

South Western CFRAM Study

SEA Environmental Report - Non-Technical
Summary UoM 18

July 2017

Office of Public Works

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Trim, Co. Meath

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1 Introduction

1.1 Introduction

This Non-Technical Summary (NTS) summarises the Strategic Environmental Assessment (SEA) Environmental Report for the Flood Risk Management Plan (FRMP) for Unit of Management (UoM) 18. The Plan has been prepared on behalf of the Office of Public Works (OPW) and their partners and sets out a programme of prioritised studies, actions and works (including both structural and non-structural measures) to manage predicted flood risk in catchments within UoM 18 in the short to long-term.

The purpose of the Environmental Report is to identify, evaluate and describe the likely significant effects on the environment of implementing the Flood Risk Management Plan (FRMP) for UoM 18. Once the environmental effects have been identified, then mitigation measures are developed in tandem with an effective monitoring programme to ensure that the potential environmental impacts are minimised.

The Environmental Report also specifically identifies the impacts of the Plan on sites of international and national nature conservation importance within UoM 18. A “Habitats Directive Assessment” (HDA) was undertaken in tandem with the SEA process and the outcomes of this assessment are included in the overall SEA appraisal presented in this Environmental Report

1.2 Flood Risk Management Plan for Unit of Management (UoM) 18

For the purpose of delivering on the components of the National Flood Policy and on the requirements of the European Union Floods Directive, the OPW, in conjunction with local authorities and stakeholders, is conducting a number of Catchment Flood Risk Assessment and Management (CFRAM) Studies. *These studies are the core activity from which medium to long-term strategies for the reduction and management of flood risk in Ireland will be achieved.*

The overarching objectives of the CFRAM Studies are to:

- i Identify and map the existing and potential future flood hazard within the study area;
- i Assess and map the existing and potential future flood risk within the study area;
- i Identify viable structural and non-structural options and measures for the effective and sustainable management of flood risk within the study area;
- i Prepare Flood Risk Management Plans (FRMPs) setting out recommendations to manage the existing flood risk and also the potential future flood risk which may increase due to climate change, development, and other pressures that may arise in the future. FRMPs will set out 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 requirements¹.

The OPW has commissioned a CFRAM study for each of Ireland’s seven River Basin Districts (RBDs)².

¹ The Floods Directive requires that Flood Risk Management Plans should take into account the particular characteristics of the areas they cover and provide for tailored solutions according to the needs and priorities of those areas, whilst promoting the achievement of environmental objectives laid down in Community legislation.

² River Basin Districts (RBDs) are the main units for the management of river basins and have been delineated by Member States under Article 3 of the Water Framework Directive (2000/60/EC). RBDs are areas of land and sea, made up of one or more neighbouring river basins together with their associated groundwaters and coastal waters.

Unit of Management 18 is located within the **South Western River Basin District (SWRBD)** which covers an area of approximately 11,160 km². The study area of the SWRBD includes most of county Cork, large parts of counties Kerry and Waterford along with small parts of the counties of Tipperary and Limerick. The study area contains over 1,800 km of coastline along the Atlantic Ocean and the Celtic Sea. (Refer to Figure 1.1)

In total, six Local Authorities administer the regions within the SWRBD: Cork County Council, Cork City Council, Kerry County Council, Waterford City and County Council, Tipperary County Council and Limerick City and County Council. Much of the SWRBD is rural and the predominant land usage is agriculture.

Figure 1.1: South Western River Basin District (SWRBD)



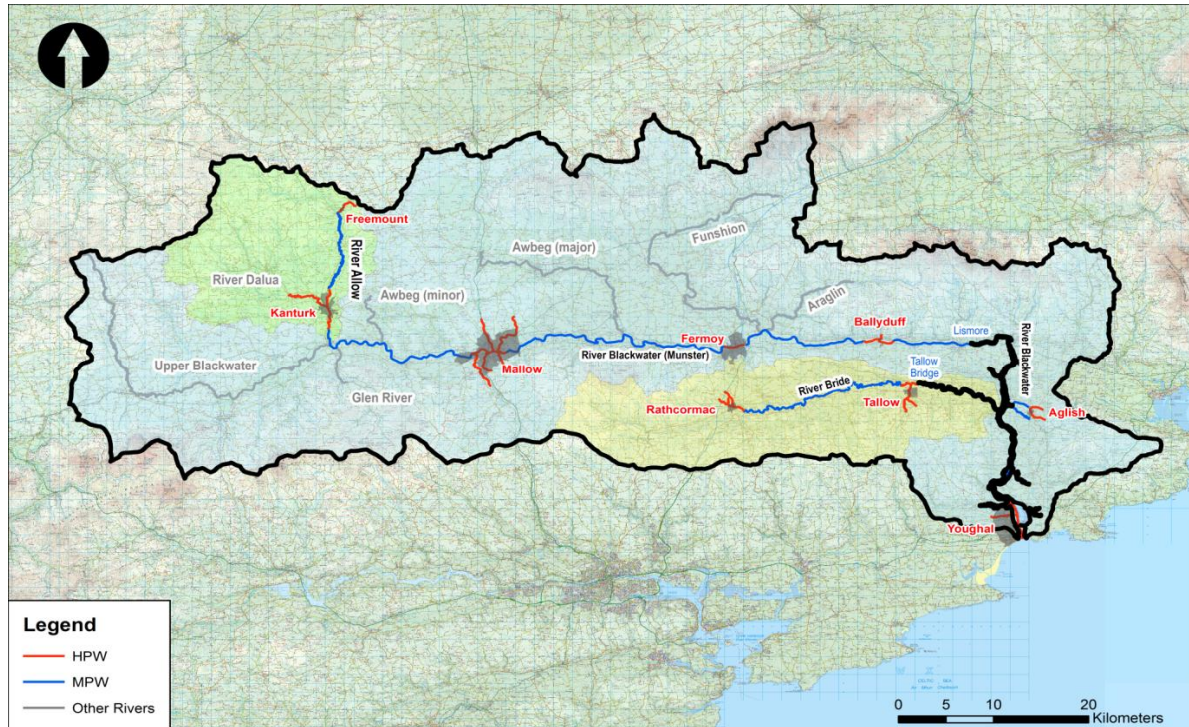
The Munster Blackwater River Basin UoM covers an area of approximately 3,295 km². The large majority of the area is in North County Cork with parts in County Waterford. UoM 18 also includes small parts of Limerick, Kerry and Tipperary and has only a few kilometres of coastline at Youghal Bay. UoM 18 comprises of three major river catchments: the Blackwater and its tributaries the Allow and the Bride (Refer to Figure 1.2).

Nine Areas for Further Assessment (AFAs) have been identified within UoM 18. However, four AFA's were ruled out at the optioneering process in Flood Risk Management Plan. Therefore, for this SEA Environmental Report, five viable structural options for the following AFA's are considered. (Refer to Table 1.2). Associated with the AFA's is over 80km of high and medium priority watercourses and 158km of medium priority watercourses.

Table 1.2: AFAs within Munster Blackwater River Basin Unit of Management

UoM	Name	Unique ID	Fluvial	Coastal	County	Easting	Northing	Viable Structural Options
18	Aglish	180247	Yes	No	Waterford	212250	91500	Yes
18	Ballyduff	180248	Yes	No	Waterford	196500	99500	Yes
18	Fermoy	180252	Yes	No	Cork	182750	99500	No
18	Freemount	180253	Yes	No	Cork	139500	114250	No
18	Kanturk	180254	Yes	No	Cork	138250	102750	Yes
18	Mallow	180262	Yes	No	Cork	155250	98500	No
18	Rathcormac	180265	Yes	No	Cork	181750	91000	Yes
18	Tallow	180266	Yes	No	Waterford	199750	93750	No
18	Youghal	180267	Yes	Yes	Cork	210250	78750	Yes

Figure 1.1: Munster Blackwater Unit of Management (UoM 18)



2 Stakeholder and Public Consultation

The SEA Directive (2001/42/EC) requires that consultation is carried out with Environmental Authorities and with members of the public at various stages in the SEA process. The intention of this consultation process is to enhance transparency in the decision-making process, to ensure that the relevant authorities and the public are informed and are provided with an early opportunity to express their opinion, and to ensure that the information used in the assessment is comprehensive and reliable. Early consultation and the open delivery of information on the assessment will avoid unnecessary delays in the decision-making process at later stages which may arise due to public opposition.

Article 5(4) of the SEA Directive requires that Environmental Authorities (designated by each Member State) be consulted when deciding on the scope and level of detail of the information which must be included in the Environmental Report i.e. consultation is statutorily required at this Scoping Stage of the SEA process.

Consultation is undertaken throughout the development of the CFRAM plan and Figure 2.1 gives an overview of the main consultation undertaken during the project development.

Figure 2.1: Overview of the CFRAM Consultation Stages and Structures



3 Key Environmental Issues in UoM 18

UoM 18 is an area of significant ecological, cultural, social and landscape value. The key environmental issues identified for UoM are as follows:

- i Population and Human Health: The town of Mallow, identified as a hub in the National Spatial Strategy (NSS), is located in UoM 18 and development in the town may influence population trends in nearby hinterlands such as Kanturk. The population of Mallow (both the town and rural environs) has increased steadily since 2002. This trend will continue into the future with the implementation of Regional Planning Guidelines. Population and development growth in Mallow could potentially increase the number of people and properties at risk from flooding. At present land use policies for Kanturk and Mallow are set out in their respective Local Area Plans, however the intension is that local planning policy for these settlements will be contained within the new Kanturk and Mallow Municipal District Plan which is currently in consultation.

The Kanturk -Mallow Municipal District Plan aims to set out a land use and transportation policy that will support increasing population trends in the future. It is intended that development of most new housing will be within a 20-minute walking distance (1.6km) of the town centre. It is noted that population growth target will required the provision of approximately 7,556 new housing units within the plan period.

The prevalence of local health care facilities is likely to increase through the implementation of the Department of Health's Health Service Reform Programme. A number of health service facilities in Mallow are located in flood risk areas. The development of existing facilities (in terms of services offered and facility capacity) could potentially result in an increase in the number of people at risk from flooding. The Mallow Local Area Plan 2015 recognises the need for flood risk assessment to support the future development of existing health care facilities and population centres. This requirement is further recognised in the Kanturk -Mallow Municipal District Plan.

Youghal, Rathcormac, Ballyduff, and Aglish are identified as Areas for Further Assessment and these areas require flood risk management measures. These AFAs are located approximately 30km from Dungarvan town which is identified as a hub in the National Spatial Strategy (not located in UoM). These towns may experience local population increases arising from development in nearby Dungarvan with a potential increase in the number of people and properties at risk from flooding. Planning policies and core settlement strategies encompassing these AFAs are included in the Municipal District Plans, namely East Cork and Fermoy Municipal Districts, these are currently in consultation.

- i Geology, Soils and Land Use: Flood management options under consideration in the Flood Risk Management Plans include non-structural options such as planning control and land use management. Publication of the plans may result in the zoning of lands for particular practices for the purpose of preventing or protecting against flooding. This may entail the re-zoning of lands currently zoned for alternative purposes
- i Archaeology and Cultural Heritage: Many RMP sites are associated with watercourses and may potentially be impacted by the implementation of flood risk management measures. There are a number of protected bridge structures on watercourses in in the AFAs which may currently act as hydraulic restrictions. Flood risk management measures may include the destruction of these structures. Protected water mills are present on watercourses in the AFAs of Kanturk, Rathcormac and Youghal. Other features, including churches, religious buildings and country houses, are located in close proximity to

watercourses and as such may constrain the application of certain flood risk management measures at these locations.

The Underwater Archaeology Unit (UAU) of the National Monuments Service maintains an inventory of shipwrecks recorded in Irish waters. Many shipwrecks have been recorded both within the bay and off the coast of Youghal. Tidal flood risk management measures may potentially impact upon maritime archaeology.

i Water Resources: Consideration must be given to how the implementation of flood protection measures could influence the achievement of the objectives of the Water Framework Directive. Flood protection measures can have direct and indirect impacts on a watercourse. Status classification for the Water Framework Directive is based on a combination of biological, morphological and chemical assessment of a watercourse. Any activity that affects any of these elements has the potential to jeopardise the achievement of Water Framework Directive objectives. Conversely, flood protection measures can assist in achieving the objectives of the WFD by preventing flooding of point source pressures, which if flooded could result in the deterioration of water quality.

Any proposed future development must be designed and implemented such that it will not result in deterioration in existing waterbody status and will not impede the achievement of the good status by the required timescale. In the absence of FRMP options, the risk of flooding to the benefiting lands would increase significantly. The flooding of water supply infrastructure will result in loss of water supply over large areas, which can magnify the impact of flooding well beyond the immediate community. Flooding can also pose a significant pollution risk to water quality with consequent negative impacts on human health, habitats and flora and fauna.

Development of flood risk management measures in areas of extreme and high groundwater vulnerability and in ground water protection areas has the potential to result in contamination of groundwater resources. Geotechnical engineering of a site can mitigate against potential groundwater pollution. The possibility of employing mitigation rather than circumventing an area can be investigated before a decision is taken to progress flood protection measures.

i Air and Climate: The Flood Risk Management Plans consider changes in climate change (based on a 100-year time horizon) and make allowance for predicted impacts. The implementation of flood risk management measures has the potential to result in a phenomenon known as coastal squeeze i.e. the loss of coastal habitats in front of coastal flood protection measures. In an unrestricted scenario, coastal habitat will naturally move landward as sea level rises with climate change. Where coastal defences are constructed these can impede the landward movement of habitat ultimately resulting in a reduction in habitat extent as it is squeezed between the increasing tide and the coastal defence.

i Biodiversity, Flora and Fauna: Many ecological features of significance within UoM 18 are aquatic habitats and species and by the nature of the environment they live in are relatively tolerant to flood events. In fact, flood events can often benefit an ecosystem e.g. through the movement, sorting and deposition of riverine bed material which can create suitable habitat for aquatic species, or through the release of nutrients from sediments due to re-suspension during flooding. Certain habitats have a dependence on flooding e.g. alluvial woodlands, a priority habitat protected under the Habitats Directive, which occurs in areas that are subject to periodic flooding within UoM 18. Flood risk management measures will alter flood regime and can cause a reduction in habitat quality and extent. The requirement for ecological protection can limit potential options for flood risk management. Freshwater pearl mussel is particularly sensitive to deterioration in water quality, nutrient enrichment and siltation, all of which may potentially occur due to the implementation of flood risk management measures. In addition, flood risk management measures can act as barriers to fish migration. The life cycle of freshwater pearl mussel is dependent on the presence of migratory fish. Implementation of flood risk management measures can also contribute towards the spread of invasive / non-native species if not properly managed.

- i Tourism and Recreation: Many of the tourist attractions of the Munster Blackwater River Basin are centred on the Blackwater River Valley. Flood risk management options can intrude upon scenic landscapes and can result in amenity walks having to be diverted thereby reducing the quality of the tourist attractions. Conversely flood risk management options can be used as an opportunity to enhance tourist attractions e.g. by using glass flood walls thereby increasing views of our rivers and coastal areas.
- i Fisheries, Aquaculture and Angling: The IFI smelt monitoring programme conducted monitoring in the River Blackwater. No juvenile smelt were recorded. There may be a future need for intervention for the protection of smelt in the Blackwater. Flood risk management measures should consider the protection and enhancement of fishery habitat and should have regard to any fishery management programmes. Also, fish migration needs to be considered in the identification of flood risk management options. Consideration should be given to the enhancement and preservation of commercial and tourism fishery facilities. Implementation of flood risk management measures can contribute towards the spread of invasive species e.g. Dace, if not properly managed
- i Landscape and Visual Amenity: Many amenity walks, scenic routes and views are along river valleys or coastal areas i.e. at locations where flood risk management measures may be implemented. Flood protection measures can intrude upon views and prospects. The application of flood risk management measures in landscape conservation areas may be constrained for the purposes of the preservation of the landscape. Flooding can be a formative feature of a landscape's character. Flood risk management options need to be sympathetic towards landscape character and opportunities to enhance landscape character should be explored.
- i Infrastructure and Material Assets: Future development can alter land drainage run-off characteristics and can result in related changes in river hydrology and therefore flooding. Flooding can cause significant damage to properties and property content, utilities, transport, and community infrastructure. In rural areas, the disruption can be particularly severe where alternative infrastructure may be rare or absent. Measures set out in the development of the FRMP to manage flood risk can produce positive impacts for material assets, through protecting existing assets and lessening the resource use that would otherwise be needed to repair and replace these assets if flooding damaged them.

4 Strategic Environmental Objectives

SEA analysis was undertaken to assess alternatives and preferred plan measures utilising the SEA Objectives, sub objectives and the associated indicators and targets. The analysis was undertaken as part of a Multi-criteria Analysis (MCA) which included environmental, social, technical and financial objectives for the projects. The analysis was undertaken in line with the National CFRAM Programme Guidance Note No. 28.

A key element of the SEA process is the development of the of SEA Objectives, Sub-Objectives, indicators and targets. These form the basis on which the environmental impact of the proposed plan measures can be assessed. The SEA Objectives are developed based on an understanding of the receiving environment in terms of spatial scale, sensitivity and existing problems. They are intended to be used as a yardstick to measure the potential for the plan measures to impact the receiving environment positively or negatively. It is important that the Strategic environmental objectives are developed to allow for the identification of opportunities as well as problems arising from the plan measures.

These objectives, sub-objectives and indicators will also perform a role in monitoring of the effectiveness of the flood risk management measures as part of a monitoring programme to inform future reviews and revisions to the Flood Risk Management Plans. These objectives, sub-objectives and indicators utilised for the purposes of this strategic environmental assessment are outlined in Table 4.1

Table 4.1: SEA Objectives, Sub-Objectives, Indicators and Targets

Objective	Sub-Objective	Indicator	Basic Requirement	Aspirational Target
Minimise risk to human health and life	Minimise risk to human health and life of residents	Annual Average number of residential properties at risk from flooding	Number of residential properties at risk from flooding does not increase	Reduce the number of residential properties at risk from flooding to 0
	Minimise risk to high vulnerability properties	Number of high vulnerability properties at risk from flooding	Do not increase number of high vulnerability properties at risk from flooding	Reduce the number of high vulnerability properties at risk from flooding to 0
Minimise risk to community	Minimise risk to social infrastructure and amenity	Number of social infrastructure receptors at risk from flooding	Do not increase number of social infrastructure receptors at risk from flooding	Reduce the number of social infrastructure receptors at risk from flooding to 0
	Minimise risk to local employment	Number of enterprises at risk from flooding	Do not increase number of enterprises at risk from flooding	Reduce the number of enterprises at risk from flooding to 0
Support the objectives of the WFD	Provide no impediment to the achievement of water body objectives and, if possible, contribute to the achievement of water body objectives.	Ecological status of water bodies	Provide no constraint to the achievement of water body objectives	Contribute to the achievement of water body objectives
Support the objectives of the Habitats and Birds Directives	Avoid detrimental effects to, and where possible enhance, Natura 2000 network, protected species and their key habitats, recognising relevant landscape features and stepping stones.	Area of site at risk from flooding and qualitative Assessment of impact of option on habitat	No deterioration in the conservation status of designated sites as a result of flood risk management measures	Improvement in the conservation status of designated sites as a result of flood risk management measures
Avoid damage to, and where possible enhance, the flora and fauna of the catchment	Avoid damage to and where possible enhance the flora and fauna of the catchment	Avoid damage to and where possible enhance, legally protected sites / habitats and other sites / habitats of national regional and local nature conservation importance	No deterioration on condition of existing sites due to implementation of option	Creation of new or improved condition of existing sites due to implementation of option
Protect, and where possible enhance, fisheries resource within the catchment	Maintain existing, and where possible create new, fisheries habitat including the maintenance or improvement of	Area of suitable habitat supporting fish. Number of upstream barriers	No loss of integrity of fisheries habitat. Maintenance of upstream accessibility	No loss of fishery habitat. Improvement of habitat quality / quantity. Enhanced upstream accessibility

Objective	Sub-Objective	Indicator	Basic Requirement	Aspirational Target
	conditions that allow upstream migration for fish species.			
Protect, and where possible enhance, landscape character and visual amenity within the river corridor	Protect, and where possible enhance, visual amenity, landscape protection zones and views into / from designated scenic areas within the river corridor.	Changes to reported conservation status of designated sites relating to flood risk management Extent of affected Natura 2000 site, NHA/pNHA or other affected National or International designations (e.g. Nature reserves and Ramsar sites), i.e. Area of re	1. No significant impact on landscape designation (protected site, scenic route/amenity, natural landscape form) within zone of visibility of measures 2. No significant change in the quality of existing landscape characteristics of the receiving environment	1. No change to the existing landscape form. 2. Enhancement of existing landscape or landscape feature
Avoid damage to or loss of features, institutions and collections of cultural heritage importance and their setting	Avoid damage to or loss of features, institutions and collections of architectural value and their setting and improve their protection from extreme floods.	a) The number of architectural features, institutions and collections subject to flooding. b) The impact of flood risk management measures on architectural features, institutions and collections.	a) No increase in risk to architectural features, institutions and collections at risk from flooding. b) No detrimental impacts from flood risk management measures on architectural features, institutions and collections.	a) Complete removal of all relevant architectural features, institutions and collections from the risk of harm by extreme floods. b) Enhanced protection and value of architectural features, institutions and collections importance arising from the implementation of the selected measures.
	Avoid damage to or loss of features, institutions and collections of archaeological value and their setting and improve their protection from extreme floods where this is beneficial.	a) The number of archaeological features, institutions and collections subject to flooding. b) The impact of flood risk management measures on archaeological features, institutions and collections.	a) No increase in risk to archaeological features, institutions and collections at risk from flooding. b) No detrimental impacts from flood risk management measures on archaeological features, institutions and collections.	a) Complete removal of all relevant archaeological features, institutions and collections from the risk of harm by extreme floods. b) Enhanced protection and value of archaeological features, institutions and collections importance arising from the implementation of the selected measures.

5 Assessment of Alternatives

The development of the FRMP for UoM 18 included the analysis of a range of flood risk management options within the Unit of Management. These flood risk options included both structural and non-structural measures. It should be noted that non-structural flood management measures will be implemented to some degree in all UoMs and so the alternatives assessment is relevant to structural measures only. The potential structural options provide realistic alternatives to the preferred options recommended at an AFA scale (Refer to Table 5.1 for the structural measures assessed as alternatives. Each of these alternatives was assessed by way of a multi-criteria analysis to identify the preferred flood risk management option. The outcomes of the alternatives assessment are presented below in Table 5.2.

Table 5.1: Structural Measures

Measure	Description
Flood Storage	Measures could include provision of flood storage/retardation system
Flow Diversion	This could include full diversion of provision of a by-pass channel/flood relief channel
Increased Conveyance	Measures could include in-channel works, floodplain earthworks, removal of constraints/constrictions or channel floodplain clearance.
Flood Defences	Flood defences can include such measures as walls, embankments or demountable defences
Improve Existing Defences	Existing defences could be repaired or gaps infilled.
Relocation of Properties	Existing properties could be relocated outside areas of flood risk
Localised Protection Works	This could involve such actions as minor raising of existing flood defences.

Table 5.2: AFAs within Unit of Management 18

UoM	Name	County	Viable structural options	Preferred Option	Note
18	Kanturk	Cork	Yes	Option 2 – Storage and Flood Defences	Preferred option at public consultation process
18	Rathcormac	Cork	Yes	Option 2 – Flow Diversion	Preferred option was revised from Option 1 to Option 2 after public consultation process
18	Ballyduff	Cork	Yes	Option 1 - Flood Defences	In this case Option 1 Flood Defences was the only viable structural measure
18	Aglish	Cork	Yes	Option 1 - Flood Defences	In this case Option 1 Flood Defences was the only viable structural measure
18	Youghal	Cork	Yes	Option 1 – Monitoring and Flood Defences	

6 Assessment of South West FRMP for UoM 18

This section identifies the likely significant effects on the receiving environment resulting from the implementation of the individual options from the proposed FRMP both alone and in combination with other relevant plans and strategies. The assessment considers the potential impacts of implementing the following options:

1. *Non-Structural Measures*: General Flood Prevention and Flood Preparedness Measures; and
2. *Structural measures*: Preferred location-specific options for the management of flooding in AFAs.

The preferred flood risk management options/measures for UoM have been determined based on range of assessments, with the strategic environmental assessment fully integrated into the decision-making process:

- i The MCA Benefit - Cost Ratio;
- i The economic viability (the BCR);
- i The outcomes of the Strategic Environmental Assessments;
- i The adaptability to possible future changes, such as the potential impacts of climate change;
- i Professional experience and judgement of the OPW, local authorities and Mott MacDonald Ireland;
- i Public and stakeholder input and opinion.

Non-Structural Measures

There are a number of prevention and preparedness measures related to flood risk management which form part of wider Government policy. These measures will be applied across the whole UoM, including all AFAs and are:

- i **Planning Control** based on the *Guidelines on the Planning System and Flood Risk Management* (DEHLG, 2009);
- i Management of runoff water from developments utilising **Sustainable Urban Drainage Systems (SUDS)**.
- i Providing **Flood Forecasting and Warning** of impending flood events.
- i Increased **Public Awareness** measures to increase the public's recognition of the potential of the risk of flooding and the potential consequences thereof. Knowing in advance means that actions can be taken in a timely manner.
- i **Land Use Management** measures include strategies to control overland flow, such as improving agricultural and forestry practices in key catchment areas. Local natural flood management measures such as the creation of wetlands or forestry to retain overland flow could also be adopted.

The non-structural measures described in this section are complimentary to structural measures and should be implemented as national policy to the SSAs where appropriate. These measures have been assessed with regard to the SEA Strategic Environmental Objectives and this assessment has identified that these measures will in general have a neutral to positive effect if implemented

Structural Measures

For each AFA, a number of structural measures have been assessed. The proposed structural measures are described below:

- i Kanturk AFA: The preferred flood risk management option as identified in the MCA is Conveyance & Flood Defences. However, the feedback received at the Public Consultation Day was against the removal of the weirs which are important to local angling. Considering the feedback and alternative viable and cost-effective options, the preferred option has been identified as: Storage and Flood Defences. This would involve the provision of a storage area on the Dalua River upstream of the town along with fluvial

flood defences. Fluvial flood defences on the Dalua and Allow rivers comprising of walls and embankments.

- i Rathcormac AFA: The preferred flood risk management option as identified in the MCA is Storage. However, there was strong opposition to this option received at the Public Consultation Day. Considering the feedback and alternative viable and cost-effective options, the preferred option has been identified as: Flow Diversion. This would involve diverting the flow from the Kilbrien Stream to the Shanowen River through the construction of a culvert north of the town.
- i Ballyduff AFA: The preferred flood risk management option as identified in the MCA is Flood Defences which consists of fluvial flood defences comprising of walls, embankments and road raising. There was limited feedback provided at the Ballyduff PCD which indicated that the public agreed with the preferred option indicated in the MCA. As an interim measure, before the preferred option is implemented, extending the existing Mallow / Fermoy Flood Forecasting and Warning System to Ballyduff would be of benefit.
- i Aglish AFA: The preferred flood risk management option as identified in the MCA is Flood Defences which consists of fluvial flood defences comprising of walls and embankments. There was limited feedback provided at the Aglish PCD which indicated that the public agreed with the preferred option indicated in the MCA.
- i Youghal AFA: The preferred flood risk management option as identified in the MCA is Tidal Monitoring and Flood Defences which consists of tidal flood defences along the quays and to the rear of properties comprising of sea walls. Removable barriers / gates are included at certain locations to maintain existing access points.

The proposed measures at an AFA scale have been assessed for the five AFAs in UoM 18 as shown on the Table 6.1 to Table 6.5 below

Table 6.1: Kanturk AFA - Outcomes of SEA Appraisal

UoM	Munster Blackwater
Area / Location	Kanturk
Option	Option 2 – Storage & Flood Defences
Code	IE-18-IE-AFA-180254-KK02-M33
Description	The provision of a storage area on the Dalua River upstream of the town along with fluvial flood defences. Fluvial flood defences on the Dalua and Allow rivers comprising of walls and embankments.



Strategic Environmental Assessments

Key Conclusions:

- The construction of this option could result in significant negative impacts on the water body status without appropriate mitigation. This measure includes the construction of instream works. In the absence of appropriate mitigation, this would result in significant emissions of sediment to the waterbody and downstream.
- Both the Dalua and Allow Rivers are tributaries of the Blackwater River and are within the Blackwater River SAC (002170). Both rivers are assigned good water status under the WFD objective. Flood protection measures can assist in achieving the objectives of the WFD by preventing flooding downstream.
- There are a number of species and habitats of conservation importance within the AFA, such as lamprey and otter and floating river vegetation. Juvenile Lamprey have been recorded in proximity to Allen's Bridge, immediately upstream of the indicative location of the flood storage area on the Dalua River. The construction of the control structure is likely to result in the permanent loss of juvenile Lamprey habitat. The control structure for the storage area can act as a barrier to fish.
- Otter have been documented throughout the area, on the Allow River upstream and downstream of Kanturk, and on the Dalua River and its tributaries upstream of Kanturk. An 8m high embankment will be required at the head of the storage area on the Dalua River. Whilst the embankment will not act as a barrier to connectivity between otter habitat, it is likely that the construction of the works will require removal of significant riparian habitat and likely to damage otter resting areas. This is the least preferred option in terms of impacts on the Birds and Habitat Directive.
- Himalayan balsam (*Impatiens glandulifera*), an invasive species has been documented in Kanturk at the pedestrian footbridge. In the absence of appropriate mitigation there is potential for spread of this invasive species during the construction phase.
- The landscape in the Kanturk area is defined as "broad marginal middleground valley" and is defined as high value. The Landscape Character Assessment (LCA) recommends the requirement to "protect rivers Blackwater, Dulia and Allow and their surrounding floodplains. As a result, this landscape is considered sensitive. Option 2 includes for the construction of considerable high embankment. The embankment is in close proximity to residential receptors. This option will have a permanent adverse impact on the visual amenity of these receptors. This option also includes construction of flood walls within the town however to a lesser extent than option 1.
- Kanturk is designated as an Architectural Conservation Area (ACA). Whilst the construction of flood walls as part of Option 1 provide flood protection to Kanturk town, the construction of walls within the town will likely change the setting of the town however these impacts are reduced when compared to other options as the flood walls and embankments will be lower.
- This option will have a neutral impact archaeological and cultural heritage of the AFA

Adaptability to Potential Future Changes

Option is adaptable to climate change

Public Consultation Outcomes

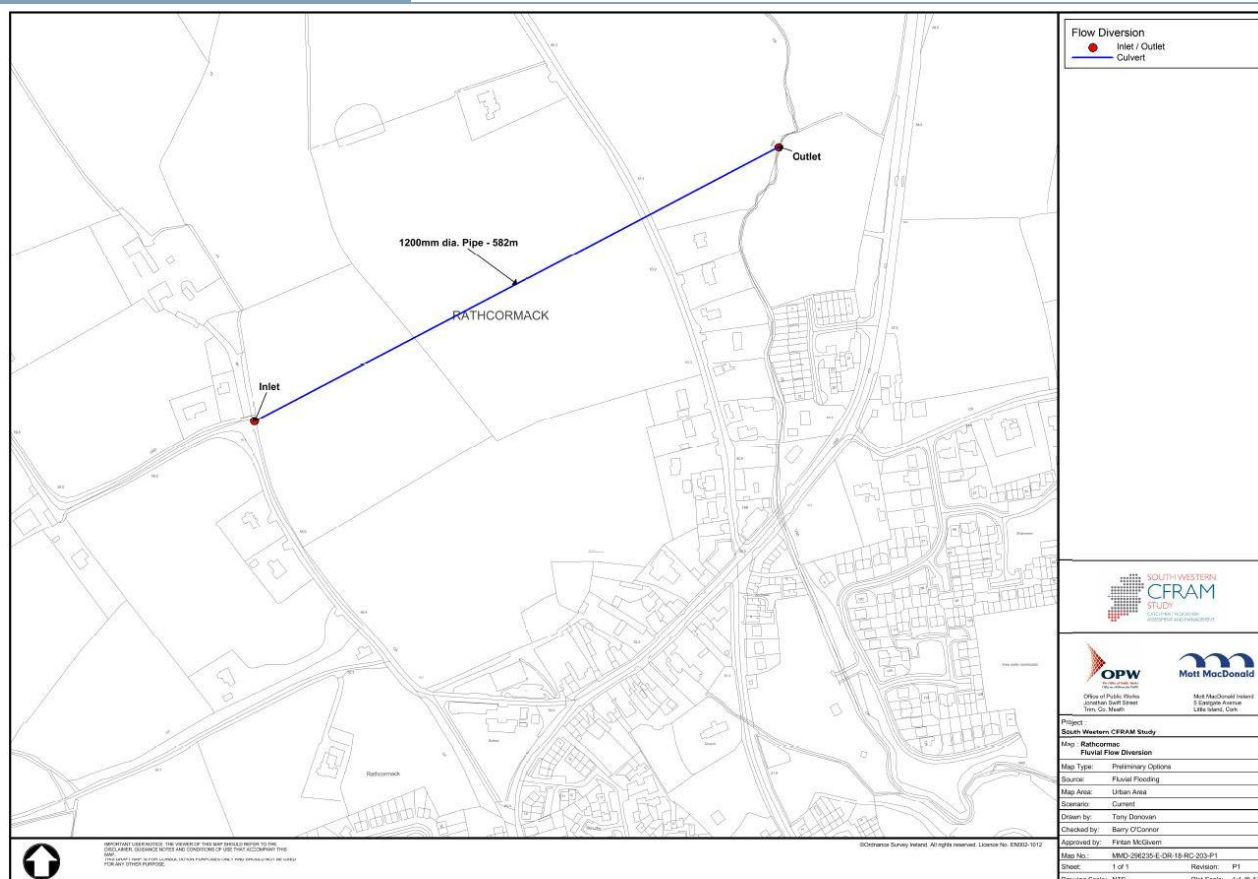
This option was preferred option of people who gave feedback at the public consultation.

Other Issues / Conclusions

The preferred flood risk management option as identified in the MCA is Option 3 – Conveyance & Flood Defences. However, the feedback received at the Public Consultation Day was against the removal of the weirs which are important to local angling. Considering the feedback and alternative viable and cost-effective options, the preferred option has been identified as Option 2 – Storage & Flood Defences

Table 6.2: Rathcormac AFA - Outcomes of SEA Appraisal

UoM	Munster Blackwater
Area / Location	Rathcormac
Option	Option 2 – Flow Diversion
Code	IE-18-IE-AFA-180265-RC03-M33
Description	Diversion of flow from the Kilbrien Stream to the Shanowen River through the construction of a culvert north of the town



Strategic Environmental Assessments

Key Conclusions:

Rathcormac is at risk from fluvial flooding. There are no designated ecological sites within the AFA, however the Kilbrien stream and Shanowen river are tributaries of the River Bride which is part of the Blackwater River SAC. there is potential for recurring negative impacts associated with diversion of flow into the Shanowen River during storm events. The increase flow volume and velocity in the Shanowen River during storm events can cause bankside erosion and associated loss of habitat, however it is noted that the river has been assessed as having the capacity to physically accommodate the increase volume without overtopping its bank. Instream works are required to facilitate the inlet and outlet flows. The construction of this option could result in significant temporary negative impacts from sedimentation, accidental pollution without appropriate mitigation. Juvenile Lamprey have been recorded in the River Bride. There are no documented records for the Shanowen River. It is unlikely that lamprey would be attracted into the flow diversion channel and ultimately into the Kilbrien stream. Similarly, Atlantic Salmon are unlikely to utilise the Shanowen River. The diversion will be through improved agricultural grasslands and hedgerows which are managed and are of low ecological value

This option will have a neutral impact architectural and archaeological and cultural heritage of the AFA.

Adaptability to Potential Future Changes

Option is adaptable to climate change

Public Consultation Outcomes

The feedback received at the public consultation day does not support this option. The feedback indicated that the public do not feel that there is a significant flood risk in the area and that recent floods were due to blockage and lack of maintenance at culvert etc.

Other Issues / Conclusions

The preferred flood risk management option as identified in the MCA is Option 1 – Storage. However, there was strong opposition to this option received at the Public Consultation Day. Considering the feedback and alternative viable and cost-effective options, the preferred option has been identified as Option 2 – Flow Diversion.

Table 6.3: Ballyduff AFA - Outcomes of SEA Appraisal

UoM	Munster Blackwater
Area / Location	Ballyduff
Option	Option 1 – Flood Defences
Code	IE-18-IE-AFA-180248-BF01-M33
Description	Fluvial flood defences comprising of walls, embankments and road raising.

<p>South Western CFRAM STUDY</p> <p>OPW Office of Public Works Jonathan Swift Street Tenn. Co. Dublin</p> <p>Mott MacDonald Mott MacDonald Ireland 5 Carrigan Avenue Liffe, Dublin, Co. Dublin</p> <p>Project: South Western CFRAM Study Map: Ballyduff - Emerging Preferred Option Map Type: Preliminary Options Source: Fluvial Flooding Map Area: Urban Area Scenario: Current Drawn by: Terry Donovan Checked by: Barry O'Connor Approved by: Fintan McGroum Map No.: MWD-296235-IE-018-18-BF-201-01 Sheet: 1 of 1 Revision: P1 Drawing Scale: NTS Plot Scale: 1:1 @ A3</p>

Strategic Environmental Assessments

Key Conclusions:

- Ballyduff AFA is located along the Blackwater River and is at risk of fluvial flooding. There are no significant polluting sources at risk from flooding in 1% AEP. The waterbody is assigned a good water status under the WFD. It is considered a sensitive waterbody. Flood protection measures can assist in contributing to maintaining the objectives of the WFD by preventing flooding. The construction of this option could result in significant temporary negative impacts from sedimentation, accidental pollution without appropriate mitigation
- Lamprey have been recorded within the River Blackwater near Ballyduff. Sea lamprey have been observed spawning downstream of Ballyduff and Juvenile lamprey have been recorded upstream of Ballyduff. Impacts on lamprey/Atlantic salmon both qualifying interests of the SAC from sedimentation associated with flood embankment construction are probable given the proximity of spawning gravels downstream of the AFA.
- The Munster Blackwater Freshwater Pearl Mussel Sub-Basin Plan (Anon, 2010) identifies pearl mussels at Ballyduff.
- According to the Waterford County Development Plan, the approach road into Ballyduff is scenic routes. The proposed measures include construction of embankments of approximate height 1.5m to 2m. Currently there are wide open views of the river along the approach roads bound by 0.5m high stone walls. The proposed measures will potentially change the character of the landscape in the absence of appropriate design.
- This option will have a neutral impact on archaeological and cultural heritage of the AFA

Adaptability to Potential Future Changes

Option is adaptable to climate change

Public Consultation Outcomes

The feedback provided at the Public Consultation Day was in support of Option 1 – Flood Defences.

Other Issues / Conclusions

The MCA has identified Option 1 – Flood Defences as the preferred Flood Risk Management Option.

Table 6.4: Aglish AFA - Outcomes of SEA Appraisal

UoM	Munster Blackwater
Area / Location	Aglish
Option	Option 1 – Flood Defences
Code	IE-18-IE-AFA-180247-AH01-M33
Description	Fluvial flood defences comprising of walls and embankments.

Legend:
Flood Defence Walls (Red line)
Flood Defence Embankments (Green line)

Map Labels:
Height - 1.1m
Aglish House
Aglish
BALLYNAP
BAILE NA F

Project Information:
Project: South Western CFRAM Study
Map: Aglish
Flood Defences
Map Type: Preliminary Options
Source: Fluvial Flooding
Map Area: Urban Area
Scenario: Current
Drawn by: Terry Downham
Checked by: Barry O'Connell
Approved by: Fergus MacDonnell
Map No.: SWD-296235-E-018-18-A11-011-P1
Sheet: 1 of 1
Revision: P1
Drawing Scale: NTS
Plot Scale: 1:1 @ A3

Strategic Environmental Assessments

Key Conclusions:

- This AFA occurs along the Aglish stream which is a tributary of the Goish River, these waterbodies are assigned good water status under the WFD. The Aglish stream is channelised along the AFA. There are no significant polluting sources at risk from flooding. The construction of this option could result in temporary negative impacts from sedimentation, accidental pollution without appropriate mitigation.
- The Aglish AFA occurs outside the boundary of the Blackwater River SAC. The stream is hydrologically connected to the SAC. The stream has no capacity to support qualifying features of the Blackwater River SAC given its heavy modification (culverting and channelization).
- The footprint of the walls will be on road verges and agricultural grassland. The riparian habitat on the Aglish stream is considered sub-optimal habitat for otter and it is unlikely that otters have established holts in the area.
- According to the Waterford Development Plan, there are no scenic or visually sensitive landscapes within the AFA. The propose measures includes the construction of low lying wall parallel to the local approach road adjacent to the local school and within the town at the rear of a dwelling. There is a currently a low-lying boundary hedgerow. The construction of the wall and embankment are unlikely change the character of the area or change the existing views from the property. Temporary negative impacts are likely to occur during the construction phase.
- This option will have a neutral impact on architectural, archaeological and cultural heritage of the AFA

Adaptability to Potential Future Changes

Option is adaptable to climate change

Public Consultation Outcomes

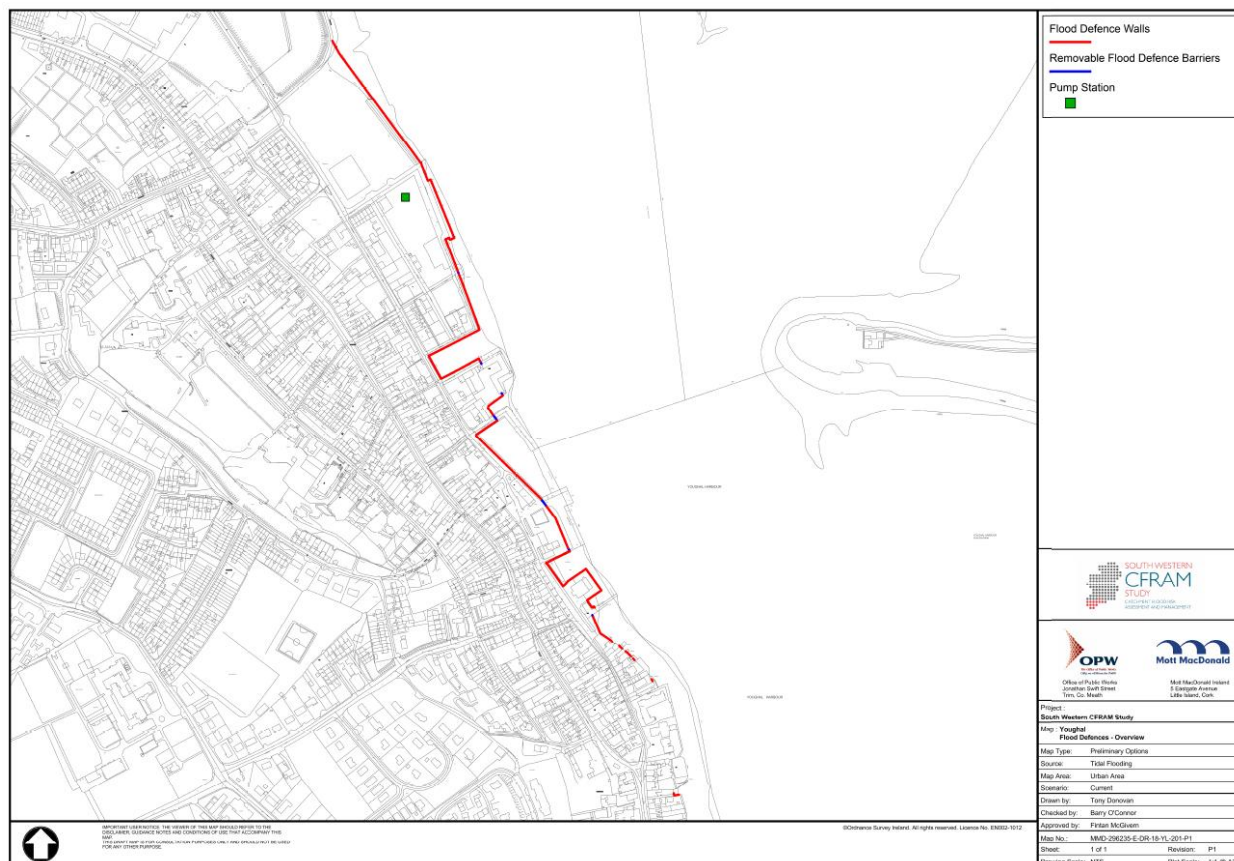
There was limited feedback received at the Public Consultation Day. However, this was in support of Option 1 – Flood Defences

Other Issues / Conclusions

The MCA has identified Option 1 – Flood Defences as the preferred Flood Risk Management Option

Table 6.5: Youghal AFA - Outcomes of SEA Appraisal

UoM	Munster Blackwater
Area / Location	Youghal
Option	Option 1 – Monitoring and Flood Defences
Code	Code for Measure (Preferred Measures Only)
Description	Tidal monitoring to be carried out in advance of any mitigation works to review and determine the design tide plus surge level. Tidal flood defences along the quays and to the rear of properties comprising of sea walls. Removable barriers / gates are included at certain locations to maintain existing access points



Strategic Environmental Assessments

Key Conclusions:

- Youghal AFA is located in east Cork at the mouth of the Blackwater in Youghal Bay and Estuary. The AFA is at risk from both fluvial and tidal flooding, however fluvial risk is minor and there are no receptors at risk. There are no significant polluting sources at risk from flooding. Youghal strand bathing waters are assigned a low/moderate status. These occur outside the AFA boundary.
- Option 1 requires the construction of local defence wall. These walls will be confined to the urban fabric of the town. There will be no requirement for machinery movement within the Annexed habitats. Installation of flood walls along quays has the potential to cause disturbance to species of conservation concern through physical presence of construction machinery and personnel, noise generated by the works and possibly artificial lighting that may be used in the darker winter months, but it is possible to implement effective mitigation measures.
- Option 1 requires the construction of low lying walls along the quays, it is considered the preferred option from a landscape and visual objective.
- There are considerable numbers of NIAHs at risk from flooding within the town. The provision of all options will perform well in terms of their protection to the AFA and its architectural and archaeological heritage, however there are potential for permanent long term negative impacts arising from the setting of the walls on the quay within the visual envelope of the town.
- From a landscape and visual objective, Option 1 is considered to be the preferred option. Whilst the measures include the construction of low lying flood walls along the quays, with appropriate design the potential impacts can be mitigated.

Adaptability to Potential Future Changes

Option is adaptable to climate change

Public Consultation Outcomes
The feedback provided at the Public Consultation Day was in support of Option 1 – Flood Defences.
Other Issues / Conclusions
The MCA has identified Option 1 – Flood Defences as the preferred Flood Risk Management Option

In combination effects have also been fully considered to assess if there is potential for significant in combination effects between (a) different plan options and (b) between the FRMP and other plans and strategies.

7 Mitigation and Monitoring

The preferred structural flood risk management options could give rise to some environmental impacts, both positive and negative of short term and long-term duration. For each of the proposed measures that have a potential negative impact mitigation measures have been developed to minimise the potential negative impacts arising from the options to be adopted.

The SEA assessment identified that the non-structural measures proposed for UoM 18 have either positive or neutral impacts and as a result do not require the implementation of mitigation measures. Furthermore, Habitats Directive Assessment was undertaken for UoM 18, whereby potentially significant effects on the *Natura 2000* sites (i.e. cSACs and SPAs) were identified. A Natura Impact Statement (NIS) was prepared for the Plan for UoM 18 and the proposed mitigation measures and conclusions of the assessment have been incorporated into the SEA mitigation measures.

The principal mitigation recommendation is that potential impacts should be considered further during the next stage of option development, when detailed design of the preferred structural option progresses. This will allow the proposed option to be optimised through detailed design to limit the potential negative impacts on the receiving environment and based on the findings of project level environmental assessment, mitigation measures should be put in place. Environmental studies based on the detailed design and construction methodology will be undertaken as appropriate.

8 Conclusions

This SEA Environmental Report demonstrates how the strategic environmental assessment process was fully integrated into the development of the FRMP for UoM 18.

The preferred flood risk management options, both structural and non-structural measures at UoM scale and at the AFA scale were assessed to determine the potential impacts on the receiving environment.

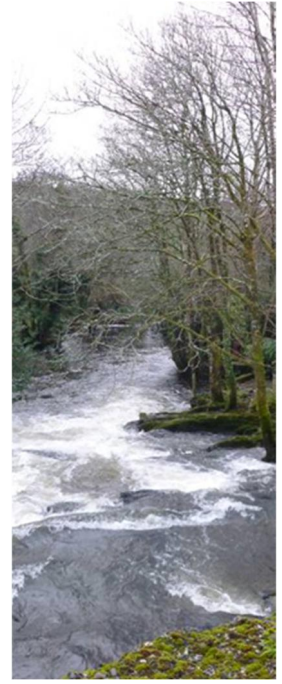
The integration of the SEA within the development of the FRMP has ensured that:

- | Key environmental issues, constraints and opportunities within the vicinity of the proposed flood management options were considered;
- | Environmentally unacceptable flood risk management measures did not progress to be a preferred option;
- | The development of flood risk management options to avoid potential environmental impacts where possible;

Structural measures were specified for five AFAs:

- | Aglish: Flood Defences;
- | Ballyduff: Flood Defences;
- | Kanturk: Storage and Flood Defences;
- | Rathcormac: Flow Diversion;
- | Youghal: Monitoring and Flood Defences.

A suite of mitigation measures and proposed monitoring were developed for each of the proposed FRMP structural measures to ensure that the potential to impact on the receiving environment are minimised.



South Western CFRAM Study

SEA Environmental Report UoM 18

Oct 2017

Office of Public Works

South Western CFRAM Study

SEA Environmental Report UoM 18

Oct 2017

Office of Public Works

Trim, Co. Meath

Issue and revision record

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C	31/07/2017	NR	RH	BOC	Updated following consultation
D	05/10/2017	NR	RH	BOC	Update to include Glossary

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Abbreviations

AA	Appropriate Assessment
ACA	Architectural Conservation Area
AFA	Area for Further Assessment
CAFE	Clean Air for Europe [Directive]
CBA	Cost Benefit Analysis
CDP	County Development Plan
CFRAM	Catchment Flood Risk Assessment and Management
CJEU	Court of Justice of the European Union
DAFM	Department of Agriculture, Food and the Marine
DAHG	Department of Arts, Heritage and the Gaeltacht
DAHRRGA	Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs
DCCAE	Department of Communications, Climate Action and Environment
DCENR	Department of Communications, Energy and Natural Resources
DD	Drainage District
DECLG	Department of Environment, Community and Local Government
DEHLG	Department of Environment, Heritage and Local Government
EIA	Environmental Impact Assessment
EPA	Environmental Protection Agency
FPM	Freshwater Pearl Mussel
FRA	Flood Risk Assessment
FRM	Flood Risk Management
FRMP	Flood Risk Management Plan

GIS	Geographical Information Systems
GSI	Geological Survey Ireland
HA	Hydrometric Area
HPW	High Priority Watercourse
IFI	Inland Fisheries Ireland
IPP	Individual Property Protection
LAP	Local Area Plan
MCA	Multi-Criteria Analysis
MPW	Medium Priority Watercourse
NHA	Natural Heritage Area
NIS	Natura Impact Statement
NIHA	National Inventory of Architectural Heritage
NPWS	National Parks and Wildlife Service
OD	Ordnance Datum
OPW	Office of Public Works
OSi	Ordnance Survey Ireland
PFRA	Preliminary Flood Risk Assessment
RBD	River Basin District
RBMP	River Basin Management Plan
RMP	Record of Monuments and Places
RPS	Record of Protected Structures
SAC	Special Area of Conservation

SEA	Strategic Environmental Assessment
SI	Statutory Instrument
SOP	Standard Operating Procedure
SPA	Special Protection Area
SWRBD	South Western River Basin District
UoM	Unit of Management
WFD	Water Framework Directive
WHO	World Health Organisation

Glossary

Annual Exceedance Probability (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 a 100, chance of occurring or being exceeded in any given year
Appropriate Assessment	An assessment of the effects of a plan or project on the Natura 2000 network
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.
Benefiting Lands	Lands benefiting from an Arterial Drainage Scheme.
Baseline	A description of the present and future state of an area, in the absence of any development, taking into account changes resulting from natural events and from other human activities
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.
Flood	The temporary covering by water of land that is not normally covered by water.
Floods' Directive	The EU '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 Hazard Map	A map indicating areas of land that may be prone to flooding, referred to as a flood extent map, or a map indicating the depth, velocity or other aspect of flooding or flood waters for a given flood event. Flood hazard maps are typically prepared for either a past event or for (a) potential future flood event(s) of a given probability
Flood Risk Map	A map showing the potential risks associated with flooding. These maps may indicate a particular aspect of risk, taking into account the probability of flooding (e.g., annual average economic damages), but can also show the various receptors that could be affected by floods of different probabilities
Floodplain	The area of land adjacent to a river or coastal reach that is prone to periodic flooding from that river or the sea
Indicator	A measure of variables over time, often used to measure achievement of objectives
Mitigation Measures	Refers to measures to avoid, reduce or offset significant adverse effects
Natura 2000 Network	The assemblage of sites which are identified as Special Areas of Conservation (SAC) under the Habitats Directive or identified as Special Protection Areas (SPAs) under the Birds Directive, or a site of Community Importance (SCI)
Natura Impact Statement	The statement prepared during Appropriate Assessment as required under the Habitats Directive which presents information on the assessment and the process of collating data on a project/plan and its potential significant impacts on Natura 2000 network sites
Objective	A statement of what is intended, specifying the desired direction of change in trends
Preliminary Flood Risk Assessment (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
Public Consultation Day (PCD)	A public and stakeholder consultation and engagement event advertised in advance, where the project team displayed and presented material (e.g., flood maps, flood risk management options) at a venue within a community, with staff available to

explain and discuss the material, and where members of the community and other interested parties could provide local information and put forward their views

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 consequence of a flood
River Basin	An area of land (catchment) draining to a particular estuary or reach of coastline
Scoping	The process of deciding the scope and level of detail of an SEA, including the sustainability effects and options which needs to be considering, the assessment methods to be used, and the structure and contents of the Environmental Report
Sedimentation	the accumulation of particles (of soils, sand, clay, peat, etc) in the river channel
SEA	Strategic environmental assessment, is a formal, systematic evaluation of the likely significant effects of implementing a plan or programme before a decision is made to adopt it. It ensures that these effects are appropriately addressed at the earliest appropriate stage of decision making in tandem with economic and social considerations
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
Surface Water	Water on the surface of the land. Often used to refer to ponding of rainfall unable to drain away or infiltrate into the soil
Tidal	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
Topography	The shape of the land, e.g., where land rises or is flat
Transitional Water	The estuarine or inter tidal reach of a river, where the water is influenced by both freshwater river flow and saltwater from the sea

Unit of management (UoM)	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
Vulnerability	The potential degree of damage to a receptor (see above), and the degree of consequences that would arise from such damage
Waterbody	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
Water Framework Directive	Directive 2000/60//EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for community action in the field of water policy
Zone of Influence	The area over which a plan can impact on the environment

1 Introduction

1.1 Introduction

This document consists of the Strategic Environmental Assessment (SEA) Environmental Report for the Flood Risk Management Plan (FRMP) covering the Unit of Management (UoM) 18 in the South Western River Basin District.

The purpose of this Environmental Report is to identify, evaluate and describe the likely significant effects on the environment of implementing the Flood Risk Management Plan (FRMP) for UoM 18. Once the environmental effects have been identified, then mitigation measures are developed in tandem with an effective monitoring programme to ensure that the potential environmental impacts are minimised.

SEA is required under the EU Council Directive 2001/42/EC on the *Assessment of the Effects of Certain Plans and Programmes on the Environment*, more commonly known as the “SEA Directive” which has been transposed into Irish law by the following regulations:

- i European Communities (Environmental Assessment of Certain Plans and Programmes) Regulations, 2004 (S.I. 435 of 2004) and the
- i Planning and Development (Strategic Environmental Assessment) Regulations, 2004 (S.I. 436 of 2004).

These regulations were replaced in 2011 by the European Communities (Environmental Assessment of Certain Plans and Programmes) (Amendment) Regulations, 2011 (S.I. No. 200 of 2011) and the Planning and Development (Strategic Environmental Assessment) (Amendment) Regulations 2011 (S.I. No. 201 of 2011).

1.2 Background – Flood Risk Assessment and Management in Ireland

In 2004, the Irish Government adopted a new National Flood Policy for Ireland which shifted the emphasis in addressing flood risk away from arterial drainage and targeted towards the protection of agriculture and cities/towns liable to serious flooding and towards a waterbody catchment-based flood risk assessment (a similar catchment-based management approach to that already being implemented under the Water Framework Directive 2000/60/EC).

In 2007, the Floods Directive [2007/60/EC] was published which requires the establishment of a framework of measures to reduce the risks of flood damage. The Floods Directive was transposed into Irish law by the European Communities (Assessment and Management of Flood Risks) Regulations, 2010 (S.I. No. 122 of 2010). The Regulations identify the Office of Public Works (OPW) as the lead agency in implementing flood management policy in Ireland.

1.3 Catchment Flood Risk Assessment and Management (CFRAM) Studies

For the purpose of delivering on the components of the National Flood Policy and on the requirements of the European Union Floods Directive, the OPW, in conjunction with local authorities and stakeholders, is conducting a number of Catchment Flood Risk Assessment and Management (CFRAM) Studies. These

studies are the core activity from which medium to long-term strategies for the reduction and management of flood risk in Ireland will be achieved.

The overarching objectives of the CFRAM Studies are to:

- i Identify and map the existing and potential future flood hazard within the study area;
- i Assess and map the existing and potential future flood risk within the study area;
- i Identify viable structural and non-structural options and measures for the effective and sustainable management of flood risk within the study area;
- i Prepare Flood Risk Management Plans (FRMPs) setting out recommendations to manage the existing flood risk and also the potential future flood risk which may increase due to climate change, development, and other pressures that may arise in the future. FRMPs will set out 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 requirements¹.

The programme for the delivery of flood risk management in Ireland comprises of the following phases:

- i Preliminary Flood Risk Assessment, which was completed in 2011 and identified areas of existing or future potentially significant flood risk (referred to as 'Areas for Further Assessment'/AFAs);
- i CFRAM Studies, which were completed during the period 2011 to 2017;
- i Flood Risk Management Plans were produced, at Unit of Management scale, for each CFRAM study in 2017;
- i The Flood Risk Management Plans will be implemented from 2017 onwards and will be reviewed on a rolling six-yearly cycle.

It should be noted that the detailed designs for flood risk management measures will not be developed as part of the Flood Risk Management Plans / CFRAM Studies but rather measures will be progressed on a project by project basis, outside of the scope of the CFRAM studies.

This report is a Strategic Environmental Assessment Environmental Report and pertains to the Munster Blackwater Catchment Unit of Management (UoM 18) in the South Western River Basin District.

1.4 Overview of the South Western River Basin District

The South Western River Basin District (SWRBD) covers an area of approximately 11,160 km². The study area of the SWRBD includes most of county Cork, large parts of counties Kerry and Waterford along with small parts of the counties of Tipperary and Limerick. The study area contains over 1,800 km of coastline along the Atlantic Ocean and the Celtic Sea. (Refer to Figure 1.1)

¹ The Floods Directive requires that Flood Risk Management Plans should take into account the particular characteristics of the areas they cover and provide for tailored solutions according to the needs and priorities of those areas, whilst promoting the achievement of environmental objectives laid down in Community legislation.

In total, six Local Authorities administer the regions within the SWRBD: Cork County Council, Cork City Council, Kerry County Council, Waterford City and County Council, Tipperary County Council and Limerick City & County Council. Much of the SWRBD is rural and the predominant land usage is agriculture.

Figure 1.1: South Western River Basin District (SWRBD)



1.5 Overview of the Munster Blackwater Catchment Unit of Management (UoM 18)

The Munster Blackwater Catchment UoM covers an area of approximately 3,295 km². Much of the area is in North County Cork with parts in County Waterford. UoM 18 also includes small parts of Limerick, Kerry and Tipperary and has only a few kilometres of coastline at Youghal Bay. UoM 18 comprises three major river catchments: the Blackwater and its tributaries the Allow and the Bride.

Nine Areas for Further Assessment (AFAs) have been identified within Unit of Management 18. However, four AFA's were ruled out at the optioneering process in the Flood Risk Management Plan. Therefore, for the purpose of this SEA Environmental Report, five viable structural options for the following AFA's are considered. (Refer to Table 1.1)

Associated with the AFA's are 80km of high priority watercourses² and 158km of medium priority watercourses.

² High priority watercourses are any modelled watercourse within an AFA. Medium priority watercourses are all other modelled watercourses

Table 1.1: AFAs within the Munster Blackwater Catchment Unit of Management

UoM	Name	Unique ID	Fluvial	Coastal	County	Easting	Northing	Viable Structural Options
18	Aglish	180247	Yes	No	Waterford	212250	91500	Yes
18	Ballyduff	180248	Yes	No	Waterford	196500	99500	Yes
18	Fermoy	180252	Yes	No	Cork	182750	99500	No
18	Freemount	180253	Yes	No	Cork	139500	114250	No
18	Kanturk	180254	Yes	No	Cork	138250	102750	Yes
18	Mallow	180262	Yes	No	Cork	155250	98500	No
18	Rathcormac	180265	Yes	No	Cork	181750	91000	Yes
18	Tallow	180266	Yes	No	Waterford	199750	93750	No
18	Youghal	180267	Yes	Yes	Cork	210250	78750	Yes

1.6 Purpose and Structure of this Report

The CFRAM studies and Flood Risk Management Plans will be informed by a Strategic Environmental Assessment completed in accordance with the requirements of the SEA Directive (2001/42/EC), as transposed into Irish law through S.I. No. 435 and 436 of 2004 and S.I. No. 200 and 201 of 2011.

This is the SEA Environmental Report for UoM 18 of the South Western River Basin District CFRAM study. This report forms part of the overall SEA process.

The purpose of this report is to:

- Outline the key environmental characteristics of the Unit of Management and to present an understanding of how flood risk management measures may influence these environmental characteristics;
- Present the Strategic Environmental Objectives;
- Presentation of an assessment of alternatives and outline the preferred flood risk management options;
- Presentation of an assessment of the preferred flood risk management options and define potential for an environmental effect;
- Define appropriate mitigation proposals and realistic monitoring programmes.

1.7 Report Structure

Section 1 Introduction: provides a broad background to the South Western CFRAM Study in the context of National Flood Policy and legislation. This section also specifies the legislative requirement for Strategic Environmental Assessment (SEA) and outlines the purpose of this document – the Environmental Report.

Section 2 Flood Risk Management in UoM 18: provides details on the historical occurrence of flooding in the Munster Blackwater Catchment Unit of Management and gives an overview of the Flood Risk Management Plan.

Section 3 Approach to Strategic Environmental Assessment: gives an overview of the SEA process and the relationship between SEA, AA and the CFRAM project.

Section 4 Stakeholder and Public Consultation: provides a programme of all the key stakeholders and public consultation events undertaken for the purposes of the Strategic Environmental Assessment of the CFRAM project in the South Western River Basin Districts.

Section 5 Relationship with Other Plans: presents a review of the potential for interactions between the CFRAMS plan for the South Western RBD and other relevant plans.

Section 6 Key Characteristics of UoM 18: provides a summary description of the receiving environment within the Unit of Management and also includes potential interrelationships / interactions between the various environmental topics.

Section 7 Strategic Environmental objectives: presents the SEA objectives, indicators and associated targets to be used in the SEA assessment, as developed in the SEA Scoping process.

Section 8 Assessment of Alternatives: outlines the results and outcomes of the assessment of alternatives undertaken during the SEA process as part of the development of the CFRAM plan for the South Western RBD.

Section 9 Assessment of South Western CFRAM Plan to UoM 18: presents details of the SEA assessment of the CFRAMS plan for the South Western RBD utilising the Strategic Environmental Objectives developed for the project.

Section 10 Mitigation and Monitoring: presents the proposed SEA mitigation measures and monitoring programme.

Section 11 Conclusions and Recommendations: Conclusions of the Strategic Environmental Assessment.

2 Flood Risk Management in UoM 18

2.1 Historic Flooding in UoM 18

Historic flood events for the catchments in UoM 18 were identified from the floods database (www.floods.ie), previous reports, and drawing on local accounts of the relevant Local Authority personnel as part of the flood risk review site inspections. There were limited details available for historic flood events, as detailed records of impacts for events more than 20 years ago are scarce. Refer to Table 2.2 for details of the key flooding events that have occurred within the UoM 18.

2.2 Preliminary Flood Risk Assessment

The Preliminary Flood Risk Assessment (PFRA) was a national screening exercise, based on available and readily-derivable information, to identify areas where there may be a significant risk associated with flooding. The PFRA for Ireland was finalised in December 2011.

The outcomes of the PFRA in combination with public consultation outcomes and the Flood Risk Reviews were used to designate the Areas of Further Assessment (AFAs). The AFAs are areas which have been identified as having significant risks associated with flooding and are the subject of further detailed assessment during the CFRAM process. Table 2.1 identifies the AFAs that are within the area covered by this FRMP, which are also shown in Figure 2.1.

Table 2.1: List of AFAs within the Munster Blackwater Catchment UoM

ID No.	COUNTY	NAME
180247	Waterford	Aglish
180248	Waterford	Ballyduff
180252	Cork	Fermoy
180253	Cork	Freemount
180254	Cork	Kanturk
180262	Cork	Mallow
180265	Cork	Rathcormac
180266	Waterford	Tallow
180267	Cork	Youghal

Table 2.2: Key Historical Flood Events

Date	Flooding Mechanisms	Areas Affected	Properties Flooded	Reported Duration of Flooding (hrs)
02/11/1980	Fluvial flooding along the Blackwater overtopping river banks	Mallow: Navigation Road, Bridge Street, Ward Terrace and Town Park	Not reported, Estimated to be over 100	48 hours
06/08/1986	Fluvial flooding along the Blackwater overtopping river banks	Mallow: Bridge Street and Town Park	Over 70 properties flooded	32 hours
22/10/1988	No flooding reported but high flows recorded at gauge	Mallow: Bridge Street and Town Park	Over 70 properties flooded	32 hours
26/08/1997	Flash flooding along the Freemount Stream combined with blockage at key culverts.	Freemount: R578 and Main Street	Estimated 20 properties flooded	< 2 hours
30/12/1998	Fluvial flooding along the Blackwater overtopping river banks	Mallow: Bridge Street and Town Park	Over 70 properties flooded	> 48 hours
06/11/2000	Fluvial flooding on an already saturated catchment	Mallow: Racecourse, Bridge Street and Town Park	Over 70 properties flooded	> 48 hours
27/10/2004	Tidal and fluvial flooding. The high tide overtopped quay walls in Youghal and high river flow from the heavy rain flooded the Allow and Blackwater.	Youghal: Quayside, The Mall, Market Place and Catherine Street Kanturk: Brogeen	40 residential properties None reported	14 hours
10/01/2008	Fluvial flooding along the Blackwater overtopping river banks	Mallow: Bridge Street, Park Street and Meadowlands Fermoy	Over 70 properties flooded	
30/01/2009	Fluvial event due to intense rainfall overtopping banks by the National Primary School	Rathcormac: Main Street	1 residential property and 1 commercial	< 2 hours
19/11/2009	Fluvial event exacerbated by saturated catchment conditions led to prolong flooding across the catchment. Limited properties were affected due to the completion of the Mallow and Fermoy schemes	Mallow: Town Park area Fermoy: Town Bridge and right bank Killavullen: Fields flooded Ballyduff: fields flooded	7 residential, 1 commercial 22 residential 16 commercial None reported None reported	17 hours +
04/08/2012	Fluvial event due to intense rainfall overtopping banks by the National Primary School	Rathcormac: Main Street	1 residential property and 1 commercial	< 2 hours
17/10/2012	Tidal flooding from storm surge overtopped quay walls.	Youghal: Quayside, The Mall, Market Place and Catherine Street	1 commercial, no residential because individual flood protection measures in place (up to 40 if protection not in place)	14 hours

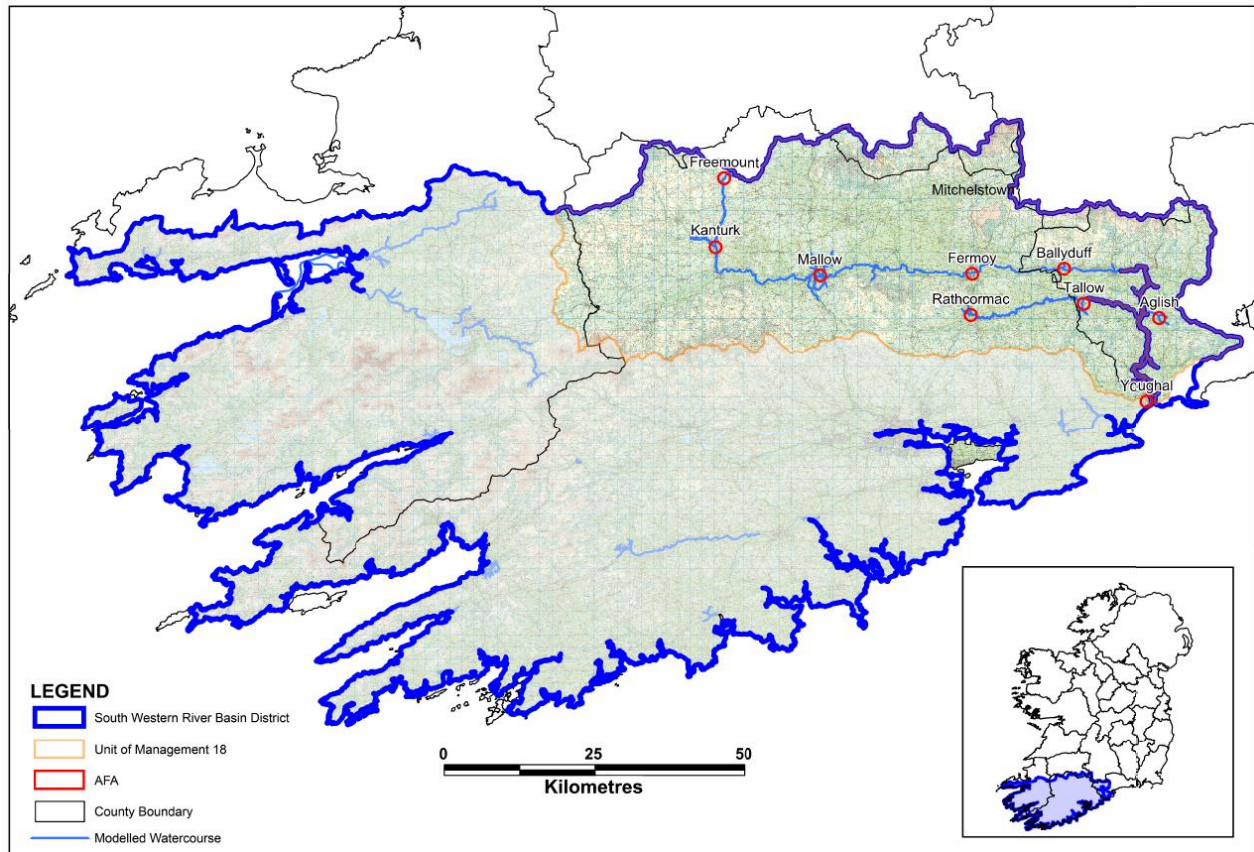
2.3 Catchment Flood Risk Assessment and Management (CFRAM) Study

A Flood Risk Management Plan (FRMP) has been prepared for UoM 18 as part of an overall development CFRAM programme for the South Western RBD.

The CFRAM programme has been developed to set out a sustainable long-term strategy to manage existing identified flood risk and potential for future increasing flood risks due to the effects of climate change. The objectives of the CFRAM Programme are to:

- i Identify and map the existing and potential future flood hazard and flood risk,
- i Identify viable structural and non-structural options and measures for the effective and sustainable management of flood risk in the Areas for Further Assessment (AFAs),
- i Prepare a set of FRMPs, and associated Strategic Environmental and Habitats Directive (Appropriate) Assessments, 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, taking account of environmental plans, objectives and legislative requirements and other statutory plans and requirements.

Figure 2.1: AFAs Within the Munster Blackwater Catchment 18 UoM



2.4 Development of the FRMP

The development of the FRMP has comprised a number of steps as part of a well-defined and transparent process aimed at identifying appropriate flood management solutions. The Strategic Environmental Assessment has been fully integrated into the FRMP development strategy.

2.4.1 Data collection and collation

The 'CFRAM' Programme involves the collection of a wide range of information on past floods, the environment, flood defence assets, ground levels, hydrometric data, details on hydrogeomorphological processes, land use, and details of watercourses and the coastline to provide a thorough understanding of the flood risk, both in the cities, towns and villages and along the rivers that connect them.

2.4.2 Flood Risk Modelling

The information and data collected is utilised as an input into the analysis process which is based on generating hydraulic models to determine flood flows and levels in rivers, estuaries and the sea, and then how floodwaters flow over the land.

Thirteen hydraulic models have been developed for High Priority and Medium Priority Watercourses in UoM18 covering the nine Areas for Further Assessment, namely: Freemount, Kanturk, Mallow, Fermoy, Ballyduff, Youghal, Rathcormac, Tallow and Aglish, and four intervening reaches of Medium Priority Watercourses. The river channels have been modelled using 1D ISIS software to calculate flows and head loss at hydraulic structures. The 2D TUFLOW software has been used to simulate the multi-directional flows within AFAs. The 1D and 2D components of the models are hydrodynamically linked such that water can flow between the river and floodplain during the event to simulate the observed flood mechanisms.

The Blackwater catchment was calibrated to flood events of 30th December 1998, 06th November 2000 and 19th November 2009 between Kanturk and Ballyduff. Rathcormac was calibrated to the 30th January 2009 event and Youghal was calibrated to the 17th October 2012 coastal event. Sensitivity tests were undertaken on flow, downstream level and Manning's 'n' for all models.

The calibrated and tested models were then run for eight flood event probabilities under the current design scenario, eight flood event probabilities under the mid-range future scenario, and three flood event probabilities under the high-end future scenario from both fluvial and coastal sources. The joint probability between different tributaries and the sea have been considered in defining each event probability. The flood extent, flood zone, flood depth, flood velocity and flood hazard have all been mapped for the specified scenarios.

The outputs of the hydraulic modelling and the flood maps were used as inputs to the flood risk review. The knowledge of the flood mechanisms, critical structures and impact of flooding established supported the development of sustainable and appropriate flood risk management options in the flood risk areas.

2.4.3 Flood Risk Analysis and Mapping

The potential adverse consequences (risk) associated with flooding to the following four risk receptor groups were assessed and mapped for each AFA:

- i Society
- i The Environment
- i Cultural Heritage
- i The Economy

In addition, specific flood risk maps were prepared to assess the following:

- i Number of Inhabitants: maps which present the indicative number of inhabitants at risk of flooding within each AEP event

- i Types of Economic Activity: maps which present the types of property use and type of economic activity at risk of flooding within each AEP event
- i Specific Risk Density: maps which present the annual average damage.

2.4.4 Flood Risk Management Objectives

A set of flood risk management objectives were developed and applied through the Pilot CFRAM Studies, with stakeholder consultation to ensure the objectives set were appropriate. In commencing the National CFRAM Programme, the objectives used in the Pilot Studies were reviewed and refined. The OPW considered it appropriate to publicly consult on the proposed objectives, and launched a public consultation in October 2014. 71 submissions were received which informed amendments then made to define the final Objectives. The final set of objectives were approved by the Minister for Public Expenditure and Reform in March 2015.

These Flood Risk Management Objectives set out the goals that the FRMP is aiming to achieve. They have a key role in the preparation of the FRMP, as the proposed plan measures are appraised against these objectives to determine how well each option contributes towards meeting the defined goals.

The Objectives are aimed at considering potential benefits and impacts across a broad range of sectors including human health, the environment, cultural heritage and economic activity.

The environmental objectives included in the overall flood risk management objectives are the SEA Objectives developed at the scoping stage of the process. This means that the strategic environmental assessment is integrated into the overall appraisal process used to identify the preferred flood risk management measures.

2.4.5 Multi-Criteria Assessment (MCA)

A Multi-Criteria Assessment (MCA) is used as part of the process for assessing potential options for reducing or managing flood risk in each AFA.

The MCA makes use of 'Global Weightings' to rank the general importance, or level of 'societal value', for each of the Objectives (Refer to Table 2.3). 'Local Weightings' are also used to reflect the relevance of each objective in each individual UoM, Sub-Catchment or AFA.

Given the key role the Objectives and their Global Weightings have in selecting preferred measures for managing flood risk, the OPW considered it appropriate to consult on the Global Weightings that would be assigned to each objective, and commissioned an independent poll of over 1000 members of the public on the Global Weightings through a structured questionnaire. The results of this poll were analysed by UCD. The final Global Weightings adopted for each Objective were then set, and are included in Table 2.3.

2.4.6 Generation of Flood Mitigation Measures

There are a wide range of different approaches or methods that can be taken to reduce or manage flood risk. These can range from non-structural methods, that do not involve any physical works to prevent flooding but rather actions typically aimed at reducing the impacts of flooding, to structural works that reduce flood flows or levels in the area at risk or protect the area against flooding. The range of methods for managing flood risk that are considered include those outlined below.

- i **Flood prevention measures** are aimed at avoiding or eliminating a flood risk. This can be done by not creating new assets that could be vulnerable to flood damage in areas prone to flooding, or removing such assets that already exist. Flood prevention is hence generally focussed on sustainable planning and / or the re-location of existing assets, such as properties or infrastructure. This includes ensuring that planning is undertaken having regard to the requirements of the *Guidelines on the Planning System and Flood Risk Management*
- i **Flood protection measures** are aimed at reducing the likelihood and/or the severity of flood events. These measures, typically requiring physical works, can reduce risk in a range of ways, such as by reducing or diverting the peak flood flows, reducing flood levels or holding back flood waters. Such measures include the development of flood defence structures, increasing channel conveyance, flow diversions and the development of flood water storage.
- i **Flood Preparedness** includes measures that reduce the consequence of flooding in terms of minimising the impact of flooding events on people, property and other assets. Such measures include Flood forecasting and warning, emergency response planning, promotion of individual and community resilience and flood related data collection.

For each UoM and AFA options for managing and reducing flood risk have been investigated to determine the most effective and appropriate Draft FRMPs were developed and were issued for public and stakeholder consultation as part of the Strategic Environmental Assessment (SEA) process.

Following the public and stakeholder consultation on the Draft FRMPs, where necessary the Plans were reviewed and amended appropriately before the Plans are submitted for comment, amendment or approval by the Minister.

It should be noted that the potential measures set out in the FRMPs that have been developed through the CFRAM Programme are to an outline design, and are generally, for structural schemes, not at this point ready for construction. Further detailed design will be required for many measures before implementation along with project-level environmental appraisal and planning permission or confirmation, where relevant.

Table 2.3: Flood Risk Management Objectives for the National CFRAM Programme

Criteria	Objective		Sub-Objective
1 Technical	a	Ensure flood risk management options are operationally robust	i) Ensure flood risk management options are operationally robust
	b	Minimise health and safety risks associated with the construction, operation and maintenance of flood risk management options	l) Minimise health and safety risks associated with the construction, operation and maintenance of flood risk management options
	c	Ensure flood risk management options are adaptable to future flood risk, and the potential impacts of climate change	i) Ensure flood risk management options are adaptable to future flood risk, and the potential impacts of climate change
2 Economic	a	Minimise economic risk	i) Minimise economic risk
	d	Minimise risk to transport infrastructure	i) Minimise risk to transport infrastructure
	c	Minimise risk to utility infrastructure	i) Minimise risk to utility infrastructure
	d	Minimise risk to agriculture	i) Minimise risk to agriculture
3 Social	a	Minimise risk to human health and life	i) Minimise risk to human health and life of residents
			ii) Minimise risk to high vulnerability properties
	b	Minimise risk to community	i) Minimise risk to social infrastructure and amenity
			ii) Minimise risk to local employment
4 Environmental	a	Support the objectives of the WFD	i) Provide no impediment to the achievement of water body objectives and, if possible, contribute to the achievement of water body objectives.
	B	Support the objectives of the Habitats Directive	i) Avoid detrimental effects to, and where possible enhance, Natura 2000 network, protected species and their key habitats, recognising relevant landscape features and stepping stones.
	c	Avoid damage to, and where possible enhance, the flora and fauna of the catchment	i) Avoid damage to or loss of, and where possible enhance, nature conservation sites and protected species or other know species of conservation concern.
	d	Protect, and where possible enhance, fisheries resource within the catchment	i) Maintain existing, and where possible create new, fisheries habitat including the maintenance or improvement of conditions that allow upstream migration for fish species.
	e	Protect, and where possible enhance, landscape character and visual amenity within the river corridor	i) Protect, and where possible enhance, visual amenity, landscape protection zones and views into / from designated scenic areas within the river corridor.

Criteria	Objective	Sub-Objective
f	Avoid damage to or loss of features, institutions and collections of cultural heritage importance and their setting	i) Avoid damage to or loss of features, institutions and collections of architectural value and their setting.
		ii) Avoid damage to or loss of features, institutions and collections of archaeological value and their setting.

3 Approach to Strategic Environmental Assessment

3.1 What is Strategic Environmental Assessment (SEA)?

Strategic Environmental Assessment (SEA) is a formal, systematic evaluation of the likely significant environmental effects of implementing a plan or programme, prior to a decision being made to adopt a plan or programme.

SEA in Ireland is based on *Directive 2001/42/EC (Assessment of the Effects of Certain Plans and Programmes on the Environment)*, more commonly known as the “SEA Directive”. The Directive has been transposed into Irish law by the *European Communities (Environmental Assessment of Certain Plans and Programmes) Regulations, 2004 (S.I. 435 of 2004)* and the *Planning and Development (Strategic Environmental Assessment) Regulations, 2004 (S.I. 436 of 2004)* as amended by the *European Communities (Environmental Assessment of Certain Plans and Programmes) (Amendment) Regulations, 2011 (S.I. No. 200 of 2011)* and the *Planning and Development (Strategic Environmental Assessment) (Amendment) Regulations 2011 (S.I. No. 201 of 2011)*.

The main objective of the SEA Directive is to:

“Provide for a high level of protection for the environment and to contribute to the integration of environmental considerations into the preparation and adoption of plans and programmes with a view to promoting sustainable development.”

3.2 SEA Guidance

The SEA for the South Western CFRAM Study is in accordance with national best practise guidance as follows:

- Environmental Protection Agency. SEA Scoping Guidance Document. March 2015;
- Environmental Protection Agency. GISEA Manual 2015;
- Environmental Protection Agency. Integrating Climate Change into Strategic Environmental Assessment in Ireland - A Guidance Note. 2015;
- Environmental Protection Agency. Developing and Assessing Alternatives in Strategic Environmental Assessment. 2015;
- Environmental Protection Agency. Strive Report No. 106. *Integrated Biodiversity Impact Assessment – Streamlining AA, SEA and EIA Processes: Practitioner’s Manual*. 2013;
- Environmental Protection Agency. *SEA Pack*. Updated 18th April 2013;
- Environmental Protection Agency & West Regional Authority. *SEA Resource Manual for Local and Regional Planning Authorities - Integration of SEA Legislation and Procedures for Land-use Plans*. July 2013;
- Environmental Protection Agency. *Review of Effectiveness of SEA in Ireland*, 2012;
- Department of the Environment, Heritage and Local Government. *Implementation of SEA Directive (2001/42/EC): Assessment of the Effects of Certain Plans and Programmes on the Environment. Guidelines for Regional Authorities and Planning Authorities*. November 2004;
- Environmental Protection Agency. Development of Strategic Environmental Assessment (SEA) Methodologies for Plans and Programmes in Ireland. Synthesis Report, 2003.

3.3 Strategic Environmental Assessment –Process Overview

3.3.1 Overview

The SEA process involves six key stages as follows:

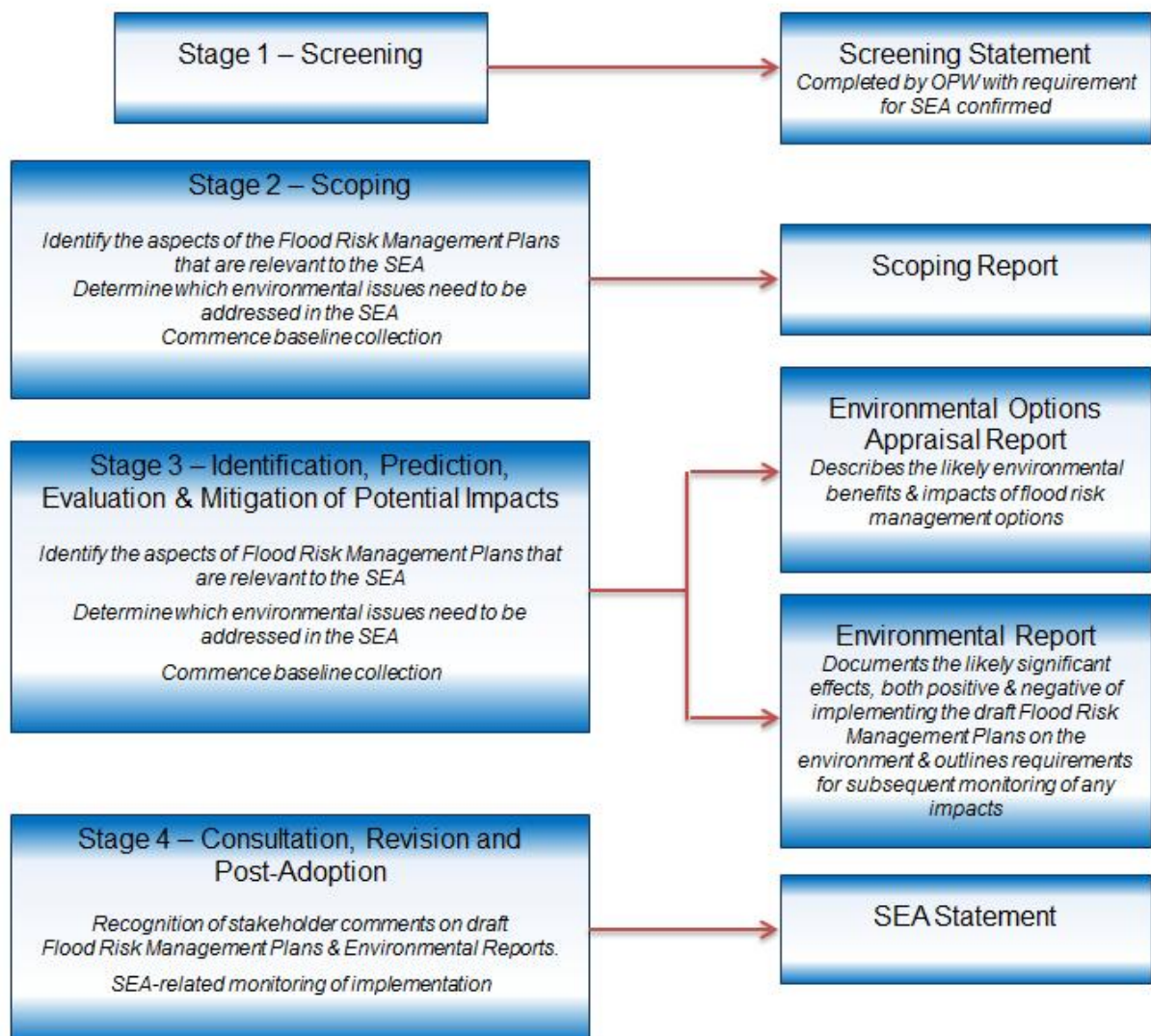
- i **Screening** – The process to identify the requirement for Strategic Environmental Assessment based on the criteria in Schedule 1 of the European Communities (Environmental Assessment of Certain Plans and Programmes) Regulations 2004 (S.I. No. 435 of 2004), as amended by the European Communities (Environmental Assessment of Certain Plans and Programmes) (Amendment) Regulations, 2011 (S.I. 200 of 2011) [SEA regulations],
- i **Scoping** – Scoping determines the range of environmental issues which are to be addressed in the Strategic Environmental Assessment. The scoping process has due regard to the requirements of Schedule 2/2b of the SEA regulations. The scoping process is of high importance as it sets out a framework for the assessment of environmental effects resulting from a plan or programme and the generation of alternatives to ensure minimal environmental impact. Consultation is a key element of the scoping process in which relevant designated environmental authorities provide input into the scoping exercise to define the relevant environmental issues to be addressed during the SEA process. A draft SEA Scoping Report was issued for consultation in November 2013. The final SEA Scoping Report was amended to take account of the inputs received during the consultation process and was issued in April 2015.
- i **Environmental Assessment and Environmental Report** – This is a key document in the SEA process as it outlines the likely significant effects on the environment arising from the implementation of the Flood Risk Management Plan and recommends mitigation to address any significant adverse effects identified. The determination of the likely significant effects on the environment is based on a qualitative assessment under a series of Environmental Objectives. These Environmental Objectives are based on Environmental headings in Annex 2(f) of the *European Communities (Environmental Assessment of Certain Plans and Programmes) Regulations, 2004 (S.I. 435 of 2004)*. The Environmental Report also documents the SEA process and how it was conducted with particular emphasis on stakeholder and public involvement. The Final version of the Environmental Assessment and Environmental Report Stage is the output of this stage.
- i **Consultation on the Draft Flood Risk Management Plan (FRMP) and SEA Environmental Report** – Consultation was conducted with the relevant environmental authorities and the public. Both groups were invited to make submissions in relation to the Draft Plan and Environmental Report. Submissions made during the consultation process were considered and the Environmental Report was amended as required to reflect the outcomes of the consultation period;
- i **SEA Statement** – From a legal and process perspective the production of the SEA Statement is the most important phase in the process. The function of the SEA Statement is to identify how the SEA process has influenced the plan and how responses from consultees were considered. Another requirement of the SEA Statement is the inclusion of reasons for choosing the plan as adopted in light of the other reasonable alternatives considered.
- i **Monitoring** - Monitoring requirements refer to the need to monitor the significant effects on the environment as a result of the implementation of the Flood Risk Management Plans. Monitoring begins with the adoption of the plan and continues for the duration of the plan.

The observations and views submitted as part of the consultation on the Draft FRMP were reviewed and assessed and where required the FRMP was amended. The FRMP will then be submitted for comment, amendment or approval by the Minister.

On finalisation of the FRMP, measures involving physical works (e.g. flood protection schemes) will be further developed at a local project level before submission for planning approval as required. At the project stage, local information that cannot be captured at the FRMP stage of the project such as ground investigation results and project-level environmental assessments, may give rise to some amendment of the proposed measures to ensure that it is fully adapted, developed and appropriate within the local context.

In this context, it is stressed that the SEA undertaken in relation to the FRMP are plan-level assessments. The FRMP will inform the progression of the preferred measures, and these measures will progress at a project level and will be subject to for the required consenting and planning. The approval of the Final FRMP does not confer approval or permission for the installation or construction of any physical works.

Figure 3.1: Stages of SEA



3.3.2 SEA Screening

The OPW conducted a screening assessment for the CFRAM studies in September 2011. In the Strategic Environmental Assessment Screening Report, it was proposed that an SEA should be undertaken as a matter of good practice for all CFRAM Studies to ensure that environmental effects and potential benefits are fully integrated into the decision-making process on appropriate flood risk management measures and strategies that will form the core of the FRMPs.

This position was further validated by way of a two-stage screening process where the context of the FRMPs have been assessed against the screening check and the environmental significance criteria as set out in Schedule 1 of the *Planning and Development (Strategic Environmental Assessment) Regulations 2004*. (S.I. No. 435 of 2004). This assessment identified the requirement for SEA based on the following criteria:

- i The outcome of the screening assessment having full regard to Schedule 1 of the European Communities (Environmental Assessment of Certain Plans and Programmes) Regulations 2004 as amended indicates that SEA is required;
- i The FRMPs will be carried out for areas typically greater than 1000 km² and collectively they will cover the entire landmass of the Republic of Ireland. The outcomes of the FRMPs therefore have the potential to have a significant effect on the environment. Carrying out SEAs will allow for the early consideration of environmental issues and the incorporation of these issues into the formulation of the recommendations for flood risk management within the FRMPs;
- i The FRMPs will form a framework for future projects and allocation of resources concerning reduction of flooding risk;
- i The FRMPs will influence spatial plans at both regional and local level;
- i The FRMPs are likely to require an assessment under Article 6 of the EU Habitats Directive.

The screening assessment also concluded that Appropriate Assessment under the Habitats Directive (92/43/EEC) is likely to be necessary for the CFRAM studies. Further information on Appropriate Assessment is provided in Section 3.4;

3.3.3 SEA Scoping

The SEA Scoping report for the South Western River Basin District was prepared and presents the following details:

- i The key environmental characteristics of each Unit of Management in the South Western River Basin District and an understanding of how flood risk management measures may influence these environmental characteristics;
- i The approach, scope, and level of detail to be included in the Environmental Report to be produced as part of the SEA process, established through consultation with statutory and non-statutory consultees;
- i The SEA Objectives that will be utilised in the appraisal of the Flood Risk Management Plans.

A set of proposed SEA objectives were compiled for each of the key environmental issues as relevant to the Flood Risk Management Plans. The SEA objectives were developed to provide a yardstick against which the environmental effects of the Flood Risk Management Plans could be assessed. The proposed SEA objectives identified in this Scoping Report are outlined in Table 3.1.

Table 3.1: SEA Objectives

CRITERIA	OBJECTIVE	SUB-OBJECTIVE
Social	a Minimise risk to human health and life	i) Minimise risk to human health and life of residents
		ii) Minimise risk to high vulnerability properties
	b Minimise risk to community	i) Minimise risk to social infrastructure and amenity

CRITERIA	OBJECTIVE	SUB-OBJECTIVE
Environmental	a Support the objectives of the WFD	ii) Minimise risk to local employment
		i) Provide no impediment to the achievement of water body objectives and, if possible, contribute to the achievement of water body objectives.
	b Support the objectives of the Habitats Directive	i) Avoid detrimental effects to, and where possible enhance, Natura 2000 network, protected species and their key habitats, recognising relevant landscape features and stepping stones.
	c Avoid damage to, and where possible enhance, the flora and fauna of the catchment	i) Avoid damage to or loss of, and where possible enhance, nature conservation sites and protected species or other know species of conservation concern.
	d Protect, and where possible enhance, fisheries resource within the catchment	i) Maintain existing, and where possible create new, fisheries habitat including the maintenance or improvement of conditions that allow upstream migration for fish species.
	e Protect, and where possible enhance, landscape character and visual amenity within the river corridor	i) Protect, and where possible enhance, visual amenity, landscape protection zones and views into / from designated scenic areas within the river corridor
	f Avoid damage to or loss of features, institutions and collections of cultural heritage importance and their setting	i) Avoid damage to or loss of features, institutions and collections of architectural value and their setting.
		ii) Avoid damage to or loss of features, institutions and collections of archaeological value and their setting

The finalised Strategic Environmental Assessment Scoping Report was informed by a series of public and stakeholder consultation events which were as follows:

i Public Consultation

- A series of public consultation days (PCDs) were held within each Area for Further Assessment (AFA) within the SWRBD between December 2014 and February 2015. The intention of the public consultation was to inform the public of progress and provide them with an opportunity to comment on the CFRAM Study, Flood Risk Management Maps and associated Strategic Environmental Assessment Scoping.
- The SW CFRAM study has also used other media for the purpose of public consultation including a dedicated project website, newsletters and SEA specific leaflets, and presentations.

j Stakeholder Consultation

- Presentation to South Western Regional Authority on 27th March 2012;
- Presentations to Kerry and Cork County Council's Development Committees on 15th April 2013;
- Presentation to the National Parks and Wildlife Services (NPWS) on proposed flood risk management options for Clonakilty on 29th May 2013;
- Elected Members Briefing on the Clonakilty Public Information Day held on 16th July 2013.
- A stakeholder workshop was held on 2nd December 2013 pertaining to Strategic Environmental Assessment (SEA) Scoping and Flood Risk Management Objectives. Stakeholder input from the workshop was incorporated into a draft SEA scoping report which was then formally issued to the Environmental Authorities on 7th November 2014 for comment.

- Consultation responses were received from the following Environmental Authorities: Environmental Protection Agency Development Applications Unit of the Department of Arts, Heritage and Gaeltacht Affairs. Inland Fisheries Ireland and the Geological Survey of Ireland also submitted formal responses following the stakeholder workshop.

Further Development of the SEA Objectives: The framework of environmental objectives, sub objectives and targets identified at the scoping stage were modified following consultation and finalised to account for feedback received during the consultation. These were then included within the full suite of flood risk management objectives, which are defined under technical, economic, social and environmental categories, and formed part of the overall option assessment process. Global weightings and local weightings were developed for each objective as described in Section 2.4.5 of this document.

3.3.4 Environmental Assessment & Environmental Report

This stage of the SEA process requires the assessment and evaluation of the FRMP measures to identify the potential significant effects of the flood risk management options on the receiving environment and to identify the preferred options and appropriate mitigation and monitoring required to offset potential impacts. This assessment has been done as part of an overall Multiple Criteria Analysis as detailed in Section 2.4.5 where the SEA Objectives are utilised to assess the measures proposed in the CFRMP for the UoM 18. The principle steps in the assessment process are as follows:

Flood Risk Management Option Development and Assessment: The SEA process has been fully integrated into the overall appraisal process for the identification of flood risk management options. Based on a detailed understanding of the flood risk identified for each Area of Further Assessment (AFA) a number of different flood risk management options were developed as described in Section 2.4.6. Each of these options was then assessed based on a multi-criteria option assessment (MCA) process (as outlined in Section 2.4.5). The MCA used a suite of project objectives, which include the SEA objectives to rate each of the proposed plan options. This assessment was then used to identify the preferred flood risk management options. In order to facilitate a more accurate assessment a semi-quantitative approach was adopted whereby each plan option was assessed against the SEA objectives and sub-objectives having regard to the indicators, basic requirements and aspirational targets (Refer to Table 3.3):

- i Indicator: The indicators are parameters, measurable and numeric where possible by which the success of an option in meeting a particular objective is gauged;
- i Basic Requirements: A basic requirement is set for each objective as a measure to gauge whether the proposed option meets a minimum standard with regard to each objective. The Basic requirement is a measure below which the proposed objective would have a negative effect.
- i Aspirational Targets: This is a target set for each objective and defines the perfect outcome with regard to the potential impact of the objective.

Each option was scored against the objectives and sub-objectives based on the scoring matrix outlined in Table 3.2. Once a score was defined for each objective then a global weighting was applied which defined the perceived importance of the objective in question. Furthermore, local conditions were also considered for each AFA whereby a local weighting was applied based on an understanding of the local conditions relevant to the objective in question.

Table 3.2: MCA Scoring

Score	Description of the Scoring
5	An option that meets the aspirational target should be given a score of 5.
1 to 4	An option that performs somewhere between the basic requirement and the aspirational target should be given a score between 1 and 4.
0	An option that meets the basic requirement only should be given a score of 0.
-1 to -5	An option that performs worse than the basic requirement i.e. creates a dis-benefit or does not perform to an acceptable standard should be given a negative score down to -5.
-999	There are exceptions to the negative scoring where the performance or impact of the option becomes unacceptable and the option should be rejected on the basis of its performance on the given option alone.

Following the identification of preferred flood risk management options from the MCA process, the next stage of the study comprises the development of an overall flood risk management strategy which would comprise a combination of flood prevention measures, flood protection measures and flood preparedness.

Table 3.3: MCA Analysis Indicators, Basic Requirements & Aspirational Targets

Criteria	Objective	Sub-Objective	Indicator	Basic Requirement	Aspirational Target
Social	Minimise risk to human health and life	Minimise risk to human health and life of residents	Annual Average number of residential properties at risk from flooding	Number of residential properties at risk from flooding does not increase	Reduce the number of residential properties at risk from flooding to 0
		Minimise risk to high vulnerability properties	Number of high vulnerability properties at risk from flooding	Do not increase number of high vulnerability properties at risk from flooding	Reduce the number of high vulnerability properties at risk from flooding to 0
	Minimise risk to community	Minimise risk to social infrastructure and amenity	Number of social infrastructure receptors at risk from flooding	Do not increase number of social infrastructure receptors at risk from flooding	Reduce the number of social infrastructure receptors at risk from flooding to 0
		Minimise risk to local employment	Number of enterprises at risk from flooding	Do not increase number of enterprises at risk from flooding	Reduce the number of enterprises at risk from flooding to 0
Environmental	Support the objectives of the WFD	Provide no impediment to the achievement of water body objectives and, if possible, contribute to the achievement of water body objectives.	Ecological status of water bodies	Provide no constraint to the achievement of water body objectives	Contribute to the achievement of water body objectives
	Support the objectives of the Habitats and Birds Directives	Avoid detrimental effects to, and where possible enhance, Natura 2000 network, protected species and their key habitats, recognising relevant landscape features and stepping stones.	Area of site at risk from flooding and qualitative Assessment of impact of option on habitat	No deterioration in the conservation status of designated sites as a result of flood risk management measures	Improvement in the conservation status of designated sites as a result of flood risk management measures
	Avoid damage to, and where possible enhance, the flora and fauna of the catchment	Avoid damage to and where possible enhance the flora and fauna of the catchment	Avoid damage to and where possible enhance, legally protected sites / habitats and other sites / habitats of national regional and local nature conservation importance	No deterioration on condition of existing sites due to implementation of option	Creation of new or improved condition of existing sites due to implementation of option
	Protect, and where possible enhance, fisheries resource within the catchment	Maintain existing, and where possible create new, fisheries habitat including the maintenance or improvement of conditions that allow upstream migration for fish species.	Area of suitable habitat supporting fish. Number of upstream barriers	No loss of integrity of fisheries habitat. Maintenance of upstream accessibility	No loss of fishery habitat. Improvement of habitat quality / quantity. Enhanced upstream accessibility
	Protect, and where possible enhance, landscape character	Protect, and where possible enhance, visual amenity, landscape protection zones and	Changes to reported conservation status of designated sites relating to flood	1. No significant impact on landscape designation (protected site, scenic	1. No change to the existing landscape form. 2.

Criteria	Objective	Sub-Objective	Indicator	Basic Requirement	Aspirational Target
	and visual amenity within the river corridor	views into / from designated scenic areas within the river corridor.	risk management Extent of affected Natura 2000 site, NHA / pNHA or other affected National or International designations (e.g. Nature reserves and Ramsar sites), i.e. Area of re	route/amenity, natural landscape form) within zone of visibility of measures 2. No significant change in the quality of existing landscape characteristics of the receiving environment	Enhancement of existing landscape or landscape feature
	Avoid damage to or loss of features, institutions and collections of cultural heritage importance and their setting	Avoid damage to or loss of features, institutions and collections of architectural value and their setting and improve their protection from extreme floods.	a) The number of architectural features, institutions and collections subject to flooding. b) The impact of flood risk management measures on architectural features, institutions and collections.	a) No increase in risk to architectural features, institutions and collections at risk from flooding. b) No detrimental impacts from flood risk management measures on architectural features, institutions and collections.	a) Complete removal of all relevant architectural features, institutions and collections from the risk of harm by extreme floods. b) Enhanced protection and value of architectural features, institutions and collections importance arising from the implementation of the selected measures.
		Avoid damage to or loss of features, institutions and collections of archaeological value and their setting and improve their protection from extreme floods where this is beneficial.	a) The number of archaeological features, institutions and collections subject to flooding. b) The impact of flood risk management measures on archaeological features, institutions and collections.	a) No increase in risk to archaeological features, institutions and collections at risk from flooding. b) No detrimental impacts from flood risk management measures on archaeological features, institutions and collections.	a) Complete removal of all relevant archaeological features, institutions and collections from the risk of harm by extreme floods. b) Enhanced protection and value of archaeological features, institutions and collections importance arising from the implementation of the selected measures.

3.3.5 Compliance with the Requirements of the SEA Directive

Table 3.4 below outlines how and where the Environmental Report complies with the requirements of the SEA Directive.

Table 3.4: Requirement of SEA Directive and Relevant Section in Environmental Report

Requirement of SEA Directive (Article 5 (1) Annex I)	Relevant Section in the Environmental Report
An outline of the contents and main objectives of the plan or programme, or modification to a plan or programme, and relationship with other relevant plans or programmes	Chapter 1 and Chapter 5
The relevant aspects of the current state of the environment and the likely evolution thereof without implementation of the plan	Chapter 6
The environmental characteristics of areas likely to be significantly affected	Chapter 6
Any existing environmental problems which are relevant to the plan, including in particular those relating to any areas of particular environmental importance, such as areas designated pursuant to Directives 79/409/EEC and 92/43/EEC	Chapter 6 and Chapter 9
The environmental protection objectives, established at international, community or member state level, which are relevant to the plan and the way those objectives and any environmental considerations have been taken into account during its preparation	Chapter 7 and Chapter 9
The likely significant effects on the environment, including on issues such as biodiversity, population, human health, fauna, flora, soil, water, air, climatic factor, material assets, cultural heritage including architectural and archaeological heritage, landscape and interrelationship between the above factors.	Chapter 8
The measures envisaged to prevent, reduce, and as fully as possible offset any significant adverse effects on the environment of implementing the plan	Chapter 9
An outline of the reasons for selecting the alternatives dealt with, and a description of how the assessment was undertaken including any difficulties encountered in compiling the required information	Chapter 9
A description of the measures envisaged concerning monitoring in accordance with Article 10	Chapter 10 and SEA Statement
A non-technical summary of the information provided under the above headings.	Non-Technical Summary

3.3.6 SEA Statement

An SEA Statement will be produced to clearly specify how environmental considerations, through the Strategic Environmental Assessment has influenced the development of the FRMP.

3.3.7 Monitoring

Monitoring requirements refer to the need to monitor the significant effects on the environment as a result of the implementation of the Flood Risk Management Plans. Monitoring begins with the adoption of the Plan and continues for the duration of the Plan.

3.4 Appropriate Assessment

Flood Risk Management Plans will be subject to Appropriate Assessment in accordance with the requirements of Articles 6(3) and 6(4) of Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (Habitats Directive). The purpose of Appropriate Assessment is to inform the Competent Authority of whether a plan will have adverse impacts on the conservation objectives of Natura 2000 sites (designated Special Areas of Conservation and Special Protection Areas) within the zone of influence.

Appropriate Assessment of the SWRBD CFRAM study has been conducted in accordance with all relevant guidance and legislation including:

- i European Communities (Birds and Natural Habitats) Regulations 2011;
- i NPWS (2012) Marine Natura Impact Statements in Irish Special Areas of Conservation, A working Document;
- i DEHLG (2009) Appropriate Assessment of Plans and Projects in Ireland Guidance for Planning Authorities (as revised in 11 February 2010 to replace "Statement for Appropriate Assessment" with "Natura Impact Statement" or NIS);
- i EC (2000) Managing Natura 2000 Sites: The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC;
- i EC (2001) Assessment of plans and projects significantly affecting Natura 2000 sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC;
- i EC (2007) Guidance document on Article 6(4) of the 'Habitats Directive' 92/43/EEC: Clarification of the concepts of alternative solutions and imperative reasons of overriding public interest, compensatory measures, overall coherence, opinion of the Commission.

3.5 Inter-Relationship between AA and SEA

Directive 2001/42/EC (Strategic Environmental Assessment Directive) requires that Strategic Environmental Assessment (SEA) must be carried out during the preparation stage of a Plan i.e. before the adoption of the Plan. When an Appropriate Assessment is being carried out for a plan it must be published concurrently/jointly with the SEA (as two separate reports). The outcomes and recommendations of each stage in the Appropriate Assessment process inform the Strategic Environmental Assessment and vice versa. It is important that the assessments be carried out in parallel in order that any environmental issues raised in each assessment can be considered as part of the other. Similarly, any mitigation or alternatives proposed must be addressed in both assessments.

Appropriate Assessment is specifically intended to determine the likely significant effects on European sites in view of their conservation objectives, and to ensure that no plan or project that would have adverse effects on the integrity of a European site is approved or adopted (unless in exceptional circumstances where the requirements of Article 6(4) of the Habitats Directive can be met). The Appropriate Assessment does not deal with all significant ecological issues of relevance to SEA, nor does it address all legal requirements in relation to the conservation and protection of ecological sites, habitats and species.

While the Appropriate Assessment is integrated with the various stages of the SEA and the data contained in the Natura Impact Statement (i.e. the Appropriate Assessment report) is fed into the SEA Environmental Report a stand-alone Natura Impact Statement is required to be produced.

The DEHLG Guidance (2009), 'Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities' requires that the findings and recommendations of the Appropriate Assessment inform the policies and strategies of the Plan. Information contained in the Natura Impact Statement that will feed into the SEA and ultimately into the South Western RBD Flood Risk Management Plans (FRMP) includes the following;

- i the areas likely to be significantly affected by the plan;
- i any existing environmental characteristics which are relevant to the plan including, in particular, those relating to any areas of a particular environmental importance, such as areas designated pursuant to Directives 79/409/EEC and 92/43/EEC;
- i the environmental protection objectives and qualifying interests (established at international, Community or Member State level) which are relevant to the areas of the environment likely to be effected by the plan;
- i The likely significant effects on the Natura 2000 site, such as impacts on biodiversity, fauna, flora, soil, water, etc.
- i the measures envisaged to mitigate against any significant adverse effects on the designated sites of implementing the plan; and
- i Alternatives to the proposals in the plan and their potential effectiveness in maintaining the conservation value of the site.

3.6 FRMP and Consenting Process

Detailed designs for flood risk management options will not be developed as part of the Flood Risk Management Plans (FRMP) / CFRAM Studies but rather measures will be progressed on a scheme by scheme basis, outside of the scope of the CFRAM studies.

In accordance with Section 20 of the European Communities (Assessment and Management of Flood Risks) Regulations, 2010 (S.I. No. 122 of 2010), once the Flood Risk Management Plans (subsequent to a process of consultation) have been approved by the Minister of Finance they will be issued to the Local Authorities for adoption, through a reserved function process. Section 25 of the Regulations permits the Office of Public Works to prepare a flood risk management scheme for the execution of such options provided for under the Flood Risk Management Plan or where the OPW considers them expedient.

There are three primary legislative pathways to securing consent for flood risk schemes:

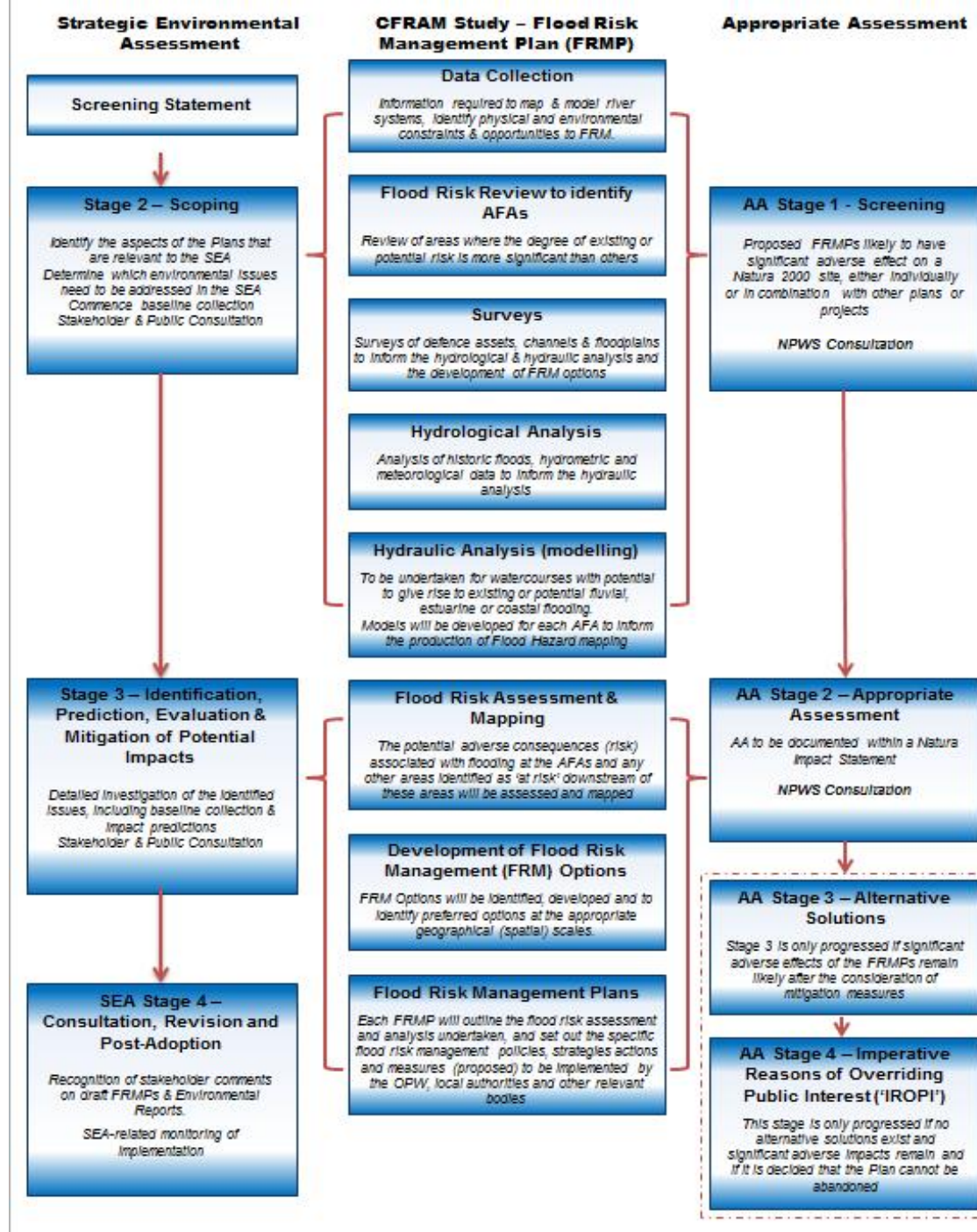
1. Approval of the scheme as 'strategic infrastructure' under the Planning and Development (Strategic Infrastructure) Act 2006 by An Bord Pleanála;
2. Approval of the scheme under Part 8 of the Planning and Development Regulations, 2001 as amended; and
3. Approval of the scheme by the Minister for Finance under the European Communities (Assessment and Management of Flood Risks) Regulations, 2010.

Every flood risk management scheme which involves the execution of works of a class specified in Article 24 of the European Communities (Planning and Development) Regulations, 2001 as amended is required to include an Environmental Impact Assessment when submitting an application for approval to a Planning Authority. Attention is also drawn to requirements of the European Union (Environmental Impact Assessment) (Flood Risk) Regulations, 2012.

Any flood risk management scheme that is to progress through the planning process with potential to impact on a Natura 2000 site will be subject to Appropriate Assessment set out by the European Communities (Birds and Natural Habitats) Regulations 2011.

Schemes which would be likely (either individually or in combination with other plans or projects) to give rise to significant adverse impacts on the integrity of any Natura 2000 site will not be permitted on the basis of the Flood Risk Management Plan unless imperative reasons of overriding public interest (IROPI) can be established and there are no feasible alternative solutions.

Figure 3.2: Inter-relationship Between AA, SEA, and FRMP



3.7 Difficulties and Data Gaps

This SEA has been undertaken using best available data and best practice methodologies available at the time of the assessment. The environmental baseline datasets established to allow for the SEA analysis are dated from the time of initial assessment in 2013.

The following difficulties and data gaps were encountered during the SEA process:

- i Relevant environmental datasets are held by a variety of bodies and this requires data to be sourced from a range of sources for the purposes of the SEA.
- i The long timeline for the development of the Flood Risk Management Plans, means that additional data and analysis were required to ensure that the data used, the processes followed and particularly the policy and legislative requirements cited are still relevant.

4 Stakeholder and Public Consultation

4.1 Introduction

The SEA Directive (2001/42/EC) requires that consultation is carried out with Environmental Authorities and with members of the public at various stages in the SEA process. The intention of this consultation process is to enhance transparency in the decision-making process, to ensure that the relevant authorities and the public are informed and are provided with an early opportunity to express their opinion, and to ensure that the information used in the assessment is comprehensive and reliable. Early consultation and the open delivery of information on the assessment will avoid unnecessary delays in the decision-making process at later stages which may arise due to public opposition.

Article 5(4) of the SEA Directive requires that Environmental Authorities (designated by each Member State) be consulted when deciding on the scope and level of detail of the information which must be included in the Environmental Report i.e. consultation is statutorily required at this Scoping Stage of the SEA process.

Consultation is undertaken throughout the development of the CFRAM plan and Figure 4.1 gives an overview of the main consultation undertaken during the project.

4.2 The CFRAM Steering and Progress Group

4.2.1 The National CFRAM Steering Group

The National CFRAM Steering Group was established in 2009, and was established to provide for the engagement of key Government Departments and other state stakeholders in the process of the implementation of the 'Floods' Directive, including the National CFRAM Programme.

4.2.2 The South Western CFRAM Project Steering Group

A Project Steering Group was established for the South Western CFRAM Project, which includes the Munster Blackwater Catchment UoM, in 2012. This Group, which includes senior representatives of the members, provided for the input of the members to guide the CFRAM Programme and acts as a forum for communication between the CFRAM Programme and senior management of key stakeholders. The Project Steering Group typically met twice a year.

4.2.3 The South Western CFRAM Project Progress Group

A Project Progress Group was established for the South Western CFRAM Project in 2012. This group is a working group that supports the Project Steering Group and met approximately every six weeks. The Group was established to ensure regular communication between key stakeholders and the CFRAM Project and to support the successful implementation of the Project. The organizational membership of this Group is the same as for the South Western CFRAM Project Steering Group.

4.3 Stakeholder Consultation Groups

Stakeholder Groups were formed at national and regional level to permit non-governmental stakeholder groups to participate in the 'Floods' Directive and CFRAM processes and these are detailed below.

4.3.1 National Stakeholder Group

The National CFRAM Stakeholder Group was established in 2014, and was established to provide for the engagement of key national non-governmental stakeholder organisations in the process of the implementation of the National CFRAM Programme.

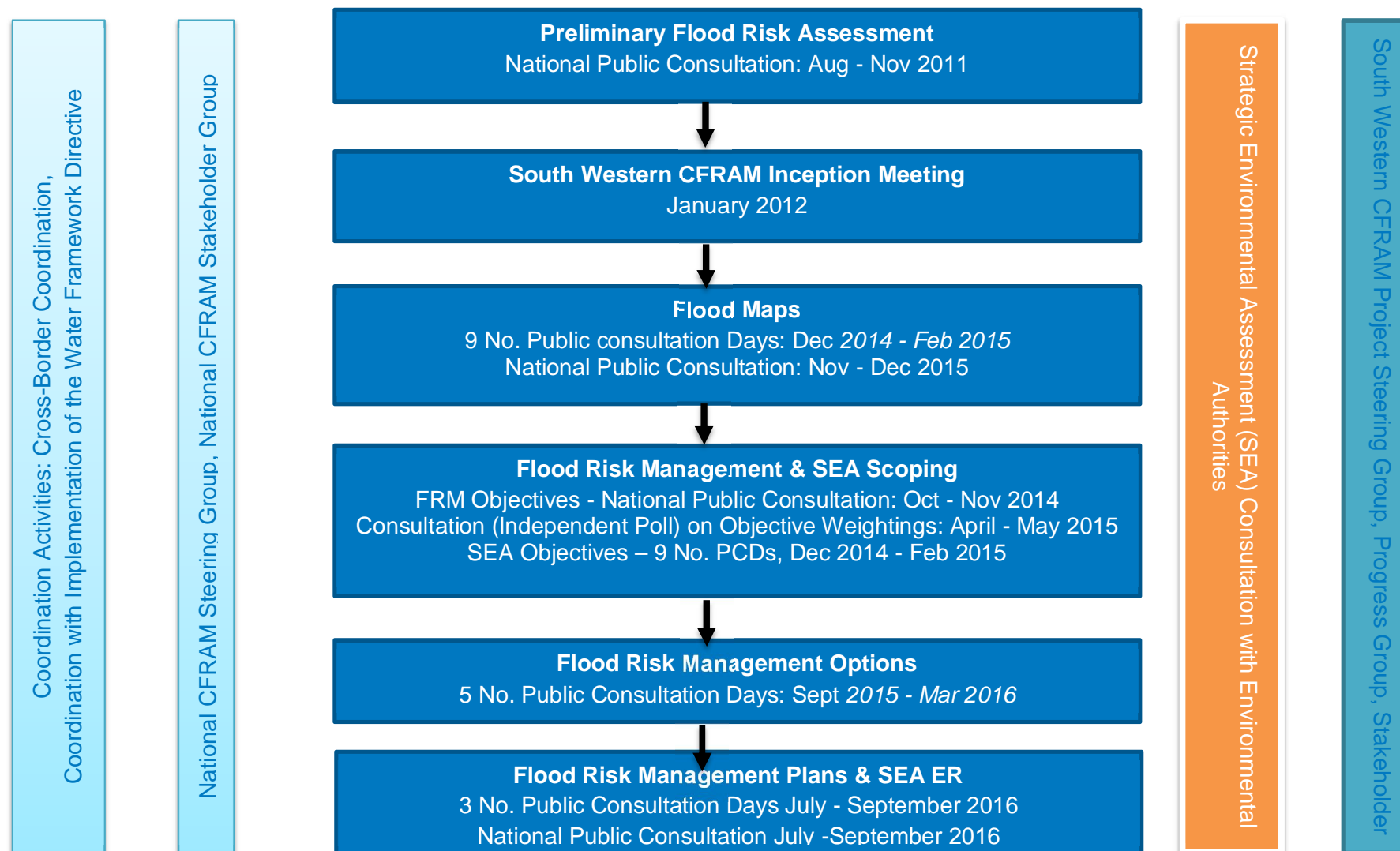
4.3.2 Regional Stakeholder Group

The South Western CFRAM Stakeholder Group was established in 2012, and was established to provide for the engagement of local non-governmental stakeholder organisations at key stages in the process of the implementation of the South Western CFRAM Project.

4.4 Public Consultation and Engagement

In addition to the structured engagement with relevant stakeholders through the Steering and Stakeholder Groups, the public have also been given the opportunity and encouraged to engage with the implementation of the CFRAM process. These engagement and consultation steps are set out in Figure 4.1 below, and are further described below.

Figure 4.1: Overview of the CFRAM Consultation Stages and Structures



4.4.1 Consultation on Flood Maps

The initial preparation of the flood maps involved extensive consultation with the South Western CFRAM Progress Group and planners within the various relevant local authorities. This led to the development of draft flood maps that were then consulted upon with the public through local Public Consultation Days and a national consultation.

The OPW decided at the beginning of the National CFRAM Programme that effective consultation and public engagement would require local engagement at a community level, and hence determined that Public Consultation Days (PCDs) would be held in each AFA (where possible and appropriate) to engage with the communities at various stages of the projects, including during the production of the flood maps.

The PCDs were advertised locally in advance, and were held at a local venue in the community during the afternoon and early evening. OPW, Local Authority and Mott MacDonald Ireland staff were present to explain the maps that were displayed around the venue and answer any questions on the maps and the CFRAM process. The PCDs in the Munster Blackwater Catchment UoM were held for consultation on the flood maps at the venues listed in Table 4.1.

Table 4.1: Public Consultation Days at the Flood Mapping Stage

AFA	Date	Venue	No. Attendees
Freemount	02/12/2014	Freemount Community Centre	6
Kanturk	02/12/2014	Kanturk Library	2
Mallow	20/02/2015	The Hibernian Hotel, Mallow	7
Fermoy	23/02/2015	The Grand Hotel, Fermoy	17
Ballyduff	16/12/2014	Carnegie Library, Ballyduff	11
Rathcormac	03/02/2015	The Community Centre, Rathcormac	9
Tallow	20/01/2015	Tallow Community Centre	6
Aglish	29/01/2015	Aglish Community Centre	7
Youghal	14/01/2015	Mall Arts Centre, Youghal	33

While the number of attendees at the PCDs were variable, overall the PCDs were very useful in informing and validating the flood maps. The PCDs were also useful as a means to raise awareness of flooding and flood risk in the community, and to begin the discussion on potential measures to manage or reduce the risk. Key environmental considerations raised through stakeholder consultation process pertain to the following:

- i The identification of additional sources of environmental receptor data e.g. the EPA SEA WebGIS, EPA bathing water mapping, GSI mapping data;

- i The identification of newly available data e.g. aggregate potential mapping, aquifer storage / recharge data;
- i The requirement of the SEA objectives to include the protection of geological heritage, all protected habitats and species (not just Natura 2000 sites);
- i The requirement to consider the interactions between the Flood Risk Management Plan and previously unidentified plans including those currently in draft format;
- i Comments on Appropriate Assessment screening.

4.4.2 National Flood Map Consultation

While not a requirement of the 'Floods' Directive, the Government considered it appropriate to stipulate in SI No. 122 of 2010 (that transposed the Directive into Irish law) that a national consultation exercise should be undertaken. The consultation on the flood for all areas was launched in November 2015, in line with SI No 495 of 2015.

4.4.3 Consultation for SEA Scoping on the Flood Risk Management Objectives

During the scoping phase of the SEA, a number of consultation exercises were undertaken to inform the decision making process during the Scoping phase and these are as follows:

- i The OPW considered it appropriate to publicly consult on the proposed flood risk management objectives. As a result, a public consultation was launched in October 2014 and 71 submissions were received during this consultation which were subsequently considered and amendments made to the Objectives where appropriate.
- i Furthermore, in order to provide a robust scoping of the SWRBD CFRAM Study, baseline information on each of the environmental headings set out in Annex 2(f) of the *European Communities (Environmental Assessment of Certain Plans and Programmes) Regulations, 2004* was gathered for each Unit of Management. This information was also subject to consultation with the project stakeholders and the public. Following this consultation, a final set of project objectives including SEA objectives were adopted in March 2015.
- i A Multi-Criteria Assessment (MCA) is used as part of the process for assessing potential options for reducing or managing flood risk in each AFA as described in section 2.4.5. The MCA makes use of weightings to rank the importance of the Objectives. The OPW considered it appropriate to consult on the weightings that would be assigned to each Objective, and commissioned an independent poll of over 1000 members of the public on the weightings through a structured questionnaire. The results of this poll were analysed by UCD, and the weightings for each of the Objectives then set.

4.4.4 Consultation on Flood Management Options

Based on the flood hazard and risk identified in the flood maps, options for reducing or managing flood risk in each AFA were developed and assessed. PCDs, similar to those held for the consultation on the flood maps were held during the development and assessment of options. These events were intended to allow for full engagement with the affected communities. Each event allowed the local community to set out the local issues of importance, the flood risk measures that they considered would be most suitable and comment on which identified options might be effective and appropriate, or otherwise. The PCDs in the Munster Blackwater Catchment UoM were held during the option development stage at the venues listed below in Table 4.2.

Table 4.2: Public Consultation Days at the Options Development Stage

AFA	Date	Venue	No. Attendees
Kanturk	24/11/2015	The Library	10
Ballyduff	08/09/2015	Carnegie Library	6
Aglish	11/03/2016	Aglish Community Centre	8
Youghal	10/03/2016	Mall Arts Centre, Youghal	34
Rathcormac	25/11/2015	Parish Hall	13

4.4.5 Consultation on Draft SEA ER and the FRMP

A report SEA Environmental Report for the Draft FRMP for the Munster Blackwater Catchment Unit of Management (UoM) was subject to public consultation and from relevant councils during the July 2016 to September 2016. Presentations were also made to Local Authorities during the Public Consultation period. A series of PCDs similar to those held for the consultation on the flood management options were held to engage locally and directly with the community and provide people with opportunity to discuss and fully understand the Draft FRMPs. The outcomes of this consultation were reported and reflected in the Final FRMPs and observations and recommendations received from the SEA statutory consultees have been taken into account in this Final Environmental Report.

4.5 Environmental Authorities and Non-Statutory Consultees

The Environmental Authorities in Ireland established under the Planning and Development (Strategic Environmental Assessment) (Amendment) Regulations 2011 which are required to be consulted on the SEA are set out hereunder. It was considered best practice to also include a number of non-statutory consultees as primary and secondary stakeholders.

Environmental Authorities

Environmental Protection Agency
Department of Communications, Energy and Natural Resources
Department of the Environment, Community and Local Government
Department of Agriculture, Food and the Marine
Department of Arts, Heritage and Gaeltacht Affairs

Primary Stakeholders

Office of Public Works
County Councils / County Development Boards
South West Regional Authority

Secondary Stakeholders

An Bord Pleanála
An Taisce
Association of Consulting Engineers of Ireland (ACEI)
Association of County and City Councils
Association of Municipal Authorities of Ireland
Badgerwatch
Bat Conservation Ireland
BirdWatch Ireland

Geological Survey Ireland
Health Services Executive (HSE)
Iarnród Éireann
Industrial Development Agency
Industrial Heritage Association of Ireland
Inland Fisheries Ireland
Inland Waterways Association of Ireland
Institute of Professional Auctioneers and Valuers (IPAV)
Insurance Ireland
Irish Academy of Engineering
Irish Angling Development Alliance
Irish Business and Employers Confederation (IBEC)
Irish Concrete Federation
Irish Co-Operative Organisation Society
Irish Countrywomen's Association
Irish Creamery Milk Suppliers Association (ICMSA)
Irish Farmers Association (IFA)
Irish Federation of Pike Angling Clubs
Irish Federation of Sea Anglers
Irish Marine Federation / Irish Boat Rental Association
Irish National Committee of Blue Shield

Bord Gáis Networks	Irish National Flood Forum
Bord na Mona	Irish Natural Forestry Foundation
Bus Eireann	Irish Peatland Conservation Council
Canoeing Ireland	Irish Planning Institute (IPI)
Chambers Ireland	Irish Red Cross
Citizens Information Board	Irish Small and Medium Enterprises Association (ISME)
CIWEM Ireland	Irish Water
Coarse Angling Federation of Ireland	Irish Water and Fish Preservation Society
Coastal and Marine Resources Centre	Irish Wildlife Trust
Coastwatch Ireland	IRLOGI
Coillte	Landscape Alliance Ireland
Construction Industry Federation (CIF)	Local and Regional Planners
Council of Cultural Institutes	Macra na Feirme
Department of Health and Children	Marine Institute
Department of Transport, Tourism and Sport	Marine Institute
Eircom	Met Eireann
EirGrid	Mills and Millers of Ireland
Electricity Supply Board (ESB)	National Anglers Representative Association
Engineers Ireland	National Monuments Service
ESB Fisheries Conservation	National Parks and Wildlife Service
Fáilte Ireland	National Roads Authority
Friends of the Irish Environment	National Transport Authority
Native Woodland Trust	St. Vincent de Paul
Recreational Angling Ireland	Sustainable Energy Authority of Ireland
Retail Grocery Dairy & Allied Trades Association - RGDATA	Sustainable Water Network (SWAN)
River Basin District Authorities and Competent Authorities for Water Framework Directive	Teagasc
Rowing Ireland	The Heritage Council
Society of Chartered Surveyors of Ireland (SCSI)	Tree Council of Ireland
	Trout Anglers Federation of Ireland
	Voice of Irish Concern for the Environment (Voice)

4.6 Coordination with the Implementation of the Water Framework Directive

The Water Framework Directive (WFD) requires all EU member states to protect and improve water quality in all waterbodies. While the 'Floods' Directive guides the assessment of flood risk and the development of flood risk management, Both Directives are concerned with water and river basin management, and hence coordination is required between the two processes to achieve integrated river basin management, achieve joint benefits and address conflicts.

There has been, and will continue to be, coordination with the authorities responsible for the implementation of the WFD through a range of mechanisms, including bi-lateral meetings and cross-representation on various management groups. These groups include the following:

- i The Water Policy Advisory Committee (WPAC), the
- i The National Implementation Group (NIG);
- i The Catchment Management Network;
- i Local Authorities Water and Communities Office (LAWCO) and
- i The Floods Directive: Steering and Progress Groups.

5 Relationship with Other Plans, Policies, and Programmes

5.1 Introduction

In addition to gathering data on the existing environmental baseline of the South Western RBD, a key part of the SEA process is to determine the plan and policy context in which the South Western Flood Risk Management Plans will be implemented. The South Western Flood Risk Management Plans will influence, and will in turn be influenced by, a number of external statutory and non-statutory plans, strategies, policies and programmes. The interaction of the environmental policies and objectives within these documents, with the proposals of the Flood Risk Management Plans, are therefore considered. It is necessary to consider these interactions at all levels of the plan and policy-making hierarchy, i.e. at National, Regional and Local.

This chapter provides an overview of the plans, policies and programmes at National, Regional and Local level which will influence, and in turn be influenced by, the South Western Flood Risk Management Plans.

5.2 Plan and Policy Context

Table 5.1 summarises the legislation, and other plans, policies and programmes of relevance to the South Western RBD which have been reviewed as part of this study.

The FRMPs will present an opportunity to inform future proposals for development. It is also recognised that recommended actions from this study will need to take account of appropriate development controls as set out at national, regional, and local level.

Other, principally non-statutory sectoral plans are also relevant to this assessment. These include various economic development, and environmental protection plans. Where relevant to flood risk management, specific policies and recommendations arising from these plans have been considered here.

Table 5.1: Legislation, Plans, Policies and Programmes with Potential to Interact with SW CFRMP in terms of the SEA

Legislation/Plan/Policies/Programme	Description	Potential relevance with SW CFRAMP in terms of the SEA
International and National Legislation		
Floods Directive (2007/60/EC)	This directive sets out a template for the assessment and management of flood risk. The aim of this Directive is to reduce the adverse consequences of flooding on human health, the environment, cultural heritage and economic activity	The development of the flood risk management plans are a core objective of the Floods Directive
Water Framework Directive (2000/60/EC)	This Directive aims to improve the water status of all waterbodies. It requires governments to take a holistic approach to the management of waterbodies. WFD implementation in Ireland is currently in its 2 nd cycle from 2016-2021.	The Flood Risk Management Plan /SEA should, ideally help to improve the water status of waterbodies and should not in any way impact on the capacity of a waterbody to achieve "good water status".
EU Habitats Directive (92/43/EC)	The Habitats Directive protects valuable natural habitats and the species supported by those habitats. Together with the Birds Directive, it underpins a European	The Flood Risk Management Plan/SEA objectives aim to prevent loss or damage to Natura 2000 sites). The Flood Risk Management Plans will also be subject to a separate AA in

Legislation/Plan/Policies/Programme	Description	Potential relevance with SW CFRAMP in terms of the SEA
	network of protected areas known as Natura 2000 sites: Special Protection Areas (SPAs, are classified under the Birds Directive)	accordance with Article 6 (3) of the Habitat Directive.
EU Birds Directive (2009/147/EC)	Protects all wild birds, their nests, eggs and habitats within the European Community. It gives EU member states the power and responsibility to classify Special Protection Areas (SPAs) to protect birds which are rare or vulnerable in Europe, as well as all migratory birds which are regular visitors	The Flood Risk Management Plan/SEA objectives aim to prevent loss or damage to Natura 2000 sites). The Flood Risk Management Plans will also be subject to a separate AA in accordance with Article 6 (3) of the Habitat Directive
EU SEA Directive (2001/42/EC)	The Directive provide for a high level of protection of the environment by integrating environmental considerations into the preparation and adoption of plans and programmes with a view to promoting sustainable development.	The FRMP is subject to a Strategic Environmental Assessment (SEA). The FRMP has been developed in parallel with the SEA process.
EIA Directive (2014/52/EC)	The Directive requires an Environmental Impact Assessment of the potential environmental effects of projects of a type and scale that are likely to have significant effects on the environment	Where a project under the FRMP options requires an Environmental Impact Assessment (EIA) under the provisions of the EIA Directive, this will be carried out.
Bathing Water Directive 2006 (2006/7/EC)	The Directive aims to protect the public and the environment from faecal pollution at designated bathing waters. Achieves this by setting out the requirement to monitoring and assess bathing waters and by making information on bathing water available to the public.	The Flood Risk Management Plans /SEA objectives should consider the contribution that measures could make towards the attainment of bathing water quality standards.
Shellfish Waters Directive (2006/113/EC)	shellfish life and growth. The Directive aims to protect or improve shellfish waters in order to support physical, chemical and microbiological requirements that designated shellfish waters must comply with.	The Flood Risk Management Plans /SEA objectives should consider the contribution that measures could make towards the attainment of shellfish designated standards within shellfish designated waters.
Drinking Water Directive (80/778/EEC) as amended by Directive (98/83/EC)	The Directive objective is to protect human health from adverse effects of any contamination of water intended for human consumption.	The Flood Risk Management Plans /SEA objectives should consider the contribution that measures could make towards the attainment of drinking water quality standards

Legislation/Plan/Policies/Programme	Description	Potential relevance with SW CFRAMP in terms of the SEA
Urban Wastewater Treatment Directive (91/271/EEC), as amended by Directive (98/15/EEC)	The Directive aims to protect the receiving environment from the adverse effects of urban wastewater discharges. It sets standards to be met in the collection and treatment of wastewater as well as the monitoring requirements for wastewater discharges from urban areas.	The Flood Risk Management Plans /SEA objectives should consider the contribution that measures could make towards the attainment of waste water quality standards
European Landscape Convention (2000)	The Convention's purpose is to promote landscape protection, management and planning of European landscapes and to organise European co-operation on landscape issues. The treaty is concerned with protection, management and enhancement of European landscape. It is extremely wide in scope: the Convention applies to the Parties' entire territory and covers natural, rural, urban and rural-urban transitional areas, also including land, inland water and marine areas. The Convention covers every-day or degraded landscapes as well as those that can be considered outstanding i.e. recognition of the importance of all landscape.	The flood risk management options will be required to be ensure compliance with the objectives and actions of the National landscape Strategy 2014-2024.
Arterial Drainage Act, 1945, and Arterial Drainage (Amendment) Act, 1995	Acts empowering the Office of Public Works to implement Arterial Drainage Schemes (1945) and Flood Relief Schemes (1995), which must then be maintained	Flood risk management options will need to be developed at project scale to ensure that the functioning of the arterial drainage and flood relief schemes are not impacted and that Arterial Drainage maintenance is not impacted.
Coast Protection Act, 1963	Act to provide for the making and execution of coast protection schemes and to provide maintenance for these schemes	Flood risk management options will need to be developed at project scale to ensure that the functioning of the arterial drainage and flood relief schemes are not impacted and that Arterial Drainage maintenance is not impacted
Local Government (Works) Act, 1949	Enables local authorities to execute works affording relief or protection from flooding	This act gives Local Authorities powers to implement schemes to alleviate perceived flood risk. The FRAMP identifies areas where flood risk exists and management measures are required. Measures implemented under both schemes will need to be consistent while ensuring the receiving environment is protected.
European Communities (Assessment and Management of Flood Risks Regulations 2010 and 2015	Transposing Instruments for the EU 'Floods' Directive European Communities (Assessment and	The flood risk management options will facilitate the core objective set out within the Regulations

Legislation/Plan/Policies/Programme	Description	Potential relevance with SW CFRAMP in terms of the SEA
	Management of Flood Risks) Regulations 2010 & 2015	
Climate Action and Low Carbon Development Act, 2015	Provides for the making of a National Adaptation Framework to specify the national strategy for the application of adaptation measures in different sectors and by local authorities to reduce the vulnerability of the State to the negative effects of climate change, including potential increases in flood risk	The implementation of the Act and similar global scale climate change mitigation programs will be required to ensure that in the future, there is not an increased flood risk resulting from climate change.
European Communities (Water Policy) Regulations, 2003 as amended	Transposing Instruments for the EU Water Framework Directive: European Communities (Water Policy) Regulations, 2003 & 2014	The flood risk management options will facilitate the core objective set out within the Regulations
European Communities (Environmental Liability) Regulations 2008	Transposing Instruments for the Environmental Liability Directive on environmental liability with regard to the prevention and remedying of environmental damage. The purpose of these Regulations is to establish a framework of environmental liability based on the 'polluter-pays' principle, to prevent and remedy environmental damage	The provision of flood risk management options will be required to ensure that there is no environmental damage resulting, having particular regard to receiving waterbodies and Natura 2000 sites.
European Communities (Birds and Natural Habitats) Regulations 2011	Transposing Instruments for the EU Birds and Habitats Directives	The Flood Risk Management Plan/SEA objectives aim to prevent loss or damage to Natura 2000 sites). The Flood Risk Management Plans will also be subject to a separate AA in accordance with Article 6 (3) of the Habitat Directive
European Communities Environmental Objectives (Groundwater) Regulations 2010	The Groundwater Regulations establish environmental objectives to be achieved in groundwater bodies and include groundwater quality standards and threshold values for the classification of groundwater and the protection of groundwater against pollution and deterioration in groundwater quality	The Flood Risk Management Plans /SEA objectives should consider the contribution that measures could make towards the attainment of water quality standards
European Communities (Environmental Impact Assessment) (Agriculture) Regulations 2011	The Regulations apply to rural restructuring of land holdings, use of uncultivated land for intensive agriculture and land drainage works on lands for agriculture.	The Flood Risk Management plan objectives should include measures to consider agricultural land use management changes through the development of Land Use and Natural Flood Risk Management
European Communities Environmental Objectives (Surface Water) Regulations 2009	The Surface Waters Regulations institute a wide-ranging set of environmental standards for Irish surface waters	The Flood Risk Management Plans /SEA objectives should consider the contribution that measures could make towards the attainment of water quality standards
European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009	The Regulations aims to support the achievement of favourable conservation status for freshwater pearl mussels. These set	There are a number of FPM waters within the SW RBD which have associated management plans. These designations were taken into account

Legislation/Plan/Policies/Programme	Description	Potential relevance with SW CFRAMP in terms of the SEA
	environmental quality objectives for the habitats of the FRPM populations named in the First Schedule to these Regulations that are within the boundaries of a site notified in a candidate list of European sites, or designated as a Special Area of Conservation, under the European Communities (Natural Habitats) Regulations, 1997. These regulations require the production of sub-basin management plans with programme of measures to achieve these objectives.	during development of FRMP having regard to the SEA objectives
Framework and Principles for the Protection of Archaeological Heritage (1999)	The document describes the administrative framework for the protection of the archaeological heritage by the Department of Arts, Heritage, Gaeltacht and the Islands and draws attention to relevant international conventions which provide a basis for policy development. The document sets out principles for the protection of the archaeological heritage	The Flood Risk Management Plans /SEA objectives should consider the contribution that measures could make towards the protection and preservation of sites of cultural and archaeological significance
The National Monuments Acts (1930 to 2004)	Acts makes provision for the protection and preservation of national monuments and for the preservation of archaeological objects.	The Flood Risk Management Plans /SEA objectives should consider the contribution that measures could make towards the protection and preservation of sites of cultural and archaeological significance
The Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act 1999	Acts provide for the establishment of a national inventory of architectural heritage and for related matters and to provide for the obligations of sanitary authorities in respect of registered historic monuments	The Flood Risk Management Plans /SEA objectives should consider the contribution that measures could make towards the protection and preservation of sites of architectural significance
Wildlife Acts 1976- 2010	Acts to provide for the protection of wildlife (both flora and fauna) and the control of activities, which may impact adversely on the conservation of wildlife	The Flood Risk Management Plans aim to prevent loss or damage to flora and fauna The FRMP/SEA objectives should have regard to the protection of species as per the Act
Flora Protection Order 2015	Order to protect listed flora and their habitats from alteration, damage or interference in anyway. This protection applies wherever the plants are found and is not confined to sites designated for nature conservation.	The Flood Risk Management Plans aim to prevent loss or damage to flora. The FRMP/SEA objectives should have regard to the protection of species as per the Wildlife Act and the Flora Protection Order
National Policies /Plans/Programmes		
National Development Plan (NDP) 2007 – 2013	The NDP identifies a number of areas for improvement including physical and social infrastructure, attraction of inward investment, social inclusion, balanced regional development environmental	The FRMP options will allow for the protection of assets and land use currently at risk from flooding. This supports the overall development strategies set out in the National Development Plan.

Legislation/Plan/Policies/Programme	Description	Potential relevance with SW CFRAMP in terms of the SEA
	protection and sustainable development. infrastructure investments are identified, including flood relief measures. A public awareness campaign linked to the issue of flooding was undertaken during the period of the Plan.	
Ireland 2040 – Our Plan	A replacement plan is currently being developed to replace the National Spatial Strategy (NSS). This plan will function as a high level framework for the spatial development until 2040.	The development of projects arising from the FRMP will be required to have regard to the national policies that will arise from Ireland 2040.
National Spatial Strategy (NSS) 2002 – 2020 (Issue Paper on National Planning Framework in preparation)	A 20-year national planning framework for Ireland that aims to achieve a better spatial balance of social, economic and physical development across Ireland, supported by more effective and integrated planning	The FRMP options will allow for the protection of assets and land use currently at risk from flooding. This supports the overall development strategies set out in the National Spatial Strategy.
National Heritage Plan (2002)	The main objective of this plan is to protect Ireland's heritage and it sets out archaeological policies and principles that should be applied by all bodies when undertaking a development. Each county is obliged to produce their own county heritage plan Relevant plans in the SWRBD include those for Counties Cork, Kerry, Waterford and Limerick.	The SEA contains objectives to ensure the protection of archaeological heritage
National Parks and Wildlife Conservation Plans for SACs and SPAs	The NPWS produces a conservation plan for each SAC, SPA and NHA. Each plan lists the wildlife resources of the area, the current human uses, any conflicts between the two, and strategies for retaining the conservation value.	These plans will be consulted/referenced during the preparation of Baseline environment considerations for each FRMP option development with regard to the SEA objectives
Climate Change Sectoral Adaptation Plan for Flood Risk Management, 2015	Sets out the policy on climate change adaptation of the OPW, the lead agency for flood risk management in Ireland, based on a current understanding of the potential consequences of climate change for flooding and flood risk in Ireland, and the adaptation actions to be implemented by the OPW and other responsible Departments and agencies in the flood risk management sector.	The flood risk management options will facilitate the core objective set out within the Adaptation Plan.
National Mitigation Plan	The National Mitigation Plan is being developed under the Climate Action and Low Carbon Development Act 2015. The Plan outlines first steps in enabling a government wide transition to a low carbon, climate-resilient and	The CFRAM FRAMP will support national mitigation actions to adapt to the impacts of Climate Change.

Legislation/Plan/Policies/Programme	Description	Potential relevance with SW CFRAMP in terms of the SEA
	environmentally sustainable economy by 2050	
Rural Development Programme 2014-2020	The Rural Development Programme (RDP) has been developed under the requirements of CAP and includes a series of agri-environment and climate measures. The RDP is structured around three core axes which have the aim of: <ol style="list-style-type: none"> 1. Improving the competitiveness of agriculture; 2. Improving the environment; and 3. Improving the quality of life in rural areas 	The RDP recognises that the OPW has been appointed as the lead agency to implement flooding policy in Ireland and that they are developing CRFAMs likely to involve both structural and non-structural measures such as storage and better flood forecasting and warning, but will also include structural works, particularly where flooding is already a problem. The RDP will monitor any developments and where necessary reflected these in the RDP measures.
The Planning System & Flood Risk Management Guidelines for Planning Authorities (2009)	Guidelines published under Section 28 of the Planning and Development Acts that provide a transparent and robust framework for the consideration of flood risk in planning and development management	The development of FRMP options will support the sustainable development of areas previously at flood risk by allowing for development to progress in the absence of flood risk where management strategies have been successful.
National Landscape Strategy for Ireland 2015-2025	This draft National Landscape Strategy is the means by which the State, working in co-operation with public authorities, stakeholders, communities and individuals, will provide a framework for the protection of the many cultural, social, economic and environmental values embedded in the landscape	The development of FRMP options should support the protection of landscape objectives set out in the strategy having regard to the SEA objectives
Regional/Local		
South West Regional Planning Guidelines for the West Region 2010 – 2022	Planning strategies at the regional level to provide the link between the national and local planning frameworks, which work within the overall approach taken in the NSS, while providing more detail and establishing a development and spatial framework that can be used to strengthen local authority development plans and other planning strategies at county, city and local level	Objectives and actions identified within the Regional Planning Guidelines were used to inform the development of FRMP options having regard to the SEA objectives.
South Western River Basin Management Plan 2009-2015 (and subsequent revisions)	Plans (RBMPs) prepared under the Water Framework Directive (2000/60/EC) that summarise the waterbodies that may not meet the environmental objectives of the WFD and identify which pressures are contributing to the environmental objectives not being achieved. The plans describe the classification results and identified measures that can be introduced in order to safeguard waters and meet the environmental objectives	The River Basin Management Plans set specific objectives for each water body and provide a Programme of Measures to be implemented in order to achieve the objectives. These measures are an important consideration for implementation of the FRMP options.

Legislation/Plan/Policies/Programme	Description	Potential relevance with SW CFRAMP in terms of the SEA
	of the WFD. New RBMPs are to be adopted by the end of 2017	
Second Cycle of River Basin Management Plans: 2015 - 2021	River Basin Management Planning takes an integrated approach to the protection, improvement and sustainable management of the water environment. Under the second cycle of WFD there is just a single river basin district covering Ireland.	
County Development Plans	The development plan sets the agenda for the development of the local authority's area over its six year lifespan. Development, whether it be residential, industrial, commercial or amenity, must generally take place in accordance with the policies and objectives of the development plan. The plan is therefore a blueprint for the economic and social development of the county for which it has been made.	The development of FRMP options should support the Land Use and development objectives and policies set out in the County Development Plans.
Local Area Plans	Local Area Plans provide more detailed planning policies at a local level for either urban areas or wider urban and rural areas where significant development and change is anticipated	The development of FRMP options should support the Land Use and development objectives and policies set out in the Local Area Plans having regard to the SEA objectives
County Heritage Plans	Identifies objectives and actions for the protection of the cultural heritage and archaeology resources at county level	The development of FRMP options should support protection of cultural heritage objectives and policies set out in the Plan having regard to the SEA objectives
Local Economic and Community Plans 2016 - 2021, when published	The plans set out the objectives and actions which will guide the economic and community development of local areas over the 2016 - 2021 period	The development of FRMP options should support economic and community objectives set out in the Plan having regard to the SEA objectives
Local Authority Strategic Plans (e.g. Cork Area Strategic Plan, Marine Leisure Infrastructure Strategy)	These plans provide strategic core goals to provide a framework setting out strategic spatial and development goals to facilitate sustainable development through the implementation of social, cultural and economic, environmental policies and programmes. while taking into account existing planning commitments and short term market trends	The development of FRMP options should support the Land Use and development objectives and policies set out in the Plan having regard to the SEA objectives
County Landscape Character Strategy	County level Landscape Strategy aims to provide an explanation landscape at a county level by way of describing what the landscape actually entails, while highlighting	The development of FRMP options should support the landscape objectives set out in the strategy having regard to the SEA objectives

Legislation/Plan/Policies/Programme	Description	Potential relevance with SW CFRAMP in terms of the SEA
	how areas within the county have their own distinctiveness and character	
Shellfish Water Pollution Reduction Programmes	The pollution reduction programme for shellfish waters in accordance with the standards and objectives established by the Quality of shellfish Waters regulations for designated shellfish growing waters.	There are a number of shellfish water within the CFRAM SW RBD which have associated pollution protection programmes. These designations were taken into account during the baseline considerations appraisal.
Draft Freshwater Pearl Mussel sub basin Management Plans	These plans aim to address catchment wide issues that re contributing to the decline in FWPM and to develop a strategy for implementing measures that will bring the catchment and population back to favourable conditions.	There are a number of FRPW waters occur within the CFRAM SW RBD which have associated management plans. These designations were taken into account during development of FRMP options as having regard to the SEA objectives

5.2.1 Relationship of CFRAMs and other Plans and Programmes

The following section explores the relationship of the international and national levels plans, programmes deemed to be most pertinent to the South Western CFRAM Study. As noted above, there are a number of plans and programmes which would be expected to influence or be influenced by the FRMPs, for the purpose of this SEA Environmental Report key relationships are discussed under each of the key environmental topics below;

5.2.1.1 Population and Human Health

The National Development Plan (NDP) is an overarching development plan setting out strategic proposals at a national scale. The National Spatial Strategy and the Regional Guidelines are the two documents which underpin the spatial development in the UoM at a national and regional level. These identify a number of areas for improvement including physical and social infrastructure, attraction of inward investment, social inclusion, balanced regional development, environmental protection and sustainable development. The NSS identifies Cork and Waterford as Gateways, the largest urban and economic centre in the South West Region and the towns of Mallow and Killarney are identified as hubs. The key challenge is to increase its rate of development and population growth in a sustainable manner. Flooding can cause risk to life, injury, illness and stress, and impacts may be greater for more socially vulnerable groups. Actions to manage flood risk can have wider positive and adverse impacts on people and human health. National and Local Planning Policies strive to reduce the exposure of people to flooding through policies and advice regarding new developments in flood risk areas and provide an enhance quality of life for the population. The FRMP is supported by land use strategies set out at National and Local scale as it ties in with the long-term objectives set out in the National Development Plan (NDP) and the National Spatial Strategy (NSS). The NSS will be replaced by the National Planning Framework (NPF), which is currently under development by the Department of Housing, Planning, Community and Local Government. This framework will have a co-ordinated focus on economic development and investment, inter alia, housing, health and education infrastructure over a period up to 2040. The FRMP will contribute to delivery of sustainable planning by reducing overall flood risk within the UoM and reducing risk to life and impacts on

human health. The FRMP and SEA objectives have been developed to minimise risk of flooding to human health and community life.

5.2.1.2 Geology, Soils and Land Use

Soils and geology provide a range of benefits, which include supporting a diverse agri-food sector, filtering impurities from water and their role and function in land use drainage and flood management practices. Pressures on soils include those from climate change, flooding risk, and land use and land management change (including compaction and soil sealing). Flooding can impact on soils through deposition of sediments and pollutants. Land use objectives and policies identified within the relevant spatial planning policy documents were used to inform the development of appropriate and sustainable flood risk management measures. Guidelines on the Planning System and Flood Risk Management, 2009 provides a transparent and robust framework for the consideration of flood risk in planning and development management. The FRMP should also assist in the realisation of sustainable land use planning by providing protection to the amenity of new and existing development.

5.2.1.3 Archaeology and Cultural Heritage

The European Convention on the Protection of the Archaeological Heritage ratified by Ireland in 1997, requires that appropriate consideration be given to archaeological issues at all stages of the planning and development process. This FRMP and the development of the SEA have had due consideration to the protection of the historic environment. Specific objectives have been included within the SEA to ensure that the protection of cultural heritage is considered within the development of the FRMP and during the SEA process.

5.2.1.4 Water Resources

The Water Framework Directive (WFD) establishes the legal framework for the protection, monitoring reporting and management of water resources across Europe. Under the Directive the management of water quality is carried out on an integrated approach and requires the preparation of River Basin Management Plans (RBMPs). The South West River Basin District Management Plan sets out a series of objectives and measures for the river, lake, estuarine, coastal and groundwater bodies of the South Western RBD. The draft River Basin Management Plan for Ireland 2018-2021 is currently subject to public consultation. The FRMP flood risk measures have been developed to achieve the objectives and measures proposed within the FRMP while ensuring compliance with the SEA objectives including the objective to support the achievement of the Water Framework Directive objectives.

5.2.1.5 Air and Climate

Air Quality regulations in Ireland derive from EU Directive 2008/50/EC, which has been transferred into Irish law through the Air Quality Standards Regulations, 2011 (S.I. No 180 of 2011), and the EU National Emissions Ceiling (NEC) Directive 2001/81/EC (EC, 2001a). In addition to the aforementioned regulations, Ireland is a member of the Convention on Long Range Transboundary Air Pollution through which the Gothenburg Protocol sets out targets for the control of ammonia emissions. Implementation of the Gothenburg Protocol is achieved through limits set out in the National Emissions Ceilings Directive. A number of atmospheric pollutants are measured by the EPA in order to monitor compliance with European ambient air quality directives (e.g. EC, 2008). As noted the drivers for air quality are largely EU driven, however in 2015 the DECLG (now DCCAE) announced the intention to publish Ireland's first National Clean Air Strategy in 2017. This Strategy will provide a policy framework by which Ireland can develop the necessary policies and measures to comply with new and emerging EU legislation, as well helping to tackle climate change. The FRMP options have been developed to take climate change projections into account when assessing flood risk, setting objectives and selecting measures that be adaptable in future to the effects of a changing climate and contribute to climate change mitigation.

5.2.1.6 Biodiversity, Flora and Fauna

At the top of the European protection hierarchy is the Habitats Directive (92/43/EC) and the Birds Directive (2009/147/EC) which have been transposed into Irish law principally through the European Communities (Birds and Natural Habitats) Regulations 2011. These regulations 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 deficiencies in the original implementing legislation. Also relevant to the FRMPs and this SEA is the EU Biodiversity Strategy to 2020 which aims to prevent and eliminate the causes of biodiversity loss and maintain and enhance current levels of biodiversity. At a national level, protection and conservation continues with the National Biodiversity Plan and the National Parks and Wildlife Conservation Plans for SACs and SPAs. The FRMP and SEA objectives have been developed to ensure that the planned flood risk measures result in compliance with all existing EU and national objectives, policies and legislation which also seek to protect the natural environment. The FRMP looks for opportunities to conserve, and where possible restore, biodiversity. Article 6 of the Habitats Directive requires that any plan or project, which includes the CFRAMS FRMPs, be screened for AA to determine if it, alone or in combination with other plans and projects, is likely to have a significant effect on a European Site. This screening has been undertaken in parallel to development of the FRMPs SEA. The outcomes and recommendations of each stage in the Appropriate Assessment process inform the Strategic Environmental Assessment and vice versa.

5.2.1.7 Fisheries, Aquaculture and Angling

The EU Common Fisheries Policy (CFP) guides the development and management of Fisheries and aquaculture in the European Union. The policy aims to ensure the sustainable and economic viability of the industry. This is achieved through a number of different measures including the usage of fishing quotas to restrict the quantity of fish caught. The Sea Fisheries Policy & Management Division of the Department of Agriculture Food and the Marine is responsible for the management of the seafood sector and the implementation of the Common Fisheries Policy. The Aquaculture and Foreshore Management Division of the Department is also responsible for the licencing of aquaculture under the Fisheries (Amendment) Act 1997. The CFP requires a multi-annual strategic plan to be prepared for aquaculture based on the Strategies Guidelines for the Sustainable Development of EU Aquaculture. The National Strategic Plan for Sustainable Aquaculture Development specifies a number of guiding principles to achieve the sustainable development of the industry including the implementation of “responsible Planning”, the implementation of Ecosystem Protection, using science based approach to decision making and ensuring compliance with the relevant European and National Legislation such as the SEA and EIA legislation. The FRMP’s have had due regard to protecting fishery assets, by virtue of the fact that the proposed measures have been developed to ensure that the receiving environment is not significantly impacted by the proposed measures. Mitigation measures during the construction phase of structural measures will be required to minimise the potential for pollution.

5.2.1.8 Tourism and Recreation

People, Place and Policy -Growing Tourism to 2025 outlines current Government policy with regard to tourism in Ireland. The policy document sets goals for significant tourism growth up to 2025 and identifies the quality of the environment as a significant attraction to overseas tourists coming to Ireland. Furthermore the policy document highlights the requirement for the development of public infrastructure and private construction to be carried out with as much sympathy as possible for the natural landscape. The document

outlines policies to ensure that the natural and built environment are protected to ensure a viable tourism product. The FRMP's have had due regard to protecting landscapes and elements of cultural heritage when devising flood management measures. The SEA has assessed the potential of proposed measures to impact on both of these elements and this assessment has informed the development of the FRMP.

5.2.1.9 Landscape and Visual Amenity

The European Landscape Convention is a Council of Europe initiative that highlights the importance of all landscapes and encourages more attention to their care and planning. Public authorities are encouraged to adopt policies and measures at local and regional level for protecting landscapes. Sensitive areas of landscape are identified at Local Authority level through County Development Plans and local Area Plans. The FRMP's have had due regard to protecting landscapes and have regard to the potential impacts of national and local landscape and visual amenity designations. Landscape policies related to key areas of recognised values, for example, designated areas, scenic routes, and national parks designations including their sensitivity and importance/value were considered in the development of appropriate flood risk management measures. The development of FRMP options reduce the risk of flooding to the benefiting lands, thereby protecting the Landscape and visual resources within these lands.

5.2.1.10 Infrastructure and Material Assets

Flood measures such as flood defences are a material asset. The FRMP options entail flood defences to ensure effective management of flood risk into the future. This management of flood risk provides protection for other material assets, such as water services, road and rail infrastructure from flooding. Sector Programmes of wastewater treatment plants and networks, water supply infrastructure, transport infrastructure and energy supply etc. are required to be implemented in several areas in order to accommodate recent and future population growth and to facilitate the climate adaptation strategies. The development of FRMP options reduce the risk of flooding to the benefiting lands, thereby protecting the material assets and strategic infrastructure resources within the UoM.

6 Key characteristics of UoM 18

6.1 Introduction

Ireland's natural environment, although under increasing pressure, generally remains of good quality and represents one of the country's most essential national assets. In the document entitled Ireland's Environment 2016 – An Assessment, the EPA outlines the four priority challenges for the environment, which, if addressed successfully should benefit the present and future quality of Ireland's environment. These are as follows:

- | Valuing and Protecting our Natural Environment;
- | Building a Resource-Efficient, Low Carbon Economy;
- | Implementing Environmental Legislation; and
- | Putting the Environment at the Centre of Our Decision Making.

These challenges are summarised below with reference to how the FRMP is framed relative to these challenges.

Challenge	FRMP is framed relative to these challenges
Valuing and Protecting our Natural Environment	Although the focus of the Plan relates to flood risk management measures the potential changes in current land-use practices (e.g. population, health, land-use adaptation and resiliencies.) and the development of the associated infrastructure (e.g. energy and climate change and transport) have the potential to impact on the natural environment. In this regard, the FRMP and AFA mitigation measures have been developed to ensure that the planned flood risk measures are carried out in compliance with all existing EU and national objectives, policies and legislation which also seek to protect the natural environment (such as biodiversity, protected habitats/species, landscapes water resources and etc)
Building a Resource-Efficient, Low Carbon Economy	The FRMP objectives set out goals that plan is aiming to achieve. They have a key role in the preparation of the Plan, and the identification of appropriate measures, as the options that are available to manage flood risk within an AFA are appraised against these objectives to determine how well the option contributes towards meeting the defined goals. The objectives are aimed at considering the benefits and impacts across a broad range of sectors to achieve the most cost effective, and sustainable management of existing and potential future flood risk
Implementing Environmental Legislation	The FRMP is undergoing both SEA and AA in line with the EU and national legislation. The approval adoption of the Plan does not confer approval or permission for the installation or construction of any project. Projects arising from the FRMP will require further environmental assessment (SEA, EIA, AA). Where development is below the thresholds of this legislation and regulation, this Environmental Report will make recommendations to protect the environment. This SEA has regard to inter-related EU legislation such as the Water Framework Directive, Habitats Directive.
Putting the Environment at the Centre of Our Decision Making	As noted above, the FRMP is undergoing both SEA and AA in line with existing EU and national legislation. This is ensuring that the environmental consequences of any measures undertaken as a result of the plan are taken into account as part of the plan's development. Both processes are helping to shape the evolution of the FRMP and the associated AFA Flood risk measures

The existing and potential future environmental characteristics of Unit of Management 18 are described in this section and the key social and environmental issues that may be affected by flooding and flood risk management are identified.

Environmental characteristics are presented under the following topics:

- | Population and Human Health;
- | Geology, Soils and Land Use;
- | Architecture, Archaeology and Cultural Heritage;

- | Water Resources;
- | Air and Climate;
- | Biodiversity, Flora and Fauna;
- | Tourism and Recreation;
- | Fisheries, Aquaculture and Angling;
- | Landscape and Visual Amenity; and
- | Material Assets.

6.2 Population and Human Health

6.2.1 Population

The results for the 2016 Census (available through www.cso.ie) recorded a national population of 4,761,865 on census night. Comparison against the 2011 census figures indicates a 3.8% increase in the national population over the 5 year period. This national trend is reflected in the South West region. (Counties Cork, Kerry, Limerick, Tipperary and Waterford) (Table 6.1).

Table 6.1: Population of CFRAMS South West (Counties Cork, Kerry, Limerick Tipperary and Waterford) from 2011 and 2016

County	Persons 2016	%age difference between 2011-2016
Cork County	417,211	4.4
Kerry	147,707	1.5
Limerick City and County	194,899	1.6
Waterford City and County	116,176	2.1
Tipperary	159,553	0.5

Source: Central Statistics Office

Centres of population are recognised as vulnerable receptors to flooding and often host services and facilities that, if flooded, will impact a broader catchment of people than that directly impacted by the flood event itself. The upward trend in population figures in the South West counties has the potential to result in an increase in the number of receptors vulnerable to flooding (where these population increases are focused around areas prone to flooding).

The CSO Small Area Population Statistics (SAPS) (2011-most recent SAPS data) demonstrates that the upward trend in population growth has continued from the 2006 census for the areas within the AFAs. Census data between 2006 and 2011 is presented in Table 6.2.

Table 6.2: CSO Population of Towns 2006 and CSO 2011 SAPS Data

AFA	Persons 2006	SAPS 2011 Data
Aglish	169	343
Ballyduff	578	No data available
Fermoy, Fermoy Urban	2,275	6,489
Environs of Fermoy, Fermoy Rural	3,598	(includes urban and rural figure)
Kanturk,	1,915	2,263
Mallow, Mallow Town	7,864	11,605

AFA	Persons 2006	SAPS 2011 Data
Environs of Mallow, Mallow Rural	2,377	(includes town and environs)
Rathcormac	1,072	1,534
Tallow	911	962
Youghal, Youghal Urban	6,393	7,794
Environs of Youghal, Youghal Rural	392	(includes town and environs)

Source: Central Statistics Office – 2011 Census data and <http://census.cso.ie/sapmap/>

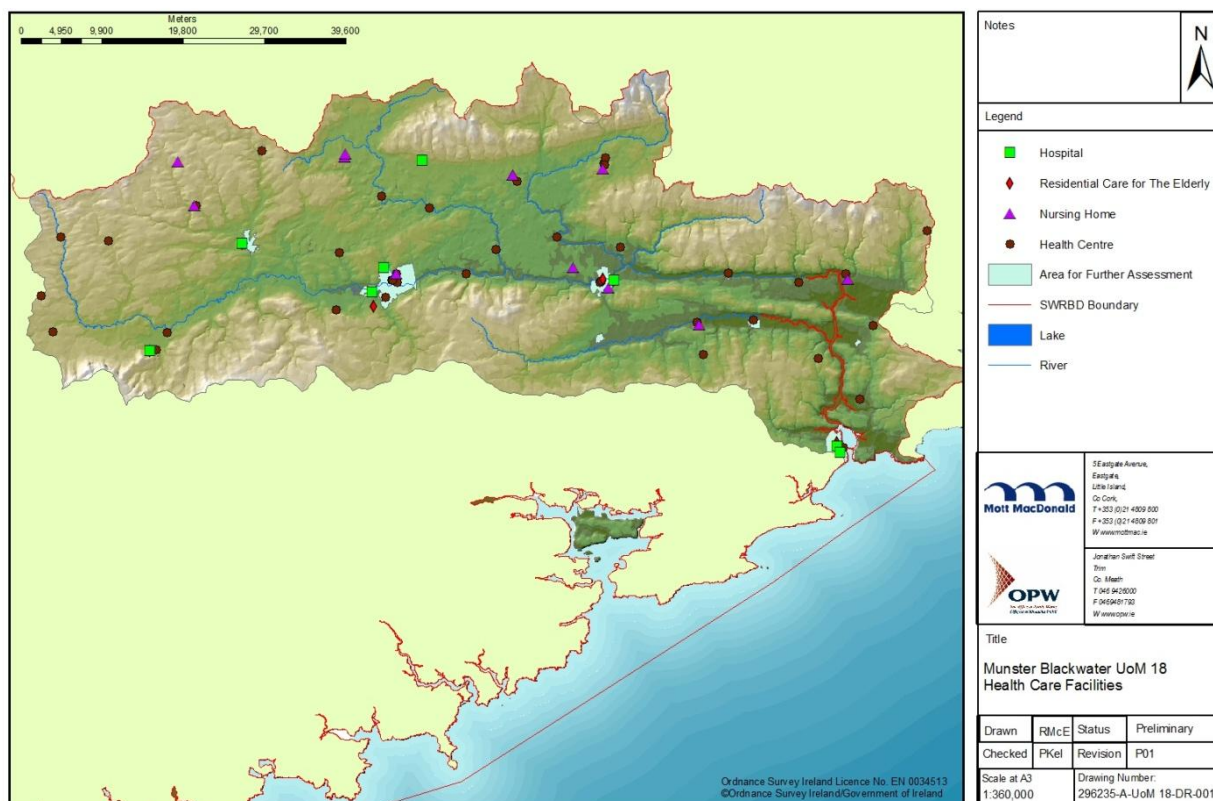
6.2.2 Human Health

Flooding can have significant temporary impacts on some of the more vulnerable members of society including the sick and the elderly. The provision of clean potable water can be affected when WWTPs are flooded and the blockage of transport links can make it difficult for the old and infirm to access required medical assistance.

Additional impacts can be realised when a health care facility is flooded including placing the safety of already vulnerable people at risk by having to move them from a facility and imposing pressures on other health care facilities which have to accommodate additional patients.

Health care service providers in Unit of Management 18 include hospitals, health care centres, and residential care for the elderly. Hospitals in the UoM are community hospitals, as opposed to regional hospitals and therefore tend to provide a lesser range of services than the larger regional facilities.

Figure 6.1: Health Care Facilities, UoM 18



6.2.3 Future Trends in Population and Human Health

6.2.3.1 Population

The general population trend in the South Western River Basin District is one of steady growth. The Central Statistics Office (CSO) regional population projections (which include traditional migration assumptions³) provide projected population figures for the South West and the South East regions to the year 2031 which reflect the observed trend (refer to Table 6.3).

The CSO reported in the publication entitled Population and Labour Force Projections 2016-2046, that the total population in Ireland is expected increase to 5.3 million by 2026. The CSO predicts the average annual population growth rate between 2016-2046 (taking account of fertility and migration) to be between 0.4 and 1%, compared to the 0.7% growth rate recorded during the 2011-2016 census periods.

³ The 1996 pattern of inter-regional flows is applied in 2016 and kept constant thereafter, with the difference between the 2006 and 1996 patterns apportioned over the years between 2006 and 2016.
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Table 6.3: Projected Population of Regional Areas

Region	CSO Projected 2031 Figure
South East	550,000
South West	733,000

The National Development Plan (NDP) sets out physical and spatial planning policy such that the population projections in the NSS are supported by adequate facilities and infrastructure. Although the period of the NDP has now expired it remains a pertinent guidance document until such time that a replacement plan or strategy is published. The National Spatial Strategy (NSS) and the NDP are implemented at a regional level through Regional Planning Guidelines which are subsequently adopted through county and local planning strategies. In 2015, the South West and South East Regional Authorities (now restructured as the Southern Regional Assembly), published their RPGs for the period 2011-2022.

A number of public investment programmes have been launched under the National Spatial Strategy are focused towards the development of key gateway (urban centres) and hub (towns linking urban centres to rural areas) areas. Public investment programmes include the following:

- i Infrastructure and Capital Investment 2012-2016: The Plan sets tranche of investment over the period 2012-2016, the capital investment is designed to facilitate economic growth and build social infrastructure in the state. Environmental Infrastructure is identified as a key investment requirement for Ireland and to this end the OPW has been allocated €500 million to assist the flood relief programme.
- i Smarter travel-A new transport Policy for Ireland 2009-2020 is designed to guide the development of sustainable transport in Ireland thereby reducing health and environmental impacts of current transport systems and improve quality of life.
- i Water Services Investment –Irish Water was established in March 2013 under the Water Services Act 2013 and is Ireland's new national water services provider. Irish Water has taken over the responsibilities relating to the provision of water and wastewater infrastructure from Local Authorities on a phased basis since January 2014.;
- i Communications and Broadband Programme – promoting the rollout of broadband across the country, focusing on achieving connectivity in rural areas; and
- i Realising Our Rural Potential – Action Plan for Rural Development (2017)–This is a plan to promote the sustainable growth of the agriculture and forestry sectors and unlock the potential of rural Ireland through a framework of supports at national and local level.

Within the South West Region, Cork City is identified as a gateway and the towns of Mallow and Killarney are identified as hubs. In the South East Region, Waterford City is identified as a Gateway and Dungarvan is identified as a hub.

On-going investment at regional and local level in order to support Ireland's National Spatial Strategy may result in the re-zoning of lands within this Unit of Management, particularly in areas identified as gateways and hubs. Regional Planning Guidelines for the South-West and South-East regions predict an increase in housing demand with the main areas of housing development located in gateway areas and hub towns. The CSO census data highlights the continual housing shortage in Ireland, the data notes households in Ireland have increased by 3%, whilst the overall population increased by 3.7%. To this end, the Government have set out an Action Plan Rebuilding Ireland – Action Plan for Housing and Homelessness. The Plan proposes a number of measures on the land management side. Spatial planning as outlined the Local Authority Development Plans and Local Area Plans are an important mechanism for land

management in Ireland. The Government estimate that on average of extra 25,000 homes are required to be provided every year in the period to 2021.

6.2.3.2 Human Health

In November 2012, the Department of Health published “Future Health: A Strategic Framework for Reform of the Health Service 2012-2015”. This document sets out proposed government health care reform for Ireland. Key areas addressed include:

- i **Service Reform** – movement away from the treatment of people through hospital care towards a greater utilisation of community care for people at the lowest level of complexity such that care is close to home and provided in a timely manner;
- j **Structural Reform** - through the provision of a new management structure in the HSE and the establishment of hospital groups on an administrative boundary basis. There will also be emphasis on the alignment of local level service providers.

The reform of the health care service in Ireland will result in a trend for more decentralised care facilities for vulnerable persons across the country as a whole and as a consequence in this region.

6.2.4 Population and Human Health – Key Issues Relating to Flood Risk Management

The town of Mallow, identified as a hub in the NSS, is located in UoM 18 and development in the town may influence population trends in nearby hinterlands such as Kanturk. The population of Mallow (both the town and rural environs) has increased steadily since 2002. This trend will continue into the future with the implementation of Regional Planning Guidelines. Population and development growth in Mallow could potentially increase the number of people and properties at risk from flooding. At present land-use policies for Kanturk and Mallow are set out in their respective Local Area Plans, however the intension is that local planning policy for these settlements will be contained within the new Kanturk and Mallow Municipal District Plan which is currently in consultation.

The draft Kanturk -Mallow Municipal District Plan aims to set out a land-use and transportation policy that will support increasing population trends in the future. It is intended that development of most new housing will be within a 20 minute walking distance (1.6km) of the town centre. It is noted that population growth target will required the provision of approximately 7,556 new housing units within the plan period.

The prevalence of local health care facilities is likely to increase through the implementation of the Department of Health’s Health Service Reform Programme. A number of health service facilities in Mallow are located in flood risk areas. The development of existing facilities (in terms of services offered and facility capacity) could potentially result in an increase in the number of people at risk from flooding. The Mallow Local Area Plan 2015 recognises the need for flood risk assessment to support the future development of existing health care facilities and population centres. This requirement is further recognised in the draft Kanturk -Mallow Municipal District Plan.

Youghal, Rathcormac, Ballyduff, and Aglish are identified as Areas for Further Assessment and these areas require flood risk management measures These AFAs are located approximately 30km from Dungarvan town which is identified as a hub in the NSS (not located in UoM). These towns may experience local population increases arising from development in nearby Dungarvan with a potential increase in the number of people and properties at risk from flooding. Planning policies and core settlement strategies

encompassing these AFAs are included in the draft Municipal District Plans, namely East Cork and Fermoy Municipal Districts, these are currently in consultation.

6.3 Geology, Soils and Land Use

6.3.1 Topography

The River Blackwater catchment ranges from less than 5mODM at Youghal Mudlands to 440mODM at the source of the Blackwater. Elevations reach over 900mODM at Galtymore Mountain, the headwaters of the Funshion. The River Blackwater and lower reaches of the Awbeg (Major) and Funshion have much shallower gradients ranging from 1 in 840 at the confluence with the Allow to 1 in 3,000 downstream of Lismore. This very low gradient for the lower 30km of the Blackwater results in significant attenuation of flood discharges.

The River Bride catchment ranges from 2mODM up to 400mODM in its headwaters with the bed slope typically ranging from 1 in 600 in the upper reaches to 1 in 1700 in the lower tidal reaches. The southern tributaries to the Bride tend to be steeper and have higher relief than those that drain areas to the north of the Bride. The floodplain is relatively wide, ranging from 2 to 3km in width along its length.

The River Allow catchment typically has higher relief being the Blackwater headwaters. Elevations range from 70mODM at its outfall to 400mODM at the source (Mullaghareirk). The River Allow has a typical gradient of 1 in 320 whilst the River Dalua tributary has steeper gradient of 1 in 260. The steeper gradient of the Dalua results in a slightly faster response to rainfall than the Allow.

6.3.2 Geology and Soils

6.3.2.1 Bedrock Geology

The geology of UoM 18 can be summarised as resistant Devonian sandstone, and volcanic geology and less resistant Dinantian limestones that run west to east in bands. The resistant geology forms the major watershed boundaries between the Blackwater and Bride catchments. The small tributaries underlain by the sandstone geology are more prone to 'flashy' or a faster response to rainfall compared with the more permeable catchment in the north of the Blackwater sub-catchment.




Conversely, the less resistant limestones form the river valleys along the Blackwater and Bride. The majority of the River Funshion, River Awbeg (major), the River Bride and parts of the Blackwater at Mallow to Killavullen are underlain by highly permeable karst geology which forms regionally important aquifers. The permeable nature of these reaches is likely to mitigate flood peaks when unsaturated, but could exacerbate and prolong flooding when the groundwater system is saturated. There are also a number of karstic features along the Blackwater valley between Mallow and Fermoy, including caves, karstic depressions, swallow holes and springs which could modify progression of the flood down the catchment.

There is one coal mine (Munster Coalfield) and a number of active quarries located within UoM 18.

0 4,950 9,900 19,800 29,700 30,600 Meters

Legend

SWRB Boundary	Ballytrasna Formation	Galtymore Formation	Kiltoran Formation	Ringmoyan Formation
UoM 18	Caherduggan Limestone Formation	Grants Grave Formation	Knockmealdown Sandstone Formation	Sievenamuck Conglomerate Formation
Bedrock Geology	Carraigdenamore Volcanics	Glenfesk Chloritic Sandstone Formation	Liscarroll Limestone Formation	Sieveragh Conglomerate Formation
Annabella Formation	Clare Shale Formation	Glenoween Shale Formation	Lough Mully Formation	Subuter Volcanic Formation
Ardane Formation	Clone Flagstone Formation	Gortaninli Formation	Lower Limestone Shale	Visean Limestones (undifferentiated)
Ardmore Member	Copstown Limestone Formation	Gun Point Formation	Namurian (undifferentiated)	Waulsortian Limestones
Assaroola Member	Croane Formation	Gyleen Formation	OMahony's Rock Formation	Westphalian (undifferentiated)
Ballygeana Formation	Crows Point Formation	Hazelwood Limestone Formation	Old Red Sandstone (undifferentiated)	In Ballysteen Formation
Ballymartin Formation	Denanian Limestones (undifferentiated)	Inchacomb Formation	Pigeon Rock Formation	
Ballyquinn Member	Doon Lava Member	Johnstown Red Marble Formation	Poulogranian Sandstone Formation	
Ballysteen Formation	Fiske Sandstone Formation	Kilsheelan Formation	Rathronan Formation	

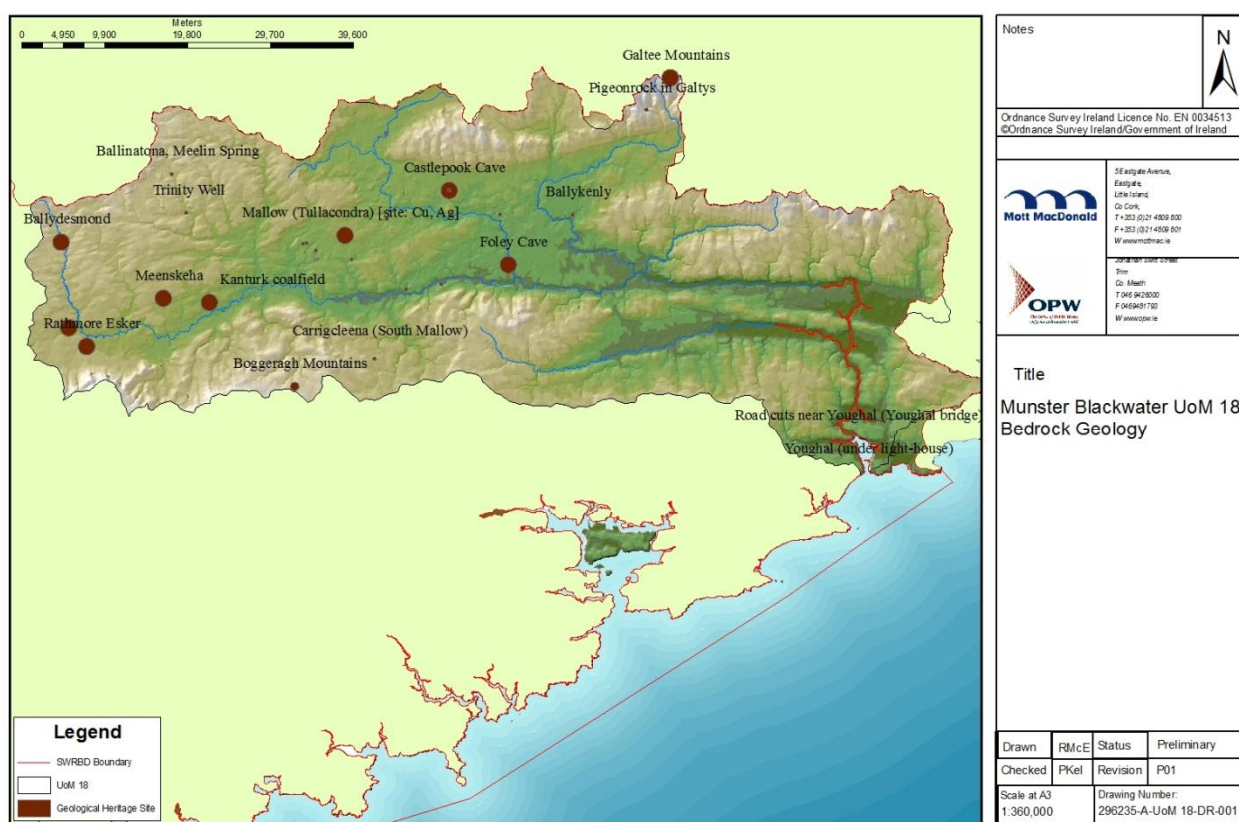
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Title Munster Blackwater UoM 18 Bedrock Geology			
Drawn	RMcE	Status	Preliminary
Checked	FKel	Revision	P01
Scale at A3 1:360,000		Drawing Number: 296235-A-UoM 18-DR-001	

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6.3.2.2 Geological Heritage

The Geological Survey of Ireland (GSI) and the National Parks and Wildlife Service (NPWS) have operated the Irish Geological Heritage Programme (IGH) in Ireland since 1998. The IGH programme aims to identify and document the wealth of geological heritage in Ireland with the ultimate goal of protecting and conserving Ireland's geological heritage. IGH sites identified to date under the Programme in UoM 18 are presented in Figure 6.3.

Figure 6.3: Irish Geological Heritage (IGH) Sites in UoM 18



Source: Geological heritage site information provided by the Geological Survey of Ireland

6.3.2.3 Soils

Soils in UoM 18 are dominated by Devonian sandstone till (TDSs) to the east and by Namurian Shale and sandstone till (TNSSs) to the west (refer to Figure 6.4).

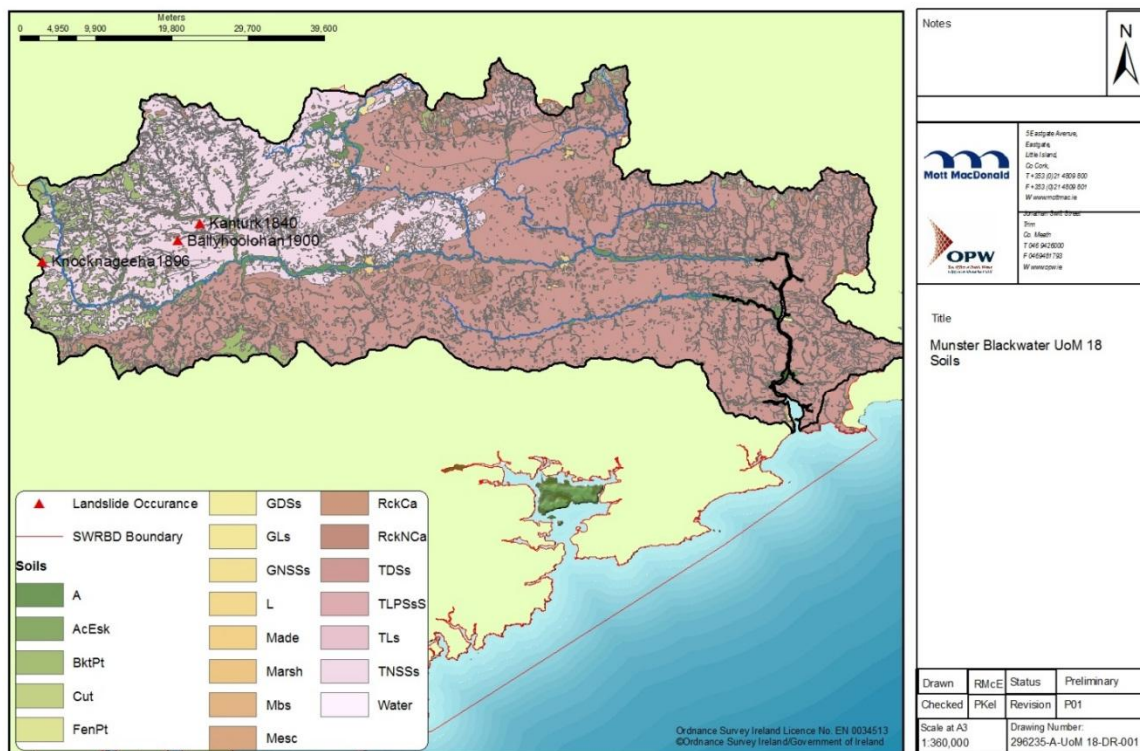
The Geological Survey of Ireland maintains an inventory of landslides in Ireland. Work in this area is on-going since 2008. The GSI has records of three landslide occurrences in UoM 18 (refer to Table 6.4). Not surprisingly these records are in areas dominated by peat / bog soil.

Table 6.4: Records of landslides in UoM 18

Location and year	County	Mechanism	Land Cover
Knocknageeha1896	Kerry	Flow	Blanket Bog
Ballyhoolohan1900	Cork	Unknown	Raised Bog
Kanturk1840	Cork	Unknown	Raised Bog

Source: Geological Survey of Ireland

Figure 6.4: Soils of UoM 18



Source: Soil mapping – free download from <http://gis.epa.ie/>

6.3.3 Land Use

The Blackwater, Allow and Bride catchments are predominately rural in nature, with the main urbanised areas located around Mallow, Fermoy, Kanturk and Youghal. Of these Mallow is the most densely populated and includes industrial areas along the River Blackwater valley upstream of the town. The rural land use comprises largely of pasture, with mixed agriculture interspersed with smaller forestry areas typically located in upland areas or on the periphery of peatlands. The significant wooded areas tend to be located on higher grounds near the Araglin and Knockanore areas in the Lower Blackwater catchment.

The headwaters of the Funshion, Araglin and Bride are dominated by the presence of peat bog and moorland on the Knockmealdown and Nagle Mountains which could attenuate runoff reaching the river channels. However, the impact of the peat bog and moorland reduced to less than 5% by the time these rivers reach the study area on the River Blackwater and Bride respectively.

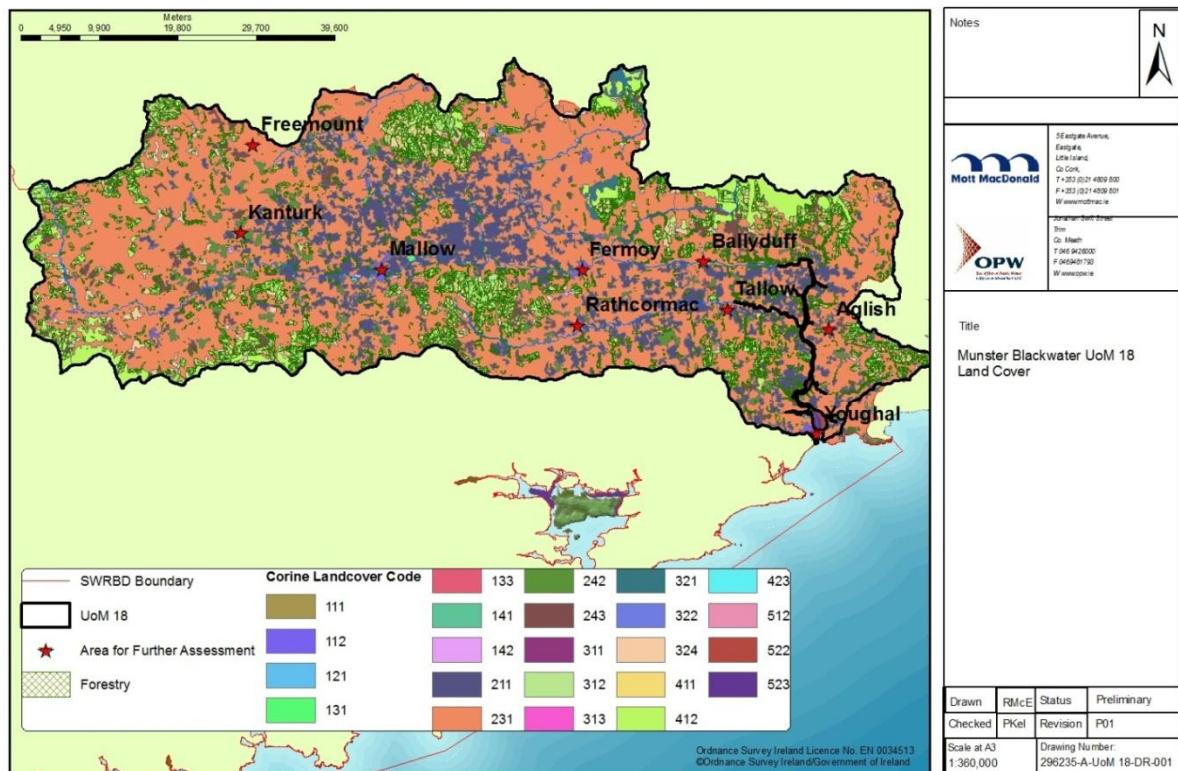
Since 1995 the Forest Service of Ireland has produced spatial datasets detailing the extent of the forest estate in Ireland. There are four distinct ownership categories in the national forest inventory dataset (FIPS): (1) Private Non-Grant Aided which includes forest areas planted prior to 1980, (2) Private Grant Aided which are forest areas which were in receipt of grant aid, (3) Premiums which includes forestry under the Teagasc grant scheme, (4) Public which is forest owned by Coillte and the National Parks and Wildlife Service.

Ireland has one of the lowest forest landcover rates in the EU. Forests provide many environmental related functions, including carbon sequestration, and storage and support of biodiversity in addition to their commercial value. Irelands National Forestry Programme 2014-2020 has identified four key needs for the national forestry sector. These include:

1. Permanently increasing Ireland's forest cover;
2. Increasing and sustaining forest based biomass production to meet the EU Energy targets;
3. Supporting forest holders in actively managing their plantations;
4. Optimising the environmental and social benefits of new and existing forests.

According to the National Forestry Policy Review (2014) annual afforestation has decreased over the past 3 years (2012-2015). The Policy Review sets out annual afforestation targets up to 2046. The appropriate management of forest land is crucial to mitigate environmental impacts, while maintaining their commercial requirements.

Figure 6.5: Land Cover within UoM 18



Source: Corine – free download from <http://gis.epa.ie>.

Forestry – Forestry07 mapping data sourced from the Department of Agriculture, Food and the Marine.

Table 6.5: Corine Codes Relevant to UoM 18

Corine Code	Description
111	Continuous urban fabric
112	Discontinuous urban fabric
121	Industrial and commercial units
131	Mineral extraction sites
133	Construction sites
141	Green urban areas
142	Sport and leisure facilities
211	Non-irrigated arable land
231	Pastures
242	Complex cultivation patterns

Corine Code	Description
243	Land principally occupied by agriculture with significant areas of natural vegetation
311	Broad-leaved forests
312	Coniferous forests
313	Mixed forests
321	Natural grassland
322	Moors and heathlands
324	Transitional woodland scrub
411	Inland marshes
412	Peat bogs
423	Intertidal flats
512	Water bodies
522	Estuaries
523	Sea and ocean

6.3.4 Future Trends in Land Use

6.3.4.1 Agriculture

Flooding can impact on soils through deposition of sediments and pollutants. Flooding may exacerbate erosion leading to loss of fertile topsoil from fields, which can damage a range of soil functions. Flooding can impact on agriculture by damaging livestock and crops, and affecting soil quality. Land cover in UoM 18 is dominated by agricultural pastureland. While it is unlikely that the general pattern of land use within the UoM will be substantially changed in the future, the reform of the EU Common Agricultural Policy (CAP) in June 2013 has the potential to result in changes in farm practices. CAP's main objective is ensuring a decent standard of living for farmers whilst securing the provision of a stable and safe food supply at affordable prices. The CAP has been reformed such that approximately 30% of payments to farmers will be linked to the farmers' compliance with sustainable agricultural practices (such as crop diversification, the maintenance of permanent grassland or the preservation of ecological areas on farms).

Milk quotas were abolished in March 2015 allowing dairy farmers scope to increase milk production. The abolition of the milk quotas has resulted in changes in land use practice and increases in stocking densities. Agriculture in Ireland is a resource-rich and primarily grass-based industry with 81% (3.8 million ha) dedicated to pasture, hay and silage. According to the 2015/2016 data published by the Department Agriculture, beef and dairy production constitute almost 68.0% of total agricultural output. The planned intensification under Food Harvest 2020 and Food Wise 2025 will increase the numbers in the national herds and if the planned intensification is not carried out in a sustainable manner it will place increased pressures on the land and flood risk management.

The EU Soil Thematic Strategy [COM(2006)231] sets out four pillars for the protection of soil in the EU:

- i Awareness raising initiatives;

- i Research projects, particularly in the areas of landslides, soil sealing, soil functions and their link to biodiversity, the soil carbon and nitrogen cycles (with a focus on peatland restoration), soil fertility, and nutrients recycling in agriculture;
- i Soil monitoring for food security and safety, diffuse contamination, and climate change adaptation; and
- i Integration of soil protection in different policies and legislation.

The strategy identifies agriculture as being one of the more detrimental activities to the protection of soil integrity. The Seventh Environment Action Program states that degradation of soil is a serious problem both for member states and globally. It is proposed that by 2020 all land in the EU should be managed sustainably and soils afforded protection, with remediation of contaminated sites also laid out as a priority. Inappropriate or intensive land-use practices can result in erosion, modification of channel geomorphology, or discharge of receiving sediments. Management of land-use practices directly impacts the soils. Pressures on soils include climate change, and land use and land management change (including compaction and soil sealing).

Within Ireland, a Nitrates Action Programme has been prepared in accordance with Article 5 of the Nitrates Directive and is to be applied to the State as a whole. The Waste Management (Use of Sewage Sludge in Agriculture) Amendment Regulations 2001, requires that where sludge is reused in agriculture, Local Authorities ensure that the testing and management of the sludge, is compliant with the requirements of the Regulations, and in particular that a nutrient management plan is used.

6.3.4.2 Energy

European Union policy to tackle climate change sets ambitious targets for the generation of energy from renewable sources. Ireland has outlined a renewable energy strategy⁴ to support the European objectives which sets a target of 40% from renewable resources by 2020. This will be met by 40% from renewable electricity, 12% from renewable heat, and 10% from renewable transport. The European Union (EU) has recently adopted a target for the year 2030 of at least 27% renewable energy. This target is binding at EU level. In Ireland, by 2013, 7.8% of gross final energy use came from renewable sources with renewable electricity accounting for 20.9% of all electricity generated⁵. It is anticipated that there will be significant investment in the development of renewable energy infrastructure in Ireland in the medium to long term.

6.3.5 Geology, Soils, Land Use and Energy Key Issues Relating to Flood Risk Management

Flood management options under consideration in the Flood Risk Management Plans include non-structural options such as planning control and land use management. Publication of the plans may result in the zoning of lands for particular land use practices for the purpose of preventing or protecting against flooding. This may entail the re-zoning of lands currently zoned for alternative purposes. In the absence of FRMP options being implemented, the risk of flooding to the benefiting lands would increase significantly.

⁴ Strategy for Renewable Energy: 2012 – 2020 (Department of Communications, Energy and Natural Resources, May 2012)

⁵ SEAI Energy in Ireland Key Statistics 2014

The flooding of agricultural land could result in damage to the valuable soil resource within the relevant lands, with knock-on effects including loss of production and the associated financial losses and costs. The environmental effects of flooding to soil also include soil erosion, bank erosion and land sliding.

6.4 Architecture, Archaeology and Cultural Heritage

The South Western River Basin District hosts a variety of archaeological and architectural features which are afforded varying levels of protection under national legislation. Such features include:

- i Records of Monuments and Places (RMP) – the National Monuments Service (www.archaeology.ie) holds responsibility for maintaining this inventory of sites of archaeological significance which pre-date the eighteenth Century (including records of those which historically have been destroyed). These sites are established under the National Monuments Acts 1930 to 2004.
- i National Inventory of Architectural Heritage (NIAH) – is a record of sites of architectural heritage importance in Ireland dating from the start of the eighteenth century up to the present day which are established under the Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act, 1999. The National Inventory of Architectural Heritage also maintains an inventory of historic gardens and demesnes.
- i Records of Protected Structures – The Planning and Development Act 2000 requires Local Authorities to compile a “Record of Protected Structures” as part of the County Development Plan. These are structures, or part thereof, which are considered to be of architectural value. Many of these structures also appear on the NIAH list.
- i Architectural Conservation Areas – In accordance with Article 81 of the Planning and Development Act 2000, Local Authority County Development Plans are to identify Architectural Conservation Areas and are to include an objective in the Plan to preserve the character of such areas.
- i Preservation Order sites - available from the Department of Arts, Heritage and the Gaeltacht, are sites protected under the National Monuments Act 1930-2004.

Flooding has the potential to cause physical damage to archaeological and architectural features. The implementation of flood risk management measures can include intentional destruction of features of architectural heritage e.g. destruction of a listed bridge for the purpose of improving the capacity of a waterbody.

The locations of archaeological and architectural features within UoM 18 are presented in Figure 6.6.

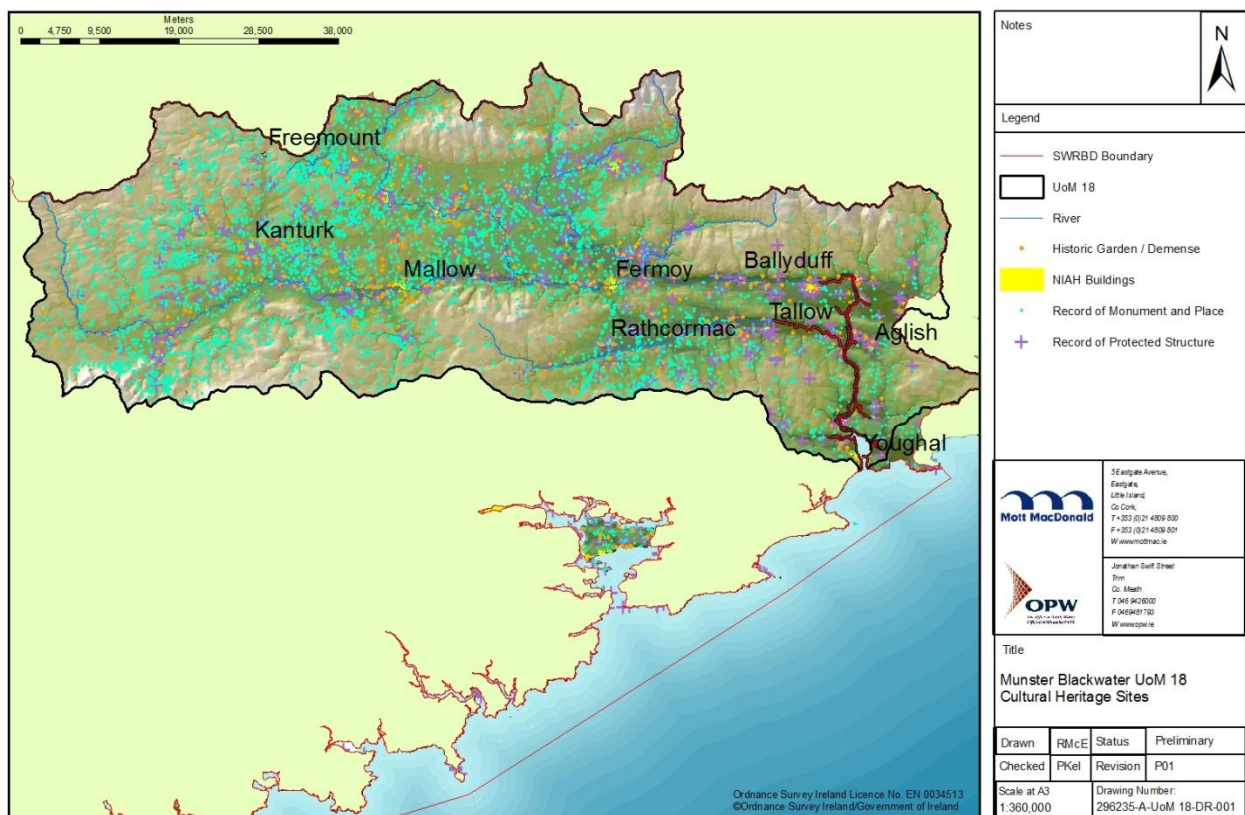
There are approximately 6,920 Records of Monuments and Places (RMP) within UoM 18, almost 230 of which are located within the AFAs of UoM 18. RMP classifications include:

- i Burial grounds;
- i Bridge (including railway bridge);
- i Buildings;
- i Cairn;
- i Canal;
- i Castle;
- i Church;

- | Historic Town;
- | Landscape feature;
- | Earthwork and enclosure;
- | Fluacht Fia;
- | Kiln;
- | Ogham Stone / Standing Stone;
- | Ringfort; and
- | Water Mill.

There are approximately 2,650 listings on the NIAH within this Unit of Management, about 815 of which are located within the AFAs in UoM 18. There are 66 historic gardens and demesnes in UoM 18; 40 of which are located in the AFAs of Mallow, Fermoy, Rathcormac and Youghal and include Mallow Castle and Youghal Community Hospital. There are approximately 680 protected structures in UoM 18, approximately 48 of which are located in the AFAs in UoM 18.

Figure 6.6: Archaeological and Architectural Features of UoM 18



6.4.1 Future Trends in Architecture, Archaeology and Cultural Heritage

Archaeological heritage of the SWRBD also includes unrecorded archaeological features. Future flood risk management projects which may arise as a result of the FRMPs will need to consider potential impacts on unknown archaeological features which may be present. In the absence of FRMP options being implemented, the risk of flooding to the benefiting lands would increase significantly. The risk of flood damage to features of architectural or archaeological heritage located within these lands would therefore also increase.

6.4.2 Architecture, Archaeology and Cultural Heritage - Key Issues in UoM 18

Many RMP sites are associated with watercourses and may potentially be impacted by the implementation of flood risk management measures. There are a number of protected bridge structures on watercourses in the AFAs which may currently act as hydraulic restrictions. Flood risk management measures may include the destruction of these structures. Protected water mills are present on watercourses in the AFAs of Kanturk, Rathcormac and Youghal. Other features, including churches, religious buildings and country houses, are located in close proximity to watercourses and as such may constrain the application of certain flood risk management measures at these locations.

The Underwater Archaeology Unit (UAU) of the National Monuments Service maintains an inventory of shipwrecks recorded in Irish waters. A number of shipwrecks have been recorded both within the bay and off the coast of Youghal. Tidal flood risk management measures may potentially impact upon maritime archaeology.

6.5 Water Resources

Water resources include surface water (rivers, streams, and lakes), groundwater (aquifers and public water sources) transitional waters (estuaries) and coastal waters. The water resources in the SWRBD are managed on a catchment basis in accordance with the South Western River Basin Management Plan 2009-2015, developed under the Water Framework Directive (2000/60/EC). The primary objectives of the Water Framework Directive are to prevent any deterioration in the existing status of waters, to aim to improve the quality of waters which are less than 'good status', to ensure the maintenance of the quality of waters which are currently of 'high status', and to achieve the standards as set out in National and European legislation for areas designated for protection such as drinking waters, bathing waters etc. The South Western River Basin Management Plan sets out specific measures to be implemented on a waterbody catchment basis such that the objectives of the Water Framework Directive are met.

Flood risk management measures interact directly with water resources and must be designed effectively such that processes influencing existing waterbody status are not negatively impacted so as to cause deterioration in waterbody status.

The entire main stem of the Munster Blackwater River is assigned good status under the WFD (refer to Figure 6.7). Freshwater Pearl Mussel populations are known to occur in the watercourse. The Freshwater

Pearl Mussel Blackwater Sub Basin Management Plan provides additional information on Freshwater Pearl Mussel populations in the area.

Activities in the Munster Blackwater catchment which are known to be attributing to the poor water quality include onsite waste water treatment systems (OSWTS) such as septic tanks, landfills and licensed waste facilities, waste water treatment plants, combined sewer overflows (CSOs), agriculture (particularly landspreading and slurry pits), licensed discharges (IPPC/IED and Local Authority) (Refer to Figure 6.8).

There are fifteen landfills and five licensed waste transfer / recovery facilities within UoM 18. Data on the location of known contaminated sites is held by Local Authorities and will be considered during the future stages of this SEA.

There are approximately 36 IPPC/IED facilities, approximately 20 licensed discharges to waters, 61 Waste Water Treatment Plants, and 17 Water Treatment Plants in UoM 18. The CSOs are principally confined to populated areas and are located in the AFAs of Youghal, Mallow and Fermoy.

There is one Seveso site in UoM 18 (Derrymore Agencies Ltd., Quaterstown, Mallow, Co. Cork) identified in accordance with the Control of Major Accident Hazards Involving Dangerous Substances Regulations (the 'COMAH Regulations' or 'Seveso Regulations') which give effect to European Directive 96/82/EC.

One waterbody, Lismore Canal, is classified as an Artificial (man-made) waterbody in UoM 18.

Figure 6.7: Surface Waterbody Status in UoM 18

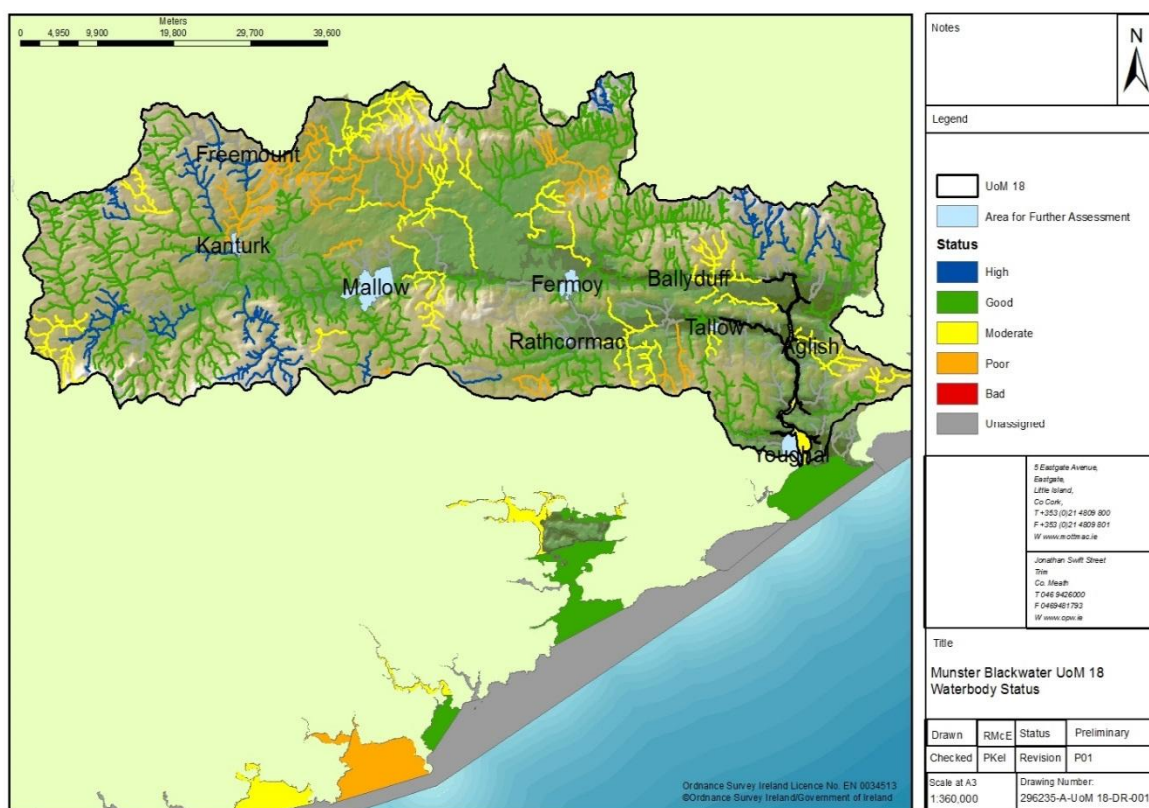
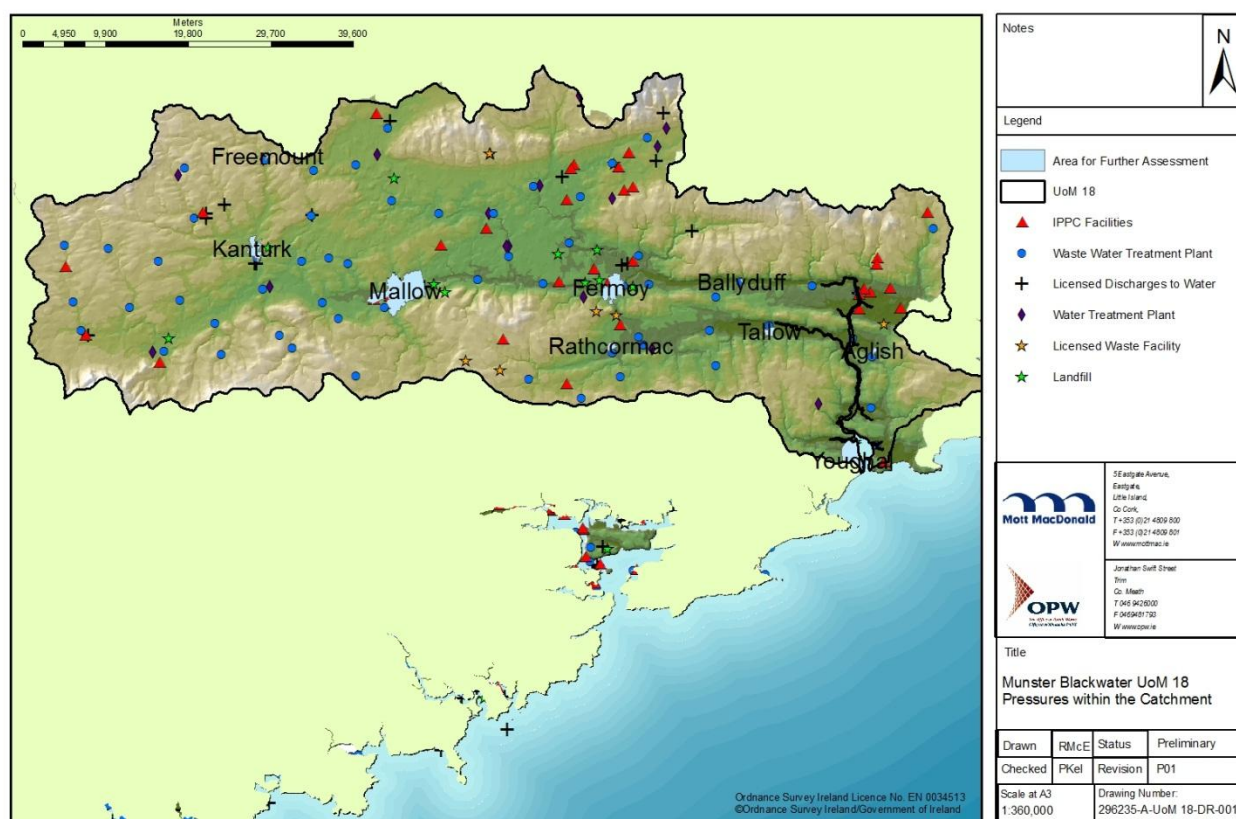


Figure 6.8: Point Pressures in UoM 18



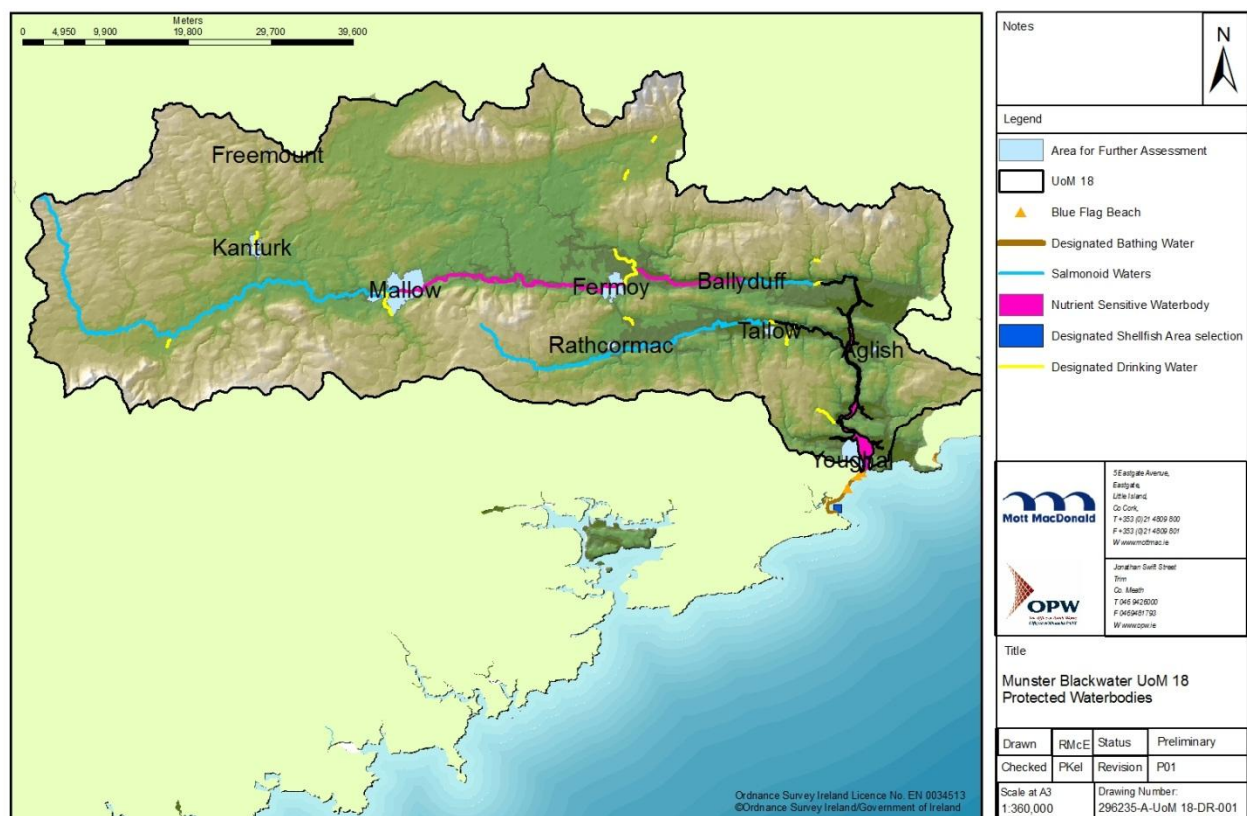
All groundwater in UoM 18 is assigned good status. There are thirteen groundwater source protection areas located within UoM 18, of which only one (Oliver's Cross in Mallow) is within the boundary of an AFA. Aquifer vulnerability in this UoM includes areas of extreme and high vulnerability. Implementation of flood risk management measures could potentially result in contamination of groundwaters in such vulnerable areas.

A number of water resources in UoM 18 have been designated for special protection (refer to Figure 6.9). These include:

- i Nutrient sensitive waters - identified under Urban Waste Water Treatment Regulations, 2001 (as amended), which requires additional treatment of effluent discharges from municipal waste water treatment plants to such waters;
- i Designated shellfish areas - areas designated in accordance with the Shellfish Waters Directive (2006/113/EC) which requires that Member States protect or improve the aquatic habitat of shellfish (bivalve and gastropod molluscs) in order to support shellfish life and growth. Standards and objectives

- for these waters are established under the European Communities (Quality of Shellfish Waters) Regulations 2006 (SI No 268 of 2006) as amended;
- Designated Bathing Waters – identified under the Bathing Water Quality Regulations, 2008 (as amended). Local authorities are responsible for bathing water quality in their functional areas;
- The Blue Flag Scheme is administered in Ireland by An Taisce. It is a voluntary, non-statutory scheme. To gain a Blue Flag, the bathing areas must also comply with certain quality and amenity criteria;
- Waters used for the abstraction of drinking water – designated under the European Communities (Quality of Surface Water Intended for the Abstraction of Drinking Water) Regulations, 1989; and

Figure 6.9: Protected Waterbodies



6.5.1 Future Trends in Water Resources

Ireland is obliged, in accordance with the requirements of the Water Framework Directive to implement measures for the achievement of good status by 2027 (where technically feasible). The implementation of measures under the South Western River Basin District Management Plan 2009-2015 (which includes the enforcement of National and European legislation for the protection of our waters) brought about

improvement in both compliance levels and the impact of urban waste water on water quality. During this period there was progress made with the licensing of urban waste water discharges and associated investment in urban waste water treatment and the implementation of the Nitrates Action Programme (Good Agricultural Practice Regulations). The 2nd cycle River Basin Management Plan is currently in draft and in consultation, and this plan will cover the period 2018-2021 and aims to build on the progress made during the first cycle and also learn from those aspects which did not progress as well as expected. Lessons learnt during the 1st cycle of the Plan, include that multiple RBD is not effective and a national single river Basin Structure is proposed as part of the 2nd cycle of the Plan.

6.5.2 Water Resources - Key Issues in UoM 18

Consideration must be given to how the implementation of flood protection measures could influence the achievement of the objectives of the Water Framework Directive. Flood protection measures can have direct and indirect impacts on a watercourse. Status classification for the purpose of the Water Framework Directive is based on a combination of biological, morphological and chemical assessment of a watercourse. Any activity that affects any of these elements has the potential to jeopardise the achievement of Water Framework Directive objectives. Conversely, flood protection measures can assist in achieving the objectives of the WFD by preventing flooding of point source pressures, which if flooded could result in the deterioration of water quality.

Any proposed future development must be designed and implemented such that it will not result in deterioration in existing waterbody status and will not impede the achievement of the good status by the required timescale. In the absence of FRMP options, the risk of flooding to the benefiting lands would increase significantly. The flooding of water supply infrastructure will result in loss of water supply over large areas, which can magnify the impact of flooding well beyond the immediate community. Flooding can also pose a significant pollution risk to water quality with consequent negative impacts on human health, habitats and flora and fauna.

Development of flood risk management measures in areas of extreme and high groundwater vulnerability and in ground water protection areas has the potential to result in contamination of groundwater resources. Geotechnical engineering of a site can mitigate against potential groundwater pollution. The possibility of employing mitigation rather than circumventing an area can be investigated before a decision is taken to progress flood protection measures.

6.6 Air and Climate

The Air Quality Standards Regulations 2011 (S.I. No. 180/2011) make provisions for the implementation of Directive 2008/50/EC on ambient air quality and cleaner air for Europe. The EPA is the competent authority in Ireland for the implementation of the regulations. The EPA has established zones throughout Ireland for the purpose of air quality assessment and air quality management. The EPA carried out air quality monitoring at 31 monitoring stations around the country in 2015. Four of these are in the SWRBD; Valentia, Cork City Centre, Glashaboy, and Heatherton Park. The EPA's Air quality report (2015) shows air quality in Ireland to be generally good and compares favourably with other EU member states. However,

when we compare our air quality levels to those recommended by the World Health Organisation, the situation is less positive and Ireland face challenges in reducing levels of particulate matter (both PM10 and PM2.5) and ozone to below those recommended by the WHO Air Quality Guidelines.

The Flood Risk Management Plans will not influence air quality, however implementation of flood risk management measures has some potential to impact on air quality during the construction phase (albeit impacts are likely to be localised minor due to exhaust emissions from construction vehicles and dust dispersion). Any flood risk management projects arising from the Flood Risk Management Plans will be subjected to the proper planning controls, including environmental assessment as necessary. Adaptation to climate change is recognised as an important response to climate change. Adaptation to reduce vulnerability to the adverse impacts of climate change have been considered with the development of the FRMP.

6.6.1 Future Trends in Air and Climate

In the long-term air quality is expected to improve as Ireland move closer towards meeting our obligations under the International and national policies and under the Kyoto and Paris Agreements for the reduction in greenhouse gas emissions.

Climate change is predicted to change existing hydrological conditions in the future. The predicted impacts of climate change are likely to include:

- i Increase in rainfall;
- i Increase in river flow;
- i Sea level rise (including land movement);
- i Increase in urbanisation (due to populations displacement); and
- i De-forestation

6.6.2 Air and Climate - Key Issues in UoM 18

The Flood Risk Management Plans consider changes in climate change (on the basis of a 100 year time horizon) and make allowance for predicted impacts.

6.7 Biodiversity, Flora and Fauna

The South Western River Basin District contains a variety of habitats and species of conservation concern which are protected under various European and National legislation. Areas in the SWRBD which have been designated for the protection of habitats and species include the following:

- i Special Areas of Conservation (SACs) - designated in accordance with the Habitats Directive (92/43/EEC) for the conservation of certain habitats and species;
- i Special Protection Areas (SPAs) - designated under the EU Birds Directive (79/409/EEC) for the protection of birds of conservation concern;

- | Natural Heritage Areas (NHAs) and proposed Natural Heritage Areas (pNHAs) - designated under the Wildlife Act as they are considered important habitats which support animals or vegetation of importance;
- | Ramsar Sites - designated under the Convention on Wetlands of International Importance for the protection of wetland areas (which are important feeding habitats for birds);
- | Wildfowl Sanctuaries - areas established under the Wildlife Act, 1976 and excluded from the 'Open Season Order' in which shooting of game birds is permitted;
- | National Parks – established under the International Union for the Conservation of Nature, are areas identified as not materially altered by human exploitation and occupation and where steps have been taken to prevent exploitation or occupation in respect of ecological, geomorphological or aesthetic features;
- | Nature Reserves - identified as being important habitats to support wildlife and are protected under Ministerial Order;
- | Biosphere Reserves – are sites recognized under UNESCO's Man and the Biosphere (MAB) Programme to promote sustainable development; and
- | OSPAR – sites identified under the OSPAR Convention to protect marine environment of the North East Atlantic. Ireland established a number of its SACs as OSPAR MPAs for marine habitats.

Any proposed development within an SAC or SPA must be subjected to Appropriate Assessment to determine whether a plan or project can be implemented without causing damage to the designated area. It is of note that under the Appropriate Assessment process in accordance with the Habitats Directive⁶, where it can be proven that development within a Natura 2000 Site (SAC or SPA) will not have a significant adverse impact on the integrity of the site, such a development may be permitted.

Also present in the SWRBD are Margaritifera sensitive areas. These are waterbody catchments known to support freshwater pearl mussel (*Margaritifera margaritifera*) which are designated under the European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009 (S.I. No 296 of 2009) and which are sensitive to changes in nutrient or sediment loading and to changes in flow dynamics.

The Blackwater River Special Areas of Conservation (site code: 2170) is the principle SAC in UoM 18. A full list of SACs which are fully or partially contained in UoM 18 is presented in Table 6. below. There are no OSPAR marine protected areas or UNESCO Biosphere Reserves in UoM 18.

The Blackwater Estuary (site code: 004028) and the Blackwater Callows (site Code: 004094) Special Protection Areas, designated under the EU Birds Directive (79/409/EEC) for the protection of birds of conservation concern are the more significant SPAs in UoM 18. A full list of SPAs which are fully or partially contained in UoM 18 is presented in Table 6.7 below.

The Blackwater Estuary is also a RAMSAR site. The site includes the estuary, marsh, dry woodlands and reedbeds and supports large numbers of wintering waterbirds and otter. There is one Nature Reserve within

⁶ Council Directive 92/43/EEC

the study area, Kilcolman Bog. There are two wildfowl sanctuaries in UoM 18, Kilcolman Bog and the River Blackwater.

Table 6.6: Special Areas of Conservation in UoM 18

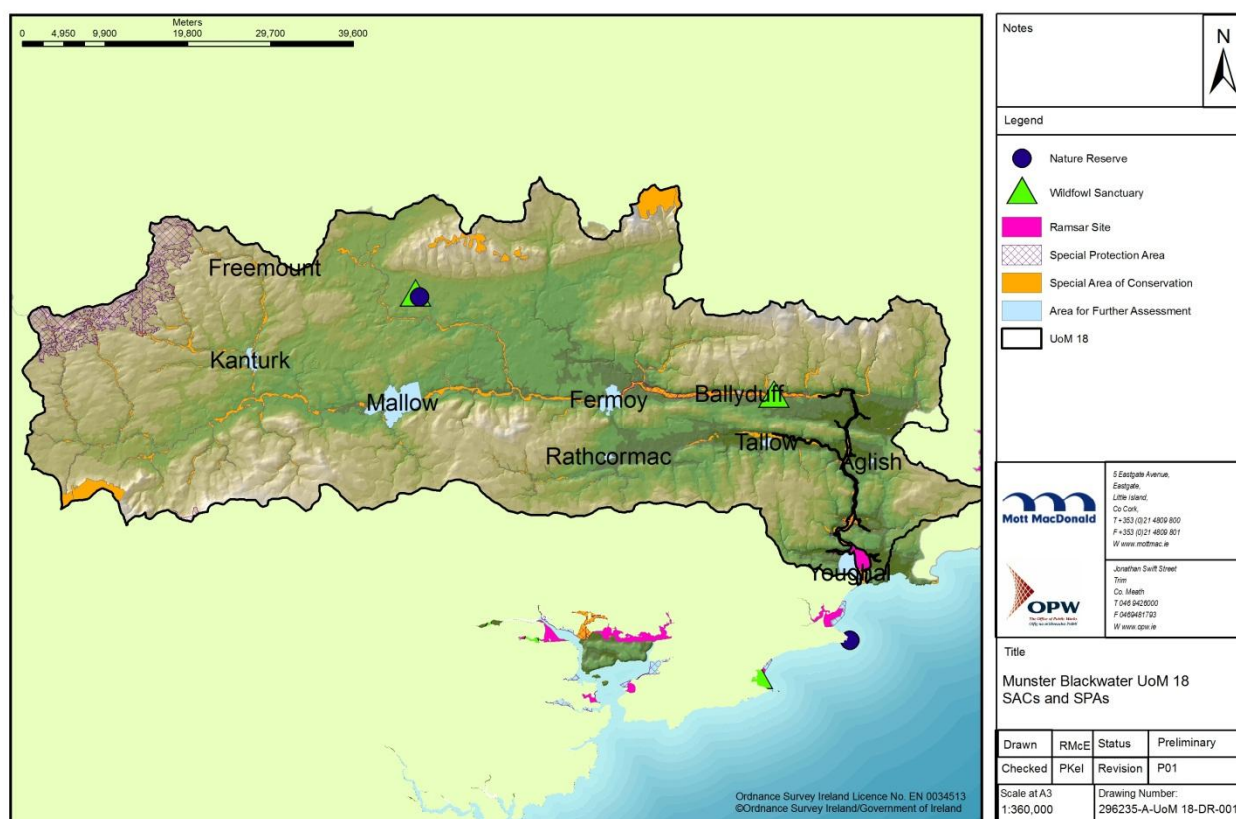
Site Name	Site Code	Qualifying Interests
Ballyhoura Mountains	002036	Ballyhoura Mountains is located on the border between counties Cork and Limerick. The site comprises the unafforested summit ridges within the mountain range extending from Carron Mountain east towards Long and Seefin mountains and including outliers at Coolfree Mountain. This site is designated for the presence of the Annex 1 habitats wet heath, dry heath and active blanket bog. The site provides crucial foraging habitat and potential nesting habitat for the important population of <i>Circus cyaneus</i> that nests in the Ballyhoura mountain range. The site also supports breeding <i>Falco peregrinus</i> .
Carrigeenamronety Hill	002037	Carrigeenamronety Hill is an eastern, lower outlier of the Ballyhoura Mountains. Heath forms the dominant vegetation of the site, especially in the higher sections. Areas of unimproved <i>Molinia</i> grassland and improved grassland are found at lower altitudes. The site is protected due to the presence of <i>Trichomanes speciosum</i> .
Blackwater River (Cork / Waterford)	002170	The River Blackwater is one of the largest rivers in Ireland, draining a major part of Co. Cork and parts of counties. Kerry, Limerick, Tipperary and Waterford. The site consists of most of the freshwater stretches of the system as well as the estuarine component at Youghal. The site supports important examples of a range of Annex I habitats, notably estuaries, intertidal mudflats and sandflats, perennial vegetation of stony banks, salt meadows, floating river vegetation, alluvial forests, yew woodland and oak woodlands. The site important populations of <i>Lampetra planeri</i> , <i>L. fluviatilis</i> , <i>Petromyzon marinus</i> and <i>Alosa fallax fallax</i> . Substantial populations of <i>Margaritifera margaritifera</i> occur, while <i>Austropotamobius pallipes</i> is found in the Awbeg River. <i>Lutra lutra</i> is widespread throughout the site and has been subject to detailed surveys. <i>Trichomanes speciosum</i> occurs at one location. Annex I bird species present in the site include breeding <i>Egretta garzetta</i> , <i>Alcedo atthis</i> and <i>Falco peregrinus</i> and wintering <i>cygnus cygnus</i> and <i>Pluvialis apricaria</i> . A good diversity of other winter waterfowl species also occurs.
Galtee Mountains	000646	This inland mountain range is one of the highest inland mountain ranges in Ireland and reaches a height of 920m. The site supports high level montane blanket bog, alpine heath, dry heath and montane cliffs, as well as Red Data species <i>Cardaminopsis petraea</i> .

Table 6.7: Special Protection Areas in UoM 18

Site Name	Site Code	Qualifying Interests
Blackwater Callows	004094	The site comprises a 23 km stretch of the River Blackwater, running in a west to east direction between Fermoy and Lismore. It includes the river channel and strips of seasonally flooded grassland within the flood plain. The site is of high importance for wintering waterfowl. It supports an internationally important population of <i>Cygnus cygnus</i> and nationally important populations of <i>Anas penelope</i> , <i>Anas crecca</i> and <i>Limosa limosa</i> . The population of <i>Limosa limosa</i> has exceeded the threshold for international importance at times. Formerly it had a regular population of <i>Cygnus columbarius bewickii</i> but this no longer occurs, reflecting a contraction of range at a national level. <i>Egretta garzetta</i> breeds locally and this species is now a regular visitor to the site. The Blackwater system is an important salmonid fishery and is of high conservation value for <i>Salmo salar</i> . It also supports important populations of <i>Lampetra planeri</i> , <i>L.</i>

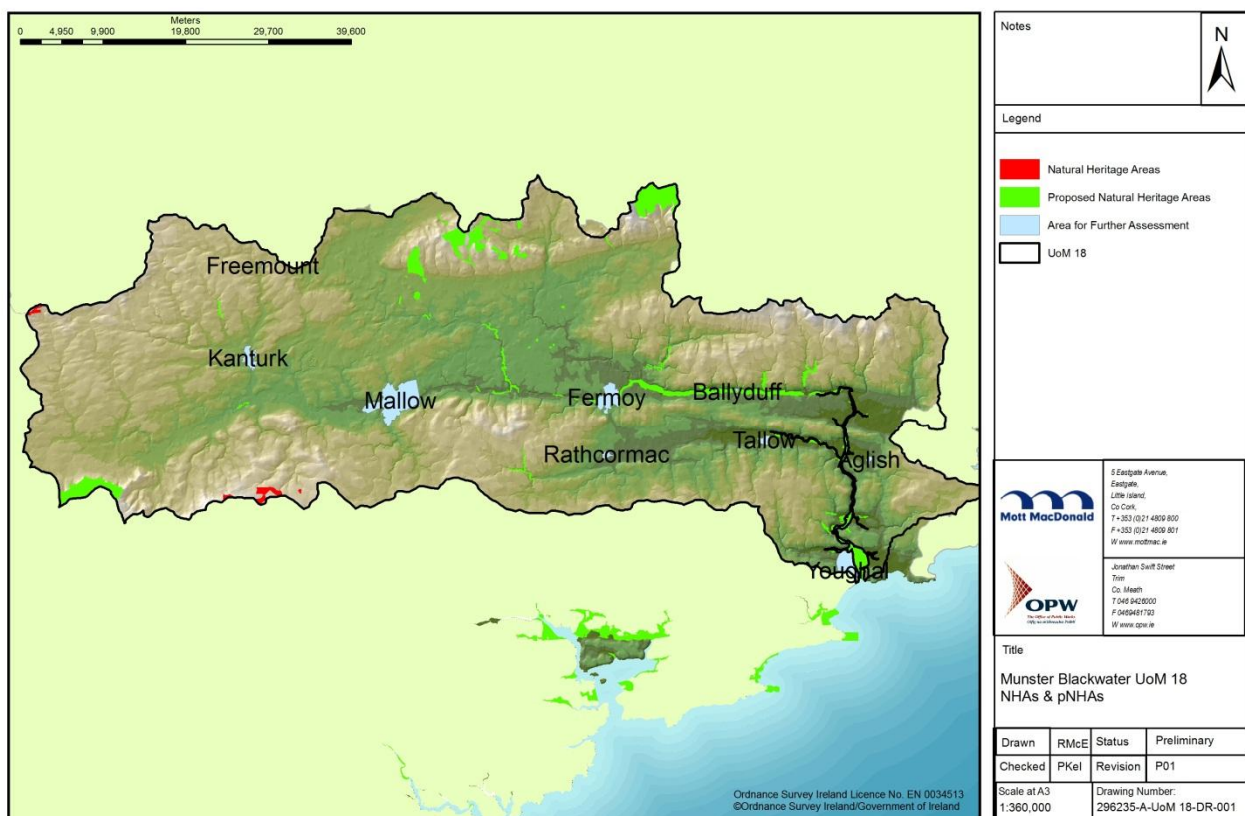
Site Name	Site Code	Qualifying Interests
		fluviatilis, Petromyzon marinus and Alosa fallax fallax. Lutra lutra is widespread throughout the site
Blackwater Estuary	004028	A relatively small, sheltered south-facing estuary, which extends from below Youghal Bridge to the Ferry Point peninsula. At low tide, intertidal flats are exposed. The intertidal sediments are mostly muds or sandy muds. Salt marshes occur along the sheltered inlets. A low-lying field which provides an important roost is included. The Blackwater Estuary is of high ornithological importance for wintering waterfowl, providing good quality feeding areas for a diversity of waterfowl species. At high tide, the birds roost along the shoreline and salt marsh fringe. The site supports an internationally important population of Limosa limosa (over 5% of the national total). It supports a further eight species in numbers of national importance: Tadorna tadorna, Anas penelope, Pluvialis apricaria, Vanellus vanellus, Calidris alpina, Numenius arquata, Tringa tetanus and Tringa nebularia. A population of Limosa lapponica exceeds the threshold for national importance in some winters. Egretta garzetta breeds locally and the Blackwater Estuary is a main feeding area. The site is important for gulls and attracts substantial numbers of Larus fuscus in autumn and winter.
Kilcolman Bog	004095	Kilcolman Bog is situated on the southern foothills of the Ballyhoura Mountains. It occupies a glacially eroded hollow in Carboniferous limestone. The site comprises a quaking fen fed by calcareous groundwater, with areas of reedswamp, freshwater marsh and wet grassland. There is a small permanent lake but in winter a large flooded area is usual. Kilcolman Bog is an important site for wintering waterfowl, with nationally important populations of Cygnus cygnus, Anas crecca and Anas clypeata. The Anas clypeata population is of particular note as it comprises over 6% of the national total. Other species with important populations include Anas penelope, Fulica atra and Vanellus vanellus. The site formerly supported a small population of Anser albifrons flavirostris, but the flock has now abandoned the area. The site is a Nature Reserve and is managed for the benefit of birds.
Stacks to Mullaghareirk Mountains, West Limerick Hillas and Mount Eagle	004161	This a very large, upland site, centred on the borders between the counties of Cork, Kerry and Limerick. Many rivers rise within the site, notably the Blackwater, Feale, Clydagh, Oolagh, and Smerlagh. The site supports 21% of the all-Ireland population of Circus cyaneus, which is the largest concentration in the country for the species. Asio flammeus, a rare breeding bird in Ireland, has nested in the past and has been recorded intermittently in recent years. Falco columbarius has a presence though the size of the population is unknown. Lagopus lagopus, a Red Data Book species, occurs.

Figure 6.10: Special Areas of Conservation and Special Protection Areas in UoM 18



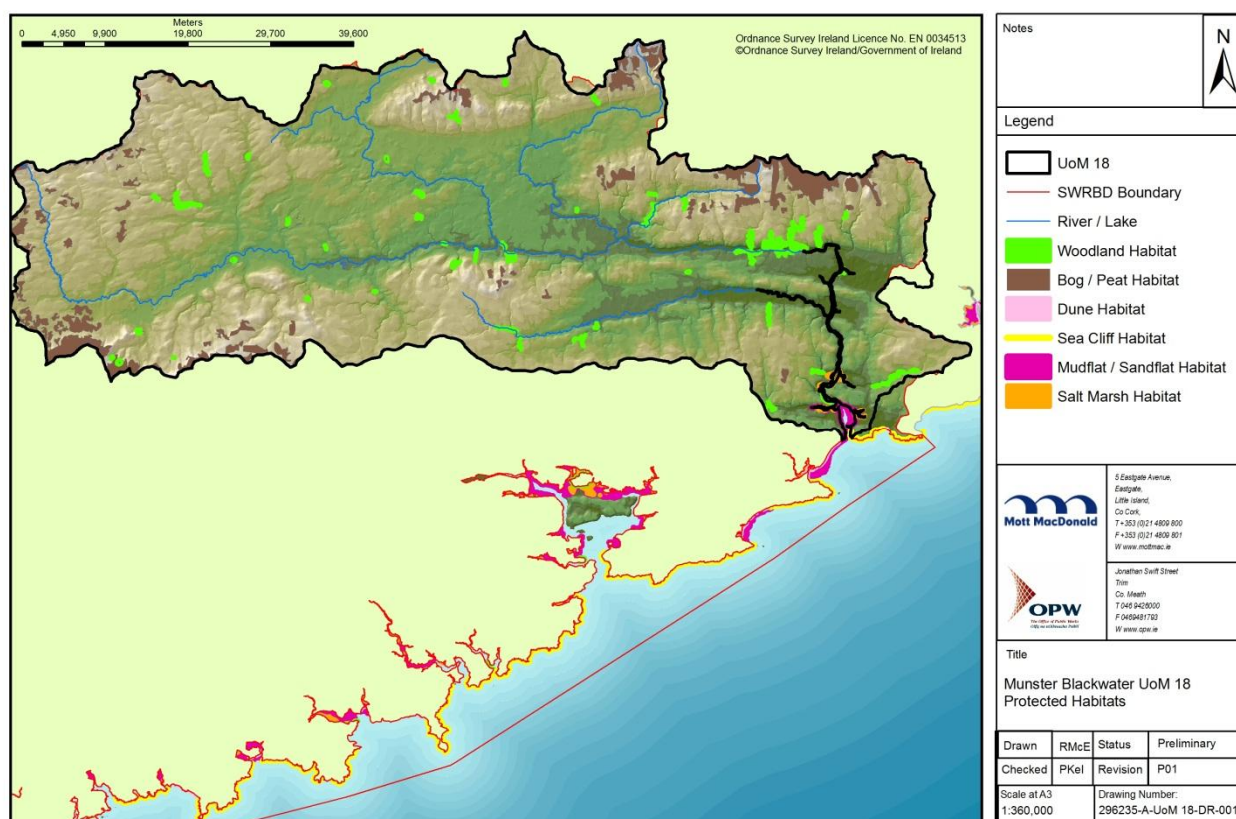
There are two Natural Heritage Areas (NHAs) and approximately 30 proposed Natural Heritage Areas (pNHAs) within the study area which have been designated under the Wildlife Act. These areas are designated as they are considered important habitats which support animals or vegetation of importance. NHAs which have been designated in Ireland are mainly raised or blanket bog habitat. pNHAs are proposed for a variety of habitats in Ireland ranging in size and function, however each is proposed for the protection of plants or animals of importance (refer to Figure 6.11).

Figure 6.11: Natural Heritage Areas and proposed Natural Heritage Areas in UoM 18



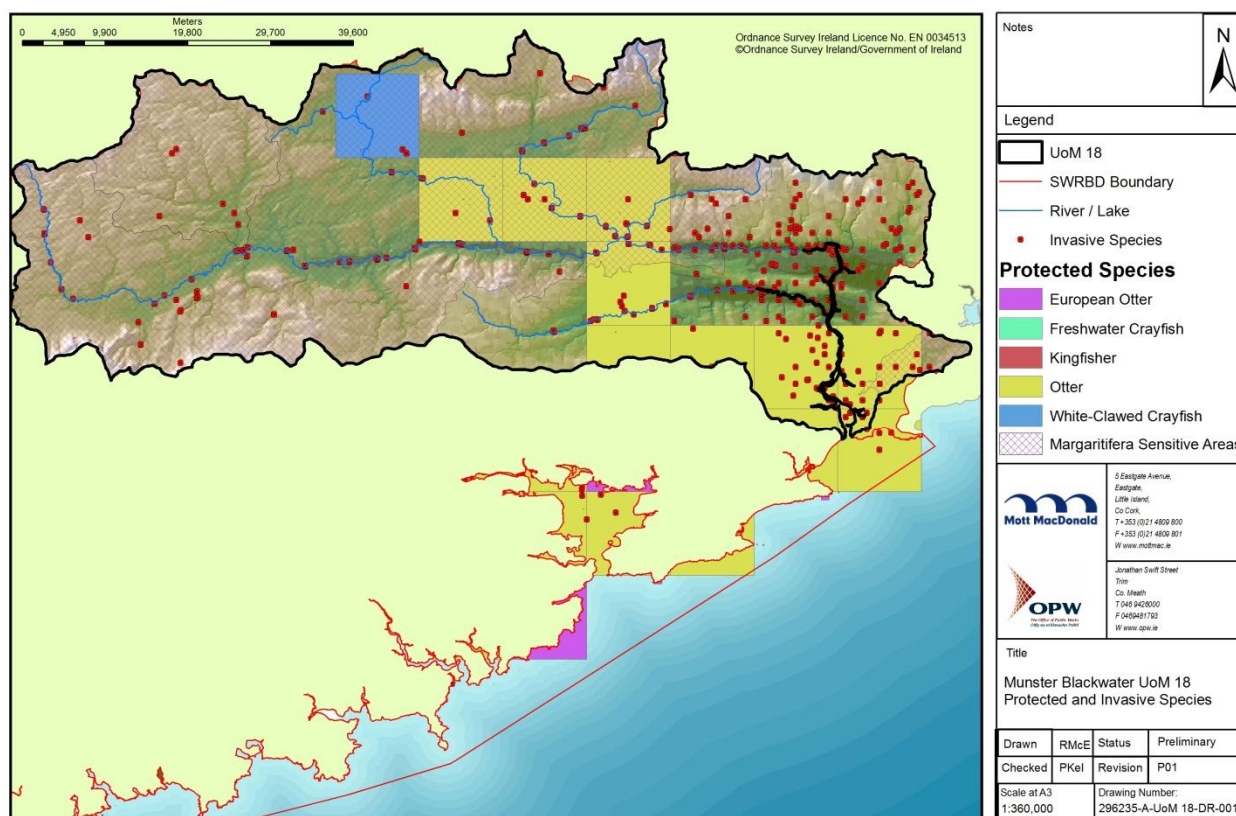
Other ecological features of significance within UoM 18 include broadleaf, mixed and coniferous woodlands, semi natural grasslands, moors and heaths, peat bogs, salt marshes, sea cliffs, and estuaries. Many of these habitats are Annex I habitats and already contained within the boundary of designated SACs (refer to Figure 6.12).

Figure 6.12: Habitats of Conservation Concern



The UoM 18 also hosts a number of protected species, many of which are aquatic species. Of particular note are the freshwater pearl mussel populations in the Blackwater River and its tributaries. Also the Blackwater River and its tributaries have been highlighted by NPWS as being of importance for breeding Kingfisher. Specific impacts to habitats and species of conservation importance will be addressed at options selection stage. Aquatic species of importance which occur in UoM 18 are shown in Figure 6.13. Records of invasive species in UoM 18 are also shown in Figure 6.13, many of which are aquatic and include Canadian pondweed, Giant hogweed, dace, Japanese knotweed, and Waterfern.

Figure 6.13: Species of Conservation Concern and Invasive Species



Source: WWW.NPWS.ie

6.7.1 Future Trends in Biodiversity, Flora and fauna

Changes in farm payments under the Common Agricultural Policy will result in a shift towards more environmentally friendly and sustainable land use practices. This, coupled with the implementation of management plans for the protection of the environment (such as the South Western River Basin Management Plan, NPWS Conservation Management Plans, local authority Biodiversity Action Plans etc.), is likely to result in an overall enhancement in biodiversity. The EIA Directive 2014, introduces the inclusion

of proposed flood risk management schemes in the EIA screening process, the Directive also introduces the need to address, where relevant biodiversity and use of natural resources during construction and operation.

The European Commission published Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment in 2013. Future application of this guidance will improve assessment of impact of a project on biodiversity and ultimately will lead to the protection of biodiversity through appropriate planning and design.

6.7.2 Biodiversity, Flora and Fauna - Key Issues in UoM 18

Many ecological features of significance within UoM 18 are aquatic habitats and species and by the nature of the environment they live in are relatively tolerant to flood events. In fact, flood events can often benefit an ecosystem e.g. through the movement, sorting and deposition of riverine bed material which can create suitable habitat for aquatic species, or through the release of nutrients from sediments due to re-suspension during flooding. Certain habitats have a dependence on flooding e.g. alluvial woodlands, a priority habitat protected under the Habitats Directive, which occurs in areas that are subject to periodic flooding within UoM 18. Flood risk management measures will alter flood regime and can cause a reduction in habitat quality and extent.

The requirement for ecological protection can limit potential options for flood risk management.

Freshwater Pearl Mussel is particularly sensitive to deterioration in water quality, nutrient enrichment and siltation, all of which may potentially occur due to the implementation of flood risk management measures. In addition flood risk management measures can act as barriers to fish migration. The life cycle of freshwater pearl mussel is dependent on the presence of migratory fish.

Implementation of flood risk management measures can also contribute towards the spread of invasive / non-native species if not properly managed.

6.8 Tourism and Recreation

The Munster Blackwater catchment offers a range of tourism and recreation opportunities. The Blackwater Valley is a key feature of UoM 18 in attracting tourists to the area. The Blackwater Valley is identified as a scenic landscape in the Cork County Development Plan and hosts a range of natural coastal and inland landscapes which has associated with it a number of tourist attractions including:

- i Amenity walks- Including a number of Slí na Sláinte walks such as those in Mallow and Youghal and also more extensive walking routes including the Blackwater Way, a 168 kilometre long walking route which follows valley of the River Blackwater and stretches from County Waterford across north Cork and into County Kerry. A number of Greenway projects are currently under consideration;
- i Cycling Routes-These are often coupled with walking routes. One of the more significant routes is the 156km Blackwater Valley Cycle Route which begins in Youghal, County Cork and finishes in Killarney, County Kerry;

- i Golf-There are a number of golf courses within UoM 18 including Youghal Golf Club, Mallow Golf club, and Fermoy Golf Club; and
- i Cork Racecourse Mallow- Draws numerous horse racing enthusiasts annually.

There is one Nature Reserve within the Blackwater catchment: Kilcolman Bog, which is located approximately 4km north-east of Buttevant in County Cork. The bog comprises of an area of fen and open water which attracts a number of wetland and waterbirds including Whooper swan, Teal and Shovler duck. The Bog attracts bird-watchers and walkers.

The rivers and lakes in the Blackwater Catchment are also important tourist attractions. The Blackwater and Bride rivers are recognised for their fishery value and attract hundreds of tourists annually. Anglers from 6 additional nationalities purchased rod licences in 2011 as compared with 2010⁷. A number of boating tour operators also operate within the Blackwater Valley, including Blackwater Cruises which operates from Youghal Jetty, and the Fermoy Amenity Group. Ballyhass Lake, located near Mallow, hosts a trout fishery and also supports water sports.

Blue Flag beaches are also an attraction of the area, including Redbarn, Frontstrand and Claycastle in Youghal.

6.8.1 Future Trends in Tourism and Recreation

People Place & Policy - Growing Tourism to 2025 identifies the Government position to grow tourism to up to 10 million overseas tourists by 2025. Tourism agencies in Ireland (Tourism Ireland and Fáilte Ireland) have developed a range of plans and policies to deliver on the objectives of the Tourism Development Programme including the development of the Wild Atlantic Way. Investment is also evident at a local level through the development of greenways (amenity walks and cycle routes) by Local Authorities.

6.8.2 Tourism and Recreation - Key Issues in UoM 18

Many of the tourist attractions of the Munster Blackwater Catchment are centred on the Blackwater River Valley. Flood risk management options can intrude upon scenic landscapes and can result in amenity walks having to be diverted thereby reducing the quality of the tourist attractions. Conversely flood risk management options can be used as an opportunity to enhance tourist attractions e.g. through the use of glass flood walls thereby increasing views of our rivers and coastal areas.

6.9 Fisheries, Aquaculture and Angling

The responsibility of monitoring fish for the purpose of assigning waterbody status in accordance with the Water Framework Directive has been assigned to Inland Fisheries Ireland. Monitoring for the South Western River Basin District showed good abundance and distribution of indicator species including Brown Trout and Salmon (in freshwater), and European Eel, Pollock, and Sea Bass (in transitional waters).

⁷ 2011 Annual Report for Inland Fisheries Ireland (IFI)

Reports produced by Inland Fishery Ireland on fish stock sampling conducted for the WFD waterbody status classification show that waterbodies in UoM 18 support fish species indicative of moderate environmental quality.

The River Blackwater and the River Bride are recognised as important rivers to support brown trout and salmon species. In 2015, 1,564 salmon were caught in the Blackwater River. This represents 20.3% of the commercial catch⁸.

There are no areas designated in accordance with the Shellfish Waters Directive (2006/113/EC) in UoM 18. The nearest designated shellfish area is Ballymacoda Bay, which is in UoM 19.

There are several aquaculture sites administered through the Aquaculture and Foreshore Management Division of the Department of Agriculture, Food and the Marine within / in close proximity to UoM 18. Five are shellfish licensed sites for the Ballymacoda area, one is a finfish licensed site at Lickey Bridge in Clashmore, and one is a shellfish licensed site in Youghal, one finfish licence in Kilworth, and one finfish licence on the Araglin.

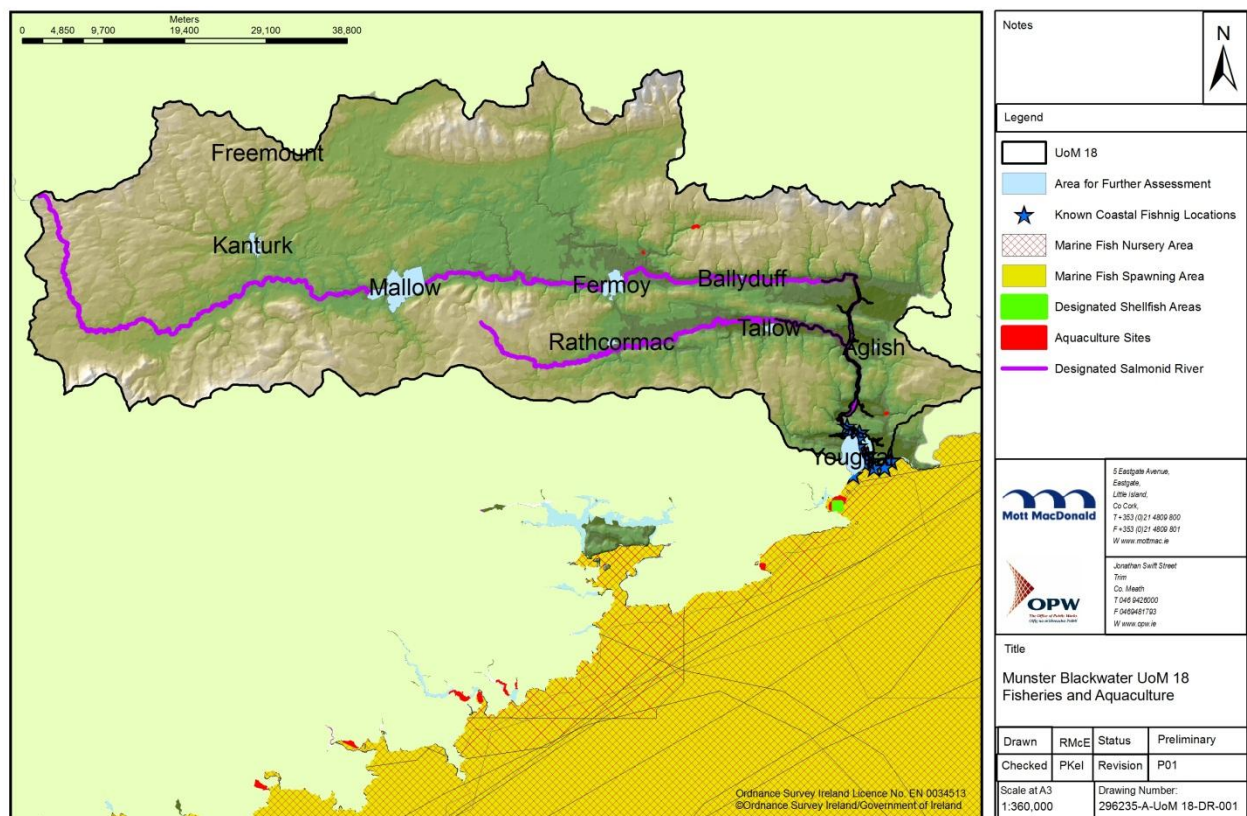
The coastal habitat in proximity to UoM 18 hosts significant nursery and spawning habitat for a number of marine fish species including cod, haddock, hake, mackerel and whiting. Much of Youghal Bay is used as a land-based vantage point for marine fishing for the above species.

IFI has developed a series of angling guides for Ireland which include on-shore angling vantage points in the Blackwater Catchment.

Flood risk management will need to consider the impact upon fish habitat, migratory routes and Aquaculture in close proximity to watercourses.

⁸ 2015 Annual Report for Inland Fisheries Ireland (IFI)

Figure 6.14: Fisheries and Aquaculture in UoM 18



6.9.1 Future Trends in Fisheries, Aquaculture and Angling

Monitoring operations conducted by Inland Fisheries Ireland will generate data which will allow the targeted implementation of measures for the better management of fish stocks.

There are on-going programmes for the protection and management of fisheries (for example the eel management programme and the Salmon Conservation Limit (CL) Attainment Project) which will continue to operate and to contribute towards the enhancement of fisheries in Ireland.

An Environmental Rivers Enhancement Programme (EREP) for the Blackwater Main Channel is currently being implemented by the Kilbride Angling Club through funding allocated by IFI. This programme includes river bank protection, fish passage improvements, spawning enhancement, in-stream structures, fencing and riparian zone improvement. These measures will enhance the environment in support of fisheries.

6.9.2 Fisheries, Aquaculture and Angling - Key Issues in UoM 18

The IFI smelt monitoring programme conducted monitoring in the River Blackwater. No juvenile smelt were recorded. There may be a future need for intervention for the protection of smelt in the Blackwater. Flood risk management measures should give consideration to the protection and enhancement of fishery habitat and should have regard to any fishery management programmes. Fish migration also needs to be considered in the identification of flood risk management options. Consideration should be given to the enhancement and preservation of commercial and tourism fishery facilities. Implementation of flood risk management measures can contribute towards the spread of invasive species e.g. Dace, if not properly managed.

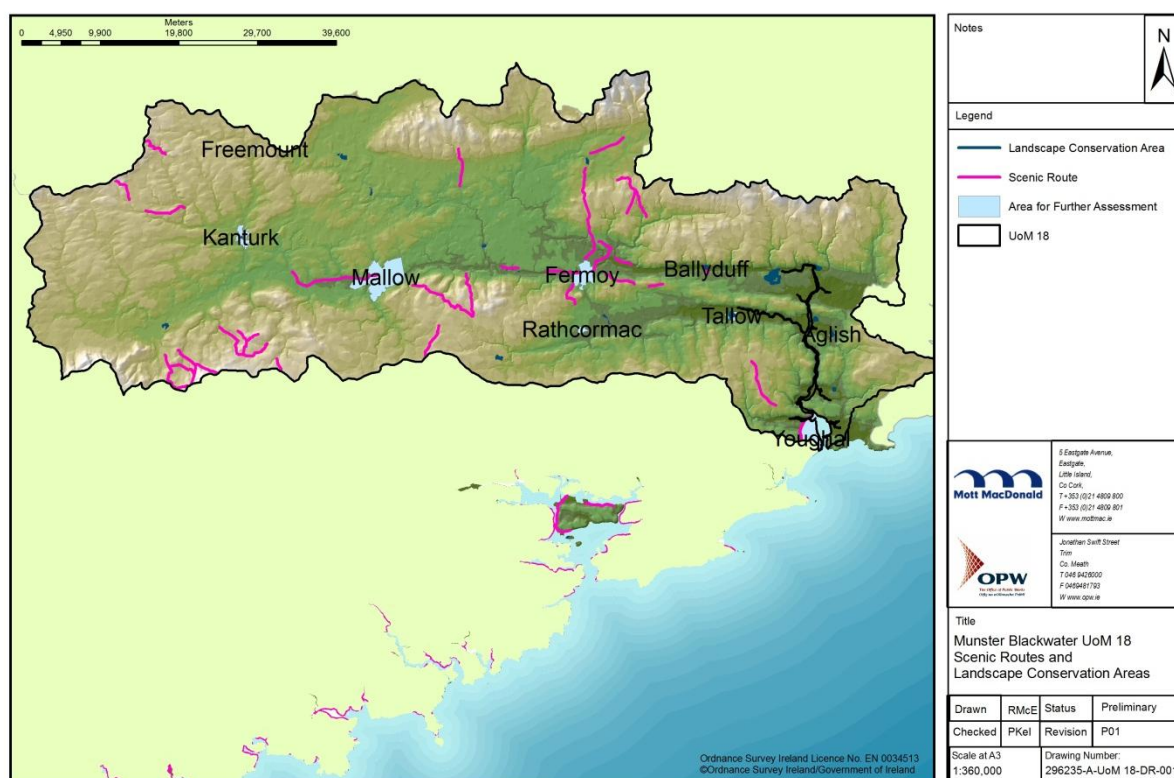
6.10 Landscape and Visual Amenity

There is no national database of landscape areas in Ireland. Sensitive areas of landscape are identified at Local Authority level through City / County Development Plans. Landscape Character Assessments are produced by Local Authorities as part of their development plans which identify areas of high, moderate and low sensitivity within the county. Local Authority approach to identifying sensitive landscape areas is based on Department of the Environment guidance on landscape and landscape assessment. The determination of landscape sensitivity takes the initial approach of identifying landscape character (based on landform / land cover and visual distinctiveness e.g. river valleys and water corridors, upland areas etc.). Following this landscape value is assigned (historical, cultural, religious, ecological), and finally landscape sensitivity is determined (a measure of the ability of the landscape to accommodate change without suffering unacceptable effects to its character and values).

The Planning and Development Act, 2000 requires that planning authorities shall set out in their County Development Plans objectives for the preservation of the character of the landscape including the preservation of views and prospects and the amenities of places and features of natural beauty or interest within their functional area. Many of the scenic routes and views in UoM 18 are along national, regional and local roads while others are along river valleys or coastal areas.

Article 204 of the Planning and Development Act, 2000 prescribed that a planning authority may designate an area or place as a landscape conservation area for the purposes of the preservation of the landscape. Development in such areas may be subject to conditions for the protection of the landscape. There are 26 landscape conservation areas in UoM 18.

Figure 6.15: Scenic Routes and Landscape Conservation Areas in UoM 18



6.10.1 Future Trends in Landscape and Visual Amenity

The existing landscape is not expected to change significantly in the immediate future, however if population targets under the National Spatial Strategy are reached, urban expansion is likely to place localised pressure on the landscape. County Development Plans identify objectives and strategies for landscape protection which aim to restrict away from areas of significant beauty or interest.

In 2010, the Heritage Council published 'Proposals for Ireland's Landscapes 2010' to promote the implementation of the European Landscape Convention (2000) which came into force in Ireland on 1st March 2004. Following this, in September 2011, the Department of Arts, Heritage and the Gaeltacht published a consultation paper on 'A National Landscape Strategy for Ireland' which aims towards the management of Ireland's landscape through improved land-use planning assisted by greater definition of baseline landscape character. Local Authorities have produced (or are in the process of producing), as part of their County Development Plans, Landscape Character Assessment (LCA) reports which identify the types of landscapes within their functional area and their sensitivity to change. Land-use planning is likely

to provide greater protection of landscape character going forward as they will be based on the more robust baseline assessment of landscape through the LCAs.

6.10.2 Landscape and Visual Amenity - Key Issues in UoM 18

Many amenity walks, scenic routes and views are along river valleys or coastal areas i.e. at locations where flood risk management measures may be implemented. Flood protection measures can intrude upon views and prospects.

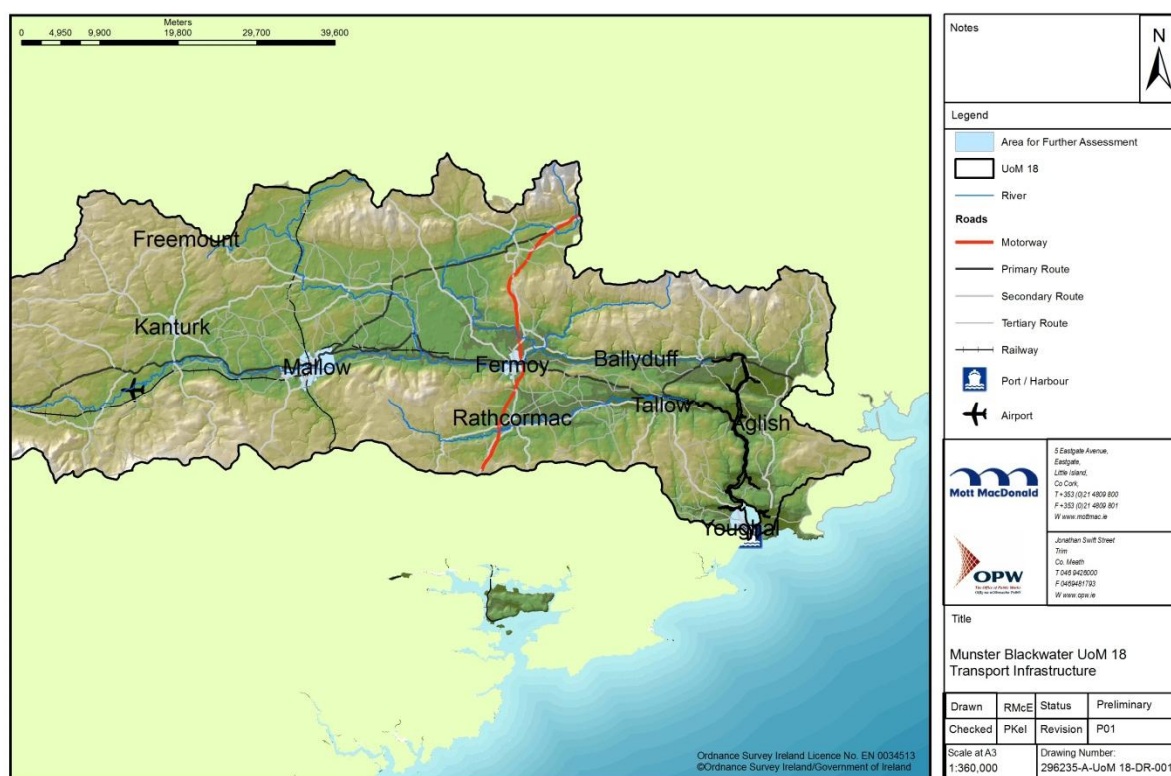
The application of flood risk management measures in landscape conservation areas may be constrained for the purposes of the preservation of the landscape.

Flooding can be a formative feature of a landscape's character. Flood risk management options need to be sympathetic towards landscape character and opportunities to enhance landscape character should be explored.

6.11 Infrastructure and Material Assets

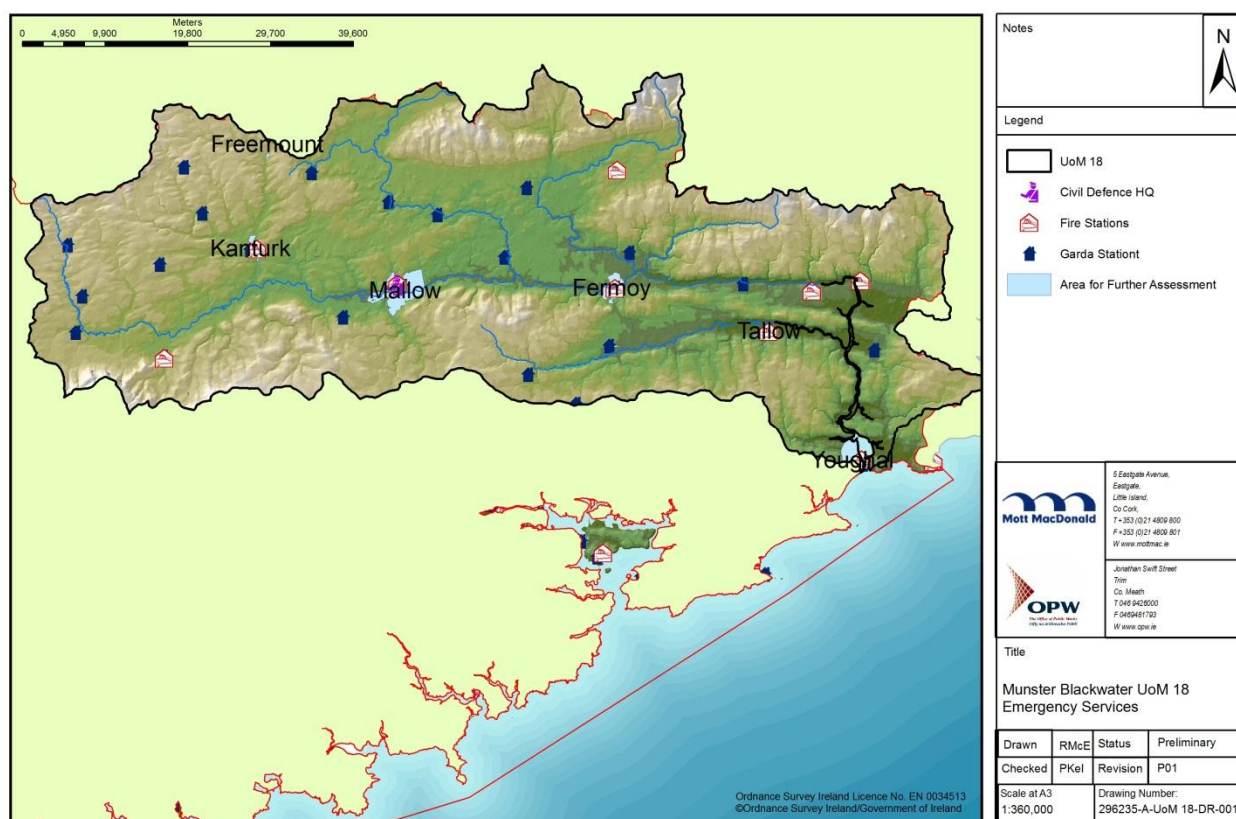
The UoM18 is relatively well serviced by transport infrastructure. The major road infrastructure in the area comprises the M8 Cork to Dublin Motorway and the N72 Mallow to Fermoy and the N73 Mallow to Mitchelstown National Primary Routes. The Cork to Mallow and the Killarney to Mallow railway lines transect this Unit of Management. Much of the road and rail infrastructure is located close to and along river networks in UoM 18 and are susceptible to flooding. Rathcoole Airfield, operated by the Rathcoole Flying Club, is located approximately 22km west of Mallow. Youghal Harbour is located on the estuary to the River Blackwater. Flooding of the transport infrastructure has the potential to cause disruption to movements of residents and commuters which could have a short-term impact on the local economy.

Figure 6.16: Key Transport infrastructure in UoM 18



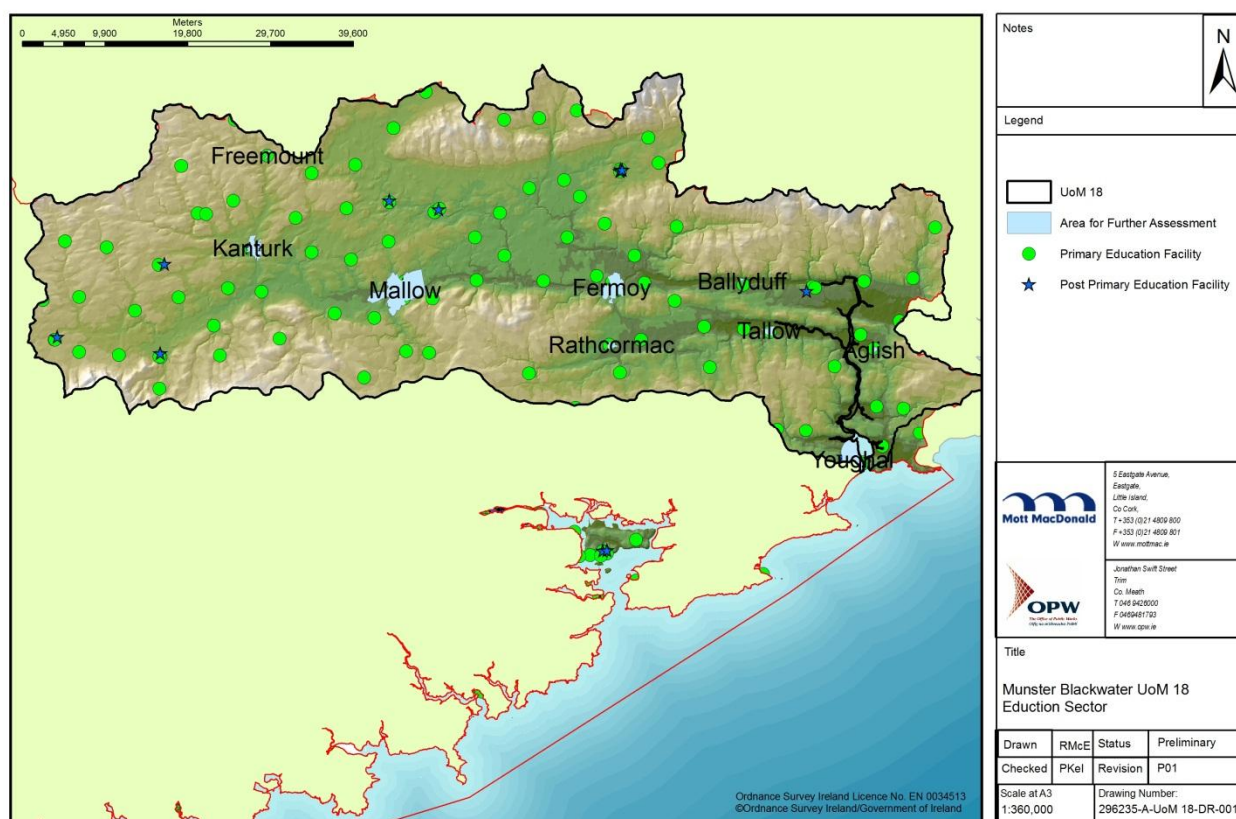
There are a number of Fire Stations and approximately 28 Garda Stations in this UoM. There is also one Civil Defence headquarters located in Mallow. The efficient delivery of emergency services is dependent on clear access to those requiring the service. Flooding of the road network can impede delivery of these services.

Figure 6.17: Emergency Services in UoM 18



Education facilities within the region are dominated by primary schools, with approximately 100 present in UoM 18. Secondary facilities are far less abundant, approximately 20 post-primary facilities. There are no third level facilities in the UoM.

Figure 6.18: Education Facilities in UoM 18



There are in excess of 10 wind farms currently operational within Unit of Management 18, each serviced by electricity transmission infrastructure including transmission lines and substations. Flooding can cause damage to such infrastructure.

6.11.1 Future Trends in Infrastructure and Material Assets

Population figures for Ireland are trending upwards and our National Spatial Strategy has set a 2022 target for the South West of 795,000. It will be necessary to invest in infrastructure in order to support this population growth. There is likely to be continued investment in renewable energy in Ireland in order to meet climate change targets.

6.11.2 Infrastructure and Material Assets - Key Issues in UoM 18

Future development can alter land drainage run-off characteristics and can result in related changes in river hydrology and therefore flooding. Flooding can cause significant damage to properties and property content, utilities, transport, and community infrastructure. In rural areas, the disruption can be particularly severe where alternative infrastructure may be rare or absent. Measures set out in the development of the FRMP to manage flood risk can produce positive impacts for material assets, through protecting existing assets and lessening the resource use that would otherwise be needed to repair and replace these assets if they were damaged by flooding.

6.12 Interrelationships

This Chapter has presented details of environmental features separately in terms of each environmental topic. However, it is also important to recognise that there are a number of inter-relationships between topics, which means that, for example, changes to one environmental feature has direct or indirect effects on other features. In carrying out the assessment these important direct and indirect relationships have been taken into account fully to ensure a robust and complete assessment. Figure below highlights the key interrelationships identified in this SEA. The potential interrelationships have been taken into account in the assessment of the FRMP options for each AFA.

Figure 6.19 Interrelationship between topics

Environmental Topic	Population and Human Health	Geology, Soils and land-use	Architecture, Archaeology and Cultural Heritage	Water Resources	Air and Climate	Biodiversity, Flora and Fauna	Tourism and Recreation	Fisheries, Aquaculture and Angling	Landscape and Visual	Infrastructure and Material Assets
Population and Human Health		√	x	√	√	√	√	√	√	√
Geology, Soils and land-use	√		√	√	√	√	√	√	√	√
Architecture, Archaeology and Cultural Heritage	x	√		√	x	√	√	√	√	√
Water Resources	√	√	√		√	√	√	√	√	√
Air and Climate	√	√	x	√		√	√	√	√	x
Biodiversity, Flora and Fauna	√	√	√	√	√		√	√	√	√
Tourism and Recreation	√	√	√	√	√	√		√	√	√
Fisheries, Aquaculture and Angling	√	√	√	√	√	√	√		x	√
Landscape and Visual	√	√	√	√	√	√	√	x		√
Infrastructure and Material Assets	√	√	x	√	x	√	√	√	√	

7 Strategic Environmental Objectives

7.1 Introduction

A key element of the scoping process is the development of a set of SEA Objectives, Sub-Objectives, indicators and targets. These form the basis on which the environmental impact of the proposed plan measures can be assessed. The SEA Objectives are developed based on an understanding of the receiving environment in terms of spatial scale, sensitivity and existing problems. They are intended to be used as a yardstick to measure the potential for the plan measures to impact the receiving environment positively or negatively. It is important that the Strategic environmental objectives are developed to allow for the identification of opportunities as well as problems arising from the plan measures.

These objectives, sub-objectives and indicators will also perform a role in monitoring of the effectiveness of the flood risk management measures as part of a monitoring programme to inform future reviews and revisions to the Flood Risk Management Plans.

7.2 Development of SEA Objectives, Sub-Objectives and Indicators

An initial revision of the SEA objectives was developed during the scoping process, based on an understanding of the environmental issues, constraints and opportunities within the study area.

The SEA objectives were divided into more specific sub-objectives to allow for a more refined analysis of potential impacts on the receiving environment. For each objectives and sub-objectives, indicators and targets (Basic requirements and Aspirational targets) were developed allowing for better quantification of the potential impacts arising from the plan measures.

Two levels of targets have been developed each objective and sub-objective:

- i Basic Requirement: The first target sets the minimum requirement that needs to be met for an option to be acceptable; or at least, could be acceptable through the implementation of appropriate mitigation strategies to offset any potential adverse effects.
- i Aspirational Target: The second, more demanding and environmentally beneficial, aspirational target does not need to be met for the acceptance of options; although options meeting these higher targets will achieve a higher score and are likely to be favoured.

7.3 SEA Objectives, Sub-Objectives Indicators and Targets

SEA objectives, sub-objectives, indicators and targets have been developed for each of the social and environmental criteria during the scoping phase of the project and are listed in Table 7.1. It should be noted that the strategic environmental objectives were integrated into a multi-criteria analysis (MCA) of the flood risk management options in order to identify the preferred and most appropriate options.

Table 7.1: SEA Objectives, Sub-Objectives Indicators and Targets

Objective	Sub-Objective	Indicator	Basic Requirement	Aspirational Target
Minimise risk to human health and life	Minimise risk to human health and life of residents	Annual Average number of residential properties at risk from flooding	Number of residential properties at risk from flooding does not increase	Reduce the number of residential properties at risk from flooding to 0
	Minimise risk to high vulnerability properties	Number of high vulnerability properties at risk from flooding	Do not increase number of high vulnerability properties at risk from flooding	Reduce the number of high vulnerability properties at risk from flooding to 0
Minimise risk to community	Minimise risk to social infrastructure and amenity	Number of social infrastructure receptors at risk from flooding	Do not increase number of social infrastructure receptors at risk from flooding	Reduce the number of social infrastructure receptors at risk from flooding to 0
	Minimise risk to local employment	Number of enterprises at risk from flooding	Do not increase number of enterprises at risk from flooding	Reduce the number of enterprises at risk from flooding to 0
Support the objectives of the WFD	Provide no impediment to the achievement of water body objectives and, if possible, contribute to the achievement of water body objectives.	Ecological status of water bodies	Provide no constraint to the achievement of water body objectives	Contribute to the achievement of water body objectives
Support the objectives of the Habitats and Birds Directives	Avoid detrimental effects to, and where possible enhance, Natura 2000 network, protected species and their key habitats, recognising relevant landscape features and stepping stones.	Area of site at risk from flooding and qualitative Assessment of impact of option on habitat	No deterioration in the conservation status of designated sites as a result of flood risk management measures	Improvement in the conservation status of designated sites as a result of flood risk management measures
Avoid damage to, and where possible enhance, the flora and fauna of the catchment	Avoid damage to and where possible enhance the flora and fauna of the catchment	Avoid damage to and where possible enhance, legally protected sites / habitats and other sites / habitats of national regional and local nature conservation importance	No deterioration on condition of existing sites due to implementation of option	Creation of new or improved condition of existing sites due to implementation of option
Protect, and where possible enhance, fisheries resource within the catchment	Maintain existing, and where possible create new, fisheries habitat including the maintenance or improvement of	Area of suitable habitat supporting fish. Number of upstream barriers	No loss of integrity of fisheries habitat. Maintenance of upstream accessibility	No loss of fishery habitat. Improvement of habitat quality / quantity. Enhanced upstream accessibility

Objective	Sub-Objective	Indicator	Basic Requirement	Aspirational Target
	conditions that allow upstream migration for fish species.			
Protect, and where possible enhance, landscape character and visual amenity within the river corridor	Protect, and where possible enhance, visual amenity, landscape protection zones and views into / from designated scenic areas within the river corridor.	Changes to reported conservation status of designated sites relating to flood risk management Extent of affected Natura 2000 site, NHA/pNHA or other affected National or International designations (e.g. Nature reserves and Ramsar sites), i.e. Area of re	1. No significant impact on landscape designation (protected site, scenic route/amenity, natural landscape form) within zone of visibility of measures 2. No significant change in the quality of existing landscape characteristics of the receiving environment	1. No change to the existing landscape form. 2. Enhancement of existing landscape or landscape feature
Avoid damage to or loss of features, institutions and collections of cultural heritage importance and their setting	Avoid damage to or loss of features, institutions and collections of architectural value and their setting and improve their protection from extreme floods.	a) The number of architectural features, institutions and collections subject to flooding. b) The impact of flood risk management measures on architectural features, institutions and collections.	a) No increase in risk to architectural features, institutions and collections at risk from flooding. b) No detrimental impacts from flood risk management measures on architectural features, institutions and collections.	a) Complete removal of all relevant architectural features, institutions and collections from the risk of harm by extreme floods. b) Enhanced protection and value of architectural features, institutions and collections importance arising from the implementation of the selected measures.
	Avoid damage to or loss of features, institutions and collections of archaeological value and their setting and improve their protection from extreme floods where this is beneficial.	a) The number of archaeological features, institutions and collections subject to flooding. b) The impact of flood risk management measures on archaeological features, institutions and collections.	a) No increase in risk to archaeological features, institutions and collections at risk from flooding. b) No detrimental impacts from flood risk management measures on archaeological features, institutions and collections.	a) Complete removal of all relevant archaeological features, institutions and collections from the risk of harm by extreme floods. b) Enhanced protection and value of archaeological features, institutions and collections importance arising from the implementation of the selected measures.

7.4 Analysis utilising the Strategic Environmental Objectives

SEA analysis was undertaken to assess alternatives and preferred plan measures utilising the SEA Objectives, sub objectives and the associated indicators and targets. The analysis was undertaken as part of a Multi-criteria analysis (MCA) which included environmental, social, technical and financial objectives for the projects. The analysis was undertaken in line with the National CFRAM Programme Guidance Note No. 28.

8 Assessment of Alternatives

8.1 Introduction

The development of the FRMP for UoM 18 included the analysis of a range of flood risk management options within the Unit of Management. These potential options provide realistic alternatives to the preferred options recommended at an AFA scale. Each of these alternatives were assessed by way of a multi-criteria analysis to identify the preferred flood risk management option. A summary of the assessed options for each AFA are presented in this chapter. All the details of the assessment of alternatives have been presented in the SEA Options Appraisal Report for UoM 18.

The Office of Public Works has published a Guidance Note under the National CFRAM Programme called *Option Appraisal and Multi-Criteria Analysis Framework (Revision C, April 2015)*. Appendix B to this guidance note includes a detailed description of each of the environmental objectives and the methodology for the environmental evaluation of the flood risk management options.

8.2 Flood Risk Management Measures

Flood risk measures proposed for UoM 18 include non-structural measures and structural measures at an AFA scale. It should be noted that non-structural flood management measures will be implemented to some degree in all AFAs and so the alternatives assessment is relevant to structural measures only. Structural measures for flood risk management can include one or a combination of some of the following;

Table 8.1: Structural Measures

Measure	Description
Flood Storage	Measures could include provision of flood storage/retardation system
Flow Diversion	This could include full diversion of provision of a by-pass channel/flood relief channel
Increased Conveyance	Measures could include in-channel works, floodplain earthworks, removal of constraints/constrictions or channel floodplain clearance.
Flood Defences	Flood defences can include such measures as walls, embankments or demountable defences
Improve Existing Defences	Existing defences could be repaired or gaps infilled.
Relocation of Properties	Existing properties could be relocated outside areas of flood risk
Localised Protection Works	This could involve such actions as minor raising of existing flood defences.

8.3 Kanturk

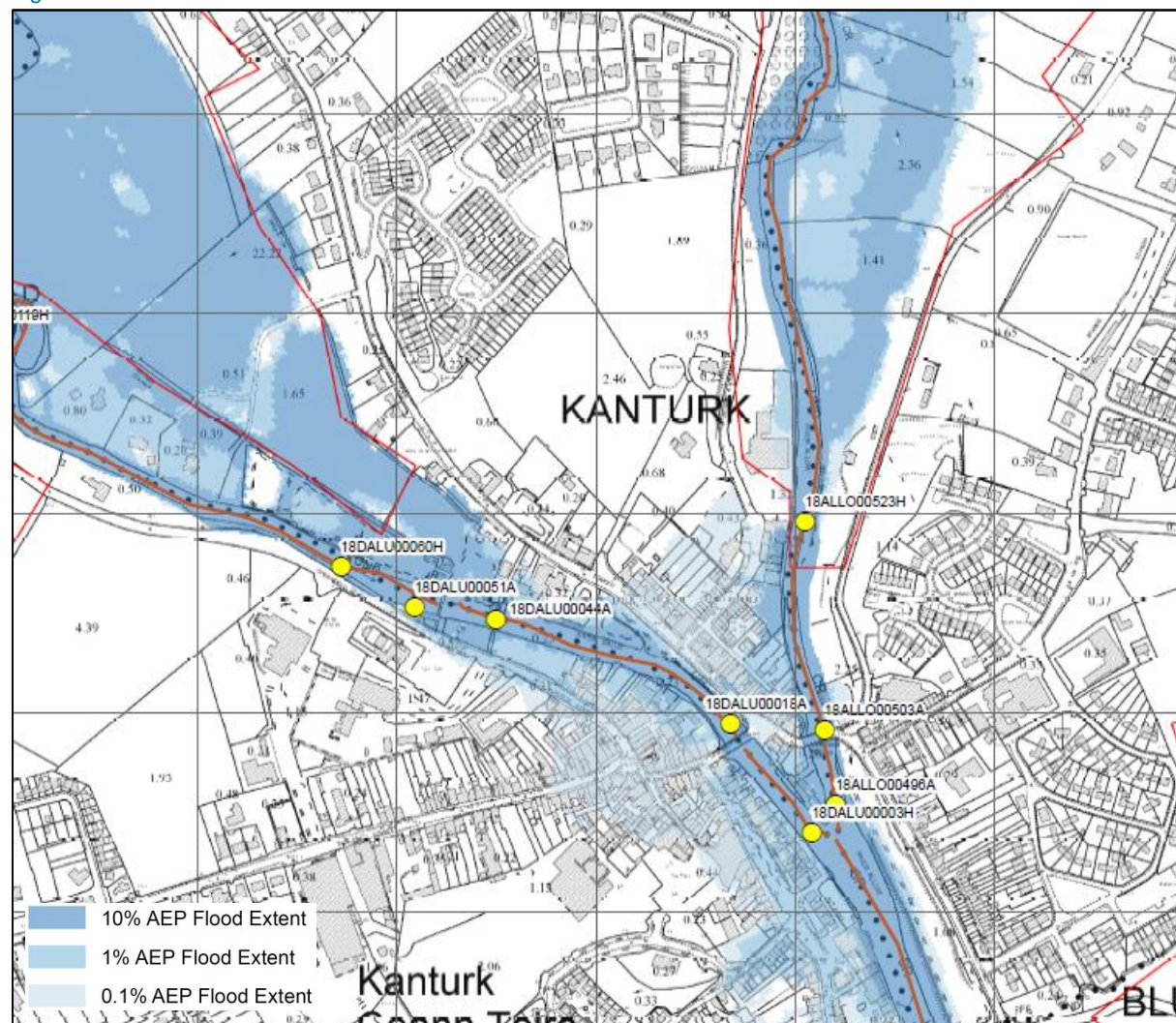
Kanturk is located at the confluence of the Dalua and Allow Rivers in County Cork. Kanturk is at risk of fluvial flooding. The AFA and the existing fluvial flood risk are depicted in Figure 8.1.

8.3.1 Viable Flood Risk Management Options

A number of viable structural flood risk mitigation options were identified and modelled to determine their effectiveness and impact and these are:

- Option 1 – Flood Defences/Localised Protection Works** - this option considers the mitigation of flood risk through the construction of flood defences and localised protection works. These defences include a combination of walls and embankments on both rivers ranging in height from 0.8m to 2.6m. The proposed option fully achieves the required standard of protection for the 1% AEP fluvial event.
- Option 2 - Storage and Flood Defences** - a viable location for the storage of fluvial flows was identified upstream on the River Dalua. A potential storage area of 330,000m² was identified as used in combination with localised defence works within the town ranging in height from 0.5m to 1.9m. The proposed option fully achieves the required standard of protection for the 1% AEP fluvial event.
- Option 3- Flood Defences & Conveyance** - This option would involve the removal of existing constructed weirs within the River Dalua at Church Street Footbridge in combination with localised protection works ranging in height from 0.5m to 2.5m. The proposed option fully achieves the required standard of protection for the 1% AEP fluvial event.

Figure 8.1: Kanturk Current Scenario Fluvial Flood Extents



8.3.2 Key Environmental Sensitivities

The key environmental sensitivities of the Kanturk AFA are summarised below:

- | Kanturk is located at the confluence of the Dalua and Allow Rivers in County Cork. The River Allow rises near the Mullaghereirk Mountains. The River Allow flows southwards towards Kanturk where it is joined by the similarly sized River Dalua immediately downstream of Greenane Bridge in the town. The Allow continues to flow southwards where it is joined by minor tributaries such as the Brogeen Stream before it flows through Riverview gauge to its confluence with the Blackwater at Leaders Bridge.
- | The Allow and Dalua Rivers are assigned good water status under the Water Framework Directive (WFD). These rivers are considered to be sensitive waterbodies.
- | Kanturk is at risk of fluvial flooding. There are two significant polluting sources (CSO and WWTP) are located within the 1% AEP flood extent.
- | The Allow and Dalua rivers are considered as part of the Blackwater Valley Special Area of Conservation (SAC). The site is important for the presence of several Annex II species, including Sea Lamprey, River Lamprey, Freshwater Pearl Mussels and otters. It is noted however the populations of Freshwater Pearl Mussels (FPM) occur upstream of Kanturk. FPM are known to be distributed along the Allow River.
- | The SAC was also selected for the occurrence of Annex I/II habitats including floating river vegetation and alluvial forests. Otter use riparian habitat as shelter, although, much of the riparian habitat has been significantly impacted through the development of river walkway.
- | According to the Cork County Development Plan (2014), the majority of the town centre has been designated an Architectural Conservation Area (ACA).
- | According to the Cork County Development Plan (2014), Kanturk is located within an area characterised as “Broad Marginal Middleground” landscape character type. The landscape type has a picturesque quality and is deemed to be of high value and high sensitivity of local value.
- | Receptors at risk 1% AEP within the AFA:
 - 53 No. Residential properties;
 - 1 No. High Vulnerability Property;
 - 3 No. Society Amenity Sites;
 - 6 No. NIAH sites;
 - 3 No. Recorded Archaeological Monuments and Sites;
 - 99 No. Non Residential Properties; and
 - 4 No. Roads at risk

8.3.3 Environmental Assessment

The potential impacts arising for each of the proposed measures has been assessed in Table 8.2 below provides a summary of the potential impacts arising from the proposed options as determined through the SEA assessment. In addition Table 8.2 also highlights the requirement for mitigation measures for each option under each social and environmental objective. Table 8.2 should be read in conjunction with the SEA scoring matrix below.

Table 8.2: Kanturk Options Scoring Matrix – Social and Environmental Objectives

SEA Objectives	Do nothing		Option 1		Option 2		Option 3	
Social Objectives	Impact	Mitigation required	Impact	Mitigation required	Impact	Mitigation required	Impact	Mitigation required
Human Health and life of residents	O	N	√√		√√		√√	
High vulnerability properties	O	N	√√√		√√√		√√√	
Social infrastructure and amenity	O	N	√√		√√		√√	
Risk to local employment	O	N	√		√		√	
Environmental Objectives								
WFD Directive	XX	Y	√	Y	√	Y	√√	Y
Birds and Habitats Directive	XX	Y	X	Y	XX	Y	O	N
Flora and Fauna	XX	N	X	Y	XX	Y	X	Y
Fisheries	XX	N	X	Y	XX	Y	√√	Y
Landscape	O	N	XX	Y	XX	Y	XX	Y
Architectural Heritage	XX	Y	√	Y	√	Y	√	Y
Archaeological Heritage	X	Y	X	Y	O	N	O	N

SEA Scoring Matrix

Score	Key	Description
+5	√√√	Achieving aspirational target
+4	√√	
+3	√√	Partly achieving aspirational target
+2	√	Exceeding minimum target
+1	√	
0	O	Meeting minimum target
-1	X	Just failing minimum target
-2	X	
-3	XX	Partly failing minimum target
-4	XX	
-5	XX X	Fully failing minimum target
-999.99	XX X	Unacceptable negative impact where feasible alternative exists

Generally, Options 1,2 and 3 performed well in relation to the WFD objective, as they can contribute to achieving the objectives of the WFD by preventing recurring flooding, which could result in the deterioration of water quality. However, the construction stage of all measures could result in temporary negative impacts on the water body status, resulting from sedimentation, accidental pollution or loss of habitat in the

absence of appropriate mitigation. Option 3 includes the removal of the existing weir within the River Dalua at Church Street Footbridge, this will return this section of the River Dalua to a more natural hydrological and morphological regime.

The Allow and Dalua rivers are considered as part of the Blackwater Valley Special Area of Conservation (SAC). All the proposed options are located within/adjacent to the SAC boundary. Having regard to the requirements of the Birds and Habitats Directive, the proposed options may result in relatively localised negative impacts on the Annex II and Annex IV species. Permanent fragmentation of linear riparian features by construction of very large embankments (e.g. 8m embankment in Kanturk) may occur which may deter commuting protected species from using an area.

Option 2 will require in-stream works during the construction of the control structure in addition to the temporary impacts caused by disturbance to river bed and banks. This option will also result in permanent loss of a small amount of river bed and bank within the footprint of the control structure.

Option 3 includes for the removal of the weir within the River Dalua at Church Street Footbridge, this will permanently alter the hydrology of the river at this location. Currently sediment builds up behind the weirs and is flushed out during flooding. It should be noted that local angling groups have indicated concerns with regard to the removal as the weirs as this will affect the fishery resource. As a result, this option has been removed from consideration.

Stretches of the proposed flood walls/embankments are located within areas used for angling within the town, so temporary disruption to access may occur.

Kanturk is designated as an Architectural Conservation Area (ACA) and is at risk from fluvial flooding. All options will provide flood protection within the AFA. There are six (National Inventory of Architectural Heritage (NIAH) buildings at risk from fluvial flooding within the AFA. There are three designated (RMPs⁹ within the town centre. One of these is a site of a mill of which there is no above ground evidence. The remaining two RMPs are bridges. The provision of flood defences within the town centre will have a permanent impact on the setting of these RMPs and the NIAHs. Option 1 includes for the construction of extensive defence walls within the town, whereas options 2 and 3 also include the construction of defence walls in the town however to a lesser extent. All the options will allow some protection of the RMPs listed in Kanturk from the future occurrence of flooding. However, as two of the designated sites are bridges, they will be afforded only limited protection by the proposed measures.

There is one high vulnerability property and three social infrastructure and amenity sites at risk from fluvial flooding within the AFA. Each of the options considered above score the same in regard to the protection the measures provide to human health and life of residents and protection provided to local employment within the AFA.

⁹ The Record of Monument and Places (RMP) is a statutory list of all known archaeological monuments provided for in the National Monuments Acts

8.3.4 Preferred Flood Risk Management Option

On the basis of the evaluation summarised above, and having regard to the public consultation, where anglers favoured option 2, it is proposed that this option will be progressed. Mitigation actions are recommended for the identified negative effects. The key recommendation is that these negative impacts should be considered during the next stage of option development, when the alignment of the proposed defences and details of the option would be optimised through detailed design in order to limit impacts on the river channel and banks of the river.

8.4 Rathcormac

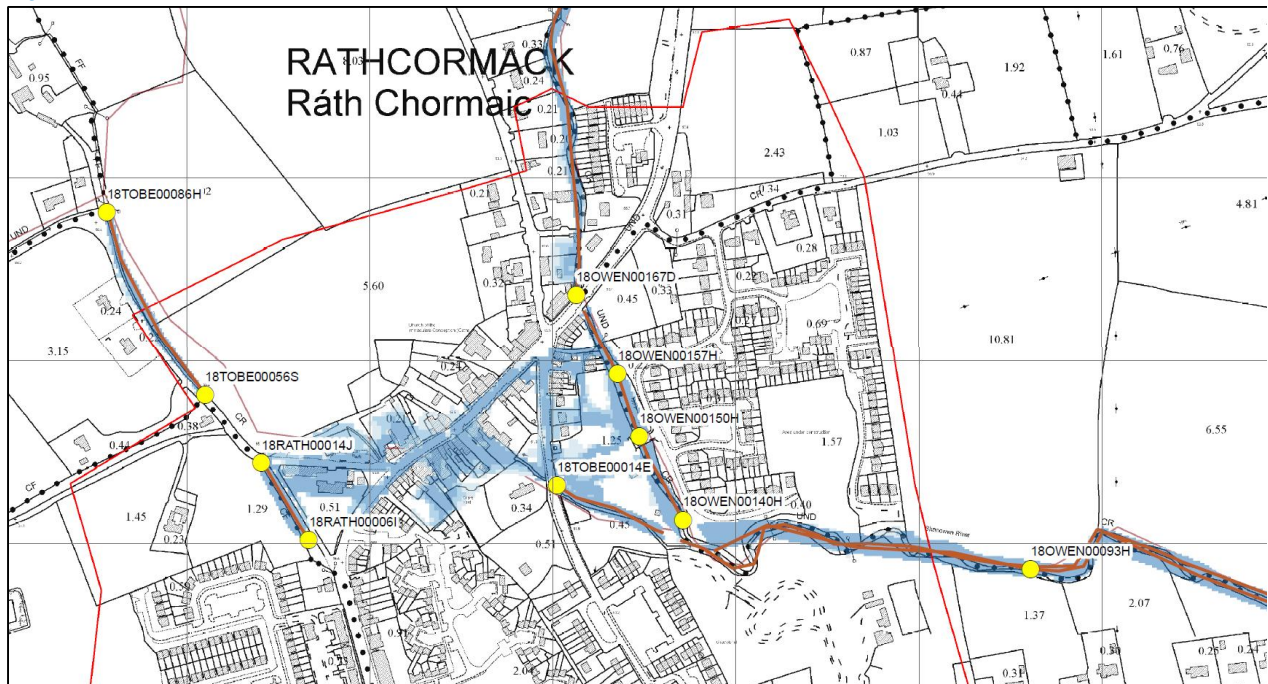
Rathcormac is located at the confluence of the Kilbrien Stream and the Shanowen River in County Cork. Rathcormac is at risk of fluvial flooding. The AFA and the existing fluvial flood risk are depicted in Figure 8.2.

8.4.1 Viable Flood Risk Management Options

A number of viable flood risk mitigation options were identified and modelled to determine their effectiveness and impact and these are:

- i **Option 1 – Storage** - a viable location for the storage of fluvial flows was identified upstream on the Kilbrien Stream. A potential storage area of 23,270m² was identified with sufficient capacity to reduce the peak flow to approx. 0.4m³/s. This work will involve stream realignment, construction of embankments to contain floodwaters and installation of a sluice gate to control flow from the storage area. The proposed option fully achieves the required standard of protection for the 1% AEP fluvial event.
- i **Option 2 – Flow Diversion** - The flooding in Rathcormac occurs due to the insufficient capacity of the culverts along the Kilbrien Stream. This measure aims to divert the flow from the Kilbrien Stream to the Shanowen River through the construction of a 582m culvert (1200mm diameter pipe) north of the town. The proposed option fully achieves the required standard of protection for the 1% AEP fluvial event.
- i **Option 3 - Flood Defences / Localised Protection Works** - This option considers the mitigation of flood risk through the construction of flood defences and localised protection works. Wall height ranges from 0.8m to 1.6m. The proposed option fully achieves the required standard of protection for the 1% AEP fluvial event.

Figure 8.2: Rathcormac Current Scenario Fluvial Flood Extents



8.4.2 Key Environmental Sensitivities

The key environmental sensitivities of the Rathcormac AFA are summarised below:

- | Rathcormac is located at the confluence of the Kilbrien Stream and the Shanowen River in County Cork. These waterbodies have not been assigned a status, however previous classification identified the Kilbrien Stream of being of "moderate status". Waterbodies are however upstream of the River Blackwater SAC and are therefore considered to be sensitive. The flooding in Rathcormac occurs due to the insufficient capacity of the culverts along the Kilbrien Stream.
- | There are no significant polluting sources at risk from fluvial flooding within the AFA.
- | Kilbrien Stream runs parallel to the local road to Garrynacole for the majority of its path and then diverts into Rathcormac. The stream is surrounded by built land and agricultural lands. The stream is heavily channelized and engineered.
- | Annex I habitats have not been documented within Rathcormac AFA. The stream is suboptimal habitat for the qualifying features of the SAC including European Otter, Common Kingfisher, and Lamprey.
- | A small stretch of the river has been designated as an amenity walkway within the village. The Kilbrien Stream is sub-optimal habitat for species protected under the Wildlife Act or Annex IV species. There is potential that otter commute along the Shanowen River.
- | Architectural heritage structures at risk from flooding within the AFA include the Catholic Church and Church of Ireland ruins and a recently restored mill building.
- | There are no recorded monuments and sites at risk from flooding.

- i Rathcormac is located within an area characterised as “Broad Fertile Lowland Valley” landscape character type. The landscape type is deemed to be of medium value and medium sensitivity and of local value.
- j Receptors at risk 1% AEP within the AFA:
 - 20 No. Residential properties
 - 11 No. Non-Residential properties
 - 1 No. Society Amenity Sites
 - 1 No. NIAH sites
 - 4 No. Roads at risk
- k There are no high vulnerability properties at risk from fluvial flooding within the AFA.

8.4.3 Environmental Assessment

The potential impacts arising for each of the proposed measures has been assessed in and Table 8.3 below provides a summary of the potential impacts arising from the proposed options as determined through the SEA assessment. In addition Table 8.3 also highlights the requirement for mitigation measures for each option under each social and environmental objective. Table 8.3 should be read in conjunction with the SEA scoring matrix.

Table 8.3: Rathcormac Options Scoring Matrix – Social and Environmental Objectives

SEA Objectives	Do nothing		Option 1		Option 2		Option 3	
Social Objectives	Impact	Mitigation required	Impact	Mitigation required	Impact	Mitigation required	Impact	Mitigation required
Human Health and life of residents	O	N	√√√	N	√√√	N	√√√	N
High vulnerability properties	O	N	O	N	O	N	O	N
Social infrastructure and amenity	O	N	√√√	N	√√√	N	√√√	N
Risk to local employment	O	N	√√√	N	√√√	N	√√√	N
Environmental Objectives								
WFD Directive	X	N	√√	Y	X	Y	X	Y
Birds and Habitats Directive	O	N	X	Y	X	Y	XX	Y
Flora and Fauna	O	N	O	N	O	N	X	Y
Fisheries	O	Y	X	Y	X	Y	X	Y
Landscape	O	N	X	Y	X	Y	X	Y
Architectural Heritage	O	Y	√	Y	√	Y	√	Y
Archaeological Heritage	O	N	O	N	O	N	O	N

SEA Scoring Matrix

Score	Key	Description
+5	vvv	Achieving aspirational target
+4	vv	
+3	vv	Partly achieving aspirational target
+2	v	Exceeding minimum target
+1	v	
0	O	Meeting minimum target
-1	x	Just failing minimum target
-2	x	
-3	xx	Partly failing minimum target
-4	xx	
-5	xxx	Fully failing minimum target
-999.99	xxx	Unacceptable negative impact where feasible alternative exists

The Kilbrien Stream at the option 1 location is engineered and modified and the stream runs parallel to the road. There is potential for short term negative construction impacts resulting in discharges of elevated levels of sediment to the stream if not managed appropriately. The construction of the on-line storage will have a permanent impact on the morphology of the stream, however there is opportunity for long term positive impacts through the provision of a more natural stream channel.

There are no designated ecological sites within the AFA, however the Kilbrien Stream and Shanowen River are tributaries of the River Bride which is part of the Blackwater River SAC. Kilbrien Stream has no capacity to support qualifying features of the Blackwater River SAC given its heavy modification. Construction works can result in loss of sediment and pollutants to the stream which may ultimately enter the River Bride with potential to impact qualifying features of the SAC e.g. lamprey. The significance of the impact can be mitigated against by staging of the works, retaining an adequate buffer from watercourses and provision of sediment controls on site.

It is considered that there is no fisheries amenity potential along the Kilbrien Stream at this location. The provision of the flood defence wall provided in Option 3 will further impact on the permanent morphology as the wall will require excavation of the bank during the construction phase and will replace the existing natural banks. In regard to Option 2 there is potential for recurring negative impacts associated with diversion of flow into the Shanowen River during storm events. The increase flow volume and velocity in the Shanowen River during storm events can cause bankside erosion and associated loss of habitat, however it is noted that the river has been assessed as having the capacity to physically accommodate the increase volume without overtopping its bank. In regard to Option 1 there is potential for a short term negative impact during the construction of the sluice gate of the storage area. This would result in emissions of sediment to the waterbody downstream. Potential for short term/intermittent discharges of water from the reservoir, which may result in a reduced trophic status, however it is not considered that this will have a significant impact on the valuable fisheries habitat further downstream in the Blackwater catchment.

All options will have a neutral effect on the architectural and archaeological heritage within the town.

There are no high vulnerability properties at risk from flooding within the AFA. Each of the options considered above score the same in the context of the protection the measures provide to human health and life of residents and protection provided to local employment within the AFA.

8.4.4 Preferred Flood Risk Management Option

On the basis of the evaluation summarised above, Option 1 (Storage) is the preferred option. However, through consultation with landowners and residents at the Public Consultation day it is evident that this option is not preferred locally. For this reason, the preferred option included in the Flood Risk Management Plan is Option 2, Flow Diversion. Mitigation actions are recommended for the identified negative effects. The key recommendation is that these negative impacts should be considered during the next stage of option development, when the alignment of the proposed defences and details of the option would be optimised through detailed design in order to limit impacts on the river channel and banks, particularly on dependent fisheries habitat.

8.5 Ballyduff

Ballyduff is located along the Blackwater and is at risk of fluvial flooding. The AFA and the existing fluvial flood risk from the 1% AEP are depicted in Figure 8.3.

8.5.1 Viable Flood Risk Management Options

One viable flood risk mitigation option was identified and modelled to determine its effectiveness and impact and this is:

- i **Option 1 - Flood Defence Works** -This option considers the mitigation of flood risk through the construction of fluvial flood defences within the town. These defences include walls, embankments and road raising. The proposed option fully achieves the required standard of protection for the 1% AEP fluvial event.

The key environmental sensitivities of the Ballyduff AFA are summarised below:

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vegetation and alluvial forests. White Well Wood is located c.1km east of Ballyduff but does not have any of the characteristics of the habitat types as set out in the Habitats Directive.

i Receptors at risk 1% AEP within the AFA:

- 3 No. Residential properties
- 10 No. Non Residential Properties
- 1 No. Society Amenity Sites
- 4 No. NIAH sites
- 1 No. Roads

j There are no high vulnerability properties at risk from fluvial flooding within the AFA. There are no RMP's at risk from fluvial flooding within the AFA.

8.5.3 Environmental Assessment

The potential impacts arising for each of the proposed measures has been assessed in and Table 8.4 below provides a summary of the potential impacts arising from the proposed options as determined through the SEA assessment. In addition, Table 8.4 also highlights the requirement for mitigation measures for each option under each social and environmental objective. Table 8.4 should be read in conjunction with the SEA scoring matrix below.

Table 8.4: Ballyduff Options Scoring Matrix – Social and Environmental Objectives

SEA Objectives	Do nothing		Option 1	
Social Objectives	Impact	Mitigation required	Impact	Mitigation required
Human Health and life of residents	0	N	√√√	N
High vulnerability properties	0	N	0	N
Social infrastructure and amenity	0	N	√√√	N
Risk to local employment	0	N	√√√	N
Environmental Objectives				
WFD Directive	O	N	X	Y
Birds and Habitats Directive	O	N	X	Y
Flora and Fauna	O	N	X	Y
Fisheries	O	N	X	Y
Landscape	O	N	X X	Y
Architectural Heritage	O	Y	√	Y
Archaeological Heritage	O	N	O	N

SEA Scoring Matrix

Score	Key	Description
+5	√√√	Achieving aspirational target
+4	√√	
+3	√√	Partly achieving aspirational target
+2	√	Exceeding minimum target
+1	√	
0	O	Meeting minimum target

-1	X	Just failing minimum target
-2	X	
-3	XX	Partly failing minimum target
-4	XX	
-5	XXX	Fully failing minimum target
-999.99	XXX	Unacceptable negative impact where feasible alternative exists

The River Blackwater is assigned 'good status' under the WFD classification system and it is considered a sensitive waterbody. The construction of the proposed measures may result in temporary negative impacts on the water body status in the absence of appropriate mitigation. There are no significant polluting sources at risk from fluvial flooding within the AFA. There are no in-stream works proposed and the measures will not directly impact on the River Blackwater, however there is an embankment on the tributary which may require excavation of the bank of stream during the construction stage may result in discharges of elevated levels of sediment to the waterbody and downstream to the River Blackwater without treatment/mitigation being implemented.

Option 1 measures are located within/adjacent to the SAC boundary. With reference to the Birds and Habitats Directive, Ballyduff AFA overlaps with areas of the Blackwater River SAC and the Blackwater Callows SPA. The Blackwater Callows SPA is a site of high importance for wintering waterfowl. However there are no records for the Special Conservation Interests of the Blackwater Callows SPA in proximity to Ballyduff.

The proposed measures have the potential to cause temporary disturbance to species of conservation importance through operation of construction plant and personnel and noise generated by the works. The Blackwater River is designated as salmonid. Lamprey have been recorded within the River Blackwater near Ballyduff and Sea Lamprey have been observed spawning downstream of Ballyduff. Potential impacts on the spawning gravels downstream from sedimentation associated with the construction of the flood embankment may occur.

The Munster Blackwater Freshwater Pearl Mussel Sub-Basin Plan (Anon, 2010) identifies pearl mussels at Ballyduff. Impacts from sedimentation associated with flood embankment construction are probable.

The approach roads into Ballyduff are scenic routes. The proposed measures include construction of embankments of approximate height 1.5m to 2m. Currently there are wide open views of the river along the approach roads bound by 0.5m high stone walls. The proposed measures will potentially change the character of the landscape in the absence of appropriate design.

There are a number of NIAH structures and buildings at risk from flooding within the 1% AEP within the AFA, these include a 17th Century house (castle) and the Ballyduff Bridge. The proposed measures will reduce the risk of flooding on the designated sites within the village but does not provide protection to the Ballyduff Castle downstream.

In comparison to the Do-nothing scenario, Option 1 provides protection to residential and non-residential properties at risk from fluvial flooding within the AFA. There are no high vulnerability properties within the AFA therefore the score for the protection of this objective is neutral.

8.5.4 Preferred Flood Risk Management Option

On the basis of the evaluation summarised above, Option 1 (Flood Defences /Localised Protection Works) is considered the preferred option. Mitigation actions are recommended for the identified negative effects. The key recommendation is that these negative impacts should be considered during the next stage of option development, when the alignment of the proposed defences and details of the option would be optimised through detailed design in order to limit impacts on the river channel and banks within the SAC. The appearance of floodwalls would be designed appropriate to minimise potential visual effects within the AFA.

8.6 Aglish

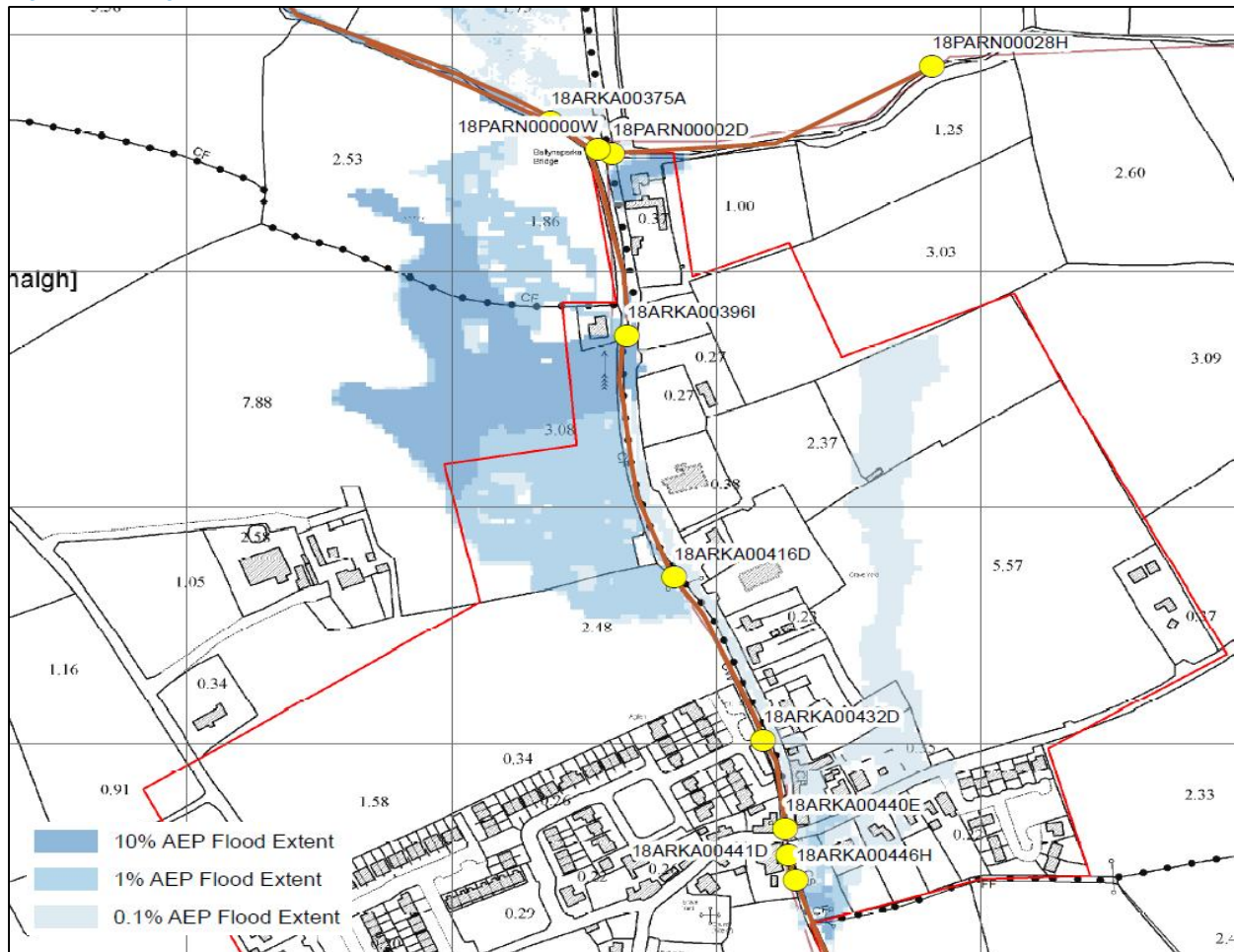
Aglish is located in County Waterford and is at risk of fluvial flooding. The AFA and the existing fluvial risk are shown in Figure 8.4.

8.6.1 Viable Flood Risk Management Options

One viable flood risk mitigation option was identified and modelled to determine its effectiveness and impact and this is:

- i **Option 1 - Flood Defence Works** -This option considers the mitigation of flood risk through the construction of fluvial flood defences within the town. These defences include walls, and embankments. The proposed option fully achieves the required standard of protection for the 1% AEP fluvial event.

Figure 8.4: Aglish – Current Scenario Tidal Flood Extents



8.6.2 Key Environmental Sensitivities

The key environmental sensitivities of the Aglish AFA are summarised below:

- | The town of Aglish is situated in a minor sub-catchment of the lower Blackwater on the Ballynaparka River. The Ballynaparka River rises 2km upstream of the town flowing north-west along the main street through Aglish Stream. Downstream of the confluence, the river flows west through Bleach to join the tidal Goish River and the River Blackwater 1km further downstream. Ballynaparka River is assigned good water status under the WFD.
- | There are no significant polluting sources within the 1% AEP Flood Extent.
- | The Aglish AFA boundary does not overlap with any Natura 2000 site boundary. The nearest designated area is the Blackwater River SAC which is located 2km downstream and west of the AFA.
- | Aglish stream is heavily channelized and engineered. There are no fisheries amenity or habitat potential along the stream. The Aglish stream is heavily modified and considered sub-optimal habitat

for salmonids and lamprey. The availability of spawning habitat in the Ballynaparka Stream has not been recorded.

- i European Otter (*Lutra lutra*) are known to occur in proximity to Aglish. Otter use riparian habitat as shelter and as commuting routes. The riparian habitat on the Aglish stream is considered sub-optimal habitat for otter.
- i The environs of Aglish have a high potential to support bat species. Natterer's, long-eared, pipistrelle and Daubenton's bats have been recorded in the area.
- i Receptors at risk 1% AEP within the AFA:
 - 3 No. Residential properties
 - 2 No. Non Residential Properties
 - 2 No. Roads
- i There are no high vulnerability properties and society amenity sites at risk from fluvial flooding within the AFA. There are no RMP's or NIAH sites at risk from fluvial flooding within the AFA.

8.6.3 Environmental Assessment

The potential impacts arising for each of the proposed measures has been assessed in and Table 8.5 below provides a summary of the potential impacts arising from the proposed options as determined through the SEA assessment. In addition Table 8.5 also highlights the requirement for mitigation measures for each option under each social and environmental objective. Table 8.5 should be read in conjunction with the SEA scoring matrix.

Table 8.5: Aglish Options Scoring Matrix – Social and Environmental Objectives

SEA Objectives		Do nothing		Option 1	
Social Objectives	Impact	Mitigation required	Impact	Mitigation required	
Human Health and life of residents	0	N	√√√		N
High vulnerability properties	0	N	0		N
Social infrastructure and amenity	0	N	0		N
Risk to local employment	0	N	√√√		N
Environmental Objectives					
WFD Directive	O	N	X		Y
Birds and Habitats Directive	O	N	O		Y
Flora and Fauna	O	N	X		Y
Fisheries	O	N	X		Y
Landscape	O	N	X		Y
Architectural Heritage	O	Y	O		N
Archaeological Heritage	O	N	O		N

SEA Scoring Matrix

Score	Key	Description
+5	vvv	Achieving aspirational target
+4	vv	
+3	v	Partly achieving aspirational target
+2	v	Exceeding minimum target
+1	v	
0	O	Meeting minimum target
-1	x	Just failing minimum target
-2	x	
-3	xx	Partly failing minimum target
-4	xx	
-5	xxx	Fully failing minimum target
-999.99	xxx	Unacceptable negative impact where feasible alternative exists

The Ballynaparka River is assigned good water status under the WFD. There are no significant polluting sources at risk from flooding.

There are no designated ecological sites within the AFA, however the Ballynaparka River is a tributary of the Blackwater River SAC. Ballynaparka River has no capacity to support qualifying features of the Blackwater River SAC given its heavy modification. Construction works can result in loss of sediment and pollutants to the stream. The significance of the impact can be mitigated against by staging of the works, retaining an adequate buffer from watercourses and provision of sediment controls on site.

According to the Waterford County Development Plan 2011-2017, there are no scenic or visually sensitive landscapes within the AFA. Option 1 includes the construction of low lying wall parallel to the local approach road adjacent to the local school and within the town at the rear of a dwelling. There is a currently a low-lying boundary hedgerow. The construction of the walls and embankment are unlikely change the character of the area or change the existing views from the property. However, temporary negative impacts are likely to occur during the construction of the proposed measure.

In regard to the architectural and archaeological objectives, there are no recorded architectural or archaeological sites or monuments at risk within the 1% AEP flood extent, therefore the score in regard to these objectives is neutral.

In comparison to the Do-nothing scenario, Option 1 provides protection to residential and non-residential properties at risk from fluvial flooding within the AFA. There are no high vulnerability properties or social amenity sites within the AFA therefore the score for the protection of this objective is neutral.

8.6.4 Preferred Flood Risk Management Option

On the basis of the evaluation summarised above, Option 1 (Flood Defences) is considered the preferred option. Mitigation actions are recommended for the identified negative effects. The key recommendation is that these negative impacts should be considered during the next stage of option development, when the

alignment of the proposed defences and details of the option would be optimised through detailed design in order to limit impacts on the stream channel. The appearance of floodwalls would be designed appropriate to minimise potential visual effects within the AFA.

8.7 Youghal

Youghal is located in east Cork at the mouth of the Blackwater and is at risk of both fluvial and tidal flooding. However, the fluvial flood risk is minor and there are no receptors at risk. The AFA and the existing tidal risk are shown in Figure 8.5.

Concern has been raised in relation to this level as it has been exceeded by a number of flood events in recent years. Based on a review of recent flood events, it was decided to assess the preliminary flood risk mitigation options for Youghal using the water level for the Mid-Range Future Scenario (MRFS) 0.5% AEP tidal event. For this reason, monitoring of tidal flood levels forms part of each of the proposed options. Tidal monitoring to be carried out in advance of any mitigation works to review and determine the design tide plus surge level.

8.7.1 Viable Flood Risk Management Options

A number of viable flood risk mitigation options were identified and modelled to determine their effectiveness and impact and these are:

- i **Option 1 – Monitoring and Flood Defences** - This option considers the mitigation of flood risk through the construction of fluvial flood defences within the town. These defences comprise low lying walls and removable defence barriers, ranging in height from 1.1m to 1.3m. The proposed option fully achieves the required standard of protection for the 0.5% AEP tidal event.
- i **Option 2 – Monitoring and Tidal Barrage (a)** – This option considers the mitigation of tidal flood risk through the construction of a tidal barrage at the narrowest part of the estuary within the Blackwater River SAC. The barrage will be approximately 715m in length. The elevation of the barrage will be 3.63m O.D. Malin, approximately 1.5m in height above the Mean High Spring. In order for the tidal barrage to be an effective measure it must have sufficient storage within the barrage to accommodate the fluvial flows during the 0.5% AEP tidal event. To maximise the potential storage area for fluvial flows the barrage should be closed at the low tide preceding a tidal event. The barrage should remain closed until the tide level outside is lower than the maximum water level within the barrage. The proposed tidal barrage is deemed to be a viable measure for mitigating tidal flooding for the 0.5% AEP tidal event
- i **Option 3 - Monitoring and Tidal Barrage (b)** - This option considers the mitigation of tidal flood risk through the construction of a tidal barrage outside the SAC boundary. The barrage will be approximately 1.4km in length. The elevation of the barrage will be 3.63m O.D. Malin approximately 1.5m in height above the average water level. In order for the tidal barrage to be an effective measure it must have sufficient storage within the barrage to accommodate the fluvial flows during the 0.5% AEP tidal event. To maximise the potential storage area for fluvial flows the barrage should be closed at the low tide preceding a tidal event. The barrage should remain closed until the tide level outside is

lower than the maximum water level within the barrage. The proposed tidal barrage is deemed to be a viable measure for mitigating tidal flooding for the 0.5% AEP tidal event.

Figure 8.5: Youghal – Mid-Range Future Scenario Tidal Flood Extents



8.7.2 Key Environmental Sensitivities

The key environmental sensitivities of the Youghal AFA are summarised below:

- | Youghal is located in east Cork at the mouth of the Blackwater in Youghal Bay and Estuary. The AFA is located on the Blackwater Estuary SPA and the Blackwater River SAC. These watercourses are assigned moderate status under the WFD, and have been identified as nutrient sensitive areas.
- | There are no significant polluting sources at risk from flooding.
- | The Blackwater Estuary is a RAMSAR site designated under the Convention on Wetlands of International Importance for the protection of wetland areas (which are important feeding habitats for birds).
- | According to the Cork County Development Plan (2014), Youghal is designated a high value landscape. The town occurs within the Broad Bay Coast landscape character type. This landscape has a very high value and very high sensitivity on a county level.

- i The River Blackwater is renowned for its Salmon fishing and Lamprey. These species are Qualifying Interests of the SAC. The estuary provides good shore fishing for species such as Flounder, Bass and Codling; shore angling marks include the mouth of the Tourig River, Ferry Point upstream of the works area and the remains of the old bridge while charter boats are available from Youghal harbour.
- j Receptors at risk 0.5% AEP MRFS within the AFA:
 - 192 No. Residential properties
 - 195 No. Roads
 - 60 No. NIAH sites
 - 16 No. archaeological sites
- i There are no high vulnerability properties and society amenity sites at risk from tidal flooding within the AFA. There are no non-residential properties at risk for 0.5% AEP tidal event.

8.7.3 Environmental Assessment

The potential impacts arising for each of the proposed measures has been assessed in and Table 8.6 below provides a summary of the potential impacts arising from the proposed options as determined through the SEA assessment. In addition Table 8.6 also highlights the requirement for mitigation measures for each option under each social and environmental objective. Table 8.6 should be read in conjunction with the SEA scoring matrix.

Table 8.6: Youghal Options Scoring Matrix – Social and Environmental Objectives

SEA Objectives	Do nothing		Option 1		Option 2		Option 3	
Social Objectives	Impact	Mitigation required	Impact	Mitigation required	Impact	Mitigation required	Impact	Mitigation required
Human Health and life of residents	O	N	√√√	N	√√√	N	√√√	N
High vulnerability properties	O	N	O	N	O	N	O	N
Social infrastructure and amenity	O	N	√√√	N	√√√	N	√√√	N
Risk to local employment	O	N	√√√	N	√√√	N	√√√	N
Environmental Objectives								
WFD Directive	O	N	X	Y	XXX	Y	XXX	Y
Birds and Habitats Directive	O	N	X	Y	XXX	Y	XX	Y
Flora and Fauna	O	N	X	N	XX	N	XX	Y
Fisheries	O	N	O	Y	XXX	Y	XXX	Y
Landscape	O	N	XX	Y	XXX	Y	XXX	Y
Architectural Heritage	XX	Y	√√	Y	√√	Y	√√	Y
Archaeological Heritage	XX	N	√√	Y	√√	Y	√√	Y
-								

SEA Scoring Matrix

Score	Key	Description
+5	vvv	Achieving aspirational target
+4	vv	
+3	vv	Partly achieving aspirational target
+2	v	Exceeding minimum target
+1	v	
0	0	Meeting minimum target
-1	x	Just failing minimum target
-2	x	
-3	xx	Partly failing minimum target
-4	xx	
-5	xxx	Fully failing minimum target
-999.99	xxx	Unacceptable negative impact where feasible alternative exists

Youghal is located in east Cork at the mouth of the Blackwater and is at risk of both fluvial and tidal flooding. However, the fluvial flood risk is minor and there are no receptors at risk. The AFA is located on the Blackwater Estuary SPA and the Blackwater River SAC. These watercourses are sensitive waterbodies. The estuary is considered a nutrient sensitive area. There are no significant polluting sources at risk from flooding. Youghal strand bathing waters are assigned a low/moderate status. These occur outside the AFA boundary.

Option 1 requires the construction of local defence wall. These walls will be confined to the urban fabric of the town. There will be no requirement for machinery movement within the Annexed habitats. Installation of flood walls along quays has the potential to cause disturbance to species of conservation concern through physical presence of construction machinery and personnel, noise generated by the works and possibly artificial lighting that may be used in the darker winter months, but it is possible to implement effective mitigation measures. Option 2 includes the construction of a tidal barrage approximately 715m in length across the narrowest part of the estuary within the Blackwater River SAC. The Annex I habitats: Blackwater Estuary and mudflats and sandflats not covered by sea water at low tide and coarse sediments occur within the bay. Option 2 occurs within the boundary of the SAC. Option 3 occurs outside the SAC boundary and will extend approximately 1.4km in length. The mudflats provide sheltered feeding grounds for a diversity of wintering waterbirds. When exposed or partially exposed by the tide, intertidal habitats provide important foraging areas for many species of waterbirds, especially wading birds, as well as providing roosting/loafing areas. When the intertidal area is inundated by the tide it becomes available for benthic and surface feeding ducks and other waterbirds. During this tidal state this area can be used by various waterbirds as a loafing/roosting resource. The proposed measures will not impact on the roosting habitat of these birds. The proposed measure will have result in the temporary freshwater inundation on the lower marsh habitat feeding grounds resulting in the temporary relocation of feeding grounds during a flood event. For Blackwater Estuary SPA, this is estimated to be 318 ha of intertidal area, the availability of suitable feeding habitat is further upstream. Changes in freshwater inundation may result at significant effects on less tolerant saline lower marsh Annex I habitats. Construction activities will cause temporary

localised disturbance to waterbirds which may cause them to temporarily move to alternative suitable feeding areas. The disturbance to other areas may temporary increase feeding competition in these areas which can indirectly impact population. The construction of Option 2 will result in direct loss of sandflat/mudflat habitat from within the footprint of the barrage. There is no direct loss of Annex I habitat resulting from the construction of Option 3.

The tidal barrage is a permanent structure within the estuary and will have a significant impact on the fisheries habitat, and flow characteristic of the bay when it is closed during a flood event. The construction of the tidal barrage has also potential negative impacts on the migratory fish (Salmon, lamprey) and indirect impacts on the reproductive success of Freshwater Pearl Mussels dependent on host salmon to host glochidial larvae these are QI within the SAC during a flood event. The construction of a tidal barrage is the least preferred option from a flora and fauna objective.

According to the Cork County Development Plan (2014), Youghal AFA is located within an area characterised as Broad Bay Coast, this landscape character type is of county importance and value and as having very high sensitivity. The construction of the tidal barrage will have a significant permanent impact on the setting of the harbour and the town. In regards to Option 2 and Option 3, it is noted that the tidal barrage will have a significant impact on the setting of the harbour. Whilst Option 1 requires the construction of low lying walls along the quays, it is considered the preferred option from a landscape and visual objective.

There are considerable numbers of NIAHs at risk from flooding within the town. The provision of all options will perform well in terms of their protection to the AFA and its architectural and archaeological heritage, however there are potential for permanent long term negative impacts arising from their setting within the visual envelope of the town resulting from the measures. Option 2 the construction of a tidal barrage is considered to fail the minimum target as it will change the quality of the landscape characteristic of the harbour area.

There is no preference in terms of the social objectives, each of the options ensures the risk to flooding on human health and risk to community is minimised.

8.7.4 Preferred Flood Risk Management Option

On the basis of the evaluation summarised above, Option 1 has been determined to be the preferred option in a do something scenarios. Do something is always preferable as it ensures the risk of flooding on human health and risk to community is minimised. The feedback provided at the Public Consultation Day was in support of monitoring and Flood Defences. Mitigation actions are recommended for the identified negative effects. The key recommendation is that these negative impacts should be considered during the next stage of option development, when the alignment of the proposed defences and details of the option would be optimised through detailed design in order to limit impacts. The appearance of floodwalls would be designed appropriate to minimise potential visual effects within the AFA.

9 Assessment of South Western FRMP for UoM18

9.1 Introduction

This chapter identifies the likely significant effects on the receiving environment resulting from the implementation of the individual options from the proposed FRMP both alone and in combination with other relevant plans and strategies. The assessment considers the potential impacts of implementing the following options:

- | *Unit of Management Measures:* General Flood Prevention and Flood Preparedness Measures; and
- | *AFA measures:* Preferred location-specific options for the management of flooding in AFAs.

9.2 Proposed Flood Risk Management Plans

The preferred flood risk management options/measures for UoM 18 have been determined based on range of assessments, with the strategic environmental assessment fully integrated into the decision making process:

- | The MCA Benefit - Cost Ratio;
- | The economic viability (the BCR);
- | The outcomes of the Strategic Environmental Assessments;
- | The adaptability to possible future changes, such as the potential impacts of climate change;
- | Professional experience and judgement of the OPW, local authorities and Mott MacDonald Ireland;
- | Public and stakeholder input and opinion.

9.3 Unit of Management Measures

There are a number of prevention and preparedness measures related to flood risk management which form part of wider Government policy. These measures are set out below and will be applied across the whole UoM, including all AFAs.

Non-structural measures such as Land Use Management, Natural Flood Management, Green Infrastructure etc. are terms used to cover a suite of measures that are intended to reduce flood risk by working with natural systems and, where possible, provide environmental benefits. While in small catchments they can effectively manage flood risk to a certain degree in their own right, in larger catchments they can work in a complimentary way with other measures to achieve flood risk management targets.

Due to the time required to initiate, establish and prove the flood risk management targets of such measures, they are not deemed viable to mitigate the current flood risk and any potential reductions in flood risk should not be considered when developing other options based on structural measures.

Where there is existing flood risk, the implementation of non-structural measures such as Planning Control, SUDS etc. at any spatial scale of assessment will not mitigate flood risk, unless those measures are retrospectively applied. As this is unrealistic and not economically viable, such non-structural measures can only be applied to new development to maintain the status quo of the current flood risk scenario or mitigate future flood risk. The application of non-structural measures such as individual property resilience,

public awareness and flood forecasting, to redevelopment or new development may reduce potential damage costs.

The non-structural measures described in this section are complimentary to structural measures and should be implemented as national policy to the SSAs where appropriate. However, at this stage they should not be considered in the development of options based on structural measures.

9.3.1 Planning Control

In November 2009, the Guidelines on the Planning System and Flood Risk Management, jointly developed by DECLG and the OPW, were published under Section 28 of the Planning Acts. These Guidelines provide a systematic and transparent framework for the consideration of flood risk in the planning and development management processes, whereby:

- i A sequential approach should be adopted to planning and development based on avoidance, reduction and mitigation of flood risk.
- i A flood risk assessment should be undertaken that should inform the process of decision-making within the planning and development management processes at an early stage.
- i Development should be avoided in floodplains unless there are demonstrable, wider sustainability and proper planning objectives that justify appropriate development and where the flood risk to such development can be reduced and managed to an acceptable level without increasing flood risk elsewhere (as set out through the Justification test).
- i The proper application of the Guidelines 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.
- i In flood-prone areas where development can be justified (i.e., re-development, infill development or new development that has passed the Justification Test), the planning authorities can manage the risk by setting suitable objectives or conditions, such as minimum floor levels or flood resistant or resilient building methods.

9.3.2 Sustainable Urban Drainage Systems (SUDS)

Sustainable Urban Drainage (SUDS) involves the management of surface water run-off from developments in a manner which attempts to replicate the natural behaviour within catchments and watercourses, which is typically achieved through attenuation.

Within existing urban or developed areas there is typically little space available for the attenuation of storm water flows to a degree which would mitigate or reduce current flood risk. Therefore, it is not considered practical to implement SUDS for the mitigation of current risk at any SSA. However, within all SSAs every new developments (and where possible redevelopment), should apply the principles of SUDS.

9.3.3 Flood Forecasting and Warning

Flood forecasting is a means of providing advanced warning of an impending flood event. A reliable advance warning system allows protective measures to be put in place and protective actions to be carried out in advance of a flood event. These actions and measures can reduce the damage caused in a flood event.

Flood forecasting is not a possible FRM measure at all SSAs. This is because the time between transmitting a flood forecast in which the authorities have reasonable confidence and the arrival of flood waters may not be long enough for people to take effective action to reduce flood damage. The minimum time to take effective action is deemed to be 6 hours.

9.3.4 Public Awareness

Many of the measures to mitigate and manage flood risk and the potential consequences for flooding will involve the public at large. It is therefore important that the public is made aware of where to find information, what the information means and what actions the public and business owners can take to reduce the damage that would occur to their properties, possessions and interests in the event of a flood.

Public awareness measures will engender the public's recognition of the potential of the risk of flooding and the potential consequences thereof. Knowing in advance means that actions can be taken in a timely manner.

Measures to increase and promote public awareness include:

- i Identifying the areas prone to flooding
- i Information on measures to be implemented to reduce and / or manage the risk of flooding
- i Measures in place to provide advance warning of flooding
- i Establishment of methods to interface with the public and in particular the owners of vulnerable properties, i.e. workshops and meetings, Facebook, Twitter, text messaging, newsprint, websites, etc.

Flood risk maps and flood hazard maps have been produced for the UoM 18 AFAs. The dissemination of this information to the public will increase awareness.

9.3.5 Land Use Management

Land Use Management can be utilised as a non-structural measure to prevent or reduce the impact of flooding on properties, roads and other critical infrastructure. Land Use Management includes strategies to control overland flow, such as improving agricultural and forestry practices in key catchment areas. Local natural flood management measures such as the creation of wetlands or forestry to retain overland flow could also be adopted.

9.4 Area of Further Assessment (AFA)

For each AFA a number of options have been assessed, some of which are described as *non-structural measures* and some of which are *structural measures*.

9.5 Non-structural measures

Non-structural measures proposed for UoM 18 at the AFA scale are identical to those to be implemented at the UoM scale. Please refer to Section 9.3 above for further details.

9.6 Structural Measures

9.6.1 Kanturk AFA

The preferred flood risk management option as identified in the MCA is Conveyance & Flood Defences. However, the feedback received at the Public Consultation Day was against the removal of the weirs which are important to local angling. Considering the feedback and alternative viable and cost effective options, the preferred option has been identified as: Storage and Flood Defences. This would involve the provision of a storage area on the Dalua River upstream of the town along with fluvial flood defences. Fluvial flood defences on the Dalua and Allow rivers comprising of walls and embankments.

9.6.2 Rathcormac AFA

The preferred flood risk management option as identified in the MCA is Storage. However, there was strong opposition to this option received at the Public Consultation Day. Considering the feedback and alternative viable and cost effective options, the preferred option has been identified as: Flow Diversion. This would involve diverting the flow from the Kilbrien Stream to the Shanowen River through the construction of a culvert north of the town.

9.6.3 Ballyduff AFA

The preferred flood risk management option as identified in the MCA is Flood Defences which consists of fluvial flood defences comprising of walls, embankments and road raising. There was limited feedback provided at the Ballyduff PCD which indicated that the public agreed with the preferred option indicated in the MCA. As an interim measure, before the preferred option is implemented, extending the existing Mallow / Fermoy Flood Forecasting and Warning System to Ballyduff would be of benefit.

9.6.4 Aglish AFA

The preferred flood risk management option as identified in the MCA is Flood Defences which consists of fluvial flood defences comprising of walls and embankments. There was limited feedback provided at the Aglish PCD which indicated that the public agreed with the preferred option indicated in the MCA.

9.6.5 Youghal AFA

The preferred flood risk management option as identified in the MCA is Tidal Monitoring and Flood Defences which consists of tidal flood defences along the quays and to the rear of properties comprising of sea walls. Removable barriers / gates are included at certain locations to maintain existing access points.

9.7 Assessment of Options

This assessment utilises the results of the detailed MCA process used to select the preferred flood risk management options which included the use of the 11 SEA objectives presented in Chapter 7. The methodologies used for this SEA assessment and evaluation process are described in Section 3.3.4 and Chapter 7. The assessment of options is presented below at two different scales:

- i Unit of Management (UoM) General Options; The general UoM options are assessed considering the UoM as one area; and
- i Area of Further Assessment (AFA) Options: The proposed AFA options are assessed for each AFA separately.

9.7.1 Unit of Management (UoM) General Options

The unit of Management (UoM) General Options are assessed considering the UoM as one area and the outputs of this assessment are presented below in Table 9.2. The general measures at UoM scale are non-structural measures with a focus on:

- i Improving the planning process to ensure that unsuitable development does not occur in flood risk areas;
- i Increasing awareness of flood risk and promoting the implementation of flood defence or flood risk reduction measures at individual properties; and
- i Improving future flood predications.

The proposed UoM scale measures are assessed having regard to the SEA Scoring Matrix outlined in Table 9.1.

Table 9.1: SEA Scoring Matrix

Score	Key	Description
+5	vvv	Achieving aspirational target
+4	vv	
+3	v	Partly achieving aspirational target
+2	v	Exceeding minimum target
+1	v	
0	o	Meeting minimum target
-1	x	Just failing minimum target
-2	x	
-3	xx	Partly failing minimum target
-4	xx	
-5	xxx	Fully failing minimum target

-999.99	xxx	Unacceptable negative impact where feasible alternative exists
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The key outcomes of the assessment are as follows:

- i The UoM scale measures have a neutral or positive effect on the SEA Objectives overall;
- i The proposed measures have potential to have a positive impact in terms of SEA objectives that relate to the social and health SEA Objectives, as the implementation of the measures will result in reduced flooding of property. Reduced flooding will result in benefits in terms of protection of health, social infrastructure and amenity and enterprise;
- i The proposed measures have potential to have a positive impact in terms of SEA objectives that relate to the Archaeological and architectural SEA Objectives, as the implementation of the measures will result in reduced flooding of buildings and urban areas where these features are located;
- i The proposed measures are non-intrusive in general and so do not have potential to impact on the SEA objectives that relate to water quality and ecological conservation. The exception to this is the implementation of the *Guidelines on the Planning System and Flood Risk Management* as these guidelines outline additional requirements to ensure the protection of Water Framework Directive (WFD) status and Natura 2000 sites as required in the planning process.

Table 9.2: SEA Assessment of Proposed UoM Scale Flood Risk Management Options.

Criteria	Objective	Sub-Objective	Planning Control				
				Land Use Management	SUDS	Public Awareness	Flood Forecasting
Social	Minimise risk to human health and life	Minimise risk to human health and life of residents	This measure will ensure that best practice planning will be implemented, thereby reducing the construction of inappropriate developments in flood risk areas. This will reduce the potential for flooding and resultant health impacts that result from contaminated flood water, flooded households and other buildings.	This measure will ensure that effective land use management will be implemented, thereby reducing the construction of inappropriate developments in flood risk areas. This will reduce the potential for flooding and resultant health impacts that result from contaminated flood water, flooded households and other buildings.	The implementation of SUDS as part of new developments will ensure that the new properties will be better protected from flooding, thereby reducing the negative health effects impacted by flooding.	The raising of awareness with regard to the requirement to implement flood management measures by each property owner will ensure that the number of properties effected by flooding will be reduced, thereby reducing the negative health effects impacted by flooding.	The improvement of flood predication will result in a reduction in the impacts of flood events in the long term with resultant benefits on health.
		Minimise risk to high vulnerability properties	This measure will ensure that best practice planning will be implemented, thereby reducing the construction of inappropriate developments in flood risk areas. This will reduce the potential for flooding on vulnerable properties	This measure will ensure that effective land use management will be implemented, thereby reducing the construction of inappropriate developments in flood risk areas. This will reduce the potential for flooding on vulnerable properties	The implementation of SUDS as part of new developments will ensure that the new properties will be better protected from flooding, thereby reducing the potential for flooding on vulnerable properties.	The raising of awareness with regard to the requirement to implement flood management measures by each property owner will ensure that the number of vulnerable properties affected by flooding will be reduced.	The improvement of flood predication will result in a reduction in the impacts of flood events on vulnerable properties in the long term.
	Minimise risk to community	Minimise risk to social infrastructure and amenity	This measure will ensure that best practice planning will be implemented, thereby reducing the construction of inappropriate developments in flood risk areas. This will reduce the potential for flooding on social infrastructure and amenity	This measure will ensure effective land use management will be implemented, thereby reducing the construction of inappropriate developments in flood risk areas. This will reduce the potential for flooding on social infrastructure and amenity	The implementation of SUDS as part of new developments will ensure that the new properties will be better protected from flooding, thereby is reducing the potential for flooding on social infrastructure and amenity.	The raising of awareness with regard to the requirement to implement flood management measures by each property owner will ensure a reduction in impacts on social infrastructure and amenity.	The improvement of flood predication will result in a reduction in the impacts of flood events on social infrastructure in the long term.
		Minimise risk to local employment	This measure will ensure that best practice planning will be implemented, thereby reducing the construction of inappropriate developments in flood risk areas. This will reduce the potential for impacts on enterprises from flooding	This measure will ensure effective land use management will be implemented, thereby reducing the construction of inappropriate developments in flood risk areas. This will reduce the potential for impacts on enterprises from flooding	The implementation of SUDS as part of new developments will ensure that the new properties will be better protected from flooding, thereby is reducing the potential for flooding on enterprises.	The raising of awareness with regard to the requirement to implement flood management measures by each property owner will ensure a reduction in impacts on enterprises.	The improvement of flood predication will result in a reduction in the impacts of flood events in the long term.
Environmental	Support the objectives of the WFD	Provide no impediment to the achievement of water body objectives and, if possible, contribute to the achievement of water body objectives.	This measure will reduce the occurrence of developments within flood risk areas in proximity to rivers and streams. This will result in a reduction in future anthropogenic pressures on rivers and streams, allowing waterbodies to achieve required water status objectives.	This measure will reduce the occurrence of developments within flood risk areas in proximity to rivers and streams. This will result in a reduction in future anthropogenic pressures on rivers and streams, allowing waterbodies to achieve required water status objectives.	This measure will not have a significant effect on the achievement of good water status as required under the water framework directive.	This measure will not have a significant effect on the achievement of good water status as required under the water framework directive.	This measure will not have a significant effect on the achievement of good water status as required under the water framework directive.
	Support the objectives of the Habitats and Birds Directives	Avoid detrimental effects to, and where possible enhance, Natura 2000 network, protected species and their key habitats, recognising relevant landscape features and stepping stones.	The guidelines specify the requirement for a full assessment of sensitive habitats under the EU Habitats Directive as part of an evaluation of developments. This will ensure the protection of Natura 2000 sites.	This measure will not have a significant effect on the conservation status of Natura 2000 sites.	This measure will not have a significant effect on the conservation status of Natura 2000 sites.	This measure will not have a significant effect on the conservation status of Natura 2000 sites.	This measure will not have a significant effect on the conservation status of Natura 2000 sites.
	Avoid damage to, and where possible enhance, the flora and fauna of the catchment	Avoid damage to and where possible enhance the flora and fauna of the catchment	This measure will reduce the occurrence of developments within flood risk areas in proximity to rivers and streams. This will result in a reduction in future anthropogenic pressures habitats in the vicinity of streams, allowing for the conservation of relevant habitats.	This measure will not have a significant effect on the conservation status of Natura 2000 sites.	This measure will not have a significant effect on the conservation status of Natura 2000 sites.	This measure will not have a significant effect on the conservation status of Natura 2000 sites.	This measure will not have a significant effect on the conservation status of Natura 2000 sites.

Criteria	Objective	Sub-Objective	Planning Control				
				Land Use Management	SUDS	Public Awareness	Flood Forecasting
	Protect, and where possible enhance, fisheries resource within the catchment	Maintain existing, and where possible create new, fisheries habitat including the maintenance or improvement of conditions that allow upstream migration for fish species.	This measure will reduce the occurrence of developments within flood risk areas in proximity to rivers and streams. This will result in a reduction in future anthropogenic pressures on rivers and streams, allowing fisheries habitats to be conserved.	This measure will reduce the occurrence of developments within flood risk areas in proximity to rivers and streams. This will result in a reduction in future anthropogenic pressures on rivers and streams, allowing fisheries habitats to be conserved.	This measure will not have a significant effect on the conservation status of Natura 2000 sites.	This measure will not have a significant effect on the conservation status of Natura 2000 sites.	This measure will not have a significant effect on the conservation status of Natura 2000 sites.
	Protect, and where possible enhance, landscape character and visual amenity within the river corridor	Protect, and where possible enhance, visual amenity, landscape protection zones and views into / from designated scenic areas within the river corridor.	This measure will not have a significant effect on the conservation status of Natura 2000 sites.	This measure will not have a significant effect on the conservation status of Natura 2000 sites.	This measure will not have a significant effect on the conservation status of Natura 2000 sites.	This measure will not have a significant effect on the conservation status of Natura 2000 sites.	This measure will not have a significant effect on the conservation status of Natura 2000 sites.
	Avoid damage to or loss of features, institutions and collections of cultural heritage importance and their setting	Avoid damage to or loss of features, institutions and collections of architectural value and their setting and improve their protection from extreme floods.	This measure will ensure that best practice planning will be implemented, thereby reducing the construction of inappropriate developments in flood risk areas. This will reduce the potential for impacts on architectural features from flooding	This measure will ensure that best practice planning will be implemented, thereby reducing the construction of inappropriate developments in flood risk areas. This will reduce the potential for impacts on architectural features from flooding	This measure will not have a significant effect on the conservation status of architectural features.	The raising of awareness with regard to the requirement to implement flood management measures by each property owner will ensure a reduction in impacts on architectural features.	The improvement of flood predication will result in a reduction in the impacts of flood events in the long term.
		Avoid damage to or loss of features, institutions and collections of archaeological value and their setting and improve their protection from extreme floods where this is beneficial.	This measure will ensure that best practice planning will be implemented, thereby reducing the construction of inappropriate developments in flood risk areas. This will reduce the potential for impacts on archaeological features from flooding	This measure will ensure that best practice planning will be implemented, thereby reducing the construction of inappropriate developments in flood risk areas. This will reduce the potential for impacts on archaeological features from flooding	This measure will not have a significant effect on the conservation status of archaeological features.	This measure will not have a significant effect on the conservation status of archaeological features.	The improvement of flood predication will result in a reduction in the impacts of flood events in the long term.

9.8 Assessment of Area of Further Assessment Options

9.8.1 Non-structural measures

The proposed non-structural measures that are viable for UoM 18 are as follows:

- | Planning Control;
- | SUDS;
- | Public Awareness;
- | Land Use Management.

As the non-structural measures at the AFA scale are identical to the proposed non-structural measures at the UoM scale, the assessment of these options is presented in Table 9.2.

9.8.2 Structural Measures

The proposed measures at an AFA scale have been assessed for the five AFAs in UoM 18. Each AFA appraisal is presented in table format in this section.

UoM	Munster Blackwater
Area / Location	Kanturk
Option	Option 2 – Storage & Flood Defences
Code	IE-18-IE-AFA-180254-KK02-M33
Description	The provision of a storage area on the Dalua River upstream of the town along with fluvial flood defences. Fluvial flood defences on the Dalua and Allow rivers comprising of walls and embankments.



MCA Appraisal Outcomes		
Objective	Score	Comment
1.a.i	3.86	Calculated as per Guidance Note 28
1.a.ii	4.95	Calculated as per Guidance Note 28
1.b.i	2.66	Calculated as per Guidance Note 28
1.b.ii	1.21	Calculated as per Guidance Note 28
3.a	2	Kanturk is at risk of fluvial flooding. Both rivers are assigned good water status under the WFD, both are tributaries of the River Blackwater. These waterbodies are considered sensitive. Flood protection measures can assist in achieving the objectives of the WFD by preventing recurring flooding (4) which could result in the deterioration of water quality. measures reduce the risk of flooding on significant polluting sources downstream. Short term impacts associated with construction of walls and embankments within the town (-2). May require excavation of the bank of River during the construction stage This would result in significant emissions of sediment to the waterbody and downstream. (-2)The proposed measures online storage area and sluice are short term or intermittent to the achievement of WB objectives resulting in potential change in the hydrological regime resulting from the construction of the embankment.

3.b	-3	<p>Otter are common throughout the area. There is potential for disturbance to otter on the Dalua in the rural location of the storage area (-3). Construction of flood walls and embankments can cause temporary release of sediment and pollutants to the watercourse which can negatively impact fishery habitat (-1).</p> <p>Note: the FPM populations in the Allow occur upstream of Kanturk. There are no known populations downstream of Kanturk in the Allow. Also habitat in the Blackwater River (between the Allow-Blackwater confluence and Lombardstown Bridge in Mallow) is considered as sub-optimal for pearl mussel. There is no potential for impact (0).</p>
3.c	-3	<p>Construction of flood walls and embankments can cause temporary release of sediment and pollutants to the watercourse which can negatively impact fishery habitat. There is existing heavy sedimentation in the watercourse as noted during pearl mussel survey (-1).</p> <p>Himalayan balsam (<i>Impatiens glandulifera</i>), an invasive species has been documented in Kanturk at the pedestrian footbridge. There is potential for spread of this invasive species during the works (-1).</p> <p>Badger are likely to occur in the woodland west of the storage location. there is potential for temporary disturbance during the works (-3)</p>
3.d	-3	<p>The Allow and Dalua rivers both form part of the River Blackwater SAC. The qualifying criteria for this Natura 2000 site include Salmon and river lamprey. As a result these rivers are considered to be sensitive water bodies. Short term minor impacts are likely during the construction phase as all the measures are in close proximity to the waterbodies. This means that any sediment or other materials lost during the construction could be washed into the river causing pollution (-2). The provision of a storage area along the existing stream (in an area designated as an SAC), will have a negative impact on fisheries habitats, due to the recurring flooding of this area and the negative impact that this will have in terms of increased pollution downstream and the impacts of increased flow on spawning areas, when the flood waters are released from the reservoir (-4) The reduction in flood events will reduce the occurrence of recurring events where flood waters entrained sediment and other contaminants from roads and streets and washed them into the river. An improvement in water quality will benefit fish habitat present (1).</p>
3.e	-4	<p>The landscape in the Kanturk area is defined as "broad marginal middle ground valley" and is defined as high value. The LCA recommends the requirement to "protect rivers Blackwater, Dulua and Allow and their surrounding floodplains. As a result this landscape is considered sensitive. There will be a permanent impact on the landscape and visual amenity in the town centre of Kanturk arising from the proposed measures, including an impact on a public park with amenity use, however the visual impact will be less than other options as the barriers will be lower (-3). Furthermore, there will be a requirement to remove existing vegetation and trees along the length of the river in the town centre. This will result in a temporary negative impact on the visual amenity in the town. (-1), prior to the re-establishment of vegetation. The development of the reservoir will require the construction of large berms (up to 8m). These berms are in close proximity to residential receptors. As a result there is considered to be a significant permanent impact on the landscape and visual amenity (-4)</p>
3.f.i	2	<p>Kanturk is designated as an Architectural Conservation Area (ACA). In addition, there are a number of NIAHs/RPS's in the town. These include three bridges over the River Allow. The provision of flood defences within the town centre will result in the protection of a number of NIAHs and RPS from possible flood damage in the future (3). However, the provision of flood defences in the town have potential to have a permanent setting impact on a number of RPSs/NIAH, however these impacts are reduced when compared to other options as the flood walls and embankments will be lower (-1)</p>
3.f.ii	0	<p>There are three designated RMPs within the town centre. One of these is a site of a mill of which there is no above ground evidence. The remaining two RMPs are bridges. The provision of flood defences within the town centre will have a permanent impact on the setting of these RMPs. However, the impacts will be less than for other options due to the reduced height of the barrier (-1). There will be some protection of the RMPs listed in Kanturk from the future occurrence of flooding. However, as two of the designated sites are bridges, they will be afforded only limited protection by the proposed measures. (1)</p>

Strategic Environmental Assessments

Key Conclusions:

- The construction of this option could result in significant negative impacts on the water body status without appropriate mitigation. This measure includes the construction of instream works. In the absence of appropriate mitigation, this would result in significant emissions of sediment to the waterbody and downstream.
- Both the Dalua and Allow Rivers are tributaries of the Blackwater River and are within the Blackwater River SAC (002170). Both rivers are assigned good water status under the WFD objective. Flood protection measures can assist in achieving the objectives of the WFD by preventing flooding downstream.
- There are a number of species and habitats of conservation importance within the AFA, such as lamprey and otter and floating river vegetation. Juvenile Lamprey have been recorded in proximity to Allen's Bridge, immediately upstream of the indicative location of the flood storage area on the Dalua River. The construction of the control structure is likely to result in the permanent loss of juvenile Lamprey habitat. The control structure for the storage area can act as a barrier to fish.
- Otter have been documented throughout the area, on the Allow River upstream and downstream of Kanturk, and on the Dalua River and its tributaries upstream of Kanturk. An 8m high embankment will be required at the head of the storage area on the Dalua River. Whilst the embankment will not act as a barrier to connectivity between otter habitat, it is likely that the construction of the works will require removal of significant riparian habitat and likely to damage otter resting areas. This is the least preferred option in terms of impacts on the Birds and Habitat Directive.
- Himalayan balsam (*Impatiens glandulifera*), an invasive species has been documented in Kanturk at the pedestrian footbridge. In the absence of appropriate mitigation there is potential for spread of this invasive species during the construction phase.
- The landscape in the Kanturk area is defined as "broad marginal middleground valley" and is defined as high value. The Landscape Character Assessment (LCA) recommends the requirement to "protect rivers Blackwater, Dulua and Allow and their surrounding floodplains. As a result this landscape is considered sensitive. Option 2 includes for the construction of considerable high embankment. The embankment is in close proximity to residential receptors. This option will have a permanent adverse impact on the visual amenity of these receptors. This option also includes construction of flood walls within the town however to a lesser extent than option 1.
- Kanturk is designated as an Architectural Conservation Area (ACA). Whilst the construction of flood walls as part of Option 1 provide flood protection to Kanturk town, the construction of walls within the town will likely change the setting of the town however these impacts are reduced when compared to other options as the flood walls and embankments will be lower.
- This option will have a neutral impact archaeological and cultural heritage of the AFA.

Adaptability to Potential Future Changes

- Option is adaptable to climate change – Score 2.33

Public Consultation Outcomes

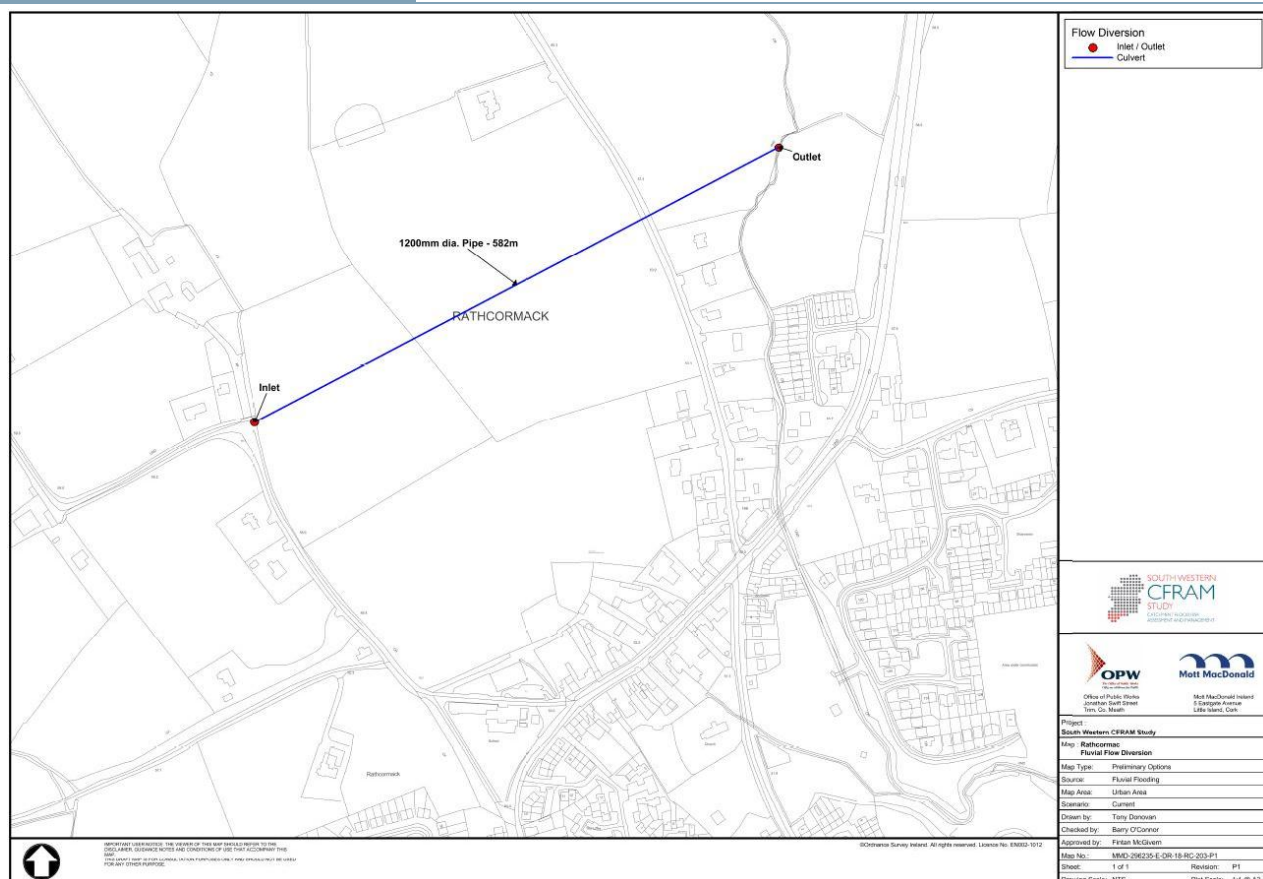
- The feedback provided at the Public Consultation Day was in support of Option 2 – Storage & Flood Defences.

Other Issues / Conclusions

The preferred flood risk management option as identified in the MCA is Option 3 – Conveyance & Flood Defences. However, the feedback received at the Public Consultation Day was against the removal of the weirs which are important to local angling. Considering the feedback and alternative viable and cost effective options, the preferred option has been identified as Option 2 – Storage & Flood Defences.

Table 9.4: Rathcormac AFA – Outcomes of SEA Appraisal

UoM	Munster Blackwater
Area / Location	Rathcormac
Option	Option 2 – Flow Diversion
Code	IE-18-IE-AFA-180265-RC03-M33
Description	Diversion of flow from the Kilbrien Stream to the Shanowen River through the construction of a culvert north of the town



MCA Appraisal Outcomes

Objective	Score	Comment
1.a.i	4.8	Calculated as per Guidance Note 28
1.a.ii	0	Calculated as per Guidance Note 28
1.b.i	4.87	Calculated as per Guidance Note 28
1.b.ii	4.72	Calculated as per Guidance Note 28
3.a	-1	The stream is currently modified and channelized. The construction of the inlet and outlet would result in significant emissions of sediment to the stream during construction (-1). This would result in significant emissions of sediment to the Shanowen river and Kilbrien Stream. In the event that the flow diversion is only a temporary option used during very high flow conditions, it will have a recurring impact on the flow regime on both waterbodies (-3). The reduction in flood events due to the measures will have an intermittent positive effect on the water quality of the stream

3.b	-	Construction works can result in loss of sediment and pollutants to the watercourses which may ultimately enter the River Bride with potential to impact qualifying features of the SAC e.g. lamprey. The significance of impact can be mitigated against by staging of the works, working off line and provision of sediment controls on site (-1). Permanent diversion of the Kilbrien Stream into the Shanowen River will increase flows in the Shanowen River. Increased flow velocity can result in scouring and increased sediment suspension which will increase the already high level of sediment deposition at the confluence with the River Bride. There will be an associated necessity for maintenance (dredging) and therefore a risk of significant sedimentation of the Bride (-3)
3.c	-1	The diversion will be through improved agricultural grasslands and hedgerows which are managed and are of low ecological value. Trenching method can be such that hedgerows / treelines are retained where possible (0). There is potential that otter commute along the Shanowen River. There is potential for interruption of commuting route during construction works (-1)
3.d	-1	Potential short term adverse impacts due to construction stage associated with inlet and outlet (-1).
3.e	-1	The landscape in the area is not designated for landscape and as such is considered of low value. The construction of the works will have a temporary impact on the landscape and visual amenity during the construction phase (-1).
3.f.i	0	There are no direct impacts on elements of archaeological heritage or their settings (0)
3.f.ii	0	There are no direct impacts on elements of architectural heritages or their settings (0).

Strategic Environmental Assessments

Key Conclusions:

Rathcormac is at risk from fluvial flooding. There are no designated ecological sites within the AFA, however the Kilbrien Stream and Shanowen River are tributaries of the River Bride which is part of the Blackwater River SAC. there is potential for recurring negative impacts associated with diversion of flow into the Shanaowen River during storm events. The increase flow volume and velocity in the Shanowen River during storm events can cause bankside erosion and associated loss of habitat, however it is noted that the river has been assessed as having the capacity to physically accommodate the increase volume without overtopping its bank.

Instream works are required to facilitate the inlet and outlet flows. The construction of this option could result in significant temporary negative impacts from sedimentation, accidental pollution without appropriate mitigation.

Juvenile Lamprey have been recorded in the River Bride. There are no documented records for the Shanowen River. It is unlikely that lamprey would be attracted into the flow diversion channel and ultimately into the Kilbrien stream. Similarly, Atlantic Salmon are unlikely to utilise the Shanowen River. The diversion will be through improved agricultural grasslands and hedgerows which are managed and are of low ecological value

This option will have a neutral impact architectural and archaeological and cultural heritage of the AFA.

Adaptability to Potential Future Changes

Option is adaptable to climate change – Score 2.0

Public Consultation Outcomes

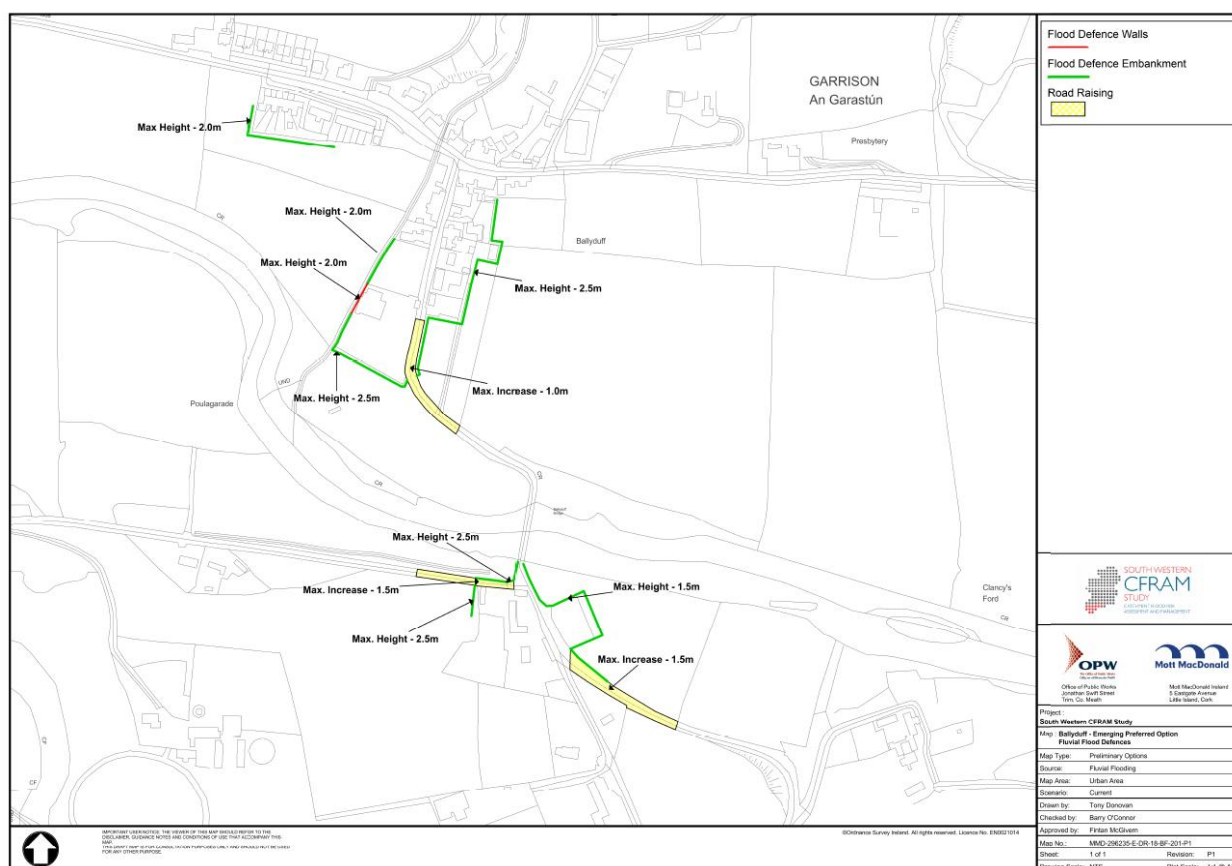
The feedback received at the public consultation day does not support this option. The feedback indicated that the public do not feel that there is a significant flood risk in the area and that recent floods were due to blockage and lack of maintenance at culvert etc.

Other Issues / Conclusions

The preferred flood risk management option as identified in the MCA is Option 1 – Storage. However, there was strong opposition to this option received at the Public Consultation Day. Considering the feedback and alternative viable and cost effective options, the preferred option has been identified as Option 2 – Flow Diversion.

Table 9.5: Ballyduff AFA – Outcomes of SEA Appraisal

UoM	Munster Blackwater
Area / Location	Ballyduff
Option	Option 1 – Flood Defences
Code	IE-18-IE-AFA-180248-BF01-M33
Description	Fluvial flood defences comprising of walls, embankments and road raising.



MCA Appraisal Outcomes

Objective	Score	Comment
1.a.i	4.2	Calculated as per Guidance Note 28
1.a.ii	0	Calculated as per Guidance Note 28
1.b.i	4.5	Calculated as per Guidance Note 28
1.b.ii	4.75	Calculated as per Guidance Note 28
3.a	-2	Ballyduff is located along the Blackwater and is at risk of fluvial flooding. There are no significant polluting sources at risk from flooding in 1% AEP. It is considered a sensitive waterbody. Flood protection measures can assist in contributing to maintaining the objectives of the WFD by preventing flooding, which if flooded could result in the deterioration of water quality, however current status is good, so flooding appears not be impacting WFD status. (-2) short term impacts associated with construction of walls and embankments
3.b	-1	Potential effects during construction on species identified as qualifying criteria of the River Blackwater SAC including lamprey, salmon and floating vegetation and FWPM. However the introduction of effective mitigation measures during construction could minimise the potential for impact on these species.
3.c	-1	Potential for localised impacts on flora and fauna during the construction phase of the project. However effective mitigation should minimise the potential for impacts.

3.d	-2	Temporary impacts on sensitive waterbody during construction are considered likely. However effective mitigation should minimise the potential for impacts.
3.e	-4	According to the Waterford County Development Plan, the approach roads into Ballyduff are scenic routes. The proposed measures include construction of embankments of approximate height 1.5m to 2m. Currently there are wide open views of the river along the approach roads bound by 0.5m high stone walls. The proposed measures will potentially change the character of the landscape in the absence of appropriate design.
3.f.i	1	RPS/NIAH structures and buildings at risk from flooding within the 1% AEP including a 17th Century house (castle) and the Ballyduff bridge. (2) The proposed measures will reduce the risk of flooding on the designated sites within the village but does not provide protection to the Ballyduff Castle downstream. However there is a minor setting impact on a number of buildings within the village due to the construction of walls 2.5m in height. (-1)
3.f.ii	0	No impact

Strategic Environmental Assessments

Key Conclusions:

- Ballyduff AFA is located along the Blackwater River and is at risk of fluvial flooding. There are no significant polluting sources at risk from flooding in 1% AEP. The waterbody is assigned a good water status under the WFD. It is considered a sensitive waterbody. Flood protection measures can assist in contributing to maintaining the objectives of the WFD by preventing flooding. The construction of this option could result in significant temporary negative impacts from sedimentation, accidental pollution without appropriate mitigation
- Lamprey have been recorded within the River Blackwater near Ballyduff. Sea lamprey have been observed spawning downstream of Ballyduff and Juvenile lamprey have been recorded upstream of Ballyduff. Impacts on lamprey/Atlantic salmon both qualifying interests of the SAC from sedimentation associated with flood embankment construction are probable given the close proximity of spawning gravels downstream of the AFA.
- The Munster Blackwater Freshwater Pearl Mussel Sub-Basin Plan (Anon, 2010) identifies pearl mussels at Ballyduff.
- According to the Waterford County Development Plan, the approach road into Ballyduff is scenic routes. The proposed measures include construction of embankments of approximate height 1.5m to 2m. Currently there are wide open views of the river along the approach roads bound by 0.5m high stone walls. The proposed measures will potentially change the character of the landscape in the absence of appropriate design.
- This option will have a neutral impact on archaeological and cultural heritage of the AFA.

Adaptability to Potential Future Changes

Option is adaptable to climate change – Score 3.5

Public Consultation Outcomes

The feedback provided at the Public Consultation Day was in support of Option 1 – Flood Defences.

Other Issues / Conclusions

The MCA has identified Option 1 – Flood Defences as the preferred Flood Risk Management Option.

Table 9.6: Aglish AFA –SEA Outcomes Appraisal

UoM	Munster Blackwater
Area / Location	Aglish
Option	Option 1 – Flood Defences
Code	IE-18-IE-AFA-180247-AH01-M33
Description	Fluvial flood defences comprising of walls and embankments.

BALLYNAP BAILE NA R

Legend:
Flood Defence Walls (Red line)
Flood Defence Embankments (Green line)

Map Labels:
Height - 1.1m
Aglish House
Aglish
CUL DE SAC
Height - 1.1m
Height - 1.1m
Height - 1.1m
Height - 1.1m

Logos:
OPW (Office of Public Works)
Mott MacDonald

Project: South Western CFRAM Study
Map: Aglish
Plan: Flood Defences
Map Type: Preliminary Options
Source: Fluvial Flooding
Map Area: Urban Area
Scale: Current
Drawn by: Barry O'Connor
Checked by: Barry O'Connor
Approved by: Fintan McGinn
Map No.: MWD-206235-E-008-18-A01-2011-P1
Sheet: 1 of 1
Revisions: P1
Drawing Scale: NTS
Plot Scale: 1:1 @ A3

MCA Appraisal Outcomes		
Objective	Score	Comment
1.a.i	4.74	Calculated as per Guidance Note 28
1.a.ii	0	Calculated as per Guidance Note 28
1.b.i	0	Calculated as per Guidance Note 28
1.b.ii	4.73	Calculated as per Guidance Note 28
3.a	-2	This AFA occurs along the Aglish stream which is a tributary of the Goish River, these waterbodies are assigned good water status under the WFD. These watercourses discharge into the River Blackwater SAC. The Aglish stream is channelised along the AFA. There are no significant polluting sources at risk from flooding. (-2) There are short term negative impacts associated with the construction
3.b	0	The Aglish Stream flows into the Goish River which is part of the Blackwater River SAC. The AFA does not occur within the boundary of the SAC. The stream has no capacity to support qualifying features of the Blackwater River SAC given its heavy modification (culverting and channelisation) The construction of the local defences will therefore have no impact on availability of habitat to qualifying features (0).

3.c	-2	The footprint of the walls will be on road verges and agricultural grassland (0). The riparian habitat on the Aglish stream is considered sub-optimal habitat for otter and it is unlikely that otters have established holts in the area. The environs of Aglish have a high habitat suitability index to support bat species. Natterer's, long-eared, pipistrelle and Daubenton's bats have been recorded in the area. Potential short term adverse impacts due to construction stage associated with flood walls (-2)
3.d	-1	Potential short term adverse impacts due to construction stage associated with flood walls (-1). The stream is currently channelized and engineered in the area
3.e	-1	According to the Waterford Development Plan, there are no scenic or visually sensitive landscapes within the AFA. The propose measures includes the construction of low lying wall parallel to the local approach road adjacent to the local school and within the town at the rear of a dwelling. There is a currently a low lying boundary hedgerow. The construction of the wall and embankment are unlikely to change the character of the area or change the existing views from the property. Temporary negative impacts are likely to occur during the construction phase (-1)
3.f.i	0	There are no architectural features at risk within the 1% AEP Flood Extent
3.f.ii	0	There are no recorded monuments or sites at risk within 1% AEP flood extent

Strategic Environmental Assessments

Key Conclusions:

- This AFA occurs along the Aglish stream which is a tributary of the Goish River, these waterbodies are assigned good water status under the WFD. The Aglish stream is channelised along the AFA. There are no significant polluting sources at risk from flooding. The construction of this option could result in temporary negative impacts from sedimentation, accidental pollution without appropriate mitigation.
- The Aglish AFA occurs outside the boundary of the Blackwater River SAC. The stream is hydrologically connected to the SAC. The stream has no capacity to support qualifying features of the Blackwater River SAC given its heavy modification (culverting and channelization).
- The footprint of the walls will be on road verges and agricultural grassland. The riparian habitat on the Aglish stream is considered sub-optimal habitat for otter and it is unlikely that otters have established holts in the area.
- According to the Waterford Development Plan, there are no scenic or visually sensitive landscapes within the AFA. The propose measures includes the construction of low lying wall parallel to the local approach road adjacent to the local school and within the town at the rear of a dwelling. There is a currently a low lying boundary hedgerow. The construction of the wall and embankment are unlikely change the character of the area or change the existing views from the property. Temporary negative impacts are likely to occur during the construction phase.
- This option will have a neutral impact on architectural, archaeological and cultural heritage of the AFA.

Adaptability to Potential Future Changes

- Option is adaptable to climate change – Score 2.5

Public Consultation Outcomes

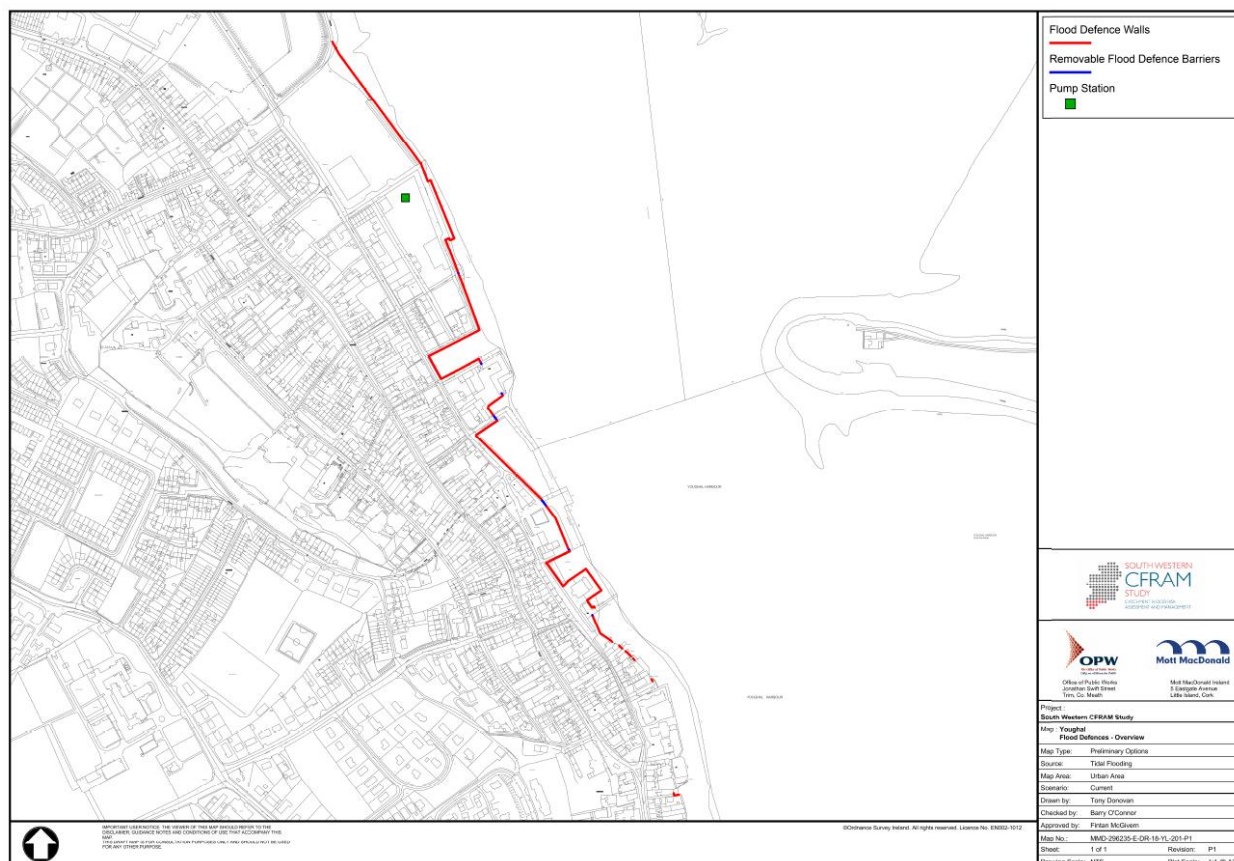
- There was limited feedback received at the Public Consultation Day. However, this was in support of Option 1 – Flood Defences.

Other Issues / Conclusions

The MCA has identified Option 1 – Flood Defences as the preferred Flood Risk Management Option.

Table 9.7: Youghal AFA – SEA Outcomes Appraisal

UoM	Munster Blackwater
Area / Location	Youghal
Option	Option 1 – Monitoring and Flood Defences
Code	IE-18-IE-AFA-180267-YL01-M61/ IE-18-IE-AFA-180267-YL01-M33
Description	Tidal monitoring to be carried out in advance of any mitigation works to review and determine the design tide plus surge level. Tidal flood defences along the quays and to the rear of properties comprising of sea walls. Removable barriers / gates are included at certain locations to maintain existing access points.



MCA Appraisal Outcomes

Objective	Score	Comment
1.a.i	4.50	Calculated as per Guidance Note 28
1.a.ii	0	Calculated as per Guidance Note 28
1.b.i	4.76	Calculated as per Guidance Note 28
1.b.ii	4.56	Calculated as per Guidance Note 28
3.a	-2	Youghal is located in east Cork at the mouth of the Blackwater. The AFA is located on the Blackwater Estuary SPA and the Blackwater River SAC. These watercourses are of moderate WFD status and have been identified as nutrient sensitive areas. There are no significant polluting sources at risk from flooding. There is potential for a short term impact during construction (-2)

3.b	-1	Flood defence works will be confined to the urban fabric of the town. The Annex I habitats: Blackwater Estuary and mudflats and sandflats not covered by sea water at low tide and coarse sediments occur within the Blackwater Estuary in proximity to Youghal. There will be no requirement for machinery movement within these Annexed habitats. Likelihood of impact is low. Installation of flood walls along quays has the potential to cause disturbance to species of conservation concern through physical presence of construction machinery and personnel, noise generated by the works and possibly artificial lighting that may be used in the darker winter months, but it is possible to implement effective mitigation measures (-1).
3.c	-2	The proposed defences will be confined to the urban fabric of the town. There will be short term temporary construction impacts on the existing ecology around the quays
3.d	0	The River Blackwater is renowned for its Salmon (<i>salmon salar</i>) fishing and lamprey. These are QI of the SAC. Fishing rights on the estuarine stretch of the River Blackwater and for Youghal Harbour are owned by the Duke of Devonshire, the rights dating back to 1753. The estuary provides good shore fishing for species such as Flounder, Bass and Codling; shore angling marks include the mouth of the Tourig River, Ferry Point upstream of the works area and the remains of the old bridge while charter boats are available from Youghal harbour. The proposed measures include the construction of flood defence wall ranging in height from 1.1-1.4m, the construction of the wall have potential to restrict access to the quays area. The proposed measures will have no impact on the fisheries habitat (0).
3.e	-3	Youghal is designated as a high value landscape. The town occurs within the Broad Bay Coast landscape character type. This landscape has a very high value and very high sensitivity on a county level. The proposed measures include the construction of low lying walls along the quays which will have a short term impact (-3).
3.f.i	3	There are a number of listed architectural features at risk from 0.5% AEP flood event which will be protected from flooding. There will be no direct impacts on any of these features resulting from the provision of the low level flood walls.
3.f.ii	3	There are a number of listed archaeological features at risk from 0.5% AEP flood event which will be protected from flooding. There will be no direct impacts on any of these features resulting from the provision of the low level flood walls.

Strategic Environmental Assessments

Key Conclusions:

- Youghal AFA is located in east Cork at the mouth of the Blackwater in Youghal Bay and Estuary. The AFA is at risk from both fluvial and tidal flooding, however fluvial risk is minor and there are no receptors at risk. There are no significant polluting sources at risk from flooding. Youghal strand bathing waters are assigned a low/moderate status. These occur outside the AFA boundary.
- Option 1 requires the construction of local defence wall. These walls will be confined to the urban fabric of the town. There will be no requirement for machinery movement within the Annexed habitats. Installation of flood walls along quays has the potential to cause disturbance to species of conservation concern through physical presence of construction machinery and personnel, noise generated by the works and possibly artificial lighting that may be used in the darker winter months, but it is possible to implement effective mitigation measures.
- Option 1 requires the construction of low lying walls along the quays, it is considered the preferred option from a landscape and visual objective.
- There are considerable numbers of NIAHs at risk from flooding within the town. The provision of all options will perform well in terms of their protection to the AFA and its architectural and archaeological heritage, however there are potential for permanent long term negative impacts arising from the setting of the walls on the quay within the visual envelope of the town.
- From a landscape and visual objective, Option 1 is considered to be the preferred option. Whilst the measures include the construction of low lying flood walls along the quays, with appropriate design the potential impacts can be mitigated.

Adaptability to Potential Future Changes

Option is adaptable to climate change – Score 1.33

Public Consultation Outcomes

The feedback provided at the Public Consultation Day was in support of Option 1 – Flood Defences.

Other Issues / Conclusions

The MCA has identified Option 1 – Flood Defences as the preferred Flood Risk Management Option.

9.9 Cumulative/In Combination Effects

In combination effects are considered to assess if there is potential for significant in combination effects between (a) different plan options and (b) between the FRMP and other plans and strategies.

9.9.1 Between individual flood management options

As identified in Tables 9.3 to 9.7, for each of the AFAs it is predicted that there will be no additional negative in-combination effects between all related components of the FRMP taking into account the potential impacts with regard to the SEA objectives.

If all the proposed flood risk management options identified in the FRMP were implemented in parallel, the in-combination effects of the proposed options would be no worse than the predicted negative effects when assessed individually.

This is because the proposed options are either geographically distinct from each other and there is limited potential for interactions; or the nature of the proposed options are such that any impacts would be neutral or mutually beneficial.

9.9.2 With other relevant plans and strategies

As identified in Tables 9.3 to 9.7, there is potential for interactions between the FRMP components and the external plans and strategies identified in Chapter 5; giving rise to the potential for resulting in-combination effects.

Table 9.8 provides details of any interactions and linkages between these plans, which could give rise to in-combination effects, for those AFAs where the proposed options contained in the FRMP have been identified as likely to result in positive or negative effects. These include the following:

- i **Strategic, County and Local development plans:** Table 9.3 provides details of any interactions and linkages between these plans and the FRMP for UoM 18, which could give rise to in-combination effects,
- i **SWRBD River Basin Management Plan and draft 2nd cycle River Basin Management Plan:** Consideration of the requirements of this plan have been fully integrated with the development of the FRMP and the SEA process through the inclusion of a SEA objective requiring the “support of the objectives of the Water Framework Directive (WFD)
- i **Sectoral Plans:** Consideration of the requirements of these plans has been made through the development of the SEA objectives relating to flora and fauna/biodiversity, pollution risk, cultural heritage, landscape, fisheries, human health, infrastructure, rural land use and community facilities
- i **Arterial Drainage Maintenance Plan List of Activities 2016-2021.** Whilst there are no statutory requirement under the Arterial Drainage Acts, 1945 as amended, for the production of a plan or programme for Arterial Drainage Maintenance scheme. The draft list of Activities has adopted a timescale 2016-2021 to facilitate the coordination with the RBMP and CFRAMs. All maintenance operations are carried out in accordance with the OPWs Environmental Management Protocols and Standard Operating Procedures (SOPs) and Environmental River Enhancement Programme (EREP).

A national framework has been set up where Arterial Drainage Maintenance activities undergo an Appropriate Assessment for a 5 year period. Consideration of these programmes has been made through the development of the SEA Objective relating to WFD, Flora and Fauna/Biodiversity,

A review of the potential effects of the proposed flood risk management options for the Lee CFRMP in combination with these plans has identified no additional or more significant negative effects, beyond those identified in Table 9.8. However, opportunities for mutual benefits e.g. the construction of structures that could provide both transport and flood risk management functions have been identified (see Table 9.3).

Table 9.8: Potential Cumulative and In-Combination Effects with Other Plans and Strategies

Flood Risk Management Option		Potential Cumulative and In-Combination Effects with other Plans and Strategies
Non-structural options	Planning Control Sustainable Urban Drainage Systems Flood Forecasting & Warning Public awareness Land Use Management	A review of all relevant plans and strategies were reviewed in regard to the proposed flood risk management options. No significant negative in combination effects were identified. The flood risk management plan is supported and planned for at a national, regional and local level.
Kanturk AFA	Preferred Structural Option- Conveyance & Flood Defences	No significant negative in combination effects were identified. Opportunities for mutual benefit include for example; The flood mapping provided as part of the FRMP will facilitate the application of Objective WS 6.1 set out within the Cork County Development Plan 2014-2020 and local objectives set out in the Kanturk Electoral Area Local Area Plan 2015. The flood risk management options will facilitate the core objective set out within the South Western River Basin Management Plan, allowing waterbodies to achieve required water status objectives as long as the specified measures to mitigate impacts are implemented. The options will have considerations of the mitigation measures and monitoring programme set out in the OPW and Environmental Management Protocols and SOPs. Each individual project will be subject to a separate appropriate assessment process as set out in Article 6(3) of the Habitats Directive to ensure there are no significant effects to the Natura 2000 site in the context of the sites conservation objectives. The flood risk management options would be designed appropriate to minimise potential visual effects on quality of existing landscape characteristics and policies set out within the Cork County Landscape Strategy. Each individual project will be subject to designed to minimise negative impacts on the designed appropriate to minimise potential adverse effects on the setting and character of the cultural archaeological and architectural heritage value within the town
Rathcormac AFA	Preferred Structural Option- Flow Diversion	No significant negative in combination effects were identified. Opportunities for mutual benefit include for example; The flood mapping provided as part of the FRMP will facilitate the application of Objective WS 6.1 set out within the Cork County Development Plan 2014-2020 and local objectives set out in the Fermoy Electoral Area Local Area Plan 2015. The flood risk management options will facilitate the core objective set out within the South Western River Basin Management Plan, allowing waterbodies to achieve required water status objectives as long as the specified measures to mitigate impacts are implemented. The options will have considerations of the mitigation measures and monitoring

Flood Risk Management Option		Potential Cumulative and In-Combination Effects with other Plans and Strategies
		<p>programme set out by OPW and Environmental Management Protocols and SOPs.</p> <p>Each individual project will be subject to a separate appropriate assessment process as set out in Article 6(3) of the Habitats Directive to ensure there are no significant effects to the Natura 2000 site in the context of the sites conservation objectives.</p> <p>The flood risk management options would be designed appropriate to minimise potential visual effects on quality of existing landscape characteristics and policies set out within the Cork County Landscape Strategy.</p> <p>Each individual project will be subject to designed to minimise negative impacts on the designed appropriate to minimise potential adverse effects on the setting and character of the cultural archaeological and architectural heritage value within the town</p>
Ballduff AFA	Preferred Structural Option-Flood Defences	<p>No significant negative in combination effects were identified. Opportunities for mutual benefit include for example; The flood mapping provided as part of the FRMP will facilitate the application of policy ENV9 set out within the Waterford County Development Plan 2011-2017.</p> <p>The flood risk management options will facilitate the core objective set out within the South Western River Basin Management Plan, allowing waterbodies to achieve required water status objectives as long as the specified measures to mitigate impacts are implemented. The options will have considerations of the mitigation measures and monitoring programme set out by OPW and Environmental Management Protocols and SOPs</p> <p>Each individual project will be subject to a separate appropriate assessment process as set out in Article 6(3) of the Habitats Directive to ensure there are no significant effects to the Natura 2000 site in the context of the sites conservation objectives.</p> <p>The flood risk management options would be designed appropriate to minimise potential visual effects on quality of existing landscape characteristics and policies set out within the Cork County Landscape Strategy.</p> <p>Each individual project will be subject to designed to minimise negative impacts on the designed appropriate to minimise potential adverse effects on the setting and character of the cultural archaeological and architectural heritage value within the town</p>
Aglish AFA	Preferred Structural Option-Flood Defences	<p>No significant negative in combination effects were identified. Opportunities for mutual benefit include for example; The flood mapping provided as part of the FRMP will facilitate the application of policy ENV9 set out within the Waterford County Development Plan 2011-2017.</p> <p>The flood risk management options will facilitate the core objective set out within the South Western River Basin Management Plan, allowing waterbodies to achieve required water status objectives as long as the specified measures to mitigate impacts are implemented. The options will have considerations of the mitigation measures and monitoring programme set out by OPW and Environmental Management Protocols and SOPs</p> <p>Each individual project will be subject to a separate appropriate assessment process as set out in Article 6(3) of the Habitats Directive to ensure there are no significant effects to the Natura 2000 site in the context of the sites conservation objectives.</p>

	Flood Risk Management Option	Potential Cumulative and In-Combination Effects with other Plans and Strategies
		<p>The flood risk management options would be designed appropriate to minimise potential visual effects on quality of existing landscape characteristics and policies set out within the Cork County Landscape Strategy.</p> <p>Each individual project will be subject to designed to minimise negative impacts on the designed appropriate to minimise potential adverse effects on the setting and character of the cultural archaeological and architectural heritage value within the town</p>
Youghal AFA	Preferred Structural Option-Tidal Monitoring and Flood Defences	<p>No significant negative in combination effects were identified. Opportunities for mutual benefit include for example; The flood mapping provided as part of the FRMP will facilitate the application of Objective WS 6.1 set out within the Cork County Development Plan 2014-2020 and local objectives set out in the Middleton Electoral Area Local Area Plan 2015.</p> <p>The flood risk management options will facilitate the core objective set out within the South Western River Basin Management Plan, allowing waterbodies to achieve required water status objectives as long as the specified measures to mitigate impacts are implemented.</p> <p>The options will have considerations of the mitigation measures and monitoring programme set out in the EREP and Environmental Management Protocols and SOPs</p> <p>Each individual project will be subject to a separate appropriate assessment process as set out in Article 6(3) of the Habitats Directive to ensure there are no significant effects to the Natura 2000 site in the context of the sites conservation objectives.</p> <p>The flood risk management options would be designed appropriate to minimise potential visual effects on quality of existing landscape characteristics and policies set out within the Cork County Landscape Strategy.</p> <p>Each individual project will be subject to designed to minimise negative impacts on the designed appropriate to minimise potential adverse effects on the setting and character of the cultural archaeological and architectural heritage value within the town</p>

Source: Mott MacDonald

10 Mitigation and Monitoring

10.1 Proposed Mitigation Measures

The FRMP makes recommendations for flood risk management options which are appropriate for flood risk management for each AFA. The Strategic Environmental Assessment and Appropriate Assessment has as part of the plan development identified the preferred flood risk management options for each of the AFAs in UoM 18. The proposed structural measures were developed through the multi-criteria analysis (MCA) of a number of alternative options for each AFA. The approval of the options does not confer approval or permission for the installation or construction of any flood management option. Flood risk management schemes must be subjected to 'project level' assessment under the relevant legislation for consenting appropriate to that project.

Section 25 of the European Communities (Assessment and Management of Flood Risks) Regulations, 2010 permits the OPW to prepare a flood risk management scheme for the execution of flood management options provided for under the FRMP, the legislative pathways for securing consent for a project is outlined in Section 3.6. Depending on this, the following as a minimum will be required:

- Environmental Impact Assessment (EIA) Screening; and
- Appropriate Assessment (AA) Screening.

Subject to the above screenings the following further assessments may be required.

The SEA assessment identified that the non-structural measures proposed for UoM 18 have either positive or neutral impacts and as a result do not require the implementation of mitigation measures. Furthermore, Habitats Directive Assessment was undertaken for UoM 18, whereby potentially significant effects on the *Natura 2000* sites (i.e. cSACs and SPAs) were identified. A Natura Impact Statement (NIS) was prepared for the Plan for UoM 18 and the proposed mitigation measures and conclusions of this assessment have been incorporated into the SEA mitigation measures.

10.1.1 General Mitigation Pre-construction/ Detail Design

The preferred structural flood risk management options could give rise to some environmental impacts, both positive and negative of short term and long term duration. For each of the proposed measures that have a potential negative impact, mitigation measures have been formulated to minimise the potential negative impacts arising from the options to be adopted.

Measures to reduce/eliminate any likely impacts of a flood risk management scheme on environmental, social and cultural receptors must adopt the mitigation hierarchy;

1. Avoidance- avoid creating impacts from the outset design optimisation by careful spatial or temporal placement of infrastructure or disturbance;
2. Minimisation – measures taken to reduce the duration, intensity and/or extent of impacts that cannot be completely avoided;
3. Rehabilitation/restoration- measures taken to improve degraded or removed ecosystems following exposure to impacts;
4. Compensation; measures taken to compensate for any residual, adverse impacts.

The principal mitigation recommendation is that potential impacts should be considered further during the next stage of option development, when detailed design of the preferred structural option progresses.

Furthermore, Section 25 of the Regulations permits the OPW to carry out such hydrometric, engineering, environmental, topographical, valuation and other surveys as deemed necessary to prepare a flood scheme. This will allow the proposed option to be optimised through detailed design in order to limit the potential negative impacts on the receiving environment and based on the findings of project level environmental assessment, mitigation measures should be put in place. Environmental studies based on the detailed design and construction methodology will be undertaken as appropriate. These studies include but are not limited to:

- i Engineering structure surveys;
- i Topographical surveys;
- i Ground investigations;
- i Habitat & species surveys¹⁰;
- i Ornithological surveys;
- i Bat surveys;
- i Fish surveys;
- i Water quality surveys;
- i WFD hydro-morphological assessments;
- i Archaeological surveys;
- i Landscape and visual assessments;
- i Land valuation surveys; and
- i Other surveys as deemed necessary to prepare a project.

Where it is not feasible to avoid impacts on protected wild birds / animals or protected flora/habitats (through for example alternative flood protection measures, design and construction methods), it will be necessary to attain a derogation from the Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs (issued through NPWS, and IFI). In accordance with Circular letter NPWS 2/07, any application for a derogation must be submitted prior to seeking planning permission or approval for a scheme.

If potential impacts on archaeological heritage (Record of Monument and Places, RMP) cannot be avoided, written notice must be issued to the Minister 2 months in advance of commencing the work. Any instruction or information request issued by the Minister in response must be adhered to.

If in the course of the implementation of a scheme it is proposed to alter in any way a structure listed on the Local Authority's Record of Protected Structures (RPS), a declaration must be sought from the Local Authority under Section 57 of the Planning and Development Act 2000 which will set out whether planning permission is required or not for the proposed works.

It is an offence under Regulation 49 of the European Communities (Birds and Natural Habitats) Regulations 2011 (as amended), to plant, disperse, allow or cause to disperse, spread or otherwise cause to grow any plant specified in the Third Schedule of the Regulations (invasive plant species). Similarly, it is an offence to release or allow / cause to disperse any animal in the Third Schedule of the Regulations. Where invasive species are determined to be present within the zone of influence of a scheme, an Invasive Species Management Plan must be produced in advance of the works. Note recommendations on the use of pesticides for the control of invasive species can only be done by a Pesticide Advisor registered with the

¹⁰ In the context of ecological mitigation, the habitat and species surveys are conducted as required to assess the various aspects for the project, such as ecological surveys for:

- protected or notable habitats and species, including Annex 1 habitats, Annex II and Annex IV species,
- species protected under the Wildlife Acts,
- species protected under the Flora Protection Order,
- the resting and breeding places of relevant species and,

invasive species, both plant and animal

Department of Agriculture, Food and the Marine (DAFM). Therefore, the Invasive Species Management Plan must be prepared by suitably qualified person(s) (note also that the use of pesticides can only be carried out by a registered 'Pesticide user' with DAFM).

10.1.2 General Mitigation Construction Stage

Mitigation measures should also refer to a monitoring regime that will be carried out over the following 6 yearly cycle. Review of national available data (i.e. catchments.ie) and associated report published as and when they become available will inform the 6 -yearly review of the CFRAM Studies. The information should be also in line with the 6-yearly cycle review for the WFD.

The opportunity for environmental enhancement should be assessed and implemented as appropriate at design stage and should include both aquatic and terrestrial enhancements as appropriate. Environmentally sensitive design should be adopted e.g. use of channel deflectors.

The feasibility / appropriateness of applying green engineering instead of hard flood protection measures should be assessed and implemented as appropriate at design stage.

An appropriate assessment shall be conducted at project stage, which will consider the specific design details and construction methods that will be set out for each option at project level.

The OPW will ensure that a Construction Environmental Management Plan (CEMP) is produced for every scheme which is to be progressed under Section 25 of the European Communities (Assessment and Management of Flood Risks) Regulations, 2010. The CEMP will incorporate all environmental commitments, mitigation measures, environmental requirements and the like, relevant to the construction of the works, as detailed;

- | In legislation;
- | The flood Risk Management Plan (FRMP) and SEA and AA;
- | Any scheme related Environmental Impact statements, Appropriate Assessments, Conditions of Approval,
- | Recommendations set out by statutory authorities, IFI, NPWS, and EPA;
- | Recommendations of surveys conducted under Section 25 of the Flood Risk Regulations;
- | The OPW Arterial Drainage Maintenance Environmental Management Protocols & Standard Operating procedures.

Best Practice construction mitigation shall include, but not be limited to, the following best practice guidance:

- | Construction Industry Research and Information Association (CIRIA) 'Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors' (CIRIA, 2001);
- | CIRIA C648: Control of water pollution from linear construction projects: Technical guidance (Murnane et al. 2006);
- | CIRIA C649 Control of Water Pollution from Linear Construction Projects: Site Guide (Murnane et al. 2006);
- | Inland Fisheries Board 2016/ 4298 Guidance Document "Guidelines on protection of fisheries during construction works in and adjacent to waters";
- | UK Environment Agency: Pollution Prevention Guidelines; and
- | BS 5228: Part 1 and the European Communities (Noise Emission by Equipment for Use Outdoors) Regulations, 2001

The CEMP should be site-specific. Work should only commence once the CEMP (and detailed method statements as appropriate) has been approved by IFI and NPWS as relevant.

An Ecological/Environmental Clerk of Works as appropriate should be engaged for each scheme.

It is noted that Regulation 38 of the European Communities (Assessment and Management of Flood Risks) Regulations, 2010 state that “it shall not be obligatory on the Commissioners, when constructing flood risk management works pursuant to a flood risk management scheme, to comply with the Fisheries Acts, 1842 to 2016.

The proposed mitigation measures have also been formulated for each AFA based on the SEA Objectives in Table 10.1 for Aglish, Table 10.2 for Ballyduff, Table 10.3 for Kanturk, Table 10.4 for Rathcormac, and Table 10.5 for Youghal. The list provided is not exhaustive and a complete list of project level specific mitigation measures will be considered further during the next stage of option development.

10.2 Proposed Mitigation and Monitoring of the Plan

In addition to the general mitigation measures noted above, a mitigation monitoring programme has been formulated for each AFA within the FRMP based on the SEA objectives sub objectives and the associated indicators. The monitoring programme is required for the following reasons:

- i To monitor the predicted significant negative effects of the FRMP; and to
- i Monitor the baseline environmental conditions for all SEA objectives.

The monitoring programme will also help to identify any unforeseen negative effects of the plan and ensure that action can be taken to mitigate them.

This monitoring will be carried out at various stages of scheme implementation e.g. before, during and after scheme development, such that the success of measures to protect or enhance environmental, social and cultural receptors can be assessed.

As part of the monitoring programme, relevant and appropriate thresholds will be agreed in consultation with the competent authorities to determine when remedial action is required for the particular aspect of the environment being monitored. Existing environmental monitoring is currently undertaken throughout Ireland by the OPW and other organisations like the EPA, IFI, and NPWS, for a number of environmental elements in accordance with environmental legislation, these sources will be used as baseline data or reference.

The proposed mitigation and monitoring programme for each AFA within the Plan is set out below in Table 10.1 for Aglish, Table 10.2 for Ballyduff, Table 10.3 for Kanturk, Table 10.4 for Rathcormac, and Table 10.5 for Youghal.

Table 10.1: Aglish Mitigation & Monitoring

Environmental Topic	Objective	Sub Objective	Indicator	Proposed Mitigation	Proposed Monitoring
Population and Human Health	Minimise risk to human health and life	Minimise risk to human health and life of residents	Annual Average number of residential properties at risk from flooding	Specific Mitigation is not required.	Review of national available population data when it becomes available i.e. CSO published reports
		Minimise risk to high vulnerability properties	Number of high vulnerability properties at risk from flooding		Review of location and details of services data during detail design
	Minimise risk to community	Minimise risk to social infrastructure and amenity	Number of social infrastructure receptors at risk from flooding	Specific Mitigation is not required	Consultation with competent authorities prior to works should enable all impacts are kept to minimum over a short timescale
		Minimise risk to local employment	Number of enterprises at risk from flooding		
Water Resources	Support the objectives of the WFD	Provide no impediment to the achievement of water body objectives and, if possible, contribute to the achievement of water body objectives.	Ecological status of water bodies	<p>Pre-construction baseline studies, including aquatic surveys, hydro-geomorphological assessments. Should important species or habitats be found during baseline and pre-construction surveys the sequential approach of avoid, reduce or mitigate should be adopted</p> <p>Consultation with statutory authorities, Development and adherence of measures set out CEMP, including as specified in accompanying Erosion and Sediment Control Plan; Invasive Species Management Plan, waste management Plan and preparation of emergency response plans and Good Site Management practises and post construction monitoring</p> <p>Ecological/Environmental Clerk of Works should be engaged for each scheme</p>	<p>Review of national available data and associated reports published as and when they become available including catchment.ie/ EPA and IFI/EREP monitoring programme and NPWS datasets, catchments.ie monitoring programme for WFD compliance</p> <p>Review of available published environmental and ecological surveys for other scheme with hydrological linkage to the proposed works area.</p>
Ecology	Support the objectives of the Habitats and Birds Directives	Avoid detrimental effects to, and where possible enhance, Natura 2000 network, protected species and their key habitats, recognising relevant landscape features and stepping stones.	Area of site at risk from flooding and qualitative Assessment of impact of option on habitat	The AFA does not occur within the boundary of the SAC. however, project level screening for AA should be undertaken	<p>Review of national available data and associated reports published as and when they become available</p> <p>Conservation Status Assessment Reports (CSARs), Backing Documents and Maps prepared in accordance with Article 17 of the Habitats Directive</p>
	Avoid damage to, and where possible enhance, the flora and fauna of the catchment	Avoid damage to and where possible enhance the flora and fauna of the catchment	Avoid damage to and where possible enhance, legally protected sites / habitats and other sites / habitats of national regional and local nature conservation importance	<p>Pre-construction baseline studies such be undertaken to inform the project</p> <p>Should important species or habitats be found during baseline and pre-construction surveys the sequential approach of avoid, reduce or mitigate should be adopted.</p> <p>Development and adherence of measures set out CEMP</p> <p>Ecological/Environmental Clerk of Works should be engaged for each scheme</p> <p>Any derogation licences applied for where necessary. Adhere to OPW EMP and SOP.</p>	<p>Review of national available data and associated reports published as and when they become available including EPA monitoring programme for WFD compliance, biodiversity Ireland data, IFI where appropriate</p> <p>Monitoring during Construction and post construction.</p> <p>Review of available published environmental and ecological surveys and monitoring for other scheme with hydrological linkage to the proposed works area including scheme maintenance and for minor works</p>

Environmental Topic	Objective	Sub Objective	Indicator	Proposed Mitigation	Proposed Monitoring
				Minimise the use of noisy equipment during the construction works	Monitoring of Receiving Waters during Construction
	Protect, and where possible enhance, fisheries resource within the catchment	Maintain existing, and where possible create new, fisheries habitat including the maintenance or improvement of conditions that allow upstream migration for fish species.	Area of suitable habitat supporting fish. Number of upstream barriers	Design optimisation to avoid loss of riparian habitat minimise working footprint of works area Consultation with IFI Good planning and timing of works to minimise footprint impacts	
Landscape and Visual	Protect, and where possible enhance, landscape character and visual amenity within the river corridor	Protect, and where possible enhance, visual amenity, landscape protection zones and views into / from designated scenic areas within the river corridor.	Changes to reported conservation status of designated sites relating to flood risk management Extent of affected Natura 2000 site, NHA/pNHA or other affected National or International designations (e.g. Nature reserves and Ramsar sites), i.e. Area of re	Landscape and visual assessment to be undertaken. Impacts are kept to a minimum through sensitive design and planning of the scheme i.e. screening of works area and adoption of Construction Best Practice Consultation with local residents potentially impacted by the measure	Review of County Development Plan landscape designations and landscape character areas in the detail design stage
Archaeology and Architectural and Cultural Heritage	Avoid damage to or loss of features, institutions and collections of cultural heritage importance and their setting	Avoid damage to or loss of features, institutions and collections of architectural value and their setting and improve their protection from extreme floods.	a) The number of architectural features, institutions and collections subject to flooding. b) The impact of flood risk management measures on architectural features, institutions and collections.	Confirm to the requirements of the National Monuments Acts 1930 as amended. Archaeological and architectural assessment to be undertaken. Impacts are kept to a minimum through sensitive design and planning of the scheme.	Review of County Development Plan designations and sensitive areas in the detail design stage
		Avoid damage to or loss of features, institutions and collections of archaeological value and their setting and improve their protection from extreme floods where this is beneficial.	a) The number of archaeological features, institutions and collections subject to flooding. b) The impact of flood risk management measures on archaeological features, institutions and collections.	Construction supervision by qualified project archaeological will minimise any impacts or the possibility of destruction of undiscovered heritage features and Any licences applied for where necessary	Review of County Development Plan designations and sensitive areas in the detail design stage

Table 10.2: Ballyduff Mitigation & Monitoring

Environmental Topic	Objective	Sub Objective	Indicator	Proposed Mitigation	Proposed Monitoring
Population and Human Health	Minimise risk to human health and life	Minimise risk to human health and life of residents	Annual Average number of residential properties at risk from flooding	Specific Mitigation is not required.	Review of national available population data when it becomes available i.e. CSO published reports
		Minimise risk to high vulnerability properties	Number of high vulnerability properties at risk from flooding	Specific Mitigation is not required.	Review of location and details of services data during detail design
	Minimise risk to community	Minimise risk to social infrastructure and amenity	Number of social infrastructure receptors at risk from flooding	Specific Mitigation is not required.	Consultation with competent authorities prior to works should enable all impacts are kept to minimum over a short timescale
		Minimise risk to local employment	Number of enterprises at risk from flooding	Specific Mitigation is not required.	
Water Resources	Support the objectives of the WFD	Provide no impediment to the achievement of water body objectives and, if possible, contribute to the achievement of water body objectives.	Ecological status of water bodies	Pre-construction baseline studies, including aquatic surveys, and, hydro-geomorphological assessments. Should important species or habitats be found during baseline and pre-construction surveys the sequential approach of avoid, reduce or mitigate should be adopted Consultation with statutory authorities, Development and adherence of measures set out CEMP, including as specified in accompanying Erosion and Sediment Control Plan; Invasive Species Management Plan, waste management Plan and preparation of	Review of national available data and associated reports published as and when they become available including EPA monitoring programme for WFD compliance, biodiversity Ireland data, IFI where appropriate Monitoring during Construction and post construction. Review of available published environmental and ecological surveys and monitoring for other scheme with hydrological linkage to the proposed works area including scheme maintenance and for minor works

Environmental Topic	Objective	Sub Objective	Indicator	Proposed Mitigation	Proposed Monitoring
				emergency response plans and Good Site Management practises and post construction monitoring Ecological/Environmental Clerk of Works should be engaged for each scheme	
Ecology	Support the objectives of the Habitats and Birds Directives	Avoid detrimental effects to, and where possible enhance, Natura 2000 network, protected species and their key habitats, recognising relevant landscape features and stepping stones.	Area of site at risk from flooding and qualitative Assessment of impact of option on habitat	Project Level screening for AA must be undertaken.	Review of national available data and associated reports published as and when they become available Conservation Status Assessment Reports (CSARs), Backing Documents and Maps prepared in accordance with Article 17 of the Habitats Directive Review of available published environmental and ecological surveys for other scheme with hydrological linkage to the proposed works area.
	Avoid damage to, and where possible enhance, the flora and fauna of the catchment	Avoid damage to and where possible enhance the flora and fauna of the catchment	Avoid damage to and where possible enhance, legally protected sites / habitats and other sites / habitats of national regional and local nature conservation importance	Design optimisation to avoid loss of riparian habitat minimise working footprint of works area Pre-construction baseline studies, including aquatic surveys, terrestrial and ornithological surveys, hydrogeomorphological assessments. Should important species or habitats be found during baseline and pre construction surveys the sequential approach of avoid, reduce or mitigate should be adopted Development and adherence of measures set out CEMP, including as specified in accompanying Erosion and Sediment Control Plan; Invasive Species Management Plan, waste management Plan and preparation of emergency response plans and Good Site Management practises and post construction monitoring Ecological/ Environmental Clerk of Works should be engaged for each scheme Any derogation licences applied for where necessary. Adhere to OPW EMP and SOP	Review of national available data and associated reports published as and when they become available including EPA monitoring programme for WFD compliance, biodiversity Ireland data, IFI where appropriate Monitoring during Construction and post construction Review of available published environmental and ecological surveys and monitoring for other scheme with hydrological linkage to the proposed works area including scheme maintenance and for minor works
	Protect, and where possible enhance, fisheries resource within the catchment	Maintain existing, and where possible create new, fisheries habitat including the maintenance or improvement of conditions that allow upstream migration for fish species.	Area of suitable habitat supporting fish. Number of upstream barriers	Design optimisation to avoid loss of riparian habitat minimise working footprint of works area Consultation with IFI Good planning and timing of works to minimise footprint impacts	
Landscape and Visual	Protect, and where possible enhance, landscape character and visual amenity within the river corridor	Protect, and where possible enhance, visual amenity, landscape protection zones and views into / from designated scenic areas within the river corridor.	Changes to reported conservation status of designated sites relating to flood risk management Extent of affected Natura 2000 site, NHA/pNHA or other affected National	Consultation with local residents potentially impacted by the measure. Currently there are wide open views of the river along the approach roads bound by 0.5m high stone walls. The proposed measures will potentially	Review of County Development Plan landscape designations and landscape character areas in the detail design stage

Environmental Topic	Objective	Sub Objective	Indicator	Proposed Mitigation	Proposed Monitoring
			or International designations (e.g. Nature reserves and Ramsar sites), i.e. Area of re	change the character of the landscape in the absence of appropriate design. The appearance of floodwalls should be designed appropriately to minimise visual impacts, particularly on areas of sensitive landscape value and high visual amenity such as the Scenic Route along which the floodwall extends. Landscape and visual assessment to be undertaken. Impacts are kept to a minimum through sensitive design and planning of the scheme i.e. screening of works area and adoption of Construction Best Practice	
Archaeology and Architectural and Cultural Heritage	Avoid damage to or loss of features, institutions and collections of cultural heritage importance and their setting	Avoid damage to or loss of features, institutions and collections of architectural value and their setting and improve their protection from extreme floods.	a) The number of architectural features, institutions and collections subject to flooding. b) The impact of flood risk management measures on architectural features, institutions and collections.	Confirm to the requirements of the National Monuments Acts 1930 as amended. Archaeological and architectural assessment to be undertaken. Impacts are kept to a minimum through sensitive design and planning of the scheme. Construction supervision by qualified project archaeological will minimise any impacts or the possibility of destruction of undiscovered heritage features and Any licences applied for where necessary	Review of County Development Plan designations and sensitive areas in the detail design stage
		Avoid damage to or loss of features, institutions and collections of archaeological value and their setting and improve their protection from extreme floods where this is beneficial.	a) The number of archaeological features, institutions and collections subject to flooding. b) The impact of flood risk management measures on archaeological features, institutions and collections.	Specific Measures are not required	Review of County Development Plan designations and sensitive areas in the detail design stage

Table 10.3: Kanturk Mitigation & Monitoring

Environmental Topic	Objective	Sub Objective	Indicator	Proposed Mitigation	Proposed Monitoring
Population and Human Health	Minimise risk to human health and life	Minimise risk to human health and life of residents	Annual Average number of residential properties at risk from flooding	Specific Mitigation is not required.	Review of national available population data when it becomes available i.e. CSO published reports
		Minimise risk to high vulnerability properties	Number of high vulnerability properties at risk from flooding	Specific Mitigation is not required.	Review of location and details of services data during detail design
	Minimise risk to community	Minimise risk to social infrastructure and amenity	Number of social infrastructure receptors at risk from flooding	Specific Mitigation is not required.	Consultation with competent authorities prior to works should enable all impacts are kept to minimum over a short timescale
		Minimise risk to local employment	Number of enterprises at risk from flooding	Specific Mitigation is not required.	
Water Resources	Support the objectives of the WFD	Provide no impediment to the achievement of water body objectives and, if possible, contribute to the achievement of water body objectives.	Ecological status of water bodies	Pre-construction baseline studies, including aquatic surveys, and, hydro-geomorphological assessments. Should important species or habitats be found during baseline and pre-construction surveys the sequential approach of avoid, reduce or mitigate should be adopted Consultation with statutory authorities, Development and adherence of measures set out CEMP, including as specified in accompanying Erosion and Sediment Control Plan; Invasive Species Management Plan, waste	Review of national available data and associated reports published as and when they become available including EPA monitoring programme for WFD compliance, biodiversity Ireland data, IFI where appropriate Monitoring during Construction and post construction. Review of available published environmental and ecological surveys and monitoring for other scheme with hydrological linkage to the proposed works area including scheme maintenance and for minor works

Environmental Topic	Objective	Sub Objective	Indicator	Proposed Mitigation	Proposed Monitoring
				management Plan and preparation of emergency response plans and Good Site Management practises and post construction monitoring Ecological/ Environmental Clerk of Works should be engaged for each scheme	
Ecology	Support the objectives of the Habitats and Birds Directives	Avoid detrimental effects to, and where possible enhance, Natura 2000 network, protected species and their key habitats, recognising relevant landscape features and stepping stones.	Area of site at risk from flooding and qualitative Assessment of impact of option on habitat	Project Level screening for AA must be undertaken.	Review of national available data and associated reports published as and when they become available including catchment.ie/ EPA and IFI/EREP monitoring programme and NPWS datasets Review of available published environmental and ecological surveys for other scheme with hydrological linkage to the proposed works area.
	Avoid damage to, and where possible enhance, the flora and fauna of the catchment	Avoid damage to and where possible enhance the flora and fauna of the catchment	Avoid damage to and where possible enhance, legally protected sites / habitats and other sites / habitats of national regional and local nature conservation importance	Pre-construction baseline studies, including aquatic surveys, terrestrial and ornithological surveys, hydrogeomorphological assessments. Should important species or habitats be found during baseline and pre-construction surveys the sequential approach of avoid, reduce or mitigate should be adopted Consultation with statutory authorities, Development and adherence of measures set out CEMP, including as specified in accompanying Erosion and Sediment Control Plan; Invasive Species Management Plan, waste management Plan and preparation of emergency response plans and Good Site Management practises and post construction monitoring Ecological/ Environmental Clerk of Works should be engaged for each scheme Any derogation licences applied for where necessary. Adhere to OPW EMP and SOP	Review of national available data and associated reports published as and when they become available including EPA monitoring programme for WFD compliance, biodiversity Ireland data, IFI where appropriate Monitoring during Construction and post construction Review of available published environmental and ecological surveys and monitoring for other scheme with hydrological linkage to the proposed works area including scheme maintenance and for minor works
	Protect, and where possible enhance, fisheries resource within the catchment	Maintain existing, and where possible create new, fisheries habitat including the maintenance or improvement of conditions that allow upstream migration for fish species.	Area of suitable habitat supporting fish. Number of upstream barriers	Should important species or habitats be found during baseline and pre-construction surveys the sequential approach of avoid, reduce or mitigate should be adopted A Construction Environmental Management Plan will be required during the construction phase of the proposed option. Measures included in the CEMP should include pollution control measures such as sediment control, storage of materials and location of refuelling areas. All measures are required to be in compliance with the CIRIA guide C741 - Environmental good practice on site guide". Works should only commence once a detailed method statement has been agreed with Inland Fisheries Ireland. All works should be undertaken in line with the	

Environmental Topic	Objective	Sub Objective	Indicator	Proposed Mitigation	Proposed Monitoring
				requirements of "Guidelines on Protection of Fisheries during construction works in and adjacent to waters	
Landscape and Visual	Protect, and where possible enhance, landscape character and visual amenity within the river corridor	Protect, and where possible enhance, visual amenity, landscape protection zones and views into / from designated scenic areas within the river corridor.	Changes to reported conservation status of designated sites relating to flood risk management Extent of affected Natura 2000 site, NHA/pNHA or other affected National or International designations (e.g. Nature reserves and Ramsar sites), i.e. Area of re	. The appearance of floodwalls should be designed appropriately to minimise visual impacts, particularly on areas of sensitive landscape value and high visual amenity such as the Scenic Route along which the floodwall extends. Landscape and visual assessment to be undertaken. Impacts are kept to a minimum through sensitive design and planning of the scheme i.e. screening of works area and adoption of Construction Best Practice	Review of County Development Plan landscape designations and landscape character areas in the detail design stage
Archaeology and Architectural and Cultural Heritage	Avoid damage to or loss of features, institutions and collections of cultural heritage importance and their setting	Avoid damage to or loss of features, institutions and collections of architectural value and their setting and improve their protection from extreme floods.	a) The number of architectural features, institutions and collections subject to flooding. b) The impact of flood risk management measures on architectural features, institutions and collections.	. Confirm to the requirements of the National Monuments Acts 1930 as amended. Archaeological and architectural assessment to be undertaken. Impacts are kept to a minimum through sensitive design and planning of the scheme. Construction supervision by qualified project archaeological will minimise any impacts or the possibility of destruction of undiscovered heritage features and Any licences applied for where necessary	Review of County Development Plan designations and sensitive areas in the detail design stage
		Avoid damage to or loss of features, institutions and collections of archaeological value and their setting and improve their protection from extreme floods where this is beneficial.	a) The number of archaeological features, institutions and collections subject to flooding. b) The impact of flood risk management measures on archaeological features, institutions and collections.	Confirm to the requirements of the Local Government (planning and Development) Act 2000 as amended	Review of County Development Plan designations and sensitive areas in the detail design stage

Table 10.4: Rathcormac Mitigation & Monitoring

Environmental Topic	Objective	Sub Objective	Indicator	Proposed Mitigation	Proposed Monitoring
Population and Human Health	Minimise risk to human health and life	Minimise risk to human health and life of residents	Annual Average number of residential properties at risk from flooding	Specific Mitigation is not required.	Review of national available population data when it becomes available i.e. CSO published reports
		Minimise risk to high vulnerability properties	Number of high vulnerability properties at risk from flooding	Specific Mitigation is not required.	Review of location and details of services data during detail design
	Minimise risk to community	Minimise risk to social infrastructure and amenity	Number of social infrastructure receptors at risk from flooding	Specific Mitigation is not required.	Consultation with competent authorities prior to works should enable all impacts are kept to minimum over a short timescale
		Minimise risk to local employment	Number of enterprises at risk from flooding	Specific Mitigation is not required.	

Environmental Topic	Objective	Sub Objective	Indicator	Proposed Mitigation	Proposed Monitoring
Water Resources	Support the objectives of the WFD	Provide no impediment to the achievement of water body objectives and, if possible, contribute to the achievement of water body objectives.	Ecological status of water bodies	<p>Pre-construction baseline studies, including aquatic surveys, and, hydrogeomorphological assessments. Should important species or habitats be found during baseline and pre-construction surveys the sequential approach of avoid, reduce or mitigate should be adopted</p> <p>Consultation with statutory authorities, Development and adherence of measures set out CEMP, including as specified in accompanying Erosion and Sediment Control Plan; Invasive Species Management Plan, waste management Plan and preparation of emergency response plans and Good Site Management practises and post construction monitoring</p> <p>Ecological / Environmental Clerk of Works should be engaged for each scheme</p>	<p>Review of national available data and associated reports published as and when they become available including EPA monitoring programme for WFD compliance, biodiversity Ireland data, IFI where appropriate</p> <p>Monitoring during Construction and post construction.</p> <p>Review of available published environmental and ecological surveys and monitoring for other scheme with hydrological linkage to the proposed works area including scheme maintenance and for minor works</p>
Ecology	Support the objectives of the Habitats and Birds Directives	Avoid detrimental effects to, and where possible enhance, Natura 2000 network, protected species and their key habitats, recognising relevant landscape features and stepping stones.	Area of site at risk from flooding and qualitative Assessment of impact of option on habitat	Project Level screening for AA must be undertaken	<p>Review of national available data and associated reports published as and when they become available including catchment.ie/ EPA and IFI/EREP monitoring programme and NPWS datasets</p> <p>Review of available published environmental and ecological surveys for other scheme with hydrological linkage to the proposed works area</p>
	Avoid damage to, and where possible enhance, the flora and fauna of the catchment	Avoid damage to and where possible enhance the flora and fauna of the catchment	Avoid damage to and where possible enhance, legally protected sites / habitats and other sites / habitats of national regional and local nature conservation importance	<p>Pre-construction baseline studies, including aquatic surveys, surveys, hydrogeomorphological assessments. Should important species or habitats be found during baseline and pre-construction surveys the sequential approach of avoid, reduce or mitigate should be adopted</p> <p>Consultation with statutory authorities, Development and adherence of measures set out CEMP, including as specified in accompanying Erosion and Sediment Control Plan; Invasive Species Management Plan, waste management Plan and preparation of emergency response plans and Good Site Management practises and post construction monitoring</p> <p>Ecological/ Environmental Clerk of Works should be engaged for each scheme</p> <p>Any derogation licences applied for where necessary. Adhere to OPW EMP and SOP</p>	<p>Review of national available data and associated reports published as and when they become available including EPA monitoring programme for WFD compliance, biodiversity Ireland data, IFI where appropriate</p> <p>Monitoring during Construction and post construction</p> <p>Review of available published environmental and ecological surveys and monitoring for other scheme with hydrological linkage to the proposed works area including scheme maintenance and for minor works</p>

Environmental Topic	Objective	Sub Objective	Indicator	Proposed Mitigation	Proposed Monitoring
	Protect, and where possible enhance, fisheries resource within the catchment	Maintain existing, and where possible create new, fisheries habitat including the maintenance or improvement of conditions that allow upstream migration for fish species.	Area of suitable habitat supporting fish. Number of upstream barriers	<p>Pre-construction baseline studies, including aquatic surveys, surveys, hydrogeomorphological assessments. Should important species or habitats be found during baseline and pre-construction surveys the sequential approach of avoid, reduce or mitigate should be adopted</p> <p>Consultation with statutory authorities, Development and adherence of measures set out CEMP, including as specified in accompanying Erosion and Sediment Control Plan; Invasive Species Management Plan, waste management Plan and preparation of emergency response plans and Good Site Management practises and post construction monitoring</p> <p>Ecological/ Environmental Clerk of Works should be engaged for each scheme</p> <p>Any derogation licences applied for where necessary. Adhere to OPW EMP and SOP</p>	
Landscape and Visual	Protect, and where possible enhance, landscape character and visual amenity within the river corridor	Protect, and where possible enhance, visual amenity, landscape protection zones and views into / from designated scenic areas within the river corridor.	<p>Changes to reported conservation status of designated sites relating to flood risk management</p> <p>Extent of affected Natura 2000 site, NHA/pNHA or other affected National or International designations (e.g. Nature reserves and Ramsar sites), i.e. Area of re</p>	<p>Landscape and visual assessment to be undertaken. Impacts are kept to a minimum through sensitive design and planning of the scheme i.e. screening of works area and adoption of Construction Best Practice</p>	Review of County Development Plan designations and sensitive areas in the detail design stage
Archaeology and Architectural and Cultural Heritage	Avoid damage to or loss of features, institutions and collections of cultural heritage importance and their setting	Avoid damage to or loss of features, institutions and collections of architectural value and their setting and improve their protection from extreme floods.	<p>a) The number of architectural features, institutions and collections subject to flooding.</p> <p>b) The impact of flood risk management measures on architectural features, institutions and collections.</p>	<p>Confirm to the requirements of the National Monuments Acts 1930 as amended. Archaeological and architectural assessment to be undertaken. Impacts are kept to a minimum through sensitive design and planning of the scheme.</p> <p>Construction supervision by qualified project archaeological will minimise any impacts or the possibility of destruction of undiscovered heritage features and Any licences applied for where necessary</p>	Review of County Development Plan designations and sensitive areas in the detail design stage
		Avoid damage to or loss of features, institutions and collections of archaeological value and their setting and improve their protection from extreme floods where this is beneficial.	<p>a) The number of archaeological features, institutions and collections subject to flooding. b) The impact of flood risk management measures on archaeological features, institutions and collections.</p>	Confirm to the requirements of the Local Government (planning and Development) Act 2000 as amended	

Table 10.5: Youghal Mitigation & Monitoring

Environmental Topic	Objective	Sub Objective	Indicator	Proposed Mitigation	Proposed Monitoring
Population and Human Health	Minimise risk to human health and life	Minimise risk to human health and life of residents	Annual Average number of residential properties at risk from flooding	Specific Mitigation is not required.	Review of national available population data when it becomes available i.e. CSO published reports

Environmental Topic	Objective	Sub Objective	Indicator	Proposed Mitigation	Proposed Monitoring
	Minimise risk to community	Minimise risk to high vulnerability properties	Number of high vulnerability properties at risk from flooding	Specific Mitigation is not required.	Review of location and details of services data during detail design
		Minimise risk to social infrastructure and amenity	Number of social infrastructure receptors at risk from flooding	Specific Mitigation is not required.	Consultation with competent authorities prior to works should enable all impacts are kept to minimum over a short timescale
		Minimise risk to local employment	Number of enterprises at risk from flooding	Specific Mitigation is not required.	
Water Resources	Support the objectives of the WFD	Provide no impediment to the achievement of water body objectives and, if possible, contribute to the achievement of water body objectives.	Ecological status of water bodies	<p>Pre-construction baseline studies, including aquatic surveys, and, hydro-geomorphological assessments. Should important species or habitats be found during baseline and pre-construction surveys the sequential approach of avoid, reduce or mitigate should be adopted</p> <p>Consultation with statutory authorities, Development and adherence of measures set out CEMP, including as specified in accompanying Erosion and Sediment Control Plan; Invasive Species Management Plan, waste management Plan and preparation of emergency response plans and Good Site Management practises and post construction monitoring</p> <p>Ecological/ Environmental Clerk of Works should be engaged for each scheme</p>	<p>Review of national available data and associated reports published as and when they become available including EPA monitoring programme for WFD compliance, biodiversity Ireland data, IFI where appropriate</p> <p>Monitoring during Construction and post construction.</p> <p>Review of available published environmental and ecological surveys and monitoring for other scheme with hydrological linkage to the proposed works area including scheme maintenance and for minor works</p>
Ecology	Support the objectives of the Habitats and Birds Directives	Avoid detrimental effects to, and where possible enhance, Natura 2000 network, protected species and their key habitats, recognising relevant landscape features and stepping stones.	Area of site at risk from flooding and qualitative Assessment of impact of option on habitat	Project Level screening for AA must be undertaken.	<p>Review of national available data and associated reports published as and when they become available including catchment.ie/ EPA and IFI/EREP monitoring programme and NPWS datasets</p> <p>Review of available published environmental and ecological surveys for other scheme with hydrological linkage to the proposed works area</p>
	Avoid damage to, and where possible enhance, the flora and fauna of the catchment	Avoid damage to and where possible enhance the flora and fauna of the catchment	Avoid damage to and where possible enhance, legally protected sites / habitats and other sites / habitats of national regional and local nature conservation importance	<p>Pre-construction baseline studies, including aquatic surveys, terrestrial and ornithological surveys, hydrogeomorphological assessments. Should important species or habitats be found during baseline and pre-construction surveys the sequential approach of avoid, reduce or mitigate should be adopted</p> <p>Consultation with statutory authorities, Development and adherence of measures set out CEMP, including as specified in accompanying Erosion and Sediment Control Plan; Invasive Species Management Plan, waste management Plan and preparation of emergency response plans and Good Site Management practises and post construction monitoring</p> <p>Ecological/ Environmental Clerk of Works should be engaged for each scheme</p>	<p>Review of national available data and associated reports published as and when they become available including EPA monitoring programme for WFD compliance, biodiversity Ireland data, IFI where appropriate</p> <p>Monitoring during Construction and post construction</p> <p>Review of available published environmental and ecological surveys and monitoring for other scheme with hydrological linkage to the proposed works area including scheme maintenance and for minor works</p>

Environmental Topic	Objective	Sub Objective	Indicator	Proposed Mitigation	Proposed Monitoring
	Protect, and where possible enhance, fisheries resource within the catchment	Maintain existing, and where possible create new, fisheries habitat including the maintenance or improvement of conditions that allow upstream migration for fish species.	Area of suitable habitat supporting fish. Number of upstream barriers	<p>Any derogation licences applied for where necessary. Adhere to OPW EMP and SOP</p> <p>Pre-construction baseline studies, including aquatic surveys, surveys, hydrogeomorphological assessments. Should important species or habitats be found during baseline and pre-construction surveys the sequential approach of avoid, reduce or mitigate should be adopted</p> <p>Consultation with statutory authorities, Development and adherence of measures set out CEMP, including as specified in accompanying Erosion and Sediment Control Plan; Invasive Species Management Plan, waste management Plan and preparation of emergency response plans and Good Site Management practises and post construction monitoring</p> <p>Ecological/ Environmental Clerk of Works should be engaged for each scheme</p> <p>Any derogation licences applied for where necessary. Adhere to OPW EMP and SOP</p>	
Landscape and Visual	Protect, and where possible enhance, landscape character and visual amenity within the river corridor	Protect, and where possible enhance, visual amenity, landscape protection zones and views into / from designated scenic areas within the river corridor.	<p>Changes to reported conservation status of designated sites relating to flood risk management</p> <p>Extent of affected Natura 2000 site, NHA/pNHA or other affected National or International designations (e.g. Nature reserves and Ramsar sites), i.e. Area of re</p>	Landscape and visual assessment to be undertaken. Impacts are kept to a minimum through sensitive design and planning of the scheme i.e. screening of works area and adoption of Construction Best Practice	Review of County Development Plan designations and sensitive areas in the detail design stage
Archaeology and Architectural and Cultural Heritage	Avoid damage to or loss of features, institutions and collections of cultural heritage importance and their setting	Avoid damage to or loss of features, institutions and collections of architectural value and their setting and improve their protection from extreme floods.	<p>a) The number of architectural features, institutions and collections subject to flooding. b) The impact of flood risk management measures on architectural features, institutions and collections.</p>	<p>Confirm to the requirements of the National Monuments Acts 1930 as amended. Archaeological and architectural assessment to be undertaken. Impacts are kept to a minimum through sensitive design and planning of the scheme.</p> <p>Construction supervision by qualified project archaeological will minimise any impacts or the possibility of destruction of undiscovered heritage features and Any licences applied for where necessary</p>	Review of County Development Plan designations and sensitive areas in the detail design stage
		Avoid damage to or loss of features, institutions and collections of archaeological value and their setting and improve their protection from extreme floods where this is beneficial.	<p>a) The number of archaeological features, institutions and collections subject to flooding. b) The impact of flood risk management measures on archaeological features, institutions and collections.</p>	Confirm to the requirements of the National Monuments Acts 1930 as amended. Archaeological and architectural assessment to be undertaken. Impacts are kept to a minimum through sensitive design and planning of the scheme.	

11 Conclusions

11.1 Overview

This SEA Environmental Report demonstrates how the strategic environmental assessment process was fully integrated into the development of the FRMP for UoM 18.

The preferred flood risk management options, both structural and non-structural measures at UoM scale and at the AFA scale were assessed to determine the potential impacts on the receiving environment.

The detailed multi-criteria assessment (MCA) focussed on undertaking a detailed assessment of the structural measures as detailed in Chapter 7 and Chapter 9. As part of this assessment alternative structural measures were assessed for each AFA in Chapter 7.

Furthermore, non-structural measures were assessed by way of a comparative analysis with the SEA objectives in Chapter 9.

The integration of the SEA within the development of the draft FRMP has ensured that:

- i Key environmental issues, constraints and opportunities within the vicinity of the proposed flood management options were considered;
- i Environmentally unacceptable flood risk management measures did not progress to be a preferred option;
- i The development of flood risk management options to avoid potential environmental impacts where possible;

Structural measures were specified for five AFAs:

- i Aglish: Flood Defences;
- i Ballyduff: Flood Defences;
- i Kanturk: Storage and Flood Defences;
- i Rathcormac: Flow Diversion;
- i Youghal: Monitoring and Flood Defences.

A suite of mitigation measures and proposed monitoring were developed for each of the proposed FRMP structural measures to ensure that the potential to impact on the receiving environment (as identified by the SEA objectives) are minimised, as detailed in Chapter 10.

12 References

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