Natura Impact Statement

Avoca – Vartry

2018
Natura Impact Statement

For

River Basin (10) Avoca – Vartry Flood Risk Management Plan

Areas for Further Assessment included in the Plan:

<table>
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<td>Seanchonach / Wilford</td>
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<td>Cill Mhantáin</td>
<td>Wicklow</td>
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Flood Risk Management Plans prepared by the Office of Public Works 2018

*In accordance with* European Communities (Assessment and Management of Flood Risks) Regulations 2010 and 2015
Purpose of this Report

As part of the National Catchment-based Flood Risk Assessment & Management (CFRAM) programme, the Commissioners of Public Works have commissioned expert consultants to prepare Strategic Environmental Assessments, Appropriate Assessment Screening Reports and, where deemed necessary by the Commissioners of Public Works, Natura Impacts Assessments, associated with the national suite of Flood Risk Management Plans.

This is necessary to meet the requirements of both S.I. No. 435 of 2004 European Communities (Environmental Assessment of Certain Plans and Programmes) Regulations 2004 (as amended by S.I. No. 200/2011), and S.I. No. 477/2011 European Communities (Birds and Natural Habitats) Regulations 2011.

Expert Consultants have prepared these Reports on behalf of the Commissioners of Public Works to inform the Commissioners' determination as to whether the Plans are likely to have significant effects on the environment and whether an Appropriate Assessment of a plan or project is required and, if required, whether or not the plans shall adversely affect the integrity of any European site.

The Report contained in this document is specific to the Flood Risk Management Plan as indicated on the front cover.

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Acknowledgements

The Office of Public Works (OPW) gratefully acknowledges the assistance, input and provision of data by a large number of organisations towards the implementation of the National CFRAM Programme. In particular, the OPW acknowledges the assistance of RPS Consulting Engineers and the valuable input and support of the Local Authorities at project level in each of the study areas.

The OPW also acknowledges the participation of members of the public, representative organisations and other groups throughout each stage of consultation.
Eastern CFRAM Study

UoM 10 Flood Risk Management Plan
Natura Impact Statement

Document Control Sheet

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The draft Flood Risk Management Plans are intended for the purpose of consultation only. They should not be used or relied upon for any other purpose or decision-making process. They are likely to be updated, refined or changed before finalisation. The Commissioners of Public Works in Ireland reserve the right to change the content and/or presentation of any of the information provided in the draft Flood Risk Management Plans at their sole discretion.
ACKNOWLEDGEMENTS

The Office of Public Works (OPW) gratefully acknowledges the assistance, input and provision of data by a large number of organisations towards the implementation of the National CFRAM Programme and the preparation of this Draft Flood Risk Management Plan, including:

- RPS Consulting Engineers
- WFD Local Authorities Water and Communities Office LAWCO
- Cavan County Council
- Dún Laoghaire - Rathdown County Council
- Dublin City Council
- Fingal County Council
- Kildare County Council
- Louth County Council
- Meath County Council
- Offaly County Council
- South Dublin County Council
- Westmeath County Council
- Wexford County Council
- Wicklow County Council
- Mid-East Regional Authority
- Dublin and Mid-Eastern Regional Authority
- The Environmental Protection Agency
- Met Éireann
- All members of the National CFRAM Steering and Stakeholder Groups

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<tr>
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<td>CAFE</td>
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<td>Department of Agriculture and Rural Development (Northern Ireland)</td>
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<td>Department of Communications, Energy and Natural Resources</td>
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<td>Department of Environment, Community and Local Government</td>
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<td>DEHLG</td>
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<td>EC</td>
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<td>Office of Public Works</td>
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1 INTRODUCTION AND BACKGROUND

1.1 THE FLOODS DIRECTIVE

The Floods Directive is being implemented in Ireland through the European Communities (Assessment and Management of Flood Risks) Regulations 2010 [S.I.122/2010] (as amended by S.I.495/2015). These Regulations appoint the Office of Public Works (OPW) as the Competent Authority for the Flood Risk Management Plans (FRMPs), which set out the measures and policies that should be pursued to achieve the most cost effective and sustainable management of flood risk. The Statutory Instrument also identifies roles for other organisations; such as the Local Authorities, Waterways Ireland, the Electricity Services Board (ESB) and Irish Water, to undertake certain duties with respect to flood risk within their existing areas of responsibility.

In Ireland, the approach to implementing the Directive has focused on a national Catchment-based Flood Risk Assessment and Management programme. This was developed to meet the requirements of the Floods Directive, as well as to deliver on core components of the 2004 report of the Flood Policy Review Group (OPW, 2004). Pilot Catchment-based Flood Risk Assessment and Management (CFRAM) studies have been undertaken since 2006 in the Dodder and Tolka catchments, the Lee Catchment, the Suir Catchment and in the Fingal / East Meath area.

The national CFRAM programme is being progressed via six engineering consultancy projects which are based at the scale of the Water Framework Directive (WFD) River Basin Districts (RBDs). Collectively these six projects will focus on 300 Areas for Further Assessment (AFAs) countrywide.

The Eastern CFRAM Study was the second CFRAM Study to be commissioned. The Study area covers approximately 6,250 km² and includes four Units of Management (UoM); each comprised of a single Hydrometric Area (HA). They are UoM07 (Boyne), UoM08 (Nanny – Delvin), UoM09 (Liffey-Dublin Bay) and UoM10 (Avoca-Vartry). Additional information on each UoM is presented in Chapter 3.1.2.

At the completion of the national CFRAM programme, each UoM will have its own Flood Risk Management Plan (FRMP).

Chapters 1-3 of this document describe the process that was undertaken to identify and screen the European sites that could be impacted by the FRMP within the context of the overall Eastern CFRAM Study. This information was used to help inform the environmental screening aspect of the Preliminary Screening stage of the Options Assessment (discussed in more detail in Chapter 3.1.1).

Chapter 4 presents a summary of the measures that are proposed for inclusion in the FRMP for UoM10 and Chapter 5 presents the appropriate assessment of the Preferred Options that have been put forward at the AFA-scale in the draft FRMP. Avoidance and mitigation measures are included in Chapter 6.

---

1 AFAs are settlement areas which were defined as a result of the first phase of implementation of the Floods Directive, the Preliminary Flood Risk Assessment (PFRA), completed in 2011. The PFRA identified areas of existing or foreseeable future potentially significant flood risk (originally referred to as ‘Areas of Potential Significant Risk’, or ‘APSRs’) and these areas are what are now referred to in the FRMPs as ‘Areas for Further Assessment’, or ‘AFAs’. 

---
1.1.1 The Eastern Catchment-based Flood Risk Assessment and Management Study

The CFRAM Studies and their product – the Flood Risk Management Plans – are at the core of the national policy for flood risk management and the strategy for its implementation. The methodology featured in each CFRAM Study includes the collection of survey data and the assembly and analysis of meteorological, hydrological and tidal data, which are used to develop a suite of hydraulic computer models. Flood maps are one of the main outputs of the Study and are the way in which the model results are communicated to end users. The studies have assessed a range of potential options to manage the flood risk and have determined which, if any, is preferred for each area and has been recommended for implementation within the draft FRMPs. The CFRAM Studies focus on areas where the risk is understood to be most significant, namely the AFAs, which are listed in Table 3.1.1 and shown in Figure 3.4.1.

The FRMPs arising from the Eastern CFRAM Study are strategic plans and as described below in Chapter 2.1 are subject to the provisions of Article 6(3) of the EU Habitats Directive via the European Communities (Birds and Natural Habitats) Regulations 2011 (as amended) ("the 2011 Regulations"). The 2011 Regulations transpose the provisions of the Habitats Directive 92/43/EEC into Irish law and consolidate 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 judgements of the Court of Justice of the European Union (CJEU).

As with Strategic Environmental Assessment (SEA), it is accepted best-practice for the Appropriate Assessment of strategic planning documents, in the context of the 2011 Regulations, to be run as an iterative process alongside the Plan development, with the emerging proposals or options continually assessed for their possible effects on European sites and modified or abandoned (as necessary) to ensure that the subsequently adopted Plan is not likely to result in significant adverse effects on any European sites, either alone or ‘in combination’ with other plans.

It is therefore important to recognise that the assessment of strategic plans is an important aspect in guiding the development of the Plan (and demonstrating that this has been done) as it is about (ultimately) assessing its effects.

1.2 LEGISLATIVE CONTEXT

The ‘Habitats Directive’ (Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora) provides legal protection for habitats and species of European importance. The main aim of the Habitats Directive is “to contribute towards ensuring biodiversity through the conservation of natural habitats of wild fauna and flora in the European territory of the Member States to which the treaty applies”. Actions taken in order to fulfil the Directive must be designed to: “maintain or restore, at a favourable conservation status, natural habitats and species of wild fauna and flora of Community interest”. A key outcome of the Habitats Directive is the establishment of Natura 2000, an ecological infrastructure developed throughout Europe for the protection of sites that are of particular importance for rare, endangered or vulnerable habitats and species. In Ireland, Special Areas of Conservation (SACs), together with Special Protection Areas (SPAs) designated under the ‘Birds Directive’ (Council Directive 2009/147/EC - codified version of Directive 79/409/EEC on the
Conservation of Wild Birds, as amended), are included in the Natura 2000 network\(^2\), and are hereafter referred to as ‘European sites’.

A central protection mechanism of the Habitats Directive is the requirement of competent authorities to undertake Appropriate Assessment\(^3\) (AA), also known as a Habitats Directive Assessment (HDA) to consider the possible nature conservation implications of any plan or project on European sites before any decision is made to allow the plan or project to proceed.

The 2011 Regulations provide the following definition of a plan: “subject to the exclusion, except where the contrary intention appears, of any plan that is a land use plan within the meaning of the Planning Acts 2000 to 2011, includes-

\[
\begin{align*}
(a) & \quad \text{any plan, programme or scheme, statutory or non-statutory, that establishes public policy in relation to land use and infrastructural development in one or more specified locations or regions, including any development of land or on land, the extraction or exploitation of mineral resources or of renewable energy resources and the carrying out of land use activities, that is to be considered for adoption authorisation or approval or for the grant of a licence, consent, permission, permit, derogation or other authorisation by a public authority, or} \\
(b) & \quad \text{a proposal to amend or extend a plan or scheme referred to in subparagraph (a)}
\end{align*}
\]

Not only is every new plan or project captured by the requirements of the 2011 Regulations, but each plan or project, when being considered for approval at any stage, must take into consideration the possible effects it may have in combination with other plans and projects.

Article 6(3) of the Habitats Directive states: “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 subject 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) is the procedure for allowing derogation from this strict protection, in certain restricted circumstances:

Article 6(4) of the Habitats Directive states: “If, in spite of a negative assessment of the implications for the site and in the absence of alternative solutions, a plan or project must nevertheless be carried out for imperative reasons of overriding public interest, including those of social or economic nature,

\(^2\) Natura 2000 sites are protected by Article 6(3) of the Habitats Directive. Protection is given to SACs from the point at which the European Commission and the Government agree the site as a ‘Site of Community Importance’ (SCI). Article 6(3) of the Habitats Directive and Article 4(4) of the Birds Directive also apply (respectively) to any other site or area that the Commission believes should be considered as an SAC or SPA, until their status is determined. Under the European Communities (Birds and Natural Habitats) Regulations 2011 (as amended) the term ‘European site’ applies to any designated SAC or SPA; any SCI; any candidate SCI (cSCI); any candidate SAC (cSAC); and any candidate or proposed SPA (pSPA).

\(^3\) ‘Appropriate Assessment’ has been historically used as an umbrella term to describe the process of assessment in its entirety from screening to IROPI (Imperative Reasons of Overriding Public Interest). The assessment process is now more commonly divided into distinct stages, one of which (Stage 2) is the ‘appropriate assessment’ stage. The overall process is often referred to as an ‘Article 6 Assessment’ or ‘Habitats Directive Assessment’ for convenience, although these terms are not included within the legislation.
the Member State shall take all compensatory measures necessary to ensure that the overall coherence of Natura 2000 is protected. It shall inform the Commission of the compensatory measures adopted."

The Habitats Directive promotes a hierarchy of avoidance, mitigation and compensatory measures. First, the plan should aim to avoid any impacts on European sites by identifying possible impacts early in the plan-making process and writing the plan in order to avoid such impacts. Second, mitigation measures should be applied, if necessary, during the AA process to the point where no adverse impacts on the site(s) remain. If the plan is still likely to result in impacts on European sites, and no further practicable mitigation is possible, then it must be rejected. If no alternative solutions are identified and the plan is required for imperative reasons of overriding public interest (IROPI test) under Article 6(4) of the Habitats Directive, then compensation measures are required for any remaining adverse effect.
2 APPROACH

2.1 GUIDANCE

The European Commission (EC) has produced non-mandatory methodological guidance (EC, 2000, 2002, 2007) in relation to the process of AA which suggests a four-stage process, although not all steps may necessarily be required. The process recommends an initial “test of likely significance”, or “screening” followed, if necessary, by appropriate assessment. The Department of Environment, Heritage & Local Government (DEHLG) has transposed the principles of the European Commission guidance into a document specific to Ireland entitled ‘Appropriate Assessment of Plans and Projects in Ireland, Guidance for Planning Authorities’ (DEHLG, 2010).

A summary of the stages is given below and additional detail on the iterative process by which each of the stages is reached and concluded is given overleaf in Figure 2.1.1.

Stage One: Screening or ‘Test of Likely Significance’ - the process which identifies the likely impacts upon a European site of a project or plan, either alone or in combination with other projects or plans, and considers whether these impacts are likely to be significant;

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

Stage Three: Assessment of Alternative Solutions - Where adverse effects remain after the inclusion of mitigation, this Stage examines alternative ways of achieving the objectives of the project or plan that avoid adverse impacts on the integrity of European Sites;

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

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4 Since 2011 known as the Department of Community, Environment and Local Government (DECLG)
Figure 2.1.1: Schematic of the stages of Appropriate Assessment

- **Stage 1**: Is the PP directly connected with or necessary to the site management for nature conservation purposes only?
  - **Yes**
    - Document evidence of UfCS (Unfavourable Conservation Status)
    - Develop objectives and plan details
    - Consider potential impacts of PP on other habitats/species/NZK sites
    - Adjust PP details if appropriate
    - Submit plan for approval
  - **No**
    - Prepare a finding of no significant effect report, containing sufficient details of the PP and of the receiving environment, including existing pressures, to demonstrate that an objective assessment has been carried out
    - Submit PP for approval
  - **Yes / Maybe**
    - Review PP against site conservation objectives
    - Assess whether the PP will adversely affect the integrity of the site
    - Review alternative locations
    - Review alternative methods
    - Apply precautionary principle
    - Document decision-making process
    - PP may be approved by competent authority with appropriate conditions

- **Stage 2**: Proceed to Stage 2 assessment: will the PP adversely affect the integrity of the Natura 2000 site(s)?
  - **Yes**
    - Identify potentially affected water bodies and location in relation to Natura 2000 site(s) within/ upstream/downstream
    - Identify water dependent habitats and species and assess significance of impacts on their conservation status
    - Determine whether the PP will lead to permanent effects on the Natura 2000 site(s) or its qualifying habitat features
    - Assess significance of cumulative impacts
    - Propose measures
    - Assess significance of residual impacts
    - Prepare ES/EIA/planning application, including clear documentation of the Habitats Directive Article 6 assessment
    - EA Report should be submitted to the relevant agencies and the public for consultation
    - Submit PP for approval
  - **No**
    - REDRAFT THE PP
    - PP may be approved by competent authority with appropriate conditions

- **Stage 3**: Assessment of alternative solutions by competent authority
  - **Yes**
    - Review Stage 2 assessment provided by PP proponent
    - Consider adequacy of measures indicated in Stage 2 assessment
    - Review and document alternative solutions, including ‘do nothing’ and demand management solutions
    - Document assessment of whether or not there are alternative solutions
  - **No**
    - Are there alternative solutions where adverse impacts remain?

- **Stage 4**: National Authorities proceed to Stage 4 assessment, in consultation with European Commission DG Environment, to determine whether the PP may be approved or not. If approved, it will be subject to agreed compensation measures.
The following guidance has been used during the preparation of this Screening Report in support of the Eastern CFRAM Study FRMPs:

- **EC (2002)** Assessment of plans and projects significantly affecting Natura 2000 sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC
- **EC (2013)** Guidelines on Climate Change and Natura 2000 Dealing with the impact of climate change on the management of the Natura 2000 Network of areas of high biodiversity value
- **NPWS (2014)** The Status of EU Protected Habitats and Species in Ireland 2013 – Overview Report

The staged approach summarised above and in Figure 2.1.1 works well at the project-level where the scheme/project design is established and possible effects on European sites can be quantitatively assessed with the benefit of detailed survey data. In contrast, the nature of the Eastern CFRAM Study and each of its FRMPs presents a number of distinct challenges for a ‘strategic’ AA; in particular, every possible outcome of each FRMP cannot always be identified and assessed in detail, since it is not within the remit of the FRMPs to develop detailed designs for individual risk management measures.

It is emphasised that the Draft FRMP sets out the proposed strategy, actions and measures that are considered to be the most appropriate at this stage of assessment. The observations and views submitted as part of the consultation on the Draft Plan will be reviewed and taken into account before the Plan is submitted for comment, amendment or approval by the Minister. Some changes may arise as a result of the consultation process.

Further, once the FRMP is finalised, measures involving physical works (e.g., flood protection schemes) will need to be further developed at a local, project level before Exhibition or submission for planning approval. At this stage, local information that can not be captured at the Plan-level of assessment, such as ground investigation results and project-level environmental assessments, may
give rise to some amendment of the proposed measure to ensure that it is fully adapted, developed and appropriate within the local context.

While the degree of detail of the assessment undertaken to date would give confidence that any amendments should generally not be significant, the measures set out in the Draft FRMP may be subject to some amendment prior to implementation, and in some cases may be subject to significant amendment.

In this context, it is stressed that the SEA and AA undertaken in relation to the FRMP are plan-level assessments. The FRMP will inform the progression of the preferred measures, but project-level assessments will need to be undertaken as appropriate under the relevant legislation for consenting to that project for any physical works that may progress in the future. The approval of the Final FRMP does not confer approval or permission for the installation or construction of any physical works. The requirements for AA Screening, including any particular issues such as knowledge gaps or mitigation measures that are expected to be necessary, are set out in the Natura Impact Statement as relevant.

It is also important to note that the safeguards set out in Article 6(3) and (4) of the Habitats Directive are triggered not by certainty, but by the possibility of significant effects and that the precautionary approach to identifying the potential impacts of the plan is maintained at all levels. Chapter 0 discusses these aspects in more detail.

The processes for progression of measures involving physical flood relief works are described in section 8.1.2 of the FRMP. EIA and/or AA Screening, and, where so concluded from the screening, Environmental Impact Assessment and/or Appropriate Assessment, must be undertaken in accordance with the relevant legislation where relevant as part of the progression of measures that involve physical works. The body responsible for implementation of such measures, typically either the OPW or the relevant local authority is required to ensure that these requirements will be complied with.

Project-level assessment will take account of the potentially viable measures identified in the Plan, but will involve the consideration of alternatives at the project-level and, as appropriate, EIA and AA, including the definition of necessary mitigation measures at the project-level. Only schemes/measures confirmed to be viable following project level assessment will be brought forward for Exhibition/Planning and detailed design.
3 STAGE 1: SCREENING FOR APPROPRIATE ASSESSMENT

Screening is the process of deciding whether or not an Appropriate Assessment is required for a plan or project. It addresses and records the reasoning and conclusions in relation to the first two tests of Article 6(3) of the Habitats Directive, i.e.

- Whether a plan or project is directly connected to or necessary for the management of the site; and
- Whether a plan or project, alone or in-combination with other plans and projects, is likely to have significant effects on a European site in view of its Qualifying Interest Features and their corresponding Conservation Objectives.

The Screening Stage includes:

- Site location and description of the plan or project;
- Identification and initial screening of European sites for potential negative effects;
- Screening conclusion.

The assessment of likely significant effects is based on the likelihood and significance of any effects of the proposed plan or project on each European site’s qualifying interests, particularly with reference to the relevant conservation objectives. In this context, the likelihood depends on whether there is the opportunity and pathway for the effect to occur, and the significance is regarded as the effect on the susceptible qualifying interests of the site(s). If the effects are deemed to be significant, potentially significant, or uncertain, or if the screening process becomes overly complicated, then the process must proceed to Stage 2 Appropriate Assessment.

3.1 DESCRIPTION OF THE PLAN

3.1.1 The Eastern CFRAM Study and its associated FRMPs

The Eastern CFRAM Study is not directly connected with or necessary to the management of any European site.

The objectives of the Eastern CFRAM Study are to:

- Identify and map the existing and potential future flood hazard\(^5\) within the Study area;
- Assess and map the existing and potential future flood risk\(^6\) within the Study area;
- Identify viable structural and non-structural options and measures for the effective and sustainable management of flood risk in the AFAs and within the Study area as a whole, and

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\(^5\) Potential future flood hazards and risk include those that might foreseeably arise (over the long-term) due to the projected effects of climate change, future development and other long-term developments.

\(^6\) Flood risk is defined as a combination of probability and degree of flooding and the adverse consequences of flooding on human health, people and society, the environment, cultural heritage and economic activity and infrastructure.
- Prepare a set of FRMPs for the Study area, and undertake associated Strategic Environmental Assessment and, as necessary, Appropriate Assessment, that sets out the policies, strategies, measures and actions that should be pursued by the relevant bodies, including the OPW, Local Authorities and other stakeholders, to achieve the most cost-effective and sustainable management of existing and potential future flood risk within the Study area, taking account of environmental plans, objectives and legislative requirements and other statutory plans and requirements.

**It is not an objective of the FRMPs to develop detailed designs for individual flood risk management measures.**

### 3.1.2 Site Location

As outlined earlier in Chapter 1.1.1, the Eastern CFRAM Study area includes four Units of Management (UoM) / Hydrometric Areas (HAs), each of which has its own FRMP. The UoMs constitute major catchments / river basins (typically greater than 1,000km²) and their associated coastal areas. Within the Eastern CFRAM Study area, each UoM boundary generally matches the boundary of a corresponding Hydrometric Area (HA). HAs are areas comprising a single large river catchment, or a group of smaller ones, that have been delineated across Ireland and Northern Ireland for the purposes of hydrological activities. This Natura Impact Statement (NIS) is for the UoM10 FRMP only.

#### 3.1.2.1 UoM10

Within UoM10 there are 10 Areas for Further Assessment (AFA), shown in Figure 3.1. UoM10 has mixed catchment land use, with the major urbanised areas, including Loughlinstown, Old Connaught/Wilford, Bray, Greystones, Kilcoole, Newcastle, Ashford/Rathnew and Wicklow being generally located along the coastline while the upland hinterland is more rural in nature but contains significant settlements including Avoca and Aughrim.

Two further High Priority Watercourses (HPWs) were specified by OPW; the Deansgrange and Carrickmines/Shanganagh Rivers which are associated with and reported alongside the Loughlinstown AFA. The location of the UoMs and the AFAs in the Eastern CFRAM Study area are shown in Figure 3.1.1.

#### 3.1.2.2 Projects running in Parallel with the Eastern CFRAM Study

Some of the UoMs in the Eastern CFRAM Study area have had projects involving the implementation of FRM methods prioritised and consequently these are at a more advanced stage than other AFAs in the RBD. In UoM10 these are: the River Dargle (Bray) Drainage Scheme and the Avoca River (Arklow) Drainage Scheme, for which Wicklow County Council is progressing schemes. In neighbouring UoM09, parallel projects which may interact with projects in UoM10 include the Carysfort Maretimmo Stream Improvement Scheme. These projects have been subject to their own environmental assessment and will be reviewed for any potential in combination or cumulative effects.
3.1.3 Methodology for the Appropriate Assessment

Although the AA is being carried out on activities occurring within the functional area of the UoM10 FRMP, the likely significance of the effects of the FRMP will also be assessed on European sites in adjacent river basins. The likely significance of effects of the proposed plan on the European sites identified and their conservation objectives have been assessed taking into account the source-pathway-receptor model. The source is defined as the individual element of the plan that has the potential to impact on a European site, its qualifying interests and its conservation objectives. The pathway is defined as the means or route by which a source can migrate to the receptor. The receptor is defined as the European site and its qualifying interests. Each element of the model may exist independently, however a potential impact is only created where there is a linkage between the source, pathway and receptor. This NIS will also review and incorporate the conclusions of the other CFRAM FRMPs, where appropriate, for in-combination and cumulative impacts.

Figure 3.1.1: Eastern CFRAM Study Area and Associated Units of Management
Figure 3.1.1 shows the extent of each UoM, for which each of the FRMPs will be prepared in the Eastern CFRAM Study area, and also the distribution of AFAs within each UoM.

Figure 3.1.2 illustrates the structure and spatial scales of assessment of the National CFRAM programme, the Eastern CFRAM Study, the FRMPs and the individual AFAs and HPWs within each UoM.

The list of the AFAs that have been investigated as part of the Eastern CFRAM Study is given in Table 3.1.1. It should be noted that the Dublin City AFA in UoM09 has been subdivided into eight discrete areas: the High Priority Watercourses (HPWs) of the Camac, Carysfort/Maretimo, Lower Liffey, Poddle and Santry Rivers (collectively shown on mapping and in the assessment as "Dublin City HPWs") while Clontarf, Raheny and Sandymount are coastal sub-AFA districts within the Dublin City AFA and have been assessed as discrete sites. In addition to the Santry River being a HPW, Santry is also an AFA. Where alternate nomenclature may be in use for AFAs in this report, this is shown in italics.

As illustrated in Figure 3.1.3, a draft FRMP has been produced for each UoM. For each FRMP produced there is an associated SEA Environmental Report and NIS. In accordance with the 2011 Regulations, the NIS is a report comprising the scientific examination of the Plan (the FRMP) and the relevant European site (or sites), to identify and characterise any possible implications of the plan either individually or in combination with other plans or projects, in view of the conservation objectives of the site or sites. It will also include any further information including but not limited to, plans, maps or drawings, scientific data or information or data required to enable the carrying out of an appropriate assessment.
Table 3.1.1 List of AFAs in the UoM10 FRMP

<table>
<thead>
<tr>
<th>AFA</th>
<th>County</th>
<th>Flood Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arklow</td>
<td>Wicklow</td>
<td>Fluvial &amp; Coastal</td>
</tr>
<tr>
<td>Aughrim</td>
<td>Wicklow</td>
<td>Fluvial</td>
</tr>
<tr>
<td>Avoca</td>
<td>Wicklow</td>
<td>Fluvial</td>
</tr>
<tr>
<td>Bray</td>
<td>Dublin &amp; Wicklow</td>
<td>Fluvial &amp; Coastal</td>
</tr>
<tr>
<td>Greystones &amp; Environs</td>
<td>Wicklow</td>
<td>Fluvial</td>
</tr>
<tr>
<td>Kilcoole</td>
<td>Wicklow</td>
<td>Fluvial</td>
</tr>
<tr>
<td>Loughlinstown</td>
<td>Dublin</td>
<td>Fluvial</td>
</tr>
<tr>
<td>Newcastle</td>
<td>Wicklow</td>
<td>Fluvial</td>
</tr>
<tr>
<td>Old Connaught / Wilford</td>
<td>Dublin</td>
<td>Fluvial</td>
</tr>
<tr>
<td>Wicklow &amp; Ashford &amp; Rathnew</td>
<td>Wicklow</td>
<td>Fluvial &amp; Coastal</td>
</tr>
</tbody>
</table>

* Wicklow AFA and Ashford & Rathnew AFA are reported together in the FRMP due to their proximity and hydrological/hydraulic connectivity.

Each NIS has fed into and influenced the related SEA Environmental Report and both environmental reports have fed into and influenced the draft FRMPs as they have evolved. Following completion of all three documents, there will be a consultation period to allow statutory and non-statutory consultees, along with the public, to comment on the Plans and Reports produced.

Under the 2011 Regulations, an appropriate assessment carried out shall "include a determination by the public authority, pursuant to Article 6(3) of the Habitats Directive as to whether or not the plan... would adversely affect the integrity of a European site... before a decision is made to approve, undertake or adopt a plan".

Figure 3.1.3 gives an overview of the iterative process being undertaken as part of the CFRAM Study to develop the final Flood Risk Management (FRM) measures. Within each FRMP the proposed FRM Methods necessary at an AFA Spatial Scale of Assessment (SSA) have been considered. At this scale, methods benefitting only the particular AFA in question are considered, even if the implementation of a given method included works or activities outside of the AFA, i.e., elsewhere in the sub-catchment or UoM. Examples of where this might apply would be storage options upstream of the AFA, or flood forecasting and warning systems, that provide benefits to no other AFAs than the AFA under consideration.

For each AFA to be assessed, the starting point was to look at a long list of FRM methods that could be implemented. This long list of FRM methods was specified by OPW as being the policy, soft engineering and hard engineering methods to manage flood risk in Ireland.

If a FRM method was found to be technically feasible, i.e. it could completely or partially manage flood risk for an area, it was then screened for its economic viability. If the method was found to be economically viable it was then screened for potentially detrimental environmental and social impacts.

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7 (or project)  
8 The AFA SSA refers to an individual AFA; such areas would include towns, villages, areas where significant development is anticipated and other areas or structures for which the risk that could arise from flooding is understood to be significant.
The environmental considerations in the FRMP screening were based on the potential for high level impacts on designated European sites in the first instance, with national and regional nature conservation designations also taken into consideration during the MCA. High level impacts are a generic and conservative description of potential impacts, taking into account plan-level FRM measures insofar as they are defined.

Figure 3.1.3: Environmental Assessment Inputs into the FRMP

Methods that were found to be technically, economically, socially and environmentally acceptable in the preliminary screening were then combined into groups of Options, which were subjected to detailed Multi-Criteria Analysis (MCA), looking at technical, economic, social and environmental criteria. The highest scoring Option for each AFA, while also taking into consideration feedback from public and stakeholder consultation, has been put forward into the draft FRMP for consultation as
the *Preferred Option*. The SEA and NIS were critical for the MCA, as they provided necessary information for the environmental and social inputs.

The observations and views submitted as part of the consultation on the Draft Plan will be reviewed and taken into account before the Plan is submitted for comment, amendment or approval by the Minister. Some changes may arise as a result of the consultation process.

It should be noted that, once the FRMP is finalised, measures involving physical works (e.g., flood protection schemes) will need to be further developed at a local, project level before Exhibition or submission for planning approval. At this stage, local information that can not be captured at the Plan-level of assessment, such as ground investigation results and project-level environmental assessments, may give rise to some amendment of the proposed measure to ensure that it is fully adapted, developed and appropriate within the local context. The measures set out in the Draft FRMP may therefore be subject to some amendment prior to implementation. However, the degree of detail of the assessment undertaken to date would give confidence that such amendments should generally not be significant.
3.2 ELEMENTS OF THE FRMP WITH POTENTIAL TO CAUSE ADVERSE IMPACTS ON EUROPEAN SITES

Table 3.2.1 below summarises the long list of FRM methods that were screened for potential implementation within FRMPs. Screening was undertaken at UoM, sub-catchment, AFA (and potentially sub-AFA) level.

The methods highlighted in green are non-structural policy and administrative based and currently do not include physical works. The methods highlighted in red are considered structural methods, wherein there will an engineered scheme with works required on the ground at a specific geographic location.

The non-structural and structural options have, in general, been retained through the screening process, even though they cannot manage flood risk as a stand-alone method. These will be incorporated later in the process to complement other methods that could manage flood risk. The ‘Do Nothing’ Method would have generally been screened out, as it is likely to increase the flood risk to an area, through abandonment of all FRM activities, and would therefore not be feasible on technical grounds.

A description of high-level environmental impacts that may arise from implementation of each method is provided in Appendix A. These high level impacts were provided to the statutory SEA consultees, progress and steering group members and stakeholders, for consultation as part of the Eastern CFRAM Study SEA scoping in September / October 2015.

Table 3.2.1: Summary of Flood Risk Management Methods

<table>
<thead>
<tr>
<th>Method</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do Nothing</td>
<td>Implement no new flood risk management measures and abandon any existing practices.</td>
</tr>
<tr>
<td>Maintain Existing Regime</td>
<td>Continue with any existing flood risk management practices, such as reactive maintenance.</td>
</tr>
<tr>
<td>Do Minimum</td>
<td>Implement additional minimal measures to reduce the flood risk in specific problem areas without introducing a comprehensive strategy, includes channel or flood defence maintenance works / programme.</td>
</tr>
<tr>
<td>Planning and Development Control</td>
<td>Zoning of land for flood risk appropriate development, prevention of inappropriate incremental development, review of existing Local Authority policies in relation to planning and development and of inter-jurisdictional co-operation within the catchment, etc.</td>
</tr>
<tr>
<td>Building Regulations</td>
<td>Regulations relating to floor levels, flood-proofing, flood resilience, sustainable drainage systems, prevention of reconstruction or redevelopment in flood-risk areas, etc.</td>
</tr>
<tr>
<td>Catchment Wide Sustainable Drainage Systems (SuDS)</td>
<td>Implement SuDS on a catchment wide basis.</td>
</tr>
<tr>
<td>Land Use Management (NFM)</td>
<td>Creation of wetlands, riparian buffer zones, etc.</td>
</tr>
</tbody>
</table>
### Method

<table>
<thead>
<tr>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Necessary floodplain development (proactive integration of structural measures into development designs and zoning, regulation on developer-funded communal retention, drainage and / or protection systems, etc.)</td>
</tr>
<tr>
<td>Installation of a flood forecasting and warning system and development of emergency flood response procedures.</td>
</tr>
<tr>
<td>Targeted public awareness and preparedness campaign.</td>
</tr>
<tr>
<td>Single or multiple site flood water storage, flood retardation, etc.</td>
</tr>
<tr>
<td>In-channel works, floodplain earthworks, removal of constraints / constrictions, channel / floodplain clearance, etc.</td>
</tr>
<tr>
<td>Construct walls, embankments, demountable defences, Rehabilitate and / or improve existing defences, etc.</td>
</tr>
<tr>
<td>Relocation of properties away from flood risk.</td>
</tr>
<tr>
<td>Full diversion / bypass channel, flood relief channel, etc.</td>
</tr>
<tr>
<td>Minor raising of existing defences / levels, infilling gaps in defences, site specific localised protection works, etc.</td>
</tr>
<tr>
<td>Protection / flood-proofing and resilience.</td>
</tr>
</tbody>
</table>

### Structural Methods

3.3 **RELATIONSHIP WITH OTHER RELEVANT PLANS AND PROGRAMMES**

The Eastern CFRAM Study is set in a flood risk management planning context, where plans, projects and activities and their associated SEA and AA requirements are all linked.

Further examination of the UoM10 FRMP in this NIS will take account of the OPW’s obligation to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies – the achievement of the objectives of the regulatory framework for environmental protection and management led by the WFD and implemented by the River Basin Management Plans (RBMPs).

Table 3.3.1 identifies the main significant environmental plans, programmes and legislation, adopted at International, European Community or Member State level, which would be expected to influence, or be influenced by, the Eastern CFRAM Study’s FRMPs. While it is recognised that there are many plans, programmes and legislation that will relate to the FRMPs, it is considered appropriate to only deal with those significant texts, to keep the assessment at a strategic level.
Table 3.3.1: List of Other Plans and Projects with potential for in-Combination Effects

<table>
<thead>
<tr>
<th>Level</th>
<th>Plan / Programme / Legislation</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU Level</td>
<td>▪ EU Floods Directive [2007/60/EC]</td>
</tr>
<tr>
<td></td>
<td>▪ A Blueprint to Safeguard Europe’s Water Resources [COM(2012)673]</td>
</tr>
<tr>
<td></td>
<td>▪ Bathing Water Directive [2006/7/EC]</td>
</tr>
<tr>
<td></td>
<td>▪ Birds Directive [2009/147/EC]</td>
</tr>
<tr>
<td></td>
<td>▪ Bonn Convention [L210, 19/07/1982 (1983)]</td>
</tr>
<tr>
<td></td>
<td>▪ Drinking Water Directive [98/83/EC]</td>
</tr>
<tr>
<td></td>
<td>▪ EIA Directive [85/337/EEC] [2014/52/EU]</td>
</tr>
<tr>
<td></td>
<td>▪ Environmental Liability Directive [2004/35/EC]</td>
</tr>
<tr>
<td></td>
<td>▪ Environmental Quality Standards Directive [2008/105/EC]</td>
</tr>
<tr>
<td></td>
<td>▪ EU Biodiversity Strategy to 2020 [COM(2011)244]</td>
</tr>
<tr>
<td></td>
<td>▪ European Landscape Convention [ETS No. 176]</td>
</tr>
<tr>
<td></td>
<td>▪ Habitats Directive [92/43/EEC]</td>
</tr>
<tr>
<td></td>
<td>▪ Nitrates Directive [91/676/EEC]</td>
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<tr>
<td></td>
<td>▪ SEA Directive [2001/42/EC]</td>
</tr>
<tr>
<td></td>
<td>▪ Sewage Sludge Directive [86/278/EEC]</td>
</tr>
<tr>
<td></td>
<td>▪ Urban Wastewater Treatment Directive [91/271/EEC]</td>
</tr>
<tr>
<td></td>
<td>▪ Water Framework Directive [2000/60/EC]</td>
</tr>
<tr>
<td></td>
<td>▪ World Heritage Convention [WHC-2005/WS/02]</td>
</tr>
<tr>
<td>National Level</td>
<td>▪ Arterial Drainage Maintenance and High Risk Designation Programme 2016-2021 (OPW, 2015)</td>
</tr>
<tr>
<td></td>
<td>▪ Food Harvest 2020 (DAFM, 2010)</td>
</tr>
<tr>
<td></td>
<td>▪ Food Wise 2025 (DAFM, 2015)</td>
</tr>
<tr>
<td></td>
<td>▪ Capital Investment Programme 2014-2016 (Irish Water, 2014)</td>
</tr>
<tr>
<td></td>
<td>▪ Harnessing Our Ocean Wealth: An Integrated Marine Plan for Ireland (Inter-Departmental Marine Coordination Group 2012)</td>
</tr>
<tr>
<td></td>
<td>▪ Irish Geological Heritage (IGH) Programme (GSI 1998-)</td>
</tr>
<tr>
<td></td>
<td>▪ Lead in Drinking Water Mitigation Plan (Irish Water, 2016)</td>
</tr>
<tr>
<td></td>
<td>▪ National Biodiversity Plan (2nd Revision 2011-2016) (DAHG, 2011)</td>
</tr>
<tr>
<td></td>
<td>▪ National Climate Change Adaptation Framework (DEHLG, 2012)</td>
</tr>
<tr>
<td></td>
<td>▪ National Climate Change Strategy 2007-2012 (DEHLG, 2007)</td>
</tr>
<tr>
<td></td>
<td>▪ National (Climate) Mitigation Plan (DECLG, 2012)</td>
</tr>
<tr>
<td></td>
<td>▪ National Forest Policy Review (DAFM, 2014)</td>
</tr>
<tr>
<td></td>
<td>▪ National Secondary Road Needs Study 2011 (NRA, 2011)</td>
</tr>
<tr>
<td></td>
<td>▪ National Sludge Wastewater Sludge Management Plan (Draft) (Irish Water, 2015)</td>
</tr>
<tr>
<td></td>
<td>▪ National Strategic Plan for Sustainable Aquaculture Development (DAFM, 2015)</td>
</tr>
<tr>
<td></td>
<td>▪ Offshore Renewable Energy Development Plan (DCENR, 2014)</td>
</tr>
<tr>
<td></td>
<td>▪ Planning System and Flood Risk Management (OPW, 2009)</td>
</tr>
<tr>
<td></td>
<td>▪ Raised Bog SAC Management Plan (Draft) (DAHG, 2014),</td>
</tr>
<tr>
<td></td>
<td>▪ National Peatland Strategy (Draft) (NPWS, 2014)</td>
</tr>
</tbody>
</table>
### Regional Level

- **Review of Raised Bog Natural Heritage Area Network (NPWS, 2014)**
- **Water Services Strategic Plan (Irish Water, 2014)**

### Sub-Regional

- **UoM10 Flood Risk Management Plan**
- **Draft Transport Strategy for the Greater Dublin Area 2016-2035 (NTA, 2015)**
- **Greater Dublin Strategic Drainage Strategy (DCC, 2005)**
- **South East BAU (Business Area Unit) 2016-2020 (Coilite, 2016)**
- **Water Supply Project Eastern and Midlands Region (WSP) (Irish Water, 2014)**

### Sub-Regional

- **Dún Laoghaire Rathdown County Development Plan 2016 – 2022 (Dun Laoghaire Rathdown County Council, 2015)**
- **Wicklow County Development Plan 2016-2022 (Wicklow County Council, 2015)**
- **Landscape Character Areas Appendix F (Dun Laoghaire Rathdown County Council, 2010)**
- **Wicklow Landscape Assessment Appendix 5 (Wicklow County Council, 2015)**
- **Wind Energy Strategy Appendix 6 (Dun Laoghaire Rathdown County Council, 2016)**
- **Wicklow County Wind Energy Strategy Appendix 1 (Wicklow County Council, 2008)**
- **Dún Laoghaire Rathdown Local Economic and Community Plan 2016-2021 (Dun Laoghaire Rathdown County Council, 2015)**
- **Brittas Bay, County Wicklow Groundwater Vulnerability and Quality (GSI, 2003)**
- **Wicklow Heritage Plan 2009-2014 (Wicklow County Council, 2009)**
- **Dún Laoghaire Rathdown County Council Housing Strategy 2010-2016 Appendix B (Dun Laoghaire Rathdown County Council, 2010)**
- **Ashford Local Area Plan 2008-2014 (Wicklow County Council, 2008)**
- **Bray Environs Local Area Plan 2009 – 2015 (Wicklow County Council, 2009)**
- **Deansgrange Local Area Plan 2010-2020 (Dun Laoghaire Rathdown County Council, 2010)**
- **Rathdrum Local Area Plan 2006 - 2016 (Wicklow County Council, 2006)**
- **County Wicklow Diversity Action Plan 2010-2015 (Wicklow County Council, 2010)**
- **Dún Laoghaire Rathdown Biodiversity Plan 2009-2013 (Dun Laoghaire Rathdown, 2009)**
3.4 EUROPEAN SITES

Special Areas of Conservation (SACs) are prime wildlife conservation areas, considered to be important on a European as well as Irish level. Most SACs are in rural areas, although a few sites reach into town or city landscapes, such as Dublin Bay and Cork Harbour.

SACs are selected under the Habitats Directive for the conservation of a number of habitat types, which in Ireland includes raised bogs, blanket bogs, turloughs, sand dunes, machair (flat sandy plains on the north and west coasts), heaths, lakes, rivers, woodlands, estuaries and sea inlets. There are 25 species of flora and fauna, including Salmon, Otter, Freshwater Pearl Mussel, Bottlenose Dolphin and Killarney Fern that are also afforded protection. These are known as Annex I habitats (including priority types which are in danger of disappearance) and Annex II species (other than birds).

The areas chosen as SAC in Ireland cover an area of approximately 13,500km². Roughly 53% is land, the remainder being marine or large lakes. Across the EU, over 12,600 sites have been identified and proposed, covering 420,000km² of land and sea, an area the size of Germany.

Special Protection Areas, (SPAs) are conservation areas which are important sites for rare and vulnerable birds (as listed on Annex I of the Birds Directive), and/or for regularly occurring migratory species. SPAs are designated under the ‘Birds Directive’ (Council Directive 2009/147/EC - codified version of Directive 79/409/EEC on the Conservation of Wild Birds, as amended).

Ireland’s SPA Network encompasses over 5,700km² of marine and terrestrial habitats. The marine areas include some of the productive intertidal zones of bays and estuaries that provide vital food resources for several wintering wader species. Marine waters adjacent to breeding seabird colonies and other important areas for seaducks, divers and grebes are also included in the network. The remaining areas of the SPA network include inland wetland sites important for wintering waterbirds and extensive areas of blanket bog and upland habitats that provide breeding and foraging resources for species including Merlin and Golden Plover. Agricultural land also represents a share of the SPA network, ranging from the extensive farmland of upland areas where its hedgerows, wet grassland and scrub offer feeding and/or breeding opportunities for Hen Harrier to the intensively farmed coastal polderland where internationally important numbers of swans and geese occur. Coastal habitats including Machair are also represented in the network, which are of high importance for Chough and breeding Dunlin.

3.4.1 Initial Screening Exercise

3.4.1.1 Capture of Sites for Screening – RBD/Study Scale

As recommended in the Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities (DEHLG, 2010), all European sites within the Eastern CFRAM Study area and within a 15 kilometre buffer of the Study area were included in the initial capture for AA screening.

The DEHLG Guidance also recommends that sites beyond this distance should also be considered where there are hydrological linkages or other pathways that extend beyond 15 km thereby ensuring that all potentially affected European sites are included in the screening process.
It is acknowledged that as the nature of the FRMPs includes the potential to impact water quality and/or quantity, there is thus the potential for ecological receptors (particularly those that are water dependent) to experience potential impacts at distances even greater than 15km from the source. In the Eastern CFRAM Study, each Unit of Management represents a single Hydrometric Area, each of which, generally speaking, has its river sources rising in an upland area and terminating at the coastline. The boundary of the Hydrometric Area represents a defined watershed, beyond which watercourses drain into a different river basin and to a different part of the coastline. The limit of the CFRAM Study Area therefore incorporates a tangible boundary for hydraulic and hydrological impacts. The OPW recognises that there are other potential impact pathways other than hydraulic/hydrological pathways for ecological receptors, such as groundwater, land and air and that mobile species, in particular birds, may range for distances beyond 15km.

As discussed in 0, for the CFRAM Study, desktop information and information received during the consultation was used in an iterative process with the AA and SEA to inform the preliminary screening of Methods which examines technical, economic, social and environmental aspects before subjecting the selected Options to detailed Multi-Criteria Analysis (MCA). In this way, Methods or Options which pose a high risk of significant adverse impacts can be ruled out in the earliest stages of Option development, therefore ensuring that, using the information available at plan level, Options which were considered likely to generate impacts that extend their influence more than 15km beyond the limits of the Eastern CFRAM Study area were not taken forward for MCA to the FRMPs. Thus it was not considered necessary at Study or Plan level to include sites further than 15km from the source.

The potential physical flood relief works or 'Schemes' set out in the Plans that have been developed through the CFRAM Programme are to an outline design, and are not at this point ready for construction. Further option design through a project-level of assessment will be required for such works before implementation.

At the project level, where physical measures are to be developed, local information that can not be captured at the Plan-level of assessment, such as project-level environmental surveys and assessments, will be used to inform the Appropriate Assessment of the potential physical flood relief works or 'Schemes'. The capture of additional local information may result in the identification of European sites within the Scheme's Zone of Influence that were not apparent during the plan screening process.

The initial site selection exercise was carried using the ESRI ArcMap GIS package, into which was loaded the most recently issued boundary shapefiles for all SACs and SPAs in Ireland, each respectively downloaded from the NPWS9 website. These were cross-referenced against the boundary shapefile for the Eastern CFRAM Study area. A search area of 15km from the boundary of the Eastern CFRAMs Study area was applied and all European sites either wholly or partially within this search area were captured. This exercise is illustrated in Figure 3.4.1, which shows the extents of the preliminary search area and the outlines of all the SAC and SPA areas within and adjacent to the Eastern CFRAM Study area.

The initial selection exercise for the Eastern CFRAM Study resulted in a total of 78 European sites being captured for screening.

Figure 3.4.1: Eastern CFRAM Study Area, showing AFAs and Study-Scale Search Area for European Sites
3.4.1.2 European Site Screening – Plan Scale

The UoM SSA refers to a full hydrometric area. At this scale, methods that could provide benefits to multiple, often all, AFAs within the Unit of Management and other areas were considered, along with the spatial and temporal coherence of methods being considered at smaller SSAs.

As discussed above in Chapter 3.1.3, each UoM has its own draft FRMP and thus the screening of European sites was grouped by UoM in the overall Study Scale AA Screening Report (IBE0600Rp0036, 2016).

The capture of sites to be screened for each FRMP area was carried out the same way as the methodology for capturing the sites to be screened-in the overall CFRAM Study, described above in 3.4.1.1. Each FRMP coverage area (i.e. each Unit of Management) was queried against the shapefiles for all Irish SACs and SPAs in ESRI ArcMap and all sites within 15km of each FRMP coverage area were captured for screening. The rationale for limiting the scope of the FRMP-scale capture area to 15km has been previously discussed in 3.4.1.1.

3.4.1.3 European Site Screening – Establishment of the ‘Zone of Influence’

For each UoM/FRMP area, every European site captured by the GIS exercise described in 3.4.1.2 above was examined individually.

A ‘Zone of Influence’ was established for each European site. The ‘Zone of Influence’ for each site automatically comprised all areas within 15km of the European site. As hydrological impacts are a possibility, it also included all catchment areas located upstream of the European site to the top of the catchment and any watercourses downstream of the European site. This was achieved by manually examining hydraulic data, specifically EPA datasets for WFD catchment areas, sub-basin catchments and watercourses.

For the reasons listed above in 3.4.1.1, it was not considered necessary at plan level to extend the ‘Zone of Influence’ for coastal sites beyond 15km. At project level, additional data capture such as hydrographic field surveys and hydrodynamic modelling will be used in identifying the extent of the influence of any coastal Scheme and informing the project level AA.

Every AFA (regardless of distance) located within the Zone of Influence for each European site was examined for potential connectivity pathways (both hydraulic and ecological) with the European site.

For purposes of reporting, distances were calculated using the ‘near table’ tool in ArcMap which measured the distance between each European site and the nearest point of each AFA (note: not the nearest point of the AFA’s catchment, but as the AFA itself is likely to be the focus of any FRM activity this was gauged to be the most appropriate site for initiating measurements). The tool produced a spreadsheet listing the distance between each European site and each AFA boundary. All distances quoted in the screening tables have been derived from the “near table” tool.
3.4.1.4 European Sites—Selection for Preliminary Screening of Methods & Options

The risk of adverse impact on the European sites was evaluated by examining their location in relation to the AFA boundaries and, in the case of those AFAs at risk of fluvial flooding, the entire extents of their upstream catchments and downstream watercourses.

The relationship between the AFAs (including their upstream catchments and downstream reaches) and each of the European sites was individually reviewed by an experienced assessor. Consideration was given to whether any potential impact pathway between the AFA and the European Site could be identified, either by a hydraulic connection or by virtue of an ecological stepping stone or biodiversity corridor.

As this exercise took place during the ‘Preliminary Screening’ phase of development of the draft FRMP (see Figure 3.1.3 on page 14), the selection of European sites to be considered for assessment took into account all of the potential FRM methods included in the “long list” of FRM methods shown earlier in Table 3.2.1 (also discussed in more detail in Appendix A) and the potential for any of these methods to result in impacts to any of the European sites, either alone or in combination with other methods. The assessment reviewed the potential for:

- Direct Impacts, examples of which include (but are not limited to):
  - A construction footprint within the boundary of a European site, or
  - A construction footprint outside a European site but which may obstruct the passage of a qualifying interest in accessing a European Site.

- Indirect Impacts, example of which include (but are not limited to):
  - Short term water quality impacts associated with construction works, for example, suspended sediment and sedimentation impacts;
  - Changes to existing hydrological and morphological regimes.

It should be noted that the FRMP is a strategic-level study, and the exact location and design of FRM measures at each AFA has not been decided. Further assessment and quantification of potential impacts will be made at the project stage.

The likely significance of effects on the European sites from the implementation of FRM measures at each of the AFAs, or in their catchments/sub catchments, taking into account their qualifying interests and conservation objectives, was assessed taking into account the source-pathway-receptor model. Site-specific conservation objectives for designated habitats/species, which are included in Appendix C, were taken into account insofar as plan-level details allowed. The project-level assessment will be undertaken based on fully-developed outline designs and site surveys to further consider the attributes and targets of site specific conservation objectives.

The source is defined as the individual element of the plan (at this stage, the source is each/any of the Methods, but when each FRMP has been developed, the source will be each of the chosen Measures) that has the potential to impact on a European site, its qualifying interests and its conservation objectives. The pathway is defined as the means or route by which a source can migrate to the receptor. For the Eastern CFRAM Study the pathways for potential impacts are primarily hydraulic, i.e. via watercourses and hydrological catchments, but the potential for linkages by other means (e.g. via an ecological stepping stone or biodiversity corridor) was also examined.
during the screening process. The receptor is defined as the European site and its qualifying interests. Each element can exist independently, however a potential impact is created where there is a linkage between the source, pathway and receptor.

NPWS guidance recommends that appropriate assessment screening is informed by the conservation condition of the qualifying interest/s of a European site, however as this screening covered an entire plan area rather than individual projects within the plan, the condition of the qualifying interest was not considered to be relevant at this stage, as the purpose of the screening was to identify which European sites may be at risk of experiencing impacts and not, at that stage, assessing the potential significance of any potential impacts.

Each European site was individually reviewed to identify whether there were potential impact pathways, via surface water, groundwater, land or air, evident from FRM methods to be employed at any of the AFAs (or in the catchment of any AFAs) in the Eastern CFRAM Study area. This included analysing river and stream network, topographic and catchment datasets to ascertain the presence or absence of hydraulic linkages between AFAs and European sites and also examining the potential for impacts on other areas of biodiversity value, such as NHAs (or pNHAs), wildfowl reserves or nature reserves, which may provide a stepping stone between European sites, or wider areas where mobile qualifying interests (e.g. migratory fish or birds) may be affected by changes, outside the boundary of the designated area.

A total of 51 SACs and 27 SPAs were identified as being within, or within 15km of, the Eastern CFRAM Study area. Of these, 33 European sites (23 SACs and 10 SPAs) were identified within the Screening Search Area of UoM10 (see Figure 3.5.1). All these sites were included in the screening process for the UoM10 FRMP.

Where no apparent linkages or relationships were found between the European site and the AFA or its modelled catchment, a conclusion of “no identifiable impact pathway” was drawn and the site was eliminated from the screening process. Where a connectivity or linkage was possible, the precautionary principle was applied and the site was retained in the screening and was recommended for further assessment (which may include appropriate assessment) at the draft FRMP stage.

The Preliminary Options Reports for each UoM were used to help define the upstream limits of the AFA’s influence. As part of the Optioneering process for each FRMP, Spatial Scales of Assessment (SSAs) have been developed for each UoM (see Chapter 4.2). For some UoMs, the upstream/upcatchment storage FRM method has already been ruled out at this stage and therefore it was possible to rule out potential impacts on European sites from upcatchment FRM methods during the AA screening. In UoMs where upstream/upcatchment FRM methods have not been ruled out, all upcatchment areas were retained in the screening process.

No specific distance limit was applied to downstream impacts and these were reviewed on a case-by-case basis.

The more detailed summaries of the preliminary screening exercise carried out for the European sites considered to be potentially influenced by FRM methods used in UoM10 are presented in Appendix B.
The ‘Natura 2000 Standard Data Form’, ‘Conservation Objectives’ and ‘Site Synopsis’ documents for each of the European sites can be found on the National Parks & Wildlife Service website\textsuperscript{10}, along with other relevant survey information and documents for each site. For each of the European Sites identified in the screening process these documents were downloaded and were used to inform the screening.

\textsuperscript{10} \url{http://www.npws.ie/protectedsites/} (accessed 5\textsuperscript{th} and 6\textsuperscript{th} October 2015)
3.5 PRELIMINARY SCREENING RESULTS FOR UOM10

There were 33 European sites (23 SACs and 10 SPAs) found within the Screening Search Area of UoM10 (see Figure 3.5.1).

All European sites in the search area were screened for possible impacts from all FRM methods at all AFAs in UoM10. The results of the screening exercise are summarised in Table 3.5.1 and Table 3.5.2.

Figure 3.5.1: UoM10 European Sites incorporated in the Preliminary Screening of Methods & Options for the FRMP
Table 3.5.1: European Sites screened for UoM10

<table>
<thead>
<tr>
<th>Site Name</th>
<th>Site Code</th>
<th>County</th>
<th>UoM</th>
<th>Water Dependent</th>
<th>AFAs within Zone of potential Influence of European Site</th>
<th>AFAs that have an Identifiable Impact Pathway to European Site</th>
<th>Screened Out?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Baldoyle Bay SAC</td>
<td>000199</td>
<td>Dublin</td>
<td>9</td>
<td>Yes</td>
<td>None</td>
<td>None</td>
<td>Yes</td>
</tr>
<tr>
<td>2 Baldoyle Bay SPA</td>
<td>004016</td>
<td>Dublin</td>
<td>9</td>
<td>Yes</td>
<td>None</td>
<td>None</td>
<td>Yes</td>
</tr>
<tr>
<td>3 Ballyman Glen SAC</td>
<td>000713</td>
<td>Dublin/Wicklow</td>
<td>10</td>
<td>Yes</td>
<td>Bray (0.0km), Greystones (5.5km), Kilcoole (10.0km), Loughlinstown (4.6km), Newcastle (13.7km), Old Connaught &amp; Wilford (0.0km)</td>
<td>Bray, Old Connaught &amp; Wilford</td>
<td>No</td>
</tr>
<tr>
<td>4 Bray Head SAC</td>
<td>000714</td>
<td>Wicklow</td>
<td>10</td>
<td>Yes</td>
<td>Ashford/Rathnew (14.8km), Bray (0.0km), Greystones (0.0km), Kilcoole (3.6km), Loughlinstown (5.5km), Newcastle (8.3km), Old Connaught &amp; Wilford (2.1km)</td>
<td>Bray, Greystones</td>
<td>No</td>
</tr>
<tr>
<td>5 Buckroney-Brittas Dunes and Fen SAC</td>
<td>000729</td>
<td>Wicklow</td>
<td>10</td>
<td>Yes</td>
<td>Ashford/Rathnew (10.1km), Aughrim (13.5km), Avoca (5.8km), Wicklow (6.8km)</td>
<td>None</td>
<td>Yes</td>
</tr>
<tr>
<td>6 Carriggower Bog SAC</td>
<td>000716</td>
<td>Wicklow</td>
<td>10</td>
<td>Yes</td>
<td>Ashford/Rathnew (9.0km), Bray (8.0km), Greystones (5.0km), Kilcoole (5.0km), Loughlinstown (15.0km), Newcastle (5.3km), Old Connaught &amp; Wilford (10.0km), Wicklow (13.0km)</td>
<td>None</td>
<td>Yes</td>
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<tr>
<td>7 Dalkey Islands SPA</td>
<td>004172</td>
<td>Dublin</td>
<td>9</td>
<td>Yes</td>
<td>Bray (6.5km), Greystones (11.4km), Kilcoole (15.6km), Loughlinstown (2.8km), Old Connaught &amp; Wilford (4.5km)</td>
<td>None</td>
<td>Yes</td>
</tr>
<tr>
<td>8 Deputy's Pass Nature Reserve SAC</td>
<td>000717</td>
<td>Wicklow</td>
<td>10</td>
<td>Yes</td>
<td>Ashford/Rathnew (5.5km), Aughrim (13.9km), Avoca (9.9km), Newcastle (12.6km), Wicklow (5.3km)</td>
<td>None</td>
<td>Yes</td>
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<tr>
<td>9 Glen of the Downs SAC</td>
<td>000719</td>
<td>Wicklow</td>
<td>10</td>
<td>Yes</td>
<td>Ashford/Rathnew (11.3km), Bray (3.5km), Greystones (0.5km), Kilcoole (2.0km), Loughlinstown (11.0km), Newcastle (5.2km), Old Connaught &amp; Wilford (6.2km), Wicklow (14.2km)</td>
<td>Greystones</td>
<td>No</td>
</tr>
<tr>
<td>Site Name</td>
<td>Code</td>
<td>County</td>
<td>UoM</td>
<td>Water Dependent</td>
<td>AFAs within Zone of potential Influence of European Site</td>
<td>AFAs that have an Identifiable Impact Pathway to European Site</td>
<td>Screened Out?</td>
</tr>
<tr>
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</tr>
<tr>
<td>Glenasmole Valley SAC</td>
<td>001209</td>
<td>Dublin</td>
<td>9</td>
<td>Yes</td>
<td>Bray (13.2km), Loughlinstown (14.4km) and Old Connaught &amp; Wilford (13.6km)</td>
<td>None</td>
<td>Yes</td>
</tr>
<tr>
<td>Holdenstown Bog SAC</td>
<td>1757</td>
<td>Outside</td>
<td>Yes</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>Yes</td>
</tr>
<tr>
<td>Howth Head Coast SPA</td>
<td>004113</td>
<td>Dublin</td>
<td>9</td>
<td>Yes</td>
<td>Loughlinstown (12.8km) and Old Connaught &amp; Wilford (14.8km)</td>
<td>None</td>
<td>Yes</td>
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<tr>
<td>Howth Head SAC</td>
<td>000202</td>
<td>Dublin</td>
<td>9</td>
<td>Yes</td>
<td>Loughlinstown (12.3km), Old Connaught &amp; Wilford (14.6km)</td>
<td>None</td>
<td>Yes</td>
</tr>
<tr>
<td>Ireland's Eye SAC</td>
<td>002193</td>
<td>Dublin</td>
<td>9</td>
<td>Yes</td>
<td>None</td>
<td>None</td>
<td>Yes</td>
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<tr>
<td>Ireland's Eye SPA</td>
<td>004117</td>
<td>Dublin</td>
<td>9</td>
<td>Yes</td>
<td>None</td>
<td>None</td>
<td>Yes</td>
</tr>
<tr>
<td>Kilpatrick Sandhills SAC</td>
<td>001742</td>
<td>Wexford</td>
<td>10</td>
<td>Yes</td>
<td>Avoca (12.5km)</td>
<td>None</td>
<td>Yes</td>
</tr>
<tr>
<td>Knocksink Wood SAC</td>
<td>000725</td>
<td>Dublin / Wicklow</td>
<td>10</td>
<td>Yes</td>
<td>Bray (0.7km), Greystones (6.5km), Kilcoole (10.4km), Loughlinstown (5.6km), Newcastle (13.7km), Old Connaught &amp; Wilford (1.7km)</td>
<td>Bray</td>
<td>No</td>
</tr>
<tr>
<td>Magherabeg Dunes SAC</td>
<td>001766</td>
<td>Wicklow</td>
<td>10</td>
<td>Yes</td>
<td>Ashford/Rathnew (6.7km), Avoca (12.7km), Newcastle (13.8km), Wicklow (3.0km)</td>
<td>None</td>
<td>Yes</td>
</tr>
<tr>
<td>North Bull Island SPA</td>
<td>004006</td>
<td>Dublin</td>
<td>9</td>
<td>Yes</td>
<td>Bray (15.1km), Loughlinstown (10.5km) and Old Connaught &amp; Wilford (13.0km), Kilcoole (24.9 km)</td>
<td>Kilcoole</td>
<td>Yes</td>
</tr>
<tr>
<td>North Dublin Bay SAC</td>
<td>000206</td>
<td>Dublin</td>
<td>9</td>
<td>Yes</td>
<td>Bray (15.1km), Loughlinstown (10.5km) and Old Connaught &amp; Wilford (13.1km)</td>
<td>None</td>
<td>Yes</td>
</tr>
<tr>
<td>Poulaphouca Reservoir SPA</td>
<td>004063</td>
<td>Kildare</td>
<td>9</td>
<td>Yes</td>
<td>None</td>
<td>None</td>
<td>Yes</td>
</tr>
<tr>
<td>Red Bog, Kildare SAC</td>
<td>000397</td>
<td>Kildare</td>
<td>9</td>
<td>Yes</td>
<td>None</td>
<td>None</td>
<td>Yes</td>
</tr>
<tr>
<td>Rockabill to Dalkey Island SAC</td>
<td>003000</td>
<td>Dublin</td>
<td>0</td>
<td>Yes</td>
<td>Bray (4.1km), Greystones (9.1km), Kilcoole (13.0km), Loughlinstown (1.5km) and Old Connaught &amp; Wilford (2.3km)</td>
<td>None</td>
<td>Yes</td>
</tr>
<tr>
<td>Site Name</td>
<td>Site Code</td>
<td>County</td>
<td>UoM</td>
<td>Water Dependent</td>
<td>AFAs within Zone of potential Influence of European Site</td>
<td>AFAs that have an Identifiable Impact Pathway to European Site</td>
<td>Screened Out?</td>
</tr>
<tr>
<td>----------------------------------------</td>
<td>------------</td>
<td>-----------------</td>
<td>-----</td>
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<td>----------------------------------------------------------</td>
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</tr>
<tr>
<td>Slaney River Valley SAC</td>
<td>000781</td>
<td>Carlow/ Wicklow/ Wexford</td>
<td>12</td>
<td>Yes</td>
<td>Aughrim (9.3km), Avoca (13.8km)</td>
<td>None</td>
<td>Yes</td>
</tr>
<tr>
<td>South Dublin Bay and River Tolka Estuary SPA</td>
<td>004024</td>
<td>Dublin</td>
<td>9</td>
<td>Yes</td>
<td>Bray (9.7km), Greystones (15.1km), Loughlinstown (5.1km), Old Connaught &amp; Wilford (7.8km), Kilcoole (19.7 km)</td>
<td>Kilcoole</td>
<td>Yes</td>
</tr>
<tr>
<td>South Dublin Bay SAC</td>
<td>000210</td>
<td>Dublin</td>
<td>9</td>
<td>Yes</td>
<td>Bray (9.8km), Greystones (15.2km), Loughlinstown (5.2km), Old Connaught &amp; Wilford (7.9km)</td>
<td>None</td>
<td>Yes</td>
</tr>
<tr>
<td>The Murrough SPA</td>
<td>004186</td>
<td>Wicklow</td>
<td>10</td>
<td>Yes</td>
<td>Ashford/Rathnew (0.0km), Bray (8.4km), Greystones (2.5km), Kilcoole (0.0km), Newcastle (0.0km), Old Connaught &amp; Wilford (12.0km) , Wicklow (0.0km)</td>
<td>Ashford/Rathnew, Greystones, Kilcoole, Newcastle, Wicklow</td>
<td>No</td>
</tr>
<tr>
<td>The Murrough Wetlands SAC</td>
<td>002249</td>
<td>Wicklow</td>
<td>10</td>
<td>Yes</td>
<td>Ashford/Rathnew (0.0km), Bray (7.4km), Greystones (1.6km), Kilcoole (0.0km), Loughlinstown (15.1km), Newcastle (0.0km) , Old Connaught &amp; Wilford (11.0km) , Wicklow (0.0km)</td>
<td>Ashford/Rathnew, Greystones, Kilcoole, Newcastle, Wicklow</td>
<td>No</td>
</tr>
<tr>
<td>Vale of Clara (Rathdrum Wood) SAC</td>
<td>000733</td>
<td>Wicklow</td>
<td>10</td>
<td>Yes</td>
<td>Ashford/Rathnew (7.2km), Aughrim (9.9km), Avoca (8.3km), Newcastle (13.4km), Wicklow (8.6km)</td>
<td>None</td>
<td>Yes</td>
</tr>
<tr>
<td>Wicklow Head SPA</td>
<td>004127</td>
<td>Wicklow</td>
<td>10</td>
<td>Yes</td>
<td>Ashford/Rathnew (2.9km), Kilcoole (13.1km), Newcastle (9.0km), Wicklow (0.0km)</td>
<td>Wicklow</td>
<td>No</td>
</tr>
<tr>
<td>Wicklow Mountains SAC</td>
<td>002122</td>
<td>Dublin/ Wicklow</td>
<td>9,10</td>
<td>Yes</td>
<td>Ashford/Rathnew (8.3km), Aughrim (10.1km), Avoca (13.8km), Bray (4.1km), Greystones (7.4km), Kilcoole (8.8km), Loughlinstown (7.8km), Newcastle (9.6km), Old Connaught &amp; Wilford (4.9km) , Wicklow (12.4km)</td>
<td>None</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Site Name</td>
<td>Site Code</td>
<td>County</td>
<td>UoM</td>
<td>Water Dependent</td>
<td>AFAs within Zone of potential Influence of European Site</td>
<td>AFAs that have an Identifiable Impact Pathway to European Site</td>
</tr>
<tr>
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<td>-----</td>
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</tr>
<tr>
<td>32</td>
<td>Wicklow Mountains SPA</td>
<td>004040</td>
<td>Dublin/Wicklow</td>
<td>9,10,12</td>
<td>Yes</td>
<td>Ashford/Rathnew (10.3km), Aughrim (10.1km), Avoca (13.8km), Bray (4.6km), Greystones (7.1km), Kilcoole (8.8km), Loughlinstown (7.9km), Newcastle (9.6km), Old Connaught &amp; Wilford (5.4km), Wicklow (14.0km)</td>
<td>None</td>
</tr>
<tr>
<td>33</td>
<td>Wicklow Reef SAC</td>
<td>002274</td>
<td>Wicklow</td>
<td>10</td>
<td>Yes</td>
<td>Ashford/Rathnew (4.4km), Greystones (16.0km), Kilcoole (12.5km), Newcastle (8.3km), Wicklow (0.9km)</td>
<td>Wicklow</td>
</tr>
</tbody>
</table>
3.5.1 Conclusion of UoM10 Preliminary Screening Results

The likely significant effects that may arise from the UoM10 FRMP were examined in the context of all factors that could potentially affect the integrity of the European sites within the plan area and beyond.

On the basis of the findings of the Screening for Appropriate Assessment, it was concluded that the FRMP for UoM10:

i. Is not directly connected with or necessary to the management of a European site; and

ii. May have significant impacts on a European site

There were a total of 33 European sites (17 SACs and 8 SPAs) which were within the identified screening search area for UoM10 and which were used to inform the preliminary options assessment of the draft UoM10 FRMP.

A total of 23 European sites, including 17 SACs and six SPAs were found to have no identifiable impact pathway associated with the implementation of FRM methods within the AFAs and were thus not at any risk of impacts. These were therefore scoped out as not requiring any further assessment in the NIS. Details of each site and the consideration of potential impacts from FRM methods are presented in Appendix B.

From the information available at the preliminary options assessment stage, it could not be concluded following screening that the UoM10 FRMP would not have significant effects on the European sites identified, as sufficient uncertainty remained due to gaps in information.

Ten European sites (six SACs and four SPAs) were assessed as having the potential to experience an impact from the implementation of FRM methods in the catchments of one or more of seven AFAs in UoM10 - see Table 3.5.2. Further assessment was recommended to assess the significance of these impacts including, where relevant, Stage 2 Appropriate Assessment, following the establishment of the Preferred Option for the draft FRMP.
Table 3.5.2: UoM10 AFA\s requiring further Assessment (Appropriate Assessment) at FRMP stage

<table>
<thead>
<tr>
<th>AFA with Identifiable Impact Pathway to European Site</th>
<th>European Site</th>
<th>Site Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ashford &amp; Rathnew</td>
<td>The Murrough SPA</td>
<td>004186</td>
</tr>
<tr>
<td></td>
<td>The Murrough Wetlands SAC</td>
<td>002249</td>
</tr>
<tr>
<td>Bray</td>
<td>Ballyman Glen SAC</td>
<td>000713</td>
</tr>
<tr>
<td></td>
<td>Bray Head SAC</td>
<td>000714</td>
</tr>
<tr>
<td></td>
<td>Knocksink Wood SAC</td>
<td>000725</td>
</tr>
<tr>
<td>Greystones</td>
<td>Bray Head SAC</td>
<td>000714</td>
</tr>
<tr>
<td></td>
<td>Glen of the Downs SAC</td>
<td>000719</td>
</tr>
<tr>
<td></td>
<td>The Murrough SPA</td>
<td>004186</td>
</tr>
<tr>
<td></td>
<td>The Murrough Wetlands SAC</td>
<td>002249</td>
</tr>
<tr>
<td>Kilcoole</td>
<td>The Murrough SPA</td>
<td>004186</td>
</tr>
<tr>
<td></td>
<td>The Murrough Wetlands SAC</td>
<td>002249</td>
</tr>
<tr>
<td></td>
<td>North Bull Island SPA</td>
<td>004006</td>
</tr>
<tr>
<td></td>
<td>South Dublin Bay and River Tolka Estuary SPA</td>
<td>004024</td>
</tr>
<tr>
<td>Newcastle</td>
<td>The Murrough SPA</td>
<td>004186</td>
</tr>
<tr>
<td></td>
<td>The Murrough Wetlands SAC</td>
<td>002249</td>
</tr>
<tr>
<td>Old Connaught &amp; Wilford</td>
<td>Ballyman Glen SAC</td>
<td>000713</td>
</tr>
<tr>
<td>Wicklow</td>
<td>The Murrough SPA</td>
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<tr>
<td></td>
<td>The Murrough Wetlands SAC</td>
<td>002249</td>
</tr>
<tr>
<td></td>
<td>Wicklow Head SPA</td>
<td>004127</td>
</tr>
<tr>
<td></td>
<td>Wicklow Reef SAC</td>
<td>002274</td>
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</tbody>
</table>
4 SUMMARY OF PROPOSED MEASURES

This Chapter provides a summary of the measures that are proposed for inclusion in the FRMP for UoM10.

4.1 UOM-SCALE FLOOD MANAGEMENT MEASURES

There are certain prevention and preparedness measures related to flood risk management that form part of wider Government policy. These measures should be applied across the whole UoM, including all AFAs. These methods are summarised below and described in 4.1.1 to 4.1.13. These strategic alternatives that will be implemented on a national scale are non-structural, with no actual physical action to take place in a specific geographic location following implementation of the FRMP.

Those non-structural/policy-based measures shown below will have no physical outcome or are an existing process and so they cannot be assessed for impacts in this NIS. The next stage of development of these future plans and policies would be environmentally neutral, however in some cases they may need taken into account for in-combination and cumulative impacts.

- Sustainable Planning and Development Management - Proper application of the Guidelines on the Planning System and Flood Risk Management by the planning authorities;
- Sustainable Urban Drainage Systems (SuDS);
- Voluntary Home Relocation;
- Local Adaptation Planning;
- Land Use Management and Natural Flood Risk Management Measures;
- Maintenance of Arterial Drainage Schemes;
- Maintenance of Drainage Districts;
- Flood Forecasting and Warning;
- Review of Emergency Response Plans for Severe Weather;
- Promotion of Individual and Community Resilience;
- Individual Property Protection;
- Flood-Related Data Collection, and
- Minor Works Scheme.

As described in Chapter 3.2 the ‘Do-Nothing’ scenario was considered from the outset as one of the FRM methods considered. Each area to be assessed from UoM to AFA scale has therefore had the Do-Nothing method assessed as a potential alternative to the Plan. In general, this has been ruled out as an option however, as it would not achieve the stated objectives of the FRMP to manage flood risk within the UoM.

4.1.1 Sustainable Planning and Development Management

The proper application of the Guidelines on the Planning System and Flood Risk Management by the planning authorities is essential to avoid inappropriate development in flood prone areas, and hence avoid unnecessary increases in flood risk into the future. The flood mapping provided as part of the FRMP will facilitate the application of the Guidelines. The Planning Authorities will ensure proper application of the Guidelines on the Planning System and Flood Risk Management (DECLG/OPW, 2009) in all planning and development management processes and decisions in order to support
sustainable development. In UoM10 this option is considered environmentally neutral as it is a policy option to prevent inappropriate development. This policy cannot be assessed for impacts.

4.1.2 Sustainable Urban Drainage Systems (SuDS)

Sustainable Urban Drainage Systems (SuDS) can play a role in reducing and managing run-off from new developments to surface water drainage systems, reducing the impact of such developments on flood risk downstream, as well as improving water quality and contributing to local amenity. In accordance with the Guidelines on the Planning System and Flood Risk Management (DECLG/OPW, 2009), planning authorities should seek to reduce the extent of hard surfacing and paving and require the use of sustainable drainage techniques. In UoM10 this option is considered environmentally neutral as it is a policy option to improve the sustainability of future development. This policy cannot be assessed for impacts.

4.1.3 Voluntary Home Relocation

In extreme circumstances, the flood risk to an area where there is already some development may be such that continuing to live in the area is not acceptable to the owners, and it may not be viable or acceptable to take measures to reduce the flooding of the area. The home-owner may choose to relocate out of such areas will remove the risk.

The Inter-Departmental Flood Policy Coordination Group will consider the policy options around voluntary home relocation for consideration by Government.

This method is applicable throughout UoM10. This option is considered environmentally neutral as it is a potential assessment of policy options. This policy cannot be assessed for impacts in the NIS.

4.1.4 Local Adaptation Planning

The consultation document on the NCCAF recognises that local authorities also have an important role to play in Ireland’s response to climate adaptation. Given the potential impacts of climate change on flooding and flood risk, the local authorities should take fully into account these potential impacts in the performance of their functions, in particular in the consideration of spatial planning and the planning and design of infrastructure. Local authorities should take into account the potential impacts of climate change on flooding and flood risk in their planning for local adaptation, in particular in the areas spatial planning and the planning and design of infrastructure.

This method is applicable throughout UoM10. The option is considered environmentally neutral as it is a policy option to prepare Adaptation Plans at local scale. This option this therefore not included in the appropriate assessment. This policy cannot be assessed for impacts in the NIS.

4.1.5 Land Use Management and Natural Flood Risk Management Measures

The OPW is liaising with the EPA on the potential impact of WFD measures on flood risk, which are typically neutral (no impact), or may have some benefit in reducing runoff rates and volumes (e.g., through agricultural measures such as minimising soil compaction, contour farming or planting, or the installation of field drain interception ponds). The OPW will continue to work with the EPA and
other agencies implementing the WFD to identify, where possible, measures that will have benefits for both WFD and flood risk management objectives, such as natural water retention measures, and also biodiversity and potentially other objectives. It is anticipated that this is most likely to be achieved in areas where phosphorous loading is a pressure on ecological status in a sub-catchment where there is also an identified potentially significant flood risk (i.e., an AFA). This coordination will also address measures that may otherwise cause conflict between the objectives of the two Directives.

This method is applicable throughout UoM10. The option has the potential for both positive and negative environmental impacts; however the next stage of implementation of land use management and natural flood management following from the FRMP will be further assessment and feasibility studies. At this early stage in its development the policy cannot assessed for impacts in the NIS.

**4.1.6 Maintenance of Arterial Drainage Schemes**

Following the passing of the Arterial Drainage Act, 1945, the OPW began investigations to determine where Arterial Drainage Schemes would be suitable and economically viable. The implementation of the Schemes began in the late-1940s and continued into the early-1990s, and a total of 11,500kms of river channel now form part of the Arterial Drainage Schemes, that also include 800km of embankments.

While new Arterial Drainage Schemes are no longer being undertaken, the OPW has a statutory duty to maintain the completed schemes in proper repair and in an effective condition. The annual maintenance programme is published by the OPW on the OPW website, and typically involves some clearance of vegetation and removal of silt build-up on a five-yearly cycle.

There are no arterial drainage schemes in UoM10.

In other UoMs, the OPW have undertaken separate environmental and appropriate assessments of the maintenance of their arterial drainage schemes. Where relevant, the appropriate assessment for the maintenance of arterial drainage schemes in the UoM has been taken into account for in-combination impacts with the FRMP.

**4.1.7 Maintenance of Drainage Districts**

Drainage Districts are areas where drainage schemes to improve land for agricultural purposes were constructed under a number of Acts of Parliament and Acts of the Oireachtas prior to 1945. Nationally, 170 Drainage District Schemes were established, covering 4,600km of channel. The statutory duty of maintenance for these schemes lies with the local authorities concerned. The standard of this maintenance varies widely from county to county.

The Local Authorities have a statutory duty to maintain the Drainage Districts, and the Draft FRMP does not amend these responsibilities. The local authorities shall maintain the Drainage Districts in their jurisdictional area in accordance with legislation. Where relevant, the maintenance of drainage districts in the UoM will be taken into consideration for cumulative or in combination impacts with measures proposed in the FRMP in the appropriate assessment.
There are no Drainage Districts located within UoM10.

### 4.1.8 Flood Forecasting and Warning

A Government decision was taken on the 5\textsuperscript{th} January 2016 to establish a national flood forecasting and warning service. Flood Forecasting and Warning was assessed as a method of flood risk management throughout UoM10. This method would utilise data from the existing hydrometric and meteorological networks to develop predictive models enabling alerts/warnings to be issued in sufficient time to flood prone receptors for action to be taken to manage the consequences of the flood event.

The FRMP recommends progression of a Flood Forecasting and Warning System, comprising a forecasting model system and the use of gauging stations, to project-level development and assessment for refinement and preparation for planning / Exhibition and, as appropriate, implementation. This policy cannot be assessed for impacts in the NIS.

### 4.1.9 Review of Emergency Response Plans for Severe Weather

The local authorities should review their severe weather emergency response plans with respect to flood events, making use of the information on flood hazards and risks provided through the CFRAM Programme and this FRMP, once finalised, and then regularly review the plans taking account of any changes or additional information, as appropriate. The local authorities should update and then regularly review their severe weather emergency response plans with respect to flood events, making use of all available information on flood hazards and risks.

This method is applicable throughout UoM10. The option is considered environmentally neutral as it is a policy option to review Emergency Response Plans. This policy cannot be assessed for impacts in the NIS.

### 4.1.10 Promotion of Individual and Community Resilience

While the State, through the OPW, local authorities and other public bodies can take certain actions to reduce and manage the risk of flooding, individual home-owners, businesses and farmers also have a responsibility to manage the flood risk to themselves and their property and other assets to reduce damages and the risk to personal health in the event of a flood. All people at flood risk should make themselves aware of the potential for flooding in their area, and take long-term and short-term preparatory actions to manage and reduce the risk to themselves and their properties and other assets.

This method is applicable throughout UoM10. The option is considered environmentally neutral as it is a policy option to promote resilience to flooding. This policy cannot be assessed for impacts in the NIS.

### 4.1.11 Individual Property Protection

Individual Property Protection can be effective in reducing the damage to the contents, furniture and fittings in a house or business, but are not applicable in all situations (for example, they may not
be suitable in areas of deep or prolonged flooding, or for some types of property with pervious foundations and flooring). Property owners considering the use of such method should seek the advice of an appropriately qualified expert on the suitability of the measures for their property. The Inter-Departmental Flood Policy Review Group will consider the policy options around installation of Individual Property Protection measures for consideration by Government.

The draft FRMP does not specifically address the management of local flood problems outside of the AFAs. Where this option is applicable within an AFA, appropriate assessment has been carried out.

### 4.1.12 Flood-Related Data Collection

Ongoing collection of hydrometric and meteorological data, and data on flood events as they occur, will help us to continually improve our preparation for, and response, to flooding. The OPW, local authorities / EPA and other organisations collecting hydro-meteorological data should continue to do so, and post-event event flood data should continue to be collected, to improve future flood risk management.

At this early stage in its development the policy cannot be assessed for impacts in the NIS. Best practice must be undertaken in the planning and installation of new gauges including, where relevant, appropriate assessment of new gauge installations at the project planning stage.

### 4.1.13 Minor Works Scheme

The Minor Flood Mitigation Works and Coastal Protection Scheme (the 'Minor Works Scheme') is an administrative scheme operated by the OPW under its general powers and functions to support the local authorities through funding of up to €500k to address qualifying local flood problems with local solutions. The OPW will continue the Minor Works Scheme until such time as it is deemed no longer necessary or appropriate.

This method is applicable throughout UoM10. This option has the potential for both positive and negative environmental impacts; however the next stage of implementation of minor works will be outside the FRMP and the CFRAM studies. Where available, information on projects being currently progressed on the minor works scheme will be taken into consideration for cumulative or in combination impacts with measures proposed in the FRMP in the appropriate assessment. Where relevant, future schemes undertaken under the Minor Works Scheme during the lifetime of the FRMP should be assessed for cumulative or in-combination impacts with the FRMP.
4.2 SUB-CATCHMENT MEASURES

The sub-catchment spatial scale of assessment refers to the catchment of the principal river on which multiple AFAs sit. One sub-catchment SSA was identified in UoM10, the Avoca sub-catchment, incorporating the catchments of Aughrim, Avoca and Arklow. Sub-catchment screening was carried out, which looked at ‘Storage’ and ‘Improvement of Channel Conveyance’, but these were concluded to be unfeasible on technical grounds. Consequently as no feasible catchment/sub-catchment methods were identified, no identification of measures or MCA appraisal has taken place for the FRMP.

Figure 4.2.1: UoM10 Spatial Scales of Assessment showing Avoca Sub-catchment
4.3 AFA-SCALE MEASURES

4.3.1 Communities (AFAs) of Zero or Very Low Risk

The AFAs in each UoM were originally determined through the Preliminary Flood Risk Assessment (PFRA), as described in Chapter 1.1.1. The flood hazard and risk analysis undertaken through the Eastern CFRAM Project has been significantly more detailed than the analysis undertaken for the PFRA. For certain AFAs, this more detailed analysis has determined that there is in fact currently zero or a very low level of flood risk from rivers and/or the sea. In such cases, the development of flood risk management measures aimed specifically at managing the risk in such AFAs has not been pursued. The UoM-level measures will however typically still be relevant and applicable.

During the CFRAM study no AFAs in UoM10 were found to have zero or very low risk. As a consequence, Optioneering has been carried out for all the AFAs in the UoM.

4.3.2 AFAs with Measures Put Forward in in FRMP

In total, ten AFAs have had FRM measures incorporating physical works proposed in the UoM10 FRMP. These are summarised in Table 4.3.1 below and the preferred methods described in Chapter 4.3.2. Full details can be found in Chapter 7.4 and Appendix G of the UoM10 FRMP.

It should be noted that for Aughrim, Kilcoole and Newcastle AFAs, no economically viable measure (i.e., a measure with a benefit - cost ratio of greater than 1.0) was found through the analysis undertaken to date, but a technically viable measure has been identified with a benefit - cost ratio of between 0.5 and 1.0. These AFAs have therefore been assessed in the NIS as there is the potential for physical works to be progressed; however, as further discussed in the FRMP these AFAs will require a more detailed assessment of the costs to be carried out before they are able to progress to full project-level assessment.

Table 4.3.1: Summary of FRM Options advanced in draft FRMP for UoM10

<table>
<thead>
<tr>
<th>Spatial Scale</th>
<th>Name</th>
<th>Option Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sub-Catchment</td>
<td>Avoca</td>
<td>0</td>
<td>No Options Technically and Economically feasible.</td>
</tr>
<tr>
<td>AFA</td>
<td>Aughrim</td>
<td>1</td>
<td>Hard Defences</td>
</tr>
<tr>
<td>AFA</td>
<td>Avoca</td>
<td>1</td>
<td>Hard Defences and Improvement of Channel Conveyance</td>
</tr>
<tr>
<td>AFA</td>
<td>Bray</td>
<td>1</td>
<td>Individual Property Protection</td>
</tr>
<tr>
<td>AFA</td>
<td>Greystones &amp; Environs</td>
<td>1</td>
<td>Hard Defences and Improvement of Channel Conveyance</td>
</tr>
<tr>
<td>AFA</td>
<td>Greystones &amp; Environs</td>
<td>2</td>
<td>Hard Defences, Improvement of Channel Conveyance and Storage</td>
</tr>
<tr>
<td>AFA</td>
<td>Kilcoole</td>
<td>1</td>
<td>Hard Defences</td>
</tr>
<tr>
<td>AFA</td>
<td>Kilcoole</td>
<td>2</td>
<td>Hard Defences and Improvement of Channel Conveyance</td>
</tr>
<tr>
<td>AFA</td>
<td>Loughlinstown</td>
<td>1</td>
<td>Hard Defences, Improvement of Channel Conveyance and Storage</td>
</tr>
<tr>
<td>AFA</td>
<td>Loughlinstown</td>
<td>2</td>
<td>Hard Defences, Improvement of Channel Conveyance and Storage</td>
</tr>
<tr>
<td>AFA</td>
<td>Loughlinstown</td>
<td>3</td>
<td>Hard Defences, Improvement of Channel Conveyance and Storage</td>
</tr>
<tr>
<td>AFA</td>
<td>Loughlinstown</td>
<td>4</td>
<td>Hard Defences, Improvement of Channel Conveyance and Storage</td>
</tr>
<tr>
<td>AFA</td>
<td>Loughlinstown</td>
<td>5</td>
<td>Hard Defences, Improvement of Channel Conveyance and Storage</td>
</tr>
<tr>
<td>Spatial Scale</td>
<td>Name</td>
<td>Option Number</td>
<td>Description</td>
</tr>
<tr>
<td>--------------</td>
<td>-----------------------------</td>
<td>---------------</td>
<td>----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>AFA</td>
<td>Loughlinstown</td>
<td>6</td>
<td>Hard Defences, Improvement of Channel Conveyance and Storage</td>
</tr>
<tr>
<td>AFA</td>
<td>Loughlinstown</td>
<td>7</td>
<td>Hard Defences, Improvement of Channel Conveyance and Storage</td>
</tr>
<tr>
<td>AFA</td>
<td>Loughlinstown</td>
<td>8</td>
<td>Hard Defences, Improvement of Channel Conveyance and Storage</td>
</tr>
<tr>
<td>AFA</td>
<td>Loughlinstown</td>
<td>9</td>
<td>Hard Defences, Improvement of Channel Conveyance and Storage</td>
</tr>
<tr>
<td>AFA</td>
<td>Newcastle</td>
<td>1</td>
<td>Hard Defences</td>
</tr>
<tr>
<td>AFA</td>
<td>Old Connaught/Wilford</td>
<td>2</td>
<td>Hard Defences and Land Use Management</td>
</tr>
<tr>
<td>AFA</td>
<td>Old Connaught/Wilford</td>
<td>1</td>
<td>Hard Defences</td>
</tr>
<tr>
<td>AFA</td>
<td>Old Connaught/Wilford</td>
<td>3</td>
<td>Hard Defences and Improvement of Channel Conveyance</td>
</tr>
<tr>
<td>AFA</td>
<td>Old Connaught/Wilford</td>
<td>4</td>
<td>Hard Defences, Improvement of Channel Conveyance and Flow Diversion</td>
</tr>
<tr>
<td>AFA</td>
<td>Wicklow and Ashford &amp; Rathnew</td>
<td>1</td>
<td>Hard Defences, Storage and Improvement of Channel Conveyance</td>
</tr>
<tr>
<td>AFA</td>
<td>Wicklow and Ashford &amp; Rathnew</td>
<td>2</td>
<td>Hard Defences, Storage, Improvement of Channel Conveyance and Relocation of Properties</td>
</tr>
</tbody>
</table>
4.3.2.1 Aughrim

Preferred Measure: Option 1 - Hard defences

Description: At risk properties would be protected from a series of flood embankments and walls (Figure 4.3.1). These hard defences would protect to the 1% AEP flood event with an average height of 1.5m and a total length of 0.76km.

Figure 4.3.1: Aughrim Preferred Measures
4.3.2.2 Avoca

**Preferred Measure:** Option 1: Hard defences and Improvement of channel conveyance

**Description:** At risk properties would be protected from a series of flood embankments and walls along with improvement of channel conveyance on the northern Avoca Tributary 2 (Figure 4.3.2). These hard defences would protect to the 1% AEP flood event with an average height of 1.4m and a total length of 0.5km. Improving the channel conveyance is required in the north of the AFA on the Avoca Tributary 2 consisting of a combination of three weir removals, dredging 18m of the river and underpinning a bridge. The result is that all properties would be protected to the 1% AEP flood event.
4.3.2.3 Bray

Preferred Measure: Option 1 – Individual Property Protection

Description: At risk properties would be given partial protection from the 0.5% AEP wave overtopping event through Individual Property Protection measures (Figure 4.3.3). It is assumed that this Option would provide only 20% of the benefit given that it is only assumed to prevent 20% of the damage during a flood event.

Figure 4.3.3: Bray Preferred Measures
4.3.2.4 Greystones and Environs

Preferred Measure: Option 2 - Hard Defences and Improvement of Channel Conveyance and Storage

Description: At risk properties would be protected using a combination of storage, in channel improvements and hard defences (Figure 4.3.4 and Figure 4.3.5). This combination of methods protects the AFA to a 1% AEP fluvial event.
4.3.2.5 Kilcoole

**Preferred Measure:** Option 1: Hard Defences

**Description:** At risk properties would be protected by a series of flood walls and embankments (Figure 4.3.6). These hard defences will provide a SoP of 1% AEP for fluvial flood events with an average height of 0.8m and a total length of 640m.

*Figure 4.3.6: Kilcoole Preferred Measures*
4.3.2.6 Loughlinstown

Preferred Measure: Option 4: Hard Defences, Improvement of Channel Conveyance and Storage.

Description: At risk properties would be protected from a series of flood embankments, walls, along with dredging and a bridge and culvert upgrade on the Shanganagh River and 2 storage areas on the Deansgrange River (Figure 4.3.7). The option would protect to the 1% AEP flood event with a total wall length of 903m, a total embankment length of 564m, a total volume of in-channel excavation of 350m³, a total volume of storage area excavation of 3,874m³, one bridge upgrade and five culvert upgrades.

Figure 4.3.7: Loughlinstown Preferred Measures
4.3.2.7 Newcastle

**Preferred Measure:** Option 2 - Hard defences and Land Use Management.

**Description:**
The Newcastle AFA is considered to be suitable as a potential pilot area for Land Use Management. This would be used in combination with Hard Defences in order to provide a fluvial standard of protection of 1% AEP to all properties. It is assumed that Land Use Management measures would reduce the peak flow of a 1% AEP flood event to the equivalent of a present day 2% AEP flood event. It is recommended that the viability of this method is analysed further through detailed design.

In addition to Land Use Management measures, at risk properties would be protected by a series of flood walls and embankments on the Newcastle watercourse properties (Figure 4.3.8). The hard defences will have an average height of 1.1m and a total length of 830m.

![Figure 4.3.8: Newcastle Preferred Measures](image_url)
4.3.2.8 Old Connaught/Wilford

**Preferred Measure:** Option 2 - Hard defences and Flow Diversion.

**Description:** At risk properties in the Aske area would be protected from flooding by a series of flood embankments and walls (Figure 4.3.9). These hard defences would protect to the 1% AEP flood event with an average height of 0.9m and a total length of 1.2km. The flow diversion is located near the upstream extent of the Old Connaught watercourse, where an in-channel weir structure will direct a proportion of the flow along a 706m channel, thus bypassing an at-risk area.

![Figure 4.3.9: Old Connaught/Wilford Preferred Measures](image)
4.3.2.9 Wicklow and Ashford & Rathnew

Preferred Measure: Option 1 - Hard defences, Storage and Improvement of Channel Conveyance.

Description: At risk properties would be protected by hard defences, the removal of weir 1017M00082W on the Ballynerin watercourse and two new storage areas on the Broomhall and Burkeen catchments (Figure 4.3.10). The hard defences have an average height of 1.1m and a total length of 4.0km. The two storage areas have a total capacity of approximately 14,800m³.

Figure 4.3.10: Wicklow and Ashford & Rathnew Preferred Measures
5 APPROPRIATE ASSESSMENT of AFA-SCALE MEASURES

5.1 AUGHRIM AFA

All European sites in the zone of influence of Aughrim AFA were screened for possible impacts from FRM methods (see Chapter 3.5).

Six sites were captured in the screening exercise and were examined for potential impact pathways with FRM methods at Aughrim AFA (Figure 5.1.1). They were:

- Buckroney-Brittas Dunes and Fen SAC (000729)
- Deputy's Pass Nature Reserve SAC (000717)
- Slaney River Valley SAC (000781)
- Vale of Clara (Rathdrum Wood) SAC (000733)
- Wicklow Mountains SAC (002122)
- Wicklow Mountains SPA (004040)

Figure 5.1.1: Aughrim AFA in context of catchment and surrounding European sites
All six of these sites were screened out, as there was no potential for hydraulic connectivity with possible FRM methods in the AFA catchment and no other identifiable potential impact pathway arising from the implementation of FRM methods at the AFA.

It is therefore determined that the proposed measures put forward in the FRMP for Aughrim AFA can be screened out of requiring appropriate assessment at Plan level. Project level assessment will be undertaken based on option designs and site surveys to further consider the attributes and targets of site specific conservation objectives.

It should, however, be noted that there may be non-SAC designated populations of the Annex II designated species Freshwater Pearl Mussel extant in the catchment area surrounding and downstream of Aughrim AFA. Therefore appropriate mitigation measures should be employed for project level works in this AFA to protect the habitat of this Annex II species. Further detail on this is presented in the accompanying UoM10 SEA Environmental report (RPS, IBE0600Rp0043, 2016)
5.2 AVOCA AFA

All European sites in the zone of influence of Avoca AFA were screened for possible impacts from FRM methods (see Chapter 3.5).

Eight sites were captured in the screening exercise and were examined for potential impact pathways with FRM methods at Avoca AFA (Figure 5.2.1). They were:

- Buckroney-Brittas Dunes and Fen SAC (000729)
- Deputy's Pass Nature Reserve SAC (000717)
- Kilpatrick Sandhills SAC (001742)
- Magherabeg Dunes SAC (001766)
- Slaney River Valley SAC (000781)
- Vale of Clara (Rathdrum Wood) SAC (000733)
- Wicklow Mountains SAC (002122)
- Wicklow Mountains SPA (004040)

Figure 5.2.1: Avoca AFA in context of catchment and surrounding European sites
All eight of these sites were screened out, as there was no potential for hydraulic connectivity with possible FRM methods in the AFA catchment and no other identifiable potential impact pathway arising from the implementation of FRM methods at the AFA.

It is therefore determined that the proposed measures put forward in the FRMP for Avoca AFA can be screened out of requiring appropriate assessment at Plan level. Project level assessment will be undertaken based on option designs and site surveys to further consider the attributes and targets of site specific conservation objectives.

It should, however, be noted that there are non-SAC designated populations of the Annex II designated species Freshwater Pearl Mussel extant in the catchment area surrounding and downstream of Avoca AFA. Therefore appropriate mitigation measures should be employed for project level works in this AFA to protect the habitat of this Annex II species. Further detail on this is presented in the accompanying UoM10 SEA Environmental report (RPS, IBE0600Rp0043, 2016)
5.3 BRAY AFA

All European sites in the zone of influence of Bray AFA were screened for possible impacts from FRM methods (see Chapter 3.5). Screening assessed the potential for impact at sixteen European sites (Figure 5.3.1):

- Ballyman Glen SAC (000713)
- Bray Head SAC (000714)
- Carriggower Bog SAC (000716)
- Dalkey Islands SPA (004172)
- Glen of the Downs SAC (000719)
- Glenasmole Valley SAC (001209)
- Knocksink Wood SAC (000725)
- North Bull Island SPA (004006)
- North Dublin Bay SAC (000206)
- Rockabill to Dalkey Island SAC (003000)
- South Dublin Bay & River Tolka Estuary SPA (004024)
- South Dublin Bay SAC (000210)
- The Murrough SPA (004186)
- The Murrough Wetlands SAC (002249)
- Wicklow Mountains SAC (002122)
- Wicklow Mountains SPA (004040)

Figure 5.3.1: Bray AFA in context of catchment and surrounding European sites

Thirteen sites were found to have no identifiable impact pathway arising from the implementation of FRM methods within the Bray catchment and were therefore screened out as not requiring any further assessment.
Three European sites were identified as potentially being impacted upon through FRM activities at Bray AFA; Ballyman Glen SAC (000713), Bray Head SAC (000714) and Knocksink Wood SAC (000725). The following section assesses the proposed FRM measures described in Chapter 4.3.2.3 in relation to these sites.

5.3.1 Identification of Potential Sources of Impact

This section further examines the source > pathway > receptor linkages that could potentially result in adverse impacts arising from FRM measures at Bray AFA on the screened-in European sites.

The preferred FRM option for Bray AFA is ‘Individual Property Protection’ of at-risk properties. It is considered unlikely that individual property protection would have any impact to designated sites in the vicinity of the properties at risk as this method of flood risk management would generally be undertaken within the curtilage of existing properties and, as such, is considered environmentally acceptable.

It is therefore determined that the proposed measures put forward in the FRMP for Bray AFA can be screened out of requiring Appropriate Assessment at Plan level. Project level assessment will be undertaken based on option designs and site surveys to further consider the attributes and targets of site specific conservation objectives.
5.4 GREYSTONES AND ENVIRONS

All European sites in the zone of influence of Greystones AFA were screened for possible impacts from FRM methods (see Chapter 3.5). Screening assessed the potential for impact at fourteen European sites (Figure 5.4.1):

- Ballyman Glen SAC (000713)
- Bray Head SAC (000714)
- Carriggower Bog SAC (000716)
- Dalkey Islands SPA (004172)
- Glen of the Downs SAC (000719)
- Knocksink Wood SAC (000725)
- Rockabill to Dalkey Island SAC (003000)
- South Dublin Bay and River Tolka Estuary SPA (004024)
- South Dublin Bay SAC (000210)
- The Murrough SPA (004186)
- The Murrough Wetlands SAC (002249)
- Wicklow Mountains SAC (002122)
- Wicklow Mountains SPA (004040)
- Wicklow Reef SAC (002274)

Ten sites were found to have no identifiable impact pathway arising from the implementation of FRM methods within the Greystones catchment and were therefore screened out as not requiring any further assessment. Four European sites were identified as potentially being impacted upon through FRM activities at Greystones AFA: Bray Head SAC (000714), Glen of the Downs SAC (000719), The Murrough SPA (004186), and The Murrough Wetlands SAC (002249). The following section assesses the proposed FRM measures described in Chapter 4.3.2.4 in relation to these sites.

Figure 5.4.1: Greystones & Environs AFA in context of catchment and surrounding European sites
5.4.1 Identification of Potential Sources of Impact

This section further examines the source > pathway > receptor linkages that could potentially result in adverse impacts arising from FRM measures at Greystones AFA on the screened-in European sites.

The qualifying interest(s) of the site(s) at risk from surface water pathways are identified in Table 5.4.1, from land and air pathways in Table 5.4.2 and from groundwater pathways in Table 5.4.3. Additional detail on the attributes and targets of the qualifying interests has been included in Appendix C. These have been consulted in order to assess the potential impacts of the proposed flood relief measures on the designated habitats and species insofar as plan-level details allowed.

5.4.1.1 Potential Sources of Impact via Surface Water Pathways

One European site was identified as potentially being impacted upon via surface water pathways; The Murrough Wetlands SAC (002249). The Murrough SPA is located 2.5km south along the coastline; therefore impacts on this site are not expected via surface water pathways. Glen of the Downs SAC is situated 0.5km upstream of Greystones AFA, and there is no impact pathway to the designated habitat of ‘Old Sessile Oak’. Bray Head SAC is an upland site and there is no impact pathway via surface water to its designated habitats of ‘Vegetated Sea Cliffs’ or ‘European Dry Heaths’. Qualifying interests of The Murrough Wetlands SAC at risk from surface water pathways are identified Table 5.4.1. Additional detail on the qualifying interests, including their conservation objectives, has been included in Appendix C.

Table 5.4.1: Qualifying Interests of the screened-in European site likely to be impacted upon via surface water pathways from FRM measures undertaken at Greystones AFA.

<table>
<thead>
<tr>
<th>European Site (Site code)</th>
<th>Qualifying interests</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Murrough Wetlands SAC (002249)</td>
<td>Annual vegetation of drift lines [1210]</td>
</tr>
<tr>
<td></td>
<td>Perennial vegetation of stony banks [1220]</td>
</tr>
<tr>
<td></td>
<td>Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330]</td>
</tr>
<tr>
<td></td>
<td>Mediterranean salt meadows (Juncetalia maritimi) [1410]</td>
</tr>
<tr>
<td></td>
<td>Calcareous fens with Cladium mariscus and species of the Caricion davallianae [7210]</td>
</tr>
<tr>
<td></td>
<td>Alkaline fens [7230]</td>
</tr>
</tbody>
</table>

The following sources of impact arising from FRM measures at Greystones AFA could potentially impact upon the European site detailed above through surface water pathways:

- **Suspended sediments** – There may be indirect negative impacts from sedimentation during construction of hard defences, storage (with associated embankments, culvert and weir), and improvement of channel conveyance through bed regrading. These activities can result in the release of suspended sediments into those waters. This can lead to increased turbidity of surface waters, and an associated reduction in photosynthesis, which can impact on surface water dependent habitats downstream.

- **Changes in nutrient levels/pollutants** – Construction activities in or adjacent to surface waters can result in the release of nutrients into those waters, and can lead to reduced
water quality and eutrophication. Spillages of hydrocarbons or other contaminants during FRM works can also result in a reduction in water quality. Reduced water quality and eutrophication can adversely impact on surface water dependent habitats.

- **Changes in water levels/channel morphology** – Construction of flood walls and embankments, and changes to channel morphology through bed regrading can lead to increased capacity and flow rates. This can lead to hydrological impacts on surface water dependent habitats upstream or downstream.

### 5.4.1.2 Potential Sources of Impact via Land and Air Pathways

One European site was identified as potentially being impacted upon via land and air pathways; The Murrough SPA (004186). The Murrough Wetlands SAC is located 1.6km south along the coastline. Coastal FRM measures are not proposed at Greystones AFA and therefore potential impacts on the designated habitats of this site are not expected via land and air pathways. Glen of the Downs SAC is situated 0.5km upstream of Greystones AFA, therefore direct impacts on the designated habitat of ‘Old Sessile Oak’ are not expected via land and air pathways. Bray Head SAC is an upland site and there is no impact pathway via land and air to its designated habitats of ‘Sea Cliffs’ or ‘European Dry Heaths’. Qualifying interests of this site at risk from land and air pathways are identified in Table 5.4.2. Additional detail on the qualifying interests, including their conservation objectives, has been included in Appendix C.

#### Table 5.4.2: Qualifying Interests of the screened-in European site likely to be impacted upon via land and air pathways from FRM measures undertaken at Greystones AFA.

<table>
<thead>
<tr>
<th>European Site (Site code)</th>
<th>Qualifying interests</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Murrough SPA (004186)</td>
<td>Red-throated Diver (<em>Gavia stellata</em>) [A001]</td>
</tr>
<tr>
<td></td>
<td>Greylag Goose (<em>Anser anser</em>) [A043]</td>
</tr>
<tr>
<td></td>
<td>Light-bellied Brent Goose (<em>Branta bernicla hrota</em>) [A046]</td>
</tr>
<tr>
<td></td>
<td>Wigeon (<em>Anas penelope</em>) [A050]</td>
</tr>
<tr>
<td></td>
<td>Teal (<em>Anas crecca</em>) [A052]</td>
</tr>
<tr>
<td></td>
<td>Black-headed Gull (<em>Chroicocephalus ridibundus</em>) [A179]</td>
</tr>
<tr>
<td></td>
<td>Herring Gull (<em>Larus argentatus</em>) [A184]</td>
</tr>
<tr>
<td></td>
<td>Little Tern (<em>Sternula albifrons</em>) [A195]</td>
</tr>
<tr>
<td></td>
<td>Wetlands and waterbirds [A999]</td>
</tr>
</tbody>
</table>

The following sources of impact arising from FRM measures at Greystones AFA could potentially impact upon the European site detailed above through land and air pathways:

- **Noise and visual disturbance** – The use of construction machinery and the presence of construction and maintenance workers can result in avoidance of suitable habitat by sensitive waterbird species.
5.4.1.3 Potential Sources of Impact via Groundwater Pathways

Two European sites were identified as potentially being impacted upon via groundwater pathways; The Murrough Wetlands SAC (002249) and Bray Head SAC (000714). Qualifying interests of this site at risk from groundwater pathways are identified in Table 5.4.3. Additional detail on the qualifying interests, including their conservation objectives, has been included in Appendix C.

Table 5.4.3: Qualifying Interests of the screened-in European site likely to be impacted upon via groundwater pathways from FRM measures undertaken at Greystones AFA.

<table>
<thead>
<tr>
<th>European Site (Site code)</th>
<th>Qualifying interests</th>
</tr>
</thead>
</table>
| The Murrough Wetlands SAC (002249) | Calcareous fens with *Cladium mariscus* and species of the *Caricion davalliana* [7210]  
Alkaline fens [7230] |
| Bray Head SAC (000714) | Vegetated sea cliffs of the Atlantic and Baltic coasts [1230]  
European dry heaths [4030] |

The following sources of impact arising from FRM measures at Greystones AFA could potentially impact upon the European site detailed above through groundwater pathways:

- **Changes in nutrient levels/pollutants** – Construction activities in or adjacent to surface waters can result in the release of nutrients into those waters, and can lead to reduced water quality and eutrophication. Spillages of hydrocarbons or other contaminants during FRM works can also result in a reduction in water quality. Reduced water quality and eutrophication can adversely impact on groundwater dependent habitats through aquifer recharge.

- **Changes in water levels/channel morphology** – Changes to channel morphology through the use of flood walls and embankments and bed regrading to improve conveyance can lead to changes in capacity and flow of surface waters. This can lead to hydrological impacts on groundwater dependent habitats (e.g. changes in groundwater levels or flow paths).

5.4.2 Impact Assessment

Table 5.4.4 assesses the screened-in European sites in more detail and examines the ways in which the identified sources and pathways could adversely impact on habitats or species. Avoidance and mitigation measures are proposed to mitigate any significant adverse impacts.

5.4.2.1 In-combination Effects

Appropriate Assessment requires consideration of the impacts on European sites of FRM measures at Greystones AFA, in combination with other plans or projects that may impact on the sites resulting in cumulative negative impacts. The potential for cumulative impacts was considered throughout the process of option development. Engagement with stakeholders ensured that the potential for in-combination and cumulative impacts at plan level was minimised. In combination and cumulative effects will be re-assessed at the project stage when project-specific information has been captured. Potential sources of in-combination effects identified as part of this assessment include:
Eastern CFRAM Study  
UoM10 FRMP NIS

- Potential in-combination effects may arise with FRM works or parallel projects being carried out at other AFAs or locations in the UoM. Generic mitigation and monitoring measures have been developed, including the avoidance of undertaking FRM work on adjoining reaches of river or coastline for different AFAs, or other parallel projects, simultaneously. Provided the FRM works are timed correctly, no significant in-combination impacts are anticipated.

- Local landowners and farmers carry out agricultural activities in areas adjacent to this FRM work that could result in similar impacts and disturbance. These activities have been ongoing for many decades and are likely to be periodic and local in nature. Provided the FRM works are planned and managed correctly, the in-combination effects of FRM measures and agricultural operations is not likely to be significant.

- Wicklow County Council carries out ad-hoc maintenance to the watercourses where resources allow, however these maintenance activities are likely to be local in nature. It is recommended that maintenance activities on watercourses connected to the AFA are planned and managed correctly so as not to have cumulative impacts with FRM construction activities.

- The Appropriate Assessment of the Wicklow County Development Plan 2016-2022 has identified a number of plan elements including new development, infrastructure and tourism where there is potential for significant impacts and which may have in-combination effects with the FRMP. Plan-level mitigation has been included in the CDP and no significant in-combination effects with the FRMP are predicted at plan level. Additional detail on potential interactions between infrastructure and FRA schemes will be captured and assessed at project level when project-specific design information is available.

There are no other plans/projects ongoing or proposed (at the time of this study) which may give rise to any form of cumulative impact on the European sites.
Table 5.4.4: Impact assessment for FRM measures at Greystones AFA

<table>
<thead>
<tr>
<th>Site name (site code)</th>
<th>Qualifying interests</th>
<th>Potential source of impact</th>
<th>Pathway</th>
<th>Potential Impact</th>
<th>Avoidance/mitigation measures</th>
<th>Residual impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Murrough Wetlands SAC (002249)</td>
<td>Annual vegetation of drift lines [1210]</td>
<td>Suspended sediments</td>
<td>Surface water</td>
<td>Construction activities upstream of the SAC could impact on designated habitats through the release of suspended sediments and associated nutrients or through pollution incidents from machinery. This could occur during construction of new hard defences (flood walls/embankments), creation of upstream storage areas or improvement of channel conveyance through bed regrading. Disconnecting areas of floodplain from the river can also lead to a reduction in water quality owing to a reduction in habitat area to attenuate nutrients or other pollutants. This could lead to a reduction in water quality, and result in adverse effects on the extent or composition of designated wetland habitats in the downstream SAC. There is some potential for indirect, negative downstream impacts from sedimentation during construction of defences on or set back from the river channel. These impacts are expected to be short-term and local in scale, and are therefore not expected to have adverse impacts on the conservation objectives of designated habitats in the SAC which is situated 1.6km south along the coastline.</td>
<td>Strictly adhere to best practice protocols and SOPs during design, construction and maintenance. Set hard defences back from the river channel, wherever possible. Avoid working in-channel, wherever possible. Careful timing of works to avoid periods of high flow that could result in increased sediment mobilisation. See also measures in Chapter 6.</td>
<td>No</td>
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<td>Perennial vegetation of stony banks [1220]</td>
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<td></td>
<td>Atlantic salt meadows (Gluco-Puccinellietalia maritima) [1330]</td>
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<td>Alkaline fens [7230]</td>
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<td>Changes to nutrient levels/pollutant release</td>
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<td>Water level changes</td>
<td></td>
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<td>The designated wetland habitats are dependent on specific hydrological regimes. Construction of flood walls/embankments, creation of upstream storage areas or improvement of channel conveyance through bed regrading in the upstream watercourse could alter hydrological regimes, thereby impacting upon the conservation objectives of these wetland</td>
<td>Strictly adhere to best practice protocols and SOPs during design, construction and maintenance. See also measures in Chapter 6.</td>
<td>No</td>
</tr>
<tr>
<td>Site name (site code)</td>
<td>Qualifying interests</td>
<td>Potential source of impact</td>
<td>Pathway</td>
<td>Potential Impact</td>
<td>Avoidance/mitigation measures</td>
<td>Residual impact</td>
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<td>habitats (e.g. habitat area or community composition). However, significant changes to the hydrological regime are unlikely, as the works will be local in nature, and are therefore unlikely to impact significantly on attributes used to define conservation status of designated habitats in the SAC which is situated 1.6km south along the coastline.</td>
<td>Strictly adhere to best practice protocols and SOPs during design, construction and maintenance. Set hard defences back from the river channel, wherever possible. Avoid working in-channel, wherever possible. Careful timing of works to avoid periods of high flow that could result in increased sediment mobilisation. See also measures in Chapter 6.</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Suspended sediments</td>
<td>Groundwater</td>
<td></td>
<td>Construction activities upstream of the SAC could impact on wetland habitats through the release of suspended sediments and associated nutrients or through pollution incidents from machinery. This could occur during construction of new hard defences (flood walls/embankments), creation of upstream storage areas or improvement of channel conveyance through bed regrading. Reduced water quality and eutrophication can adversely impact on groundwater dependent habitats through aquifer recharge. Potential impacts from hard defences could occur upon alkaline fens and alluvial forest habitats through groundwater pathways as these are groundwater-dependent habitats. These habitats primarily occur between five mile point and six mile point, directly south along the coastline. Any impacts that could occur through groundwater pathways are expected to be short-term (construction phase) and local in scale and, owing to distance, are not expected to have adverse impacts on the conservation objectives of designated habitats.</td>
<td></td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Changes to nutrient levels/pollutant release</td>
<td>Water level change</td>
<td>The designated habitats and species depend on specific hydrological regimes. Construction of</td>
<td>Strictly adhere to best practice protocols and</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Site name (site code)</td>
<td>Qualifying interests</td>
<td>Potential source of impact</td>
<td>Pathway</td>
<td>Potential Impact</td>
<td>Avoidance/mitigation measures</td>
<td>Residual impact</td>
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</tr>
</tbody>
</table>
| The Murrough SPA (004186) | Red-throated Diver (*Gavia stellata*) [A001]  
Greylag Goose (*Anser anser*) [A043]  
Light-bellied Brent Goose (*Branta bernicla hrota*) [A046]  
Wigeon (*Anas penelope*) [A050]  
Teal (*Anas crecca*) [A052]  
Black-headed Gull (*Chroicocephalus ridibundus*) [A179]  
Herring Gull (*Larus argentatus*) [A184]  
Little Tern (*Sterna albifrons*) [A195]  
Wetlands and waterbirds [A999] | Noise and visual disturbance | Land and air | upstream flood walls and embankments, creation of upstream storage areas or improvement of channel conveyance through bed regrading can result in changes in channel hydrology, by increasing capacity and flow rates. This can lead to hydrological impacts on groundwater dependent habitats (e.g. changes in groundwater levels or flow paths). Hard defences will only impact upon alkaline fens and alluvial forest habitats through groundwater pathways as these are the only groundwater dependent habitats within the site. However, significant changes to the hydrogeological regime are unlikely owing to the scale and location (1.6km upstream) of the works; therefore FRM works are unlikely to impact significantly on attributes used to define conservation status of these habitats. | SOPs during design, construction and maintenance. Habitat and hydrological studies will be carried out at project level to inform the FRM option design and any necessary mitigation. See also measures in Chapter 6. | No |
<table>
<thead>
<tr>
<th>Site name (site code)</th>
<th>Qualifying interests</th>
<th>Potential source of impact</th>
<th>Pathway</th>
<th>Potential Impact</th>
<th>Avoidance/mitigation measures</th>
<th>Residual impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bray Head SAC (000714)</td>
<td>Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] European dry heaths [4030]</td>
<td>Changes to nutrient levels/pollutant release</td>
<td>Groundwater</td>
<td>In soft cliffs flushes may be present in areas where the groundwater seeps out onto the cliff face. Flush sub-communities are dependent on the local hydrological regime including groundwater quality. Construction activities upstream of the SAC could impact on groundwater dependent habitats through the release of suspended sediments and associated nutrients or through pollution incidents from machinery. This could occur during construction of new hard defences (flood walls/embankments), creation of upstream storage areas or improvement of channel conveyance through bed regrading. Reduced water quality and eutrophication can adversely impact on groundwater dependent habitats through aquifer recharge.</td>
<td>See also measures in Chapter 6.</td>
<td>Not Significant</td>
</tr>
<tr>
<td>Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] European dry heaths [4030]</td>
<td>Water Level Change</td>
<td></td>
<td></td>
<td>The designated habitat ‘European Dry Heaths’ is dependent on freely-draining, acidic to circumneutral soils with low nutrient content. Construction of flood walls/embankments, creation of upstream storage areas or improvement of channel conveyance through bed regrading in the upstream watercourse could alter hydrological regimes, thereby impacting upon the conservation objectives of these habitats (e.g. habitat area or community composition). Significant changes to the hydrological regime are unlikely, as the works will be local in nature, and are therefore unlikely to impact significantly on attributes used to define conservation status of designated habitats in the SAC.</td>
<td>Habitat and hydrological studies will be carried out at project level to inform the FRM option design and any necessary mitigation. See also measures in Chapter 6.</td>
<td>Not Significant</td>
</tr>
</tbody>
</table>
5.4.3 Conclusions

This NIS details the findings of the Stage 2 Appropriate Assessment conducted to further examine the potential direct and indirect impacts of proposed FRM works at Greystones AFA on the following European sites:

- Bray Head SAC (000714)
- Glen of the Downs SAC (000719)
- The Murrough SPA (004186)
- The Murrough Wetlands SAC (002249)

The Appropriate Assessment investigated the potential direct and indirect impacts of the proposed works on the integrity and interest features of the above European sites, alone and in-combination with other plans and projects, taking into account the sites’ structure, function and conservation objectives. Where potentially significant adverse impacts were identified, a range of mitigation and avoidance measures have been suggested to help offset them (see Chapter 6). As a result of this Appropriate Assessment it has been concluded that, following the avoidance and mitigation measures suggested, the FRM measures at Greystones AFA will not have a significant adverse impact on the above European sites.

Project level assessment will be undertaken based on option designs and site surveys to further consider the attributes and targets of site specific conservation objectives.
5.5 KILCOOLE

All European sites in the zone of influence of Kilcoole AFA were screened for possible impacts from FRM methods (see Chapter 3.5). During consultation, the possibility of an impact pathway with Light-bellied Brent Goose (*Branta bernicla hrota*), a qualifying interest of the two Dublin Bay SPA sites was also identified. Screening assessed the potential for impact at fifteen European sites (see Figure 5.5.1):

- Ballyman Glen SAC (000713)
- Bray Head SAC (000714)
- Carriggower Bog SAC (000716)
- Dalkey Islands SPA (004172)
- Glen of the Downs SAC (000719)
- Knocksink Wood SAC (000725)
- North Bull Island SPA (004006)
- Rockabill to Dalkey Island SAC (003000)
- South Dublin Bay and River Tolka Estuary SPA (001024)
- The Murrough SPA (004186)
- The Murrough Wetlands SAC (002249)
- Wicklow Head SPA (004127)
- Wicklow Mountains SAC (002122)
- Wicklow Mountains SPA (004040)
- Wicklow Reef SAC (002274)

Eleven sites were found to have no identifiable impact pathway arising from the implementation of FRM methods within the Kilcoole catchment and were therefore screened out as not requiring any further assessment. Four European sites were identified as potentially being impacted upon through FRM activities at Kilcoole AFA; North Bull Island SPA, South Dublin Bay and River Tolka Estuary SPA, The Murrough SPA (004186) and The Murrough Wetlands SAC (002249). The following section assesses the proposed FRM measures described in Chapter 4.3.2.5 in relation to these sites.

![Figure 5.5.1: Kilcoole AFA in context of catchment and surrounding European sites](image-url)
5.5.1 Identification of Potential Sources of Impact

This section further examines the source > pathway > receptor linkages that could potentially result in adverse impacts arising from FRM measures at Kilcoole AFA on the screened-in European sites.

The qualifying interest(s) of the site(s) at risk from surface water pathways are identified in Table 5.5.1, from land and air pathways in Table 5.5.2 and from groundwater pathways in Table 5.5.3. Additional detail on the attributes and targets of the qualifying interests has been included in Appendix C. These have been consulted in order to assess the potential impacts of the proposed flood relief measures on the designated habitats and species insofar as plan-level details allowed.

5.5.1.1 Potential Sources of Impact via Surface Water Pathways

Two European sites were identified as potentially being impacted upon via surface water pathways; The Murrough SPA (004186) and The Murrough Wetlands SAC (002249). Qualifying interests of these sites at risk from surface water pathways are identified in Table 5.5.1. Additional detail on the qualifying interests, including their conservation objectives, has been included in Appendix C.

Table 5.5.1: Qualifying Interests of the screened-in European sites likely to be impacted upon via surface water pathways from FRM measures undertaken at Kilcoole AFA.

<table>
<thead>
<tr>
<th>European Site (Site code)</th>
<th>Qualifying interests</th>
</tr>
</thead>
</table>
| The Murrough Wetlands SAC (002249) | Annual vegetation of drift lines [1210]  
| | Perennial vegetation of stony banks [1220]  
| | Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330]  
| | Mediterranean salt meadows (Juncetalia maritimi) [1410]  
| | Calcareous fens with Cladium mariscus and species of the Caricion davallianae [7210]  
| | Alkaline fens [7230] |
| The Murrough SPA (004186) | Wetlands and waterbirds [A999] |
| North Bull Island SPA (004006) | Light-bellied Brent Goose (Branta bernicla hrota) [A046] |
| South Dublin Bay and River Tolka Estuary SPA (004024) | Light-bellied Brent Goose (Branta bernicla hrota) [A046] |

The following sources of impact arising from FRM measures at Kilcoole AFA could potentially impact upon the European sites detailed above through surface water pathways:

- **Suspended sediments** – There may be indirect negative impacts from sedimentation during construction. Construction of flood walls and embankments can result in the release of suspended sediments into those waters. This can lead to increased turbidity of surface waters, and an associated reduction in photosynthesis, which can impact on surface water dependent habitats downstream.
- **Changes in nutrient levels/pollutants** – Construction activities in or adjacent to surface waters can result in the release of nutrients into those waters, and can lead to reduced water quality and eutrophication. Spillages of hydrocarbons or other contaminants during FRM works can also result in a reduction in water quality. Reduced water quality and eutrophication can adversely impact on surface water dependent habitats.

- **Changes in water levels/channel morphology** – Construction of flood walls and embankments can lead to increased capacity and flow rates. This can lead to hydrological impacts on surface water dependent habitats upstream or downstream.

### 5.5.2 Potential Sources of Impact via Land and Air Pathways

One European site was identified as potentially being impacted upon via land and air pathways; The Murrough SPA (004186). Qualifying interests of this site at risk from land and air pathways are identified in Table 5.5.2. Additional detail on the qualifying interests, including their conservation objectives, has been included in Appendix C.

**Table 5.5.2 Qualifying Interests of the screened-in European sites likely to be impacted upon via land and air pathways from FRM measures undertaken at Kilcoole AFA.**

<table>
<thead>
<tr>
<th>European Site (Site code)</th>
<th>Qualifying interests</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Murrough SPA (004186)</td>
<td>Red-throated Diver (<em>Gavia stellata</em>) [A001]</td>
</tr>
<tr>
<td></td>
<td>Greylag Goose (<em>Anser anser</em>) [A043]</td>
</tr>
<tr>
<td></td>
<td>Light-bellied Brent Goose (<em>Branta bernicla hrota</em>) [A046]</td>
</tr>
<tr>
<td></td>
<td>Wigeon (<em>Anas penelope</em>) [A050]</td>
</tr>
<tr>
<td></td>
<td>Teal (<em>Anas crecca</em>) [A052]</td>
</tr>
<tr>
<td></td>
<td>Black-headed Gull (<em>Chroicocephalus ridibundus</em>) [A179]</td>
</tr>
<tr>
<td></td>
<td>Herring Gull (<em>Larus argentatus</em>) [A184]</td>
</tr>
<tr>
<td></td>
<td>Little Tern (<em>Sterna albifrons</em>) [A195]</td>
</tr>
<tr>
<td></td>
<td>Wetlands and waterbirds [A999]</td>
</tr>
<tr>
<td>North Bull Island SPA (004006)</td>
<td>Light-bellied Brent Goose (<em>Branta bernicla hrota</em>) [A046]</td>
</tr>
<tr>
<td>South Dublin Bay and River Tolka Estuary SPA (004024)</td>
<td>Light-bellied Brent Goose (<em>Branta bernicla hrota</em>) [A046]</td>
</tr>
</tbody>
</table>

The following sources of impact arising from FRM measures at Kilcoole AFA could potentially impact upon the European sites detailed above through land and air pathways:

- **Noise and visual disturbance** – The use of construction machinery and the presence of construction and maintenance workers can result in avoidance of suitable habitat by sensitive waterbird species.

### 5.5.2.1 Potential Sources of Impact via Groundwater Pathways

One European site was identified as potentially being impacted upon via groundwater pathways; The Murrough Wetlands SAC (002249). Qualifying interests of this site at risk from groundwater
pathways are identified in Table 5.5.3. Additional detail on the qualifying interests, including their conservation objectives, has been included in Appendix C.

Table 5.5.3: Qualifying Interests of the screened-in European site likely to be impacted upon via groundwater pathways from FRM measures undertaken at Kilcoole AFA.

<table>
<thead>
<tr>
<th>European Site (Site code)</th>
<th>Qualifying interests</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Murrough Wetlands SAC (002249)</td>
<td>Calcareous fens with <em>Cladium mariscus</em> and species of the <em>Caricion davallianae</em> [7210] Alkaline fens [7230]</td>
</tr>
</tbody>
</table>

The following sources of impact arising from FRM measures at Kilcoole AFA could potentially impact upon the European site detailed above through groundwater pathways:

- **Changes in nutrient levels/pollutants** – Construction activities in or adjacent to surface waters can result in the release of nutrients into those waters, and can lead to reduced water quality and eutrophication. Spillages of hydrocarbons or other contaminants during FRM works can also result in a reduction in water quality. Reduced water quality and eutrophication can adversely impact on groundwater dependent habitats through aquifer recharge.

- **Changes in water levels/channel morphology** – Changes to channel morphology through the use of flood walls and embankments can lead to changes in capacity and flow of surface waters. This can lead to hydrological impacts on groundwater dependent habitats (e.g. changes in groundwater levels or flow paths).

### 5.5.3 Impact Assessment

Table 5.5.4 assesses the screened-in European sites in more detail and examines the ways in which the identified sources and pathways could adversely impact on habitats or species. Avoidance and mitigation measures are proposed to mitigate any significant adverse impacts.

#### 5.5.3.1 In-combination Effects

Appropriate Assessment requires consideration of the impacts on European sites of FRM measures at Kilcoole AFA, in combination with other plans or projects that may impact on the sites resulting in cumulative negative impacts. The potential for cumulative impacts was considered throughout the process of option development. Engagement with stakeholders ensured that the potential for in-combination and cumulative impacts at plan level was minimised. In combination and cumulative effects will be re-assessed at the project stage when project-specific information has been captured. Potential sources of in-combination effects identified as part of this assessment include:

- Potential in-combination effects may arise with FRM works or parallel projects being carried out at other AFAs or locations in the UoM. Generic mitigation and monitoring measures have been developed, including the avoidance of undertaking FRM work on adjoining reaches of river or coastline for different AFAs, or other parallel projects, simultaneously. Provided the FRM works are timed correctly, no significant in-combination impacts are anticipated.
- Local landowners and farmers carry out agricultural activities in areas adjacent to this FRM work that could result in similar impacts and disturbance. These activities have been ongoing for many decades and are likely to be periodic and local in nature. Provided the FRM works are planned and managed correctly, the in-combination effects of FRM measures and agricultural operations is not likely to be significant.

- Wicklow County Council carries out ad-hoc maintenance to the watercourses where resources allow, however these maintenance activities are likely to be local in nature. It is recommended that maintenance activities on watercourses connected to the AFA are planned and managed correctly so as not to have cumulative impacts with FRM construction activities.

- The Appropriate Assessment of the Wicklow County Development Plan 2016-2022 has identified a number of plan elements including new development, infrastructure and tourism where there is potential for significant impacts and which may have in-combination effects with the FRMP. Plan-level mitigation has been included in the CDP and no significant in-combination effects with the FRMP are predicted at plan level. Additional detail on potential interactions between infrastructure and FRA schemes will be captured and assessed at project level when project-specific design information is available.

There are no other plans/projects ongoing or proposed (at the time of this study) which may give rise to any form of cumulative impact on the European sites.
Table 5.5.4: Impact assessment for FRM measures at Kilcoole AFA

<table>
<thead>
<tr>
<th>Site name (site code)</th>
<th>Qualifying interests</th>
<th>Potential source of impact</th>
<th>Pathway</th>
<th>Potential Impact</th>
<th>Avoidance/mitigation measures</th>
<th>Residual impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Murrough Wetlands SAC (002249)</td>
<td>Annual vegetation of drift lines [1210] Perennial vegetation of stony banks [1220] Atlantic salt meadows (<em>Glaucopuccinellietalia maritima</em>) [1330] Mediterranean salt meadows (<em>Juncetalia maritimi</em>) [1410] Calcareous fens with <em>Cladium mariscus</em> and species of the <em>Caricion davallianae</em> [7210] Alkaline fens [7230]</td>
<td>Suspended sediments Changes to nutrient levels/pollutant release</td>
<td>Surface water</td>
<td>Construction activities upstream of the SAC could impact on wetland habitats through the release of suspended sediments and associated nutrients or through pollution incidents from machinery. This could occur during construction of new hard defences (flood walls/embankments). Disconnecting areas of floodplain from the river can also lead to a reduction in water quality owing to a reduction in habitat area to attenuate nutrients or other pollutants. This could lead to a reduction in water quality, and result in adverse effects on the extent or composition of wetland habitats in the downstream SAC. There are likely to be indirect, negative downstream impacts from sedimentation during construction of defences on or set back from the river channel. These impacts are expected to be short-term and local in scale, and are therefore not expected to have adverse impacts on the conservation objectives of designated habitats.</td>
<td>Strictly adhere to best practice protocols and SOPs during design, construction and maintenance. Set hard defences back from the river channel, wherever possible. Avoid working in-channel, wherever possible. Careful timing of works to avoid periods of high flow that could result in increased sediment mobilisation. See also measures in Chapter 6.</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Water level changes</td>
<td></td>
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<tr>
<td></td>
<td>The designated wetland habitats are dependent on specific hydrological regimes. Construction of flood walls/embankments in the upstream watercourse could alter hydrological regimes, thereby impacting upon the conservation objectives of these wetland habitats (e.g. habitat area or community composition). However, significant changes to the hydrological regime are unlikely, as the works will be local in nature, and are therefore unlikely to impact significantly on attributes used to define conservation status.</td>
<td></td>
<td></td>
<td></td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Site name (site code)</td>
<td>Qualifying interests</td>
<td>Potential source of impact</td>
<td>Pathway</td>
<td>Potential Impact</td>
<td>Avoidance/mitigation measures</td>
<td>Residual impact</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Groundwater</td>
<td>Construction activities upstream of the SAC could impact on wetland habitats through the release of suspended sediments and associated nutrients or through pollution incidents from machinery. This could occur during construction of new hard defences (flood walls/embankments). Reduced water quality and eutrophication can adversely impact on groundwater dependent habitats through aquifer recharge. Potential impacts from hard defences could occur upon alkaline fens and alluvial forest habitats through groundwater pathways as these are groundwater-dependent habitats. These habitats primarily occur between five mile point and six mile point, directly south along the coastline. Any impacts that could occur through groundwater pathways are expected to be short-term (construction phase) and local in scale, and are therefore not expected to have adverse impacts on the conservation objectives of designated habitats.</td>
<td>Strictly adhere to best practice protocols and SOPs during design, construction and maintenance. Set hard defences back from the river channel, wherever possible. Avoid working in-channel, wherever possible. Careful timing of works to avoid periods of high flow that could result in increased sediment mobilisation. See also measures in Chapter 6.</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Groundwater</td>
<td>The designated habitats and species depend on specific hydrological regimes. Construction of upstream flood walls and embankments can result in changes in channel hydrology, by increasing capacity and flow rates. This can lead to hydrological impacts on groundwater dependent habitats (e.g. changes in groundwater levels or flow paths).</td>
<td>Strictly adhere to best practice protocols and SOPs during design, construction and maintenance. Habitat and hydrological studies will be carried out at project level to inform the FRM option design</td>
<td>No</td>
</tr>
<tr>
<td>Site name (site code)</td>
<td>Qualifying interests</td>
<td>Potential source of impact</td>
<td>Pathway</td>
<td>Potential Impact</td>
<td>Avoidance/mitigation measures</td>
<td>Residual impact</td>
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<tr>
<td><strong>Introduction or spreading of alien invasive species</strong></td>
<td></td>
<td></td>
<td><strong>Land and surface water</strong></td>
<td>Invasive species can spread rapidly through habitats, form dense thickets which can out-compete native plants and cause problems with soil erosion</td>
<td>Carry out invasive species surveys and follow SOPs (see Table 6.1.1) See general mitigation in Chapter 6</td>
<td>No</td>
</tr>
<tr>
<td><strong>The Murrough SPA (004186)</strong></td>
<td>Red-throated Diver (<em>Gavia stellata</em>) [A001] Greylag Goose (<em>Anser anser</em>) [A043] Light-bellied Brent Goose (<em>Branta bernicla hrota</em>) [A046] Wigeon (<em>Anas penelope</em>) [A050] Teal (<em>Anas crecca</em>) [A052] Black-headed Gull (<em>Chroicocephalus ridibundus</em>) [A179] Herring Gull (<em>Larus argentatus</em>) [A184] Little Tern (<em>Sterna albifrons</em>) [A195] Wetlands and waterbirds [A999]</td>
<td>Suspended sediments Changes to nutrient levels/pollutant release</td>
<td><strong>Surface water</strong></td>
<td>The birds for which this SPA is designated are dependent wetland habitats within the site. Construction of hard defences upstream of the SAC could impact on these habitats through the release of suspended sediments and associated nutrients or through pollution incidents from machinery. This could lead to a reduction in water quality, affecting the extent or composition of wetland habitats and the food supply of waterbirds. Disconnecting areas of floodplain from the river channel can also lead to a reduction in water quality owing to a reduction in habitat area to attenuate nutrients or other pollutants. This could negatively impact on the conservation objectives of the species, through changes in population size and/or distribution and range. There is potential for indirect, negative impacts from sedimentation during construction, however any impacts are expected to be short-</td>
<td>Strictly adhere to best practice protocols and SOPs during design, construction and maintenance. Set hard defences back from the river channel, wherever possible. Avoid working in-channel, wherever possible. Careful timing of works to avoid periods of high flow that could result in increased sediment mobilisation.</td>
<td>No</td>
</tr>
<tr>
<td>Site name (site code)</td>
<td>Qualifying interests</td>
<td>Potential source of impact</td>
<td>Pathway</td>
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<td></td>
<td></td>
<td>Water level changes</td>
<td></td>
<td>Term and local in scale and are therefore not expected to impact significantly on attributes used to define conservation status.</td>
<td>Strictly adhere to best practice protocols and SOPs during design, construction and maintenance.</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Noise and visual disturbance</td>
<td>Land and air</td>
<td>The habitats that support these species are dependent on specific hydrological regimes. Construction of upstream flood walls/embankments could alter hydrological regimes, thereby impacting wetland habitats and the conservation objectives of the bird species that they support (population size, distribution and range). However, significant changes to the hydrological regime are unlikely, as hard defences in the upstream river are confined to short stretches and are therefore not expected to negatively impact on attributes used to define conservation status of wetland habitat or waterbirds.</td>
<td>Strictly adhere to best practice protocols and SOPs during design, construction and maintenance. Avoid carrying out construction work in the over-wintering period (September - March). Avoid carrying out construction work in the Little Tern breeding season (April to late August).</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>T</td>
<td>See also measures in Chapter 6.</td>
<td>See also measures in Chapter 6.</td>
</tr>
</tbody>
</table>
### North Bull Island SPA (004006)

**Light-bellied Brent Goose (Branta bernicla hrota) [A046]**

**Potential source of impact**
- Suspended sediments
- Changes to nutrient levels/pollutant release

**Pathway**
- Surface water

**Potential Impact**
Construction activities within the AFA could impact on wetland habitats through the release of suspended sediments and associated nutrients or through pollution incidents from machinery. This could occur during construction of new flood walls/embankments and along access routes. This could lead to a reduction in water quality, affecting the extent or composition of wetland habitats and the food supply of Brent Goose. Impacts on its wetland habitats and/or food supply could negatively impact on the conservation objectives of the species, through changes in population size and/or distribution and range.

**Avoidance/mitigation measures**
- Strictly adhere to best practice protocols and SOPs during design, construction and maintenance.
- Avoid working in-channel whenever possible.
- Set hard defences back from the river channel, wherever possible to minimise sediment loss into the river channel. See also measures in Chapter 6.

**Residual impact**
Not significant

---

### South Dublin Bay and River Tolka Estuary SPA (004024)

**Physical Habitat Disturbance**

**Pathway**
- Land and Air

**Potential Impact**
The grazing and wetland habitats that support populations of Brent Goose may be vulnerable to physical disturbance arising from construction activities. Physical disturbance by machinery and workers could lead to a loss of habitat adjacent to the hard defences and along access routes. Ongoing maintenance of flood walls/embankments could also result in physical disturbance of adjacent habitats or along access routes. This could reduce the available habitat and alter or reduce food sources for this species, negatively impacting on its conservation objectives (changes in the range, timing or intensity of use of areas).

**Avoidance/mitigation measures**
- Surveys should be carried out to identify areas within the AFA used by Brent Goose and inform option design and any necessary mitigation. If found to be present, avoid carrying out construction work in the over-wintering period (September - March).

**Residual impact**
Not significant

---

### Noise and visual disturbance

**Pathway**
- Land and Air

**Potential Impact**
Geese may be sensitive to disturbance form human activity, e.g. construction and/or maintenance work and noise from machinery - they may avoid areas where works are being undertaken. This could adversely affect the species’ conservation objectives (change in the range, timing or intensity of use of areas).

**Avoidance/mitigation measures**
- Strictly adhere to best practice protocols and SOPs during design, construction and maintenance.
- Surveys should be carried out to identify areas

**Residual impact**
Not significant
<table>
<thead>
<tr>
<th>Site name (site code)</th>
<th>Qualifying interests</th>
<th>Potential source of impact</th>
<th>Pathway</th>
<th>Potential Impact</th>
<th>Avoidance/mitigation measures</th>
<th>Residual impact</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>within the AFA used by Brent Goose and inform any necessary mitigation. If found to be present, avoid carrying out construction work in the over-wintering period (September - March). See also measures in Chapter 6.</td>
<td></td>
</tr>
</tbody>
</table>

If found to be present, avoid carrying out construction work in the over-wintering period (September - March). See also measures in Chapter 6.
5.5.4 Conclusions

This NIS details the findings of the Stage 2 Appropriate Assessment conducted to further examine the potential direct and indirect impacts of proposed FRM works at Kilcoole AFA on the following European sites:

- The Murrough SPA (004186)
- The Murrough Wetlands SAC (002249)
- North Bull Island SPA (004006)
- South Dublin Bay and River Tolka Estuary SPA (004024)

The Appropriate Assessment investigated the potential direct and indirect impacts of the proposed works on the integrity and interest features of the above European sites, alone and in-combination with other plans and projects, taking into account the sites’ structure, function and conservation objectives. Where potentially significant adverse impacts were identified, a range of mitigation and avoidance measures have been suggested to help offset them (see Chapter 6). As a result of this Appropriate Assessment it has been concluded that following the avoidance and mitigation measures suggested, the FRM measures at Kilcoole AFA will not have a significant adverse impact on the above European sites.

Project level assessment will be undertaken based on option designs and site surveys to further consider the attributes and targets of site specific conservation objectives.
5.6 LOUGHLINSTOWN

All European sites in the zone of influence of Loughlinstown AFA were screened for possible impacts from FRM methods (see Chapter 3.5 – full details of the screening are presented in Appendix B).

Eighteen sites were captured in the screening exercise and were examined for potential impact pathways with FRM methods at Loughlinstown AFA (Figure 5.6.1). They were:

- Ballyman Glen SAC (000713)
- Bray Head SAC (000714)
- Carriggower Bog SAC (000716)
- Dalkey Islands SPA (004172)
- Glen of the Downs SAC (000719)
- Glenasmole Valley SAC (001209)
- Howth Head Coast SPA (004113)
- Howth Head SAC (000202)
- Knocksink Wood SAC (000725)
- North Bull Island SPA (004006)
- North Dublin Bay SAC (000206)
- Rockabill to Dalkey Island SAC (003000)
- South Dublin Bay & River Tolka Estuary SPA (004024)
- South Dublin Bay SAC (000210)
- The Murrough Wetlands SAC (002249)
- Wicklow Mountains SAC (002122)
- Wicklow Mountains SPA (004040)

Figure 5.6.1: Loughlinstown AFA in context of catchment and surrounding European sites
All eighteen of these sites were screened out, as they are not hydraulically linked to the AFA catchment and have no other identifiable potential impact pathway arising from the implementation of FRM methods at the AFA.

It is therefore determined that the proposed measures put forward in the FRMP for Loughlinstown AFA can be screened out of requiring appropriate assessment at Plan level. Project level assessment will be undertaken based on option designs and site surveys to further consider the attributes and targets of site specific conservation objectives.
5.7 NEWCASTLE AFA

All European sites in the zone of influence of Newcastle AFA were screened for possible impacts from FRM methods (see Chapter 3.5). Screening assessed the potential for impact at fourteen European sites (see Figure 5.7.1):

- Ballyman Glen SAC (000713)
- Bray Head SAC (000714)
- Carriggower Bog SAC (000716)
- Deputy’s Pass Nature Reserve SAC (000717)
- Glen of the Downs SAC (000719)
- Knockskink Wood SAC (000725)
- Magherabeg Dunes SAC (001766)
- The Murrough SPA (004186)
- The Murrough Wetlands SAC (002249)
- Vale of Clara (Rathdrum Wood) SAC (000733)
- Wicklow Head SPA (004127)
- Wicklow Mountains SAC (002122)
- Wicklow Mountains SPA (004040)
- Wicklow Reef SAC (002274)

Twelve sites were found to have no identifiable impact pathway arising from the implementation of FRM methods within the Newcastle catchment and were therefore screened out as not requiring any further assessment. Two European sites were identified as potentially being impacted upon through FRM activities at Newcastle AFA; The Murrough SPA (004186) and The Murrough Wetlands SAC (002249). The following section assesses the proposed FRM measures described in Chapter 4.3.2.7 in relation to these sites.

Figure 5.7.1: Newcastle AFA in context of catchment and surrounding European sites
5.7.1 Identification of Potential Sources of Impact

This section further examines the source > pathway > receptor linkages that could potentially result in adverse impacts arising from FRM measures at Newcastle AFA on the screened-in European sites.

The qualifying interest(s) of the site(s) at risk from surface water pathways are identified in Table 5.7.1, from land and air pathways in Table 5.7.2 and from groundwater pathways in Table 5.7.3. Additional detail on the attributes and targets of the qualifying interests has been included in Appendix C. These have been consulted in order to assess the potential impacts of the proposed flood relief measures on the designated habitats and species insofar as plan-level details allowed.

5.7.1.1 Potential Sources of Impact via Surface Water Pathways

Two European sites were identified as potentially being impacted upon via surface water pathways; The Murrough Wetlands SAC (002249) and The Murrough SPA (004186). Qualifying interests of these sites at risk from surface water pathways are identified in Table 5.7.1. Additional detail on the qualifying interests, including their conservation objectives, has been included in Appendix C.

Table 5.7.1: Qualifying Interests of the screened-in European sites likely to be impacted upon via surface water pathways from FRM measures undertaken at Newcastle AFA.

<table>
<thead>
<tr>
<th>European Site (Site code)</th>
<th>Qualifying interests</th>
</tr>
</thead>
</table>
| The Murrough Wetlands SAC (002249) | Annual vegetation of drift lines [1210]  
|                                    | Perennial vegetation of stony banks [1220]                                         |
|                                    | Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330]                    |
|                                    | Mediterranean salt meadows (Juncetalia maritimi) [1410]                            |
|                                    | Calcareous fens with Cladium mariscus and species of the Caricion davallianae [7210]|
|                                    | Alkaline fens [7230]                                                               |
| The Murrough SPA (004186)          | Wetlands and waterbirds [A999]                                                     |

The following sources of impact arising from FRM measures at Newcastle AFA could potentially impact upon the European sites detailed above through surface water pathways:

- **Suspended sediments** – There may be indirect negative impacts from sedimentation during construction. Construction of flood walls and embankments can result in the release of suspended sediments into those waters. This can lead to increased turbidity of surface waters, and an associated reduction in photosynthesis, which can impact on surface water dependent habitats downstream.

- **Changes in nutrient levels/pollutants** – Construction activities in or adjacent to surface waters can result in the release of nutrients into those waters, and can lead to reduced water quality and eutrophication. Spillages of hydrocarbons or other contaminants during FRM works can also result in a reduction in water quality. Reduced water quality and eutrophication can adversely impact on surface water dependent habitats.
- **Changes in water levels/channel morphology** – Construction of flood walls and embankments can lead to increased capacity and flow rates. This can lead to hydrological impacts on surface water dependent habitats upstream or downstream.

### 5.7.1.2 Potential Sources of Impact via Land and Air Pathways

One European site was identified as potentially being impacted upon via land and air pathways; The Murrough SPA (004186). Qualifying interests of this site at risk from land and air pathways are identified in Table 5.7.2. Additional detail on the qualifying interests, including their conservation objectives, has been included in Appendix C.

Table 5.7.2: Qualifying Interests of the screened-in European site likely to be impacted upon via land and air pathways from FRM measures undertaken at Newcastle AFA.

<table>
<thead>
<tr>
<th>European Site (Site code)</th>
<th>Qualifying interests</th>
</tr>
</thead>
</table>
| The Murrough SPA (004186) | Red-throated Diver (*Gavia stellata*) [A001]  
Greylag Goose (*Anser anser*) [A043]  
Light-bellied Brent Goose (*Branta bernicia hrota*) [A046]  
Wigeon (*Anas penelope*) [A050]  
Teal (*Anas crecca*) [A052]  
Black-headed Gull (*Chroicocephalus ridibundus*) [A179]  
Herring Gull (*Larus argentatus*) [A184]  
Little Tern (*Sterna albifrons*) [A195]  
Wetlands and waterbirds [A999] |

The following sources of impact arising from FRM measures at Newcastle AFA could potentially impact upon the European site detailed above through land and air pathways:

- **Noise and visual disturbance** – The use of construction machinery and the presence of construction and maintenance workers can result in avoidance of suitable habitat by sensitive waterbird species.

### 5.7.1.3 Potential Sources of Impact via Groundwater Pathways

One European site was identified as potentially being impacted upon via groundwater pathways; The Murrough Wetlands SAC (002249). Qualifying interests of this site at risk from groundwater pathways are identified in Table 5.7.3. Additional detail on the qualifying interests, including their conservation objectives, has been included in Appendix C.

Table 5.7.3: Qualifying Interests of the screened-in European site likely to be impacted upon via groundwater pathways from FRM measures undertaken at Newcastle AFA.

<table>
<thead>
<tr>
<th>European Site (Site code)</th>
<th>Qualifying interests</th>
</tr>
</thead>
</table>
| The Murrough Wetlands SAC (002249) | Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae* [7210]  
Alkaline fens [7230] |
The following sources of impact arising from FRM measures at Newcastle AFA could potentially impact upon the European site detailed above through groundwater pathways:

- **Changes in nutrient levels/pollutants** – Construction activities in or adjacent to surface waters can result in the release of nutrients into those waters, and can lead to reduced water quality and eutrophication. Spillages of hydrocarbons or other contaminants during FRM works can also result in a reduction in water quality. Reduced water quality and eutrophication can adversely impact on groundwater dependent habitats through aquifer recharge.

- **Changes in water levels/channel morphology** – Changes to channel morphology through the use of flood walls and embankments can lead to changes in capacity and flow of surface waters. This can lead to hydrological impacts on groundwater dependent habitats (e.g. changes in groundwater levels or flow paths).

5.7.2 Impact Assessment

Table 5.7.4 assesses the screened-in European sites in more detail and examines the ways in which the identified sources and pathways could adversely impact on habitats or species. Avoidance and mitigate

5.7.2.1 In-combination Effects

Appropriate Assessment requires consideration of the impacts on European sites of FRM measures at Newcastle AFA, in combination with other plans or projects that may impact on the sites resulting in cumulative negative impacts. The potential for cumulative impacts was considered throughout the process of option development. Engagement with stakeholders ensured that the potential for in-combination and cumulative impacts at plan level was minimised. In combination and cumulative effects will be re-assessed at the project stage when project-specific information has been captured. Potential sources of in-combination effects identified as part of this assessment include:

- Potential in-combination effects may arise with FRM works or parallel projects being carried out at other AFAs or locations in the UoM. Generic mitigation and monitoring measures have been developed, including the avoidance of undertaking FRM work on adjoining reaches of river or coastline for different AFAs, or other parallel projects, simultaneously. Provided the FRM works are timed correctly, no significant in-combination impacts are anticipated.

- Local landowners and farmers carry out agricultural activities in areas adjacent to this FRM work that could result in similar impacts and disturbance. These activities have been ongoing for many decades and are likely to be periodic and local in nature. Provided the FRM works are planned and managed correctly, the in-combination effects of FRM measures and agricultural operations is not likely to be significant.

- Wicklow County Council carries out ad-hoc maintenance to the watercourses where resources allow, however these maintenance activities are likely to be local in nature. It is recommended that maintenance activities on watercourses connected to the AFA are
planned and managed correctly so as not to have cumulative impacts with FRM construction activities.

- The Appropriate Assessment of the Wicklow County Development Plan 2016-2022 has identified a number of plan elements including new development, infrastructure and tourism where there is potential for significant impacts and which may have in-combination effects with the FRMP. Plan-level mitigation has been included in the CDP and no significant in-combination effects with the FRMP are predicted at plan level. Additional detail on potential interactions between infrastructure and FRA schemes will be captured and assessed at project level when project-specific design information is available.

There are no other plans/projects ongoing or proposed (at the time of this study) which may give rise to any form of cumulative impact on the European sites.
Table 5.7.4: Impact assessment for FRM measures at Newcastle AFA

<table>
<thead>
<tr>
<th>Site name (site code)</th>
<th>Qualifying interests</th>
<th>Potential source of impact</th>
<th>Pathway</th>
<th>Potential Impact</th>
<th>Avoidance/mitigation measures</th>
<th>Residual impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Murrough Wetlands SAC (002249)</td>
<td>Annual vegetation of drift lines [1210] Perennial vegetation of stony banks [1220] Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330] Mediterranean salt meadows (Juncetalia maritimae) [1410] Calcareous fens with Cladium mariscus and species of the Caricion davallianae [7210] Alkaline fens [7230]</td>
<td>Suspended sediments Changes to nutrient levels/pollutant release</td>
<td>Surface water</td>
<td>Construction activities upstream of the SAC could impact on wetland habitats through the release of suspended sediments and associated nutrients or through pollution incidents from machinery. This could occur during construction of new hard defences (flood walls/embankments). Disconnecting areas of floodplain from the river can also lead to a reduction in water quality owing to a reduction in habitat area to attenuate nutrients or other pollutants. This could lead to a reduction in water quality, and result in adverse effects on the extent or composition of wetland habitats in the downstream SAC. There are likely to be indirect, negative downstream impacts from sedimentation during construction of defences on or set back from the river channel. These impacts are expected to be short-term and local in scale, and are therefore not expected to have adverse impacts on the conservation objectives of designated habitats.</td>
<td>Strictly adhere to best practice protocols and SOPs during design, construction and maintenance. Set hard defences back from the river channel, wherever possible. Avoid working in-channel, wherever possible. Careful timing of works to avoid periods of high flow that could result in increased sediment mobilisation. See also measures in Chapter 6.</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Water level changes</td>
<td></td>
<td></td>
<td>The designated wetland habitats are dependent on specific hydrological regimes. Construction of flood walls/embankments in the upstream watercourse could alter hydrological regimes, thereby impacting upon the conservation objectives of these wetland habitats (e.g. habitat area or community composition). However, significant changes to the hydrological regime are unlikely, as the works will be local in nature, and are therefore unlikely to impact</td>
<td>Strictly adhere to best practice protocols and SOPs during design, construction and maintenance. Habitat and hydrological studies will be carried out at project level to inform the FRM option design and any necessary mitigation.</td>
<td>No</td>
</tr>
<tr>
<td>Site name (site code)</td>
<td>Qualifying interests</td>
<td>Potential source of impact</td>
<td>Pathway</td>
<td>Potential Impact</td>
<td>Avoidance/mitigation measures</td>
<td>Residual impact</td>
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<tr>
<td></td>
<td></td>
<td>Suspended sediments</td>
<td>Groundwater</td>
<td>Construction activities upstream of the SAC could impact on wetland habitats through the release of suspended sediments and associated nutrients or through pollution incidents from machinery. This could occur during construction of new hard defences (flood walls/embankments). Reduced water quality and eutrophication can adversely impact on groundwater dependent habitats through aquifer recharge.</td>
<td>Strictly adhere to best practice protocols and SOPs during design, construction and maintenance.</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Changes to nutrient levels/pollutant release</td>
<td>Groundwater</td>
<td>Potential impacts from hard defences could occur upon alkaline fens and alluvial forest habitats through groundwater pathways as these are groundwater-dependent habitats. These habitats primarily occur between five mile point and six mile point, directly south along the coastline from Newcastle AFA. Any impacts that could occur through groundwater pathways are expected to be short-term (construction phase) and local in scale, and are therefore not expected to have adverse impacts on the conservation objectives of designated habitats.</td>
<td>Set hard defences back from the river channel, wherever possible.</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Water level changes</td>
<td>Groundwater</td>
<td>The designated habitats and species depend on specific hydrological regimes. Construction of upstream flood walls and embankments can result in changes in channel hydrology, by increasing capacity and flow rates. This can lead to hydrological impacts on groundwater dependent habitats (e.g. changes in groundwater levels or flow paths).</td>
<td>Strictly adhere to best practice protocols and SOPs during design, construction and maintenance. Habitat and hydrological studies will be carried out at project level to inform the FRM option design.</td>
<td>No</td>
</tr>
<tr>
<td>Site name (site code)</td>
<td>Qualifying interests</td>
<td>Potential source of impact</td>
<td>Pathway</td>
<td>Potential Impact</td>
<td>Avoidance/mitigation measures</td>
<td>Residual impact</td>
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<td>----------------</td>
</tr>
</tbody>
</table>
| **The Murrough SPA (004186)** | Red-throated Diver (*Gavia stellata*) [A001]  
Greylag Goose (*Anser anser*) [A043]  
Light-bellied Brent Goose (*Branta bernicla hrota*) [A046]  
Wigeon (*Anas penelope*) [A050]  
Teal (*Anas crecca*) [A052]  
Black-headed Gull (*Chroicocephalus ridibundus*) [A179]  
Herring Gull (*Larus argentatus*) [A184]  
Little Tern (*Sterna albifrons*) [A195]  
Wetlands and waterbirds [A999] | Introduction or spreading of alien invasive species | Land and surface water | Invasive species can spread rapidly through habitats, form dense thickets which can out-compete native plants and cause problems with soil erosion | Carry out invasive species surveys and follow SOPs (see Table 6.1.1)  
See general mitigation in Chapter 6 | No |
| |  | Suspended sediments | Surface water | The birds for which this SPA is designated are dependent upon wetland habitats within the site. Construction of hard defences upstream of the SAC could impact on these habitats through the release of suspended sediments and associated nutrients or through pollution incidents from machinery. This could lead to a reduction in water quality, affecting the extent or composition of wetland habitats and the food supply of waterbirds. Disconnecting areas of floodplain from the river channel can also lead to a reduction in water quality owing to a reduction in habitat area to attenuate nutrients or other pollutants. This could negatively impact on the conservation objectives of the species, through changes in population size and/or distribution and range.  
There is potential for indirect, negative impacts from sedimentation during construction, | Strictly adhere to best practice protocols and SOPs during design, construction and maintenance.  
Set hard defences back from the river channel, wherever possible.  
Avoid working in-channel, wherever possible.  
Careful timing of works to avoid periods of high flow that could result in increased sediment mobilisation. | No |

Hard defences will only impact upon alkaline fens and alluvial forest habitats through groundwater pathways as these are the only groundwater dependent habitats within the site. However, significant changes to the hydrogeological regime are unlikely owing to the scale and location of the works; therefore FRM works are unlikely to impact significantly on attributes used to define conservation status of these habitats.

However, significant changes to the hydrogeological regime are unlikely owing to the scale and location of the works; therefore FRM works are unlikely to impact significantly on attributes used to define conservation status of these habitats.
<table>
<thead>
<tr>
<th>Site name (site code)</th>
<th>Qualifying interests</th>
<th>Potential source of impact</th>
<th>Pathway</th>
<th>Potential Impact</th>
<th>Avoidance/mitigation measures</th>
<th>Residual impact</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Water level changes</td>
<td></td>
<td>however any impacts are expected to be short-term and local in scale and are therefore not expected to impact significantly on attributes used to define conservation status.</td>
<td>See also measures in Chapter 6.</td>
<td>No</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td>The habitats that support these species are dependent on specific hydrological regimes. Construction of upstream flood walls/embankments could alter hydrological regimes, thereby impacting wetland habitats and the conservation objectives of the bird species that they support (population size, distribution and range). However, significant changes to the hydrological regime are unlikely, as hard defences in the upstream river are confined to short stretches and are therefore not expected to negatively impact on attributes used to define conservation status of wetland habitat or waterbirds.</td>
<td>Strictly adhere to best practice protocols and SOPs during design, construction and maintenance. See also measures in Chapter 6.</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Noise and visual disturbance</td>
<td>Land and air</td>
<td>These waterbird species will be sensitive to disturbance from machinery and workforces during construction of new flood walls and embankments upstream and during maintenance activities. An important population of Little Terns nest on the shingle beach between Kilcoole and Newcastle during the summer (April to late August). Noise and visual disturbance could cause displacement of populations which can require significant energy expenditure for the birds, which could have an adverse impact on population trends and distribution.</td>
<td>Strictly adhere to best practice protocols and SOPs during design, construction and maintenance. Avoid carrying out construction work in the over-wintering period (September - March). Avoid carrying out construction work in the Little Tern breeding season (April to late</td>
<td>No</td>
</tr>
<tr>
<td>Site name (site code)</td>
<td>Qualifying interests</td>
<td>Potential source of impact</td>
<td>Pathway</td>
<td>Potential Impact</td>
<td>Avoidance/mitigation measures</td>
<td>Residual impact</td>
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<td>August)</td>
<td>See also measures in Chapter 6.</td>
<td></td>
</tr>
</tbody>
</table>
5.7.3 Conclusions

This NIS details the findings of the Stage 2 Appropriate Assessment conducted to further examine the potential direct and indirect impacts of proposed FRM works at Newcastle AFA on the following European sites:

- The Murrough Wetlands SAC (002249)
- The Murrough SPA (004186)

The Appropriate Assessment investigated the potential direct and indirect impacts of the proposed works on the integrity and interest features of the above European sites, alone and in-combination with other plans and projects, taking into account the sites’ structure, function and conservation objectives. Where potentially significant adverse impacts were identified, a range of mitigation and avoidance measures have been suggested to help offset them (see Chapter 6). As a result of this Appropriate Assessment it has been concluded that, following the avoidance and mitigation measures suggested, the FRM measures at Newcastle AFA will not have a significant adverse impact on the above European sites.

Project level assessment will be undertaken based on option designs and site surveys to further consider the attributes and targets of site specific conservation objectives.
5.8 OLD CONNAUGHT AND WILFORD AFA

All European sites in the zone of influence of Old Connaught and Wilford AFA were screened for possible impacts from FRM methods (See Chapter 3.5). Screening assessed the potential for impact at eighteen European sites (See Figure 5.8.1):

- Ballyman Glen SAC (000713)
- Bray Head SAC (000714)
- Carriggower Bog SAC (000716)
- Dalkey Islands SPA (004172)
- Glen of the Downs SAC (000719)
- Glenasmole Valley SAC (001209)
- Howth Head Coast SPA (004113)
- Howth Head SAC (000202)
- Knocksink Wood SAC (000725)
- North Bull Island SPA (004006)
- North Dublin Bay SAC (000206)
- Rockabill to Dalkey Island SAC (003000)
- South Dublin Bay and River Tolka Estuary SPA (004024)
- South Dublin Bay SAC (000210)
- The Murrough SPA (004186)
- The Murrough Wetlands SAC (002249)
- Wicklow Mountains SAC (002122)
- Wicklow Mountains SPA (004040)

Seventeen sites were found to have no identifiable impact pathway arising from the implementation of FRM methods within the Old Connaught and Wilford catchment and were therefore screened out as not requiring any further assessment. One European site was identified as potentially being impacted upon through FRM activities at Old Connaught and Wilford AFA; Ballyman Glen SAC (000713). The following section assesses the proposed FRM measures described in Chapter 4.3.2.8 in relation to these sites.
5.8.1 Identification of Potential Sources of Impact

This section further examines the source > pathway > receptor linkages that could potentially result in adverse impacts arising from FRM measures at Old Connaught and Wilford AFA on the screened-in European sites.

Ballyman Glen SAC was screened-in for further assessment of potential impacts during the preliminary screening exercise, owing to its location directly adjacent to Old Connaught and Wilford AFA. The two qualifying interests of this site are groundwater-dependent habitats (details of the qualifying interests and their conservation objectives have been provided in Appendix C).

The preferred FRM option for Old Connaught and Wilford AFA is ‘Hard Defences’ and ‘Improvement of Channel Conveyance’. Ballyman Glen SAC has no hydraulic connectivity with the watercourses presenting a flood risk in this AFA, therefore there is no risk to this site via surface water pathways. As the SAC is uphill of the AFA there is no potential groundwater pathway. There are not considered to be any other potential impact pathways present between Old Connaught and Wilford AFA and Ballyman Glen SAC.

It is therefore determined that the proposed measures put forward in the FRMP for Old Connaught and Wilford AFA can be screened out of requiring Appropriate Assessment at Plan level. Project level assessment will be undertaken based on option designs and site surveys to further consider the attributes and targets of site specific conservation objectives.
5.9 WICKLOW AND ASHFORD/RATHNEW AFA

All European sites in the zone of influence of Wicklow and Ashford / Rathnew AFAs (“Wicklow AFA”) were screened for possible impacts from FRM methods (see Chapter 3.5). Screening assessed the potential for impact at twelve European sites (see Figure 5.9.1):

- Buckroney-Brittas Dunes and Fen SAC (000729)
- Carriggower Bog SAC (000716)
- Deputy’s Pass Nature Reserve SAC (000717)
- Glen of the Downs SAC (000719)
- Magherabeg Dunes SAC (001766)
- The Murrough SPA (004186)
- Vale of Clara (Rathdrum Wood) SAC (000733)
- Wicklow Head SPA (004127)
- Wicklow Mountains SAC (002122)
- Wicklow Mountains SPA (004040)
- Wicklow Reef SAC (002274)

Eight sites were found to have no identifiable impact pathway arising from the implementation of FRM methods within the Wicklow AFA catchment and were therefore screened out as not requiring any further assessment. Four European sites were identified as potentially being impacted upon through FRM activities at Wicklow AFA; The Murrough SPA (004186), The Murrough Wetlands SAC (002249), Wicklow Head SPA (004127), and Wicklow Reef SAC (002274). The following section assesses the proposed FRM measures described in Chapter 4.3.2.9 in relation to these sites.

Figure 5.9.1: Wicklow & Ashford/Rathnew AFA in context of catchment and surrounding European sites
5.9.1 Identification of Potential Sources of Impact

This section further examines the source > pathway > receptor linkages that could potentially result in adverse impacts arising from FRM measures at Wicklow AFA on the screened-in European sites.

The qualifying interest(s) of the site(s) at risk from surface water pathways are identified in Table 5.9.1 and from land and air pathways in Table 5.9.2. Additional detail on the attributes and targets of the qualifying interests has been included in Appendix C. These have been consulted in order to assess the potential impacts of the proposed flood relief measures on the designated habitats and species insofar as plan-level details allowed.

5.9.1.1 Potential Sources of Impact via Surface Water Pathways

Four European sites were identified as potentially being impacted upon via surface water pathways; The Murrough SPA (004186), The Murrough Wetlands SAC (002249), Wicklow Head SPA (004127) and Wicklow Reef SAC (002274). Qualifying interests of these sites at risk from surface water pathways are identified in Table 5.9.1. Additional detail on the qualifying interests, including their conservation objectives, has been included in Appendix C.

Table 5.9.1: Qualifying Interests of the screened-in European sites likely to be impacted upon via surface water pathways from FRM measures undertaken at Wicklow AFA.

<table>
<thead>
<tr>
<th>European Site (Site code)</th>
<th>Qualifying interests</th>
</tr>
</thead>
</table>
| The Murrough Wetlands SAC (002249) | Annual vegetation of drift lines [1210]  
Perennial vegetation of stony banks [1220]  
Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330]  
Mediterranean salt meadows (Juncetalia maritim) [1410]  
Calcic fens with Cladium mariscus and species of the Caricion davallianae [7210]  
Alkaline fens [7230] |
| The Murrough SPA (004186) | Wetlands and waterbirds [A999] |
| Wicklow Head SPA (004127) | Kittiwake (Rissa tridactyla) [A188]  
Additional Special Conservation Interests:  
Razorbill (Alca torda) [A200]  
Peregrine Falcon (Falco peregrinus) [A103]  
Fulmar (Fulmarus glacialis) [A009]  
Whitethroat (Sylvia communis) [A309]  
Guillemot (Uria aalge) [A199] |
| Wicklow Reef SAC (002274) | Reefs [1170] |

The following sources of impact arising from FRM measures at Wicklow AFA could potentially impact upon the European sites detailed above through surface water pathways:

- **Suspended sediments** – There may be indirect negative impacts from sedimentation during construction. Construction of fluvial or coastal flood walls and embankments for hard defences or creation of storage areas and removal of weirs to increase conveyance can result in the release of suspended sediments into those waters. This can lead to increased turbidity of surface waters, and an associated reduction in photosynthesis, which can impact on surface water dependent habitats downstream.
- **Changes in nutrient levels/pollutants** – Construction activities in or adjacent to surface waters can result in the release of nutrients into those waters, and can lead to reduced water quality and eutrophication. Spillages of hydrocarbons or other contaminants during FRM works can also result in a reduction in water quality. Reduced water quality and eutrophication can adversely impact on surface water dependent habitats.

- **Changes in water levels/channel morphology** – Changes to channel morphology through the construction of fluvial hard defences, creation of upstream storage areas or removal of weirs can lead to increased capacity and flow rates. This can lead to hydrological impacts on surface water dependent habitats downstream.

### 5.9.1.2 Potential Sources of Impact via Land and Air Pathways

Three European sites were identified as potentially being impacted upon via land and air pathways; The Murrough SPA (004186), The Murrough Wetlands SAC (002249) and Wicklow Head SPA (004127). Qualifying interests of these sites at risk from land and air pathways are identified in Table 5.9.2. Additional detail on the qualifying interests, including their conservation objectives, has been included in Appendix C.

#### Table 5.9.2: Qualifying Interests of the screened-in European sites likely to be impacted upon via land and air pathways from FRM measures undertaken at Wicklow AFA.

<table>
<thead>
<tr>
<th>European Site (Site code)</th>
<th>Qualifying interests</th>
</tr>
</thead>
</table>
| **The Murrough Wetlands SAC (002249)** | Annual vegetation of drift lines [1210]  
Perennial vegetation of stony banks [1220]  
Atlantic salt meadows (*Glaucopuccinellietalia maritimae*) [1330]  
Mediterranean salt meadows (*Juncetalia maritimi*) [1410]  
Calcareaous fens with *Cladium mariscus* and species of the *Caricion davallianae* [7210]  
Alkaline fens [7230] |
| **The Murrough SPA (004186)** | Red-throated Diver (*Gavia stellata*) [A001]  
Greylag Goose (*Anser anser*) [A043]  
Light-bellied Brent Goose (*Branta bernicla hrota*) [A046]  
Wigeon (*Anas penelope*) [A050]  
Teal (*Anas crecca*) [A052]  
Black-headed Gull (*Chroicocephalus ridibundus*) [A179]  
Herring Gull (*Larus argentatus*) [A184]  
Little Tern (*Sterna albifrons*) [A195]  
Wetlands and waterbirds [A999] |
| **Wicklow Head SPA (004127)** | Kittiwake (*Rissa tridactyla*) [A188]  
Additional Special Conservation Interests:  
Razorbill (*Alca torda*) [A200]  
Peregrine Falcon (*Falco peregrinus*) [A103]  
Fulmar (*Fulmarus glacialis*) [A009]  
Whitethroat (*Sylvia communis*) [A309]  
Guillemot (*Uria aalge*) [A199] |

The following sources of impact arising from FRM measures at Wicklow AFA could potentially impact upon the European sites detailed above through land and air pathways:

- **Physical habitat disturbance** – There is likely to be a direct loss of natural and semi-natural habitat in the direct footprint and vicinity of the defences in Tinakelly at Broad Lough.
Construction of flood walls and embankments adjacent to surface waters can result in a direct loss of or disturbance to aquatic, marginal and riparian habitats. This can indirectly impact on species through loss of habitat or changes in food supply, thereby negatively affecting conservation objectives (population size and range).

- **Noise and visual disturbance** – The use of construction machinery and the presence of construction and maintenance workers can result in avoidance of suitable habitat by sensitive waterbird species.

### 5.9.2 Impact Assessment

Table 5.9.3 assesses the screened-in European sites in more detail and examines the ways in which the identified sources and pathways could adversely impact on habitats or species. Avoidance and mitigation measures are proposed to mitigate any significant adverse impacts.

#### 5.9.2.1 In-combination Effects

Appropriate Assessment requires consideration of the impacts on European sites of FRM measures at Wicklow AFA, in combination with other plans or projects that may impact on the sites resulting in cumulative negative impacts. The potential for cumulative impacts was considered throughout the process of option development. Engagement with stakeholders ensured that the potential for in-combination and cumulative impacts at plan level was minimised. In combination and cumulative effects will be re-assessed at the project stage when project-specific information has been captured.

Potential sources of in-combination effects identified as part of this assessment include:

- Potential in-combination effects may arise with FRM works or parallel projects being carried out at other AFAs or locations in the UoM. Generic mitigation and monitoring measures have been developed, including the avoidance of undertaking FRM work on adjoining reaches of river or coastline for different AFAs, or other parallel projects, simultaneously. Provided the FRM works are timed correctly, no significant in-combination impacts are anticipated.

- Local landowners and farmers carry out agricultural activities in areas adjacent to this FRM work that could result in similar impacts and disturbance. These activities have been ongoing for many decades and are likely to be periodic and local in nature. Provided the FRM works are planned and managed correctly, the in-combination effects of FRM measures and agricultural operations is not likely to be significant.

- Wicklow County Council carries out ad-hoc maintenance to the watercourses where resources allow, however these maintenance activities are likely to be local in nature. It is recommended that maintenance activities on watercourses connected to the AFA are planned and managed correctly so as not to have cumulative impacts with FRM construction activities.

- The Appropriate Assessment of the Wicklow County Development Plan 2016-2022 has identified a number of plan elements including new development, infrastructure and tourism where there is potential for significant impacts and which may have in-combination effects with the FRMP. Plan-level mitigation has been included in the CDP and no significant...
in-combination effects with the FRMP are predicted at plan level. Additional detail on potential interactions between infrastructure and FRA schemes will be captured and assessed at project level when project-specific design information is available.

There are no other plans/projects ongoing or proposed (at the time of this study) which may give rise to any form of cumulative impact on the European sites.
### Table 5.9.3: Impact assessment for FRM measures at Wicklow AFA (Hard defences, storage, and improvement of channel conveyance).

<table>
<thead>
<tr>
<th>Site name (site code)</th>
<th>Qualifying interests</th>
<th>Potential source of impact</th>
<th>Pathway</th>
<th>Potential Impact</th>
<th>Avoidance/mitigation measures</th>
<th>Residual impact</th>
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</thead>
<tbody>
<tr>
<td>The Murrough Wetlands SAC (002249)</td>
<td>Annual vegetation of drift lines [1210] Perennial vegetation of stony banks [1220] Atlantic salt meadows <em>(Glaucopuccinillietalia maritimae)</em> [1330] Mediterranean salt meadows <em>(Juncetalia maritimi)</em> [1410] Calcareous fens with <em>Cladium mariscus</em> and species of the <em>Caricion davallianae</em> [7210] Alkaline fens [7230]</td>
<td>Suspended sediments Changes to nutrient levels/pollutant release</td>
<td>Surface water</td>
<td>Construction activities upstream, adjacent to and within the SAC could impact on wetland habitats through the release of suspended sediments and associated nutrients or through pollution incidents from machinery. This could occur during construction of new fluvial and coastal hard defences (flood walls/embankments), creation of upstream storage areas and removal of a weir to increase channel conveyance. Weir removal may result in increased flow velocities, changes to sediment deposition and erosion of downstream sites. Disconnecting areas of floodplain from the river can also lead to a reduction in water quality owing to a reduction in habitat area to attenuate nutrients or other pollutants. This could lead to a reduction in water quality, and result in adverse effects on the extent or composition of wetland habitats in the SAC. There are likely to be indirect, negative impacts from sedimentation during construction of fluvial and coastal hard defences and in-channel conveyance work. For the most part, these impacts are expected to be short-term and local in scale, and are therefore not expected to have adverse impacts on the conservation objectives of designated habitats. However, in Tinakelly, hard defences will be constructed within the boundaries of the SAC at Broad Lough. In this area, there is potential for more significant impacts on the conservation objectives of designated saltmeadow and wetland habitats, which are a feature of the Broad Lough area.</td>
<td>Strictly adhere to best practice protocols and SOPs during design, construction and maintenance. Set hard defences back from the river channel or coastline, wherever possible. The design, construction and maintenance phases should be carried out using effective mitigation against erosion and sedimentation. Hydraulic model testing should be used to inform design in respect of velocity changes and ensure that it is such that in the project-level assessment, a conclusion of ‘no likely significant effect’ would be achieved. Avoid working in-channel, wherever possible. Careful timing of works to avoid periods of high flow that could result in increased sediment mobilisation.</td>
<td>Potential medium to long term impacts on designated habitat in Tinakelly. The significance of these potential impacts cannot be determined without further AA studies at the option design stage.</td>
</tr>
<tr>
<td>Site name (site code)</td>
<td>Qualifying interests</td>
<td>Potential source of impact</td>
<td>Pathway</td>
<td>Potential Impact</td>
<td>Avoidance/mitigation measures</td>
<td>Residual impact</td>
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<tr>
<td>Water level changes</td>
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<td></td>
<td>The designated wetland habitats are dependent on specific hydrological regimes. Construction of new fluvial and coastal hard defences (flood walls/embankments), creation of upstream storage areas and removal of a weir to increase channel conveyance within and upstream of the SAC could alter hydrological regimes, thereby impacting upon the conservation objectives of these wetland habitats (e.g. habitat area or community composition). Weir removal may result in increased flow velocities, changes to sediment deposition and erosion of downstream sites. For the most part, significant changes to the hydrological regime are unlikely, as hard defences are confined to short stretches and are therefore not expected to negatively impact on attributes used to define conservation status of designated wetland habitats. Construction of hard defences within the SAC at Tinakelly near Broad Lough could adversely impact upon the hydrology and associated sediment dynamics in this area. This could lead to impacts upon wetland habitats, affecting their conservation objectives (maintenance of range or structure and functions).</td>
<td>Strictly adhere to best practice protocols and SOPs during design, construction and maintenance. Survey to assess potential hydrological impacts on designated wetland habitat from construction of hard defences in Tinakelly. Surveys should inform option design and design-specific mitigation prior to commencement of the FRM work. Hydraulic model testing should be used to inform design and ensure that it is such that in the project-level assessment, a conclusion of ‘no likely significant effect’ would be achieved.</td>
<td>Potential for residual hydrological impacts on designated habitats in Tinakelly. The significance of these potential impacts cannot be determined without further AA studies at the option design stage.</td>
</tr>
<tr>
<td>Physical habitat disturbance</td>
<td>Land and Air</td>
<td>Construction activities that remove vegetation or otherwise disturb habitats could adversely affect the habitat area, vegetation structure and composition of designated habitats.</td>
<td></td>
<td>There is likely to be a direct loss of natural and</td>
<td>Strictly adhere to best practice protocols and SOPs during design, construction and maintenance.</td>
<td>Potential medium to long term impacts on designated habitat in</td>
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<td>Site name (site code)</td>
<td>Qualifying interests</td>
<td>Potential source of impact</td>
<td>Pathway</td>
<td>Potential Impact</td>
<td>Avoidance/mitigation measures</td>
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<tr>
<td><strong>The Murrough SPA (004186)</strong></td>
<td>Red-throated Diver (<em>Gavia stellata</em>) [A001] Greylag Goose (<em>Anser anser</em>) [A043] Light-bellied Brent Goose (<em>Branta bernicla hrota</em>) [A046] Wigeon (<em>Anas penelope</em>) [A050] Teal (<em>Anas crecca</em>) [A052] Black-headed Gull (<em>Chroicocephalus ridibundus</em>) [A179] Herring Gull (<em>Larus argentatus</em>) [A184] Little Tern (<em>Sterna albifrons</em>) [A195] Wetlands and waterbirds [A999]</td>
<td>Suspended sediments Changes to nutrient levels/pollutant release</td>
<td>Surface water</td>
<td>The birds for which this SPA is designated are dependent upon wetland habitats within the site. Construction of hard defences upstream, adjacent to, and within the SPA could impact on these habitats through the release of suspended sediments and associated nutrients or through pollution incidents from machinery. This could lead to a reduction in water quality, affecting the extent or composition of wetland habitats and the food supply of waterbirds. Disconnecting areas of floodplain from the river channel can also lead to a reduction in water quality owing to a reduction in habitat area to attenuate nutrients or other pollutants. This could negatively impact on the conservation objectives of the species, through changes in population size and/or medium to long term impacts on designated habitat in Tinakelly.</td>
<td>Carry out invasive species surveys and follow SOPs (see Table 6.1.1) See general mitigation in Chapter 6</td>
<td>No</td>
</tr>
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</table>

Habitat survey should be carried out by a qualified ecologist to inform option design and design-specific mitigation prior to commencement of the FRM work.

The footprint of hard defences should be minimised as much as is practically possible.

See also measures in Chapter 6.

Strictly adhere to best practice protocols and SOPs during design, construction and maintenance.

Set hard defences back from the river channel, wherever possible.

Avoid working in-channel, wherever possible.

Careful timing of works to avoid periods of high flow that could result in potential medium to long term impacts on designated habitat in Tinakelly. The significance of these potential impacts cannot be determined without further AA.
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<tr>
<th>Site name (site code)</th>
<th>Qualifying interests</th>
<th>Potential source of impact</th>
<th>Pathway</th>
<th>Potential Impact</th>
<th>Avoidance/mitigation measures</th>
<th>Residual impact</th>
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<td></td>
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<td>Water level changes</td>
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<td>increased sediment mobilisation. See also measures in Chapter 6.</td>
<td>studies at the option design stage.</td>
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There are likely to be indirect, negative impacts from sedimentation during construction of fluvial and coastal hard defences and in-channel conveyance work. For the most part, these impacts are expected to be short-term and local in scale, and are therefore not expected to have adverse impacts on the conservation objectives of designated habitats. However, in Tinakelly, hard defences will be constructed within the boundaries of the SPA at Broad Lough. In this area, there is potential for more significant impacts on the conservation objectives of designated saltmeadow and wetland habitats, which are a feature of the Broad Lough area.

The habitats that support these species are dependent on specific hydrological regimes. Construction of new fluvial and coastal hard defences (flood walls/embankments), creation of upstream storage areas and removal of a weir to increase channel conveyance could alter hydrological regimes, thereby impacting wetland habitats and the conservation objectives of the bird species that they support (population size, distribution and range).

For the most part, significant changes to the hydrological regime are unlikely, as hard defences are confined to short stretches and are therefore not expected to negatively impact on attributes used to define conservation status of wetland habitat or waterbirds. Construction of hard defences within the SPA at Tinakelly near Broad Lough could adversely impact upon the hydrology and associated sediment dynamics in this area. This could lead to impacts upon...
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<th>Site name (site code)</th>
<th>Qualifying interests</th>
<th>Potential source of impact</th>
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<th>Potential Impact</th>
<th>Avoidance/mitigation measures</th>
<th>Residual impact</th>
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<td>wetland habitats and to designated bird species who rely on these habitats</td>
<td>conclusion of ‘no likely significant effect’ would be achieved. See also measures in Chapter 6.</td>
<td></td>
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<tr>
<td>Physical habitat disturbance</td>
<td></td>
<td>Land and air</td>
<td>Construction activities that remove vegetation or otherwise disturb habitats could adversely affect the habitat area, vegetation structure and composition of designated habitats. There is likely to be a direct loss of natural and semi-natural habitat in the direct footprint and vicinity of the hard defences in the Tinakelly area of Broad Lough.</td>
<td>The footprint of hard defences should be minimised as much as is practically possible. Habitat and bird survey should be carried out by a qualified ecologist/ornithologist to inform option design and design-specific mitigation prior to commencement of the FRM work. See also measures in Chapter 6.</td>
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<tr>
<td>Noise and visual disturbance</td>
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<td>These waterbird species will be sensitive to disturbance from machinery and workforces during construction of new flood walls and embankments upstream and during maintenance activities. This disturbance could cause displacement of populations which can require significant energy expenditure for the birds, which could have an adverse impact on population trends and distribution.</td>
<td>Strictly adhere to best practice protocols and SOPs during design, construction and maintenance. Bird surveys should be carried out by a qualified ornithologist to inform option design and design-specific mitigation prior to commencement of the</td>
<td>No</td>
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<tr>
<td>Site name (site code)</td>
<td>Qualifying interests</td>
<td>Potential source of impact</td>
<td>Pathway</td>
<td>Potential Impact</td>
<td>Avoidance/mitigation measures</td>
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<tr>
<td>Wicklow Head SPA (004127)</td>
<td>Kittiwake (<em>Rissa tridactyla</em>) [A188]</td>
<td>Suspended sediments</td>
<td>Surface water</td>
<td>Kittiwake and other waterbirds included as Additional Special Conservation Interests for this SPA are dependent upon marine areas for foraging at the cliff base of Wicklow Head SPA. Construction of hard defences upstream, north along the coastline from the SPA could impact on these habitats through the release of suspended sediments and associated nutrients or through pollution incidents from machinery. This could lead to a reduction in water quality, affecting the water quality of the SPA.</td>
<td>Strictly adhere to best practice protocols and SOPs during design, construction and maintenance. Set hard defences back from the river channel or coastline, wherever possible.</td>
<td>No</td>
</tr>
<tr>
<td>Site name (site code)</td>
<td>Qualifying interests</td>
<td>Potential source of impact</td>
<td>Pathway</td>
<td>Potential Impact</td>
<td>Avoidance/mitigation measures</td>
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<tr>
<td>Guillemot (Uria aalge) [A199]</td>
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<td>extent or composition of coastal habitats and the food supply of waterbirds. This could negatively impact on the conservation objectives of the species, through changes in population size and/or distribution and range.</td>
<td>Avoid working in-channel, wherever possible. Careful timing of works to avoid periods of high flow that could result in increased sediment mobilisation. See also measures in Chapter 6.</td>
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<tr>
<td>Noise and visual disturbance</td>
<td>Kittiwake and other waterbird species included as Additional Special Conservation Interests will be sensitive to disturbance from machinery and workforces during construction. This disturbance could cause displacement of populations which can require significant energy expenditure for the birds, which, if undertaken during winter months, could have an adverse impact on population trends and distribution. However, Wicklow Head SPA is located 3km to the south of Wicklow AFA along the coast, with marine areas used by foraging waterbirds included to a distance of 500m from the cliff base. Owing to the distance from the AFA, no significant adverse impacts on these species are expected.</td>
<td>Strictly adhere to best practice protocols and SOPs during design, construction and maintenance. Bird surveys should be carried out by a qualified ornithologist to inform on specific mitigation requirements prior to commencement of the FRM work. See also measures in Chapter 6.</td>
<td>No</td>
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<tr>
<td>Wicklow Reef SAC (002274)</td>
<td>Reefs [1170]</td>
<td>Suspended sediments</td>
<td>Construction activities upstream of the SAC could impact on marine habitat through the release of suspended sediments and associated nutrients or through pollution incidents from</td>
<td>Strictly adhere to best practice protocols and SOPs during design, construction and</td>
<td>No</td>
<td></td>
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<tr>
<td>Site name (site code)</td>
<td>Qualifying interests</td>
<td>Potential source of impact</td>
<td>Pathway</td>
<td>Potential Impact</td>
<td>Avoidance/mitigation measures</td>
<td>Residual impact</td>
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<td>levels/pollutant release</td>
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<td>maintenance.</td>
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<td>Set hard defences back from the river channel or coastline, wherever possible.</td>
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<td>Avoid working in-channel, wherever possible.</td>
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<td>Careful timing of works to avoid periods of high flow that could result in increased sediment mobilisation.</td>
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<td>The design, construction and maintenance phases should be carried out using effective mitigation against erosion and sedimentation. Hydraulic model testing should be used to inform design in respect of velocity changes and ensure that it is such that in the project-level assessment, a conclusion of ‘no likely significant effect’ would be achieved.</td>
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<td>See also measures in Chapter 6.</td>
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</tbody>
</table>

There is slight potential for indirect, negative impacts from sedimentation during construction of fluvial and coastal hard defences and in-channel conveyance work. However, Wicklow Reef SAC is located offshore of Wicklow AFA and, owing to the distance from the AFA, no significant adverse impacts on reef habitats are expected.
5.9.3 Conclusions

This NIS details the findings of the Stage 2 Appropriate Assessment conducted to further examine the potential direct and indirect impacts of proposed FRM works at Wicklow AFA on the following European sites:

- The Murrough SPA (004186)
- The Murrough Wetlands SAC (002249)
- Wicklow Head SPA (004127)
- Wicklow Reef SAC (002274)

The Appropriate Assessment investigated the potential direct and indirect impacts of the proposed works on the integrity and interest features of the above European sites, alone and in-combination with other plans and projects, taking into account the sites’ structure, function and conservation objectives. Where potentially significant adverse impacts were identified, a range of mitigation and avoidance measures have been suggested to help offset them (see Chapter 6).

As a result of this Appropriate Assessment, it has been concluded that, after applying the avoidance and mitigation measures suggested (see Table 5.9.3 and Chapter 6), the FRM measures at Wicklow AFA proposed in the UoM10 FRMP have the potential to generate adverse residual impacts on The Murrough Wetlands SAC and The Murrough SPA. This relates to the potential for damage and disturbance to wetland habitats in the Tinakelly area through the construction of hard defences.

The significance of the potential impacts would need investigated further at the option design phase, with site-specific hydrological, ecological and bird surveys required to undertake a detailed Stage 2 Appropriate Assessment.

Project level assessment will be undertaken based on option designs and site surveys to further consider the attributes and targets of site specific conservation objectives.

It should also be noted that part of Ashford and Rathnew AFA is in the lower reaches of the Vartry Freshwater Pearl Mussel sensitive area. The Vartry catchment is a catchment with previous records of the Annex II species *Margaritifera*, but current status unknown and it does not currently hold any related EU designations. There is potential for FRM physical works in this AFA to have impacts on the conservation objectives for this species, including potential ‘habitat extent’ and ‘substratum quality’. Appropriate mitigation measures should be employed for project level works in this AFA to protect / enhance the habitat of this Annex II species. Further detail on this is presented in the accompanying UoM10 SEA Environmental report (RPS, IBE0600Rp0043, 2016).
6 AVOIDANCE AND MITIGATION MEASURES

6.1 GENERAL MITIGATION

General mitigation measures have been included in Chapter 6 of the FRMP. Mitigation measures are recommended where the preferred options are predicted to have negative effects (whether minor, moderate or major). In some cases where positive effects are identified, actions may be recommended to maximise the potential benefit.

The principal mitigation recommendation is that the predicted negative effects should be considered further during the next stage of option development, when details of the option (e.g. alignment and footprint of flood defences) can be optimised through detailed feasibility studies and design in order to limit identified impacts on sensitive receptors.

Further environmental studies to inform the detailed design and construction methodology should be undertaken as appropriate. These studies may involve, but are not limited to, aquatic and terrestrial habitat surveys, ornithological, ground mammal and bat surveys and fish surveys. At project level, the preferred option design and construction methodology will be subject to a further screening for Appropriate Assessment and, where necessary, Appropriate Assessment carried out.

Before any works are carried out, detailed method statements and management plans (construction and environmental) should be prepared, including timing of works and information on the specific mitigation measures to be employed for each works area. These should be completed in the option design stage and should be subject to further Appropriate Assessment where potential impacts have been identified in this NIS for the FRMP. Works should only be carried out once the method statements have been agreed with relevant authorities such as the NPWS and Inland Fisheries Ireland (IFI). At the project level it will not be sufficient to defer the production of construction method statements.

Consideration will be given to the planning and timing of construction and maintenance works. FRM works on adjoining reaches of river or coastline in different AFAs should not be scheduled to occur simultaneously with each other, or with other parallel projects.

Direct instream works such as 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. No instream or potentially significantly damaging out of river works should occur during restricted periods for relevant species and consultation should be undertaken with Inland Fisheries Ireland (IFI) in this regard.

A designated environmental officer should be appointed for environmental management of each scheme. Monitoring of project level mitigation measures should be undertaken during and after works, to ensure effectiveness.

All works and planning of works will be undertaken with regard to the OPW Environmental Management Protocols (EMP) and Standard Operating Procedures (SOP), all relevant legislation, licensing and consent requirements, and recommended best practice guidelines at the time of construction or maintenance.
Table 6.1.1: General Mitigation recommended in the FRMP

<table>
<thead>
<tr>
<th>Potential Impact</th>
<th>Proposed Mitigation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temporary disturbance and destruction of existing habitats and flora, and the displacement of fauna, along the river corridors.</td>
<td>Good planning and timing of works to minimise footprint impacts. Where applicable, prior to any vegetation clearance an appropriately qualified ecologist should be contracted to undertake a 'pre-vegetation clearance' survey for signs of nesting birds and protected and important species e.g. otters, kingfisher etc. Should important species be found during surveys the sequential approach of avoid, reduce or mitigate should be adopted to prevent significant impacts with advice from appropriately qualified professional. Vegetation and tree clearance should be minimised and only occur outside the main bird nesting season. 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. At sites where there are populations of over-wintering birds, to avoid disturbance, works should not be undertaken between September and March. Following construction, replanting and landscaping, or natural revegetating, should be undertaken in line with appropriate guidelines that aim to improve local biodiversity and wildlife, therefore will give medium and long term benefits to the biodiversity, flora and fauna of the working areas. Where possible, original sediment/soil should be reinstated to original levels to facilitate natural restoration and recolonisation of habitat. Adhere to OPW EMP and SOP or other relevant best practice at the time of development and consider integration of design as part of blue/green infrastructure plans and habitat enhancement where possible.</td>
</tr>
<tr>
<td>Temporary displacement of otters, birds, fish and other fauna during the construction period.</td>
<td>Good planning, good timing of works and sensitive construction methods are essential. Adherence to best practice at the time of construction or maintenance, e.g. NRA construction guidelines on Crossing of Watercourses, on Treatment of Otters etc., Eastern Regional Fisheries Board Requirements for 'Protection of Fisheries Habitat during Construction and Development Works at River Sites' and IFI 'Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters'. Proposed measures should be designed to minimise impact on otter habitat and shall include otter passes and fishways / ladders where possible. Pre-construction otter survey on all watercourses and any derogation licences applied for, where necessary. Adhere to OPW EMP and SOP or other relevant best practice at the time of development and maintenance.</td>
</tr>
<tr>
<td>Impact on European sites, habitats and species from construction or operation of FRM scheme.</td>
<td>Good planning and timing of works, and good construction and management practices to keep impacts to a minimum. Site and species specific mitigation provided in NIS for the FRMP including site specific surveys, timing of works etc. Provide local, connected, compensatory habitat if loss of area of Natura site is unavoidable. Adhere to OPW EMP and SOP or other relevant best practice at the time of development and maintenance.</td>
</tr>
<tr>
<td>Spread of invasive species during construction.</td>
<td>Pre-construction survey for alien invasive species along all watercourses and adjoining lands where necessary, eg. for Himalayan balsam and Japanese knotweed. Cleaning of equipment and machinery along with strict management protocols to combat the spread of invasive species. Preparation of invasive species management plan for construction and maintenance-related activities, if invasive species are recorded during the pre-construction surveys. Any imported materials will need to be free from alien invasive species. Post-construction survey for invasive species. Adhere to OPW EMP and SOP or other relevant best practice at the time of development and maintenance.</td>
</tr>
<tr>
<td>Potential Impact</td>
<td>Proposed Mitigation</td>
</tr>
<tr>
<td>---------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Culverting impacts on faunal passage, where applicable.</td>
<td>Ledges and adequate access may be required for some culverts to allow continued passage of fauna. Consideration will be given to setting back walls from the river bank as an alternative to culverts where feasible. Adhere to OPW EMP and SOP or other relevant best practice at the time of development and maintenance.</td>
</tr>
<tr>
<td>Impacts on Freshwater Pearl Mussel</td>
<td>Where freshwater pearl mussels may be impacted, an appropriate FPM expert should be consulted for surveys and in planning, scheme design and project level mitigation. Any relevant FPM Management Plans and SOPs should be adhered to and relevant best practice adhered to.</td>
</tr>
<tr>
<td>Dredging impacts on biodiversity, flora and fauna.</td>
<td>Minimise requirement for in-stream works through good planning. Good dredging practices should be implemented, along with consultation with environmental bodies e.g. IFI, on methodology and appropriate timing to cause the least amount of damage, habitat loss, and sedimentation. Dredging works should be carried out during low flow conditions and should cease during heavy rainfall and flood conditions, to reduce suspended solids in the river. Spoil and removed vegetation material from the river should be stored back from the river and a vegetation buffer zone is to be retained, in order to reduce the run-off of suspended solids back into the watercourse. In stream works should be phased to leave undamaged refugia to maintain aquatic macroinvertebrates populations within the river channel. No machinery should be allowed to operate within the river flow without full consultation and approval of the methodology of the proposed works by the relevant statutory bodies. Scoping or relevant specialist ecological surveys during the planning stage and prior to any construction works. Adhere to OPW EMP and SOP or other relevant best practice at the time of development and maintenance.</td>
</tr>
<tr>
<td>Removal of soil and rock material via dredging and excavation works during construction.</td>
<td>Re-use material where possible on site for either embankments or landscaping. Consideration for use of material such as geotext or coir mesh on embankments above rivers or streams to hold the soil allowing time for vegetation to establish, while avoiding erosion. Where applicable it is recommended that coarse aggregates (cobble and gravel) removed from the river channel should be stockpiled for replacement and rehabilitation in the reformed river bed. Such material will be stored away from the river bank to ensure that runoff from the material does not affect water quality in the river in the form of increased suspended solids.</td>
</tr>
<tr>
<td>Temporary disturbances of water quality during the construction phase</td>
<td>Good management and planning to keep water quality disturbance to a minimum. Any potential water quality issues from construction should be contained and treated to ensure no damage to natural waterbodies. Dredging and construction will have to be planned appropriately, using Best Available Techniques / Technology (BAT) at all times, to ensure water quality issues are kept to a minimum, with no significant adverse effects. Guidelines such as CIRIA Document C532 - Control of Water Pollution from Construction Sites and CIRIA documents C521 - SUDS - Design manual for Scotland and NI, and C523 - SUDS - Best Practice Manual to be adhered to. Development and consenting of environmental management plan prior to commencement of works. Adhere to OPW EMP and SOP or other relevant best practice at the time of development and maintenance.</td>
</tr>
<tr>
<td>Potential for pollution incidents during the construction phase.</td>
<td>Minimise requirement for in-stream works through good planning. Strict management and regulation of construction activities. Provision of good facilities in construction areas to help prevent pollution incidents. Preparation of emergency response plans. Good work practices including; channelling of discharges to settlement ponds, construction of silt traps, construction of cut-off ditches to prevent run-off from entering watercourse, hydrocarbon contaminants.</td>
</tr>
</tbody>
</table>
### 6.1.1 Avoidance of Impacts by Selecting Alternative Options and/or Design Solutions

This has been undertaken for all locations and options through the option development and integrated multi-criteria assessment process. Environmental constraints and opportunities highlighted through the SEA and AA processes were used to screen out environmentally unacceptable flood risk management measures in each location and then inform the identification and development of options, prior to the detailed option assessment process. This process, described in detail in Chapter 0, ensures that the options selected from the multi-criteria option assessment process were generally those that had a lower risk of significant negative impacts on European sites and that the likely impacts of the preferred flood risk management options could potentially be minimised.

<table>
<thead>
<tr>
<th>Potential Impact</th>
<th>Proposed Mitigation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interceptors installed at sensitive outfalls, appropriate storage of fuel, oils and chemicals, refuelling of plant and vehicles on impermeable surfaces away from drains / watercourses, provision of spill kits, installation of wheelwash and plant washing facilities, implementation of measures to minimise waste and ensure correct handling, storage and disposal of waste and regular monitoring of surface water quality. Adhere to OPW EMP and SOP or other relevant best practice at the time of development and maintenance.</td>
<td></td>
</tr>
<tr>
<td>Potential requirement for maintenance dredging as siltation of the channel and excess vegetative growth will naturally occur.</td>
<td>Design should aim to ensure WFD objectives are not compromised and all options will be subject to a WFD Assessment. Any negative impact on the status of a water body will only be permitted under the WFD if the strict conditions set out in WFD Article 4 are met. Where appropriate, watercourses affected by a scheme should be subjected to a River Hydromorphology Assessment Technique survey (RHAT) for pre and post scheme scenarios. Adhering to good work practices including: diversion of discharges to settlement ponds, construction of silt traps, construction of cut-off ditches to prevent run-off from entering excavations, granular materials placed over bare soils. If a channel is maintained on an as required basis, using good planning, timing and BAT, there should be only minimal temporary disturbance to the local water quality. Adhere to OPW EMP and SOP or other relevant best practice at the time of development and maintenance.</td>
</tr>
<tr>
<td>Alterations to coastal processes</td>
<td>Detailed surveys and hydrodynamic modelling to inform detailed design of coastal works to ensure no negative impacts on coastal processes.</td>
</tr>
<tr>
<td>Culverting, dredging and impoundment impacts on fisheries and potential to impede fish passage.</td>
<td>Instream works including any culverting, provision of sluice gates, penstocks and dredging operations to be undertaken during the period July to September inclusive, following consultation and agreement with IFI. All works affecting any watercourse both temporary and permanent will be agreed with the relevant drainage and fishery authorities. Project level aquatic ecology and fisheries surveys and assessment, based on option design, to be undertaken prior to consenting. Where possible bottomless culverts should be used so the natural stream bed can be retained. Proposed measures should be designed to minimise impact on fish spawning grounds, migration and habitats. Adhere to OPW EMP and SOP or other relevant best practice at the time of development and maintenance.</td>
</tr>
</tbody>
</table>
6.1.1.1 Avoid, or Reduce the Scale of, Identified Impacts through Option Development

The outline measures identified for the preferred options following the option assessment process have been reviewed in order to identify and recommend mitigation to avoid, or reduce, significant effects. Further avoidance of impacts will be achieved through careful design at the next stage of detailed option development as required.

Specific mitigation measures, other than those within the individual impact assessment sections in Chapter 5 include:

- Where possible, defences should be set back from the waterbodies and sensitive environmental habitats and species.
- Utilise environmentally sensitive techniques;
- Consideration of potential negative impacts associated with future developments at the planning stage, before development is allowed to proceed;
- Generally, areas to be coffer dammed and de-watered should be kept to the minimum required;
- Except where absolutely necessary, machinery should operate from the bankside/shore, i.e. “in the dry”;
- The contents and objectives of the Eastern River Basin Management Plan should be considered during the option design phase;
- A full work methodology should be developed prior to the commencement of any on site works;
- Works should only be carried out after a method statement, detailed plans and timing of works have been agreed with the National Parks & Wildlife Service and Inland Fisheries Ireland; and
- Timing of works in environmentally sensitive areas should be a key consideration, e.g. carrying out construction outside of the main breeding/wintering seasons as appropriate.

6.1.1.2 Mitigation of loss of Habitats and Species

- Avoid unnecessary vegetation clearance, particularly trees. Where possible, retain vegetated buffer strips. Ensure that reinstatement of appropriate, local riparian vegetation is carried out once works are completed.
- Undertake surveys and ecological assessments in relation to biodiversity, flora and fauna;
- If scope is present for applying basic instream enhancement techniques to develop suitable spawning and nursery habitats for fish, this should be pursued. The IFI Guidelines referenced below in 6.4 should be consulted in this regard during option design.
- 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. Imported materials must be free from alien invasive species.

6.1.1.3 Mitigation in relation to Lamprey & Salmonids

- Surveys should be carried out for lamprey, salmonids and other aquatic species of conservation concern, e.g. white-clawed crayfish.
- Before any area is de-watered, suitable juvenile lamprey habitat, and suitable salmonid nursery habitat in adjacent areas of river should be identified if present.
Following installation of coffer dams, the enclosed waters should be electrofished. Fish removal must be completed by IFI or persons authorised under Section 14 of the Fisheries Consolidation Acts 1959 (as amended).
Pumps used for de-watering should be provided with mesh screens to avoid taking in fish.

6.2 MITIGATION OF SUSPENDED SOLIDS POLLUTION

The construction method statement should indicate what measures will be taken to avoid sediment or soil loss associated with all aspects of the construction and how these will be monitored for effectiveness. These mitigation measures in combination with an appropriate considerable buffer area between the works and the river will serve to reduce the likelihood of silt mobilisation. Measures to mitigate against suspended solids pollution should include (but not be limited to):

- The amount of bare ground created by excavation and vegetation removal should be minimised to prevent run-off;
- 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;
- The construction method statement should include planning / contingency measures to be undertaken in the event of the risk of a flood event;
- [Where relevant] embankment material should be selected that has low silt content;
- Where construction of flood defences poses a significant risk of suspended solids and other pollution, the area of the proposed works should be isolated using coffer dams. If de-watering is necessary to allow works to proceed, water pumped from the contained area should be passed through a settlement pond or pre-fabricated settlement tanks with oil interceptor before being discharged to the river;
- For construction activities close to the river bank, eroded sediments should be retained on site with erosion and sediment control structures such as sediment traps, silt fences and sediment control ponds. Sediment ponds and grit/oil interceptors should be placed at the end of drainage channels. Sediment control measures should be regularly monitored for effectiveness.

6.3 MITIGATION OF OTHER POLLUTION

The construction Method Statement should indicate what measures will be taken to avoid pollution associated with all aspects of the construction and how these will be monitored for effectiveness. Measures to mitigate against pollutants being discharged may include (but not be limited to):

- Raw or uncured waste concrete should be disposed of by removal from the site;
- Washing out of truck mixers, concrete pumps, skips and other items of plant and equipment needing to be cleaned of concrete after use must only take place at a designated area, away from watercourses.
- Direct discharges of waste water onsite to watercourses, ditches or roadside drains will not be permitted. Waste water will be directed to a suitable treatment area within the site and treated to an appropriate standard prior to discharge by an approved method.
- Biodegradable fuels and lubricants should be used where possible;
- All fuels, lubricants and hydraulic fluids will be kept in secure bunded areas at a minimum of 10m from the river. The bunded area will accommodate 110% of the total capacity of the containers within it. Containers will be properly secured to prevent unauthorised access and misuse.
The Contractor shall indicate 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 from any drains or water bodies. Vehicles will not be left unattended during refuelling.

- Any waste oils or hydraulic fluids will be collected, stored in appropriate containers and disposed of offsite in an appropriate manner;
- Spill kits will be made available and an effective spillage procedure will be put in place with all staff properly briefed.
- All plant shall be well maintained with any fuel or oil drips attended to on an ongoing basis.
- Foul drainage from site offices etc. should be connected to a local sewer or removed to a suitable treatment facility or discharged to a septic tank system constructed in accordance with EPA guidelines;
- Tools and equipment are not to be cleaned in rivers;
- Chemicals shall be stored in sealed containers in the site lockup;
- Any chemicals shall be applied in such a way as to avoid any spillage or leakage;
- If temporary toilet facilities are used, the location of these facilities must be suitable and they must be maintained by a licensed contractor.

6.4 GUIDELINES

The following guidelines should be consulted during the detailed planning of the works phase.

- Guidelines on Protection of Fisheries during Construction Works in or adjacent to Waters, Inland Fisheries Ireland (2016).
- Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites’, Eastern Regional Fisheries Board (2003).
- Best practice toolkit of freshwater morphology measures developed by the Freshwater Morphology Programmes of Measures and Standards (POMS) study under the Shannon International River Basin District (ShIRBD) project.
- Good Practice Guidelines on the Control of Water Pollution from Construction Sites developed by the Construction Industry Research and Information Association (CIRIA).
- Pollution prevention guidelines (PPGs) in relation to a variety of activities developed by the Environmental Agency (EA), the Scottish Environmental Protection Agency (SEPA) and the Northern Ireland Environment Agency (NIEA).

The OPW’s Environmental Management Protocols and Standard Operating Procedures (OPW, 2011) set out how regional management staff manage a range of environmental aspects, including programming of works to accommodate certain environmental windows or restrictions on timing of works, and recording of data. A total of 7 No. Standard Operating Procedures (SOPs) are applied during operational works. These SOPs set out actions designed to eliminate, or substantially reduce likely impacts to identified species and their associated habitats. These include:

- Environmental Drainage Maintenance Guidance Notes (10 Steps to Environmentally Friendly Maintenance)
- Lamprey SOP
- Crayfish SOP
- Otter SOP
- Mussel SOP
- Invasive Species SOP
- Zebra Mussel SOP
- Bank Protection.
- Bush Cutting / Branch Trimming.
7 CONCLUSIONS

This NIS details the findings of the Stage 2 Appropriate assessment conducted to further examine the potential direct and indirect impacts of the FRM Options advanced in the draft FRMP for UoM10 incorporating the AFAs of Aughrim, Avoca, Bray, Greystones & Environs, Kilcoole, Loughlinstown, Newcastle, Old Connaught & Wilford and Wicklow & Ashford/Rathnew on the following European sites:

- The Murrough SPA (004186)
- The Murrough Wetlands SAC (002249)
- Ballyman Glen SAC (000713)
- Bray Head SAC (000714)
- Knocksink Wood SAC (000725)
- Glen of the Downs SAC (000719)
- Wicklow Head SPA (004127)
- Wicklow Reef SAC (002274)

These sites were identified by a screening exercise (see Chapter 3.5) that determined the risk of significant effects in relation to the above sites. The screening exercise was conducted using the source – pathway – receptor method, examining surface water, groundwater, land and air pathways.

The Appropriate Assessment (Chapter 5) has investigated the potential direct and indirect impacts of the proposed works on the integrity and interest features of the above European sites for each of the AFAs where an Option incorporating FRM measures has been proposed in the draft FRMP.

The potential direct and indirect impacts of the proposed works on the integrity and interest features of the above European sites have been investigated, alone and in-combination with other plans and projects, taking into account the sites’ structure, function and conservation objectives.

Where potentially significant adverse impacts were identified, a range of mitigation and avoidance measures have been suggested to help eliminate them by design or reduce them to acceptable levels (see Chapter 6).

As a result of this Appropriate Assessment it has been concluded that provided the avoidance and mitigation measures suggested are adopted at the project stage, the proposed draft FRM measures for the AFAs of Aughrim, Avoca, Bray, Greystones & Environs, Kilcoole, Loughlinstown, Newcastle and Old Connaught & Wilford in the UoM10 FRMP will not have a significant adverse impact on the above European sites.

However, after applying the avoidance and mitigation measures suggested (see Table 5.9.3 and Chapter 6), the FRM measures at Wicklow and Ashford & Rathnew AFAs proposed in the UoM10 FRMP have the potential to generate adverse residual impacts on The Murrough Wetlands SAC and The Murrough SPA. This relates to the potential for damage and disturbance to wetland habitats in the Tinakelly area through the construction of c. 1.15km of hard defences surrounding two properties.

As there is uncertainty due to lack of detail about projects emanating from the plan, it is appropriate to devolve further appropriate assessment undertakings to lower tiers of decision-making, i.e. the
project level. Should the FRM measures at Tinakelly be brought forward for further consideration at
the project level, the significance of the potential impacts would need investigated further at the
detailed design phase, with site-specific hydrological, ecological and bird surveys required to
undertake a detailed Stage 2 Appropriate Assessment. If these measures fail to pass the stage 2
Appropriate Assessment at project level, alternative measures will have to be considered instead
(see Section 2.1 and Figure 2.1.1).

To confirm this conclusion, the following checklist, taken from DEHLG (2009) has been completed.

Table 7.1.1 Integrity of Site Checklist (from DEHLG, 2009)

<table>
<thead>
<tr>
<th>Conservation objectives: does the project or plan have the potential to:</th>
<th>Y/N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cause delays in progress towards achieving the conservation objectives of the sites?</td>
<td>N – With the exception of identified potential residual impacts from FRM measures at Wicklow and Ashford &amp; Rathnew AFAs (see Section 5.9.2), following mitigation, no significant adverse residual impacts have been identified that will prevent achievement of the conservation objectives of the assessed sites.</td>
</tr>
<tr>
<td>Interrupt progress towards achieving the conservation objectives of the sites?</td>
<td>N - With the exception of identified potential residual impacts from FRM measures at Wicklow and Ashford &amp; Rathnew AFAs (see Section 5.9.2), following mitigation, no significant adverse residual impacts have been identified that will prevent achievement of the conservation objectives of the assessed site.</td>
</tr>
<tr>
<td>Disrupt those factors that help to maintain the favourable conditions of the site?</td>
<td>N - With the exception of identified potential residual impacts from FRM measures at Wicklow and Ashford &amp; Rathnew AFAs (see Section 5.9.2), potential adverse impacts via surface water; land and air; and groundwater pathways identified during the screening process can be mitigated against.</td>
</tr>
<tr>
<td>Interfere with the balance, distribution and density of key species that are the indicators of the favourable condition of the site?</td>
<td>N - With the exception of identified potential residual impacts from FRM measures at Wicklow and Ashford &amp; Rathnew AFAs (see Section 5.9.2), potential adverse impacts on the habitats and species of the six SACs and two SPAs are not expected as impacts can be avoided by implementing the mitigation and avoidance measures detailed.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other objectives: does the project or plan have the potential to:</th>
<th>Y/N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cause changes to the vital defining aspects (e.g. nutrient balance) that determine how the site functions as a habitat or ecosystem?</td>
<td>N - With the exception of identified potential residual impacts from FRM measures at Wicklow and Ashford &amp; Rathnew AFAs (see Section 5.9.2), potential adverse impacts from suspended solid and nutrient release are not expected as measures can be included within working protocols to ensure potential impacts are effectively mitigated.</td>
</tr>
<tr>
<td>Change the dynamics of the relationships (between, for example, soil and water or plants and animals) that define the structure and/or function of the site?</td>
<td>N - Potential adverse impacts relating to hydrological status and water quality have been identified which could impact on the functioning and dynamics of the site; however, these are not expected to be significant given the mitigation measures detailed to ensure potential impacts are effectively mitigated. The potential for significant impacts from FRM measures at Wicklow and Ashford &amp; Rathnew AFAs cannot be ruled out at the plan level (see Section 5.9.2).</td>
</tr>
<tr>
<td>Question</td>
<td>Answer</td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Interfere with predicted or expected natural changes to the site (such as water dynamics or chemical composition)?</td>
<td><strong>N - With the exception of identified potential residual impacts from FRM measures at Wicklow and Ashford &amp; Rathnew AFAs (see Section 5.9.2), potential adverse impacts from changes to the hydrological regime and suspended solid/nutrient/pollutant release are not expected, as measures can be included within working protocols to ensure potential impacts are effectively mitigated.</strong></td>
</tr>
<tr>
<td>Reduce the area of key habitats?</td>
<td><strong>N - With the exception of identified potential residual impacts from FRM measures at Wicklow and Ashford &amp; Rathnew AFAs (see Section 5.9.2), potential adverse impacts on the habitats of the six SACs and two SPAs are not expected given the mitigation measures that have been detailed.</strong></td>
</tr>
<tr>
<td>Reduce the population of key species?</td>
<td><strong>N - With the exception of identified potential residual impacts from FRM measures at Wicklow and Ashford &amp; Rathnew AFAs (see Section 5.9.2), potential impacts to the habitats supporting the aquatic, riparian and marine species for which the SACs and SPAs are designated, are not expected as impacts can be avoided by implementing the mitigation measures detailed.</strong></td>
</tr>
<tr>
<td>Change the balance between key species?</td>
<td><strong>N - With the exception of identified potential residual impacts from FRM measures at Wicklow and Ashford &amp; Rathnew AFAs (see Section 5.9.2), potential impacts on the aquatic, riparian and marine species for which the SACs and SPAs are designated, are not expected as impacts can be avoided by implementing the mitigation measures detailed.</strong></td>
</tr>
<tr>
<td>Reduce diversity of the site?</td>
<td><strong>N - With the exception of identified potential residual impacts from FRM measures at Wicklow and Ashford &amp; Rathnew AFAs (see Section 5.9.2), the identified mitigation measures to protect designated habitats and species will ensure that the current diversity of the sites is maintained.</strong></td>
</tr>
<tr>
<td>Result in disturbance that could affect population size or density or the balance between key species?</td>
<td><strong>N - With the exception of identified potential residual impacts from FRM measures at Wicklow and Ashford &amp; Rathnew AFAs (see Section 5.9.2), potential impacts to the aquatic, riparian and marine species for which the SACs and SPAs are designated, are not expected as impacts can be avoided by implementing the mitigation measures detailed.</strong></td>
</tr>
<tr>
<td>Result in fragmentation</td>
<td><strong>N - With the exception of identified potential residual impacts from FRM measures at Wicklow and Ashford &amp; Rathnew AFAs (see Section 5.9.2), the plan will not result in fragmentation of habitats.</strong></td>
</tr>
<tr>
<td>Result in loss or reduction of key features (e.g. tree cover, tidal exposure, annual flooding etc.)?</td>
<td><strong>N - With the exception of identified potential residual impacts from FRM measures at Wicklow and Ashford &amp; Rathnew AFAs (see Section 5.9.2), potential adverse impacts on SAC and SPA habitats are not expected as impacts can be avoided by implementing the mitigation measures detailed so there will be no loss of, or reduction of, key features.</strong></td>
</tr>
</tbody>
</table>
8 REFERENCES


**EC** (2002) Assessment of plans and projects significantly affecting Natura 2000 sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC.


**EC** (2011) Guidelines on the Implementation of the Birds and Habitats Directives in Estuaries and Coastal Zones with particular attention to port development and dredging

**EC** (2013) Guidelines on Climate Change and Natura 2000 Dealing with the impact of climate change on the management of the Natura 2000 Network of areas of high biodiversity value


APPENDIX A

SUMMARY OF FLOOD RISK MANAGEMENT METHODS AND THEIR HIGH LEVEL IMPACTS
## APPENDIX A

### TABLE OF FLOOD RISK MANAGEMENT METHODS AND THEIR HIGH LEVEL IMPACTS

<table>
<thead>
<tr>
<th>FRM Method</th>
<th>Likely Positive Impacts (+)</th>
<th>Likely Negative Impacts (-)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Do Nothing</strong></td>
<td>No new flood risk management measures and abandon existing defences and maintenance</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Likely Positive Impacts</strong></td>
<td><strong>Likely Negative Impacts</strong></td>
</tr>
<tr>
<td></td>
<td>- Unlikely to be significant positive impacts at a strategic level, however there is</td>
<td>- Potential for significantly increased flood risk to human health, properties and</td>
</tr>
<tr>
<td></td>
<td>the potential for local improvements to habitats and biodiversity in the vicinity of</td>
<td>infrastructure.</td>
</tr>
<tr>
<td></td>
<td>previously maintained defences.</td>
<td></td>
</tr>
<tr>
<td><strong>Existing Regime</strong></td>
<td></td>
<td><strong>Likely Negative Impacts</strong></td>
</tr>
<tr>
<td><strong>Likely Positive Impacts</strong></td>
<td></td>
<td><strong>Likely Negative Impacts</strong></td>
</tr>
<tr>
<td><strong>Existing Regime</strong></td>
<td>- Unlikely to be significant positive impacts at a strategic level.</td>
<td>- Potential for increased flood risk to human health, properties and</td>
</tr>
<tr>
<td></td>
<td></td>
<td>infrastructure due to climate change.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Existing defence works may be interfering or causing deterioration to the ecological</td>
</tr>
<tr>
<td></td>
<td></td>
<td>requirements of species and habitats and the relevant conservation objectives.</td>
</tr>
<tr>
<td><strong>Do Minimum</strong></td>
<td>Additional minimum measures to reduce flood risk in specific areas. Includes channel or</td>
<td></td>
</tr>
<tr>
<td></td>
<td>flood defence maintenance works / programme.</td>
<td></td>
</tr>
<tr>
<td><strong>Likely Positive Impacts</strong></td>
<td></td>
<td><strong>Likely Negative Impacts</strong></td>
</tr>
<tr>
<td><strong>Do Minimum</strong></td>
<td>- Unlikely to be significant positive impacts at a strategic level.</td>
<td>- Unlikely to be significant negative impacts at a strategic level. However method is</td>
</tr>
<tr>
<td></td>
<td></td>
<td>non-specific.</td>
</tr>
<tr>
<td><strong>Likely Positive Impacts</strong></td>
<td></td>
<td><strong>Likely Negative Impacts</strong></td>
</tr>
<tr>
<td><strong>Maintenance Programme</strong></td>
<td>- Unlikely to be significant positive impacts at a strategic level.</td>
<td></td>
</tr>
<tr>
<td><strong>Likely Positive Impacts</strong></td>
<td></td>
<td><strong>Likely Negative Impacts</strong></td>
</tr>
<tr>
<td><strong>Planning and Development</strong></td>
<td>- Unlikely to be significant positive impacts at a strategic level, however will</td>
<td>- Unlikely to be significant negative impacts at a strategic level. However will</td>
</tr>
<tr>
<td><strong>Likely Positive Impacts</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Planning and Development</strong></td>
<td>- Unlikely to be significant positive impacts at a strategic level, however will</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Development

prevent future additional flood risk from being created. prevent some developments which may curtail economic growth in certain areas.

### Building Regulations

Regulations on finished floor levels, flood proofing, flood resilience and SuDS.

**Building Regulations**
- Unlikely to be significant positive impacts at a strategic level, however will prevent future additional flood risk from being created.
- Unlikely to be significant negative impacts at a strategic level.

### Catchment Wide Sustainable Drainage Systems (SuDS)

Recommendations for future development drainage systems.

**SuDS**
- Slight direct positive impacts through reduction of flood risk and impacts to property and infrastructure.
- Likely to be temporary negative impacts through disturbance and inconvenience to the local population during construction.

### Land Use Management (NFM)

Runoff Control – Overland flow management through changes in land use and / or agricultural practices.

River / Floodplain Restoration - Creation of wetlands, restoration of meanders, in-channel flow retardation, floodplain flow retardation and riparian buffer zones.

Coastal Restoration - Attenuation waves and coastal surge through the creation and restoration of natural habitats.

**Runoff Control**
- Implementation of runoff control would slow down and store some potential flood waters, which will benefit the downstream population through reduction of flood risk and impacts to property and infrastructure during high frequency flood events.
- Done correctly in the appropriate locations, non-structural land use management has the potential to have positive environmental benefits through habitat creation, increased biodiversity and natural flood management.
- The creation of habitat and / or land management practices can help to improve attenuation of nutrients and reduce the loss of sediments, leading to improvements in water quality.
- By increasing habitats such as woodland and wetland, there is potential to increase carbon storage.
- Enhancing and restoring wetlands may lead to benefits to habitats and species.
- Runoff control may enhance the productivity of cultivated land and semi natural grassland by protecting soils from erosion and loss of nutrients, and through providing a more diverse habitat for pollinators and biological control of pests and disease.
- Run off control in drinking water catchments may help to reduce treatment requirements for drinking water.
- There may be benefits to freshwater fisheries from improved water quality and reduced sedimentation.
- The effects on recreation, wildlife watching and landscape are generally likely to be positive, as runoff control should improve habitat diversity and

- If misplaced, non-structural land use management has the potential to be either ineffective or actually detrimental to the local environment, through loss or displacement of native species.
- Some areas of productive agricultural land may be lost.
- An increase in the wetness of cultivated land and semi-natural grassland ecosystems may increase the prevalence of some livestock pests.
### River / Floodplain Restoration

- **biodiversity.**
  - The introduction of riparian buffer zones is unlikely to have negative impacts on habitats and species.

- **Reconnection of the river with the floodplain** will enhance the natural storage capacity and provide slight direct positive social impacts through reduction of flood risk and impacts to property and infrastructure during high frequency flood events.
- **Restoration of habitat** within the river and floodplain, and reduced erosion of the river bed and banks can help to filter nutrients and reduce sediments; which can lead to improved water quality.
- There is the potential for improved fish habitats.
- Greater areas of river and floodplain wetland habitat will provide increased biodiversity.
- River and floodplain restoration in drinking water catchments may help to reduce treatment requirements for drinking water.
- The effects on recreation, wildlife watching and landscape are generally likely to be positive, with improved habitat diversity and biodiversity.
- With improvements to biodiversity and water quality, this method may help to improve WFD status.
- With wetland enhancement there may be benefits to the connectivity and health of wetland ecosystems, and there may be benefits to carbon storage.
- There may be local improvements in recreational fishing in the area with a more natural river course and improved water quality.

- There is the potential for the direct loss of agricultural land with this method.
- The existing ecosystems in the area for restoration will be directly impacted in the short term through a potential change of land use, habitat and hydromorphology. These impacts could be positive or negative in the long term.
- If parkland areas are used the land could become unsuitable for some types of recreation, temporarily during a flood event or in the medium to long term through changing the wetness of the land.
- There could be reduced seasonal access to riparian areas for recreational activities from floodplain re-connection.
- In-stream works can release fine sediments which adversely affect fish spawning gravels.
- There is the potential for impacts on the local landscape from this; however these could be positive or negative, depending on the finished look of established vegetation.

### Coastal Restoration

- **Coastal restoration** can attenuate waves and coastal surge through the creation and restoration of natural habitats, reducing the potential flood risk.
- **Enhancement of coastal natural habitats** can help to protect from coastal erosion, provide carbon storage, and help to adapt to future climate change.
- **Restoration and creation of intertidal areas** may help to provide nurseries for fish.
- By improving the coastal environment there is likely to be benefits to recreation, amenity and wildlife experience.

- Works could cause disturbance to feeding and breeding birds.
- Restoration and creation of intertidal areas could lead to some loss of productive land.
- Works could restrict or alter access to coastal areas which could cause short or long term, local negative effects.
- In areas of longshore drift, works in one location can have implications for sediment distribution in others.
- Beach re-charge could affect sediment sources for offshore sand banks.

### Strategic Development Management

For necessary floodplain development, with integration of structural measures into development design and zoning.

- **Strategic Development**
  - Unlikely to be significant positive impacts at a strategic level, however will reduce flood risk to human health.
  - Unlikely to be significant negative impacts at a strategic level.

### Upstream Storage

Online or offline, single or multiple storage areas, with potential for embankments / engineered walls. Online storage refers to creating a dam and reservoir across the floodplain of a river, often with an outlet control structure such as an undershot culvert or sluices, to control outlet flow, and with an overflow weir and spillway. Offline storage is an area of floodplain that is embanked to prevent or control flooding within the storage area or wash-land during minor events.
### Storage

- There will be slight direct positive social impacts through the regulation of flow and reduction of flood risk and impacts to property and infrastructure.
- Recreational access to the waterway for some activities could be improved with sensitive scheme design.
- Offline storage areas should ideally be located away from the existing riparian zone and can then provide environmental benefits through the creation of high biodiversity wetlands.
- Prolonged flooding in offline storage could increase the sediment store in the floodplain and reduce sediments stored in rivers, reducing downstream sedimentation and potential flood risk.

### Improvement of Channel Conveyance

<table>
<thead>
<tr>
<th>Increase Conveyance</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>There will be slight direct positive social impacts from increasing conveyance through the regulation of flow and reduction of flood risk and impacts to</td>
<td></td>
</tr>
<tr>
<td>It may be possible to use this method within some designated areas depending on the species and habitats present. Short sections of increased channel conveyance are unlikely to have significant impacts upon species</td>
<td></td>
</tr>
</tbody>
</table>

- Online storage dams should not be placed in areas of high biodiversity or on migratory routes, therefore not within SACs or SPAs. However if the normal discharge volume is to be maintained they should be able to be placed upstream of an SAC or SPA.
- Offline storage areas should not be developed within an SAC or SPA where the designated habitat and / or species are vulnerable to flooding. This method could be further investigated within designated areas that require or are not sensitive to periodic inundation.
- Storage is likely to cause or exacerbate the disconnection between the river and the floodplain.
- There is the potential for disruption to natural processes, loss of habitat and potentially negative effects on water quality (due to loss of habitat to filter nutrients) and carbon storage.
- Erosion can be exacerbated upstream and / or downstream of storage areas with potentially significant negative effects.
- There is the potential for a reduction in pollinating services and pest and disease control due to the loss of natural habitat from direct footprint impacts.
- Embankment of rivers to create storage areas can result in the loss of natural riparian habitat that filters and removes nutrients from agriculture.
- There is the potential for long term changes to land use from direct footprint impacts.
- Loss of natural habitat and reduced biodiversity can impact recreational activities like angling and wildlife watching.
- Some storage areas may use parkland and recreational grounds which could render the land unsuitable for some types of activities, either temporarily during a flood event, or in the medium to long term through changing accessibility to the area.
- Changes to river flow and water levels could affect navigation channels.
- Prolonged flooding in offline storage could increase the sediment store in the floodplain and reduce sediments stored in rivers, disrupting the natural sediment regime.
- Drinking water quantity may be negatively impacted if using reservoirs for flood storage, as retaining lower water levels could affect water supply.
- There is likely to be temporary negative impacts through disturbance and inconvenience to the local population during construction of storage areas.
Removal of channel constraints provides the opportunity to remove barriers to fish migration. This could improve production of salmon when combined with other river restoration actions. The design of the new structures should build in requirements for migratory fish and to diversify in-stream habitat where possible.

Daylighting culverts may reduce barriers to fish barriers and improve habitats.

Culverting of an entire AFA has the potential for significant negative environmental impacts within a designated site, as it replaces the natural hydrological and ecological regime with an artificial bypass. Culverting is unlikely to be an acceptable standalone method within a designated site. Culverting however should have no hydraulic impacts upstream of a designated site.

Increasing conveyance modifies the storage and flow of water, causing or exacerbating disconnection between the river and the floodplain. There can be disruption to natural processes, the loss of habitat and potentially negative effects on water quality, due to loss of habitat to filter nutrients, and reduced carbon storage.

There is the potential for increased downstream flood risk.

Erosion can be exacerbated upstream and / or downstream of modified conveyance areas with potentially significant negative effects.

There is likely to be the direct loss of habitat and displacement of species in the vicinity of works, however these may re-establish in the medium to long term.

There is the potential for a reduction in pollinating services and pest and disease control due to the loss of natural habitat from direct footprint impacts.

There is the potential for long term changes to land use from direct footprint impacts.

Loss of natural habitat and reduced biodiversity can impact recreational activities like angling and wildlife watching.

There is the potential for reduced water quality during construction from increased sediments.

There may be temporary negative visual impacts during in-channel works.

### Hard Defences

**Fluvial flood walls or flood embankments.** Rehabilitate and / or improve existing defences

**Tidal Barrages**

**Coastal Flood walls**

**Fluvial flood walls or flood embankments**

- Hard river defences can deliver benefits by regulating water flow and reducing flood risk; therefore protecting human health, properties and infrastructure.

- Hard defences can interfere with natural process, by causing some or all of the floodplain to be disconnected from the river, which can lead to the loss of natural habitat to capture, filter and recycle nutrients or pollutants. This can
- Depending on their design, some defences can improve access for some types of recreation.

- There is likely to be a direct loss of natural and semi-natural habitat in the direct footprint and vicinity of the defences. There may be indirect negative downstream impacts from sedimentation during construction.
- Erosion may also increase either side of the defences due to changes in river processes.
- Defences could impact negatively on river morphology and sediment dynamics, and affect WFD status and classification.
- Loss of natural habitat and biodiversity can reduce the quality of the environment for recreation and wildlife watching. Within the urban landscape, direct defences have potentially negative effects through disrupting the setting and view of the river and floodplain.
- Defences may alter the setting of heritage sites.
- There is the potential for downstream increased flood risk.
- Direct defences have the potential for negative effects on freshwater fisheries due to the loss of in river and riparian habitat and sedimentation.
- There may be temporary negative impacts through disturbance and inconvenience to the local population during engineering works.
- Flood walls and embankments are unlikely to have negative impacts upon designated sites, unless the footprint of the structure is directly on the designated feature, or if they cause a greater flood hazard downstream of the feature in a vulnerable designated area.

### Tidal Barriers

- Tidal barrages can deliver benefits by regulating water flow and reducing flood risk, therefore protecting human health, properties and infrastructure.

- Tidal barrages should ideally not be placed within a designated site, however probably all estuaries where a tidal barrage could be incorporated within Ireland are designated European sites. This measure has the potential to have significant ecological impacts, particularly on migratory fish and other water dependent species.
- New tidal barriers could have potentially significant negative effects on water quality (including morphology) and erosion.
- Tidal barriers could impede fish passage and impact on upstream protected sites.

### Coastal Flood walls

- Hard coastal defences can deliver benefits by regulating water flow and reducing flood risk, therefore protecting human health, properties and infrastructure.

- New hard coastal defences on undeveloped shoreline or tidal barriers could have potentially significant negative effects on water quality, coastal morphology and erosion.
- In areas of longshore drift, defences in one location can have implications for sediment distribution in other areas.
- Coastal defences may reduce access for recreational activities.
- There are potential negative visual effects on urban and coastal landscapes.
- There are potential negative visual effects on the seascape from artificial
Rehabilitation of Existing Defences

- Changes to existing defences could potentially deliver significant positive environmental effects, for example, by setting back defences from the shoreline or river.
- Sensitive rehabilitated defences may help to improve amenity, particularly if the shoreline is already modified.

Although existing defences have an established footprint and have an established hydraulic impact, rehabilitation of existing flood defence measures has the potential to result in impacts such as pollution, changes in sedimentation, disturbance, deterioration, damage and other impacts on species distribution arising from construction or repair activities. Regard must therefore be undertaken for the planning and implementation of such activities.

Relocation

Abandoning existing properties and relocating to existing or new properties outside the floodplain.

- Reduced flood risk to human health and properties.

Potential for direct, significant, long term social impacts to those required to relocate. These impacts could however be positive or negative depending on the occupant's attitude to relocating. There is the potential for indirect, significant social impacts to residents through fragmentation of neighbourhoods. There is the potential for indirect, significant social impacts to relocated commercial properties if old customers do not frequent the new premises.
- There are unlikely to be any significant impacts on the environment from the relocation of properties/infrastructure away from flood risk areas, provided the new properties / infrastructure are not relocated to environmentally sensitive areas.

Flow Diversion

Diversion of Flow - Realignment of entire river, diversion channel out of river basin and/or bypass channel to return flow downstream.

- There will be direct positive social impacts from diversion of flow through the reduction of flood risk and impacts to property and infrastructure.

Flow diversion includes realigning the entire river or creating by-pass channels. They are usually implemented in the immediate vicinity of the AFA and any impacts are likely to be localised. There will however be direct negative impacts on local existing habitats in the footprint of the diversion channel.
- Flow diversions have the potential to interfere with the hydrology of a river and its structure and function and thus may have implications for habitats where natural hydrological processes need to be maintained and/or restored and also in habitats where flooding is an important constituent element.
- Full diversion of a watercourse should not be proposed within a designated site, as is likely to impact upon the designation criteria.
- There should be limited impact from bypass channels if the normal flow in the original channel is maintained and the bypass channel is not created in a...
| **Overland Floodways** | habitat that is sensitive to flooding.  
Diversion of flow may just transfer the flood risk to another location.  
Overland floodways should not be proposed within designated sites where the designated habitat and / or species are vulnerable to flooding, as there is the potential for significant negative environmental impacts during a flood event. This measure may be further investigated within designated areas that require or are not sensitive to periodic inundation.  
Overland floodways may just transfer the flood risk to another location. |
|---|---|
|  ▪ There will be direct positive social impacts from using overland floodways through the reduction of flood risk and impacts to property and infrastructure.  
Other Works  
Minor raising of existing defences / levels, infilling gaps in defences, site specific localised protection works, etc.  
Other Works  
Unknown  
Site Specific Protection Works  
Unlikely to be significant positive impacts at a strategic level.  
Unlikely to be significant negative impacts at a strategic level. However method is non-specific.  
Flood Forecasting  
Monitoring rain and flows and alerting relevant recipients of flood risk likely to occur.  
Flood Forecasting  
Unlikely to be significant positive impacts at a strategic level, however will reduce flood risk to human health.  
Unlikely to be significant negative impacts at a strategic level.  
Public Awareness  
Make public aware of risk and advice on measures to protect themselves and properties.  
Public Awareness  
Unlikely to be significant positive impacts at a strategic level, however will reduce flood risk to human health.  
Unlikely to be significant negative impacts at a strategic level.  
Individual Property Protection  
Flood proofing, flood gates, capping vents and / or resilience measures.  
Individual Property Protection  
Property level protection may provide positive impacts to those provided with protective equipment by giving them more peace of mind. There will be positives for the public that can protect themselves from small flood events, reducing or even eliminating damages that would otherwise cause disturbance and inconvenience.  
Unlikely to be significant negative impacts at a strategic level, provided property protection does not impact on protected structures or monuments and their setting. |
APPENDIX B

SCREENING OF EUROPEAN SITES WITH POTENTIAL TO BE IMPACTED BY THE
EASTERN CFRAM STUDY
## APPENDIX B

### UoM10 SCREENING TABLES

<table>
<thead>
<tr>
<th>Name: Baldoyle Bay SAC</th>
<th>Site code: (IE000199)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Qualifying Interest(s)</strong></td>
<td>Annex I Habitat: Mudflats and sandflats not covered by seawater at low tide [1140], Atlantic salt meadows (<em>Glauco-Puccinellietalia maritimae</em>) [1330], Mediterranean salt meadows (<em>Juncetalia maritimi</em>) [1410] and Salicornia and other annuals colonizing mud and sand [1310]</td>
</tr>
<tr>
<td><strong>Proximity to AFA(s) and Linkage</strong></td>
<td>Baldoyle Bay is a tidal estuarine bay protected from the open sea by a large sand - dune system. Large areas of intertidal flats are exposed at low tide at this site. These are mostly sands but grade to muds in the inner sheltered parts of the estuary. Baldoyle Bay is an important bird site for wintering waterfowl and the inner part of the estuary is a Special Protection Area under the E.U. Birds Directive as well as being a Statutory Nature Reserve. Baldoyle Bay SAC is located in UoM09, but it is also located within 15km of UoM10 and thus has the potential to be influenced by the UoM10 FRMP. It has therefore been included in the screening. Baldoyle Bay SAC is in a separate hydrometric area from the AFAs in UoM10 and therefore has no direct hydraulic connectivity with the river catchments of the AFAs in UoM10, the nearest of which are Loughlinstown (15.6 km) and Old Connaught &amp; Wilford (17.8 km). There is no potential connectivity between the qualifying interests of this European site and the AFAs in UoM10 by virtue of a biodiversity corridor or stepping stone, or by groundwater, land or air pathways. There is not considered to be any potential impact from the use of FRM methods used in the catchments of the AFAs in UoM10 and the qualifying interests of this European site.</td>
</tr>
<tr>
<td><strong>Potential Impacts</strong></td>
<td>There is not considered to be any potential impact pathway between the qualifying interests of Baldoyle Bay SAC and the implementation of FRM methods for any of the AFAs in UoM10. Consequently this site has been removed from requiring any further screening for the UoM10 FRMP.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Name: Baldoyle Bay SPA</th>
<th>Site code: (IE004016)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Qualifying Interest(s)</strong></td>
<td>Wetland and Waterbirds [A999] supporting populations of Species of Special Conservation Interest: Light-bellied Brent Goose (<em>Branta bernicla hrota</em>) [A046], Shelduck (<em>Tadorna tadorna</em>) [A048], Ringed Plover (<em>Charadrius hiaticula</em>) [A137], Golden Plover (<em>Pluvialis apricaria</em>) [A140], Grey Plover (<em>Pluvialis squatarola</em>) [A141] and Bar-tailed Godwit (<em>Limosa lapponica</em>) [A157]</td>
</tr>
<tr>
<td><strong>Proximity to AFA(s) and Linkage</strong></td>
<td>Baldoyle Bay is a tidal estuarine bay protected from the open sea by a large sand - dune system. Large areas of intertidal flats are exposed at low tide at this site. These are mostly sands but grade to muds in the inner sheltered parts of the estuary. Baldoyle Bay is an important bird site for wintering waterfowl and the inner part of the estuary is a Special Protection Area under the E.U. Birds Directive as well as being a Statutory Nature Reserve. Baldoyle Bay SPA is located in UoM09, but it is also located within 15km of UoM10 and thus has the potential to be influenced by the UoM10 FRMP. It has therefore been included in the screening. Baldoyle Bay SPA is in a separate hydrometric area from the AFAs in UoM10 and therefore has no direct hydraulic connectivity with the river catchments of the AFAs in UoM10, the nearest of which are Loughlinstown (15.6 km) and Old Connaught &amp; Wilford (18.0 km). There is no potential connectivity between the qualifying interests of this European site and the AFAs in UoM10 by virtue of a biodiversity corridor or stepping stone, or by groundwater, land or air pathways. There is not considered to be any potential impact from the use of FRM methods used in the catchments of the AFAs in UoM10 and the qualifying interests of this European site.</td>
</tr>
</tbody>
</table>
There is not considered to be any potential impact pathway between the qualifying interests of Baldoyle Bay SPA and the implementation of FRM methods for any of the AFAs in UoM10. Consequently this site has been removed from requiring any further screening for the UoM10 FRMP.

### Name: Ballyman Glen SAC  
**Site code:** (IE000713)

<table>
<thead>
<tr>
<th>Qualifying Interest(s)</th>
<th>Annex I Habitat: Alkaline fens [7230] and Petrifying springs with tufa formation ([Cratoneurion] [7220])</th>
</tr>
</thead>
</table>

**Proximity to AFA(s) and Linkage**

Ballyman Glen is situated approximately 3 km north of Enniskerry and straddles the County boundary between Dublin and Wicklow. It is orientated in an east-west direction with a stream running through the centre. The glen is bounded mostly by steeply sloping pasture with Gorse and areas of wood and scrub. Ballyman Glen contains a small strip of alkaline fen which is associated with petrifying spring/seepage areas that have given rise to thick deposits of marl. There are six AFAs from UoM10 within 15km of Ballyman Glen SAC. These are: Bray (0.0km), Greystones (5.5km), Kilcoole (10.0km), Loughlinstown (4.6km), Newcastle (13.7km) and Old Connaught & Wilford (0.0km).

The AFAs of Greystones, Kilcoole, Loughlinstown and Newcastle are all coastally-located (Greystones and Loughlinstown are subject to coastal flood risk in addition to fluvial flood risk) and in separate river catchments with no hydraulic connectivity to the Ballyman Glen SAC. There is no potential connectivity between the qualifying interests of this European site and the AFAs in UoM10 by virtue of a biodiversity corridor or stepping stone, or by groundwater, land or air pathways. There is not considered to be any potential impact from the use of FRM methods used in the catchments of the AFAs in UoM10 and the qualifying interests of this European site.

The SAC is partly within the AFAs of Bray and Old Connaught & Wilford. There is potential for direct impact on the qualifying interest of Ballyman Glen SAC from FRM methods at these AFAs.

<table>
<thead>
<tr>
<th>Potential Impacts</th>
<th>There exists the potential for direct impacts on the qualifying interests of Ballyman Glen SAC from FRM methods at Bray and Old Connaught &amp; Wilford AFAs. Appropriate Assessment is required to assess the significance of these impacts.</th>
</tr>
</thead>
</table>

### Name: Bray Head SAC  
**Site code:** (IE000714)

<table>
<thead>
<tr>
<th>Qualifying Interest(s)</th>
<th>Annex I Habitat: Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] and European dry heaths [4030]</th>
</tr>
</thead>
</table>

**Proximity to AFA(s) and Linkage**

Bray Head is a coastal site situated in the north-east of Co. Wicklow between the towns of Bray and Greystones. The bedrock geology is Cambrian quartzites and shales (with mudstones and greywackes). Bray Head consists of a plateau of high ground, with five prominent quartzite knobs and has a maximum height of 241 m. Bray Head is of high conservation importance as it has good examples of two habitats (sea cliffs and dry heath) listed on Annex I of the E.U. Habitats Directive. It also supports a number of rare plant species and has ornithological importance.

There are seven AFAs from UoM10 within 15km of Bray Head SAC. These are: Ashford/Rathnew (14.8km), Bray (0.0km), Greystones (0.0km), Kilcoole (3.6km), Loughlinstown (5.5km), Newcastle (8.3km) and Old Connaught & Wilford (2.1km).

The AFAs of Ashford/Rathnew, Kilcoole, Loughlinstown and Newcastle are all coastally-located (Ashford/Rathnew and Loughlinstown are subject to coastal flood risk in addition to fluvial flood risk) and are separated from Bray Head SAC by several km of open coastal waters. It is concluded that the distance between the AFAs and the European site is such that no potential impact pathway exists between these AFAs and the European site, nor is any connectivity evident by virtue of a biodiversity stepping stone or corridor.
The AFA of Old Connaught & Wilford is 2.1km along the coast from the SAC. The main pressures on the qualifying interests are described in the context of increased/enriched water seepage down the cliff face from development near cliff tops. In this context, it is considered that there is no potential impact pathway between the AFA and the qualifying interests of the Bray Head SAC.

The AFAs of Bray and Greystones are partly within the Bray Head SAC. There is potential for direct impact on the qualifying interests of Bray Head SAC from FRM methods at these AFAs.

### Potential Impacts

There exists the potential for direct impacts on the qualifying interests of Bray Head SAC from FRM methods at Bray and Greystones AFAs. Appropriate Assessment is required to assess the significance of these impacts.

### Name: Buckroney-Brittas Dunes and Fen SAC

<table>
<thead>
<tr>
<th>Qualifying Interest(s)</th>
<th>Site code: (IE000729)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annex I Habitat: Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130], Embryonic shifting dunes [2110], Humid dune slacks [2190], Alkaline fens [7230], Annual vegetation of drift lines [1210], Shifting dunes along the shoreline with Ammophila arenaria (white dunes) [2120], Atlantic decalcified fixed dunes (Calluno-Ulicetea) [2150], Dunes with Salix repens ssp. argentea (Salix arenariae) [2170], Mediterranean salt meadows (Juncetalia maritimi) [1410] and Perennial vegetation of stony banks [1220]</td>
<td></td>
</tr>
</tbody>
</table>

### Proximity to AFA(s) and Linkage

Buckroney-Brittas Dunes and Fen SAC comprises two main sand dune systems, Brittas Bay and Buckroney Dunes, connected on the coast by the rocky headland of Mizen Head. The dunes have cut off the outflow of a small river at Mizen Head and a fen, Buckroney Fen, has developed. There are four AFAs within 15km of Buckroney-Brittas Dunes and Fen SAC. These are: Ashford/Rathnew (10.1km), Aughrim (13.5km), Avoca (5.8km) and Wicklow (6.8km).

The AFAs of Aughrim and Avoca are located upstream on the Aughrim and Avoca rivers respectively, which are in a separate catchment to the watercourses passing through the SAC with no hydraulic connectivity. The Avoca river discharges into the sea at Arklow, approximately 5km south of the boundary of the Buckroney-Brittas Dunes and Fen SAC. Due to the distance between the discharge point and the SAC, across open coastal waters, there is considered to be no potential impact pathway between Avoca and Aughrim AFAs and the qualifying interests of Buckroney-Brittas Dunes and Fen SAC.

The AFAs of Ashford/Rathnew and Wicklow are subject to both fluvial and coastal flood risk. These are separated from the Buckroney-Brittas Dunes and Fen SAC by c. 9km of open coastal waters and Wicklow Head. Due to the distance between the SAC, across open coastal waters, there is considered to be no potential impact pathway between Ashford/Rathnew and Wicklow AFAs and the qualifying interests of Buckroney-Brittas Dunes and Fen SAC.

### Potential Impacts

As there is no potential impact pathway between the qualifying interests of the Buckroney-Brittas Dunes and Fen SAC and the AFAs in UoM10, it has been concluded that the SAC will not be impacted by any of the FRM methods proposed in the UoM10 FRMP. Consequently the SAC has been removed from any further screening.

### Name: Carriggower Bog SAC

<table>
<thead>
<tr>
<th>Qualifying Interest(s)</th>
<th>Site code: (IE000716)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annex I Habitat: Transition mires and quaking bogs [7140]</td>
<td></td>
</tr>
</tbody>
</table>

### Proximity to AFA(s) and Linkage

Carriggower Bog is situated on Calary plateau at the eastern edge of the Wicklow Mountains. The site is an area of wet bog and poor fen, flanked by the Vartry River on the south-western side. This site is of conservation importance because it shows a good transition between fen and bog vegetation (with the fen being colonised by characteristic bog species.

There are eight AFAs in UoM10 within 15km of the Carriggower Bog SAC. These are: Ashford/Rathnew (9.0km), Bray (8.0km), Greystones (5.0km), Kilcoole (5.0km), Loughlinstown (15.0km), Newcastle (5.3km), Old Connaught & Wilford (10.0km) and Wicklow (13.0km).
A review of the hydraulic and environmental data in the area shows that Carriggower Bog SAC is hydraulically connected to Ashford/Rathnew AFA via the Vartry River and Vartry Reservoirs. Carriggower Bog SAC is also hydraulically linked to Kilcoole AFA via the Kilmullin River. Carriggower SAC is upstream of the Vartry Reservoir, the impoundment of which is considered to pose a barrier to any impact pathway between the AFA and the SAC. The SAC is in the uppermost reaches of the Kilmullin River catchment and is approximately 6.8km upstream from Kilcoole AFA. There is no possibility of any upstream / upcatchment FRM methods being adopted for Kilcoole AFA that would have any impact on the qualifying interests or conservation objectives of Carriggower Bog SAC.

The AFAs of Bray, Greystones, Loughlinstown, Newcastle, Old Connaught & Wilford and Wicklow are all coastally located and have no hydraulic connectivity with the Carriggower Bog SAC. There is no potential connectivity between the qualifying interests of this European site and the AFAs in UoM10 by virtue of a biodiversity corridor or stepping stone, or by groundwater, land or air pathways. There is not considered to be any potential impact from the use of FRM methods used in the catchments of the AFAs in UoM10 and the qualifying interests of this European site.

Potential Impacts
As there is no potential impact pathway between the qualifying interests of the Carriggower Bog SAC and the AFAs in UoM10, it has been concluded that the SAC will not be impacted by any of the FRM methods proposed Eastern CFRAM Study. Consequently the SAC has been removed from any further screening.

Name: Dalkey Islands SPA  
Site Code: (IE004172)

<table>
<thead>
<tr>
<th>Qualifying Interest(s)</th>
<th>Species of Special Conservation Interest: Roseate Tern (<em>Sterna dougallii</em>) [A192], Common Tern (<em>Sterna hirundo</em>) [A193], Arctic Tern (<em>Sterna paradisaea</em>) [A194]</th>
</tr>
</thead>
</table>

Proximity to AFA(s) and Linkage
Dalkey Islands SPA is a short distance offshore from UoM09 but it is also located within 15km of UoM10 and therefore has been included in the screening. There are 12 AFAs within 15km of Dalkey Islands SPA; seven in UoM09 and five in UoM10. The AFAs in UoM10 with potential to influence the SPA are: Bray (6.5km), Greystones (11.4km), Kilcoole (15.6km), Loughlinstown (2.8km) and Old Connaught & Wilford (4.5km). All of these AFAs are coastally-located and Bray, Greystones and Loughlinstown are subject to coastal flood risk as well as fluvial. These AFAs, the closest of which is Loughlinstown, 2.8km from the site, are separated from the Dalkey Islands by open coastal waters with strong tidal currents present in Dalkey Sound and Muglins Sound. It is considered that the deep waters and strong currents surrounding the islands would rule out the potential for an impact pathway to be present between the AFAs in UoM10 and the SPA. No impacts from the implementation of FRM methods in these five AFAs, such as the alteration of flows within the affected watercourses, alterations to the sediment regime where those watercourses discharge into the Irish Sea or impacts from the implementation from coastal FRM methods, are predicted to reach the qualifying interests of the Dalkey Islands SPA.

Potential Impacts
It is considered that there is no potential impact pathway between the qualifying interests of the Dalkey Islands SPA and the AFAs of Bray, Greystones, Kilcoole, Loughlinstown and Old Connaught & Wilford in UoM10. Dalkey Islands SPA will therefore not be impacted by any of the FRM methods proposed in UoM10. Consequently the site has been removed from any further screening.

Name: Deputy’s Pass Nature Reserve SAC  
Site code: (IE000717)

<table>
<thead>
<tr>
<th>Qualifying Interest(s)</th>
<th>Annex I Habitat: Old sessile oak woods with <em>Ilex</em> and <em>Blechnum</em> in British Isles [91A0]</th>
</tr>
</thead>
</table>

Proximity to AFA(s) and Linkage
Deputy’s Pass woodland is located on the northern spur of the Deputy’s Pass near Glenealy in Co. Wicklow. It was designated a Nature Reserve in 1982. Deputy’s Pass is managed as a Nature Reserve and is part of an internationally important series of oak woods in Co. Wicklow which are almost certainly natural in origin and which retain much of their original character.
and species composition. The site supports breeding populations of the Smooth Newt and the Common Frog, amphibians protected by the Wildlife Act, 1976. There are 5 AFAs within 15km of Deputy’s Pass Nature Reserve SAC. These are: Ashford/Rathnew (5.5km), Aughrim (13.9km), Avoca (9.9km), Newcastle (12.6km) and Wicklow (5.3km).

Examination of the available watercourse and environmental data shows that Deputy’s Pass Nature Reserve SAC is contained within the catchment of the Potter’s River, which has no hydraulic connectivity with any of the other catchments in which the surrounding AFAs are located. There is no potential connectivity between the qualifying interests of this European site and the AFAs in UoM10 by virtue of a biodiversity corridor or stepping stone, or by groundwater, land or air pathways. There is not considered to be any potential impact from the use of FRM methods used in the catchments of the AFAs in UoM10 and the qualifying interests of this European site.

### Potential Impacts

As there is no potential impact pathway between the qualifying interests of the Deputy’s Pass Nature Reserve SAC and any of the AFAs in UoM10, it has been concluded that the SAC will not be impacted by any of the FRM methods proposed in the Eastern CFRAM Study. Consequently the SAC has been removed from any further screening.

### Glen of the Downs SAC

**Qualifying Interest(s) Annex I Habitat:** Old sessile oak woods with *Ilex* and *Blechnum* in British Isles [91A0]

**Proximity to AFA(s) and Linkage**

Glen of the Downs is a semi-natural oak wood situated within a steep valley created by a former glacial overflow channel. There are 8 AFAs within 15km of the SAC. These are: Ashford/Rathnew (11.3km), Bray (3.5km), Greystones (0.5km), Kilcoole (2.0km), Loughlinstown (11.0km), Newcastle (5.2km), Old Connaught & Wilford (6.2km), Wicklow (14.2km). All of these AFAs are coastally-located and with the exception of Kilcoole and Newcastle are subject to coastal flood risk as well as fluvial. The boundary of the Dublin City HPWs is 14.3km from Glen of the downs SAC.

Examination of the available watercourse and environmental data shows that Glen of the Downs SAC is on the Three Trout River, a stream which discharges to the sea via Greystones AFA. There exists the possibility of potential impacts on the SAC if upcatchment/upstream FRM methods are implemented at this AFA.

Three Trout River has no hydraulic connectivity with any of the other catchments in which the surrounding AFAs are located, nor is there any connectivity by virtue of a biodiversity corridor or stepping stone or by groundwater, land or air pathways. There is not considered to be any potential impact from the use of FRM methods used in the catchments of Bray, Kilcoole, Loughlinstown, Newcastle, Old Connaught & Wilford and Wicklow and the qualifying interests of this European site.

### Potential Impacts

There is no potential impact pathway between Glen of the Downs SAC and the implementation of FRM methods for the AFAs of Bray, Kilcoole, Loughlinstown, Newcastle, Old Connaught & Wilford and Wicklow.

There exists the potential for direct impacts on the qualifying interest of Glen of the Downs SAC from the implementation of FRM methods at Greystones AFA; Appropriate Assessment is required to assess the significance of these impacts.

### Glenasmole Valley SAC

**Qualifying Interest(s) Annex I Habitat:** Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco Brometalia*)[*important orchid sites*] [6210], Molinia meadows on calcareous, peaty or clavey-silt-laden soils (*Molinion caeruleae*) [6410] and Petrifying springs with tufa formation (*Cratoneurion*) [7220]

**Proximity to AFA(s) and Linkage**

Glenasmole Valley in south Co. Dublin lies on the edge of the Wicklow uplands, approximately
### Linkage

5 km from Tallaght. The River Dodder flows through the valley and has been impounded here to form two reservoirs which supply water to south Dublin. Glenasmole Valley contains a high diversity of habitats and plant communities, including three habitats listed on Annex I of the E.U. Habitats Directive. The presence of four Red Data Book plant species further adds to the value of the site, as does the presence of populations of several mammal and bird species of conservation interest.

There are 3 AFAs in UoM10 within 15km of Glenasmole Valley SAC. They are: Bray (13.2km), Loughlinstown (14.4km) and Old Connaught & Wilford (13.6km).

Glenasmole Valley SAC is in a separate hydrometric area from the AFAs in UoM10 and therefore has no direct hydraulic connectivity with the river catchments of the AFAs in UoM10. There is no potential connectivity between the qualifying interests of this European site and the AFAs in UoM10 by virtue of a biodiversity corridor or stepping stone, or by groundwater, land or air pathways. There is not considered to be any potential impact from the use of FRM methods used in the catchments of the AFAs in UoM10 and the qualifying interests of this European site.

### Potential Impacts

It is considered that there is no potential impact pathway between the qualifying interests of the Glenasmole Valley SAC and any of the AFAs in UoM10. It has therefore been concluded that the SAC will not be impacted by any of the FRM methods proposed in the UoM10 FRMP and as a consequence the SAC has been removed from any further screening.

### Name: Holdenstown Bog SAC

**Site code:** (IE001757)

**Qualifying Interest(s)**

Annex I Habitat: Transition mires and quaking bogs [7140]

**Proximity to AFA(s) and Linkage**

Holdenstown Bog is situated about 3 km south-east of Baltinglass, Co. Wicklow. It is a small raised bog surrounded by transition mire which has developed in a kettle hole. Holdenstown Bog is of conservation importance as an intact example of transition mire, a habitat listed on Annex I of the E.U. Habitats Directive, and for a range of plant species typical of incipient raised bog development.

Holdenstown Bog SAC is outside the Eastern CFRAM Study area, but is located within 15km of UoM10 and therefore has the potential to be influenced by the UoM10 FRMP. As such, it has been included in the screening.

Holdenstown Bog SAC is in a separate hydrometric area from the AFAs in UoM10 and therefore has no direct hydraulic connectivity with the river catchments of the AFAs in UoM10, the nearest of which is Aughrim, 23.4km away. There is no potential connectivity between the qualifying interests of this European site and the AFAs in UoM10 by virtue of a biodiversity corridor or stepping stone, or by groundwater, land or air pathways. There is not considered to be any potential impact from the use of FRM methods used in the catchments of the AFAs in UoM10 and the qualifying interests of this European site.

### Potential Impacts

As there is no potential impact pathway between the qualifying interests of Holdenstown Bog SAC and any of the AFAs in UoM10, it has been concluded that the SAC will not be impacted by the UoM10 FRMP. Consequently, the SAC has been removed from any further screening.

### Name: Howth Head Coast SPA

**Site code:** (IE004113)

**Qualifying Interest(s)**

Species of Special Conservation Interest: Kittiwake (*Rissa tridactyla*) [A188]

**Proximity to AFA(s) and Linkage**

Howth Head is a rocky headland situated on the northern side of Dublin Bay. The peninsula is composed of Cambrian rock of the Bray Group, the most conspicuous component being quartzite. The site comprises the sea cliffs extending from just east of the Nose of Howth to the tip of the Bailey Lighthouse peninsula. The marine area to a distance of 500 m from the cliff base, where seabirds socialise and feed, is included within the site. This site is of high ornithological importance, with four seabird species having populations of national
importance. It is also a traditional nesting site for Peregrine Falcon. There are two AFAs in UoM10 within 15km of Howth Head Coast SPA. The AFAs in UoM10 with potential to influence the SPA are: Loughlinstown (12.8km) and Old Connaught & Wilford (14.8km). Due to the separation distance between the AFAs and the site, which is located on the opposite (southwest) side of Dublin Bay, separated by open coastal waters, no impacts from the implementation of fluvial or coastal FRM methods in Loughlinstown and Old Connaught & Wilford AFAs are predicted to occur on the qualifying interests of Howth Head Coast SPA.

### Potential Impacts

It is considered that there is no potential impact pathway between the qualifying interests of Howth Head Coast SPA and any of the AFAs in UoM10. It has been concluded that the SPA will not be impacted by the UoM10 FRMP. Consequently, the SPA has been removed from any further screening.

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<table>
<thead>
<tr>
<th>Name: Howth Head SAC</th>
<th>Site code: (IE000202)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Qualifying Interest(s)</strong></td>
<td>Annex I Habitat: Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] and European dry heaths [4030]</td>
</tr>
<tr>
<td><strong>Proximity to AFA(s) and Linkage</strong></td>
<td>Howth Head is a rocky headland situated on the northern side of Dublin Bay. The peninsula is composed of Cambrian slates and quartzites, joined to the mainland by a post-glacial raised beach. Limestone occurs on the north-west side while glacial drift is deposited against the cliffs in places. The site is of national importance for breeding seabirds. It also displays a fine range of natural habitats, including two Annex I habitats, within surprisingly close proximity to Dublin city. The site is also of scientific importance for its seabird colonies, invertebrates and lichens. It also supports populations of at least two legally protected plant species and several other scarce plants. The AFAs in UoM10 with potential to influence the SAC are: Loughlinstown (12.3km) and Old Connaught &amp; Wilford (14.6km). Due to the separation distance between the AFAs, which are located on the opposite (southwestern) side of Dublin Bay, separated by open coastal waters, no impacts from the implementation of fluvial or coastal FRM methods in Loughlinstown and Old Connaught &amp; Wilford AFAs are predicted to occur on the qualifying interests of Howth Head SAC.</td>
</tr>
<tr>
<td><strong>Potential Impacts</strong></td>
<td>It is considered that there is no potential impact pathway between the qualifying interests of Howth Head SAC and any of the AFAs in UoM10. It has therefore been concluded that the SAC will not be impacted by any of the FRM methods proposed in the UoM10 FRMP and as a consequence the SAC has been removed from any further screening.</td>
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</tbody>
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<table>
<thead>
<tr>
<th>Name: Ireland’s Eye SAC</th>
<th>Site code: (IE002193)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Qualifying Interest(s)</strong></td>
<td>Annex I Habitat: Perennial vegetation of stony banks [1220] and Vegetated sea cliffs of the Atlantic and Baltic coasts [1230]</td>
</tr>
<tr>
<td><strong>Proximity to AFA(s) and Linkage</strong></td>
<td>Ireland’s Eye is a small island approx. 1.5km offshore from Howth Head in UoM09. Although it is considered part of UoM09 it is located within 15km of UoM10 and therefore has been included in the screening. There are no AFAs from UoM10 within 15km of Ireland’s Eye SAC; the nearest AFA is Loughlinstown, c.17km away. There is no potential impact pathway between Loughlinstown AFA and this SAC, or from any of the other AFAs in UoM10.</td>
</tr>
<tr>
<td><strong>Potential Impacts</strong></td>
<td>It is considered that there is no potential impact pathway between the qualifying interests of Ireland’s Eye SAC and any of the AFAs in the Eastern CFRAM Study Area. It has therefore been concluded that the SAC will not be impacted by any of the FRM methods proposed in the UoM10 FRMP and as a consequence the SAC has been removed from any further screening.</td>
</tr>
</tbody>
</table>
## Ireland's Eye SPA

**Site code:** (IE004117)

**Qualifying Interest(s):**
- Species of Special Conservation Interest: Cormorant (*Phalacrocorax carbo*) [A017], Herring Gull (*Larus argentatus*) [A184], Kittiwake (*Rissa tridactyla*) [A188], Guillemot (*Uria aalge*) [A199], Razorbill (*Alca torda*) [A200]

**Proximity to AFA(s) and Linkage:**
Ireland’s Eye is a small island approx. 1.5km offshore from Howth Head in UoM09. Although it is considered part of UoM09 it is located within 15km of UoM10 and therefore has been included in the screening.

There are no AFAs from UoM10 within 15km of Ireland’s Eye SPA; the nearest AFA is Loughlinstown, c.16.5km away. There is no potential impact pathway between Loughlinstown AFA and this SPA, or from any of the other AFAs in UoM10.

**Potential Impacts:**
It is considered that there is no potential impact pathway between the qualifying interests of Ireland’s Eye SPA and any of the AFAs in UoM10. It has therefore been concluded that the SPA will not be impacted by any of the FRM methods proposed in the UoM10 FRMP and as a consequence the SPA has been removed from any further screening.

## Kilpatrick Sandhills SAC

**Site code:** (IE001742)

**Qualifying Interest(s):**
- Annex I Habitat: Annual vegetation of drift lines [1210], Embryonic shifting dunes [2110], Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120], Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] and Atlantic decalcified fixed dunes (*Calluno-Ulicetea*) [2150].

**Proximity to AFA(s) and Linkage:**
Kilpatrick Sandhills SAC is at the southernmost extent of the Eastern CFRAM Study area. There is one AFA from UoM10 located within 15km from the SAC – Avoca (12.5km).

The Avoca River discharges unto the sea approximately 6.5km north of Kilpatrick Sandhills SAC and Avoca AFA is around 10km upstream on the river. Due to their relative geographic locations, there would be no potential connectivity between Avoca AFA and the qualifying interests of the Kilpatrick Sandhills SAC.

**Potential Impacts:**
It is considered that there is no potential impact pathway between the qualifying interests of Kilpatrick Sandhills SAC and Avoca AFA, or any of the other AFAs in the Eastern CFRAM Study Area. It has therefore been concluded that the SAC will not be impacted by any of the FRM methods proposed in the Eastern CFRAM Study and as a consequence the SAC has been removed from any further screening.

## Knocksink Wood SAC

**Site code:** (IE000725)

**Qualifying Interest(s):**
- Annex I Habitat: Petrifying springs with tufa formation (*Cratoneurion*) [7220] and Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) [91E0]

**Proximity to AFA(s) and Linkage:**
Knocksink Wood is situated in the valley of the Glencullen River, just north-west of Enniskerry in Co. Wicklow. The fast flowing Glencullen River winds its way over granite boulders along the valley floor. The steep sides of the valley are mostly covered with calcareous drift, and support extensive areas of woodland. The importance of this site lies in the diversity of woodland habitats which occur. Two habitats listed in Annex I of the E.U. Habitats Directive, both with priority status, occur at this site (petrifying springs and alluvial woodland). The presence of rare or threatened plants and invertebrates adds to the interest.

There are six AFAs from UoM10 within 15km of Knocksink Wood SAC. These are: Bray (0.7km), Greystones (6.5km), Kilcoole (10.4km), Loughlinstown (5.6km), Newcastle (13.7km), Old Connaught & Wilford (1.7km).

Knocksink Wood SAC is on the Glencullen River, which runs adjacent to the boundary of the
Bray AFA before joining the Dargle River where it then passes through Bray AFA before discharging into the Irish Sea. There exists the possibility of potential impacts on the SAC if upcatchment/upstream FRM methods are implemented at Bray AFA.

The AFAs of Greystones, Kilcoole, Loughlinstown and Newcastle are coastally-located and are unconnected to the Glencullen/Dargle River catchments. The AFA of Old Connaught & Wilford is indirectly connected to the Dargle River via a stream which rises in the hillside above Ballyman Glen and passes along the AFA’s southwestern boundary before joining the River Dargle in Bray. However, there is considered to be no potential impact pathway between Old Connaught & Wilford AFA and Knocksink Wood SAC.

Potential Impacts

There is no potential impact pathway between Knocksink Wood SAC and the AFAs of Greystones, Kilcoole, Loughlinstown, Newcastle and Old Connaught & Wilford. There exists the potential for direct impacts on the qualifying interests of Knocksink Wood SAC from the implementation of FRM methods at Bray AFA; Appropriate Assessment is required to assess the significance of these impacts.

Name: Magherabeg Dunes SAC

Site code: (IE001766)

Qualifying Interest(s)

Magherabeg Dunes SAC is a sand dune system situated at Ardmore Point, about 5km south of Wicklow Head in Co. Wicklow. The Three Mile Water River enters the sea through the dunes. The site is fairly intact, though some areas are being naturally eroded by wind and sea, in particular at the southern end, where bedrock has been exposed. The site is of conservation importance because it is a fine example of a dune system which is fairly intact and which has a well-developed flora. The presence of wetland vegetation on the site is of additional interest.

There are four AFAs within 15km of Magherabeg Dunes SAC. These are: Ashford/Rathnew (6.7km), Avoca (12.7km), Newcastle (13.8km) and Wicklow (3.0km).

Avoca and Newcastle AFAs are subject to fluvial flooding only; no potential impacts are predicted to occur on the qualifying interests of the SAC as they are not susceptible to any potential alterations of flow from the Avoca or Newcastle River, or alterations to the sediment regime at the mouth of the Avoca or Newcastle rivers.

The AFAs of Ashford/Rathnew and Wicklow are subject to both coastal and fluvial flooding. These AFAs are separated from Magherabeg Dunes SAC by approximately 6km of coastline, including Wicklow Head. No potential impacts are predicted to occur on the qualifying interests of the SAC from fluvial FRM methods as they are not susceptible to any potential alterations of flow from the Vartry, Rathnew, Burkeen, Ballynerin or Ballyguile Rivers, or alterations to the sediment regime at the mouth of these rivers. No potential impacts are predicted to occur on the qualifying interests of the SAC from the implementation of coastal FRM methods, as the AFAs are in a separate coastal sediment cell (for which Wicklow Head forms the boundary) from the SAC.

Potential Impacts

It is considered that there is no potential impact pathway between the qualifying interests of Magherabeg Dunes SAC and any of the AFAs in the Eastern CFRAM Study Area. It has therefore been concluded that the SAC will not be impacted by any of the FRM methods proposed in the UoM10FRMP and as a consequence the SAC has been removed from any further screening.

Name: North Bull Island SPA

Site code: (IE004006)

Qualifying Interest(s)

Wetland and Waterbirds [A999] habitat supporting Species of Special Conservation Interest: Light-bellied Brent Goose (Branta bernicla hrota) [A046], Shelduck (Tadorna tadorna) [A048],
Teal (Anas crecca) [A052], Pintail (Anas acuta) [A054], Shoveler (Anas clypeata) [A056], Oystercatcher (Haematopus ostralegus) [A130], Golden Plover (Pluvialis apricaria) [A140], Grey Plover (Pluvialis squatarola) [A141], Knot (Calidris canutus) [A143], Sanderling (Calidris alba) [A144], Dunlin (Calidris alpina) [A149], Black-tailed Godwit (Limosa limosa) [A156], Bar-tailed Godwit (Limosa lapponica) [A157], Curlew (Numenius arquata) [A160], Redshank (Tringa totanus) [A162], Turnstone (Arenaria interpres) [A169], Black-headed Gull (Chroicocephalus ridibundus) [A179]

The North Bull Island sand spit is a relatively recent depositional feature, formed as a result of improvements to Dublin Port during the 18th and 19th centuries. It is almost 5km long and 1 km wide and runs parallel to the coast between Clontarf and Sutton. Part of the interior of the island has been converted to golf courses. A well-developed and dynamic dune system stretches along the seaward side of the island. The North Bull Island SPA is an excellent example of an estuarine complex and is one of the top sites in Ireland for wintering waterfowl. It is of international importance on account of both the total number of waterfowl and the individual populations of Light-bellied Brent Goose, Black-tailed Godwit and Bar-tailed Godwit that use it.

There are four AFAs in UoM10 with the potential to influence North Bull Island SPA: Bray (15.1km), Loughlinstown (10.5km) and Old Connaught & Wilford (13.0km). The AFAs of Bray, Loughlinstown (both subject to coastal as well as fluvial flood risk) and Old Connaught & Wilford are located on the coastline south of Dublin, and are separated from Dublin Bay by Sorrento Point and the Dalkey Islands. Due to the distance between these AFAs and the North Bull Island, there is considered to be no potential impact pathway between the sites and no adverse impacts to the qualifying interests of North Bull Island SPA are expected to arise, either from the alteration of flows within the affected watercourses, from alterations to the sediment regime where those watercourses discharge into St George’s Channel or from the implementation of coastal flood protection measures.

During consultation, it was established that there is a potential impact pathway between Kilcoole AFA (24.9km from the European site) and the North Bull Island SPA, as a MSc study from UCD published in 2009 found that despite being almost 30km away, “some Brent [geese] that roost in Dublin fly to Kilcoole, Co Wicklow each day”. This potential impact pathway would need further examination at the project scale.

There is a potential impact pathway between the qualifying interests of North Bull Island SPA and Kilcoole AFA in UoM10. Appropriate Assessment is required to assess the significance of these impacts.

Name: North Dublin Bay SAC
Site code: (IE000206)

Qualifying Interest(s)
Annex I Habitat: Mudflats and sandflats not covered by seawater at low tide [1140], Annual vegetation of drift lines [1210], Salicornia and other annuals colonising mud and sand [1310], Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330], Mediterranean salt meadows (Juncetalia maritimi) [1410], Embryonic shifting dunes [2110], Shifting dunes along the shoreline with Ammophila arenaria (white dunes) [2120], Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] and Humid dune slacks [2190]

Annex II Species: Petalophyllum ralfsii (Petalwort) [1395]

This site covers the inner part of north Dublin Bay, the seaward boundary extending from the Bull Wall lighthouse across to the Martello Tower at Howth Head. The North Bull Island is the focal point of this site. This site is an excellent example of a coastal site with all the main habitats represented. The site holds good examples of nine habitats that are listed on Annex I of the E.U. Habitats Directive; one of these is listed with priority status. Several of the wintering bird species have populations of international importance, while some of the invertebrates are of national importance. The site contains a numbers of rare and scarce plants including some which are legally protected.

There are three AFAs in UoM10 with the potential to influence North Dublin Bay SAC: Bray (15.1km), Loughlinstown (10.5km) and Old Connaught & Wilford (13.1km). The AFAs of Bray, Loughlinstown (both subject to coastal as well as fluvial flood risk) and Old
Connaught & Wilford are located on the coastline south of Dublin, and are separated from Dublin Bay by Sorrento Point and the Dalkey Islands. Due to the distance between these AFAs and the North Dublin Bay SAC, there is considered to be no potential impact pathway between the sites and no adverse impacts to the qualifying interests of North Dublin Bay SAC are expected to arise, either from the alteration of flows within the affected watercourses, from alterations to the sediment regime where those watercourses discharge into St George’s Channel or from the implementation of coastal flood protection measures.

**Potential Impacts**

There is no potential impact pathway between the qualifying interests of North Dublin Bay SAC and any of the AFAs in UoM10. No further screening is required in the UoM10 assessment.

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**Name:** Poulaphouca Reservoir SPA  
**Site code:** (IE004063)

**Qualifying Interest(s)**

Species of Special Conservation Interest:  Greylag Goose (*Anser anser*) [A043] and Lesser Black-backed Gull (*Larus fuscus*) [A183]

**Proximity to AFA(s) and Linkage**

Poulaphouca Reservoir SPA, located in the western foothills of the Wicklow Mountains, was created in 1944 by damming of the River Liffey for the purpose of generating electricity from hydropower. The reservoir covers an area of approximately 20 square kilometres and is the largest inland water body in the mid-east and south-east regions. Whooper Swan, a species that is listed on Annex I of the E.U. Birds Directive. The site is also notable as a winter roost for gulls, especially Lesser Black-backed Gull.

Poulaphouca Reservoir SPA is located in UoM09. However, as it is located within 15km of UoM10 it has the potential to be influenced by AFAs in UoM10 and therefore has been screened.

Poulaphouca Reservoir SPA is in a separate hydrometric area from the AFAs in UoM10 and therefore has no direct hydraulic connectivity with the river catchments of the AFAs in UoM10, the nearest of which is Bray, 21.6km away. There is no potential connectivity between the qualifying interests of this European site and the AFAs in UoM10 by virtue of a biodiversity corridor or stepping stone, or by groundwater, land or air pathways. There is not considered to be any potential impact from the use of FRM methods used in the catchments of the AFAs in UoM10 and the qualifying interests of this European site.

**Potential Impacts**

There is not considered to be any potential impact pathway between the qualifying interests of Poulaphouca Reservoir SPA and the implementation of FRM methods for any of the AFAs in UoM10. Consequently this site has been removed from requiring any further screening for the UoM10 FRMP.

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**Name:** Red Bog, Kildare SAC  
**Site code:** (IE000397)

**Qualifying Interest(s)**

Annex I Habitat: Transition mires and quaking bogs [7140]

**Proximity to AFA(s) and Linkage**

Red Bog comprises a wetland complex of lake, fen and bog situated in a hollow between ridges of glacially-deposited material and underlain by rocks of Ordovician age. It is a site of particular conservation significance, supporting a good example of transition mire, a habitat that is listed on Annex I of the E.U. Habitats Directive.

Red Bog, Kildare SAC is located in UoM09. However, as it is located within 15km of UoM10 it has the potential to be influenced by AFAs in UoM10 and therefore has been screened.

Red Bog, Kildare SAC is in a separate hydrometric area from the AFAs in UoM10 and therefore has no direct hydraulic connectivity with the river catchments of the AFAs in UoM10, the nearest of which is Bray, 24.6km away. There is no potential connectivity between the qualifying interests of this European site and the AFAs in UoM10 by virtue of a biodiversity corridor or stepping stone, or by groundwater, land or air pathways. There is not considered to be any potential impact from the use of FRM methods used in the catchments of the AFAs in UoM10 and the qualifying interests of this European site.
### Potential Impacts

There is not considered to be any potential impact pathway between the qualifying interests of Red Bog, Kildare SAC and the implementation of FRM methods for any of the AFAs in UoM10. Consequently this site has been removed from requiring any further screening for the UoM10 FRMP.

### Name: Rockabill to Dalkey Island SAC  
**Site code:** (IE003000)

#### Qualifying Interest(s)

<table>
<thead>
<tr>
<th>Annex I Habitat</th>
<th>Reef [1170]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annex II Species</td>
<td><em>Phocoena phocoena</em> (Harbour Porpoise) [1351]</td>
</tr>
</tbody>
</table>

#### Proximity to AFA(s) and Linkage

Rockabill to Dalkey Island SAC encompasses a large and broadly rectangular-shaped offshore area, measuring approximately 7 km wide and 40 km in length, extending south from Rockabill Island, running adjacent to Howth Head, and crossing the outer part of Dublin Bay to Frazer Bank in south Co. Dublin. The site encompasses Dalkey, Muglins and Rockabill islands.

There are five AFAs in UoM10 with the potential to influence Rockabill to Dalkey Island SAC: Bray (4.1km), Greystones (9.1km), Kilcoole (13.0km), Loughlinstown (1.5km) and Old Connaught & Wilford (2.3km).

With the exception of Bray (which is subject to both fluvial and coastal flood risk), all these AFAs are subject to fluvial flood risk only. Having regard to the separation distance, across coastal waters and the nature of the qualifying interests, no impacts from the implementation of FRM methods in the AFAs in UoM10 are predicted to occur on the qualifying interest of the Rockabill to Dalkey Island SAC, either from the alteration of flows within the affected watercourses, from alterations to the sediment regime where those watercourses discharge into the sea, or from the implementation of coastal flood defences.

#### Potential Impacts

As there is no potential impact pathway between the qualifying interest of the Rockabill to Dalkey Island SAC and any of the AFAs in UoM10, it has been concluded that the SAC will not be impacted by any of the FRM methods proposed in the UoM10 FRMP. Consequently the SAC has been removed from any further screening.

### Name: Slaney River Valley SAC  
**Site code:** (IE000781)

#### Qualifying Interest(s)

**Annex I Habitat:** Estuaries [1130], Mudflats and sandflats not covered by seawater at low tide [1140], Water courses of plain to montane levels with the Ranunculion fluitantis and Callirhoe-Batrachion vegetation [3260], Old sessile oak woods with Ilex and Blechnum in the British Isles [91A0], Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) [91E0]

**Annex II Species:** *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029], *Petromyzon marinus* (Sea Lamprey) [1095], *Lampetra planeri* (Brook Lamprey) [1096], *Lampetra fluviatilis* (River Lamprey) [1099], *Alosa fallax fallax* (Twaite Shad) [1103], *Salmo salar* (Salmon) [1106], *Lutra lutra* (Otter) [1355] and *Phoca vitulina* (Common Seal) [1365]

#### Proximity to AFA(s) and Linkage

Slaney River Valley SAC comprises the freshwater stretches of the River Slaney as far as the Wicklow Mountains and a number of tributaries. The site supports populations of several species listed on Annex II of the E.U. Habitats Directive, and habitats listed on Annex I of this Directive, as well as important numbers of wintering wildfowl including some species listed on Annex I of the E.U. Birds Directive. The presence of wet and broadleaved woodlands increases the overall habitat diversity and the occurrence of a number of Red Data Book plant and animal species adds further importance to the site. Overall it is of considerable conservation significance.

Slaney River Valley SAC is outside the Eastern CFRAM Study area, but is located within 15km of UoM10 and therefore has the potential to be influenced by the UoM10 FRMP. As such, it has been included in the screening.

There are no AFAs from UoM09 within 15km of the Slaney River Valley SAC. There are two AFAs in UoM10 within 15km of the European site: Aughrim (9.3km) and Avoca (13.8km). Slaney River Valley SAC is in a separate river catchment area to Aughrim and Avoca AFAs and
there is no hydraulic connectivity between the sites, nor is there any connectivity by virtue of a biodiversity stepping stone or corridor.

Slaney River Valley SAC is in a separate hydrometric area from the AFAs in UoM10 and therefore has no direct hydraulic connectivity with the river catchments of the AFAs in UoM10, the nearest of which are Aughrim (9.3km) and Avoca (13.8km). There is no potential connectivity between the qualifying interests of this European site and the AFAs in UoM10 by virtue of a biodiversity corridor or stepping stone, or by groundwater, land or air pathways. There is not considered to be any potential impact from the use of FRM methods used in the catchments of the AFAs in UoM10 and the qualifying interests of this European site.

Potential Impacts

There is not considered to be any potential impact pathway between the qualifying interests of Slaney River Valley SAC and the implementation of FRM methods for any of the AFAs in UoM10. Consequently this site has been removed from requiring any further screening for the UoM10 FRMP.

**Name:** South Dublin Bay and River Tolka Estuary SPA  
**Site code:** (IE004024)

**Qualifying Interest(s):**

Wetland and Waterbirds [A999] habitat supporting Species of Special Conservation Interest: Light-bellied Brent Goose (Branta bernicla hrota) [A046], Oystercatcher (Haematopus ostralegus) [A130], Ringed Plover (Charadrius hiaticula) [A137], Grey Plover (Pluvialis squatarola) [A141], Knot (Calidris canutus) [A143], Sanderling (Calidris alba) [A144], Dunlin (Calidris alpina) [A149], Bar-tailed Godwit (Limosa lapponica) [A157], Redshank (Tringa totanus) [A162], Black-headed Gull (Chroicocephalus ridibundus) [A179], Roseate Tern (Sterna dougallii) [A192], Common Tern (Sterna hirundo) [A193] and Arctic Tern (Sterna paradisaea) [A194]

**Proximity to AFA(s) and Linkage:**

The South Dublin Bay and River Tolka Estuary SPA comprises a substantial part of Dublin Bay. It includes the intertidal area between the River Liffey and Dun Laoghaire, and the estuary of the River Tolka to the north of the River Liffey, as well as Booterstown Marsh. A portion of the shallow marine waters of the bay is also included. The South Dublin Bay and River Tolka Estuary SPA is of international importance for Light-bellied Brent Goose and of national importance for nine other waterfowl species. As an autumn tern roost, it is also of international importance. Furthermore, the site supports a nationally important colony of Common Tern. All of the tern species using the site are listed on Annex I of the E.U. Birds Directive, as are Bar-tailed Godwit and Mediterranean Gull.

The AFAs in UoM10 with the potential to influence the South Dublin Bay and River Tolka Estuary SPA are: Bray (9.7km), Greystones (15.1km), Loughlinstown (5.1km) and Old Connaught & Wilford (7.8km). All of these AFAs are located south of Dublin Bay and are separated from it by several kilometres of open coastline, Sorrento Point and the Dalkey Islands. It is considered that due to the distances involved, across open coastal waters, there is no potential impact pathway between these AFAs and the South Dublin Bay and River Tolka Estuary SPA.

During consultation, it was established that there is a potential impact pathway between Kilcoole AFA (19.7km from the European site and the South Dublin Bay and River Tolka Estuary SPA, as a MSc study from UCD published in 2009 found that despite the AFA being almost 20km away from the European site, “some Brent [geese] that roost in Dublin fly to Kilcoole, Co Wicklow each day”. This potential impact pathway would need further examination at the project scale.

**Potential Impacts:**

A potential impact pathway has been identified between the qualifying interests of South Dublin Bay and River Tolka Estuary SPA and Kilcoole AFA in UoM10. Appropriate Assessment is required to assess the significance of these impacts.

**Name:** South Dublin Bay SAC  
**Site code:** (IE000210)
### Qualifying Interest(s)

<table>
<thead>
<tr>
<th>Annex I Habitat: Mudflats and sandflats not covered by seawater at low tide [1140]</th>
</tr>
</thead>
</table>

### Proximity to AFA(s) and Linkage

This site lies south of the River Liffey in Co. Dublin, and extends from the South Wall to the west pier at Dun Laoghaire. It is an intertidal site with extensive areas of sand and mudflats. The sediments are predominantly sands but grade to sandy muds near the shore at Merrion Gates. The main channel which drains the area is Cockle Lake. This site is a fine example of a coastal system with extensive sand and mudflats, a habitat listed on Annex I of the E.U. Habitats Directive. South Dublin Bay is also an internationally important bird site. The AFAs in UoM10 with the potential to influence the South Dublin Bay SAC are: Bray (9.8km), Greystones (15.2km), Loughlinstown (5.2km) and Old Connaught & Wilford (7.9km). All of these AFAs are located south of Dublin Bay and are separated from it by several kilometres of open coastline, Sorrento Point and the Dalkey Islands. It is considered that due to the distances involved, across open coastal waters, there is no potential impact pathway between these AFAs and the South Dublin SAC.

### Potential Impacts

There is no potential impact pathway between the qualifying interests of South Dublin Bay SAC and any of the AFAs in UoM10. No further screening is required in the UoM10 assessment.

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### Name: The Murrough SPA

#### Site code: (IE004186)

### Qualifying Interest(s)

| Wetland and Waterbirds [A999] habitat supporting Species of Special Conservation Interest: Red-throated Diver (*Gavia stellata*) [A001], Greylag Goose (*Anser anser*) [A043], Light-bellied Brent Goose (*Branta bernicla hrota*) [A046], Wigeon (*Anas penelope*) [A050], Teal (*Anas crecca*) [A052], Black-headed Gull (*Chroicocephalus ridibundus*) [A179], Herring Gull (*Larus argentatus*) [A184] and Little Tern (*Sterna albifrons*) [A195] |

### Proximity to AFA(s) and Linkage

The Murrough SPA comprises a coastal wetland complex that stretches for 13 km from Kilcoole Station, east of Kilcoole village in the north to Wicklow town in the south, and extends inland for up to 1 km in places. The site includes an area of marine water to a distance of 200m from the low water mark. A shingle ridge runs along the length of the site and carries the Dublin-Wexford railway line. The Murrough SPA is an important site for wintering waterbirds, being internationally important for Brent Goose and nationally important for Red-throated Diver, Greylag Goose, Wigeon, Teal, Black-headed Gull and Herring Gull. It is probably the most important site in the country for nesting Little Tern. The site is also of considerable importance for the wide range of coastal and freshwater habitats that it supports, including several that are listed on Annex I of the E.U. Habitats Directive.

There are seven AFAs within 15km of The Murrough SPA. They are: Ashford/Rathnew (0.0km), Bray (8.4km), Greystones (2.5km), Kilcoole (0.0km), Newcastle (0.0km), Old Connaught & Wilford (12.0km) and Wicklow (0.0km).

The AFAs of Ashford/Rathnew, Kilcoole, Newcastle and Wicklow include areas within the SPA boundary and there is potential for direct impacts on the qualifying interests from FRM methods at these AFAs.

Greystones AFA, which is subject to fluvial flood risk, is 2.5km from The Murrough SPA. There is the potential for indirect impacts from the implementation of FRM methods at Greystones on the qualifying interests of The Murrough SPA.

The AFAs of Bray and Old Connaught & Wilford are 8-12km from The Murrough and are separated from it by open coastal waters and Bray Head. There is considered to be no potential impact pathway between these AFAs and the qualifying interests of the SPA.

### Potential Impacts

There is no potential impact pathway between the qualifying interests of The Murrough SPA and the AFAs of Bray and Old Connaught & Wilford.

There exists the potential for indirect and direct impacts on the qualifying interests of The Murrough SPA from the implementation of FRM methods at Ashford/Rathnew, Greystones, Kilcoole, Newcastle and Wicklow AFAs; Appropriate Assessment is required to assess the significance of these impacts.
### UoM10 SCREENING TABLES

#### Name: The Murrough Wetlands SAC  
**Site code:** (IE002249)

**Qualifying Interest(s):**

- **Annex I Habitat:** Annual vegetation of drift lines [1210], Perennial vegetation of stony banks [1220], Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330], Alkaline fens [7230], Mediterranean salt meadows (*Juncetalia maritimi*) [1410] and Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae* [7210]

**Proximity to AFA(s) and Linkage:**

The Murrough SPA comprises a coastal wetland complex that stretches for 13 km from Kilcoole Station, east of Kilcoole village in the north to Wicklow town in the south, and extends inland for up to 1 km in places. The site includes an area of marine water to a distance of 200m from the low water mark. A shingle ridge runs along the length of the site and carries the Dublin-Wexford railway line. This site is of importance as it is the largest coastal wetland complex on the east coast of Ireland. Although much affected by drainage, it still contains a wide range of coastal and freshwater habitats, including six listed on Annex I of the E.U. Habitats Directive, some of which contain threatened plants. Areas on the site contain a rich invertebrate fauna, including several rarities. It is an important site for both wintering and breeding birds and supports a variety of species listed on Annex I of the E.U. Birds Directive. There are eight AFAs within 15km of The Murrough SAC. They are: Ashford/Rathnew (0.0km), Bray (7.4km), Greystones (1.6km), Kilcoole (0.0km), Loughlinstown (15.1km), Newcastle (0.0km), Old Connaught & Wilford (11.0km) and Wicklow (0.0km).

The AFAs of Ashford/Rathnew, Kilcoole, Newcastle and Wicklow include areas within the SAC boundary and there is potential for direct impacts on the qualifying interests from FRM methods at these AFAs.

Greystones AFA, which is subject to fluvial flood risk, is 1.6km from The Murrough SAC. There is the potential for indirect impacts from the implementation of FRM methods at Greystones on the qualifying interests of The Murrough SAC.

The AFAs of Bray, Loughlinstown, and Old Connaught & Wilford are 7.4-c.15km from The Murrough and are separated from it by open coastal waters and Bray Head. There is considered to be no potential impact pathway between these AFAs and the qualifying interests of the SAC.

**Potential Impacts:**

There is no potential impact pathway between the qualifying interests of The Murrough SAC and the AFAs of Bray, Loughlinstown, and Old Connaught & Wilford.

There exists the potential for indirect and direct impacts on the qualifying interests of The Murrough SAC from the implementation of FRM methods at Ashford/Rathnew, Greystones, Kilcoole, Newcastle and Wicklow AFAs; Appropriate Assessment is required to assess the significance of these impacts.

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#### Name: Vale of Clara (Rathdrum Wood) SAC  
**Site code:** (IE000733)

**Qualifying Interest(s):**

- **Annex I Habitat:** Old sessile oak woods with *Ilex* and *Blechnum* in British Isles [91A0]

**Proximity to AFA(s) and Linkage:**

The Vale of Clara (Rathdrum Wood) SAC is an oak woodland on the on the east side of the Avonmore River, a tributary of the Avoca River. This site is a good example of what remains of the once extensive oak forests of east Wicklow, and is representative of the relatively dry, acid oak woods of eastern Ireland. The woodlands are of considerable conservation significance as they conform to a type listed on Annex I of the E.U Habitats Directive. The historical record of land use within the woods adds to the interest of the site, as does the occurrence of a number of rare and scarce species.

There are 5 AFAs within 15km of Vale of Clara (Rathdrum Wood) SAC. These are: Ashford/Rathnew (7.2km), Aughrim (9.9km), Avoca (8.3km), Newcastle (13.4km) and Wicklow (8.6km).

The AFAs of Ashford/Rathnew, Aughrim, Newcastle and Wicklow are in separate catchments to the Avoca River and have no hydraulic connectivity with it, nor any connectivity by means of a biodiversity corridor or stepping stone.

Avoca AFA is c. 10.8km downstream of the Vale of Clara (Rathdrum Wood) SAC. There is no possibility of any upstream / upcatchment FRM methods being adopted for Avoca AFA that would have any impact on the qualifying interests or conservation objectives of the Vale of...
<table>
<thead>
<tr>
<th>Name: Wicklow Head SPA</th>
<th>Site code: (IE004127)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Qualifying Interest(s)</strong></td>
<td>Species of Special Conservation Interest: Kittiwake (<em>Rissa tridactyla</em>) [A188]</td>
</tr>
<tr>
<td><strong>Proximity to AFA(s) and Linkage</strong></td>
<td>There are four AFAs within 15km of Wicklow Head SPA. These are: Ashford/Rathnew (2.9km), Kilcoole (13.1km), Newcastle (9.0km), Wicklow (0.0km). Kilcoole and Newcastle AFAs are 9-13km from Wicklow Head SPA and are separated from it by open coastal waters. There is considered to be no potential impact pathway between these AFAs and the qualifying interest of the SPA. Ashford/Rathnew AFA is 2.9km from Wicklow Head SPA and is subject to both coastal and fluvial flood risk. However, the AFA is set back c.800m from the shoreline, inland of Broad Lough and the Leitrim River Estuary. The qualifying interest of Wicklow Head SPA will not experience any significant impacts from the alteration of flows within the affected watercourses in Ashford/Rathnew AFA, from alterations to the sediment regime where those watercourses discharge into the sea, or from the implementation of coastal flood defences. Wicklow AFA is immediately adjacent to the Wicklow Head SPA and is subject to coastal as well as fluvial flood risk. The Ballyguile Stream, which passes through the AFA, discharges into the waters of the SPA. There exists the potential for direct impacts on Wicklow Head SPA from FRM methods at Wicklow AFA.</td>
</tr>
<tr>
<td><strong>Potential Impacts</strong></td>
<td>There is no potential impact pathway between the qualifying interest of Wicklow Head SPA and the AFAs of Ashford/Rathnew, Kilcoole and Newcastle. There exists the potential for indirect and direct impacts on the qualifying interests of Wicklow Head SPA from the implementation of FRM methods at Wicklow AFA; Appropriate Assessment is required to assess the significance of these impacts.</td>
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<thead>
<tr>
<th>Name: Wicklow Mountains SAC</th>
<th>Site code: (IE002122)</th>
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<tbody>
<tr>
<td><strong>Qualifying Interest(s)</strong></td>
<td>Annex I Habitat: Oligotrophic to mesotrophic standing waters with vegetation of the <em>Littorelletea uniflorae</em> and/or <em>Isoeto-Nanojuncetea</em> [3130], Natural dystrophic lakes and ponds [3160], Northern Atlantic wet heaths with <em>Erica tetralix</em> [4010], European dry heaths [4030], Alpine and Boreal heaths [4060], Species-rich <em>Nardus</em> grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe) [6230], Blanket bogs (if active bog) [7130], Siliceous scree of the montane to snow levels (<em>Androsacetalia alpinae</em> and <em>Galeopsietalia ladani</em>) [8110], Calcareous rocky slopes with chasmophytic vegetation [8210], Siliceous rocky slopes with chasmophytic vegetation [8220] and Old sessile oak woods with <em>Ilex</em> and <em>Blechnum</em> in the British Isles [91A0] Annex II Species: <em>Lutra lutra</em> (Otter) [1355],</td>
</tr>
<tr>
<td><strong>Proximity to AFA(s) and Linkage</strong></td>
<td>Wicklow Mountains SAC is a complex of upland areas in Counties Wicklow and Dublin, flanked by the Blessington reservoir to the west and Vartry reservoir in the east, Cruagh Mountain in the north and Lybagh Mountain in the south. Most of the site is over 300 m, with much ground over 600 m. The highest peak is 925 m at Lugnaquilla. Wicklow Mountains is important as a complex, extensive upland site. It shows great diversity from a geomorphological and a topographical point of view. The vegetation provides examples of the typical upland habitats with heath, blanket bog and upland grassland covering large, relatively</td>
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</tbody>
</table>
undisturbed areas. In all, eleven habitats listed on Annex I of the E.U. Habitats Directive are found within the site. Several rare or protected plant and animal species occur, adding further to its value.

Wicklow Mountains SAC is a large SAC, spread over a number of hydrometric areas, including UoM09 and UoM10.

The AFAs in UoM10 with the potential to influence the Wicklow Mountains SAC are:
- Ashford/Rathnew (8.3km), Aughrim (10.1km), Avoca (13.8km), Bray (4.1km), Greystones (7.4km), Kilcoole (8.8km), Loughlinstown (7.8km), Newcastle (9.6km), Old Connaught & Wilford (4.9km) and Wicklow (12.4km).

All of the AFAs in UoM10, except Loughlinstown, have hydraulic connectivity with the SAC, as they are all downstream of the SAC, which provides the upland source catchment for all the principal watercourses draining through the AFAs. With the exception of Avoca and Aughrim AFAs, all of the AFAs in UoM10 are coastally located and are at the downstream extent of their river catchments. Avoca and Aughrim, although not coastal, are respectively 11 and 18km downstream from the SAC.

There is no possibility of any upstream / upcatchment FRM methods being adopted for any of the AFAs in UoM10 that would have any impact on the qualifying interests or conservation objectives of the Wicklow Mountains SAC. The upstream distance is such that there is not considered to be any potential impact pathway between any of the AFAs in UoM10 and the qualifying interests of the Wicklow Mountains SAC.

**Potential Impacts**

There is no potential impact pathway between the qualifying interests of the Wicklow Mountains SAC and any of the AFAs in UoM10. It has therefore been concluded that the SAC will not be impacted by any of the FRM methods proposed in the UoM10 FRMP. Consequently the SAC has been removed from any further screening.

---

**Name: Wicklow Mountains SPA**

**Site code:** (IE004040)

**Qualifying Interest(s)**

Species of Special Conservation Interest:
- Merlin (*Falco columbarius*) [A098]
- Peregrine (*Falco peregrinus*) [A103]

**Proximity to AFA(s) and Linkage**

Wicklow Mountains SPA is an extensive upland site, comprising a substantial part of the Wicklow Mountains. The Wicklow Mountains SPA is of high ornithological importance as it supports nationally important populations of Merlin and Peregrine, both species that are listed on Annex I of the E.U. Birds Directive.

Wicklow Mountains SPA is a large SPA, spread over a number of hydrometric areas, including UoM09 and UoM10.

The AFAs in UoM10 with the potential to influence the Wicklow Mountains SPA are:
- Ashford/Rathnew (10.3km), Aughrim (10.1km), Avoca (13.8km), Bray (4.6km), Greystones (7.1km), Kilcoole (8.8km), Loughlinstown (7.9km), Newcastle (9.6km), Old Connaught & Wilford (5.4km) and Wicklow (14.0km).

All of the AFAs in UoM10, except Loughlinstown, have hydraulic connectivity with the SPA, as they are all downstream of the SPA, which provides the upland source catchment for all the principal watercourses draining through the AFAs. With the exception of Avoca and Aughrim AFAs, all of the AFAs in UoM10 are coastally located and are at the downstream extent of their river catchments. Avoca and Aughrim, although not coastal, are respectively 11 and 18km downstream from the SPA.

There is no possibility of any upstream / upcatchment FRM methods being adopted for any of the AFAs in UoM10 that would have any impact on the qualifying interests or conservation objectives of the Wicklow Mountains SPA. The upstream distance is such that there is not considered to be any potential impact pathway between any of the AFAs in UoM10 and the qualifying interests of the Wicklow Mountains SPA.

**Potential Impacts**

There is no potential impact pathway between the qualifying interests of the Wicklow Mountains SPA and any of the AFAs in UoM10. It has therefore been concluded that the SPA will not be impacted by any of the FRM methods proposed in the UoM10 FRMP. Consequently the SPA has been removed from any further screening.
**Name:** Wicklow Reef SAC  
**Site code:** (IE002274)

<table>
<thead>
<tr>
<th>Qualifying Interest(s)</th>
<th>Annex I Habitat: Reefs [1170]</th>
</tr>
</thead>
</table>

**Proximity to AFA(s) and Linkage**

Wicklow Reef SAC is an offshore area, near Wicklow Head, measuring approximately 4.5km by 3.5km. The substrate is a mixture of cobbles, bedrock and sand and is subject to strong tidal streams. There are four AFAs within 15km of Wicklow Reef SAC. These are: Ashford/Rathnew (4.4km), Kilcoole (12.5km), Newcastle (8.3km) and Wicklow (0.9km).

The main pressures and threats to reef habitats arise from fishing/dredging, extraction, and construction. It is also noted in the Conservation Objectives Supporting Document -Marine Habitat (V1 -June 2013) for this site that there is naturally high turbidity in the waters due to the high currents.

Ashford/Rathnew, Kilcoole and Newcastle AFAs are all several km, across open coastal waters from Wicklow Reef SAC. It is considered that there is no potential impact pathway between these AFAs and the qualifying interest of the SAC.

Wicklow SAC is 0.9km from the boundary of Wicklow AFA, which is subject to both coastal and fluvial flood risk. Indirect impacts from FRM methods at Wicklow AFA are unlikely, but not impossible.

<table>
<thead>
<tr>
<th>Potential Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>There is no potential impact pathway between the qualifying interest of Wicklow Reef SAC and the AFAs of Ashford/Rathnew, Kilcoole and Newcastle.</td>
</tr>
<tr>
<td>There exists the potential for indirect impacts on the qualifying interests of Wicklow Reef SAC from the implementation of FRM methods at Wicklow AFA; Appropriate Assessment is required to assess the significance of these impacts.</td>
</tr>
</tbody>
</table>
Table C1 – Qualifying interests, key environmental conditions supporting site integrity and conservation objectives for European sites in UoM10.

<table>
<thead>
<tr>
<th>Site Name and Code</th>
<th>Qualifying interests</th>
<th>Key environmental conditions supporting site integrity</th>
<th>Conservation Objectives</th>
<th>Water-dependent</th>
</tr>
</thead>
</table>
| Ballyman Glen SAC (000713) | Petrifying springs with tufa formation *(Cratoneurion)* [7220] | Groundwater rich in calcium bicarbonate. | **Maintain/Restore** favourable conservation condition, defined by the following attributes and targets:  
**Range** – The natural range of the habitat, and the area it covers within that range, are stable or increasing.  
**Structure and functions** – The specific structure and functions which are necessary for the long-term maintenance of the habitat exist and are likely to continue to exist for the foreseeable future.  
**Typical species** – The conservation status of typical species is favourable. | Yes |
|                      | Alkaline fens [7230] | High water table; Ground-surface water supply; Calcium-rich conditions. | | |
| Bray Head SAC (000714) | Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] | Steep slopes. Sea exposure. Salinity. | **Maintain/Restore** favourable conservation condition, defined by the following attributes and targets:  
**Range** – The natural range of the habitat, and the area it covers within that range, are stable or increasing.  
**Structure and functions** – The specific structure and functions which are necessary for the long-term maintenance of the habitat exist and are likely to continue to exist for the foreseeable future.  
**Typical species** – The conservation status of typical species is favourable. | Yes |
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</tr>
</thead>
</table>
| Knocksink Wood SAC (000725) | European dry heaths [4030] | Freely-draining, acidic to circumneutral soils with low nutrient content. Extensive grazing. | Maintain/Restore favourable conservation condition, defined by the following attributes and targets:  
Range – The natural range of the habitat, and the area it covers within that range, are stable or increasing.  
Structure and functions – The specific structure and functions which are necessary for the long-term maintenance of the habitat exist and are likely to continue to exist for the foreseeable future.  
Typical species – The conservation status of typical species is favourable. | |
| Glen of the Downs SAC (000719) | Petrifying springs with tufa formation (Cratoneurion) [7220] | Groundwater rich in calcium bicarbonate. | Maintain/Restore favourable conservation condition, defined by the following attributes and targets:  
Range – The natural range of the habitat, and the area it covers within that range, are stable or increasing.  
Structure and functions – The specific structure and functions which are necessary for the long-term maintenance of the habitat exist and are likely to continue to exist for the foreseeable future.  
Typical species – The conservation status of typical species is favourable. | Yes |
| Glen of the Downs SAC (000719) | Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae) [91E0] | Periodical fluvial inundation. | Maintain/Restore favourable conservation condition, defined by the following attributes and targets:  
Range – The natural range of the habitat, and the area it covers within that range, are stable or increasing.  
Structure and functions – The specific structure and functions which are necessary for the long-term maintenance of the habitat exist and are likely to continue to exist for the foreseeable future.  
Typical species – The conservation status of typical species is favourable. | |
| Glen of the Downs SAC (000719) | Old sessile oak woods with Ilex and Blechnum in the British Isles [91A0] | Base poor soils. Moderately high rainfall. | Maintain/Restore favourable conservation condition, defined by the following attributes and targets:  
Range – The natural range of the habitat, and the area it covers within that range, are stable or increasing.  
Structure and functions – The specific structure and functions which are necessary for the long-term maintenance of the habitat exist and are likely to continue to exist for the foreseeable future.  
Typical species – The conservation status of typical species is favourable. | |
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</tr>
</thead>
<tbody>
<tr>
<td>The Murrough SPA (004186)</td>
<td>Red-throated Diver (<em>Gavia stellata</em>) [A001]</td>
<td>Food availability (fish). Shallow sandy bays.</td>
<td>Maintain/restore, favourable conservation condition, defined by the following attributes and targets: <strong>Population trend</strong> – Population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.</td>
<td>Water-dependent</td>
</tr>
<tr>
<td></td>
<td>Greylag Goose (<em>Anser anser</em>) [A043]</td>
<td>Food availability (grass/pasture/crops). Undisturbed coastal roosting sites close to feeding sites. Grazing.</td>
<td>Range – The natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future.</td>
<td></td>
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<tr>
<td></td>
<td>Light-bellied Brent Goose (<em>Branta bernicla hrota</em>) [A046]</td>
<td>Food availability (intertidal aquatic vegetation/pasture/crops). Undisturbed coastal roosting sites close to feeding sites. Grazing.</td>
<td>Habitat – There is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.</td>
<td></td>
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<tr>
<td></td>
<td>Wigeon (<em>Anas penelope</em>) [A050]</td>
<td>Food availability (vegetation) in mud-flats, coastal flooded grassland and saltmarsh pastures</td>
<td></td>
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</tbody>
</table>
## Conservation Objectives

<table>
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<tr>
<th>Site Name and Code</th>
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<tbody>
<tr>
<td><strong>Teal (Anas crecca) [A052]</strong></td>
<td>Fish/crustacean/vegetation availability in shallow inshore/freshwaters. Undisturbed, ice-free marine/freshwater feeding grounds.</td>
<td><strong>Wetland and Waterbirds [A999]</strong></td>
<td>To maintain or restore the favourable conservation condition of the wetland habitat at The Murrough SPA as a resource for the regularly-occurring migratory waterbirds that utilise it.</td>
<td><strong>Black-headed Gull (Chroicocephalus ridibundus) [A179]</strong></td>
</tr>
<tr>
<td><strong>Black-headed Gull (Chroicocephalus ridibundus) [A179]</strong></td>
<td>Food availability (intertidal fauna/pasture). Flooding regime of coastal grasslands. Undisturbed coastal roosting sites close to feeding areas.</td>
<td></td>
<td><strong>Herring Gull (Larus argentatus) [A184]</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Herring Gull (Larus argentatus) [A184]</strong></td>
<td>Food availability (intertidal fauna/pasture); Flooding regime of coastal grasslands; Undisturbed coastal roosting sites close to feeding areas.</td>
<td></td>
<td><strong>Little Tern (Sterna albifrons) [A195]</strong></td>
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<tr>
<td><strong>Little Tern (Sterna albifrons) [A195]</strong></td>
<td>Sea level; Natural/artificial nest site availability; Undisturbed breeding sites; Regularity of extreme weather events; Marine prey availability (sand eel); Predation.</td>
<td></td>
<td><strong>The Murrough Wetlands</strong></td>
<td></td>
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<tr>
<td><strong>The Murrough Wetlands</strong></td>
<td>Annual vegetation of drift lines [1210]</td>
<td>Deposits of shingle lying at or above mean high-water spring tides.</td>
<td>Maintain/Restore favourable conservation condition, defined by the following attributes and targets:</td>
<td></td>
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</table>

- **Range** — The natural range of the habitat, and the area it covers within that range, are stable or
<table>
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</table>
| SAC (002249)      | Perennial vegetation of stony banks [1220] | Level of stability. Quantity of fine material. Width of the foreshore. | increasing.  
*Structure and functions* — The specific structure and functions which are necessary for the long-term maintenance of the habitat exist and are likely to continue to exist for the foreseeable future.  
*Typical species* — The conservation status of typical species is favourable. |  |
|                   | Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] | Frequency of tidal submergence. |  |  |
|                   | Mediterranean salt meadows (*Juncetalia maritimi*) [1410] | Frequency of tidal submergence. |  |  |
|                   | Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae* [7210] | Groundwater rich in calcium bicarbonate. |  |  |
|                   | Alkaline fens [7230] | High water table; Ground-surface water supply; Calcium-rich conditions. |  |  |
| Wicklow Reef SAC (002274) | Reefs [1170] | Rocky marine habitat. Tidal submergence (generally subtidal, but may extend into the intertidal). Sufficient light | **Maintain/restore** favourable conservation condition, defined by the following attributes and targets:  
*Population trend* — Population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.  
*Range* — The natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future.  
*Habitat* — There is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis. | Yes |
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</tr>
</thead>
</table>
**Community structure** – Conserve the following community type in a natural condition: Current-swept subtidal reef community complex. |  |
| | Teal (*Anas crecca*) [A052] | Fish/crustacean/vegetation availability in shallow inshore/freshwaters. Undisturbed, ice-free marine/freshwater feeding grounds. |  |  |
| | Pintail (*Anas acuta*) [A054] | Food availability (intertidal flora and fauna/pasture/cereal). Undisturbed freshwater/coastal roosting sites close to feeding sites. | **Maintain** the favourable conservation condition, defined by the following attributes and targets:  
**Population trend** – Long term population trend stable or increasing  
**Distribution** – No significant decrease in the range, timing or intensity of use of areas by qualifying interest, other than that occurring from natural patterns of variation.  
**Habitat Area** – The permanent area occupied by the wetland habitat should be stable and not significantly less than the area of 1,713 hectares, other than that occurring from natural patterns of variation. | Yes |
<p>| | Shoveler (<em>Anas clypeata</em>) [A056] | Food availability (intertidal fauna/pasture). Flooding regime of coastal grasslands. Undisturbed coastal roosting sites close to feeding areas. |  |  |
| | Oystercatcher (<em>Haematopus ostralegus</em>) [A130] |  |  |  |
| | Golden Plover (<em>Pluvialis apricaria</em>) [A140] |  |  |  |</p>
<table>
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<tbody>
<tr>
<td>Grey Plover (Pluvialis squatarola) [A141]</td>
<td>Food availability (intertidal fauna/pasture/sewage). Coastal water quality.</td>
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<tr>
<td>Knot (Calidris canutus) [A143]</td>
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<tr>
<td>Sanderling (Calidris alba) [A144]</td>
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<tr>
<td>Dunlin (Calidris alpina) [A149]</td>
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<tr>
<td>Black-tailed Godwit (Limosa limosa) [A156]</td>
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<tr>
<td>Bar-tailed Godwit (Limosa lapponica) [A157]</td>
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<tr>
<td>Curlew (Numenius arquata) [A160]</td>
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<tr>
<td>Redshank (Tringa totanus) [A162]</td>
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<tr>
<td>Turnstone (Arenaria interpres) [A169]</td>
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<tr>
<td>Black-headed Gull (Chroicocephalus ridibundus) [A179]</td>
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<tr>
<td>Wetland and Waterbirds [A999]</td>
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</thead>
<tbody>
<tr>
<td>South Dublin Bay and River Tolka Estuary SPA (004024)</td>
<td>Light bellied Brent Goose (<em>Branta bernicla hrota</em>) [A046]</td>
<td>Food availability (intertidal aquatic vegetation/pasture/crops). Undisturbed coastal roosting sites close to feeding sites. Grazing.</td>
<td>Maintain the favourable conservation condition, defined by the following attributes and targets: Population trend – Long term population trend stable or increasing Distribution – No significant decrease in the range, timing or intensity of use of areas by qualifying interest, other than that occurring from natural patterns of variation. Habitat Area – The permanent area occupied by the wetland habitat should be stable and not significantly less than the area of 1,713 hectares, other than that occurring from natural patterns of variation.</td>
</tr>
<tr>
<td></td>
<td>Oystercatcher (<em>Haematopus ostralegus</em>) [A130]</td>
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<td></td>
<td>Ringed Plover (<em>Charadrius hiaticula</em>) [A137]</td>
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<tr>
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<td>Knot (<em>Calidris canutus</em>) [A143]</td>
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<td>Sanderling (<em>Calidris alba</em>) [A144]</td>
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<td>Dunlin (<em>Calidris alpina</em>) [A149]</td>
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<td>Redshank (<em>Tringa totanus</em>) [A162]</td>
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<tr>
<td>Common Tern (Sterna hirundo) [A193]</td>
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<tr>
<td>Arctic Tern (Sterna paradisaea) [A194]</td>
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<tr>
<td>Wetland and Waterbirds [A999]</td>
<td></td>
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</tbody>
</table>
GLOSSARY OF TERMS

**Annual Exceedance Probability Or AEP**
The probability, typically expressed as a percentage, of a flood event of a given magnitude being equalled or exceeded in any given year. For example, a 1% AEP flood event has a 1%, or 1 in 100, chance of occurring or being exceeded in any given year.

**Appropriate Assessment**
An assessment of the effects of a plan or project on Natura 2000 sites (European Sites). European Sites comprise Special Protection Areas under the Birds Directive and Special Areas of Conservation under the Habitats Directive.

**Area for Further Assessment or AFA**
Areas where, based on the Preliminary Flood Risk Assessment, the risks associated with flooding are considered to be potentially significant. For these areas further, more detailed assessment is required to determine the degree of flood risk, and develop measures to manage and reduce the flood risk. The AFAs are the focus of the CFRAM Studies.

**Arterial Drainage Scheme**
Works undertaken under the Arterial Drainage Act (1945) to improve the drainage of land. Such works were undertaken, and are maintained on an ongoing basis, by the OPW.

**Biodiversity**
Word commonly used for biological diversity and defined as assemblage of living organisms from all habitats including terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part.

**Birds Directive**

**Catchment**
The area of land draining to a particular point on a river or drainage system, such as an Area for Further Assessment (AFA) or the outfall of a river to the sea.

**Catchment Flood Risk Assessment and Management Study Or CFRAM Study**
A study to assess and map the flood hazard and risk, both existing and potential future, from fluvial and coastal waters, and to define objectives for the management of the identified risks and prepare a Plan setting out a prioritised set of measures aimed at meeting the defined objectives.

**Consequences**
The impacts of flooding, which may be direct (e.g., physical injury or damage to a property or monument), a disruption (e.g., loss of electricity supply or blockage of a road) or indirect (e.g., stress for affected people or loss of business for affected commerce)

**Drainage**
Works to remove or facilitate the removal of surface or sub-surface water, e.g., from roads and urban areas through urban storm-water drainage systems, or from land through drainage channels or watercourses that have been deepened or increased in capacity.

**Drainage District**
Works across a specified area undertaken under the Drainage Acts to facilitate land drainage.

**Estuary**
A semi-enclosed coastal body of water with one or more rivers or streams flowing into it, and with an open connection to the sea.

**Flood**
The temporary covering by water of land that is not normally covered by water.
### ‘Floods’ Directive

The European Union ‘Floods’ Directive [2007/60/EC] is the Directive that came into force in November 2007 requiring Member States to undertake a PFRA to identify Areas for Further Assessment (AFAs), and then to prepare flood maps and Plans for these areas.

### Flood Extent

The extent of land that has been, or might be, flooded. Flood extent is often represented on a flood map.

### Flood Risk

Refers to the potential adverse consequences resulting from a flood hazard. The level of flood risk is the product of the frequency or likelihood of flood events and their consequences (such as loss, damage, harm, distress and disruption).

### Flood Risk Management Method

Structural and non-structural interventions that modify flooding and flood risk either through changing the frequency of flooding, or by changing the extent and consequences of flooding, or by reducing the vulnerability of those exposed to flood risks.

### Flood Risk Management Option

Can be either a single flood risk management method in isolation or a combination of more than one method to manage flood risk.

### Flood Risk Management Plan (Plan)

A Plan setting out a prioritised set of measures within a long-term sustainable strategy aimed at achieving defined flood risk management objectives. The Plan is developed at a River Basin (Unit of Management) scale, but is focused on managing risk within the AFAs.

### Floodplain

The area of land adjacent to a river or coastal reach that is prone to periodic flooding from that river or the sea.

### Fluvial

Riverine, often used in the context of fluvial flooding, i.e., flooding from rivers, streams, etc.

### Groundwater

All water which is below the surface of the ground in the saturation zone and in direct contact with the ground or subsoil. This zone is commonly referred to as an aquifer which is a subsurface layer or layers of rock or other geological strata of sufficient porosity and permeability to allow a significant flow of groundwater or the abstraction of significant quantities of groundwater.

### Habitats Directive

The Habitats Directive [92/43/EEC] on the Conservation of Natural Habitats and of Wild Flora and Fauna aims at securing biodiversity through the provision of protection for animal and plant species and habitat types deemed to be of European conservation importance.

### Hazard

Something that can cause harm or detrimental consequences. In this context, the hazard referred to is flooding.

### Hydraulics

The science of the behaviour of fluids, often used in this context in relation to estimating the conveyance of flood water in river channels or structures (such as culverts) or overland to determine flood levels or extents.

### Hydrology

The science of the natural water cycle, often used in this context in relation to estimating the rate and volume of rainfall flowing off the land and of flood flows in rivers.

### Hydrometric Area

Hydrological divisions of land, generally large catchments or a conglomeration of small catchments, and associated coastal areas. There are 40 Hydrometric Areas in the island of Ireland.
Hydromorphology: The physical characteristics of the shape, boundaries and content of a water body. For rivers, this includes river depth and width variation, structure and substrate of the river bed and structure of the riparian zone. For lakes it includes lake depth variation, quantity, structure & substrate of the lake bed and structure of the lake shore.

Individual Risk Receptor Or IRR: A single receptor (see below) that has been determined to represent a potentially significant flood risk (as opposed to a community or other area at potentially significant flood risk AFA).

Inundation Measure: Another word for flooding or a flood (see ‘Flood’)

Mitigation Measures: Measures to avoid/prevent, minimise/reduce, or as fully as possible, offset/compensate for any significant adverse effects on the environment, as a result of implementing a plan or project.

Morphology / Morphological: See ‘hydromorphology’ above.

National CFRAM Programme: The programme developed by the OPW to implement key aspects of the EU ‘Floods’ Directive in Ireland, which includes the CFRAM Studies, and builds on the findings of the PFRA.

Natura 2000: European network of protected sites (‘European sites’) which represent areas of the highest value for natural habitats and species of plants and animals which are rare, endangered or vulnerable in the European Community. The Natura 2000 network includes two types of area: Special Areas of Conservation (SAC) where they support rare, endangered or vulnerable natural habitats and species of plants or animals (other than birds) and Special Protection Areas (SPA) where areas support significant numbers of wild birds and their habitats. SACs are designated under the Habitats Directive and SPAs are classified under the Birds Directive. Certain sites may be designated as both SAC and SPA.

Natural Heritage Area: An area of national nature conservation importance, designated under the Wildlife Act 1976 (as amended), for the protection of features of high biological or earth heritage value or for its diversity of natural attributes.

Non Structural Options: Include flood forecasting and development control to reduce the vulnerability of those currently exposed to flood risks and limit the potential for future flood risks.

Pluvial: Refers to rainfall, often used in the context of pluvial flooding, i.e., flooding caused directly from heavy rainfall events (rather than overflowing rivers).

Preliminary Flood Risk Assessment Or PFRA: An initial, high-level screening of flood risk at the national level to determine where the risks associated with flooding are potentially significant, to identify the AFAs. The PFRA is the first step required under the EU ‘Floods’ Directive.

Ramsar Site: Wetland site of international importance designated under the Ramsar Convention on Wetlands of International Importance 1971, primarily because of its importance for waterfowl. All Ramsar sites hold the European designation of SAC or SPA (or both).
Receptor

Something that might suffer harm or damage as a result of a flood, such as a house, office, monument, hospital, agricultural land or environmentally designated sites.

Return Period

A term that was used to describe the probability of a flood event, expressed as the interval in the number of years that, on average over a long period of time, a certain magnitude of flood would be expected to occur. This term has been replaced by ‘Annual Exceedance Probability, as Return Period can be misleading.

Riparian

River bank. Often used to describe the area on or near a river bank that supports certain vegetation suited to that environment (Riparian Zone).

Risk

The combination of the probability of flooding, and the consequences of a flood.

River Basin

An area of land (catchment) draining to a particular estuary or reach of coastline.

River Basin District

Or RBD

A hydrological division of land defined for the purposes of the Water Framework Directive. There are eight RBDs in the island of Ireland; each comprising a group of River Basins.

Riverine

Related to a river.

Runoff

The flow of water over or through the land to a waterbody (e.g., stream, river or lake) resulting from rainfall events. This may be overland, or through the soil where water infiltrates into the ground.

Screening [or Test of Likely Significance]

The process which identifies the likely impacts upon a European site [Natura 2000 site] of a project or plan, either alone or in combination with other projects or plans, and considers whether these impacts are likely to be significant.

SEA Directive


Sedimentation

The accumulation of particles (of soil, sand, clay, peat, etc.) in the river channel.

Significant Risk

Flood risk that is of particular concern nationally. The PFRA Main Report (see www.cfram.ie) sets out how significant risk is determined for the PFRA, and hence how Areas for Further Assessment have been identified.

Spatial Scale(s) of Assessment

Defines the spatial scale at which flood risk management options are assessed. Assessment Units are defined on four spatial scales ranging in size from largest to smallest as follows: catchment scale, Assessment Unit (AU) scale, Areas for Further Assessment (APSR) and Individual Risk Receptors (IRR).

Special Area of Conservation

A Special Area of Conservation (SAC) is an internationally important site, protected for its habitats and non-bird species. It is designated, as required, under the EC Habitats Directive. A candidate SAC (cSAC) is a candidate site, but is afforded the same status as if it were confirmed.

Special Protection Area

A Special Protection Area (SPA) is a site of international importance for breeding, feeding and roosting habitat for bird species. It is designated, as required, under the EC Birds Directive.

Standard of Protection Or SoP

The magnitude of flood, often defined by the annual probability of that flood occurring being exceeded (the Annual Exceedance Probability, or 'AEP'), that a measure / works is designed to protect the area at risk against.
<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strategic Environmental Assessment Or SEA</td>
<td>A SEA is an environmental assessment of plans (such as the Plans) and programmes to ensure a high level consideration of environmental issues in the plan preparation and adoption, and is a requirement provided for under the SEA directive [2001/42/EC]</td>
</tr>
<tr>
<td>Structural Options</td>
<td>Involve the application of physical flood defence measures, such as flood walls and embankments, which modify flooding and flood risk either through changing the frequency of flooding, or by changing the extent and consequences of flooding.</td>
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<tr>
<td>Surface Water</td>
<td>Water on the surface of the land. Often used to refer to ponding of rainfall unable to drain away or infiltrate into the soil.</td>
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<tr>
<td>Surge</td>
<td>The phenomenon of high sea levels due to meteorological conditions, such as low pressure or high winds, as opposed to the normal tidal cycles</td>
</tr>
<tr>
<td>Sustainability</td>
<td>The capacity to endure. Often used in an environmental context or in relation to climate change, but with reference to actions people and society may take.</td>
</tr>
<tr>
<td>Tidal</td>
<td>Related to the tides of the sea / oceans, often used in the context of tidal flooding, i.e., flooding caused from high sea or estuarine levels.</td>
</tr>
<tr>
<td>Topography</td>
<td>The shape of the land, e.g., where land rises or is flat.</td>
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<tr>
<td>Transitional Water</td>
<td>The estuarine or inter-tidal reach of a river, where the water is influenced by both freshwater river flow and saltwater from the sea.</td>
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<tr>
<td>Unit of Management Or UoM</td>
<td>A hydrological division of land defined for the purposes of the Floods Directive. One Plan will be prepared for each Unit of Management, which is referred to within the Plan as a River Basin.</td>
</tr>
<tr>
<td>Vulnerability</td>
<td>The potential degree of damage to a receptor (see above), and the degree of consequences that would arise from such damage.</td>
</tr>
<tr>
<td>Water Framework Directive Or WFD</td>
<td>The Water Framework Directive [2000/60/EC] aims to protect surface, transitional, coastal and ground waters to protect and enhance the aquatic environment and ecosystems and promote sustainable use of water resources</td>
</tr>
<tr>
<td>Waterbody</td>
<td>A term used in the Water Framework Directive (see below) to describe discrete section of rivers, lakes, estuaries, the sea, groundwater and other bodies of water.</td>
</tr>
<tr>
<td>Watercourse</td>
<td>Any flowing body of water including rivers, streams, drains, ditches etc.</td>
</tr>
<tr>
<td>Zone of Influence</td>
<td>The area over which ecological features may be subject to significant effects as a result of the proposed Plan and associated activities. This may extend beyond the Plan area, for example where there are ecological or hydrological links beyond the Plan boundary. The zone of influence may vary for different ecological features depending on their sensitivity to an environmental change.</td>
</tr>
</tbody>
</table>
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