures to be implemented. ▪ The Contractor will ensure that the engineer setting out the works is fully aware of the ecological constraints and mitigation requirements. Kildare County Council will ensure that a Corrective Action procedure is put in place in the event of an incident onsite. ▪ The amount of bare ground created by excavation and vegetation removal will be minimised, to prevent run-off. ▪ Direct instream works such as culvert upgrades and proposed measures along the riverbank have the greatest potential for negative impacts during spawning / breeding and early nursery periods for aquatic protected species in the study area. No instream works or out-of-river works with potential for significant damage should occur during restricted periods for relevant species (see Table 6.1). Consultation should be undertaken with the IFI in this regard. ▪ Storage areas will be clearly identified, ensuring that similar items are stored together to prevent wastage ▪ Perishable materials will be stored inside, under cover or in containers ▪ Where possible, materials will be stored off the ground by using pallets or racking ▪ Materials will be used within their shelf life ▪ Materials will be stored in accordance with manufacturer's guidelines to prevent damage. ▪ Regular housekeeping checks will be made to ensure the site remains safe (in terms of reducing slip, trip and fall hazards) and environmentally sound. ▪ The amount of materials actually stored on site should be kept to a minimum to help instil the concept of the law of diminishing returns amongst operatives (i.e. resources will be used more wisely when less abundant).
Pollution of Watercourses	<p><u>General</u></p> <ul style="list-style-type: none"> ▪ To prevent the spread of invasive aquatic / riparian species, all plant and equipment employed on the construction site (e.g. excavator, footwear, etc.) must be thoroughly cleaned down using a power washer unit and washed into a dedicated and contained area, prior to arrival on site. A sign off sheet must be maintained by the contractor to confirm cleaning. ▪ Tools and equipment are not to be cleaned in rivers. ▪ Chemicals/fuels used shall be stored in sealed containers in the site lockup prior to use. ▪ The chemicals shall be applied in such a way as to avoid any spillage or leakage. Any and all excavated material is not to be temporarily stored adjacent to watercourses ▪ Storage areas will be identified in advance of any deliveries and will be located in the area of least risk to environmental receptors. For example, should there be any storm water drainage systems

Potential Impact	Mitigation Measure
	<p>on site, raw materials and hazardous liquids will be stored away from this area.</p> <ul style="list-style-type: none"> ▪ Any spoil will be stored a minimum of 10 metres from watercourses, covered if practicable and sandbagged or other suitable measures employed to prevent silt run-off. ▪ Materials such as cement will be covered from the weather to prevent spoiling and caustic runoff. ▪ All hazardous liquids below 200 litres in capacity will be stored in drip trays, under cover and larger volumes divided into smaller containers e.g. 20 litre cans in preference to 190 litre drums. ▪ All hazardous liquids above 200 litres will be fully bunged to 110% of their capacity. Steel drums should be avoided in favour of bunged, bulk stores with integral dispensing systems e.g. fuel cube mounted in a refuelling bay. <p><u>Fuelling and Lubrication</u></p> <ul style="list-style-type: none"> ▪ The Contractor shall provide designated areas for fuel transfer away from any watercourses or drainage channels. The refuelling of mobile plant in the working area will be undertaken well away (minimum 10m) from any drains or water bodies. Oil contaminated water will be disposed of at an appropriate oil recovery plant or licensed tip site. ▪ Vehicles will not be left unattended during refuelling. All machinery will be checked regularly for any leaks or signs of wear and tear. The Contractor will ensure that personnel are nominated as being responsible for the supervision of the filling of vehicles. Any standing machinery will have drip trays placed underneath to prevent oil and fuel leaks causing pollution. ▪ Adequately sized spill kits will be available on site, with additional material available for restocking. Emergency spill control training will be provided for all operatives working on site including emergency communication. When crossing rivers, floating booms and silt traps will also be held onsite. ▪ All fuels, lubricants and hydraulic fluids will be kept in secure bunged areas at a minimum of 10m from the river. ▪ The bunged area will accommodate 110% of the total capacity of the containers within it. Containers will be properly secured to prevent unauthorised access and misuse. An effective spillage procedure will be put in place with all staff properly briefed. Any waste oils or hydraulic fluids will be collected, stored in appropriate containers and disposed of offsite in an appropriate manner. ▪ All plant shall be well maintained with any fuel or oil drips attended to on an ongoing basis. ▪ Any minor spillage during this process will be cleaned up immediately. Should any incident occur, the situation will be dealt with and coordinated by the nearest supervisor who will be responsible for instructions by Kildare County Council. ▪ Disposal of unused liquids will be via a specialist, licensed contractor fully complying with relevant legislation. This will include run off from drip trays. <p><u>Cement/Concrete Runoff</u></p> <ul style="list-style-type: none"> ▪ Measures relating to concrete/cement management will apply to the construction of the flood walls Morr7, Morr22, Slane1, Slane 4 and Kill 1. <ul style="list-style-type: none"> □ Disposal of raw or uncured waste concrete will be controlled to ensure that the watercourse will not be impacted; □ Best practice in bulk-liquid concrete management addressing pouring and handling, secure shuttering / form-work, adequate curing times; □ Where shuttering is used, measures should be put in place to prevent against shutter failure and control storage, handling and disposal of shutter oils; □ All working materials and excavated material should be stockpiled on the land side of the works within the assigned temporary working area; □ For works within 10m of river banks, the river side of the flood wall excavation will be separated from the river by a sediment barrier. Once the flood wall is complete the sediment barrier should be left in-situ to allow the reinstated ground around the wall to settle in. The sediment barrier should only be removed after inspection of the reinstated ground confirms that it is stable; □ Wash water from cleaning ready mix concrete lorries and mixers may be contaminated with cement and is therefore highly alkaline. Due to the size of the site and the proximity of sensitive watercourses, it is recommended that lorries and mixers are washed out offsite. ▪ The following activities associated with the construction of flood defence walls should be noted:

Potential Impact	Mitigation Measure
	<ul style="list-style-type: none"> □ <u>Bank Protection</u> – Refer to OPW’s Environmental Management Protocols and Standard Operating Procedures (OPW, 2011). □ <u>Bush Cutting / Branch Trimming</u> - Refer to OPW’s Environmental Management Protocols and Standard Operating Procedures (OPW, 2011). <p>Silt Runoff</p> <p>Measures relating to management of silt runoff will mostly apply to the construction of the embankments.</p> <ul style="list-style-type: none"> ■ The following measures should be employed during proposed works: <ul style="list-style-type: none"> □ Works should be carried out ideally during a period of settled weather with no flood risk which will allow sufficient time for construction materials to settle; □ Embankment material should be selected that has low silt content; □ All working materials and excavated material should be stockpiled on the land side of the works within the temporary working area; and □ For works within 10m of river banks, the river side of the embankment excavation will be separated from the river by a sediment barrier. Once the embankment is complete the sediment barrier should be left in-situ to allow the reinstated ground around the wall to settle in. The sediment barrier should only be removed after inspection of the reinstated ground confirms that it is stable. □ A silt trap will be located downstream of works. ■ The following activities associated with the construction of embankments should be noted: <ul style="list-style-type: none"> □ <u>Bank Protection</u> – Refer to the OPW’s Environmental Management Protocols and Standard Operating Procedures (OPW, 2011). □ <u>Bush Cutting / Branch Trimming</u> - Refer to the OPW’s Environmental Management Protocols and Standard Operating Procedures (OPW, 2011).

Table 6.3: Human Beings: Summary of Mitigation Measures

Potential Impact (Human Beings)	Summary of Proposed Mitigation
<p>Construction</p> <p>Potential impacts include construction noise, and temporary dust and vibration arising from the construction works and associated construction traffic.</p>	<p>Mitigation measures for traffic, noise, & vibration and dust are presented in their respective chapters.</p>
<p>There is potential for some disruption to the residential/ working population and economic activity within the study area during the construction phase of the flood management scheme. Some disruption to residents and businesses may arise during the construction period, from works occurring close to commercial premises, road restrictions, etc.</p>	<p>Impacts will also be mitigated by the adoption of good construction and traffic management measures and by the dissemination of information to owners and operators of places of work. Such measures should be identified in a formal Construction and Environmental Management Plan (CEMP) and Construction Traffic Management Plan (CTMP).</p> <ul style="list-style-type: none"> ■ The CEMP will be implemented by the contractor to mitigate against adverse impacts during construction. The CEMP will incorporate mitigation measures to avoid nuisance from construction activities including dust and noise. ■ The CTMP will also be prepared in advance of the proposed works to minimise any impacts on other road users and to maximise road safety along the haul routes. The aim of a CTMP is to put in place procedures to manage construction traffic effectively. The plan will consider construction traffic accessing the site via the public road network as well as traffic circulation within

Potential Impact (Human Beings)	Summary of Proposed Mitigation
	<p>the construction site.</p> <ul style="list-style-type: none"> ▪ The working and resident community would also benefit from an organised information campaign on temporary access arrangements and proposed construction detail.
<p>During construction, potential impacts in respect of education and health are not expected to be significantly different from the existing situation. There will be a temporary increase in the number of HGVs on routes within the works areas during construction and the resultant temporary traffic management procedures may result in some minor disruption to local traffic which may include increases to typical journey times.</p>	<p>Construction phase impacts in respect of education and health will be mitigated in the same way as for the resident/working population in the section above, by the adoption of good construction and traffic management measures and by the dissemination of information to schools and healthcare providers. Such measures should be identified in the CEMP and CTMP plan as previously outlined, and an organised information campaign on temporary access arrangements and proposed construction detail as previously identified.</p>
<p>Whilst the proposed works will have little impact on many sectors of the tourism industry within the catchment, there is potential for an impact to angling activity. The proposed scheme will have a localised temporary adverse impact on the angling amenity during any in-stream works.</p>	<p>Construction phase impacts in respect of tourism and leisure will be mitigated in the same way as for the resident/working population above.</p> <ul style="list-style-type: none"> ▪ Phasing of works around peak user times of other uses such as specific sports facilities, in particular Killeen Golf Club, and seasonal tourist facilities should be considered. ▪ Local angling clubs and IFI have been included in the consultation process and will be kept informed throughout the construction process. Mitigation and control measures to address the impact from suspended sediments associated with construction activities should follow good work practices and sound design principles (see also Table 15.7, Aquatic Ecology). Contractors shall establish contact with the relevant authorities, e.g. IFI before works commence, with ongoing liaison throughout the construction. ▪ Regular updates and consultation with all sports clubs/schools affected by construction works will be required. Ongoing consultation with other land users specifically affected by proposed construction works will be required.
<p>Construction works may affect land uses within the study area through temporary landtake for construction purposes. Particular land areas may temporarily severed from access to facilitate construction works and/or have temporary access restrictions (short term access to land may be affected immediately adjacent to the works) causing a short term adverse impact.</p>	<ul style="list-style-type: none"> ▪ Extensive landowner consultation has been carried out during the development of the proposed scheme. ▪ Consultation with landowners will continue throughout detailed design and construction of the scheme to ensure that appropriate mitigation for individual landowners is agreed between the landowner and the Contractor and will be implemented. ▪ Existing accesses to property or severed areas, including homes and farms will, where practicable, be maintained during construction, otherwise reasonable temporary access will be provided. Discussions have taken place with landowners in this regard and these discussions will continue throughout the construction period. ▪ All lands, temporarily acquired, will be re-instated to pre-construction conditions, subject to the agreement of the landowners.
<p>Construction works may affect safety within the study area.</p>	<p>The works will be subject to the Safety, Health and Welfare at Work Act 2005 (S.I. No. 10 of 2005) and at a minimum the Safety, Health and Welfare at Work (Construction) Regulations, 2013 (S.I. No. 291 of 2013). All aspects of design construction will be reviewed with regard to health and safety and risk assessments will be carried out.</p> <ul style="list-style-type: none"> ▪ A project supervisor design process (PSDP) has been

Potential Impact (Human Beings)	Summary of Proposed Mitigation
	<p>appointed. As part of their duties they will be required to produce a Preliminary Safety and Health Plan for the project. The main contractor will be appointed as project supervisor construction stage (PSCS) and will be responsible for the control and co-ordination of health and safety during the construction phase of the works.</p> <ul style="list-style-type: none"> ▪ A CTMP will be prepared in advance of the proposed works to minimise any impacts on other road users and to maximise road safety along the haul routes.
<p>Potential impacts to agricultural activities within the proposed works areas.</p>	<ul style="list-style-type: none"> ▪ Mitigation measures regarding construction traffic, dust and noise are outlined in the Tables 15.2, 15.3 and 15.4 below. ▪ Any disruption to water supply will be reinstated immediately by the Contractor or an alternative source supplied until the original source is reinstated, unless otherwise agreed with the landowner. Discussions have taken place with landowners in this regard and these discussions will continue throughout the construction period. ▪ Existing accesses to all properties will, where practicable, be maintained during construction otherwise reasonable temporary access will be provided. ▪ Where necessary, suitable stock proof temporary fencing will be erected for the duration of construction. ▪ Where any fences, walls or hedges are damaged they will be made stock proof immediately, where necessary. Any necessary permanent restoration of fences, walls, drains or land will be completed as soon as practicable after work has concluded ▪ During the construction stage the contractor will be instructed that any gates used by them are closed so as to prevent animals from straying. ▪ All machines will be treated with appropriate disinfectant prior to arrival on site. The contractor will verify to the construction manager engineer that this has been done. ▪ The construction manager will liaise with the local District Veterinary Office (DVO) to establish the location of any restricted herds along the proposed scheme. The liaison will continue on a regular basis throughout the construction period. ▪ Where the construction manager has been informed of a restricted herd along the scheme, all machinery and personnel will be disinfected appropriately before leaving the land concerned. The contractor will arrange for disinfectant mats/baths to be replenished with disinfectants, as required. ▪ In the event of an outbreak of a serious Class A Disease, the project will be subject to such operational restrictions as are imposed by the Department of Agriculture, Food and Marine.
<p>Operation</p> <p>Impacts will arise particularly to the residential amenity of the occupants of specific residential properties within the study area where some of the proposed flood defences are to be constructed adjacent to residential properties</p>	<ul style="list-style-type: none"> ▪ The proposed scheme will alleviate intermittent flooding to the residential properties in the catchment area. This is a significant positive and long term impact. ▪ For the resident and working community, no mitigation is required; provided plans to reinstate areas damaged

Potential Impact (Human Beings)	Summary of Proposed Mitigation
(i.e. embankments constructed close to residence boundaries).	or disturbed during the construction phase are implemented in a timely manner following the carrying out of the works and that the necessary maintenance to ensure the continued effectiveness of the scheme is carried out.
During the operation phase, significant areas of land and a wide range of land uses such as residential and agricultural will benefit from reduced flood risk, though some agricultural areas will be included in the post scheme floodplain.	<ul style="list-style-type: none"> There are no mitigation measures to off-set significantly reduced land usage due to embankment locations. There are also no mitigation measures to off-set significantly increased flooding of certain land parcels due to the proposed scheme. Extensive landowner consultation has been carried out during the development of the proposed scheme. Where possible, adversely affected landowners have been accommodated by protecting adjacent land parcels.

Table 6.4: Traffic, Transport and Infrastructure: Summary of Mitigation Measures

Potential Impact (Traffic, Transport and Infrastructure)	Summary of Proposed Mitigation
Construction Phase Increase in HGV movements along roads that may not normally be used for HGV journeys.	<p>Statutory Undertakers are required to agree temporary traffic management procedures with the local authority to carry out their works. The traffic management proposals will be carried out using the following industry recognised standards:</p> <ul style="list-style-type: none"> Traffic Signs Manual 2010 Chapter 8 – temporary Traffic Measures and Signs for Roadworks (Department of Transport, Tourism and Sport). Chapter 8 assists with planning all works activities and temporary closures to optimise safety, road space and work efficiency, whilst minimising road user congestion, delay and inconvenience. Safe and efficient traffic management is founded upon the following simple principles: <ul style="list-style-type: none"> Provision of clear and early warning of obstructions in the highway; Optimisation of road space and the provision of adequate safety zones and working space at works locations; Clear directions relating to decisions/actions required from the road users; Minimisation of potential conflict between road users, and between road users and road workers and their operations; Credibility of traffic signs and temporary requirements; Speed limits and restrictions appropriate for the temporary highway geometry and safety features. <p>The underlying design of traffic management arrangements should be to produce a safety performance no worse than the rate for non-works conditions, whilst minimising delays for traffic passing the works. Therefore the use of these measures will mitigate the potential temporary, localised traffic delays that may be caused by the construction of the scheme.</p> <p>A Construction Traffic Management Plan (CTMP) will be prepared in advance of the proposed works to minimise any impacts on other road users and to maximise road</p>

Potential Impact (Traffic, Transport and Infrastructure)	Summary of Proposed Mitigation
	<p>safety along the haul routes. It should also outline measures to enhance the efficient transportation of construction materials and machinery whilst minimising delay and disruption to the general traffic.</p> <p>The Traffic Management Plan will address the following issues:-</p> <ul style="list-style-type: none"> ▪ Consultation with Kildare County Council / TII to minimise road works on the N7 during the construction programme; ▪ Maintenance of the haul route – ensuring that it is adequately swept to avoid the safety hazard of mud building up on the road, and pavement condition monitored so that developing potholes are dealt with promptly; ▪ Ensuring that Emergency Response Systems are in place to deal with incidents, written notification of the commencement of the delivery periods shall be given to the Gardaí, Fire and Ambulance services, and TII to allow the coordination of the work and the mobilisation of the safety procedures; ▪ Local residents in the area would also be notified prior to the commencement of works; ▪ Systems to encourage HGV drivers not to exceed the speed limit, not to over-rev engines etc. and to drive with consideration for other road users; ▪ Application of maintenance standards to minimise emissions by ensuring all HGVs are well-maintained; ▪ Systems to ensure that roles and responsibilities of all parties are clearly appreciated; ▪ Reuse of materials on site where possible to reduce HGV movements; and ▪ Backloading - removing waste material from site using the return journeys of HGVs that bring material to site - would reduce the amount of empty running associated with the transport of materials. Backloading options will be explored at the project progresses to detailed design. <p>The proposed mitigation measures for the above and provision of a CTMP may include, but not limited to, the following:</p> <ul style="list-style-type: none"> ▪ Signage and temporary traffic control measures and devices at specific locations; ▪ Plan drawings providing the details of the proposed traffic management measures including the text and location of the proposed temporary signage:- advisory, warning and Variable Message Signage (VMS); ▪ Details of times that the heavy vehicles are permitted on the public roads; ▪ Details of speed limits for the heavy vehicles; ▪ Details of the Public information Strategies; and ▪ Details of the Traffic Incident Management. <p>The traffic management mechanisms described above will ensure that the works will be co-ordinated and controlled. The detailed CTMP will be agreed with the local authority post consent.</p>

Potential Impact (Traffic, Transport and Infrastructure)	Summary of Proposed Mitigation
Potential impact of excavation work on underground utilities. Potential impact of construction plant on overhead utilities	Precautions will be necessary during construction of the works in order to ensure there is no damage to any of this infrastructure. These precautions will be determined at detailed design stage in consultation with the Service Providers.
Operation Phase Only minor traffic requirements will be associated with scheme maintenance. These are not predicted to present significant residual impacts for the operational phase of the development. The scheme will result in protection from flooding for events up to the 1% AEP for a number of roads including the N7, the L6016, the L2010, the L6021 and the Killenmore Road which will represent a very substantial improvement over the existing situation.	No mitigation measures are required.

Table 6.5: Air Quality: Summary of Mitigation Measures

Potential Impact (Air Quality)	Summary of Proposed Mitigation
Construction Phase The movement of machinery will generate exhaust fumes and subsequently contribute to potential emissions of the following compounds; oxides of nitrogen, carbon monoxide, sulphur dioxide, particulate matter (including PM ₁₀ /PM _{2.5}), volatile organic compounds (VOCs) and polycyclic aromatic hydrocarbons (PAHs).	While concentrations of these pollutants are expected to increase in the immediate vicinity of the machines during site works it is not anticipated that they will have any impact on the air quality of the region or in turn on the sensitive receptors in the area considering the size and nature of the proposed scheme and the number of machines proposed.
Construction activities are likely to generate some dust emissions. The potential for dust to be emitted depends on the type of construction activity being carried out in conjunction with environmental factors including levels of rainfall, wind speeds and wind direction. The potential for impact from dust depends on the distance to potentially sensitive receptors locations and whether the wind can carry the dust to these locations.	In order to mitigate construction dust emissions during the construction phase, a dust minimisation plan will be prepared as part of the Construction Environmental Management Plan (CEMP). The dust minimisation plan will be based upon the industry guidelines in the Building Research Establishment document entitled 'Control of Dust from Construction and Demolition Activities'. The implementation of a dust minimisation plan during the construction phase of the project will include measures such as: <ul style="list-style-type: none"> Site roads shall be regularly cleaned and maintained as appropriate. Hard surface roads shall be swept to remove mud and aggregate materials from their surface while any un-surfaced roads shall be restricted to essential site traffic only; Any site roads with the potential to give rise to dust will be regularly watered, as appropriate, during dry and/or windy conditions (also applies to vehicles delivering material with dust potential); All vehicles exiting the site shall make use of a wheel wash facility prior to entering onto public roads, to ensure mud and other wastes are not tracked onto public roads. Wheel washes should be self-contained systems that do not require discharge of the wastewater to water bodies; Public roads outside the site shall be regularly inspected for cleanliness, and cleaned as necessary;

Potential Impact (Air Quality)	Summary of Proposed Mitigation
	<ul style="list-style-type: none"> ▪ Material handling systems and site stockpiling of materials shall be designed and laid out to minimise exposure to wind; ▪ Water misting or sprays shall be used as required if particularly dusty activities are necessary during dry or windy periods; ▪ All vehicles which present a risk of spillage of materials, while either delivering or removing materials, will be loaded in such a way as to prevent spillage on to the public road; ▪ Vehicles delivering material with dust potential shall be enclosed or covered with tarpaulin at all times to restrict the escape of dust; ▪ The Contractor will be required to ensure that all vehicles are suitably maintained to ensure that emissions of engine generated pollutants is kept to a minimum. ▪ Due to the transient nature of the works, it is recommended that regular inspections are carried out by the construction contractor to monitor the potential for dust deposition. Where the duration of works are estimated to be longer than 4 weeks, it is recommended that the construction Contractor monitors monthly dust deposition levels for the duration of construction using the Bergerhoff method (German Standard VD 2119, 1972). Results should be compared to the TA Luft guidelines of 350mg/m²/day (for non-hazardous dusts). This will be applicable for works at Paines 1, Morr 4, Morr 17 and Morr 23. The monitoring is only deemed necessary where residential receptors are located within 1km of the proposed works locations. In this instance, monitoring should take place along the boundary of the location of works or at the nearest residential location. ▪ In order to minimise the likelihood of complaints, the Council and affected residents should be kept informed of the works to be carried out. A complaints procedure should be operated by the Contractor throughout the construction phase.
<p>Construction activities will require energy resources and will generate vehicle emissions such as CO₂ which have potential to influence climate change.</p>	<p>A Traffic Management Plan will be prepared in advance of the construction works. This will form part of the specification for the construction works. The CTMP will outline measures to minimise congestion and queuing, reduce distances of deliveries and eliminate unnecessary loads;</p> <ul style="list-style-type: none"> ▪ Reducing the idle times by providing an efficient material handling plan that minimises the waiting time for loads and unloads. Reducing idle times could save up to 10% of total emissions during construction phase; ▪ Turning off vehicular engines when not in use for more than five minutes. This restriction will be enforced strictly unless the idle function is necessary for security or functionality reasons; and ▪ Regular maintenance of plant and equipment. Technical inspection of vehicles to ensure they will perform the most efficiently. <p>As part of the Construction Environmental Management Plan, the Contractor will be required to implement an Energy Management System for the duration of the works. This Energy Management system may include such</p>

Potential Impact (Air Quality)	Summary of Proposed Mitigation
	<p>measures as:-</p> <ul style="list-style-type: none"> ▪ The use of thermostatic controls on all space heating systems in site buildings to maintain optimum comfort at minimum energy use; ▪ The use of sensors on light fittings in all site buildings and low energy lighting systems; ▪ The use of adequately insulated temporary building structures for the construction compound fitted with suitable vents; ▪ The use of low energy equipment and “power saving” functions on all PCs and monitors in the site offices; ▪ The use of low flow showers and tap fittings; and ▪ The use of solar/thermal power to heat water for the on-site welfare facilities and contamination unit (sinks and showers).
<p>Operational Phase</p> <p>No energy requirements will be associated with the proposed scheme post construction and as such there are no scheduled emissions planned for the scheme. Therefore it is not envisaged that the proposed scheme’s operation will have any significant impacts on air or climate.</p>	<p>There will be no operational phase impacts on air quality/climate as a result of the proposed scheme.</p>

Table 6.6: Noise: Summary of Mitigation Measures

Potential Impact (Noise)	Summary of Proposed Mitigation
<p>Construction Phase</p> <p>The most noticeable noise impact will occur during general construction activities associated with the proposed scheme. There are a number of noise sensitive receptors located adjacent to the proposed work areas where embankments and new walls will be constructed.</p>	<p>Reference will be made to BS 5228-1: 2009: <i>Code of Practice for Noise and Vibration Control on Construction and Open Sites: Noise</i>, which offers detailed guidance on the control of noise and vibration from demolition and construction activities. The following proposed practices will be adopted during construction and will be outlined in the Construction Management Plan, including:</p> <ul style="list-style-type: none"> ▪ The normal working hours for the construction of this scheme will be 7.30am – 4:30pm Monday to Friday. Working hours may be extended to 7.00am - 7.00pm Monday to Friday; and 9.00am and 4.00pm on Saturdays on occasion. There will be no activity on Sundays or Bank Holidays. Where additional or alternative working hours outside those stated above are required, these will require notification to Kildare County Council and to be agreed in advance;; ▪ All construction related traffic should only use the designated and approved haul routes; ▪ Provision of a 2.4m high hoarding should be provided around contractors compound; ▪ A mobile system of screens or temporary hoarding should be placed close to the noisy construction works within embankment areas to provide acoustic screening in locations with residential properties in close proximity to construction works; ▪ Establishing channels of communication between the client/ contractor, Kildare County Council and residents through implementation of a communications

Potential Impact (Noise)	Summary of Proposed Mitigation
	<p>procedure for noise and vibration related issues;</p> <ul style="list-style-type: none"> ▪ Appointing a site representative responsible for matters relating to noise and vibration; and ▪ Monitoring typical levels of noise and vibration during critical periods and at sensitive locations. <p>Furthermore, it is envisaged that a variety of practicable noise control measures will be employed. These may include:</p> <ul style="list-style-type: none"> ▪ Selection of plant with low inherent potential for generation of noise and/ or vibration; ▪ Erection of enclosures as necessary around noisy processes and items such as generators, heavy mechanical plant or high duty compressors; and ▪ Placing of noisy/ vibratory plant as far away from sensitive properties as permitted by site constraints and the use of vibration isolated support structures where necessary. <p>It is also recommended that periodic noise monitoring be undertaken during the initial construction phase to determine noise levels at noise sensitive receptors, in particular during 'noisy' activities. If the recommended noise exposure levels are exceeded, further mitigation measures will be employed including temporary enclosures or screens around particularly 'noisy' plant.</p>
<p>Potential sources of vibration during typical construction projects include rock-breaking equipment, sheet piling machinery, excavators, dump trucks and HGVs.</p>	<ul style="list-style-type: none"> ▪ It has been identified that sheet-piling will not be used during the construction works. If this changes during detailed design and sheet piling is undertaken of the flood defence walls as part of the proposed scheme, vibration measurements will need to be carried out at any requisite monitoring points in the vicinity of residential properties. The chosen locations will be agreed in advance with Kildare County Council. This would help to ensure that any vibration generated by the construction of the proposed scheme would not give rise to nuisance in the vicinity of the proposed scheme. If vibration-monitoring results were to indicate that levels were approaching the standard limits, appropriate mitigation measures will need to be put in place to ensure that vibration levels were reduced to acceptable levels. ▪ It is proposed that vibration monitoring will be carried out for all properties in close proximity to construction works and haul routes. Precondition surveys will be carried out at residential properties in close proximity to the construction works and haul routes. Survey and monitoring locations will be identified during detailed design and agreed with residents/owners as part of the CEMP in advance of the construction works. The vibration limits for the duration of the construction works are set out in Table 8.3 and represent the allowable vibration in order to minimise the risk of building damage. Specifically, Noise & Vibration levels shall be kept below those levels specified in Table 8.3, or if further limits are imposed by the Local Authority. ▪ A programme of noise monitoring and vibration (if required) at sensitive receptors will be detailed by the Contractor prior to works beginning. This will allow for a constant review of noise and vibration (if required) levels generated by the construction of the proposed

Potential Impact (Noise)	Summary of Proposed Mitigation
	scheme and will highlight the need for further mitigation measures should they be required
Operational Phase There is no significant noise impact predicted to be emitted from the operational phase of the proposed scheme. Maintenance requirements will consist of clearing the overgrowth from the river banks and embankments in addition to removing debris from the rivers, embanked areas and culverts and will be completed on an annual basis, as required.	No mitigation measures are necessary.

Table 6.7: Landscape and Visual: Summary of Mitigation Measures

Potential Impact (Landscape and Visual)	Summary of Proposed Mitigation
Construction Phase Potential construction stage impacts relate to the following: <ul style="list-style-type: none"> (i) Obstruction of views; (ii) Change in landscape character; (iii) Machinery for site preparation/enabling works and operations; and (iv) Site access and vehicular and plant movements. The proposed scheme has lengths of both flood walls and embankments extending to approximately 2.00m in height. The construction of flood walls will be required at certain locations particularly in proximity to properties. The proposed scheme will result in loss of riverside vegetation at some locations.	The impact of the proposed scheme should be ameliorated through a landscape rehabilitation plan, prepared in conjunction with the engineering design which would, in time, go some way to insuring integration of the proposals into the broader environment. Given the nature of the proposals, particular mitigation measures shall be incorporated as part of the proposed scheme. A list of objectives in terms of mitigation for visual quality and landscape character shall include the following for the construction and operational stage. <ul style="list-style-type: none"> ▪ Materials chosen for flood wall construction to be of similar colour, size and scale to existing flood walls within the locality. Walls where visible at roadsides will be masonry stone faced and where appropriate stone capped; ▪ Temporary storage heaps associated with infill materials and soil not to exceed 1m height; ▪ Storage compound areas will be reinstated to former agricultural use upon completion of the works. ▪ Vehicles exiting compound areas will be subject to wheel wash facilities or road sweepers shall be used in order to maintain clean roads; ▪ Any lighting used will be kept to a minimum, providing for site safety only and shall be directed into the compound and away from adjacent residential properties. Lighting shall be shielded to avoid light spill onto adjacent properties and roads. ▪ Fencing used around site offices, welfare units and parking within the compound areas shall be painted green in order to merge with surrounding landscape. ▪ Construction of Embankments. The embankments will be planted with grass; ▪ Protection of existing trees. The services of a qualified arboriculturist will be sought to perform a tree survey of the proposed scheme. The trees should be assessed to quantify their age, condition and amenity value and tagged with metal tags. Prior to commencement of construction, existing trees which are to be retained will be protected by erection of timber post and wire fence to ensure no works are carried out under reach of their canopies. Unstable

Potential Impact (Landscape and Visual)	Summary of Proposed Mitigation
	<p>trees should be removed under direction of the arboriculturist;</p> <ul style="list-style-type: none"> Ensuring landscape framework remains dominant by cleaning up of debris on river banks and providing a landscape management programme to protect and reinforce bank side vegetation.
<p>Operational Phase</p> <p>The key potential direct impact on the landscape is from the positioning of new vertical flood walls and embankments and loss of any vegetation as permanent features in this landscape.</p> <p>There are existing flood embankments at locations within the wider Morell floodplain and therefore such features are not uncharacteristic of this landscape.</p> <p>The permanent loss of vegetation will have localised but significant impacts at locations, particularly at Morr 2; Morr 7; Morr 20-23; and Slane 1-4. The new flood walls and embankments will read as part of the wider landscape from most locations.</p>	<ul style="list-style-type: none"> Ensuring the landscape management programme identified previously is implemented during the lifetime of the proposed scheme to protect and reinforce bank side vegetation with the aim of ensuring landscape framework remains dominant; and Ongoing landscape maintenance and debris cleaning from the river channel.

Table 6.8: Terrestrial Ecology: Summary of Mitigation Measures

Potential Impact (Terrestrial Ecology)	Summary of Proposed Mitigation
<p>Construction Phase</p>	<ul style="list-style-type: none"> It is recommended that a Construction Manager with appropriate experience and expertise be employed for the duration of the construction phase to ensure that all the mitigation measures outlined in relation to the environment are implemented. This manager will be awarded a level of authority and will be allowed to stop construction activity if there is potential for adverse environmental effects other than those predicted in the EIS. In addition a Project Ecologist will be appointed to assist with potential ecology queries as they may arise during the course of the project.
<p>There is potential for indirect impacts as a result of run-off from construction areas, eutrophication and sedimentation decreasing water quality in the Grand Canal pNHA.</p>	<ul style="list-style-type: none"> The effective protection of water quality within the proposed scheme during the construction and operation phases will minimise the risk to the ecological interests of this site and other water bodies within the Morell catchment. The measures outlined in Table 15.7 below to ensure protection of water quality during operation, along with the requirement to implement current best practice for works at the time of maintenance will ensure the protection of waterbodies.
<p>The proposed scheme will involve the construction of c. 7683m of new embankments, potential restoration works to c. 1843m of existing embankments, construction of c.544m of new flood walls, c. 100m of stream alignment (over two areas) and a number of culvert upgrades. Construction activities and site clearance could lead to direct loss of habitats and disturbance through trampling or damage by machinery. There will be a permanent loss of habitat in the footprint of any new flood alleviation measures, although impacts arising from disturbance to habitats would last longer than the construction period, it is likely to be reversible in time once construction ceases</p>	<ul style="list-style-type: none"> General mitigation will involve implementation of best practice, such as the OPW's Standard Operating Procedures for Arterial Drainage Maintenance Service (OPW, 2011). Works shall be carried out ideally during a period of settled weather with no flood risk which will allow sufficient time for construction materials to settle. Effective measures to prevent silt runoff will be in place at the foot of each embankment as it develops and for a settling period following completion.

Potential Impact (Terrestrial Ecology)	Summary of Proposed Mitigation
allowing the habitat to re-establish in the vicinity of the proposed scheme.	
<p><i>Wet Grassland and Marsh</i></p> <p>Scheme measures Morr 4, Morr 7, Morr 8, Morr 15 and Morr 17 will involve c. 400m of walls and embankment to be built on <i>Wet Grassland and Marsh habitat</i>, and a stream diversion adjoining the habitat, constituting direct habitat removal.</p>	<ul style="list-style-type: none"> Where construction activity takes place in habitat types that are identified as sensitive ecological receptors it is important that construction activity is restricted to the footprint required for development of the proposed scheme measures. Therefore, the proposed works area must be clearly demarcated with temporary fencing or another suitable method to restrict access to areas outside the necessary working area. When establishing central base compounds and access tracks, vegetation should only be removed where absolutely essential. The implementation of the proposed scheme will not result in the drying out of wet grassland and marsh habitat. Therefore, no indirect impacts are anticipated. The embankments will be positioned in relatively species poor areas of wet grassland. Therefore the loss of wet grassland habitat is not deemed to be significant. No further mitigation is required. The stream realignment at Slane 8 will encourage the establishment of riparian woodland within in the old stream alignment lands. Therefore the loss of a very small section of riparian woodland is not deemed to be significant. No further mitigation is required The <i>Mixed Broadleaved Woodland</i> habitat at Morr 3 was not classified as semi-natural habitat and the loss of a very small portion is not deemed to be significant. No further mitigation is required.
<p><i>Riparian Woodland</i></p> <p>Scheme measures Slane 8 will involve the realignment of a small section of the stream to remove a sharp bend. Although this will largely involve the direct removal of improved agricultural grassland to dig the realignment channel, there may be a very small portion of riparian woodland removed at either end of the new channel.</p>	
<p><i>Mixed Broadleaved Woodland</i></p> <p>Scheme measure Morr 3 will likely involve the removal of a small area of <i>Mixed Broadleaved Woodland</i> habitat c. <30m in length, immediately adjoining the south side of Turnings Upper road on western bank of River Morell.</p>	
<p><i>Treelines, Hedgerows and Scrub</i></p> <p>Scheme measures Morr 1-6, Morr 8 - 10, Morr 15-23, Paines 1, 2, 4 & 5, Kill 1, Slane 1-6 and Slane 9 will necessitate removal of small sections of treelines, hedgerows and scrub where the proposed scheme embankments, walls and stream realignments will cross field boundaries. Some scrub/ tree removal may also be required at the junction of Killeenmore Road and the L2010 for haulage routes accessibility. In the absence of mitigation, the loss of these habitats could result in a permanent, irreversible, negative impact significant at the local level.</p>	<ul style="list-style-type: none"> Trees, hedgerows, treelines, woodland and scrub shall be retained intact where possible. Trees located adjoining/adjacent to the construction/compound areas shall be protected from root damage by machinery by an exclusion zone of at least seven metres or equivalent to canopy height. Such protected trees shall be fenced off by adequate temporary fencing prior to other works commencing. NRA guidelines on the protection of trees and hedges prior to and during construction should be followed (NRA, 2006d). No soil, spoil, construction materials or rubbish will be stored or tipped and no construction plant or vehicles will be parked within the spread of existing trees, shrubs or hedges. Where treeline, hedgerow or scrub removal as part of the proposed scheme was unavoidable, a new native planting scheme should be implemented to function as replacement habitat for that removed.
<p><i>Invasive Species</i></p> <p>Invasive species can be introduced into a location or spread from a location by contaminated vehicles and equipment, in particular tracked vehicles which have been used previously in locations that contained invasive alien plant species. They can also be spread to a location via vector materials such as soil. Therefore, construction works for the scheme measures have the potential to introduce invasive alien plant species into the proposed scheme area. In the absence of mitigation this could result in a long term reversible negative impact significant at the local level.</p>	<p>The introduction of invasive alien plant species (including Japanese Knotweed (<i>Fallopia japonica</i>)) will be avoided during the construction and operation phase of the proposed scheme by ensuring that appropriate precautionary measures are in place.</p> <ul style="list-style-type: none"> Prior to undertaking any construction works of the various scheme measures, or establishing central base compounds and access tracks, the OPW shall engage a suitably qualified ecologist to carry out an invasive plant species survey, in the appropriate botanical season (April through to September). This should entail a walkover of each location of the proposed scheme measures due for construction in that phase, to identify any stands of invasive plants species that may have

Potential Impact (Terrestrial Ecology)	Summary of Proposed Mitigation
	<p>become established in the intervening period between the EIA surveys and construction. Particular attention should be given to identifying those invasive plant species listed on the Third Schedule of the Birds and Natural Habitats Regulations 2011 (as amended). If any invasive alien plant species are identified then the suitably qualified ecologist shall outline the appropriate course of action to be taken with regard to treatment during construction works.</p> <ul style="list-style-type: none"> ▪ All plant and equipment employed on the construction/compound sites (e.g. excavator, footwear, etc.) must be thoroughly cleaned down using a power washer unit and washed into a dedicated and contained area prior to arrival on site to prevent the spread of invasive aquatic / riparian species such as Japanese Knotweed (<i>Fallopia japonica</i>) and Himalayan Balsam (<i>Impatiens glandulifera</i>). A sign off sheet must be maintained by the contractor to confirm cleaning. ▪ The treatment and control of invasive alien species will follow <i>Guidelines for the Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads</i> (NRA 2010), and any other best practice guidance which may become available in the interim. ▪ For any material entering the site, including all fill material, the supplier must provide an assurance that it is free of non-native invasive species. ▪ Should any invasive plant species be encountered, the infested areas will be clearly demarcated accounting for potential underground rhizome spread, creating an exclusion zone. ▪ Ensure all site users are aware of invasive species management plan and treatment methodologies. This can be achieved through “toolbox talks” before works begin on the site. ▪ Adequate site hygiene signage should be erected in relation to the management of non-native invasive material.
<p>Badger</p> <p>Potential badger setts/mammal burrows were identified in the vicinity of scheme measures Morr 1a, Morr 3, Morr 4, Morr 6, Morr 18 and Slane 9. The construction of the proposed scheme could result in direct destruction of setts via excavation for embankment/wall construction or via machinery driving over setts en route to the construction area.</p>	<p>Precise mitigation measures for badger will be informed by a badger survey prior to construction works commencing on each phase of the development (including establishing central base compounds, satellite sites and access tracks) to identify setts and confirm the level of activity and breeding status of setts/mammal burrows at that time. The following measure is proposed:</p> <ul style="list-style-type: none"> ▪ Prior to construction works commencing on each phase of the development (including establishing central base compounds, satellite sites and access tracks) the Contractor will engage the services of a suitably qualified ecologist to conduct a badger survey of the proposed scheme measure areas and all access routes. This shall be undertaken to NRA (2006a) specifications, and no more than 10 months in advance of construction; ▪ If an active sett is encountered, mitigation measures as outlined in national guidelines <i>Guidelines for the Treatment of Badgers Prior to the Construction of National Road Schemes</i> (NRA, 2006a) will apply. In brief these are, but are not limited to: <ul style="list-style-type: none"> □ During the breeding season (December to June inclusive) a clearly marked exclusion zone of 50m should be established around the active sett and no

Potential Impact (Terrestrial Ecology)	Summary of Proposed Mitigation
	<p>works should take place within this exclusion zone;</p> <ul style="list-style-type: none"> □ Outside of the breeding season (July – November inclusive) a clearly marked exclusion zone of 30m should be established around the active sett and no heavy machinery used within this exclusion zone. Lighter machinery (wheeled vehicles) should not be used within 20m of a sett entrance and light work such as digging by hand should not take place within 10m of a sett entrance; □ Any works in and around setts must be supervised/carried out by a suitably qualified and experienced ecologist; □ If the above detailed exclusion zones cannot be adhered to and disturbance to setts is deemed likely during construction works then the local NPWS Ranger will be contacted. This may require an application for a derogation licence from the NPWS to exclude the sett. If required, any further mitigation measures required will follow those outlined in NRA (2006a) and will be agreed with the NPWS at the time of licence application.
<p><i>Bat</i></p> <p>A number of trees and treelines were identified as having low to moderate bat roost potential, which could be affected by scheme measures Morr 1, Morr 1a, Morr 16, Morr 16a, Morr 17, Morr 18, Morr 20-23, Paines 1, Paines 5, Kill 1 and Slane 9. One building near Killeenmore was identified as having low bat roost potential, located near Morr 16-16a. In the absence of mitigation, if any of these trees/treelines and buildings supported bat roosts and had to be removed as a result of the construction works, there would be potential for bat mortality. This could result in a short term negative impact, significant at a local level.</p> <p>Hedgerows, treelines and rivers act as commuting corridors for bats in the landscape. The proposed scheme requires the removal of some hedgerows and treelines for creation of the scheme measures. Temporary negative impacts are likely but are not expected to be significant at a local level.</p>	<p>As no bats have so far been identified as roosting within the study area no specific mitigation in relation to roost loss is recommended.</p> <p>In the unlikely event that bats are found on the site during construction works, works will immediately cease in that area and the local NPWS Conservation Ranger will be contacted. The bats will be removed by hand by a suitably qualified and licenced bat surveyor.</p> <p>A number of trees/treelines, buildings and bridges in the proposed scheme area were identified as potential bat roots and the following mitigation applies.</p> <ul style="list-style-type: none"> ■ Where possible, trees, treelines and woodland shall be retained. Any existing trees adjacent to the works, construction sites or compounds to be retained shall be protected from root damage by machinery by an exclusion zone of at least seven metres or equivalent to canopy height. Such protected trees shall be fenced off by adequate temporary fencing prior to other works commencing. ■ Any trees requiring removal to facilitate construction works, establishment of compounds or access tracks, must be subject to a visual inspection by a suitably qualified and licenced bat surveyor to identify bat roosts potential and advise on additional surveys required. If potential bat roosts are identified then bat activity surveys at such trees will be required. If bats are found, the suitably qualified and licenced bat surveyor will advise on the appropriate course of action, including the need for application for a derogation licence from the NPWS. ■ All trees requiring removal in the proposed scheme area should be felled and left in place on the ground for 24 hours prior to removal/disposal to allow any bats beneath foliage to escape overnight. ■ Should the removal of mature broadleaved trees be unavoidable, it is recommended that two bat boxes, of Schwegler Type 1FF flat box, for each felled mature broadleaved tree shall be attached to suitable

Potential Impact (Terrestrial Ecology)	Summary of Proposed Mitigation
	<p>alternative trees in order to compensate for the loss of potential roosting space. The bat box locations and supervision of installation of same shall be carried out by a suitably qualified ecologist in line with best practice measures.</p> <ul style="list-style-type: none"> ▪ One abandoned cottage and associated outhouses was identified in Killeenmore adjacent to scheme measures Morr 16 and Morr 16a. Although not identified as requiring removal for construction for the proposed scheme, adopting a precautionary approach, in the event that demolition or other construction works on the abandoned cottage and associated outhouses are required, the Contractor will refer to the mitigation outlined in section 10.5.1 of the EIS. ▪ No construction or upgrade works to bridges have been identified for the proposed scheme, rather the works identified are either in relation to culverts but that may be associated with bridges, or embankment/wall tie ins to bridges which will not affect the underside of the bridge structure. However, adopting a precautionary approach, mitigation has been specified for any works to culverts or bridges adjoining or adjacent to culverts to ensure that any potential disturbance to potential roosting bats is considered prior to construction activities commencing and in the event that any works to bridges becomes apparent during construction. ▪ The bridge must be subject to a visual inspection by a suitably qualified and licenced bat surveyor to identify bat roost potential and advise on additional surveys required. If potential bat roosts are identified then bat activity surveys will be required. If bats are found, the suitably qualified and licenced bat surveyor will advise on the appropriate course of action, including the need for application for a derogation licence from the NPWS. ▪ Lighting should be avoided where possible. If any external lighting is required to facilitate night time working, security lighting in the proposed works areas or within the central base compounds, it must be sensitive to the presence of bats in the area. Directional lighting shall be used to prevent overspill. Lighting levels should be the minimum required for health and safety requirements, and vertical light spill at light sources should be below 3m to avoid potential bat flight paths. ▪ Existing hedgerows and treelines, semi-natural scrub or semi-natural grasslands should be retained where possible and incorporated into the landscaping programme. Where hedgerow or treeline removal is unavoidable, the severed linear features should, where possible, be reconnected using native hedgerow or tree species to compensate for the loss of hedgerows that are currently used by bats. The exact locations of such planting will be designed at detailed landscaping stage. Treelines are of far greater benefit to bats than single, free-standing trees or shrubs as they provide corridors for movement, avoidance of light and predators, a better shelter belt for the clustering of insects and provide greater substrate for insect breeding and feeding (bats food source). Broadleaved trees are generally more beneficial to bats..
<i>Other Mammals</i>	No mitigation measures are necessary

Potential Impact (Terrestrial Ecology)	Summary of Proposed Mitigation
<p>It is likely that Pygmy shrew and Hedgehog occur in hedgerows, woodlands and grasslands. The proposed scheme will involve the removal of sections of these habitats in a number of locations. In the absence of mitigation, if the species were present then negative impacts could arise via direct mortality or disturbance.</p> <p>As a relatively widespread mobile species, it is considered likely that both Pygmy shrew and Hedgehog could re-establish in adjacent habitats and that the proposed scheme is extremely unlikely to negatively affect the conservation status of the species locally. Therefore it is unlikely that a significant impact would arise.</p>	
<p>Amphibians</p> <p>In the absence of mitigation, there could be a negative impact on amphibians through direct mortality during construction works. It is considered likely that this short term impact could negatively affect the conservation status of frogs locally.</p>	<ul style="list-style-type: none"> The Construction Manager and Project Ecologist shall maintain a watching brief for frog spawn and frogs throughout construction works. If frog spawn is identified, this should be translocated to an alternative suitable habitat under derogation licence from the NPWS.
<p>Birds</p> <p>If vegetation clearance and/or building demolition is carried out during the breeding bird season (i.e. from the 1st March to the 31st August), there is the potential for significant negative impacts to local breeding bird populations. During the breeding season noise, vibration, increased human presence and movement of construction vehicles associated with the construction phase of the proposed scheme has the potential to result in a disturbance to local breeding bird populations. This could result in reduced breeding success of birds in habitats adjacent to the construction zone and could potentially impact on the conservation status of bird species locally. Therefore a significant effect at a local level is concluded.</p> <p>The construction of the proposed scheme will require the removal of hedgerows, trees, treelines, scrub and some woodland. It may also involve the removal of some buildings/structures. These habitats have the potential to provide breeding habitat for birds. Removal of these areas of habitat during the breeding bird season could potentially impact on the conservation status of bird species locally.</p>	<ul style="list-style-type: none"> To limit the potential impact of construction on breeding birds, vegetation removal/trimming (including trees, treelines, hedgerow, woodland and) will not be permitted during the breeding bird season (1st March to 31st August inclusive). If this seasonal restriction cannot be accommodated, a suitably qualified ecologist with experience in nest-finding will be required to check all vegetation for nests (under licence from NPWS to permit potential disturbance to nesting birds) prior to removal/trimming.
<p>Operational Phase</p> <p>During the operational phase of the proposed scheme there will be considerably less site activity than during the construction phase. Maintenance will be carried out to maintain the completed flood relief scheme in proper repair and effective condition. This may mean, inter alia:</p> <ul style="list-style-type: none"> Clearing obstructions to flows from time to time e.g., fallen trees, significant weed growth, build-up of materials likely to impact on the performance of the scheme; Repairing and rebuilding structures (walls and embankments); and Prevention of erosion/undermining of the completed works of the proposed scheme. 	<ul style="list-style-type: none"> General mitigation will involve implementation of current best practice for riparian works at the time of maintenance, e.g. the OPW's Standard Operating Procedures for Arterial Drainage Maintenance Service (OPW, 2011) or any subsequent updates. No additional mitigation measures are required.
<p>Maintenance works for the proposed scheme located in the vicinity of the Grand Canal may be hydrologically connected to the Grand Canal via wet field drains and/or</p>	<ul style="list-style-type: none"> The effective protection of water quality within the proposed scheme during the construction and operation phases will minimise the risk to the ecological interests

Potential Impact (Terrestrial Ecology)	Summary of Proposed Mitigation
wet ditches. There is potential for indirect impacts as a result of run-off from construction areas, eutrophication and sedimentation decreasing water quality in the Grand Canal. This may in turn impact on the aquatic species therein. In the absence of mitigation this could result in a temporary, reversible negative impact.	of this site and other water bodies within the Morell catchment. The water quality mitigation measures for avoidance, reduction and remediation of impacts outlined in Table 17.7 below and the requirement to implement current best practice for works at the time of maintenance will ensure the protection of waterbodies.
Once completed, areas from which vegetation was removed will gradually re-vegetate through succession. Some smaller areas of arable land, amenity grassland and broadleaved woodland will also be subject to reduced flooding. This is unlikely to result in any significant changes in species composition as these areas will still be subject to periodic flooding, albeit reduced. New flooding areas and the 1% AEP floodplain are also mainly located in areas of agricultural grasslands (and associated hedgerows and treelines) and buildings and artificial surfaces (mainly associated with residential dwellings). Some smaller areas of habitat located within the flood area include arable land, amenity grassland, wet grassland, scrub, broadleaved and riparian woodland will also be subject to reduced flooding. This is unlikely to result in any significant changes in species composition as much of these areas will only be subject to periodic flooding.	No mitigation measures are necessary
Maintenance work poses a potential risk of introducing invasive species, via contaminated vehicles and equipment. In the absence of mitigation this could result in a long term reversible negative impact, significant at the local level.	<ul style="list-style-type: none"> ▪ Prior to undertaking any maintenance works along the scheme measures, the OPW shall engage a suitable qualified ecologist to carry out an invasive plant species survey, in the appropriate botanical season (April through to September) and in advance of any maintenance works. This should entail a walkover of the scheme measures due for maintenance works to identify any stands of invasive plants species that may have become established in the intervening period between construction and maintenance. Particular attention should be given to identifying those invasive plant species listed on the Third Schedule of the Birds and Natural Habitats Regulations 2011 (as amended). If any invasive alien plant species are identified then the suitably qualified ecologist shall outline the appropriate course of action to be taken with regard to treatment during maintenance works. ▪ Specific mitigation measures in respect of invasive species are as per those stated for the construction phase above.
In the absence of mitigation, there could be a negative impact on badger through direct destruction or disturbance to badger setts during maintenance works. It is considered likely that this short term impact could negatively affect the conservation status of badger locally.	<ul style="list-style-type: none"> ▪ Prior to undertaking any maintenance works along the scheme measures, the OPW shall engage a suitably qualified ecologist to assess the potential ecological impact of the maintenance works (including but not limited to badgers, bats, otters, bird, water quality and invasive species) and identify potential constraints. Dependent on the extent of the works, this may require a survey of the scheme measures due for maintenance works to confirm presence/absence of species and to identify potential impact pathways that may exist between the maintenance works, access routes and flora and fauna. ▪ The ecologist should be engaged in advance of works to allow adequate time for survey, monitoring if required, and developing measures to avoid ecological impacts
In the absence of mitigation, there could be a negative impact on bats through direct destruction or disturbance to bat roosts in trees or works to bridges during maintenance works. Maintenance works could result in a short term negative impact on the conservation status of bats locally.	
In the absence of mitigation, there could be a negative impact on amphibians through direct mortality during maintenance works. Wet areas that host frogs and frog	

Potential Impact (Terrestrial Ecology)	Summary of Proposed Mitigation
<p>spawn could be directly trampled by machinery. Removal of bank side vegetation also has the potential to result in direct mortality of frogs that utilise this habitat. It is considered likely that this short term impact could negatively affect the conservation status of frogs locally.</p> <p>Maintenance works requiring the removal of vegetation such as scrub and trees during the breeding bird season (i.e. from the 1st March to the 31st August), have the potential for significant negative impacts to local breeding bird populations. During the breeding season noise, vibration, increased human presence and movement of vehicles associated with the maintenance of the proposed scheme has the potential to result in a disturbance to local breeding bird populations. This could result in reduced breeding success of birds in habitats adjacent to the maintenance area and could potentially impact on the conservation status of bird species locally. Therefore a significant effect at a local level is concluded.</p>	<p>where possible, and to propose mitigation measures for those impacts that cannot be avoided. Where appropriate, construction methodology for maintenance works should detail how water quality will be maintained throughout the maintenance works. All mitigation measures outlined should be in line with current best practice and national guidelines</p>

Table 6.9: Aquatic Ecology and Environment: Summary of Mitigation Measures

Potential Impact (Aquatic Ecology and Water Environment)	Summary of Proposed Mitigation
<p>Construction Phase</p> <p>The proposed scheme has been identified as potentially giving rise to adverse effects on water quality within the Morell River Catchment.</p>	<ul style="list-style-type: none"> Standard pollution control and mitigation measures, as outlined in Table 11.21, will be employed where relevant when working in and near the watercourses affected by the proposed works, to prevent the transport of deleterious substances to the Morell River Catchment and its associated water-dependent habitats and species. The CEMP and Method Statements will include how these mitigation measures will be monitored for effectiveness. An outline water quality monitoring plan has been included in the draft CEMP but this will be developed by the contractor and a detailed programme of water quality monitoring, will be agreed with the IFI. Direct instream works such as stream alignment, culvert upgrades or proposed measures along the riverbank have the greatest potential for negative impacts during spawning / breeding and early nursery periods for aquatic protected species in the study area. No instream or potentially significantly damaging out of river works should occur during restricted periods for relevant species in relation to individual measures (Table 11.22 of the EIS).
<p>Haul routes, access roads and parking areas can generate significant quantities of water polluted with sediment. During heavy rainfall surface run-off can erode the surface of the haul route. The tracking of plant and machinery across wet or saturated soil can also loosen and mobilise additional sediment.</p>	<ul style="list-style-type: none"> Surface water should be directed away from haul routes to prevent uncontaminated run-off flowing onto the road. Excess water should be prevented from running along haul routes by installing small earth bunds (like speed bumps) or cut-off ditches at regular spacing to direct water into roadside ditches. Where haul routes cross watercourses, adopt measures to prevent sediment-laden run-off from entering them, e.g. ensuring crossing structures have edge upstands or bunds eg straw bales, sandbags or earth; and making sure bridge decks are sealed.

Potential Impact (Aquatic Ecology and Water Environment)	Summary of Proposed Mitigation
	<ul style="list-style-type: none"> Water polluted by sediment should not be allowed to leave the site untreated; polluted run off should be routed for treatment by filtration, settlement or specialist techniques. Where inlets to existing surface water drainage are present on-site (eg road gullies or yard drains), they should be protected them from run-off polluted with sediment. Water should be diverted away from the inlet to treatment facilities. Where this is not possible, a bund should be created around the surface water drain to prevent contaminated water entering.
<p>There is potential for the release of sediment during the construction phase. The potential for sediment loss would primarily arise as a result of earth movement and excavation associated with the placement of embankments and defence walls, particularly those proposed along riverbanks. Such an impact would be more likely during very heavy rain giving to slumping of the bank edges or run-off of silt-laden water.</p>	<ul style="list-style-type: none"> Works should be carried out ideally during a period of settled weather with no flood risk which will allow sufficient time for construction materials to settle. Embankment material should be selected that has low silt content. All working materials and excavated material should be stockpiled on the land side of the works within the assigned 15m temporary working area. Where embankments which are within 10 metres of a river, sediment barriers, e.g. silt fencing, should be used on the river side to minimise the potential for sediment transport. Once the embankment is complete the sediment should be left in-situ to allow the reinstated ground around the wall to settle in. The sediment barriers should only be removed after inspection of the reinstated ground confirms that it is stable.
<p>There is potential for the release of sediment during instream works and in particular stream realignments. Sediment loss can give rise to increased bottom sedimentation, which, in turn, can adversely impact macroinvertebrates and aquatic habitat quality. Elevated suspended solids levels within the water column can damage the gills of salmonid fish, white-clawed crayfish and benthic macroinvertebrates and can smother fish spawning areas when deposited.</p> <p>Plumes of silt could result in a reduced food supply for otters- i.e. where reductions in water quality affect macro-invertebrate diversity and abundance and fisheries production or temporarily displace fish from sections of channel.</p>	<ul style="list-style-type: none"> All instream works should adhere to timing restrictions for aquatic protected species of the Morell Catchment (Table 11.22 in Chapter 11). Operation of machinery instream should be kept to an absolute minimum. All construction machinery operating instream should be mechanically sound to avoid leaks of oils, hydraulic fluid, etc. In-stream works will be carried out outside of the salmonid spawning season and the times that early life stages of salmonid fish will be present. In-stream work within the period 1st October to 1st May (inclusive) will only be undertaken with the advanced approval of Inland Fisheries Ireland. Stream realignments shall be carried out in accordance with the recommendations within the document '<i>Requirements for the protection of Fisheries Habitat during construction and Development Works at River Sites</i>' (ERFB, 2003). Method Statements will be prepared by the Contractor and approved; Stream diversions will be excavated in the dry to an agreed specification. Fish will need to be removed from the impacted section of the existing channel being diverted at Slane 8 in advance. The fish removal must be completed by IFI or persons authorised under Section 14 of the Fisheries Consolidation Acts 1959 (as amended). During realignment works on the Slane River, contractor SOPs will be applied to respond in the case white-clawed crayfish are present and emerge from refuges at the times of stream realignment. In the event that significant populations of white clawed

Potential Impact (Aquatic Ecology and Water Environment)	Summary of Proposed Mitigation
	<p>crayfish emerge, advice will be sought from IFI and NPWS to facilitate any necessary rescue and relocation.</p> <ul style="list-style-type: none"> ▪ The banks and bed of the new channel will be lined with a biodegradable geotextile; ▪ The stream diversions will have a natural stream bed and will replicate insofar as practicable the stream bed material characteristics of the watercourse. ▪ Bungs will be fixed at both ends of the existing channel and removed in a controlled manner at IFI's direction ensuring the river flow remains uninterrupted from above to below the works. ▪ Effective silt management measures should be placed in stages downstream of the new channel in advance of opening the channel. These will be specified by the Contractor in the Method Statement and agreed with IFI, but the currently proposed measure would be triple silt curtains derived from Terram or other similar material, which would be placed in stages downstream of the confluence with the new channel to first filter out the heaviest of materials and subsequently the finer material. These would need to be checked on a regular basis with the heavy material removed from the first silt curtain thereby keeping it functional. A procedure will need to be included in the Method Statement for the removal of the silt barrier on a staged basis, as even these preventative measures will lead to a build up behind the curtain. The curtain nearest to the point of works should be removed first followed by the others; ▪ The design and construction of new channel with natural habitat characteristics will where possible replicate the existing and will incorporate riparian vegetation and other natural features such as meanders. This will require importation of various grades of stone and gravel to construct habitat features e.g. riffles, pools and gravel areas. Materials from original channel may be re-used to minimise quantities of new material required.
<p>There is potential for the release of sediment and other pollutants during culvert alteration works.</p>	<ul style="list-style-type: none"> ▪ All instream works should adhere to timing restrictions for aquatic protected species of the Morell Catchment. ▪ Works should be carried out ideally during a period of settled weather with no flood risk which will allow sufficient time for construction materials to settle. ▪ In-channel works for upgrades on Culverts 5, 9, 10 and 22 and, where relevant, 1, 2, 4, 4a, 7, 18 & 19 will use cofferdam type construction whereby flow can be restricted allowing the civil engineering works to be undertaken in the dry. Method statements for the construction of cofferdam structures should be agreed in advance with IFI personnel in advance of construction works. ▪ The Morell River (Cul 5) and Painestown River (Cul 9 & 10) should be electro fished downstream of the proposed works in advance of any works to assess whether there are any fish or lamprey ammocoetes in the affected channels as advised by IFI. The fish removal must be completed by IFI or persons authorised under Section 14 of the Fisheries Consolidation Acts 1959 (as amended); ▪ If there is significant water ingress into the cofferdam

Potential Impact (Aquatic Ecology and Water Environment)	Summary of Proposed Mitigation
	<p>(dependant on river levels), an approved pumping and settlement system will be set up. Pumps will transfer accumulated standing water into a settlement tank, or tanks, which in turn will discharge into a 'silt buster' or 'dirt bag' prior to being returned to the watercourse, to minimise the discharge of suspended solids into the watercourse. Water quality monitoring will be carried out to monitor the effectiveness of the mitigation measures.</p> <ul style="list-style-type: none"> ▪ Headwalls for Cul 5, Cul 9 and Cul 10 should be pre-fabricated and inserted or assembled on site without the use of bulk liquid concrete; ▪ For proposed works on Cul 5, Cul 9 and Cul 10, and, where relevant Culverts 1, 2, 4, 4a, 7, 18 & 19 effective silt management measures should be placed in stages down-stream of the new channel, in advance of commencing culvert alterations. The proposed measures are as per the mitigation for stream realignment above and will be specified by the Contractor in the Method Statement and agreed with IFI. A procedure will also need to be included in the Method Statement for the removal of the silt management measures.
<p>There exists the risk of sediment loss from stockpiled construction materials held within the temporary working areas associated with each of the various measures and also stored at the larger stockpiling/compound areas that will be established for the project beside Paines 3, Morr 19 and Morr 23 as illustrated in Figure 11.1. Haul routes, access roads and parking areas can generate significant quantities of water polluted with sediment. Being temporary in nature, they are often formed by simply stripping topsoil and grading the subsoil to suit. This means that during heavy rainfall surface run-off can erode the surface. The tracking of plant and machinery across wet or saturated soil can also loosen and mobilise additional sediment.</p>	<ul style="list-style-type: none"> ▪ The compounds have been selected to be located away from vulnerable watercourses (or, in the case of Paines 3, separated from them by existing embankments) and outside the flood plain to reduce the risk of sediment mobilisation. ▪ Stockpile run-off must be prevented from entering drains, ditches and watercourses. ▪ Surface water should be directed away from exposed soils. ▪ Diversion drains should be implemented on the upstream/upslope side of the stockpile area. Drains should be lined with a non-erodible material such as turf/geotextiles. ▪ Bunds should be placed around exposed soils. This will prevent clean water entering the area and dirty water from leaving the area. Bunds should be made of non-erodible material such as straw bales/geotextiles. ▪ Water polluted by sediment should not be allowed to leave the site untreated; polluted run off should be routed for treatment by filtration, settlement or specialist techniques.
<p>There is a potential for the loss of cement or hydrocarbons such as diesel and hydraulic fluids during the construction phase particularly at locations proposed for defence walls along select riverbanks of the Slane and Kill (EIS REF: Slane 1, Slane 4 & Kill 1) as well as construction of head walls within the Morell River Lower and Painestown River (EIS REF: Cul 5 & Cul 10) respectively and culvert upgrading at Cul 9, also on the Painestown River. Cement is highly alkaline and can give rise to very serious fish kills with similar effects on invertebrates, including white-clawed crayfish. Wash off from poorly cured cement can also be highly alkaline and potentially dangerous to fish.</p>	<ul style="list-style-type: none"> ▪ Operation of machinery instream should be kept to an absolute minimum. ▪ All construction machinery operating instream should be mechanically sound to avoid leaks of oils, hydraulic fluid, etc. ▪ Concreting works will only occur 'in the dry' ▪ Headwalls for Cul 5, Cul 9 and Cul 10 should be pre-fabricated and inserted or assembled on site without the use of bulk liquid concrete. ▪ Disposal of raw or uncured waste concrete will be controlled to ensure that the watercourse will not be impacted; ▪ Best practice will be adopted in bulk-liquid concrete management addressing pouring and handling, secure shuttering / form-work, adequate curing times and

Potential Impact (Aquatic Ecology and Water Environment)	Summary of Proposed Mitigation
	<p>management of spills;</p> <ul style="list-style-type: none"> Where shuttering is used, measures should be put in place to prevent against shutter failure and control storage, handling and disposal of shutter oils; Wash water from cleaning ready mix concrete lorries and mixers may be contaminated with cement and is therefore highly alkaline. Due to the size of the site and the proximity of sensitive watercourses, it is recommended that lorries and mixers are washed out offsite.
Invasive species can be introduced into a location or spread from a location by contaminated vehicles and equipment.	<ul style="list-style-type: none"> Refer to mitigation in Table 15.6 above.
<p><i>Otter</i></p> <p>Loss of habitat/vegetation cover (scrub clearance) could result in reduced habitat quality and cover for otter utilising the various rivers throughout the catchment.</p> <p>Plumes of silt could result in a reduced food supply - i.e. where reductions in water quality affect macro-invertebrate diversity and abundance and fisheries production or temporarily displace fish from sections of channel.</p>	<ul style="list-style-type: none"> Where possible, flood measures will be set back from the river bank, leaving a buffer zone of natural riparian vegetation. The removal of natural riparian vegetation should be minimised. Where possible, bank slopes should be protected - minimise scraping of bank slope on working bank. This will ensure that riparian habitat is permanently available for otters, thus providing potential breeding and sheltering opportunities; Prior to construction works commencing, the Contractor will engage the services of a suitably qualified ecologist to conduct an otter survey of the proposed scheme measures, construction compounds and all access routes to identify whether the species occurs or not at the site of the proposed measure to be constructed and whether there is a breeding or resting place present. The OPW Environmental Management Protocols and SOPs (for Otter) should be followed: Operational Staff will walkover the works area one week in advance in conjunction with the Health & Safety assessment noting dense cover with access directly to the water that is to be avoided where feasible. Any recognisable signs of Otter presence observed such as Spraints, Footprints or suspected Holts, will be recorded on the Weekly Record Cards. While holts are usually well concealed, where Operational Staff observe a suspected holt such as a burrow opening, in consultation with Management Staff, subject to flood risk management functions, no works are to occur within a 50m buffer each side. It is important that any otter holts identified during survey work are dealt with appropriately, to stay within the obligations of relevant legislation. Where a holt is identified by a suitably trained ground staff member, work should not commence until NPWS have been consulted for advice and on the requirement for a licence to proceed. Where construction activities are required within 150m of a breeding Otter holt, a derogation licence will be required from NPWS. In relation to nonbreeding holts, no wheeled or tracked vehicles should be permitted within 20m of active holts or scrub clearance by hand within 15m (NRA, 2008). Where possible, mature trees within the river corridor should be retained. Similarly, large in-stream boulders

Potential Impact (Aquatic Ecology and Water Environment)	Summary of Proposed Mitigation
	<p>and substrate should be retained where possible. Where in-stream works are required, the replacement of in-stream boulders will also ensure that features are available for otters to use as territorial sign posts, and substrate is available for fish spawning/hiding places. Steps to enhance fisheries (loosen bed gravels and if channel bed is composed of suitable material, excavate pools and create riffles) should also be undertaken. This will ensure that fisheries habitat, fish populations and food availability for otters are improved (Envirocentre, 2006).</p>
<p>Operational Phase</p> <p>Maintenance works for the proposed scheme may potentially give rise to adverse effects on water quality. The effective protection of water quality within the proposed scheme during operational (maintenance) phase will minimise the risk to the ecological interests of this site and other water bodies within the Morell catchment.</p>	<ul style="list-style-type: none"> General mitigation will involve implementation of current best practice for riparian works at the time of maintenance e.g. the OPW's Standard Operating Procedures for Arterial Drainage Maintenance Service (OPW, 2011) or any subsequent updates. Maintenance works to be carried out will be subject to the relevant environmental assessment requirements, including Screening for Appropriate Assessment and surveys for protected species.
<p>Culvert Alterations can result in potential impacts on aquatic ecology during the operation of the proposed scheme. Culvert works, particularly if incorrectly designed, may prevent fish from migrating through them due to the flow pattern in the culvert or behavioural changes resulting from the imposition of a new structure i.e. increased shade, etc. if not appropriately designed. This can lead to a net loss of large areas of habitat as fish are unable to colonise or spawn within aquatic habitats upstream of an inappropriately designed culvert.</p>	<ul style="list-style-type: none"> The design of any alteration to a culvert will ensure the unimpeded passage of fish at all times.
<p>Instream structures may change flow patterns resulting in loss of gravel substrate, increased siltation and may remove meanders and natural riffle-pool sequences, which are important for fish populations.</p>	<ul style="list-style-type: none"> Alterations to the channel will be designed such that they display hydraulic and morphological characteristics fulfilling the requirements of salmonid habitats.
<p>Stream diversions - Certain proposed works at the Slane River (Slane 8) will involve realigning the stream channel to alleviate bank erosion (See Section 4.3.4 in Chapter 4 for complete description of works). At Morr 8, a short section (70 metres) of a small tributary of the Painestown River running adjacent to the railway embankment will be diverted to allow construction of the flood defence at this location. If poorly designed, stream diversions can result in changes to the hydraulic and morphological characteristics of the channel, making them less desirable for fish populations. Permanent diversions of watercourses can result in permanent loss of habitat if the new channel is significantly shorter than the original or if it is not reinstated to a standard at least equivalent to the original in terms of fish habitat type and quality.</p>	<ul style="list-style-type: none"> The design and construction of new channel with natural habitat characteristics will where possible replicate the existing and will incorporate riparian vegetation and other natural features such as meanders. This will require importation of various grades of stone and gravel to construct habitat features e.g. riffles, pools and gravel areas. Materials from original channel may be re-used to minimise quantities of new material required. The design of the realigned channel shall be carried out in accordance with best practice, i.e. Crossing of Watercourses during the Construction of National Roads Scheme (NRA, 2005), 'Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites' (ERFB, 2003) and CIRIA Technical Guidance C648 (CIRIA 2006).
<p>Loss of bank riparian cover as a result of installation of walls and embankments will result in increased light incidence to the channel and may encourage greater in-stream productivity, i.e. increased algal growth and benthic macroinvertebrate density. A decrease in channel shading can also impact negatively on fish and crayfish distribution. Riparian tree cover plays an important role in regulating</p>	<ul style="list-style-type: none"> Vegetation removal will be kept to a minimum. Mature trees will be retained, where possible (see also mitigation in Table 15.5). A landscape management programme will be implemented during the lifetime of the proposed scheme to protect and reinforce natural bank side vegetation.

Potential Impact (Aquatic Ecology and Water Environment)	Summary of Proposed Mitigation
stream ecology, e.g. stream temperature, carbon inputs, in-stream vegetation cover. Recent IFI research, for example, shows the importance of channel shading in avoiding lethal stream temperatures for salmonids in Irish rivers (Gretta Hannigan, IFI, pers comm). Lack of shade has been shown to be correlated with absence of crayfish in habitat that would otherwise be optimal for the species (Besson et al., 2007). Whilst it is not proposed for any removal of canopy cover along the riparian zone for operational purposes, there may be some incidental requirement for removal of individual canopy stands during proposed construction works.	

Table 6.10: Hydrology and Drainage: Summary of Mitigation Measures

Potential Impact (Hydrology and Drainage)	Summary of Proposed Mitigation
<p>Construction Phase</p> <p>During the construction phase of the works, the potential causes of flooding could include:</p> <p>Blockage to the river flows due to collapsing of unstable river banks or temporary or permanent stockpiles during construction;</p> <p>Flooding of adjacent lands and properties caused by any reduction of channel conveyancing capacity during the construction of flood defences.</p>	<ul style="list-style-type: none"> An examination of historical flood records shows the worst of the fluvial flooding in this catchment occurs during the winter months, as would be expected. It is therefore recommended that the works be undertaken in summer months when flooding risks are lower.
<p>The existing land drainage system in the study area could be affected during the construction period of the works. Potential impacts on the existing drainage systems include:</p> <p>The pattern of runoff could change with some existing drains and ditches receiving significantly more or less flow than they receive currently; rainfall on elevated areas could wash peat and silt into the surrounding watercourses. Localised erosion and scouring could occur while reduced flow may result in stagnation in some drains and ditches; and</p> <p>Obstruction of flow paths could cause localised water logging in the vicinity of the proposed flood protection embankments.</p>	<ul style="list-style-type: none"> To avoid any water logging in the lands adjacent to the river banks, it is proposed to maintain the existing drainage ditches that are crossed over by the proposed flood defences and similarly for any temporary or permanent stockpiles to ensure overland surface water flow is not restricted.
<p>Operational Phase</p> <p><i>Morell River (Turnings Lower to Ballyhays)</i></p> <p>As a result of the installation of flood defences in these areas, there are increases in water level ranging from 0.035 m to 0.210 m between the abattoir bridge and the bridge under the R406. This increase results in a slight increase in flood extents to pastureland in these areas.</p>	<ul style="list-style-type: none"> No mitigation measures are necessary
<p><i>Morell River (Killeenmore to Turnings Lower)</i></p> <p>In areas along this stretch of river, there are increases in water level ranging from 0.025 m to 0.376 m. These increased water levels result in an additional flooding to pastureland adjacent to the proposed defences Morr 3 and Paines 1.</p>	<ul style="list-style-type: none"> The affected landowner has been accommodated by ensuring an adjacent land parcel is protected.

<p><i>Morell River (Sherlockstown to Killeenmore)</i></p> <p>There are increases in water level ranging from 0.002m to 0.637 m.</p> <p>Increased water levels adjacent to Morr 4, Morr 15, Morr 17 and Morr 19 are the result of flood defences being put in place to protect properties at risk in these areas.</p> <p>Increased water levels result in an additional flooding to pastureland adjacent to Morr 17. However this is the result of a reduction in the floodplain in the surrounding areas which helps to protect a minimum of 8 properties.</p>	<ul style="list-style-type: none"> ▪ Affected landowners have been accommodated by ensuring adjacent land parcels are protected.
<p><i>Slane River</i></p> <p>The Slane River has a combination of reduced and increased water levels upstream and downstream of the N7 due to the opening of culvert under the road.</p> <p>Upstream of the N7 and surrounding lands there is a significant reduction in the floodplain;</p> <p>Downstream of the N7 there are increased water levels within the retention pond at Blackchurch.</p> <p>In the townland of Tuckmilltown adjacent to the proposed defences there is an increase of water levels.</p>	<ul style="list-style-type: none"> ▪ It is proposed to increase the height of the retention pond embankments at Blackchurch to maintain freeboard. ▪ At Tuckmilltown defences are proposed to protect a minimum of 4 properties from flooding. As a result of these defences, there is an overall reduction in the floodplain in this area.
<p>The drainage pattern of the overland flows to the river channel along the embankments may be changed slightly. Construction of the embankments in the floodplain will change the slope of the existing lands in some areas which consequently may have an impact on the existing surface water drainage pattern. For example, the existing permeability of the soil could be reduced and the time of concentration to surface water flow could increase if the existing slope reduces.</p> <p>Some existing land drainage culverts under the railway will be fully or partially blocked to prevent flood waters bypassing the defences.</p>	<ul style="list-style-type: none"> ▪ Toe drains will be included at the base of the embankments, where required, in order to ensure that adjacent fields can continue to drain. ▪ Existing field drains that intersect the proposed embankments will be dealt with, by diverting them to adjacent field drains or by maintaining a limited flow path through the proposed defence.

Table 6.11: Soils, Geology and Hydrogeology: Summary of Mitigation Measures

Potential Impact (Soils, Geology and Hydrogeology)	Summary of Proposed Mitigation
Construction Phase General construction activities present a risk to water quality.	<ul style="list-style-type: none"> All construction works should be completed in line with the following best practice guidelines to ensure the potential for accidental soil and groundwater contamination is minimised: CIRIA (Construction Industry Research and Information Association) guidance on 'Control of Water Pollution from Construction Sites' (CIRIA Report No C532, 2001) CIRIA (Construction Industry Research and Information Association) guidance on 'Control of Water Pollution from Linear Construction Projects' (CIRIA Report No. C648, 2006)
Construction activities relating to the import and placement of fill material would be considered to constitute a temporary negative impact on the soils, geology and hydrogeology of the area. Over-compaction of soil and subsoil due to plant activities and potential for sediment run-off to the adjacent watercourses are particular risks that need careful management.	<ul style="list-style-type: none"> Ensuring that a Construction & Environmental Management Plan is in place will mitigate any risks associated with embankment construction activities, thus reducing these impacts to an imperceptible level.
Where the nature of the soil cannot be returned to a similar pre-construction quality due to soil spreading activities, this would constitute a permanent negative impact on the soils and geology of the area. The attribute importance of the soils is considered to be medium as they are considered in general moderately drained with moderate fertility. A permanent impact on a significant proportion of the soil in the area would constitute a moderate impact on the soils and geology.	<ul style="list-style-type: none"> Land used as the temporary working area will be restored to its original condition.
The proposed scheme will necessitate the requirement to store soil along the length of works areas. In the absence of mitigation, soil storage may present a risk of instability.	<ul style="list-style-type: none"> A maximum height of 1 metre will apply for all temporary spoil heaps, with maximum side slopes of 1V:3H, to ensure that risk of instability is reduced. This will be subject to stability analysis by a suitably qualified geotechnical engineer at design stage.
In the absence of mitigation, construction of new embankments and river banks may present a risk of slope instability.	<ul style="list-style-type: none"> The construction of the embankments should be completed to ensure slope stability based on the mixture of rock and soil type used in the construction. The final design of these features should be approved by a geotechnical engineer to ensure slope failure will not occur. The construction of new river banks at the stream realignment should be completed to ensure slope stability based on in-situ material. The final design of these features should be approved by a geotechnical engineer to ensure slope failure will not occur.
The import and pouring of concrete material for the foundations and walls could result in spillage and contamination of adjacent watercourses and soils.	<ul style="list-style-type: none"> Refer to Table 15.7 above for proposed mitigation measures in respect of concrete management.
It is proposed to use surface dewatering pumps to dewater the section of the channel where works are taking place. It is possible that during such works slight to moderate groundwater inflows from the channel bed could occur where fractured limestone is exposed. Inflows can be expected laterally through the weathered bedrock and also vertically where discrete fissures are intercepted in the riverbed.	<ul style="list-style-type: none"> Effective silt management measures such as the use of silt curtains will be placed in stages down-stream of the new channel, in advance of commencing stream realignments. These will be specified by the Contractor in the Method Statement and agreed with IFI. A procedure will also need to be included in the Method Statement for the removal of the silt management measures.

Potential Impact (Soils, Geology and Hydrogeology)	Summary of Proposed Mitigation
<p>Stream realignment works are also proposed at Slane 8 in Tuckmilltown and Morr 8 at Killeenmore. It is proposed that the plant required can operate from the river bank without need to enter the stream. However, works have the potential for significant sediment disturbance and run-off during this operation.</p> <p>Where water management controls may be required, this may involve dewatering within the channel in the vicinity of the works. Dewatering would constitute a temporary, slight negative impact on the groundwater flow regime. In-channel works can lead to river sediment disturbance with subsequent siltation and deposition downstream of the location which is considered a slight impact on soils and geology.</p>	<ul style="list-style-type: none"> An approved pumping and settlement system will be established to deal with dewatering activities. Pumps will transfer accumulated standing water into a settlement tank, or tanks, which in turn will discharge into a 'silt buster' or 'dirt bag' prior to being returned to the watercourse, to minimise the discharge of suspended solids into the watercourse. Water quality monitoring will be carried out to monitor the effectiveness of the mitigation measures.
There is the potential for accidental soil and groundwater contamination due to spills and leaks of oils and other contaminants during the construction stage of the proposed works.	<ul style="list-style-type: none"> Refer to Table 15.7 above for proposed mitigation measures in respect of fuels and oils.
There is the potential to hydrogeological impact on local water features such as ground water wells where dewatering may be required e.g. at culvert upgrades. However, the extent of dewatering required over a short timeframe is not expected to result in any significant impact.	<ul style="list-style-type: none"> No mitigation measures are necessary.
There is potential to encounter contaminated ground as part of the embankment excavation works, particular towards the north of the study area. There is a high risk of encountering and having to deal with contaminated materials as part of the existing embankment upgrade works.	<ul style="list-style-type: none"> Existing material in working areas (if found to be contaminated) will have to be screened on site in the first instance to remove plastics, timber, glass, organics etc, with the possibility of needing to dispose at a suitably licenced facility. Based on the GI log descriptions contaminated materials are likely to be construction and domestic waste primarily, which will require disposal at a suitable licenced facility. The following works areas were identified during Ground Investigations as having waste materials present. Morr 2, Paines 1-3, Slane 6. It is considered that further testing to Waste Acceptance Criteria (WAC) will need to be carried out at design stage on any of the above embankments where it is required to excavate existing material as part of the works.
<p>Operational Phase</p> <p>Maintenance activities during operational stage will involve periodic inspection of flood defence measures at most (likely to be annual). This is expected to be carried out as visual walkover inspections and general landscaping activities. As a result, there are no expected impact due to spillages or leaks.</p>	<ul style="list-style-type: none"> No mitigation measures are necessary.
The existing land drainage system in the study area could be affected during the construction period of the works (see also Table 15.8).	<ul style="list-style-type: none"> Permanent cut-off ditches are proposed on the land side of all embankments to direct overland flow away from the embankments.

Table 6.12: Cultural Heritage: Summary of Mitigation Measures

Potential Impact (Cultural Heritage)	Summary of Proposed Mitigation
<p>Construction Phase</p> <p>Ground disturbances, such as topsoil stripping, have the potential to have a direct and negative impact on previously unrecorded archaeological features or deposits that may survive beneath the current ground level with no surface expression.</p>	<ul style="list-style-type: none"> All topsoil stripping associated with the proposed scheme should be subject to full time archaeological monitoring. This will be carried out by a suitably qualified archaeologist under licence by the National Monuments Service. Full provision will be made available for the resolution of any archaeological features or deposits that may be identified, should that be deemed the most appropriate manner to proceed. A wade survey will be carried out within the section of Slane River to be realigned prior to any construction works going ahead. This will be carried out by a suitably qualified archaeologist, under licence by the National Monuments Service. Full provision will be made available for the resolution of any archaeological features or deposits that may be identified, should that be deemed the most appropriate manner to proceed. It is recommended that topsoil stripping within Morr 19 and 23 stock pile areas is monitored by a suitably qualified archaeologist. It is recommended that the area at Paines 3 only be used as a last resort. If it is required, it is recommended that the site be subject to archaeological testing in the first instance. This should be undertaken by an archaeologist under licence to the DoAHRRGA. Full provision should be made available for the resolution of any archaeological features that may be discovered, should that be deemed an appropriate manner in which to proceed.
<p>Ground disturbances associated with the construction of embankments adjacent to a number of bridge structures: 'Old Morell Bridge', 'Morell Bridge', 'Painestown Bridge', 'Finger-post Bridge' and an un-named bridge in Tuckmilltown, have the potential to directly and negatively impact on these structures. This may occur through inadvertent damage from plant, or burying of portions of the structures from the construction of embankments.</p>	<ul style="list-style-type: none"> A written and photographic record will be carried out of 'Finger-post Bridge' prior to construction and any direct impact on the structural remains of the bridge will be avoided. Furthermore a sufficient buffer (minimum of 1m) will be maintained between the embankment and bridge during construction. Any direct impact to the remaining three bridges 'Old Morell Bridge', 'Morell Bridge' and 'Painestown Bridge' will be avoided during use of the haulage and due care will be taken by all vehicles during the construction phase
<p>Three potential stock pile areas may be required as part of the proposed scheme. Topsoil stripping within these sites has the potential to have a direct and negative impact on archaeological features that have the potential to survive within these areas, especially in the site at Turnings North.</p>	<ul style="list-style-type: none"> It is recommended that topsoil stripping within Morr 19 and 23 stock pile areas is monitored by a suitably qualified archaeologist. It is recommended that the area at Paines 3 only be used as a last resort. To avoid the need for topsoil stripping at this site, the contractor will instead temporarily stockpile fill material on top of a geotextile layer at this location, if it required for material storage.
<p>Operational Phase</p> <p>No operational phase impacts are predicted to occur.</p>	<ul style="list-style-type: none"> No mitigation measures are necessary.

6.2 CONSTRUCTION WASTE MANAGEMENT PLAN

The Contractor will be required to produce and follow a waste management plan for the project.

As a minimum the following measures will be taken to ensure that the central base sites and surroundings are kept clean and tidy:

- A regular program of site tidying will be established to ensure a safe and orderly site.
- Food waste will be strictly controlled on all parts of the site.
- Mud spillages on roads and footpaths outside the site will be cleaned regularly and will not be allowed to accumulate.

6.3 AIR AND DUST MANAGEMENT

A dust minimisation plan will be based upon industry guidelines in the Building Research Establishment document entitled 'Control of Dust from Construction and Demolition Activities'. An outline dust minimisation plan is included in Appendix A.

6.4 WATER QUALITY MONITORING

6.4.1 Water Quality Monitoring Plan

A Water Quality Monitoring Plan will be prepared in compliance with the relevant environmental quality standards. It will be agreed with relevant authorities, including Kildare County Council, the IFI, EPA and the NPWS.

The monitoring programme will take a multi faceted approach to ensure a robust system is in place capable of policing construction activities. The contractor's Environmental Manager will be responsible for drawing up a schedule of the environmental monitoring programme required as part of the Water Quality Monitoring Plan and this will be based on the requirements of all monitoring recommended in this draft CEMP, conditions imposed as part of any consents, mitigation measures presented in Chapter 6 and Tables 6.7, 6.8 and 6.9, requirements for best practice and adherence to relevant legislation and guidelines as described in Section 3.3.

Monitoring will be required prior to, during and post construction. The monitoring programme will be the responsibility of the contractor's Environmental Manager and reporting will be made to the Engineer, IFI, NPWS and Kildare County Council. Baseline sampling shall start in advance of the works and will continue for a period after the works have been complete, these timeframes will be agreed in advance of construction with the relevant authorities outlined above. As a minimum requirement sampling will be carried out downstream of the main work areas that are progressing at any one time during the construction programme.

Monitoring will include regular inspection of silt management measures and all interceptors, sumps and ancillary elements associated with water collection or transfer systems. This will ensure no significant pollution incidents occur on site in particular in relation to water quality where suspended solids and turbidity may lead to deterioration in water quality.

An outline Water Quality Monitoring Plan is provided in Appendix B.

6.4.2 Emergency Spill Response Plan

An Emergency Response Plan will be prepared, detailing actions to be taken in the event of an accidental spillage of fuel, chemicals or other hazardous material. It will detail procedures to be followed if there is an accidental spillage. The Environmental Manager for the site should be notified of all incidents where there has been a breach in agreed environmental management procedures.

The contingency plan may take in to consideration the recommendations published within the UK's '*Pollution Prevention Guidelines Incident Response Planning: PPG 21*' and '*Pollution Prevention Guidelines Dealing with Spills: PPG 22*' (UK Environment Agency, 2009) and will be prepared in collaboration with the Contractor(s).

Staff should be trained so that they know where there is a copy of the Emergency Response Plan; what they should do if there is a spill; and where pollution control and personal protective equipment is.

An outline Emergency Response plan is included in Appendix C. If the main contractor already has a standard spill response procedure in operation then this should instead be amended to reflect the local conditions on site.

7 SITE SAFETY

Safety will be of prime importance during the construction works. The works will be subject to the Safety, Health and Welfare at Work Act 2005 (S.I. No. 10 of 2005) and at a minimum the Safety, Health and Welfare at Work (Construction) Regulations, 2013 (S.I. No. 291 of 2013). All aspects of design construction will be reviewed with regard to health and safety and risk assessments will be carried out.

A project supervisor design process (PSDP) has been appointed. As part of their duties they will be required to produce a Preliminary Safety and Health Plan for the project. The main contractor will be appointed as project supervisor construction stage (PSCS) and will be responsible for the control and co-ordination of health and safety during the construction phase of the works. All individuals working on the Project will be required to undertake induction procedures. Such will be designed to make individuals aware of all the issues associated with the Project and will include, but not be limited to:

- The terms of the CEMP;
- Working Hours;
- Access arrangements;
- Health, Safety and environmental policy and procedures;
- Code of Conduct within the site and surrounding environs;
- Statutory obligations of individuals on site;
- Traffic Management;
- Site parking;
- Public Access;
- Lighting requirements;
- Complaints and disciplinary procedures;
- Protection of the water environment;
- Protection of wildlife and habitats;
- Dust and air quality;
- Noise and vibration; and
- Emergency procedures.

Visitors will not be allowed onto the site unless they have received formal induction or are accompanied by an authorised person who has completed the induction. All visitors will be required to sign a visitor's book.

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APPENDIX A

OUTLINE DUST MANAGEMENT PLAN

OUTLINE DUST MANAGEMENT PLAN

In order to ensure that any dust nuisance is minimised, a series of mitigation measures are prescribed below:

- Display name and contact details of responsible person for dust issues at relevant in addition to site office contact.
- Record all dust and air quality complaints and record outcomes.
- Consult with and advise any landowners with the potential to be impacted by temporary construction dust emission prior to starting of those activities.
- Make the complaints log available to the local authority when asked.
- Record any exceptional incidents that cause dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation in the log book.
- Where required, use solid screens as an interface between closest residential receptors and working area.
- Avoid site runoff of water or mud.
- Keep site fencing, barriers and scaffolding clean using wet methods.
- Carry out regular inspections to ensure compliance with the CEMP/Dust Management Plan (DMP) and record results in the site log book. Increase the frequency of inspections during activities with a high potential to create dust or in prolonged dry weather.
- Undertake daily on and off site visual inspections where there are nearby receptors ensuring that no excessive dust emissions and/or deposition during pipeline installation.
- Ensure all vehicles switch off engines when stationary - no idling vehicles.
- Enforce an on-site speed limit of 15 mph on surfaced roads and 10 mph on unsurfaced areas. Have sign posts indicating these speed limits.
- Vehicles and machinery to be fitted with appropriate exhaust systems and emission controls. The devices will be maintained in good working order.
- Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.
- Ensure an adequate water supply on the site for effective dust/particulate matter suppression /mitigation, using non-potable water where possible and appropriate.
- Use enclosed chutes, conveyors and covered skips. Minimise drop heights of materials.
- Ensure aggregates are stored in bunded areas and are not allowed to dry out.
- Ensure vehicles entering and leaving the site are appropriately covered.
- Use water-assisted dust sweepers to clean access and local roads. Avoid dry sweeping of large areas.
- No bonfires and burning of waste materials on site
- Ensure use of covered skips as appropriate

APPENDIX B

OUTLINE WATER QUALITY MONITORING PLAN

INTRODUCTION

The Water Quality Monitoring Plan (WQMP) shall be adhered to throughout the construction phase to include preventive and precautionary methods of working and if necessary a mechanism through which abnormal or emergency situations are managed and addressed. The Water Quality Monitoring Plan outlines how the construction activities are to be monitored and will ensure the mitigation measures included to ensure water quality is protected and managed appropriately are effective and preventative of environmental damage.

PROCEDURES

The plan shall be enacted on all occasions, whatever the source of information.

- However, the main mechanisms for identifying issues pertaining to the water environment e.g. potential pollution incidents are as follows:
- Surface Water Drainage and proposed temporary discharge points will be mapped on a site plan, tracked on a schedule and agreed with relevant authorities
- The Environmental Manager shall undertake a site walkover on a weekly basis and make notes. These notes shall form the primary source of environmental checks of the works
- Temporary drainage and sedimentation features will be visually inspected on a daily basis and any abnormalities reported to the Environmental Manager
- Water quality monitoring to alert of any detrimental effects that particular construction activities may be having on water quality and provide evidence of the effectiveness of management procedures on site
- All site workers shall be given tool-box talks to enable them to understand the mechanism for reporting environmental incidents, including spillages, and how to respond to emergency or abnormal situation with regards to the water environment
- Site Supervisors shall be encouraged to identify potential pollution or hydrological problems or concerns and report them to the Environmental Manager.

Should the source of the pollution be attributable to a construction activity associated with the Works then measures will be undertaken immediately to mitigate the release of pollutants or the activity will cease until this can be achieved. The root cause of any pollution incident will be investigated and measures or corrective actions put in place in order to prevent its reoccurrence.

Roles and Responsibilities

Staff roles and responsibilities will be defined on appointment of the Main Works Contractor during the preparation of the detailed contractor CEMP.

MONITORING PROGRAMME

Pre-Construction Baseline Survey

A pre-construction baseline survey will be required to assess background concentrations of relevant parameters in the Morell River and tributaries affected by the proposed works. This is essential in

order to be able to assess any impact from the works against the existing conditions. The baseline survey will require consultation with the Contractor and relevant authorities to determine;

- Relevant parameters deemed necessary for analysis;
- Frequency and timeframe of monitoring;
- Threshold concentration levels which must not be exceeded; and
- Actions to be taken if threshold levels are breached.

This will help determine the threshold concentrations for certain parameters which the construction activities will be required to adhere to, and as such it is suggested that a suite of physico-chemical and chemical analyses are undertaken. A possible list of parameters is provided below, giving consideration to the potential impacts and pressures associated with the construction of the slipway, piers and ferry terminals.

- Total Suspended solids
- Visible oil and grease
- Turbidity (as a surrogate for TSS)
- Dissolved oxygen
- Temperature
- pH
- Conductivity

As suspended solids and sediment transport pose significant potential impact to water quality and aquatic ecology during construction, turbidity readings shall be used as a surrogate in the field. This will require a rating relationship curve drawn up from the results of the baseline survey to allow a turbidity/suspended solid threshold limit to be calculated. Real time measurement of turbidity using field instrumentation can then be used to assess the potential impact from the construction activities.

Once a pre-construction baseline survey is complete and has been processed it will further inform the water quality monitoring programme to be carried out under the CEMP. Until then, this preliminary proposal for the monitoring programme will outline recommended monitoring locations, parameters for analysis and other mitigation measures which may have an impact on water quality.

CONSTRUCTION PHASE MONITORING

During the construction phase, monitoring of water quality will continue to enable any pollution incidents to be identified and the effectiveness of pollution mitigation measures to be evaluated.

Consultation will continue with the OPW, Kildare County Council, Inland Fisheries and the NPWS regarding the water quality monitoring to be undertaken for watercourses that will be affected by construction works or discharge of surface water run-off.

The parameters to be tested, frequency of sampling and sampling locations will be agreed with the above bodies prior to construction commencing.

Monitoring is required during the construction period in order to:

- Alert the contractor to any detrimental effects that particular construction activities may be having on water quality (based on the baseline thresholds set) in order that appropriate remedial action can be taken as quickly as possible; and
- Provide evidence that management procedures on site (for example sediment run-off control) are adequate and working correctly, consistent with the CEMP control measures, and are being adhered to.

The proposed construction phase monitoring regime will be agreed with the relevant authorities but should include the information below:

- Daily visual monitoring of surface waters crossed by the scheme, at a point upstream and downstream, for colouration, oil sheens, and flow. Measurement of pH, temperature, conductivity, DO and turbidity (NTU) (other parameters may be included depending on activities and circumstances). Downstream monitoring for any temporary discharges required from settlement systems, will be undertaken at a location that allows sufficient mixing of discharge waters and receiving waters;
- Daily visual inspections of water discharge at all outfalls or watercourses whilst high risk activities are occurring along the associated working areas. Such activities would include earthworks and drainage works;
- The streambed below each construction phase will also be inspected during daily monitoring in order to assess the degree of siltation and any appropriate remedial action. Water quality monitoring points will be located immediately upstream and downstream of crossing construction points
- Daily visual inspection of surface water courses and ponds adjacent to any compounds; and
- In-situ monitoring of turbidity should be undertaken at critical nodes in the surface water network downstream of construction activities to ensure pre-determined threshold turbidity levels, derived with due consideration of the pre-construction baseline, are not breached. In the event of a breach an agreed and proportionate response and remedial action protocol shall be included in the CEMP and agreed with the relevant authorities.

REPORTING AND RECORDING

Construction Period Reporting

The results of the water quality monitoring will be routinely reported to the responsible parties in the CEMP, unless baseline threshold levels are breached where immediate contact and/or meetings with the statutory bodies will be required.

Exceedances of Baseline Threshold Values Reporting

Where any exceedances of defined baseline threshold values occur, this will be reported within 30 minutes to the Client Project Manager and Engineer. At this point, the actions proposed will also be notified to parties affected, including relevant statutory authorities.

All reports shall be reviewed and signed off by the Environmental Manager.

APPENDIX C

OUTLINE EMERGENCY POLLUTION SPILL RESPONSE PLAN

OUTLINE EMERGENCY SPILL RESPONSE PLAN

An emergency response plan shall be prepared to inform the procedures to be taken in the event of a spillage that has the potential to cause pollution.

The contractor will be responsible for the preparation and implementation of the spillage response procedure. The key issues to consider for the spillage response procedure include:

1. If the main contractor already has a standard spill response procedure in operation then this should be amended to reflect the local conditions on site. Where a spill response plan is not in place a project specific plan will be developed;
2. The Plan should also detail the procedures to be followed if there is any accidental spillage or discharge of contaminated water. It will be important to ensure that the Environmental Manager is notified of all incidents where there has been a breach in agreed environmental management procedures;
3. As a general rule the following principles should apply In the event of an environmental emergency:
 - a. If SAFE, stop the source of the spill and raise the alarm to alert people working in the vicinity of any potential dangers. Inform Engineer immediately
 - b. IF SAFE (USE PPE), contain the spill using the absorbent spill material provided. Do not spread or flush away the spill. Cover or bund off any vulnerable areas where appropriate.
 - c. If possible, clean up as much as possible using the absorbent spills materials. Do not hose the spillage down or use any detergents.
 - d. Contain any used absorbent material so that future contamination is limited.
 - e. Notify the Construction Manager or the Engineer and environmental officer so that used absorbent material can be disposed of using a specialist contractor.
4. The Construction Manager, in conjunction with the contractor's environmental manager, will develop and test, through exercises, the Emergency Spillage Procedure to ensure that appropriate measures to prevent and mitigate damage due to accidents and spillages are in place.
5. Testing of the Emergency Spillage Procedure shall be recorded on the relevant environmental control form.
6. Inform all personnel about the spill response procedure through toolbox talks and/or induction training. Consider the need for refresher training on long-term construction projects.

7. Use reminder posters, identifying the key essential elements of the spill response procedure, located in appropriate areas such as fuel storage areas, mess cabins, security points or on the back of toilet doors.
8. Example control containment measures for different pollutants are given below:

Control/Containment Measure	Pollutants				
Spill on ground	Concrete / cement	Paints	Oils	Silt	Detergents
Sand	✓	✓	✓	✗	✓
Straw bales	✗	✗	✓	✓	✗
Absorbent granules	✗	✗	✓	✗	✗
Geotextile fence	✓	✗	✗	✓	✗
Drip trays	✗	✓	✓	✗	✗
Pads/rolls	✗	✗	✓	✗	✗
Drain seal	✓	✓	✓	✓	✓
Earth bunds	✓	✓	✓	✓	✓
Spill in water					
Straw bales	✗	✗	✓	✓	✗
Pads/rolls	✗	✗	✓	✗	✗
Booms	✗	✗	✓	✗	✗
Stop further spill contain and inform appropriate personnel immediately	✓	✓	✓	✓	✓

In the event of a significant spill contact the relevant Emergency Response Agencies:

EPA, Local Authority, Fire Service, Health Service Executive, Gardaí, Health and Safety Authority, Fisheries Board, Sanitary Authority, Food Safety Authority

It will be important to incorporate the names and telephone numbers of others you need to inform (includes alerting people out of hours) and who should contact them within the spillage response plan.

Further issues to be considered when the main contractor is preparing an emergency spill response plan include:

- Details of a professional 24 hour call-out clean-up service
- Ensure sufficient types and quantities of spill response equipment are available on site. Keep spill kits where spills may occur, e.g. at refuelling points or on plant working near a watercourse.
- Material safety data sheets and CLP assessments will assist in identifying appropriate spill measures for dealing with hazardous materials.
- Dispose of used spill response material appropriately, e.g. oily granules or pads should be bagged up and placed in the designated waste skip.

IMPORTANT TELEPHONE NUMBERS

Emergency Contact Details	
Emergency Services	112 or 999
Nearest hospital – Accident & Emergency Dept.	
Environmental Incident Reporting	

Contractor Contacts: (Out of Hours)	
Engineer	TBC
Construction manager	TBC
Environmental Manager	TBC
Foreman	TBC

The flow chart in Figure C.1 summarises the action to be taken in the event of a spillage and will be used to inform the development of the contractor's emergency spill response plan.

What to do if you find a spillage of any substance on site

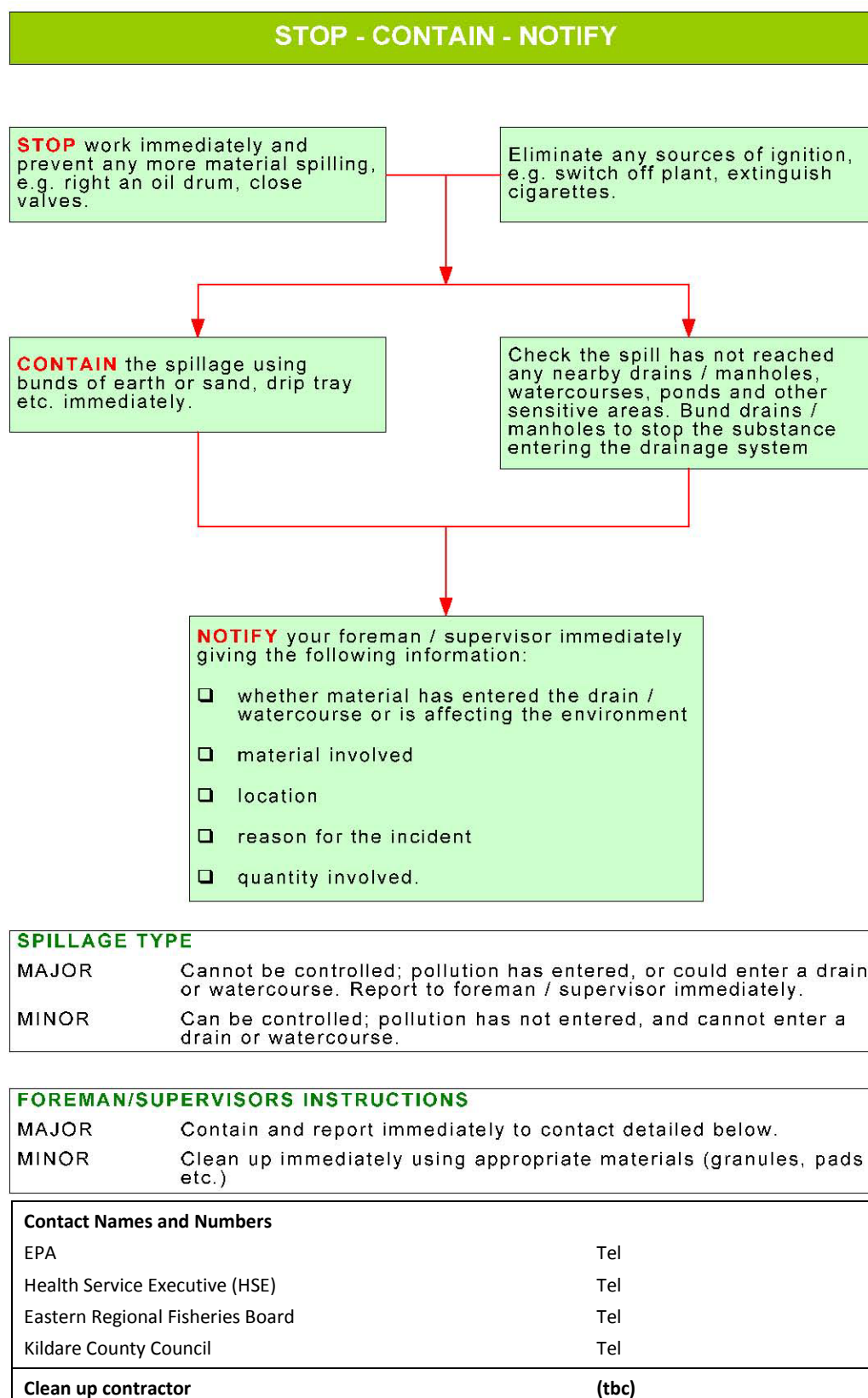


Figure C1 Emergency Spillage Response Flow Chart

