



South Western CFRAM Study

Preliminary Options Report UoM 19

July 2016

The Office of Public Works



South Western CFRAM Study

Preliminary Options Report UoM 19

July 2016

The Office of Public Works

Jonathan Swift Street
Trim
Co. Meath

USER NOTICE

Please read carefully the following statements and conditions of use of the data, contained in this report. Accessing the information and data denotes agreement to, and unconditional acceptance of, all of the statements and conditions.

I have read in full, understand and accept all of the above notes and warnings concerning the source, reliability and use of the data available in this report.

I agree that the Commissioners of Public Works in Ireland have the absolute right to reprocess, revise, add to, or remove any data made available in this report as they deem necessary, and that I will in no way hold the Commissioners of Public Works in Ireland liable for any damage or cost incurred as a result of such acts.

I will use any such data made available in an appropriate and responsible manner and in accordance with the above notes, warnings and conditions.

I understand that the Commissioners of Public Works in Ireland do not guarantee the accuracy of any data made available, or any site to which these pages connect and it is my responsibility to independently verify and quality control any of the data used and ensure that it is fit for use.

I further understand that the Commissioners of Public Works in Ireland shall have no liability to me for any loss or damage arising as a result of my use of or reliance on this data.

I will not pass on any data used to any third party without ensuring that said party is fully aware of the notes, warnings and conditions of use.

I accept all responsibility for the use of any data made available that is downloaded, read or interpreted or used in any way by myself, or that is passed to a third party by myself, and will in no way hold the Commissioners of Public Works in Ireland liable for any damage or loss howsoever arising out of the use or interpretation of this data.

Issue and Revision Record

Revision	Date	Originator	Checker	Approver	Description
A	February 2016	TD / RM / JD	B. O'Connor	F. McGivern	Draft Issue
B	May 2016	T. Donovan	B. O'Connor	F. McGivern	Draft Final
C	June 2016	T. Donovan	B. O'Connor	F. McGivern	Final
D	July 2016	J Desmond	T. Donovan	F. McGivern	Final

USER NOTICE

Please read carefully the following statements and conditions of use of the data, contained in this report. Accessing the information and data denotes agreement to, and unconditional acceptance of, all of the statements and conditions.

I have read in full, understand and accept all of the above notes and warnings concerning the source, reliability and use of the data available in this report.

I agree that the Commissioners of Public Works in Ireland have the absolute right to reprocess, revise, add to, or remove any data made available in this report as they deem necessary, and that I will in no way hold the Commissioners of Public Works in Ireland liable for any damage or cost incurred as a result of such acts.

I will use any such data made available in an appropriate and responsible manner and in accordance with the above notes, warnings and conditions.

I understand that the Commissioners of Public Works in Ireland do not guarantee the accuracy of any data made available, or any site to which these pages connect and it is my responsibility to independently verify and quality control any of the data used and ensure that it is fit for use.

I further understand that the Commissioners of Public Works in Ireland shall have no liability to me for any loss or damage arising as a result of my use of or reliance on this data.

I will not pass on any data used to any third party without ensuring that said party is fully aware of the notes, warnings and conditions of use.

I accept all responsibility for the use of any data made available that is downloaded, read or interpreted or used in any way by myself, or that is passed to a third party by myself, and will in no way hold the Commissioners of Public Works in Ireland liable for any damage or loss howsoever arising out of the use or interpretation of this data.

Information class: Standard

This document is issued for the party which commissioned it and for specific purposes connected with the above-captioned project only. It should not be relied upon by any other party or used for any other purpose.

We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

This document contains confidential information and proprietary intellectual property. It should not be shown to other parties without consent from us and from the party which commissioned it.

Appendices

Appendix A. Estimate of Costs	75
Appendix B. Drawings of Potential FRM Options	76
Appendix C. Draft SEA Options Appraisal Report	77
Appendix D. Draft Screening for Appropriate Assessment under the Habitats Directive	78
Appendix E. Climate Change Adaptability	79
Appendix F. Multi Criteria Assessment	80

Appendix C. Draft SEA Options Appraisal Report



South Western RBD CFRAM Study

SEA Options Appraisal Report
Unit of Management 19

June 2016

Office of Public Works

South Western RBD CFRAM Study

SEA Options Appraisal Report
Unit of Management 19

June 2016

Office of Public Works

Jonathan Swift Street
Trim
Co. Meath

Issue and revision record

Revision	Date	Originator	Checker	Approver	Description
A	22nd February 2016	N. Roche R. Hallissey	P. Kelly	B. O'Connor	Issue for Client Review
B	28 th April 2016	N. Roche	P. Kelly	B. O'Connor	Update option
C	21 st June 2016	N. Roche	B O'Connor	F. McGivern	Final for consultation

Please read carefully the following statements and conditions of use of the data, contained in this report. Accessing the information and data denotes agreement to, and unconditional acceptance of, all of the statements and conditions.

I have read in full, understand and accept all of the above notes and warnings concerning the source, reliability and use of the data available in this report.

I agree that the Commissioners of Public Works in Ireland have the absolute right to reprocess, revise, add to, or remove any data made available in this report as they deem necessary, and that I will in no way hold the Commissioners of Public Works in Ireland liable for any damage or cost incurred as a result of such acts.

I will use any such data made available in an appropriate and responsible manner and in accordance with the above notes, warnings and conditions.

I understand that the Commissioners of Public Works in Ireland do not guarantee the accuracy of any data made available, or any site to which these pages connect and it is my responsibility to independently verify and quality control any of the data used and ensure that it is fit for use.

I further understand that the Commissioners of Public Works in Ireland shall have no liability to me for any loss or damage arising as a result of my use of or reliance on this data.

I will not pass on any data used to any third party without ensuring that said party is fully aware of the notes, warnings and conditions of use.

I accept all responsibility for the use of any data made available that is downloaded, read or interpreted or used in any way by myself, or that is passed to a third party by myself, and will in no way hold the Commissioners of Public Works in Ireland liable for any damage or loss howsoever arising out of the use or interpretation of this data.

Information class: Standard

We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties

This document contains confidential information and proprietary intellectual property. It should not be shown to other parties without consent from us and from the party which commissioned it.

Contents

Chapter	Title	Page
	Executive Summary	i
1	Introduction	1
	1.1 General	1
	1.2 Overview of the South Western River Basin District	2
	1.3 Purpose and Structure of this Report	4
2	Flood Risk Management Options	6
	2.1 Introduction	6
	2.2 Evaluating the Effectiveness of Flood Risk Management Options	7
3	Strategic Environmental Assessment	10
	3.1 Introduction	10
	3.2 Overview of the SEA Process	10
	3.3 SEA Objectives, Sub-Objectives and Targets	12
	3.4 Assessment of Alternatives	15
4	Appropriate Assessment	16
	4.1 Introduction	16
	4.2 Habitats Directive Screening (for Appropriate Assessment)	16
5	Castlemartyr	17
	5.1 Flood Risk	17
	5.2 Viable Flood Risk Management Options	17
	5.3 Environmental Sensitives	18
	5.4 Environmental Assessment	19
	5.5 Preferred Flood Risk Management Option	21
6	Ballingeary	22
	6.1 Flood Risk	22
	6.2 Viable Flood Risk Management Options	22
	6.3 Key Environmental Sensitivities	23
	6.4 Environmental Assessment	24
	6.5 Preferred Flood Risk Management Option	25
7	Inchigeelagh	27
	7.1 Flood Risk	27
	7.2 Viable Flood Risk Management Options	27
	7.3 Key Environmental Sensitives	28

7.4	Environmental Assessment	28
7.5	Preferred Flood Management Options	30
8	Conclusions and Next Steps	31
8.1	Conclusions	31
8.2	Next Steps	31
	Appendices	32
A.	AFA Option Drawings	33
B.	SEA scoring Matrix	38

Executive Summary

The Office of Public Works (OPW) is undertaking six catchment-based flood risk assessment and management (CFRAM) studies to identify and map areas across Ireland which are at existing and potential future risk of flooding. Mott MacDonald Ireland Ltd. has been appointed by the OPW to assess flood risk and develop flood risk management options in the South Western River Basin District. This SEA Options Appraisal Report is one of a series of reports being produced as part of the South Western Catchment Flood Risk Assessment and Management Study (SW CFRAM Study). As part of the strategic environmental assessment (SEA) process to inform the development of the Flood Risk Management Plans this report has been prepared to assess the options to manage flood risk in Unit of Management 19 (Lee / Cork Harbour Catchment).

The findings from this assessment of the flood risk management options against the objectives defined in the previously prepared SEA Scoping Report will be integrated into the decision-making process for the selection of the preferred measures and options to manage flood risk in Unit of Management 19. These measures and options will form the basis for the Flood Risk Management Plan for this Unit of Management.

The strategic environmental assessment has identified that the preferred alternatives are as set out below.

Table 1.1: Preferred Flood Risk Management Options (UoM 19)

AFA	Preferred Flood Risk Management Option
Castlemartyr	Option 1 (Flood Defence)
Ballingeary	Option 1(Flood Defence)
Inchigeelagh	Option 1 (Flood Defence)

These findings will be integrated into the overall multi-criteria analysis for the identification of the overall preferred flood risk management option in each AFA.

Once the preferred flood risk management option has been identified in each AFA the Draft Flood Risk Management Plan will be prepared. The next stage (Stage 3) of the strategic environmental assessment process involves the identification of the environmental impacts (including where appropriate mitigation measures) and recommending monitoring for the evaluation of the plan.

1 Introduction

1.1 General

Flood risk management in Ireland has historically focused on land drainage schemes for the improvement of agricultural land. The 1945 Arterial Drainage Act established a national drainage authority (the Office of Public Works) with the remit of implementing a national arterial drainage programme. The Arterial Drainage Act was amended in 1995 to include for the protection of urban areas suffering from flooding.

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.

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.

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:

- Identify and map the existing and potential future flood hazard within the study area;
- Assess and map the existing and potential future flood risk within the study area;
- Identify viable structural and non-structural options and measures for the effective and sustainable management of flood risk within the study area; and
- 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.

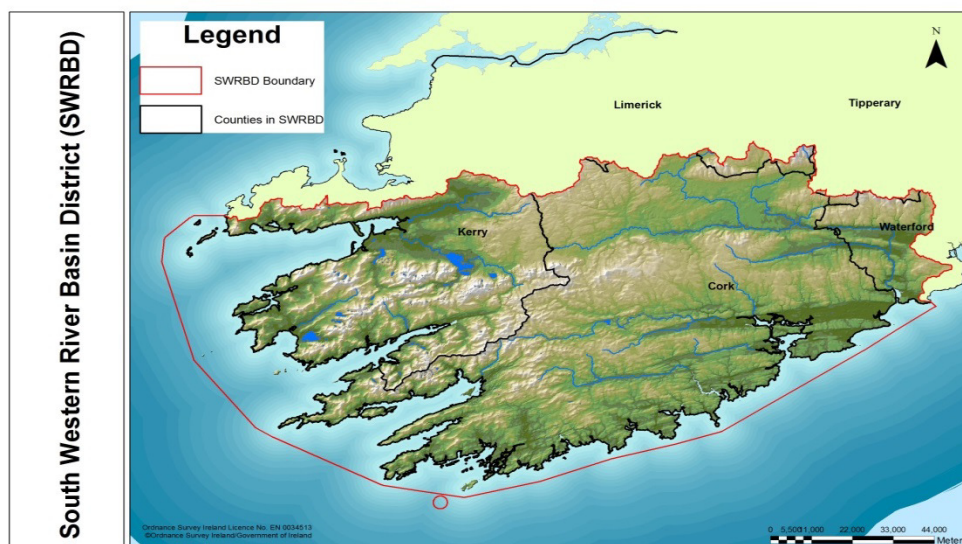
The OPW has commissioned a CFRAM study for each of Ireland's seven River Basin Districts (RBDs)².

1.2 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.

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 County Council. Much of the SWRBD is rural and the predominant land usage is agriculture. The SWRBD contains Cork City (pop. 119,418) and a number of other large towns such as Killarney (pop. 13,497), Mallow (pop. 7,864) and Bandon (pop. 6,640).

Figure 1.1: South Western River Basin District (SWRBD)



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.

The South Western River Basin District is divided into the following five Units of Management (UoMs)³:

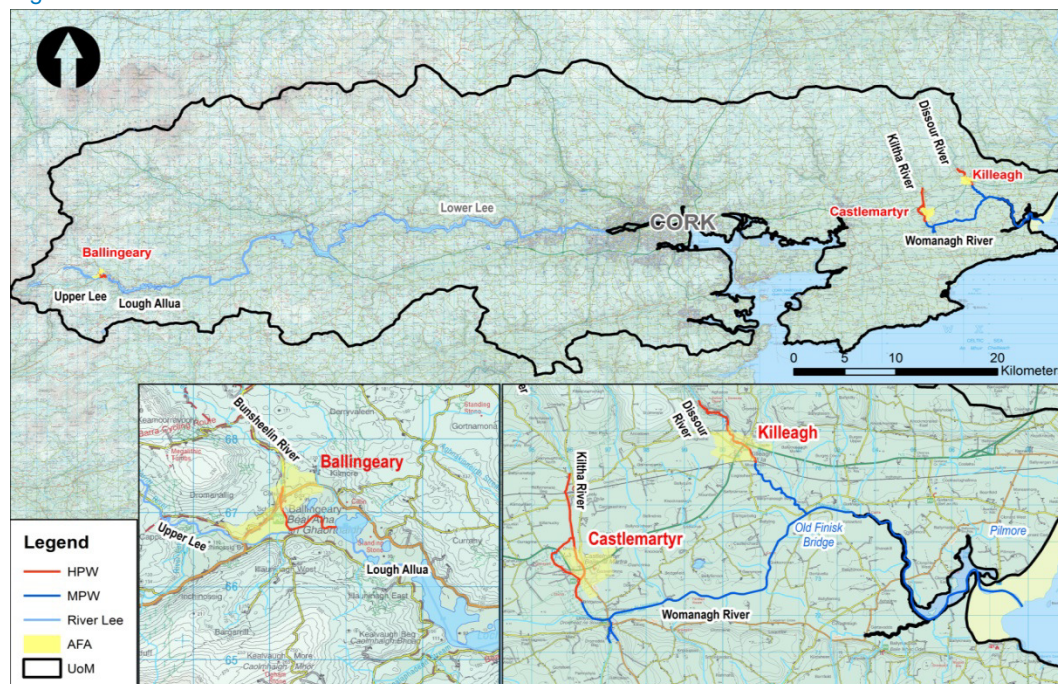
- The Munster Blackwater Catchment (UoM18);
- The Lee / Cork Harbour Catchment (UoM19);
- The Bandon / Skibbereen Catchment (UoM20);
- The Dunmanus / Bantry / Kenmare Bay Catchment (UoM21); and
- The Laune / Maine / Dingle Bay Catchment (UoM22).

Unit of Management 19, which forms part of the SWRBD, covers an area of approximately 2,145 km². The entire area of UoM 19 is within County Cork. The main rivers within UoM 19 are the Lee, Owenboy and Womagh. The OPW undertook a separate Catchment Flood Risk Assessment and Management (CFRAM) Study for the Lee Catchment which included all the main rivers and their tributaries draining into Cork Harbour (the Rivers Lee, Bride, Shournagh, Sullane, Owenboy, Glashaboy and Owennacurra). The town of Ballingeary in the upper reach of the Lee, which has been identified as an AFA and was not included in the Lee CFRAM. The SWRBD CFRAM therefore covers the entire Womagh River Catchment and also includes Ballingeary which was excluded from the Lee CFRAM. There are three Areas for Further Assessment (AFAs) within UoM19, these include Castlemartyr, Killeagh, and Ballingeary Inchingelagh. Killeagh AFA was ruled out of the optioneering process as it was determined that the risk of flooding is low. Associated with the AFAs is over 29km of high and medium priority watercourses. Based on the historical flood evidence, the key mechanisms for each of the AFA's are as follows:

- **Castlemartyr:** Flooding typically occurs due to the overtopping of river banks along the Kiltha River at Mogeely Road, as flow through Castlemartyr Bridge is constricted, causing water levels to rise upstream and flood the surrounding area.
- **Ballingeary and Inchingelagh:** Flooding typically occurs due to the overtopping of river banks along the River Lee and Bunsheelin River because the excess flows are unable to discharge into Lough Allua when water levels are raised by water from previous events. Ballingeary is also identified as at risk from pluvial flooding during intense rainfall events due to the limited capacity of the urban drainage network.

³ UoMs are representative of Hydrometric Area boundaries.

Figure 1.2: UoM 19



1.3 Purpose and Structure of this Report

Purpose

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 report is a Strategic Environmental Assessment Options Appraisal Report and pertains to Unit of Management 19 (The Lee/Cork Harbour Catchment) the South Western River Basin District.

The purpose of this report is to:

- a) Review the environmental aspects associated with the alternative flood risk management options under consideration. Flood risk management options consist(s) of one or, more commonly, a combination of flood risk management (FRM) methods;
- b) Determine the benefits and impacts of the alternative options assessed and mitigation/environmental enhancement measures where considered appropriate;
- c) Evaluate and rank the alternative options against the Strategic Environmental Assessment (SEA) Objectives,

Indicators and Targets identified during the SEA Scoping Stage; and

- d) Identify the preferred flood risk management option from a strategic environmental assessment perspective.

Report Structure

Table 1.1: Report Structure

Chapter	Title	Purpose
1	Introduction	This chapter provides a broad background to the CFRAM Studies in the context of National Flood Policy and legislation. This section also sets out the purpose of the SEA Options Appraisal Study
2	Flood Risk Management Options	This chapter provides an overview of the processes associated with the identification of the preliminary flood risk management options and multi-criteria analysis.
3	Strategic Environmental Assessment	This chapter provides an overview of the SEA process and the relationship between CFRAM and SEA with a particular emphasis on the flood risk management options evaluation stage.
4	Appropriate Assessment	This chapter provides a brief overview of the AA process and the relationship between CFRAM and AA with a particular emphasis on the flood risk management options evaluation stage.
5	Castlemartyr	This chapter describes the flood risk management options for Castlemartyr and the identification of the preferred option from an SEA perspective.
6	Ballingeary	This chapter describes the flood risk management options for Ballingeary and the identification of the preferred option from an SEA perspective.
7	Inchigeelagh	This chapter describes the flood risk management options for Inchigeelagh and the identification of the preferred option from an SEA perspective
8	Conclusions and Next Steps	This chapter summarises the conclusion from the SEA Option Appraisal Study and the next steps in the SEA process.

2 Flood Risk Management Options

2.1 Introduction

A flood risk management option consists of one or, more commonly, a combination of flood risk management methods / measures. These methods/measures can be structural or non-structural in nature. The suitability of specific methods/measures needs to be reviewed on a case by case basis to ensure their appropriateness as all methods/measures may not be suitable in all circumstances.

Non-Structural Measures

Non structural measures can include one or a combination of some of the following;

Table 2.1: Non-Structural Measures

Measure	Description
Planning Control	This can include land-use development restrictions in statutory land-use plans (e.g. County/City Development Plans or Local Area Plans)
Building Regulations/Planning Conditions	This can involve requiring certain development/structures to be flood resilient through specified construction methods, building fabrics and uses (e.g. regulations relating to floor levels, flood-proofing, flood resilience, sustainable drainage systems, prevention of reconstruction or redevelopment in flood-risk areas, etc.);
Flood Forecasting	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.
Public Awareness	Public awareness measures include, for example; <ul style="list-style-type: none"> • Identification and disclosure of areas prone to flooding • Provision of information on the measures in place to provide advance warning of flooding • Establishment of methods to interface with the public and owners of vulnerable properties
Land-Use Management	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.
Emergency Response Planning	Measures include strategic planning for the integrated response of the emergency services for flood risk and flood events

Structural Measures

Structural measures for flood risk management can include one or a combination of some of the following;

Table 2.2: Structural Measures

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.
Flood Storage	Measures could include provision of flood storage/retardation system

2.2 Evaluating the Effectiveness of Flood Risk Management Options

Overview

The effectiveness of each of the viable flood risk management option (FRM) is measured in terms of how it achieve a set of Flood Risk Management Objectives through a process of multi-criteria analysis (MCA).

The objectives are split into a number of categories. These are;

- Technical;
- Economic;
- Social; and
- Environmental.

Some of the objectives within a particular category are further split into sub-objectives to provide clarity, particularly where individual objectives have multiple aspects associated with same.

Multi-Criteria Analysis Allocating Scores

Each sub objective has a basic requirement and an aspirational target associated with it. The basic requirement for each sub objective equates to a no change scenario. That is the status quo before the FRM option is adopted. The aspirational target in most cases is set to the highest achievement that is reasonably possible against the sub-objective in implementing the FRM option. The performance of each FRM option is measured against the basic and aspirational targets for each sub objective and assigned a score in accordance with the principles set out below.

Table 2.3: MCA Scoring

Option Performance	Score
Meets Aspirational Target	5
Partially Achieving Aspirational Target	Score in proportion to performance
Meeting Basic Requirement (No Change)	0

Option Performance	Score
Just Failing Basic Requirement	Score in proportion to performance
Fully Failing Basic Requirement	-5
Totally Failing Basic Requirement (Option Illegal or Totally Unacceptable)	-999

In the MCA the technical objectives measure if an option is robust in terms of operation. Higher scores are allocated to options that do not rely on mechanical, electrical or human intervention to operate effectively. Examples of such interventions include sluice gates, storm water over pumping, or erection of demountable barriers. The technical objectives also consider if the options can be constructed safely and if they can be managed effectively into the future.

The measurement of the performance of the options against the objective to avoid economic damage is measured in terms of the percentage of economic damage avoided by that option. When calculating the percentage reduction in damage for a particular option this is calculated relative to the total potential damages in the town. The economic objectives also measure the performance of the option in terms of reducing the risk to transportation routes, utility infrastructure and agricultural land.

The social objectives in the MCA include the reduction of flood risk to people, high vulnerability properties such as hospitals and fire stations and to social infrastructure and amenities. Under social objectives the MCA also measures the performance of the option to reduce the risk to local employment in relation to the number of non-residential properties at risk.

Under the environmental objectives the MCA measures the performance of the option as described below in accordance with the methodology as described in Chapter 3. This report has been prepared to describe the assessment of the FRM options against the environmental objectives.

Once all of the options have been analysed with reference to their performance against each of the sub-objectives the MCA score for each criteria can be calculated. This is done by multiplying the score for each sub objective by the Global and the Local Weighting and then by summing the weighted scores for all the sub objectives under that criteria.

Global and Local Weightings

In order to take account of the relative importance of some objectives in comparison other objectives, each sub-objective is given a Global Weighting. These global weightings are set at a national level and are the same across all of the CFRAM Studies. These weightings vary in value from 5 points to 30 points depending on their importance from a national perspective.

In order to take cognisance of the local perspective on the relative importance of objectives, each sub objective is also given a local weighting. Local weightings vary from 0 for not locally important to 5 for very important locally.

Multi-Criteria Analysis Overall Score

The **MCA Benefit Score** is calculated by adding the weighted score for the Economic, Social and Environmental Criteria together. This score represents the net benefits of the option.

The **Option Selection MCA Score** is calculated by adding the weighted scores of all the criteria together. This score includes the technical score and therefore includes all of the aspects that should be taken into account in considering the preferred option for a given location.

The **Total Construction Cost €** is the cost of the FRM option.

The **MCA Benefit – Cost Ratio** is calculated by dividing the **MCA Benefit Score** by the cost of the option. This is a numerical but non monetised ratio that indicates the overall benefits that can be delivered per euro of investment.

The **Economic Benefit €** is the cost of the damage avoided for the FRM Option

The **Economic Benefit – Cost Ratio** is calculated by dividing the cost of the damage avoided by adopting the FRM Option by the cost of the option. This is the traditional method used by OPW in assessing the economic case for proceeding with a flood relief scheme. In general terms a flood relief scheme would be considered economically viable if the benefit cost ratio is greater than 1.

3 Strategic Environmental Assessment

3.1 Introduction

The management of flood risk will be achieved through the implementation of measures which are selected to achieve an acceptable balance of environmental, social, and technical factors. As part of the process to select the measures, the evaluation of the alternatives from an environmental perspective is a key step in the Strategic Environmental Assessment process.

3.2 Overview of the SEA Process

The SEA process involves six key stages as follows:

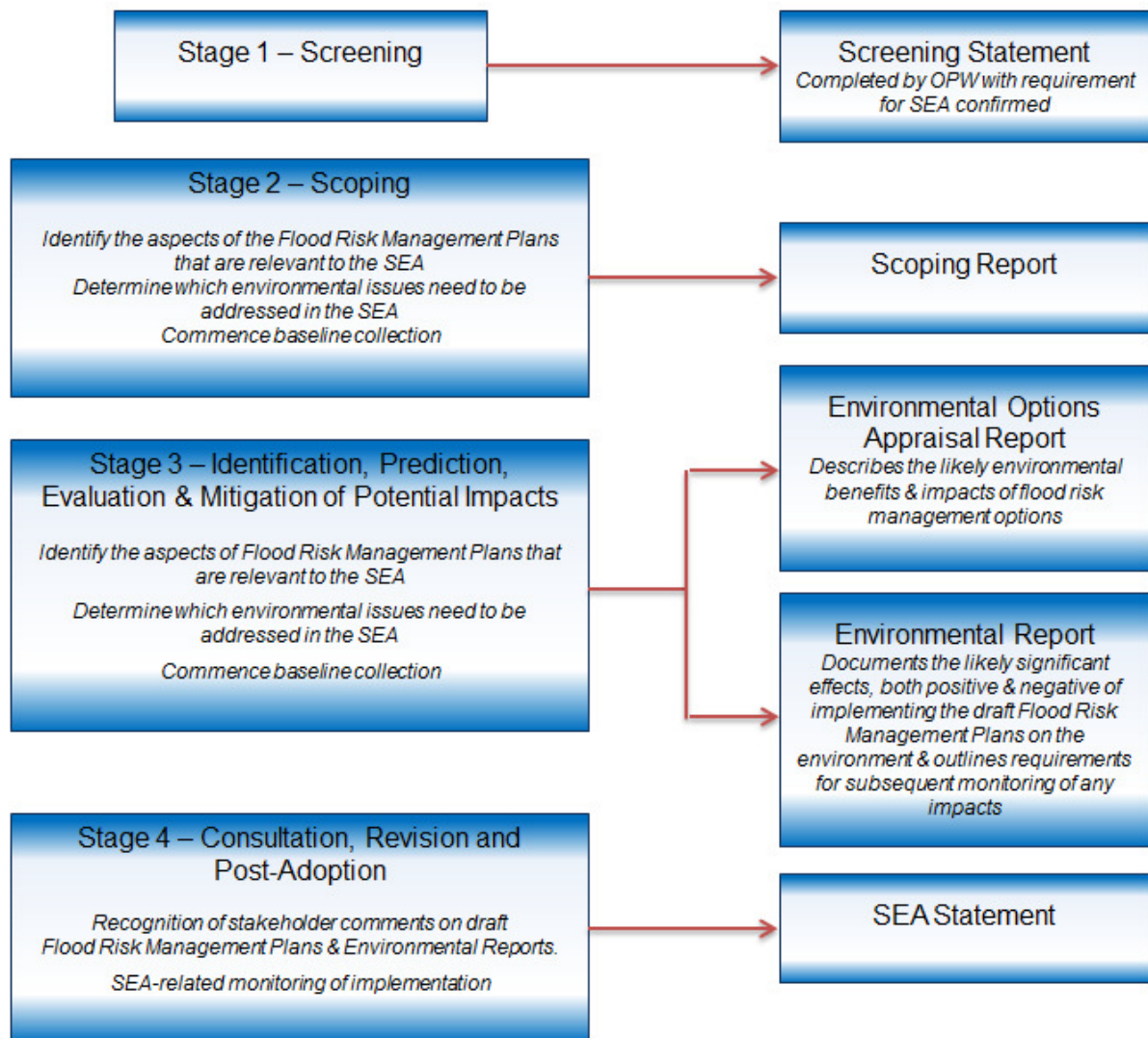
- **Screening** - the process of deciding whether the flood risk management plans would be likely to have significant environmental effects and as such would warrant a full SEA. The OPW conducted a screening assessment for the CFRAM studies in September 2011 which concluded that a full SEA is required.
- **Scoping** – Scoping determines the key environmental issues which are to be addressed in the Strategic Environmental Assessment. The scoping process set 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. The SEA process was completed in April 2015 following a consultation process with stakeholders.
- **Environmental Assessment and Environmental Report** – this is a key document in the SEA process as it outlines the likely significant effects on the environment of the Flood Risk Management Plan and recommends mitigation to address the significant adverse effects. 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)* as amended and include the following aspects:
 - Biodiversity;
 - Population;
 - Human health;
 - Fauna;
 - Flora;
 - Soil;
 - Water;

- Air;
- Climatic factors;
- Material assets;
- Cultural heritage including architectural and archaeological heritage;
- Landscape; and
- The inter-relationship of the above factors.

This document will also contain a history of the SEA process and how it was conducted with particular emphasis on stakeholder and public involvement;

- **Consultation on the Draft FRMP and SEA Environmental Report** – Consultation will be conducted with the relevant Environmental Authorities and also with the public. Both groups will be invited to make submissions in relation to the Draft Plan and Environmental Report. Submissions must be considered and the Environmental Report amended appropriately if deemed necessary;
- **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. This requires careful scripting, particularly in the context of how differing opinions from consultees have been managed throughout the process. 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.
- **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.

Figure 3.1: Stages of SEA



3.3 SEA Objectives, Sub-Objectives and Targets

During the Scoping Stage, SEA objectives, sub-objectives and indicative targets were developed for each of the social and environmental criteria scoped into the study during this phase of the project. These objectives, sub-objectives and indicators have been developed to ensure that the SEA and multi-criteria flood risk management options appraisal focuses on those issues of relevance and significance to the

SWRBD. The SEA objectives align with the flood risk management objectives which have been developed on a national level through extensive consultation with stakeholders.

Table 3.1: SEA Objective, Sub-Objectives (and Targets)

Criteria	Objective	Sub-Objective	Example Indicator
Social	a Minimise risk to human health and life of residents	i Minimise risk to human health and life of residents	Number of residential properties at risk of flooding
		ii Minimise risk to high vulnerability properties	Number of high vulnerability properties at risk from flooding (e.g. hospitals, health centres, nursing and residential homes)
	b Minimise risk to community	i Minimise risk to social infrastructure and amenity	(i) Number of social infrastructure assets at risk from flooding (e.g. educational institutions, fire and Garda stations, Bord Gáis facilities). (ii) Number/length of key strategic transport assets at risk of flooding.
		ii Minimise risk to local employment	Number of non-residential properties at risk from flooding.
Environmental	a 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.	Likelihood to impact on water body status elements: <ul style="list-style-type: none"> • Biology; • Physico-chemical; • Hydrology and morphology; • Priority substances and priority hazardous substances.
	b Support the objectives of the Habitats Directive and Birds Directive	Avoid detrimental effects to, and where possible enhance, Natura 2000 network, other protected sites, protected species and their key habitats, recognising relevant	(i) Area of internationally designated sites at risk from flooding and assessment of likely impact. (ii) Reported conservation status of internationally designated sites relating to flood risk management.

Criteria	Objective	Sub-Objective	Example Indicator
		landscape features and stepping stones.	
c	Avoid damage to, and where possible enhance, the flora and fauna of the catchment	Avoid damage to or loss of, and where possible enhance, nature conservation sites and protected species or other known species of conservation concern	(i) Area of nationally designated sites at risk from flooding and assessment of likely impact, particularly where designated for Otter, White-clawed Crayfish or Freshwater Pearl Mussel (ii) Reported conservation status of nationally designated sites relating to flood risk management. (iii) Area/length of river within Freshwater Pearl Mussel sensitive areas where flood risk management actions are proposed, and assessment of likely impact.
d	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	(i) Area of suitable habitat supporting salmonid and other fish species (ii) Number of upstream barriers
e	Protect, and where possible enhance, landscape character and visual amenity within the zone of influence	Protect, and where possible enhance, visual amenity, landscape protection zones and views into / from designated scenic areas within the zone of influence	(i) Length of waterway corridor qualifying as a landscape protection zone within urban areas (ii) Change of quality in existing scenic areas and routes (iii) Loss of public landscape amenities
f	Avoid damage and reduce risk of flooding to, or loss of, features, institutions and collections of cultural heritage importance and their setting	i Avoid damage and reduce risk of flooding to, or loss of, features, institutions and collections of	Number of architectural assets at flood risk and assessment of impact on their setting.

Criteria	Objective	Sub-Objective	Example Indicator
		architectural value and their setting	
	ii	Avoid damage and reduce risk of flooding to, or loss of, features, institutions and collections of archaeological value and their setting	Number of cultural heritage and archaeological assets at flood risk and assessment of impact on their setting.

Source: Mott MacDonald

3.4 Assessment of Alternatives

A key requirement for effective strategic environmental assessment is the evaluation of alternatives. The evaluation of alternatives from an SEA perspective is a key consideration in the determination of the best flood risk management option. This process has been described in detail in *Section 2.2 Evaluating the Effectiveness of Flood Risk Management Options*.

The Office of Public Works have 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.

4 Appropriate Assessment

4.1 Introduction

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). 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.

4.2 Habitats Directive Screening (for Appropriate Assessment)

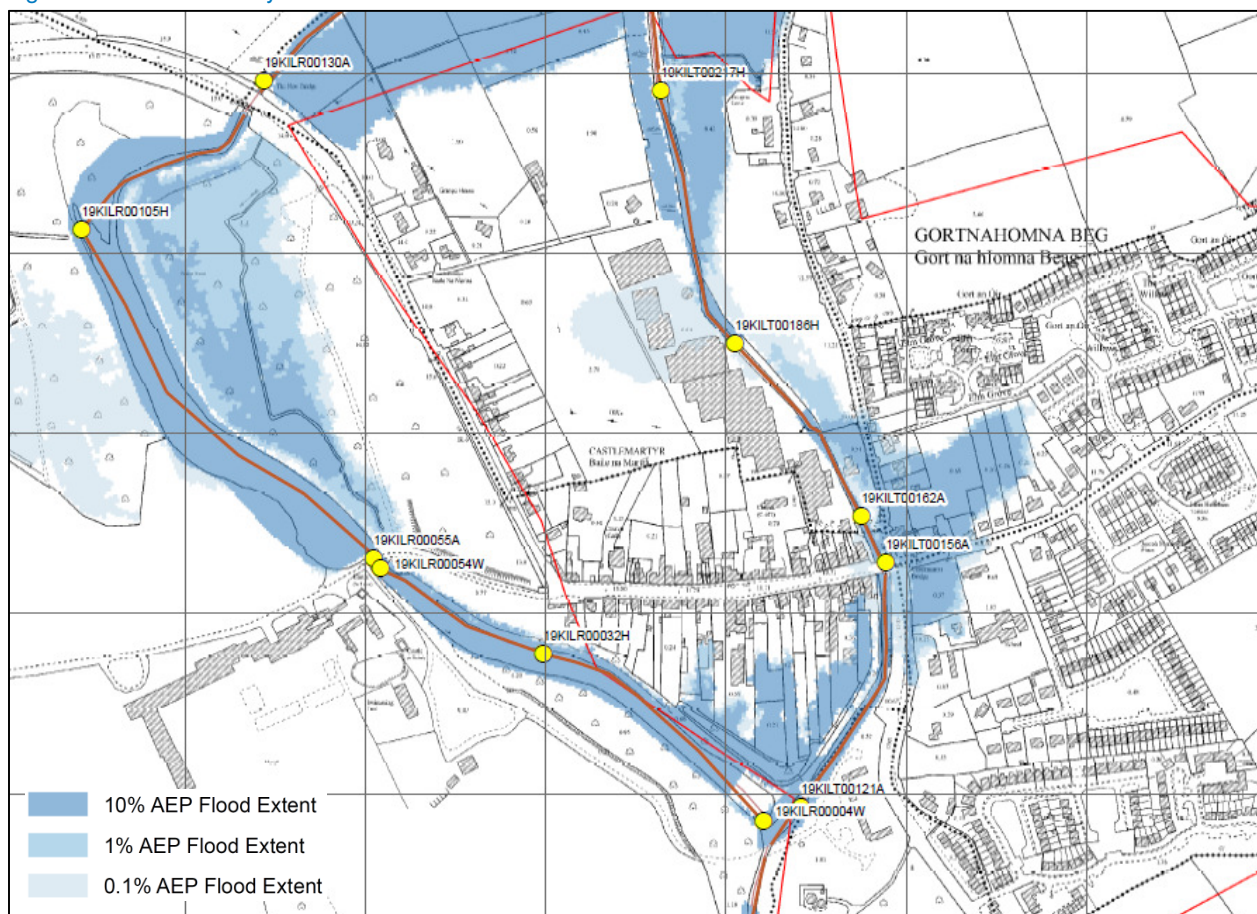
A separate draft Habitats Directive Screening (for Appropriate) Assessment has been developed to inform the Preliminary Options Report. The assessments have been included as an appendix to the Preliminary Options Reports.

5 Castlemartyr

5.1 Flood Risk

Castlemartyr is located on the confluence of the Kiltha River and Womanagh River in County Cork. The AFA and the existing fluvial flood risk are shown in Figure 5.1.

Figure 5.1: Castlemartyr Current Scenario Fluvial Flood Extents



5.2 Viable Flood Risk Management Options

A number of viable flood risk management options were identified and modelled to determine their effectiveness and impact. It should be noted that due to the strategic level of the assessment, the locations in which viable options may be constructed within the AFA may change at detailed design stage if an option is progressed through as a scheme. These are described below and illustrated in **Appendix A** of this report. Multi-criteria analysis (MCA) for each option was undertaken to assess if a preferred option could be established on environmental and social grounds. The detailed breakdown of SEA scoring for the purpose of this appraisal is provided in **Appendix B** of this report.

Option 1-Flood Defences This option includes the construction of flood walls and embankments ranging in height from 1.1m to 1.5m within the town. The locations and heights of the defences are provided in **Appendix A** of this report. The proposed flood defences fully achieve the required standard of protection for the 1% AEP fluvial event.

Option 2- Flood Defences and Flow Diversion – This option includes diverting excess flows (in excess of 7m³/sec) from the Kiltha River around the town through an existing bypass channel which is currently disused (Killamucky Stream). A new flow diversion structure is required to reconnect to the flow diversion channel. Flood walls will also be constructed within the town north of the confluence of the Killamucky stream and the River Kiltha ranging in height from 1.1m to 1.4m. The proposed flood defences fully achieve the required standard of protection for the 1% AEP fluvial event.

5.3

Environmental Sensitives

The key environmental sensitives of the Castlemartyr AFA are summarised below;

- The Womanagh River stretches from its source at Carrigour to its tidal outfall at Pilmore.
- The Kiltha River flows from Springfields/Mogeely southwards through Castlemartyr to join the Womanagh near Ladysbridge. Within Castlemartyr, a spring at Little Island diverts water from the Kiltha via the Castle, through the lake to re-join downstream of the town.
- The River Womanagh is classified as having a moderate to good water status under the Water Framework Directive (WFD) and is a considered sensitive body. Kilath is unclassified under the WFD.
- The rivers discharge into Youghal Bay a shellfish sensitive area designated under the European Communities (Quality of Shellfish Waters) Regulations 2006 as amended.
- The Castlemartyr AFA boundary does not overlap with any Natura 2000 site boundary. The Ballymacoda Bay Special Area of Protection (SPA) and Ballymacoda (Clonpriest and Pillmore) Special Area of Conservation (SAC) are located approximately 10km east of Castlemartyr. The Kiltha River (which flows through Castlemartyr) is hydrologically connected to Ballymacoda Bay via the Womanagh River.
- There are no significant polluting sources within the 1% Annual Exceedance Probability⁴ (AEP) flood extent.
- Womanagh River is not known as a river for high salmon/lamprey potential. There may be local fishing amenity value along the river.
- The village and surrounding area has a wealth of natural and built heritage. According to the Cork County Development Plan (2014), there are five buildings or other structures located within the village, which are entered in the Record of Protected Structures. These includes St. Anne's Church of Ireland and Castlemartyr Castle, which, along with its grounds and part of the village main street, are included

⁴ The Annual Exceedance Probability is the chance or probability of a flood event occurring annually and is usually expressed as a percentage. 1% AEP is event has a 1% chance of occurring in a year, so once in every 100 years.

as part of an Architectural Conservation Area. According to the Plan there is an objective to protect and enhance the special character of the area. These sites are not within the 1% AEP at risk from fluvial flooding.

- According to the Cork Development Plan (2014), Castlemartyr is located within an area characterised as “Broad Fertile Lowland Valley” landscape character type. This landscape character type is classified as having local value and medium sensitivity in its ability to accommodate change without adverse impact on its character and value. There are no scenic routes within the town.
- Receptors at risk from the 1% AEP flood extent within the AFA include:
 - 13 No. Residential properties
 - 9 No. Non-Residential properties
 - 1 No. Society Amenity Site
 - 3 No. Roads at risk
- There are no high vulnerability properties at risk from fluvial flooding within the AFA. There are no recorded or protected archaeological monuments or sites at risk 1% AEP within the AFA.

5.4 Environmental Assessment

Table 5.1 below provides a summary of the potential impacts arising from the proposed options as determined through the SEA assessment. In addition Table 5.1 below also highlights the requirement for mitigation measures for each option under each social and environmental objective. Table 5.1 should be read in conjunction with the SEA scoring matrix contained within **Appendix B**.

Table 5.1: Castlemartyr Options Scoring Matrix- Social and Environmental Objectives

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

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	X X	Partly failing minimum target
-4	X X	
-5	XX X	Fully failing minimum target
-999.99	XX X	Unacceptable negative impact where feasible alternative exists

There are no significant polluting sources within the 1% Annual Exceedance Probability (AEP) flood extent within the Castlemartyr AFA. 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. However, *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 river bed and bank within the footprint of the control structure. It is also considered that the diversion structure will not significantly alter the attainment of good water status in the long term.

Having regard to the requirements of the Habitats and Birds Directive, the AFA does not occur within any Natura 2000 site. There is no requirement for land take within a Natura 2000 site for the construction of the proposed measures. Potential removal of riparian habitat to accommodate the options will not impact the qualifying features of the SAC or SPA.

The Kiltha River is hydrologically connected to Ballymacoda Bay via the Womanagh River. Sediment release / accidental pollution of the Kiltha River could potentially enter the bay. The release of sediment into the bay is extremely unlikely to impact the qualifying features of the SAC. These habitats are habitually inundated with sediment during tidal exchanges and are adapted to such conditions. Pollutants e.g. concrete / oil leaks will be diluted by flows in the Kiltha River, the Womanagh River and also by estuarine water in the bay. It is highly unlikely that pollutants would reach the bay at such concentrations what would cause habitat damage.

All of the proposed options have the potential to cause disturbance to species of conservation importance , such as otters, and bats, through operational impacts generally associated with construction stage project, noise generated by the works and possibly artificial lighting that may be used in the darker evenings or in winter months in order to facilitate the construction works.

Option 1 includes the construction of extensive length of flood walls in the town, short term negative impacts are likely during the the construction including the possible removal of riparian habitat and riverside screen planting in order to facilitate the construction of the measures. Option 2 measures include a flow diversion for the Kiltha River. A new flow diversion structure will be required and the bypass channel will need to be cleared of debris / vegetation before coming on line. The proposed measure may result in the scouring in the Kiltha River at the bypass channel outlet and potential damage to habitat during the construction.

The protection of lamprey and salmon are not qualifying features within the Ballymacoda Bay SAC. Woamagh is not designated as a salmonid watercourse under the European Communities (Quality of Salmonid Waters) Regulations, 1988 and is not known as a river for high salmon/lamprey habitat potential. There may however be local fishing amenity value along the river. The flow diversion structure within *Option 2* will result in a permanent loss of fisheries habitat within the footprint of the structure.

The existing Kiltha River runs through Pigeon Wood. Pigeon Wood a long established woodland, is located immediately west of Castlemartyr AFA. This woodland comprises a mix of conifer plantation, broadleaf and mixed woodland. There are also areas which have been recently clear-felled. This is not Annex I habitat, it is outside the boundary of Natura 2000 sites and is not a qualifying feature. There is potential for destruction of woodland habitat to facilitate the access of machinery during the construction of the diversion structure.

In terms of the social objectives do something is always preferable, Options 1 and 2 achieve aspirational targets set out to minimise flood risk to residential properties and risk to the community within the AFA. Each of the options considered above score the same having regard to the protection the measures provide to human health and life of residents and protection provided to local employment within the AFA.

According to the Cork County Development Plan (2014), parts of the Castlemartyr main street are included within an Architectural Conservation Area (ACA), where it is an objective to protect and enhance the special character of the area. There are no protected buildings or recorded monuments and sites at risk within the 1% AEP extent within the AFA. All of the 'do something' options will however provide same protection for the town however there is no discernible difference between options in the context of potential impacts on the architectural setting and landscape value of the AFA. Option 1 includes the construction of flood walls within the town north of the confluence of the Killamucky stream and the River Kiltha ranging in height from 1.1m to 1.4m. There are a number of existing walls already within the town and the construction of the new defence walls are unlikely be notably different subject to a consistent visual appearance being integrated into the design process.

5.5 Preferred Flood Risk Management Option

On the basis of the detailed evaluation summarised above, Option 1 (Flood Defences) has been determined to be the preferred option.

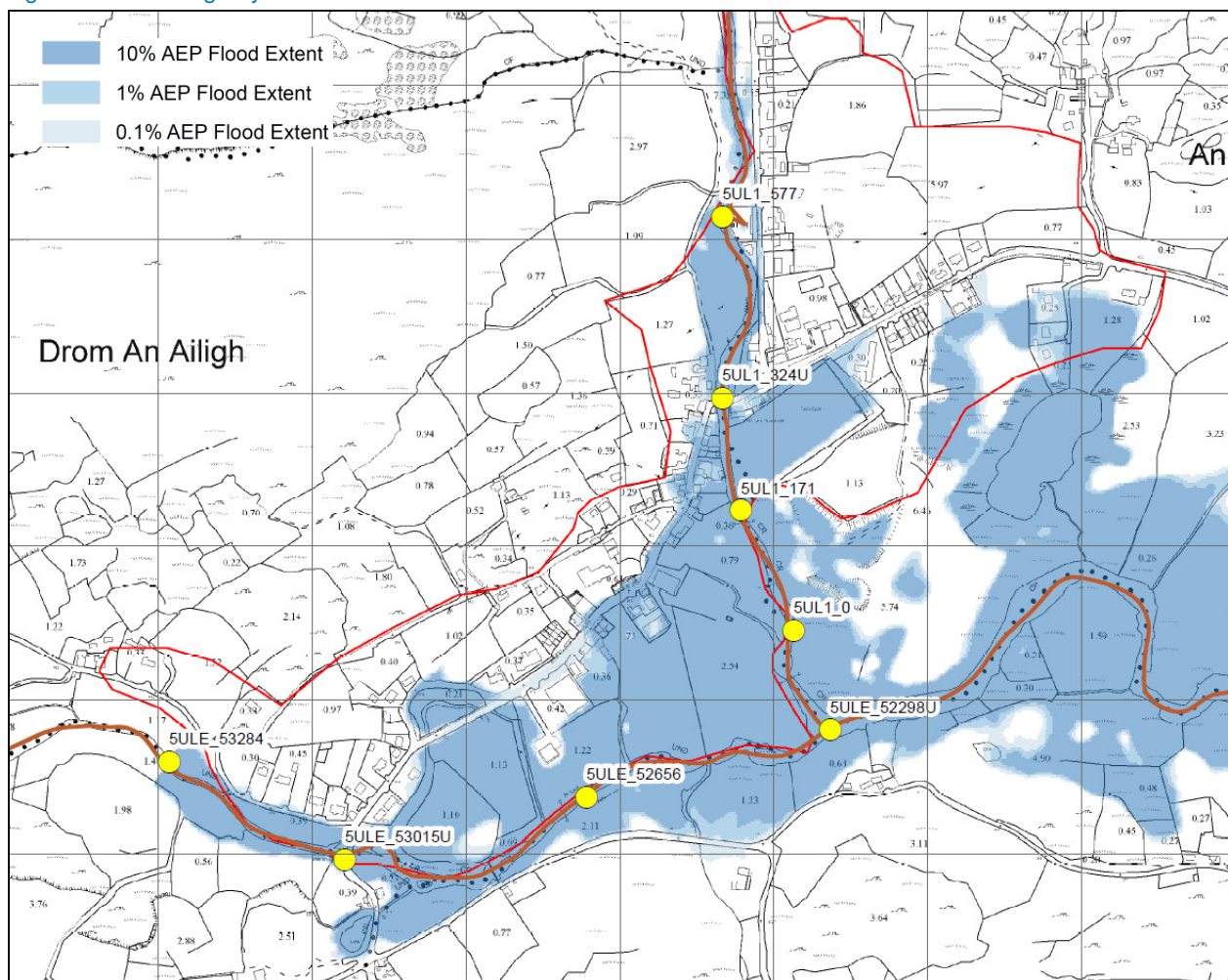
Mitigation actions are recommended for the identified negative effects. The key recommendation is that these negative impacts should be considered during the next stage of option development, when the alignment of the proposed defences and details of the option would be optimised through detailed design in order to limit impacts on the river channel and banks of the river.

6 Ballingeary

6.1 Flood Risk

Ballingeary is located along the upper reach of the River Lee in County Cork. Ballingeary is at risk of fluvial flooding. The AFA and the existing fluvial flood risk are shown in Figure 6.1.

Figure 6.1: Ballingeary – Current Scenario Fluvial Flood Extents



6.2 Viable Flood Risk Management Options

A number of viable flood risk management options were identified and modelled to determine their effectiveness and impact. It should be noted that due to the strategic level of the assessment, the locations in which viable options may be constructed within the AFA may change at detailed design stage if an option is progressed through as a scheme. These are described below and illustrated in **Appendix A** of this report. Multi-criteria analysis (MCA) for each option was undertaken to assess if a preferred option

could be established on environmental and social grounds. The detailed breakdown of SEA scoring for the purpose of this appraisal is provided in **Appendix B** of this report.

Option 1- Flood Defences- This option includes the construction of flood walls and embankments ranging in height from 0.7m to 1.5m within the town. The locations and heights of the defences are provided in **Appendix A** of this report. The proposed flood defences fully achieve the required standard of protection for the 1% AEP fluvial event.

Option 2-Storage- This option includes the construction of two flood storage areas on the River Lee and its tributary Bunsheelin of 450,700m² and 257,500m² respectively. This work will involve stream realignment, construction of embankments to contain flood waters and installation of a sluice gate to control flow from the storage.

6.3 Key Environmental Sensitivities

The key environmental sensitivities of the Ballingeary AFA are summarised below;

- The Bunsheelin stream and River Lee flows through Ballingeary. These watercourses are classified as good status under the WFD.
- The River Lee is designated as salmonid and considered a sensitive waterbody. Spawning grounds for salmonid are likely upstream along the River Lee. There is local fishing amenity value along the River Lee.
- There is one significant polluting source at risk from flooding in the 1% AEP.
- The AFA boundary does not overlap with any Natura 2000 site boundary. The Gearagh SPA and The Gearagh SAC are located approximately 15km southeast of Ballingeary. The sites are hydrologically connected via the River Lee.
- According to the Cork County Development Plan (2014), the village occurs in a landscape character zone "Ridged and Peaked upland". The landscape value is considered to be high value and has a sensitivity of local importance.
- According to the Cork County Development (2014), the approach roads into the town are protected scenic routes.
- Receptors at risk from the 1% AEP flood extent within the AFA include:
 - 21 No. Residential properties
 - 25 No. Non-Residential properties
 - 2 No. Society Amenity Site
 - 3 No. Roads at risk
 - 1 No. High Vulnerability Properties
- There are no NIAH monuments at risk within the 1% AEP extent. The bridges within the town are RMP and these occur within the 1% AEP flood extent.

6.4 Environmental Assessment

Table 6.1 below provides a summary of the potential impacts arising from the proposed options as determined through the SEA assessment. In addition Table 6.1 below also highlights the requirement for mitigation measures for each option under each social and environmental objective. Table 6.1 should be read in conjunction with the SEA scoring matrix contained within **Appendix B**.

Table 6.1: Ballingear Options Scoring Matrix- Social and Environmental Objectives

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

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	X X	Partly failing minimum target
-4	X X	
-5	XX X	Fully failing minimum target
-999.99	XX X	Unacceptable negative impact where feasible alternative exists

Having regard to the requirements of the Habitats and Birds Directive, the AFA does not occur within any Natura 2000 site. There is no requirement for land take within a Natura 2000 site for the construction of the proposed measures. Potential removal of riparian habitat to accommodate the options will not impact the qualifying features of the SAC or SPA..

The Bunsheelin stream, a tributary of the River Lee, flows through Ballingeary is hydrologically connected downstream to the Gearagh SAC. The release of sediment into the river is extremely unlikely to impact the qualifying features of the SAC. Pollutants e.g. concrete / oil leaks will be diluted by flows in the River Lee and its tributary. It is highly unlikely that pollutants would reach the Gearagh at such concentrations that would cause habitat damage. Therefore there are no preferences between the options having regard to potential impacts associated with the Birds and Habitats Directive objective.

Permanent fragmentation of linear riparian features resulting from the construction of very large embankments (e.g. 7m embankment in River Lee) which may deter commuting protected species from using an area. The construction of Option 2 will require significant instream works including the excavation of the river bed and bank material, a section of the river bed will be replaced by a concrete channel and walls such that the control structure can be anchored to the concrete. This will result in the loss of river bed and river bank within the footprint of the control structure.

The River Lee is designated as salmonid and is classified as having a good status under the WFD. The River Lee and its tributary are sensitive water bodies. There is one significant polluting source at risk from flooding in the 1% AEP. All of the options provide flood protection measures which assist in achieving the objectives of the WFD by prevent flooding. Spawning grounds for salmonid are likely upstream along the River Lee. Impacts on salmonid from sedimentation associated with instream works and construction of the embankments required for Option 2 are likely to be significant prior to mitigation. Having regard to the requirements of the WFD, Option 2 is the least preferred option.

Option 2 includes for the construction of a storage area, the proposed measures include the construction of 7m embankment, given the local topography this measure is likely to be visible from the scenic roads and will result in a permanent change in the landscape prior mitigation.

Option 1 includes the construction of flood walls within the town ranging in height from 0.7m to 1.5m. There are a number of existing walls already within the town and the construction of the new defence walls are unlikely be notably different subject to a consistent visual appearance being integrated into the design process.

In comparison to the Do-nothing scenario, in terms of the social objectives do something is always preferable. Each of the do something options considered above score the same in regard to the protection the measures provided to human health and life of residents and protection provided to local community within the AFA.

6.5 Preferred Flood Risk Management Option

On the basis of the detailed evaluation summarised above, Option 1 (Flood Defences) has been determined to be the preferred option.

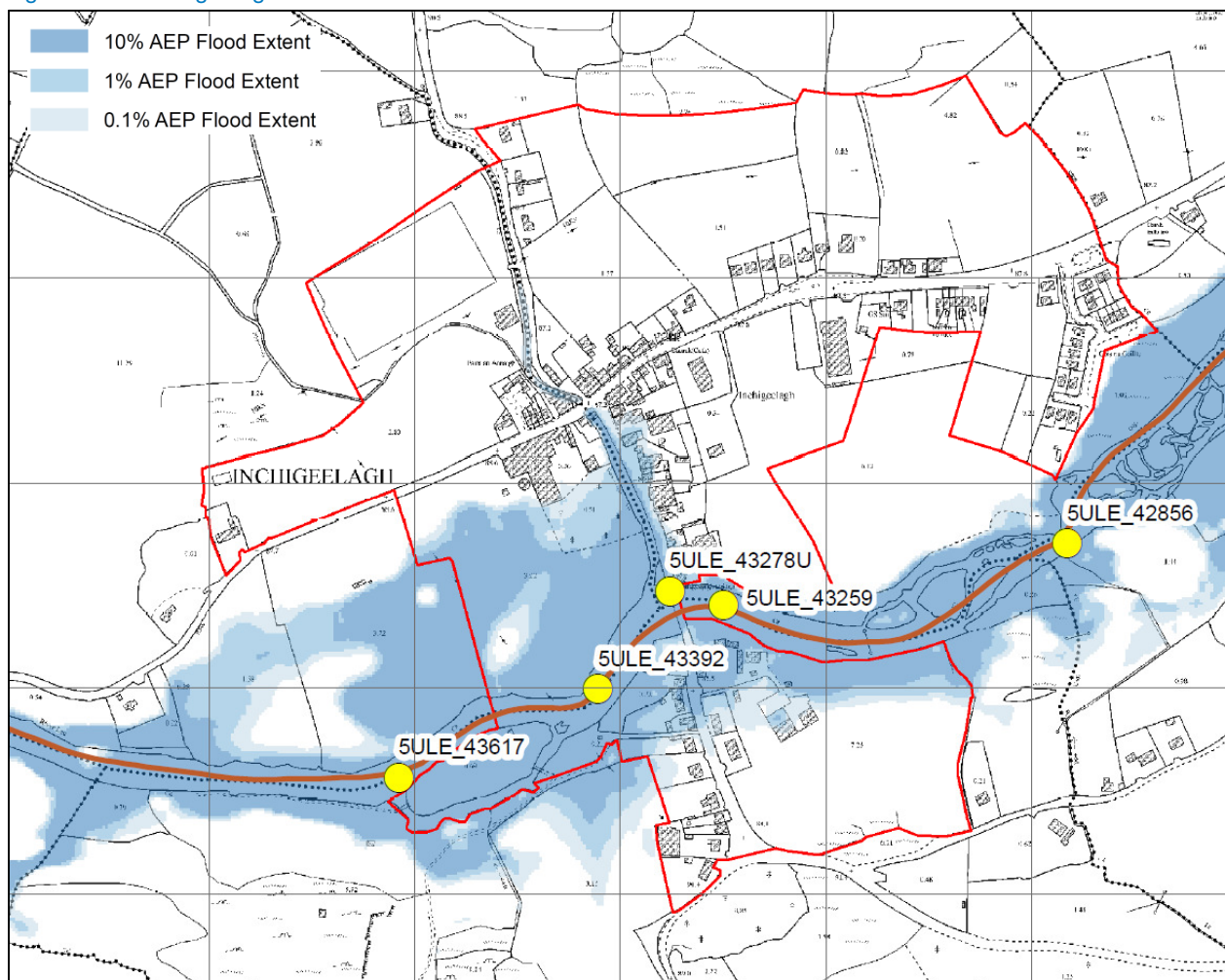
Mitigation actions are recommended for the identified negative effects. The key recommendation is that these negative impacts should be considered during the next stage of option development, when the alignment of the proposed defences and details of the option would be optimised through detailed design in order to limit impacts on the river channel and banks of the river.

7 Inchigeelagh

7.1 Flood Risk

Inchigeelagh is located along the River Lee in County Cork, approximately 8km downstream of Ballingeary. Inchigeelagh is at risk of fluvial flooding. The AFA and the existing fluvial flood risk are shown in Figure 7.1

Figure 7.1: Inchigeelagh – Current Scenario Fluvial Flood Extents



7.2 Viable Flood Risk Management Options

One viable flood risk management option was identified and modelled to determine its effectiveness and impact. This is described below and illustrated in **Appendix A** of this report. It should be noted that due to the strategic level of the assessment, the locations in which viable options may be constructed within the AFA may change at detailed design stage if an option is progressed through as a scheme. Multi-criteria analysis (MCA) for the option was undertaken to assess if a preferred option could be established on environmental and social grounds. SEA scoring for the purpose of this appraisal is provided in **Appendix B** of this report.

Option 1- Flood Defences; This option includes the construction of flood walls and embankments ranging in height from 0.6m to 1.9m within the village. This option also includes the sealing of an existing culvert within the village. The locations and heights of the defences are provided in **Appendix A** of this report. The proposed flood defences fully achieve the required standard of protection for the 1% AEP fluvial event.

7.3 Key Environmental Sensitives

The key environmental sensitives of the Inchigeelagh AFA are summarised below:

- The River Lee flows through Inchigeelagh AFA. This watercourse is classified as good status under the WFD.
- The River Lee is designated as salmonid and considered a sensitive waterbody. Spawning grounds for salmonid are likely upstream along the River Lee. River Lee is noted for its importance of fishery amenity value.
- There is one significant polluting source at risk from flooding in the 1% AEP.
- The Inchigeelagh AFA boundary does not overlap with any Natura 2000 site boundary. The Gearagh SPA and Gearagh SAC are located approximately 7km east of the village.
- According to the Cork County Development Plan (2014), the village occurs in a landscape character zone assigned as "Ridged and Peaked upland". The landscape value is considered to be high value and sensitivity of local importance.
- According to the Cork County Development Plan (2014), there are scenic routes on the approach road from Ballingeary.
- Receptors at risk from the 1% AEP flood extent within the AFA include:
 - 14 No. Residential properties
 - 14 No. Non-Residential properties
 - 1 No. Society Amenity Site
 - 2 No. Roads at risk
- There are no high vulnerability properties at risk from fluvial flooding within the AFA.
- There are no NIAH monuments at risk within the 1% AEP extent. There is one RMP within the 1% AEP extent.

7.4 Environmental Assessment

Table 7.1 below provides a summary of the potential impacts arising from the proposed options as determined through the SEA assessment. In addition Table 7.1 below also highlights the requirement for mitigation measures for each option under each social and environmental objective. Table 7.1 should be read in conjunction with the SEA scoring matrix contained within Appendix B.

Table 7.1: Inchigeelagh Options Scoring Matrix-Social and Environmental Objectives

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

Source: Mott MacDonald

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	X X	Partly failing minimum target
-4	X X	
-5	XX X	Fully failing minimum target
-999.99	XX X	Unacceptable negative impact where feasible alternative exists

The 'do-something option', Option 1, can assist in contributing to maintaining the objectives of the Water Framework Directive by preventing flooding of the significant polluting source within the 1% AEP extent.

In the context of the Birds and Habitat Directive objective, it should be noted that there are no Natura 2000 sites within the AFA. The proposed works will have the potential to cause disturbance to species of conservation importance such as otters through operation of construction machinery and personnel, noise generated by the works and possibly artificial lighting that may be used in the darker winter months.

The River Lee is recognised as an important river for supporting salmon species and it is recognised as having high fishery value. The proposed works will not directly impact on the River Lee, however the works may require excavation of the bank of river during the construction stage. This would result in short term damage to habitat and emissions of sediment to the waterbody and downstream on the River Lee without appropriate mitigation measures being implemented. There is a potential need for access restrictions to the local fishery for during the construction stage.

The proposed measures within Option 1 will change the views across the river from the bridge, however the wall and embankments relatively low lying. The construction of the low lying walls along the river bank is unlikely to adversely impact on the views along the road. There is potential to include landscape planting as part of the design of the embankments. The proposed measures will likely change the existing landscape form in the short term during construction.

The construction of the low lying walls has potential impacts on the setting of the Church/Parish Hall (CO081-014001) within the AFA, however there are currently low lying stone wall parallel to the local road, the proposed measures will result in a height increase of approximately 0.5m and the measures will provide protection to this monument.

In comparison to the Do-nothing scenario, in terms of the social objectives do something is always preferable, the viable option, Option 1, exceeds the minimum targets set out to minimise flood risk to residential properties and risk to the community within the AFA.

7.5 Preferred Flood Management Options

On the basis of the detailed evaluation as summarised above, Option 1, on the Brewery River in combination with localised flood defences on the River Lee is considered to be 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, particularly on water quality status of the river and setting of the protected monuments within the town.

8 Conclusions and Next Steps

8.1 Conclusions

The strategic environmental assessment has identified that the preferred alternatives are as set out below.

Table 8.1: Preferred Flood Risk Management Options (UoM 20)

AFA	Preferred Flood Risk Management Option
Castlemartyr	Option 1 (Flood Defences)
Ballingeary	Option 1 (Flood Defences)
Inchingeelagh	Option 1 (Flood Defences)

8.2 Next Steps

The findings from the strategic environmental assessment of the flood risk management options will be integrated into the overall multi-criteria analysis for the identification of the overall preferred flood risk management option in each AFA.

Once the preferred flood risk management option has been identified in each AFA the draft flood risk management plan will be prepared. The next stage (Stage 3 with reference Figure 3-1 in Chapter 3 of this report) of the strategic environmental assessment process involves the identification of the environmental impacts (including where appropriate mitigation measures) and recommending monitoring for the evaluation of the plan.

Appendices

A.	AFA Option Drawings	33
B.	SEA scoring Matrix	38

A. AFA Option Drawings

Figure A.1: Castlemartyr Option 1 Flood Defences

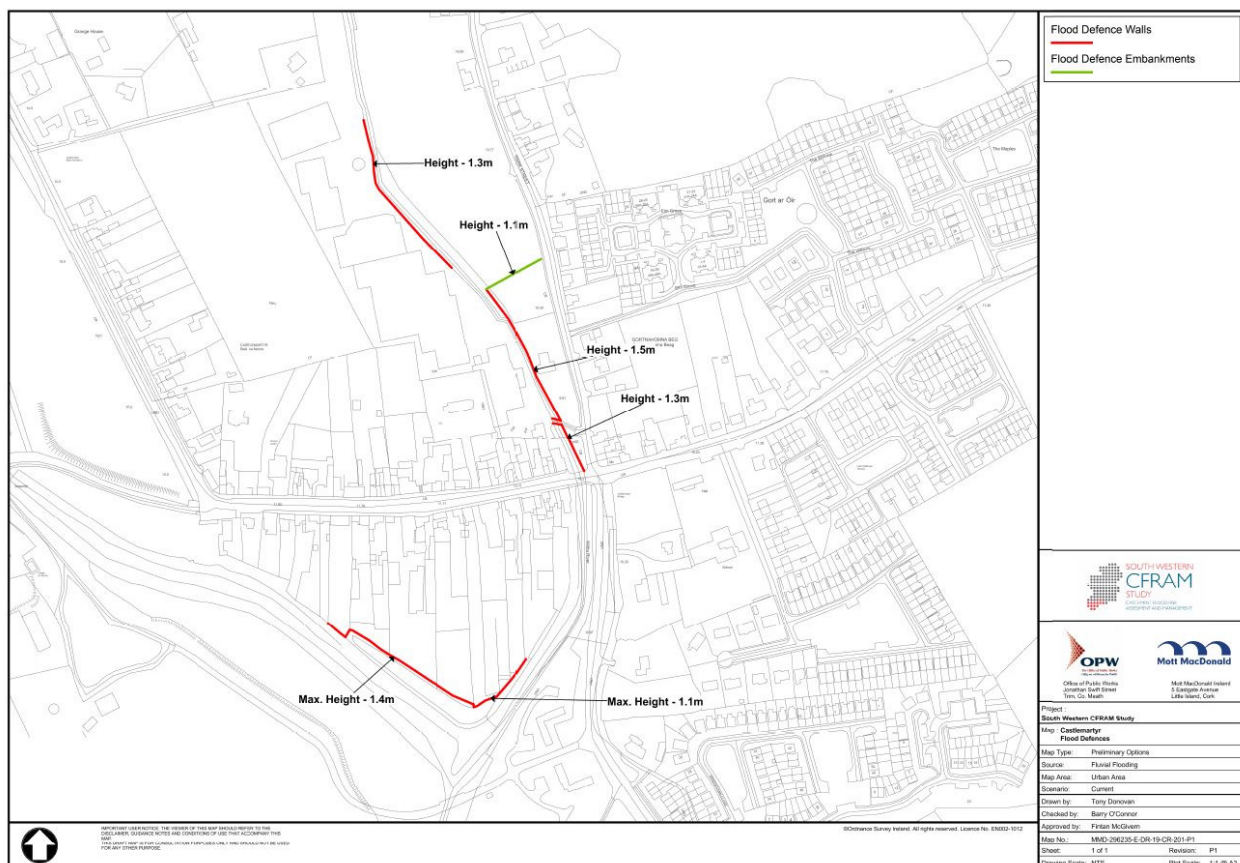


Figure A.2: Castlemartyr Option 2 Flow Diversion /Flood Defences

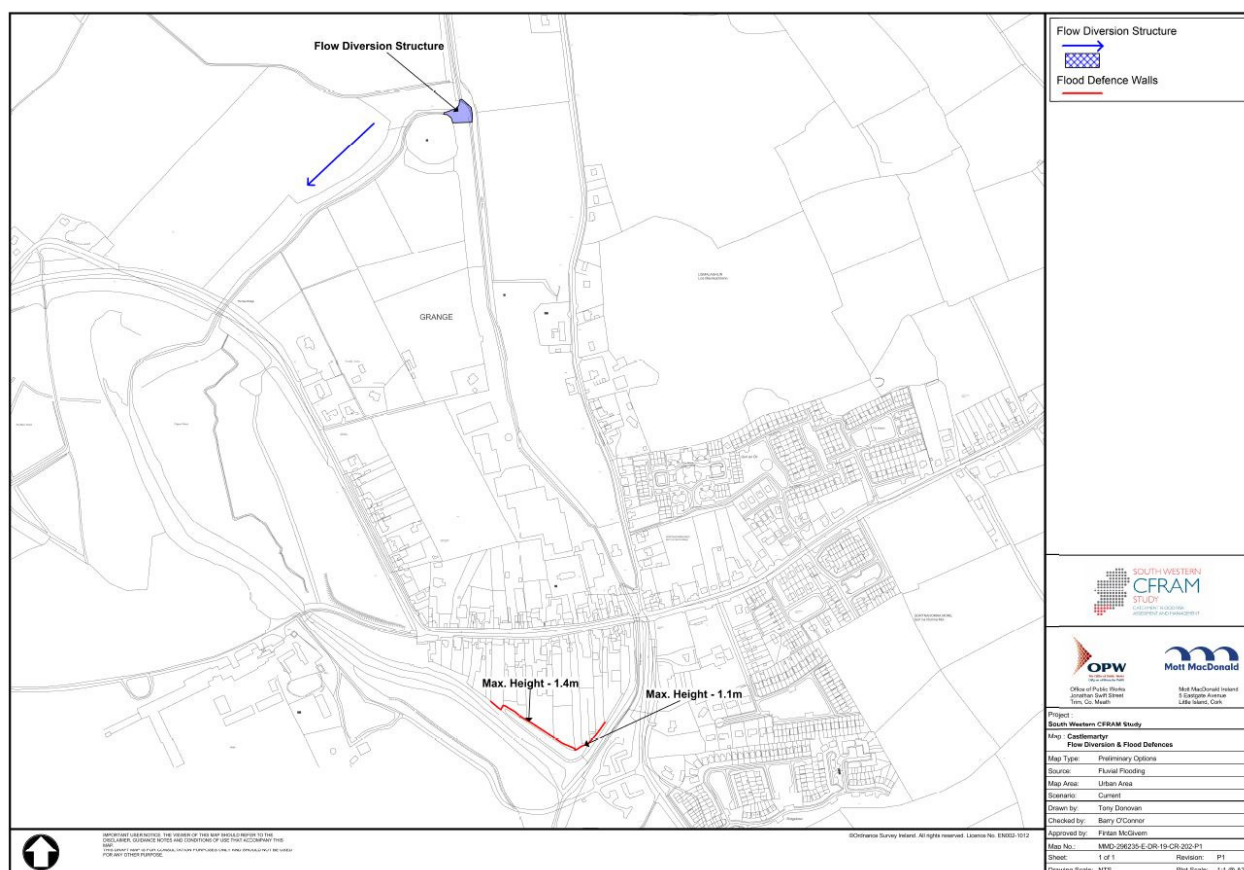


Figure A.3: Ballingearry Option 1 Flood Defences

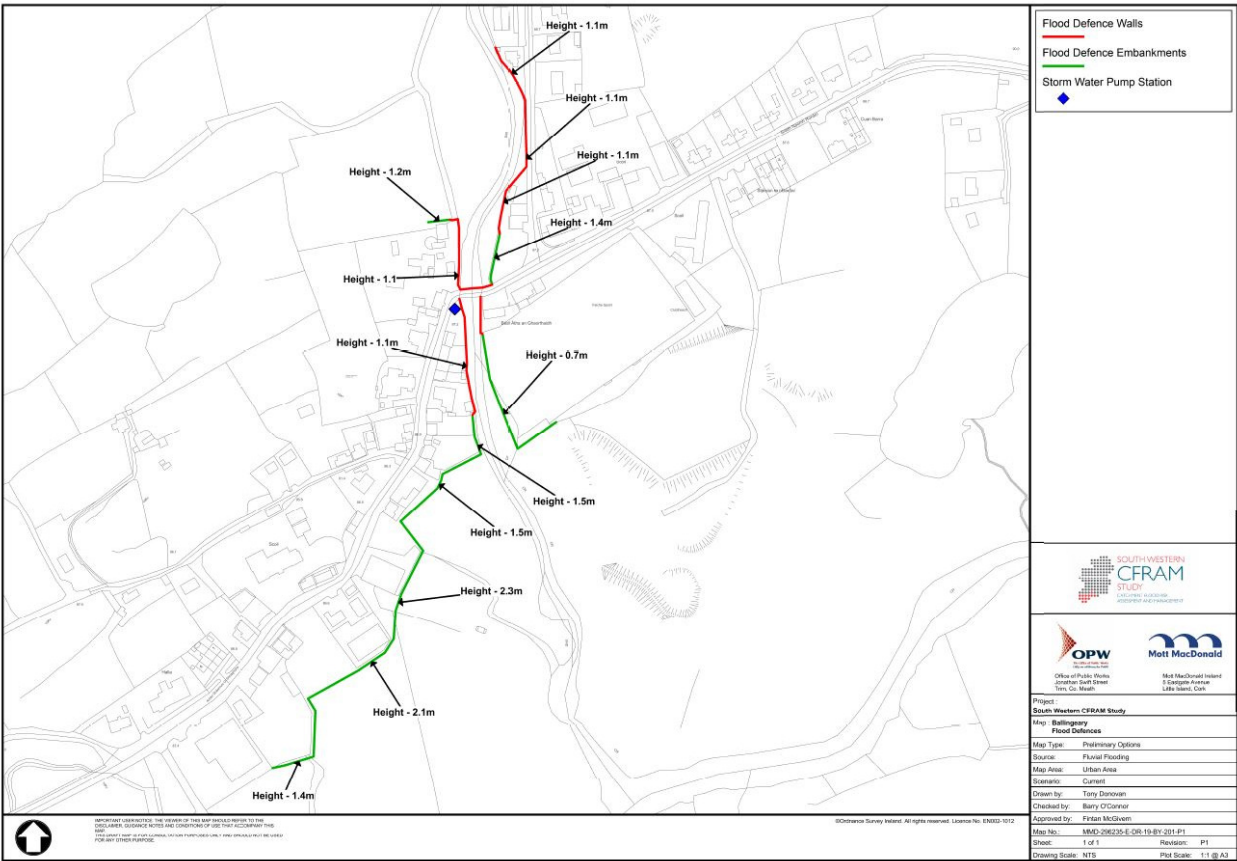


Figure A.4: Ballingeary Option 2 Flood Storage

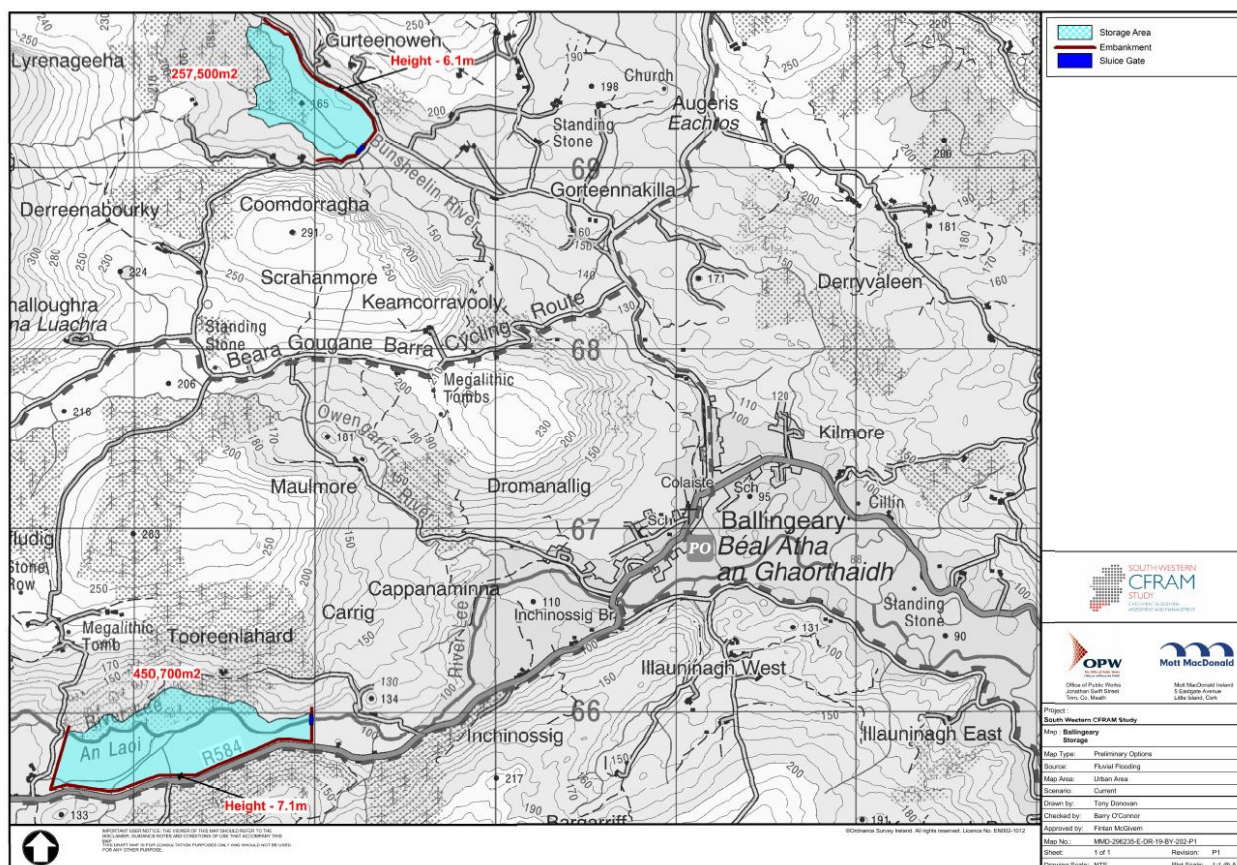
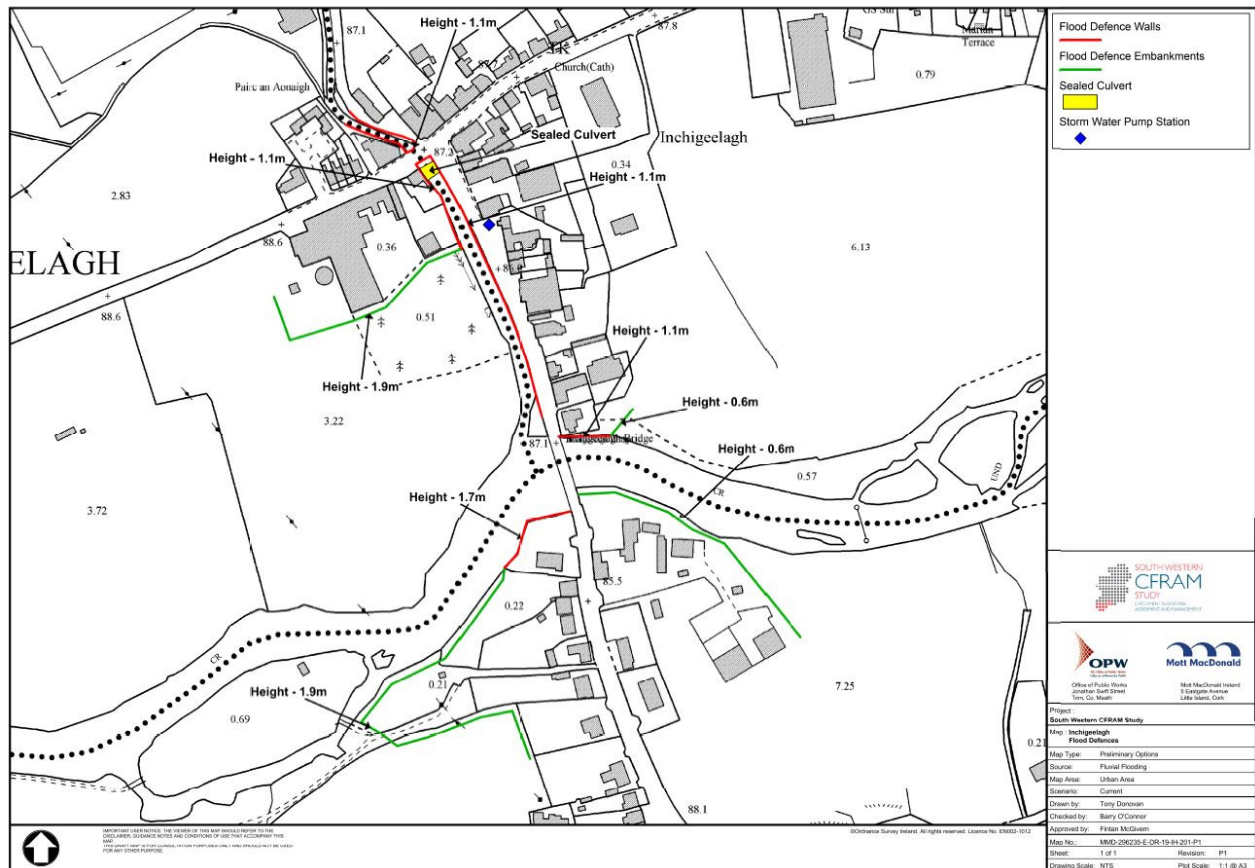


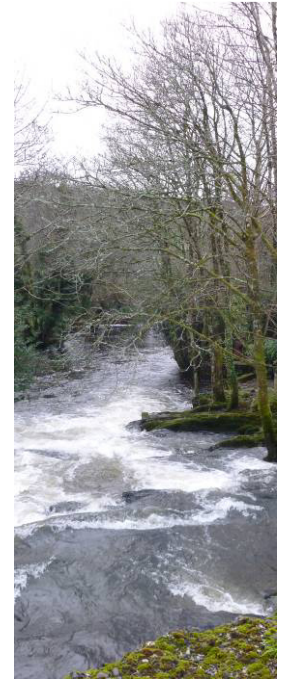
Figure A.5: Inchigeelagh Option 1



B. 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	X X	Partly failing minimum target
-4	X X	
-5	XX X	Fully failing minimum target
-999.99	XX X	Unacceptable negative impact where feasible alternative exists

Appendix D. Draft Screening for Appropriate Assessment under the Habitats Directive



South Western CFRAM Study

Screening for Appropriate Assessment: Lee -
Cork Harbour Catchment (UoM 19)

February 2016

Office of Public Works

South Western CFRAM Study

Screening for Appropriate Assessment: Lee -
Cork Harbour Catchment (UoM 19)

February 2016

Office of Public Works

Jonathan Swift Street
Trim
Co. Meath

Issue and revision record

Revision	Date	Originator	Checker	Approver	Description
A	18 December 2014	R. Mansfield	B. O' Connor	F. McGivern	Initial Draft for submission to CFRAM AA Workshop (January 2015)
B	23 February 2016	R. Mansfield	B. O' Connor	F. McGivern	Client comment

Information class: Standard

This document is issued for the party which commissioned it and for specific purposes connected with the above-captioned project only. It should not be relied upon by any other party or used for any other purpose.

We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

This document contains confidential information and proprietary intellectual property. It should not be shown to other parties without consent from us and from the party which commissioned it.

Contents

Chapter	Title	Page
	Executive Summary	i
1	Introduction	4
1.1	Flood Risk Assessment and Management in Ireland	4
2	Appropriate Assessment	6
2.1	Statutory Requirement for Appropriate Assessment	6
2.2	Appropriate Assessment – The Process	7
2.3	Objective of Appropriate Assessment Screening	8
2.4	Methodology	9
2.5	Statement of Authority	10
2.6	Consultation	10
3	Description of the Plan	11
3.1	Flood Risk Management Plan	11
3.2	Overview of the South Western River Basin District	12
3.2.1	Units of Management in the SWRBD	12
3.3	Flood Risk Management Options	13
3.4	The Lee – Cork Harbour UoM 19	15
3.4.1	Areas for Further Assessment in UoM 19	16
3.5	Flood Risk Management Options for the Lee - Cork Harbour UoM	17
3.5.1	Non-Structural Measures	17
3.5.2	Structural Measures	19
3.6	Flood Risk Management Options with Potential for Significant Effects on Natura 2000 Sites	20
3.6.1	Potential Impacts of Non-Structural Options in UoM 19	20
3.6.2	Potential Impacts of Structural Options in UoM 19	22
4	Characteristics of Natura 2000 Sites	25
4.1	Natura 2000 Sites within the Zone of Impact	25
4.2	Likelihood of Impacts on Natura 2000 Sites	26
4.2.1	Castlemartyr AFA	27
4.2.2	Ballingeary AFA	28
4.2.3	Inchigeelagh AFA	30
4.2.4	Summary of Likely Impacts on the Ballymacoda Bay SPA, the Ballymacoda (Clonpriest and Pillmore) SAC and the Gearagh SAC and SPA	30
5	Significance of Impacts on Natura 2000 Sites	31
5.1	General	31
5.2	Assessment of Significance	31

6	Conclusions and Screening Statement	32
7	References	35

Figures

Figure 2-1 Appropriate Assessment the Process	8
Figure 3-1 South Western River Basin District (SWRBD)	12
Figure 3-2 Units of Management and Areas for Further Assessment in the SWRBD	13
Figure 3-3 Unit of Management 19	16

Tables

Table 3.1: Suite of Flood Risk Management Options	14
Table 3.2: Areas for Further Assessment within Unit of Management 19	16
Table 3.3: Structural Flood Risk Management Options for UoM 18	20
Table 4.1: Noise Levels, dB(A), at Various Distances from Construction Activities	28
Table 6.1: Screening Matrix for UoM 19	32

Executive Summary

Introduction

The Office of Public Works (OPW) is the competent authority in Ireland for the implementation of the EU Floods Directive [2007/60/EC], which is transposed into Irish law by the European Communities (Assessment and Management of Flood Risk) Regulations, 2010. The Floods Directive requires Member States to:

- Identify areas of existing or foreseeable future potentially significant flood risk (referred to as Areas for Further Assessment - AFAs);
- Prepare flood hazard and risk maps for the AFAs;
- Prepare Flood Risk Management Plans by 22 December 2015, setting objectives for managing the flood risk within the AFAs and setting out a prioritised set of measures for achieving those objectives.

Mott MacDonald Ireland Ltd. was appointed by the OPW to undertake the above activities as part of the Catchment Flood Risk Assessment and Management Study (CFRAMs) for the South Western River Basin District.

The South Western River Basin District CFRAM study (and output Flood Risk Management Plans) will be informed by Appropriate Assessment, the requirement for which is derived from Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (Habitats Directive). Appropriate Assessment is the process of determining whether the Flood Risk Management Plan is likely to pose a risk to the attainment or maintenance of conservation objectives for areas protected for their ecological value within the State (Natura 2000 sites - Special Areas of Conservation and Special Protection Areas), and the identification of alternatives or mitigation as appropriate.

One Flood Risk Management Plan will not be developed for the entire South Western River Basin District but rather, targeted individual plans will be produced on a waterbody catchment basis (Units of Management basis). The South Western River Basin District is broken down into five Units of Management:

- The Munster Blackwater Catchment (UoM18)
- The Lee / Cork Harbour Catchment (UoM19)
- The Bandon / Skibbereen Catchment (UoM20)
- The Dunmanus / Bantry / Kenmare Bay Catchment (UoM21)
- The Laune / Maine / Dingle Bay Catchment (UoM22)

UoMs are further broken down in to Areas for Further Assessment (AFAs). These are communities within an individual UoM with a quantifiable flood risk and include towns, villages and areas where significant development is anticipated. Associated with AFAs are high and medium priority watercourses. High priority watercourses are located within and 2km upstream of AFAs whereas medium priority watercourses are the interconnecting watercourses between AFAs or the coast.

Lee – Cork Harbour Catchment (UoM19)

The Lee-Cork Harbour Catchment covers an area of approximately 2,145 km². The entire area of UoM 19 is within County Cork. The main rivers within UoM 19 are the Lee, Owenboy and Womanagh. The OPW undertook a separate Catchment Flood Risk Assessment and Management (CFRAM) Study for the Lee Catchment which included all the main rivers and their tributaries draining into Cork Harbour (the Rivers Lee, Bride, Shournagh, Sullane, Owenboy, Glashaboy and Owennacurra). The town of Ballingeary in the upper reach of the Lee, which has been identified as an AFA and was not included in the Lee CFRAM. The SWRBD CFRAM therefore covers the entire Womanagh River Catchment and also includes Ballingeary which was excluded from the Lee CFRAM.

There are three Areas for Further Assessment (AFAs) within UoM19, these include Castlemartyr, Killeagh, and Ballingeary Inchingeelagh. Killeagh AFA was ruled out of the optioneering process as it was determined that the risk of flooding is low. Associated with the AFAs is over 29km of high and medium priority watercourses. Based on the historical flood evidence, the key mechanisms for each of the AFA's are as follows:

- **Castlemartyr:** Flooding typically occurs due to the overtopping of river banks along the Kiltha River at Mogeely Road as flow through Castlemartyr Bridge is constricted, causing water levels to rise upstream and flood the surrounding area.
- **Ballingeary and Inchigeelagh:** Flooding typically occurs due to the overtopping of river banks along the River Lee and Bunsheelin River because the excess flows are unable to discharge into Lough Allua when water levels are raised by water from previous events. Ballingeary is also identified as at risk from pluvial flooding during intense rainfall events due to the limited capacity of the urban drainage network.

Flood risk management options for the Lee-Cork Harbour UoM have provisionally been identified and can be summarised as:

- Upstream storage – using embankments coupled with a control structure on the watercourse to hold back water in order to limit the flow in the downstream watercourse;
- Flow diversion - interception of flood flows within a watercourse and diverting these flows through an artificial channel into another watercourse or into another section of the same watercourse;
- Flood Walls and Embankments - physical structures designed to contain floodwaters for a defined flood event;
- Flood forecasting - providing advance warning about the timing and scale of flooding by monitoring weather combined with watercourse flows and levels.

Natura 2000 Sites

The Castlemartyr AFA boundary does not overlap with any Natura 2000 site boundary. Flood risk management options in Castlemartyr are proposed for both the Womanagh River and Kiltha River. The Kiltha River (which flows through Castlemartyr) is hydrologically connected to Ballymacoda Bay SPA and Ballymacoda (Clonpriest and Pillmore) SAC via the Womanagh. The Ballymacoda Bay SPA and Ballymacoda (Clonpriest and Pillmore) SAC are located approximately 10km east of Castlemartyr.

The Ballingearry AFA boundary does not overlap with any Natura 2000 site boundary. Flood risk management options in Ballingearry are proposed for the River Lee, and its tributary Bunsheelin stream. The River Lee is hydrologically connected to the Gearagh SAC and Gearagh SPA, located approximately 15km downstream. Inchigeelagh AFA boundary does not overlap with any Natura 2000 site boundary. Flood risk management option in Inchigeelagh is proposed for the River Lee. The River Lee is hydrologically connected to the Gearagh SAC and Gearagh SPA.

Potential Impacts on Qualifying Features

Castlemartyr AFA

There are no potential impacts for the flood risk management works in the Castlemartyr AFA.

Ballingearry AFA

There are no potential impacts for the flood risk management works in the Ballingearry AFA. The AFA boundary does not overlap with any Natura 2000 site boundary.

Inchigeelagh AFA

The Inchigeelagh AFA boundary does not overlap with any Natura 2000 site boundary. The AFA boundary does not overlap with any Natura 2000 site boundary.

Significance of Impacts

No likely impacts have been determined on the Natura 2000 sites from the implementation of viable options in the Castlemartyr, Ballingearry and Inchigeelagh AFAs.

No likely significant effects on Natura 2000 sites are reasonably foreseeable as a result of the implementation of flood risk management measures in UoM 19.

1 Introduction

1.1 Flood Risk Assessment and Management in Ireland

Flood risk management in Ireland has historically focused on land drainage schemes for the improvement of agricultural land. The 1945 Arterial Drainage Act established a national drainage authority (the Office of Public Works) with the remit of implementing a national arterial drainage programme. The Arterial Drainage Act was amended in 1995 to include for the protection of urban areas suffering from flooding.

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 (targeted towards the protection of agriculture and cities / town 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.

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:

- Identify and map the existing and potential future flood hazard within the study area;
- Assess and map the existing and potential future flood risk within the study area;
- Identify viable structural and non-structural options and measures for the effective and sustainable management of flood risk within the study area;
- 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.

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

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

- Preliminary Flood Risk Assessment, which was completed in 2011, identified areas of existing or foreseeable future potentially significant flood risk (referred to as 'Areas for Further Assessment'/AFAs);
- CFRAM Studies, which are being completed in the period 2011 to 2016;
- By mid 2016 draft Flood Risk Management Plans will be produced for each CFRAM study;
- The Flood Risk Management Plans will be implemented from 2016 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 scheme by scheme basis, outside of the scope of the CFRAM studies.

The OPW has commissioned a CFRAM study for each of Ireland's seven River Basin Districts (RBDs)². This report is an Appropriate Assessment produced in accordance with the Habitats Directive and pertains to the South Western River Basin District.

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.

2 Appropriate Assessment

2.1 Statutory Requirement for Appropriate Assessment

Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (Habitats Directive) is European Community legislation regarding nature conservation. The intention of the Directive is to aim to ensure biodiversity through the conservation of natural habitats and wild fauna and flora in Europe. The Habitats Directive was transposed into Irish law by the European Communities (Natural Habitats) Regulations, 1997 (S.I. No. 94/1997) which was subsequently revoked and replaced by the European Communities (Birds and Natural Habitats) Regulations 2011.

A network of sites of conservation importance hosting habitats and/or species identified in the Directives as needing to be either maintained at or returned to favourable conservation status have been identified by each Member State. These sites are known as the Natura 2000 network and in Ireland, Natura 2000 sites comprise areas designated as Special Areas of Conservation (SACs) and candidate Special Areas of Conservation (cSACs), and/or Special Protection Areas (SPAs) and candidate Special Protection Areas (cSPAs).

The Habitats Directive requires that where a plan or project is likely to have a significant effect on a Natura 2000 Site, while not directly connected with or necessary to the nature conservation management of the site, it shall be subject to 'Appropriate Assessment' to identify any implications for the site in view of the site's conservation objectives³.

Specifically Article 6(3) of the Habitats Directive states:

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

The CFRAM studies will identify viable strategies and measures for flood risk management in Ireland, some of which will be within areas designated under the Natura 2000 network. The Flood Risk Management Plans developed under these studies **are not directly connected with or necessary to the management of any Natura 2000 sites**. Therefore, in the context of the Habitats Directive, the Plans must be subjected to Screening for Appropriate Assessment to determine whether the strategies or measures outlined therein are likely to have a significant effect on a Natura 2000 site, either alone or in

³ The NPWS is currently developing Conservation Management Plans for all SACs nationally. Objectives for the conservation of the features of interest for which the site is designated are set out in the Conservation Management Plans and the principal pressures impacting the achievement of Favourable Conservation Status are identified. Strategies to meet the objectives are also identified.

combination with other plans or projects. Where significant effects are determined to be likely the Plans are statutorily required to be subjected to Appropriate Assessment.

2.2 Appropriate Assessment – The Process

The European Commission in 2002 published guidance on the assessment of plans and projects significantly affecting Natura 2000 sites. This guidance provides details of the general approach to Appropriate Assessment. The guidance sets out a tiered/staged approach as summarised below:

Stage 1 - Screening for a likely significant effect: An initial assessment of the project or plan's effect on a European site(s). A description of the plan/project and the elements that have the potential to impact on Natura 2000 sites must be provided. The potential impacts and their significance must be assessed. If it cannot be concluded that there will be no significant effect upon a European site, an Appropriate Assessment is required; (*Note this report is a Stage 1 Screening Assessment*).

Stage 2 - Appropriate Assessment: The consideration of the impact on the integrity of the Natura 2000 site of the project or plan, either alone or in combination with other projects or plans, with respect to the site's structure and function and its conservation objectives. Additionally, where there are adverse impacts, an assessment of the potential mitigation of those impacts. The output of this stage of Appropriate Assessment is a Natura Impact Statement (NIS) report;

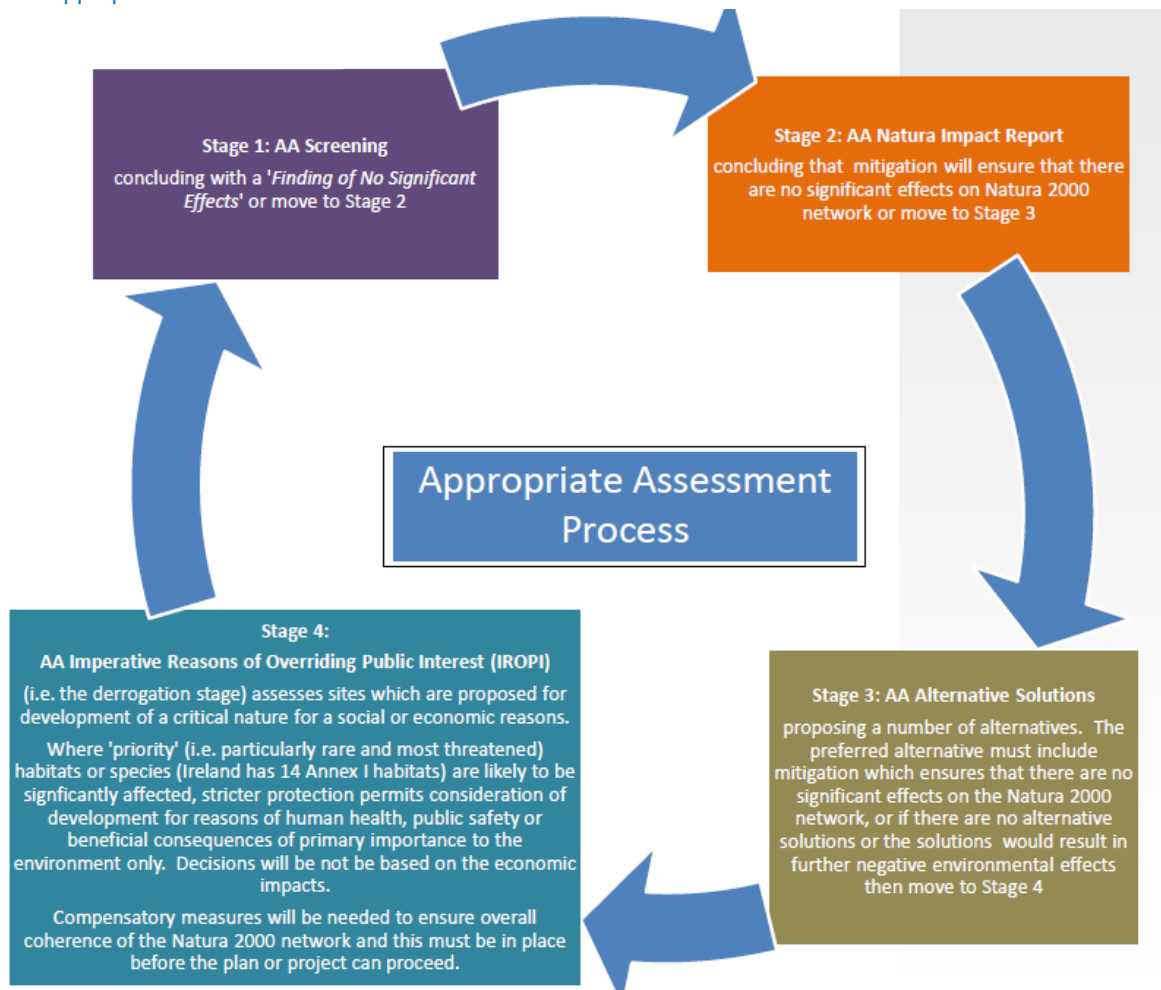
Stage 3 – Assessment of alternative solutions: The process which examines alternative ways of achieving the objectives of the project or plan that avoid adverse impacts on the integrity of the Natura 2000 site (where mitigation cannot be achieved); and

Stage 4 – Assessment where no alternative solutions exist and where adverse impacts remain: Development of compensatory measures where, in the light of imperative reasons of overriding public interest (IROPI), it is deemed that the project or plan should proceed.

Each stage in the process determines whether a further stage is required. If, for example, the conclusions at the end of Stage 1 are that there will be no significant impacts on the Natura 2000 site, there is no requirement to carry out an Appropriate Assessment (Stage 2). The approach to Appropriate Assessment screening must however apply the precautionary principle i.e. where it cannot be definitively determined that a plan/project will not adversely impact the integrity of the Natura 2000 site then it must be assumed that there is potential for impact and a full Appropriate Assessment must be carried out.

The objective of the process is to provide adequate information, based on the best available scientific information, to inform the Competent Authority to enable them to conduct an assessment of whether the plan or project is likely to have a significant effect on the conservation objectives of the relevant Natura 2000 sites within the zone of influence. Where adverse impacts are identified mitigation measures necessary to avoid, reduce or offset such impacts must be prescribed.

Figure 2-1 Appropriate Assessment the Process



Source: West Regional Authority (WRA) in association with the Environmental Protection Agency (EPA) (2013) Draft 'SEA Resource Manual for Local and Regional Authorities'

2.3 Objective of Appropriate Assessment Screening

The objective of this Stage 1 Screening Assessment is to determine whether the South Western RBD Flood Risk Management Plans are likely to have adverse impacts on conservation objectives of Natura 2000 sites. The direct, indirect and in-combination ecological impacts of the proposed plan policies / measures on Natura 2000 sites are identified and the necessity to carry out a Stage 2 Appropriate Assessment is determined. The findings of this Stage 1 Screening Assessment are documented through this Screening Statement. The outcomes of the assessment are also summarised in a 'Screening Matrix' presented in Section 6.

The DEHLG Guidance (2009), '*Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities*' requires that the findings and recommendations of Appropriate Assessment informs the policies and strategies of the Plan.

Information contained in the Appropriate Assessment that will inform the South Western RBD Flood Risk Management Plans (FRMP) includes the following;

- the areas likely to be significantly affected by the plan;
- 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;
- 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 affected by the plan;
- the likely significant effects on the Natura 2000 sites, such as impacts on biodiversity, fauna, flora, soil, water, etc.
- the measures envisaged to mitigate against any significant adverse effects on the designated sites of implementing the plan; and
- alternatives to the proposals in the plan and their potential effectiveness in maintaining the conservation value of the site.

2.4 Methodology

This screening assessment has been prepared in accordance with all relevant guidance and legislation including:

- European Communities (Birds and Natural Habitats) Regulations 2011;
- NPWS (2012) Marine Natura Impact Statements in Irish Special Areas of Conservation. A Working Document.
- DEHLG (2009) Appropriate Assessment of Plans and Projects in Ireland Guidance for Planning Authorities [revised, February 2010];
- EC (2000) Managing Natura 2000 Sites: The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC;
- 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;
- 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.

An extensive data collection exercise was conducted as part of this Appropriate Assessment Screening. Available information utilised in the preparation of this report includes:

- Conservation Status Assessment Reports⁴ (CSARs), Backing Documents and Maps prepared in accordance with Article 17 of the Habitats Directive;

⁴ Every six years, Member States of the European Union are required to report on the conservation status of all habitats and species listed on the annexes of the Habitats Directive as required under Article 17 of the Directive. Ireland submitted our conservation

- Natura 2000 Site Synopsis, Data Forms and Conservation Objective Reports available from NPWS;
- Published and unpublished NPWS reports on protected habitats and species including Irish Wildlife Manual reports, Species Action Plans and Conservation Management Plans;
- Existing relevant mapping and databases e.g. waterbody status, species and habitat distribution etc. (sourced from the Environmental Protection Agency - <http://gis.epa.ie/>, the National Biodiversity Data Centre - <http://maps.biodiversityireland.ie> and the National Parks and Wildlife Services - <http://www.npws.ie/mapsanddata/>).

2.5 Statement of Authority

This Screening for Appropriate Assessment was prepared by Rita Mansfield. Rita is a Senior Ecologist [BSc. (Hons) Applied Ecology, University College Cork, 2003 and H.Dip Environmental Protection and Pollution Control, Sligo Institute of Technology, 2008] with over ten years' post graduate experience in public and private sector projects with the main focus being public infrastructure (water and waste water, roads, power). Rita has managed numerous Ecological Impact Assessments, Appropriate Assessments and environmental feasibility assessments of complex projects and land use plans. Rita has prepared ecological monitoring and mitigation guidance for the NRA for inclusion in their PPP and DB Contracts. Rita has undertaken and managed a wide range of field surveys including protected species surveys (e.g. badger, otter, red squirrel, bats, wetland birds, kingfisher, crayfish and lamprey), habitat surveys and biological and physicochemical water quality monitoring and habitat mapping.

2.6 Consultation

A National Workshop on Appropriate Assessment (AA) of Flood Risk Management Plans (FRMP) was held between the Office of Public Works (OPW), their consultants on the CFRAMs projects and the National Parks & Wildlife Service (NPWS) on the 28th January 2015. The NPWS outlined their expectations of the AA for the FRMPs as follows:

- The zone of influence of flood risk management options should be identified on a case by case basis using the Source-Pathway-Receptor approach;
- Any mitigation prescribed in the NIS should be specific and should be demonstrated to be achievable and effective;
- Consideration should be given to the construction impacts at Plan level;
- Appropriate Assessment must be based on scientific evidence;
- If an option for one AFA needs to go to IRPOI then it may be the case that the entire FRMP will need to go through IROPI;
- Care needs to be taken in how the fresh water pearl mussel is considered.

3 Description of the Plan

3.1 Flood Risk Management Plan

The Floods Directive [2007/60/EC] requires the establishment of a framework of measures to reduce the risks of flood damage. Catchment Flood Risk Assessment and Management (CFRAM) Studies have been commissioned to determine flood hazard and identify risk receptors that are susceptible to flooding in Ireland. Measures to mitigate risk (both existing and future) must also be determined. The outputs of the CFRAM studies are Flood Risk Management Plans (FMRPs). The purpose of the FMRPs are to set out policies, strategies, measures and actions that should be pursued by the relevant bodies to achieve the most cost-effective and sustainable management of existing and potential future flood risk.

One Flood Risk Management Plan will not be developed for the entire South Western River Basin District but rather, targeted individual plans will be produced on a waterbody catchment basis (Units of Management basis). The South Western River Basin District is therefore broken down into Units of Management (UoMs) for the purpose of implementing the Floods Directive.

UoMs are representative of existing Hydrometric Area boundaries constituting major catchments or river basins typically greater than 1,000km² and their associated coastal areas, or conglomerations of smaller river basins and their associated coastal areas.

Flood Risk Management Plans for each Unit of Management (UoM) in the South Western River Basin are due to be published in 2016.

The FRMPs shall include a prioritised set of actions and measures aimed at meeting defined flood risk management objectives for each UoM. The flood risk management objectives are set out under four categories (Technical, Economic, Social, and Environmental), and include objectives such as:

- Minimise health and safety risk of flood risk management options;
- Manage risk to agricultural land;
- Minimise risk to social amenity;
- Minimise the risk of environmental pollution;
- Avoid damage to, and where possible enhance, fisheries within the catchment.

A description of the flood risk management objectives which are particular to each UoM will be included in the Flood Risk Management Plans.

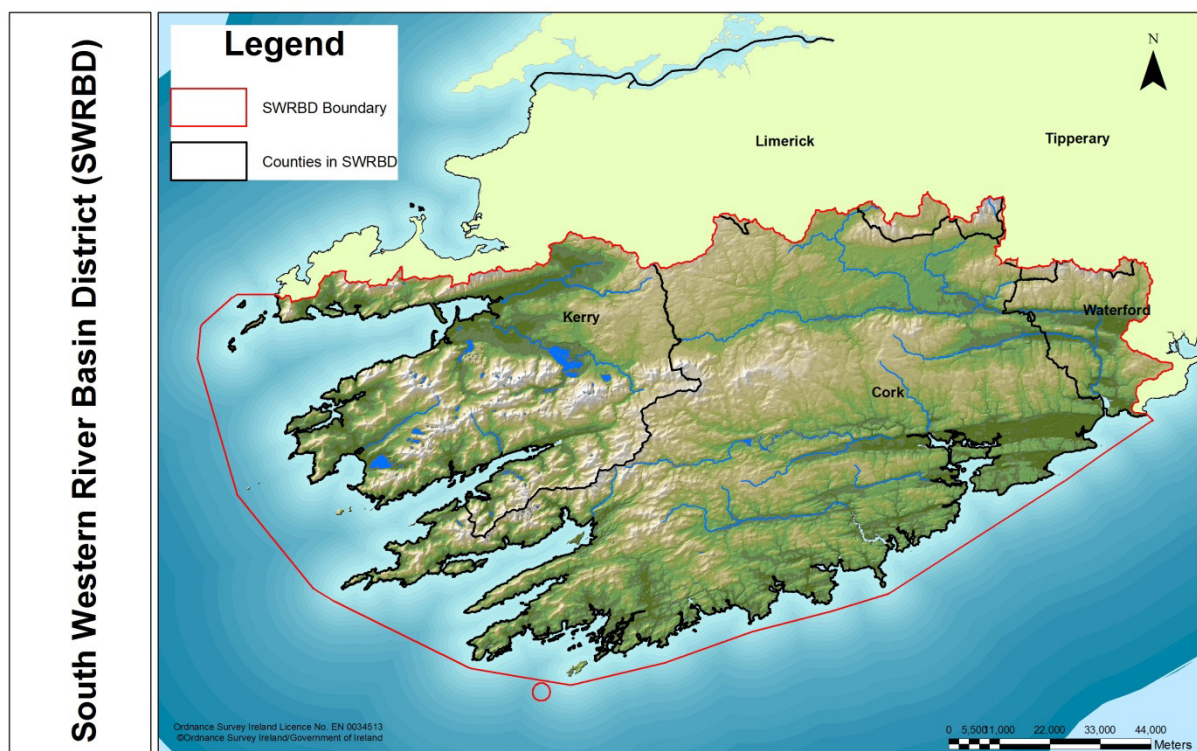
The Flood Risk Management Plans will demonstrate the indicative costs and benefits of the preferred actions and measures, the robust reasoning for the identification of a measure as a preferred option and the priority each measure should be afforded. The plans shall also recommended a programme of work (including a prioritised and costed programme of policies, strategies, actions and measures) to be implemented by the OPW, Local Authorities or other relevant bodies to mitigate flood risk in each UoM.

The FRMPs will influence, and will in turn be influenced by external statutory and non-statutory plans, strategies and policies and programmes. National and local policies relating to the protection of the environment must be considered in the development of the FRMPs. This process is conducted as part of the Strategic Environmental Assessment of the FRMPs.

3.2 Overview of the South Western River Basin District

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

Figure 3-1 South Western River Basin District (SWRBD)



3.2.1 Units of Management in the SWRBD

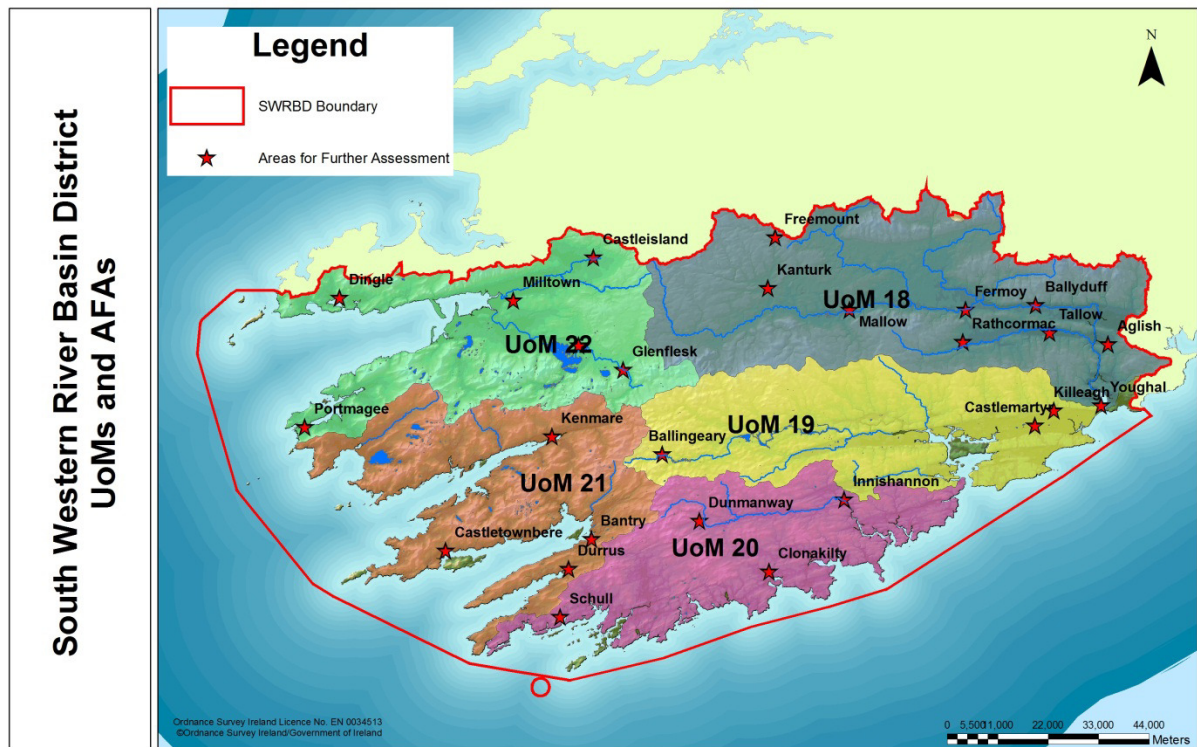
There are five Units of Management within the South Western River Basin District which follow watershed catchment boundaries rather than political boundaries. The Units are as follows;

- The Munster Blackwater Catchment (UoM18)
- The Lee / Cork Harbour Catchment (UoM19)

- The Bandon / Skibbereen Catchment (UoM20)
- The Dunmanus / Bantry / Kenmare Bay Catchment (UoM21)
- The Laune / Maine / Dingle Bay Catchment (UoM22)

UoMs are further broken down in to Areas for Further Assessment (AFAs). The SWRBD includes 26 Nr. Areas for Further Assessment (AFAs).

Figure 3-2 Units of Management and Areas for Further Assessment in the SWRBD



3.3 Flood Risk Management Options

The CFRAM study for the SWRBD is currently at the *options appraisal stage*, to identify the preferred measures and options to manage flood risk for each UoM in the SWRBD. Receptors to flood risk within each UoM in the SWRBD have been identified through detailed technical studies. The potential options to manage the flood risk of the various receptors have provisionally been identified and are currently being assessed for viability.

A flood risk management option consists of one, or more commonly a combination of, flood risk management measures. The suite of flood risk management options for consideration under the CFRAM study are presented in Table 3.1.

Table 3.1: Suite of Flood Risk Management Options

Option	Description
Do Nothing	Implement no new flood risk management measures and abandon any existing practices.
Existing Regime	Continue with any existing flood risk management practices, such as reactive maintenance.
Do Minimum	Implement additional minimal measures to reduce the flood risk in specific problem areas without introducing a comprehensive strategy - infill gaps in existing walls, maintain channel.
Non-Structural Measures	<p>Planning and development control measures (zoning of land for flood risk appropriate development, prevention of inappropriate incremental development, review of existing Local Authority policies in relation to planning and development and of inter-jurisdictional co-operation within the catchment, etc.);</p> <p>Building regulations (regulations relating to floor levels, flood-proofing, flood resilience, sustainable drainage systems, prevention of reconstruction or redevelopment in flood-risk areas, etc.);</p> <p>Sustainable urban drainage systems (SUDS);</p> <p>Installation of a flood forecasting and warning system and development of emergency flood response procedures;</p> <p>Targeted public awareness and preparedness campaign;</p> <p>Individual property flood resistance (protection / flood-proofing) and resilience;</p> <p>Land use management, including creation of wetlands, riparian buffer zones, etc.</p>
Structural measures	<p>Storage (single or multiple site flood water storage, flood retardation, etc.)</p> <p>Flow diversion (full diversion / bypass channel, flood relief channel, etc.)</p> <p>Increase conveyance (in-channel works, floodplain earthworks, removal of constraints / constrictions, channel / floodplain clearance, etc.)</p> <p>Construct flood defences (walls, embankments, demountable defences, etc.)</p> <p>Rehabilitate, improve existing defences</p> <p>Relocation of properties</p> <p>Localised protection works (e.g. minor raising of existing defences / levels).</p>
Channel or Flood Defence Maintenance Works / Programme	-
Other relevant works	-

Flood risk management options have been developed for each UoM in the SWRBD. All of the available options from the prescribed suite (Table 3.1) are not applicable to every UoM. Options appraisal involves the technical assessment⁵ of all options to determine those which are applicable and viable for each UoM and associated AFAs. Following the technical assessment a cost analysis of the viable options is conducted such that a preferred option (in terms of effectiveness, potential impacts, and cost) is determined.

The options proposed in the Flood Risk Management Plans are set at an appropriate scale which includes the following levels:

⁵ The effectiveness and potential impacts of each FRM option is considered in terms of the following criteria:

- Applicability to the area
- Economic (potential benefits, impacts, likely costs etc.)
- Environmental (potential impacts and benefits)
- Social (impacts on people, society and the likely acceptability of the method) and
- Cultural (potential benefits and impacts upon heritage sites and resources)

- Units of Management (UoM) – i.e. at river basin catchment level;
- Analysis Unit (AU) - these are sub-catchments or coastal areas within the Unit of Management;
- Areas for Further Assessment (AFAs) - these are communities within an individual UoM with a quantifiable flood risk and include towns, villages and areas where significant development is anticipated. Associated with AFAs are high and medium priority watercourses. High priority watercourses are located within and 2km upstream of AFAs whereas medium priority watercourses are the interconnecting watercourses between AFAs⁶.

3.4 The Lee – Cork Harbour UoM 19

The Lee / Cork Harbour Unit of Management covers an area of approximately 2,145 km². The entire area of UoM 19 is within County Cork. The main rivers within UoM 19 are the Lee, Owenboy and Womanagh.

The OPW undertook a separate Catchment Flood Risk Assessment and Management (CFRAM) Study for the Lee Catchment which included all the main rivers and their tributaries draining into Cork Harbour (the Rivers Lee, Bride, Shournagh, Sullane, Owenboy, Glashaboy and Owennacurra). The towns of Ballingearry and Inchigeelagh in the upper reach of the Lee, which have been identified as an AFA's and were not included in the Lee CFRAM. The SWRBD CFRAM therefore covers the entire Womanagh River Catchment and also includes Ballingearry and Inchigeelagh which were excluded from the Lee CFRAM.

The Lee CFRAM is subject to separate Appropriate Assessment and is therefore excluded from this study.

Womanagh Catchment

The Womanagh River stretches from its source at Carrigour to its tidal outfall at Pilmore, Youghal Bay. The Kiltha River flows from Springfields/Mogeely southwards through Castlemartyr to join the Womanagh near Ladysbridge. Within Castlemartyr, a spring at Little Island diverts water from the Kiltha via the Castle, through the lake to re-join downstream of the town. The Dower River and Ladysbridge Stream join the Womanagh before the Dissour River. The Dower River in particular is heavily dominated by karst and flows through swallow holes, creating a dry valley in its upper reaches. The Dissour River flows from Kilcronatmountain southwards through Glenane Beg Ravine before flowing through Killeagh town and joining the River Womanagh at Finisk Old Bridge.

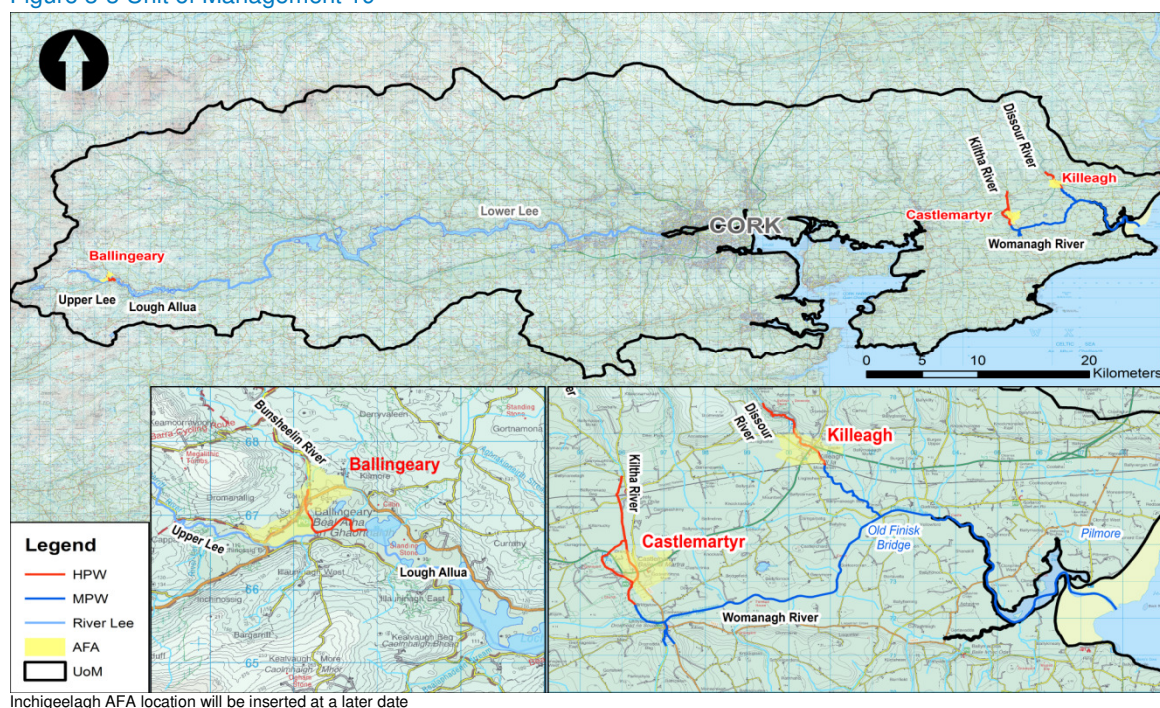
The Womanagh River can be considered tidal downstream of Finisk Old Bridge, some 10km inland. Downstream of Crompaun Bridge, the tidal channel widens to a more estuarine feature over 300m wide with several low-flow loop channels until its tidal outfall at Pilmore. There are large intertidal flats in the estuarine area which are inundated on most tides. The spit features at the tidal outfall protect inland areas from extreme wave action.

⁶ The designation of a watercourse as high priority or medium priority is not a reflection of how the watercourse is viewed in terms of its importance in flood risk management planning.

Ballingeary and Inchigeelagh

The Upper Lee flows from its source near Rosslougha in an easterly direction to the south of Ballingeary at Inchinossig Bridge and continues towards Cork. The Bunsheelin River flows through Ballingeary from the North to join the upper River Lee downstream of Inchinossig Bridge. The River Lee then flows in an easterly direction into Lough Allua and downstream to Inchigeelagh. The Bunsheelin River has a steep gradient of 1 in 35 reducing to 1 in 130 before entering the flat water body of Lough Allua.

Figure 3-3 Unit of Management 19



3.4.1 Areas for Further Assessment in UoM 19

There are three Areas for Further Assessment (AFAs) within Unit of Management 19. Associated with the AFAs is over 29km of high and medium priority watercourses.

Table 3.2: Areas for Further Assessment within Unit of Management 19

UoM	Name	Fluvial	Coastal
19	Killeagh	Yes	No
19	Castlemartyr	Yes	No
19	Ballingeary	Yes	No
19	Inchigeelagh	Yes	No

3.5 Flood Risk Management Options for the Lee - Cork Harbour UoM

Flood risk management options for the Lee - Cork Harbour UoM have been identified through option appraisal. Non-structural and structural options (as described in Table 3.1 of this report) will be combined to reduce the risk of damage to properties from flooding. Structural options are not viable for all AFAs however non-structural measures can be applied on a UoM basis.

This Appropriate Assessment Screening is carried out in conjunction with the option appraisal process such that potential environmental impacts of the various options are considered at option selection stage.

3.5.1 Non-Structural Measures

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:

A sequential approach should be adopted to planning and development based on avoidance, reduction and mitigation of flood risk.

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.

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).

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.

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.

Building Regulations / Planning Conditions

The risk of damage to properties from flooding can be mitigated by the use of appropriate construction techniques and materials. For example the damage caused to an internal wall of a property by flooding can depend on the materials and methods of its construction. A timber stud partition covered with plasterboard with low level electrical wiring would have to be completely replaced following immersion in flood water. However, a solid concrete block wall covered with tiles and high level electrical wiring on the other hand would only have to be washed down following a flood.

If for a particular town or high flood probability areas, certain building regulations or planning conditions were adopted that ensured structures were flood resilient through specified construction methods, building fabrics and uses, a decrease in the risk of damage could be achieved. The question of whether such regulations or planning conditions could be imposed upon developers, business owners or householders in flood prone areas would need to be addressed if this were to be brought forward as a flood risk management measure.

Flood Forecasting

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 viable Flood Risk Management Measure for all of the UoM 19 AFAs. This is because the time between transmitting a flood forecast the arrival of flood waters may not be long enough for people to take effective action to reduce flood damage. Flood warning is a viable option for each of the AFA's Castlemartyr , Ballingeary and Inchingelagh .

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.

Measures to increase and promote public awareness include:

- Identifying the areas prone to flooding
- Information on measures to be implemented to reduce and / or manage the risk of flooding
- Measures in place to provide advance warning of flooding
- 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.

Land Use Management

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.

Emergency Response Planning

Well prepared and executed emergency response plans can significantly reduce the impact of flood events, particularly for human health and welfare.

The Framework for Major Emergency Management was developed in 2005 and was adopted by Government decision in 2006. Its purpose is to set out common arrangements and structures for front line public sector emergency management in Ireland. The Framework is based on the internationally recognized systems approach that, in essence, proposes an iterative cycle of continuous activity through five stages of emergency management:

- Hazard Identification
- Mitigation
- Preparedness
- Response
- Recovery

Under the Framework, Local Authorities are designated as the lead agency for co-ordinating the response to severe weather events, and each Local Authority should have, as a specific sub-plan of its Major Emergency Plan, a plan for responding to severe weather emergencies, whether a major emergency is declared or not. The other principal response agencies should include sub-plans for responding to notifications from the Local Authorities of severe weather warnings.

A Guide to Flood Emergencies (MEM Guidance Document 11, July 2013) has been published to assist the Principal Response Agencies in meeting their responsibilities, under the Framework for Major Emergency Management, and to deliver on the responsibilities of the OPW and the Local Authorities with respect to emergency planning as set out in the Report of the Flood Policy Review Group. The Guide provides advice on the development and implementation of consistently effective flood emergency response and short-term recovery planning by the Principal Response Agencies and others, and includes a template plan.

3.5.2 Structural Measures

Structural flood risk management options for the Lee - Cork Harbour UoM are shown in Table 3.3. Options are presented in terms of the viable options considered for each AFA. Figures showing the viable flood risk management options are included in the Preliminary Options Report. It should be noted that these figures are indicative only. The locations in which viable options may be constructed within the AFAs may change at detailed design stage if an option is progressed through a scheme.

A preferred option for the AFAs will emerge following technical assessment and cost analysis of the viable options and following input from members of the public. Public input is gained through Public Consultation in December 2015 and January 2016.

Table 3.3: Structural Flood Risk Management Options for UoM 18

AFA	Viable Options
Killeagh	<ul style="list-style-type: none"> No viable measures are proposed.
Castlemartyr	<ul style="list-style-type: none"> Option 1- Flood defences and flow diversion - diverting excess flows (in excess of 7m³/sec) from the Kiltha River around the town through an existing bypass channel which is currently disused (Killamucky Stream). A new flow diversion structure will be required to reconnect to the flow diversion channel. Flood walls would also be constructed within the town north of the confluence of the Killamucky stream and the River Kiltha ranging in height from 1.1m to 1.4m Option 2- Flood walls and embankments ranging in height from 1.1m to 1.5m within the town.
Ballingeary	<ul style="list-style-type: none"> Option 1- Flood walls and embankments ranging in height from 0.7m to 1.5m within the village Option 2- Storage - Storm attenuation of flood waters on the River Lee and its tributary Bunsheelin through construction of storage areas of 450,700m² and 257,500m² respectively. This work will involve stream realignment, construction of embankments to contain flood waters and installation of a sluice gates to control flow from the storage -
Inchigeelagh	<ul style="list-style-type: none"> Option 1- Flood walls and embankments ranging in height from 0.6m to 1.9m within the village. This option also includes the sealing of a culvert within the village.

3.6 Flood Risk Management Options with Potential for Significant Effects on Natura 2000 Sites

Flood risk management measures, while having a positive social impact can have a negative environmental impact. The requirement for ecological protection can limit potential options for flood risk management. The South Western River Basin District contains a variety of habitats and species of conservation concern which are protected under national and European legislation. A flood risk management option is unlikely to emerge as the preferred option for an AFA where there is an associated significant impact on species or habitats for which Ireland has designated areas for their protection (i.e. Natura 2000 Sites).

The potential impacts of the structural and non-structural flood risk management options for UoM 19 are characterised hereunder.

3.6.1 Potential Impacts of Non-Structural Options in UoM 19

Periodic high (flood) and low (drought) flows are a natural element of river hydrology. The flora and fauna inhabiting a watercourse and its riparian zone will be adapted to the natural variation in flow and level which is typical of the system. An extreme flood event, outside of the river systems normal range, can have negative impacts on the ecology of the watercourse as follows:

- Prolonged submergence of riparian flora can result in damage to and loss of species, this can provide opportunity for colonisation by invasive species;
- Increase pollution of the watercourse due to high levels of runoff from land and increased erosion of river banks due to high flow velocities can lead to high sedimentation in the river which can have subsequent negative impacts on fishery habitat;
- Reduced biomass in the watercourse due to the washing out of macroinvertebrates and detritus which has subsequent impacts on populations of consumers in the watercourse;

With the exception of Land Use Management, non-structural measures will not restrain the flow of water during an extreme flood event. The implementation of these measures cannot therefore influence the current frequency, extent or depth of flooding. Impacts on an ecosystem from an extreme flood event will not be prevented by the implementation of non-structural measures. Non-structural measures can however prevent future exacerbation of flooding by ensuring that development within the catchment will not increase runoff to the watercourse through Planning Control.

Land Use Management aims at retaining / delaying runoff within a catchment such that a sudden increase in flows in a watercourse is not experienced / is limited. This option can have the effect of reducing the depth and extent of a flood event. There will be an associated reduction in the potential negative impacts on ecology. Land Use Management provides an opportunity to increase biodiversity through creation of woodland or wetland habitat in place of agricultural lands. This can have a long term positive impact.

Flood Forecasting requires the installation of gauges along a watercourse to measure level and flow. Typically river gauges are installed within a housing (usually a PVC pipe) strapped to a bridge. The bridge acts as a supporting structure to the gauge housing, thereby eliminating the requirement for bankside works. It is not always practical to site a river gauge at the location of a bridge, in which case a bank-side structure is required to support the gauge. The installation of a gauge and supporting structure can have the following impacts on the watercourse:

- permanent removal of riparian vegetation to accommodate the support structure;
- temporary disturbance of river bank and river bed during installation resulting in the release of sediment into the watercourse which can cause temporary deterioration in the quality of fishery habitat and can smother immobile flora and fauna in the watercourse;
- release of concrete into the watercourse (where the structure is not prefabricated) which can result in reduced water quality with subsequent negative consequences for the ecology of the watercourse;
- temporary noise and physical disturbance to species in proximity to the gauge site during installation;
- alteration of water turbulence / flow pattern in the immediate vicinity of the gauge structure which can result a change in erosion / deposition pattern locally and therefore a change in habitat.

3.6.2 Potential Impacts of Structural Options in UoM 19

The viable structural options identified for the management of for the extreme flood event within the UoM can be summarised as Flow Diversion and Flood Walls and Embankments. The potential impacts associated with each viable structural option are presented hereunder.

It should be noted that the options will have the effect of reducing the flood extents. Certain habitats have a dependence on flooding e.g. alluvial woodlands, a priority habitat protected under the Habitats Directive. Alteration of flood regime can negatively impact the distribution of flood dependent habitats and species.

Also all options will involve the use of machinery which is a potential source of environmental pollution through oil and fuel leaks.

Flow Diversion

Flow diversion involves the interception of flood flows within a watercourse and diverting these flows through an artificial channel into another watercourse or into another section of the same watercourse such that a reduction in water volumes is achieved within areas at risk of flooding.

Flow diversion has been identified as a viable option for the Kiltha River in Castlemartyr. It is proposed to use an existing flow bypass channel which is through Pigeon Woods west of the town centre. A new flow diversion structure will be required and the bypass channel will need to be cleared of debris / vegetation before coming on line. Potential environmental effects of flow diversion the Kiltha River include:

- Scouring in the Kiltha River at the bypass channel outlet with associated sediment suspension in the watercourse and river bed erosion;
- Attraction of fish into the bypass channel when it is in operation;
- Damage to habitat;

Flood Walls and Embankments

Flood Walls and Embankments are physical structures designed to contain floodwaters for a defined flood event. Floodwalls can be constructed from a variety of materials including concrete, brick / stone masonry and steel. Embankments are typically constructed from earth which is vegetated to protect against erosion.

The construction of flood walls and embankments has been determined to be a viable option in Castlemartyr, Ballingeary and Inchingelagh. The physical implementation of these structural measures within the AFA's can have the following impacts on protected habitats and species:

- Temporary release of sediment to the watercourse from embankments with subsequent effects on habitat quality;
- Temporary disturbance to species by noise and physical presence on site during construction;

- Introduction of invasive species, e.g. Japanese Knotweed, in the earth imported to site for embankments;
- Accidental spill of construction materials e.g. concrete for wall construction, which can have toxic effects on flora and fauna;
- Removal of riparian habitat to facilitate wall / embankment construction.

Flood Storage

Storage is provided upstream of a flood risk area in order to limit the flow in the downstream watercourse such that it does not overtop its banks. The storage area will come in to operation in times of flood flows. Implementation of flood storage requires the availability of land upstream of the flood risk area with suitable topography which can be allowed to flood during flood conditions in the river. A storage area is typically formed by constructing earth embankments perpendicular to the course of the river coupled with a control structure on the watercourse which will limit flows to that which can be accommodated downstream. The storage area is designed such that during flood flows the watercourse will overtop its banks into the surrounding lands within the storage area (which is contained by the earth embankments) and the control structure will ensure that flows downstream are maintained at levels which will not overtop the banks.

Flood Storage has been assessed as a viable option for:

- Ballingeary (on the River Lee and its tributary the Bunsheelin), comprising an area of 708,200m² within agricultural lands; and

Construction of the flood storage areas in Ballingeary will require that earth is brought to site for embankment construction. Potential significant environmental effects associated with the construction of embankments include:

- Sedimentation of the River Lee and its tributary the Bunsheelin. Sediment deposition in a watercourse can cause a temporary to short term reduction the quality of fishery habitat by infilling interstitial spaces in gravel beds. Sedimentation can reduce light penetration in the water column and can affect oxygen levels both in the river bed and in the free moving water thereby impacting river vegetation and river fauna. Sedimentation can block the gills of in-stream fauna.
- Dust deposition in proximity to the works due to wind blow from the earth used in embankment construction. Dust deposition on the foliage of protected flora or habitats can inhibit effective photosynthesis and transpiration. Dust deposition within a watercourse or on soil can affect the chemical composition and therefore potentially the ecology of the habitat.
- Permanent fragmentation of linear riparian features by construction of very large embankments (e.g. 7m embankment in River Lee) which may deter commuting protected species from using an area;
- Temporary disturbance of species protected under Annex II of the Habitats Directive by noise and physical presence on site;
- Introduction of invasive species, e.g. Japanese Knotweed, in the earth imported to site.

The storage areas will require a control structure (sluice gate / penstock) to be installed on the watercourse to ensure downstream flows are maintained below extreme flood levels. The installation of the control structure will require in-stream works. Installation of a sluice gate / penstock requires that bed and bank material is excavated and the section is replaced by a concrete channel and walls such that the control structure can be anchored to the concrete. Potential significant environmental effects associated with the installation of the control structure include:

- Permanent loss of river bed and river bank within the footprint of the control structure;
- Damage to river bed and bank due to machinery movement in-stream;
- Release of sediment in to the watercourse during installation caused by disturbance to river bed and banks (sedimentation effects are discussed in relation to the embankments above);
- Obstruction to fish passage within the river channel when the control structure is restricting flows;
- Isolation of fish within the flooded storage area in the event that flood waters subside rapidly;
- Creation of temporary wetland habitat within the storage area during flooding;

4 Characteristics of Natura 2000 Sites

4.1 Natura 2000 Sites within the Zone of Impact

Viable flood risk management options have been determined for the Castlemartyr, Ballingeary, and Inchingeelagh AFA's.

Castlemartyr is on the Kiltla River which flows into the Womanagh River which ultimately flows into Ballymacoda Bay SPA (Site code 004023) and the Ballymacoda (Clonpriest and Pillmore) SAC (Site code 000077).

Flood risk management options for Ballingeary and Inchingeelagh are proposed along the River Lee and its tributary the Bunsheelin. These AFA's do not occur within the boundary of any Natura 2000 sites, however the River Lee is hydrologically connected downstream to The Gearagh SAC (Site code 000108) and The Gearagh SPA (Site code 004109).

There is potential that impacts as described in Section 3.6 of this Screening Assessment could affect the qualifying features of the Ballymacoda Bay SPA, the Ballymacoda (Clonpriest and Pillmore) SAC, and the Gearagh SAC and SPA.

Ballymacoda Bay SPA (004023)

The site comprises of the estuary of the Womanagh River. The inner part of the site is well sheltered by a stabilised sandy peninsula (Ring peninsula) and includes the tidal section of the river as far as Crompaun Bridge. Sediments here are mostly muds or muddy sands, and salt marshes are well developed. The outer part of the site is well exposed and sediments here are mostly fine, rippled sands. An area of shallow marine water is included.

Ballymacoda Bay is the second most important site for wintering waterfowl on the south coast after Cork Harbour. The site has internationally important numbers of *Limosa limosa* and *Larus fuscus*, and is the most important site in the country for *Larus fuscus* during autumn. Nationally important numbers of a further 16 species are found in the site. Of particular note is that it holds 9.6% of the national total for *Pluvialis apricaria*, 9.2% of the total for *Pluvialis squatarola*, 4.3% for *Limosa lapponica* and 3.2% for *Calidris alpina*. Ballymacoda Bay is a regular site for passage waders such as *Philomachus pugnax*, *Calidris ferruginea* and *Numenius phaeopus*. It is also an important site for wintering gulls, especially *Larus canus*. The site provides both feeding and roosting areas for the waterfowl species and habitat quality for most of the estuarine habitats is very good.

Ballymacoda (Clonpriest and Pillmore) SAC (000077)

This site comprises the estuary of the Womanagh River. Intertidal flats are well represented, with a good diversity of macro-invertebrate species and range of intertidal biotopes. Atlantic salt meadows are particularly well developed and currently extending in parts of site. Salicornia and other annuals of intertidal sand and mud flats also occur. The site is very important for wintering waterfowl. Qualifying features are Estuaries [1130], Mudflats and sandflats not covered by seawater at low tide [1140], Salicornia and other

annuals colonizing mud and sand [1310] and Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330].

The Gearagh SAC (000108)

This site is located on the River Lee in Co. Cork, extending westwards and southwards from the Lee Bridge, which is about 1.5 km south of Macroom. It extends for about 7 km of river, to Dromcarra Bridge. The Gearagh occupies a wide, flat valley of the River Lee, on a bed of limestone overlain with sand and gravel. Qualifying features are Water courses of plain to montane levels with the *Ranunculus fluitantis* and *Callitriche-Batrachion* vegetation [3260], Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0], Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*) [91E0] and *Lutra lutra* (Otter) [1355].

Gearagh still represents the only extensive alluvial woodland in Ireland or Britain, or indeed west of the Rhine in Europe. For this reason it is a unique site and has been designated also as a Statutory Nature Reserve. The international importance of the site is recognised by its designation both as a Ramsar site and as a Biogenetic Reserve. The reservoir is also a Wildfowl Sanctuary.

The Gearagh SPA (004109)

The boundary of the site overlaps to some extent with the Gearagh SAC. The site includes the Annahala lough. The qualifying features include: Wigeon (*Anas penelope*) [A050], Teal (*Anas crecca*) [A052], Mallard (*Anas platyrhynchos*) [A053], Coot (*Fulica atra*) [A125], and Wetland and Waterbirds [A999].

4.2 Likelihood of Impacts on Natura 2000 Sites

The likelihood of the potential impacts as described in Section 3.6 of this Screening Assessment affecting the qualifying features of the Ballymacoda Bay SPA and the Ballymacoda (Clonpriest and Pillmore) SAC and the Gearagh SAC and SPA are determined through Source-Pathway-Receptor assessment.

A review of available data was carried out to determine the presence of qualifying features of the Ballymacoda Bay SPA and the Ballymacoda (Clonpriest and Pillmore) SAC and the Gearagh SAC and SPA within the environs of the AFA's. Data reviewed included:

- Protected species spatial datasets for the SWRBD provided by NPWS
- Article 17 spatial data on protected habitats and species available through NPWS website
- Article 12 reporting data on breeding distributions and ranges of protected bird species available through NPWS website
- iWebs data
- National Survey of Native Woodlands 2003-2008 spatial data available through NPWS website
- Irish Semi-natural Grassland Survey spatial data available through NPWS website
- Coastal Monitoring Project 2004-2006 available through NPWS website
- Saltmarsh Monitoring Project 2006-2008 available through NPWS website
- Protected species data sourced through the National Biodiversity Data Centre

The likelihood of an impact occurring is characterised in accordance with the NRA (2009) classification:

- Near-certain: >95% chance of occurring as predicted
- Probable: 50-95% chance of occurring as predicted
- Unlikely: 5-50% chance of occurring as predicted
- Extremely unlikely: <5% chance of occurring as predicted

4.2.1 Castlemartyr AFA

Flood Walls and Embankments

The likelihood of potential impacts of constructing Flood Walls and Embankments in Castlemartyr on the qualifying features of the Ballymacoda (Clonpriest and Pillmore) SAC and the special conservation interests of the Ballymacoda Bay SPA are discussed hereunder.

The Castlemartyr AFA boundary does not overlap with any Natura 2000 site boundary. The Ballymacoda Bay SPA and Ballymacoda (Clonpriest and Pillmore) SAC are located approximately 10km east of Castlemartyr. There will be no requirement for land take within a Natura 2000 site for the construction of flood protection works. Therefore there is no potential for direct damage to Annex I habitat. Potential removal of riparian habitat to accommodate the works will not impact the qualifying features of the SAC or SPA. The conservation interests of the SPA are not known to roost or feed along riparian habitat.

The Kiltha River (which flows through Castlemartyr) is hydrologically connected to Ballymacoda Bay via the Womanagh River. Sediment release / accidental pollution of the Kiltha River could potentially enter the Bay. The release of sediment into the bay is extremely unlikely to impact the qualifying features of the SAC. These habitats are habitually inundated with sediment during tidal exchanges and are adapted to such conditions. Pollutants e.g. concrete / oil leaks will be diluted by flows in the Kiltha River, the Womanagh River and also by estuarine water in the bay. It is highly unlikely that pollutants would reach the Bay at such concentrations what would cause habitat damage.

Disturbance of wetland waterbirds for which the Ballymacoda Bay SPA is designated is highly unlikely given distance from site. The flight response distance (i.e. the point at which the bird moves away from a source of disturbance) varies between species, is greater during adverse weather, and depends on the acclimatisation of the birds to such disturbance. Wetland birds have been documented to tolerate noise levels at or below 70dB(A) (Institute of Estuarine & Coastal Studies, University of Hull, 2009). BS 5228-1:2009+A1:2014 prescribes typical noise level data for various construction plant and activities within 10m from source. The inverse square law⁷ can be applied to determine likely noise levels at varying distances from the Dundalk WWTP site (Table 4.1).

⁷ Inverse Square Law – For every doubling of the distance from the noise source, the sound pressure levels will broadly be reduced by 6 decibels (dB)

Table 4.1: Noise Levels, dB(A), at Various Distances from Construction Activities

Distance from Source (m)	Tracked excavator	Mixing cement - large lorry concrete mixer	Dumper Truck (empty)	Dumper Truck (tipping fill)	Breaking concrete	Dozer	Wheeled Loading Lorry
10	78	77	87	79	96	81	80
20	74	73	83	75	92	77	76
40	68	67	77	69	86	71	70
80	62	61	71	63	80	65	64
160	56	55	65	57	74	59	58
320	50	49	59	51	68	53	52
640	44	43	53	45	62	47	46
1280	38	37	47	39	56	41	40
2560	32	31	41	33	50	35	34

Based on BS 5228-1:2009+A1:2014

From Table 4.1, noise generated during construction will have diminished to tolerable levels for wetland birds [70dB(A)] within 320m of the works.

Flow Diversion

The existing flow diversion channel is through Pigeon Wood, an area long established woodland is located immediately west of Castlemartyr AFA. This woodland comprises a mix of conifer plantation, broadleaf and mixed woodland (Fossitt code WD1). There are also areas which have been recently clear-felled. There is potential for destruction of woodland habitat for the purpose of machinery access. This is not Annex I habitat, it is outside the boundary of Natura 2000 sites and is not a qualifying feature. Damage to Annex I habitat during construction of the flow diversion structure in the Kiltha River is extremely unlikely.

The Womanagh River and Kiltha River are not designated as salmonid and are not known to support populations of Annex II species e.g. lamprey, Atlantic Salmon, freshwater pearl mussel or white-clawed crayfish. There is no designation on the watercourses for the protection of these species and they are not qualifying features of the Ballymacoda (Clonpriest and Pillmore) SAC. Impact on fish will not negatively impact the conservation objectives of the SAC or SPA.

4.2.2 Ballingearry AFA

Flood Walls and Embankments

The likelihood of potential impacts of constructing Flood Walls and Embankments in Ballingearry on the qualifying features of the Gearagh SAC and SPA are discussed hereunder.

The Ballingearry AFA boundary does not overlap with any Natura 2000 site boundary. The Gearagh SPA and SAC are located approximately 15km east of Ballingearry. There will be no requirement for land take within a Natura 2000 site for the construction of flood protection works. Therefore there is no potential for direct damage to Annex I habitat. Potential removal of riparian habitat to accommodate the works will not impact the qualifying features of the SAC or SPA. Given the distance from the Natura 2000, , there will be no impacts on wetland waterbirds for which the Gearagh SPA is designated.

The Bunsheelin stream, a tributary of the River Lee, flows through Ballingearry is hydrologically connected downstream to the Gearagh SAC. The release of sediment into the river is extremely unlikely to impact the qualifying features of the SAC. Pollutants e.g. concrete / oil leaks will be diluted by flows in the River Lee and its tributary. It is highly unlikely that pollutants would reach the Gearagh at such concentrations what would cause habitat damage.

The proposed works occur approximately 15km from the SAC site boundary. There will be no impacts on the conservation objectives of otters.

Storage

The likelihood of potential impacts of flood storage areas on the River Lee and its tributary Bunsheelin Stream in Ballingearry on the qualifying features of the Gearagh SAC and SPA are discussed hereunder.

It is near certain that sediment resuspension and washing out will occur in the River Lee and its tributary Bunsheelin Stream during in-stream works and during the removal of riparian habitat to construct a control structure for flood storage areas. Also sediment runoff into the watercourse from embankments is probable given their proximity to the watercourse.

Damage to Annex I qualifying features is extremely unlikely given that the storage options are within terrestrial habitat outside the boundary of the SAC which is designated principally for woodland habitats. The storage areas are proposed within areas of improved agricultural grassland and scrub. Impacts on alluvial woodland and oak woodland are extremely unlikely. Watercourses of plain to montane levels with the *Ranunculus fluitantis* and *Callitriche-Batrachion* vegetation are qualifying features of the Gearagh SAC. Very little survey work has been conducted on distribution of these species in Ireland. The release of sediment into the river is extremely unlikely to impact the qualifying features of the SAC. Pollutants e.g. concrete / oil leaks will be diluted by flows in the River Lee and its tributary. It is highly unlikely that pollutants would reach the Gearagh at such concentrations what would cause habitat damage.

The proposed works occur approximately 15km from the SAC site boundary. There will be no impacts on the conservation objectives of otters.

Potential removal of riparian habitat and hedgerows to accommodate the works will not impact the qualifying features of the SAC or SPA. There will be no disturbance of wetland waterbirds for which the Gearagh SPA is designated.

4.2.3 Inchigeelagh AFA

The likelihood of potential impacts of constructing Flood Walls and Embankments in Inchigeelagh on the qualifying features of the Gearagh SAC and SPA are discussed hereunder:

The Inchigeelagh AFA boundary does not overlap with any Natura 2000 site boundary. The Gearagh SPA and SAC are located approximately 7km east of the village. There will be no requirement for land take within a Natura 2000 site for the construction of flood protection works. Therefore there is no potential for direct damage to Annex I habitat. Potential removal of riparian habitat to accommodate the works will not impact the qualifying features of the SAC or SPA. There will be no disturbance of wetland waterbirds for which the Gearagh SPA is designated.

The River Lee is hydrologically connected downstream to the Gearagh SAC. The release of sediment into the river is extremely unlikely to impact the qualifying features of the SAC. Pollutants e.g. concrete / oil leaks will be diluted by flows in the River Lee and its tributary. It is highly unlikely that pollutants would reach the Gearagh at such concentrations what would cause habitat damage.

The proposed works occur approximately 7km from the SAC site boundary. There will be no impacts on the conservation objectives of otters.

4.2.4 Summary of Likely Impacts on the Ballymacoda Bay SPA, the Ballymacoda (Clonpriest and Pillmore) SAC and the Gearagh SAC and SPA

No likely impacts have been determined on the Ballymacoda Bay SPA and the Ballymacoda (Clonpriest and Pillmore) SAC from the implementation of viable options in the Castlemartyr AFA.

No likely impacts have been determined on the Gearagh SPA and the Gearagh SAC from the implementation of viable options in the Ballingearry and Inchigeelagh AFA.

5 Significance of Impacts on Natura 2000 Sites

5.1 General

The significance of an impact is relative to the existing condition/conservation status of a Natura 2000 site and to the scale of the impact in space and time.

Favourable conservation condition of an Annex I habitat is achieved when:

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

The favourable conservation condition of an Annex II species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

5.2 Assessment of Significance

Where it is determined that a likely impact of flood risk management options will have a significant impact on a Natura 2000 site, the flood risk management options must be assessed through full Appropriate Assessment. The precautionary principle must be applied in determining significance of an impact. Where the significance of an impact cannot definitively be ascertained on the basis of the information available it is required to progress to full Appropriate Assessment i.e. an option cannot be screened out unless there is certainty that no significant impact is likely.

An assessment of potential impacts of the flood risk management options for Castlemartyr, Ballingeary, and Inchigeelagh AFA's identified that potential impacts (habitat destruction, disturbance to species and environmental pollution) are highly unlikely due to distance of qualifying features from the Natura 2000 sites and will not cause significant impacts on Natura 2000 sites.

No likely significant effects on the conservation objectives any Natura 2000 site is reasonably foreseeable as a result of the construction and operation of the viable flood risk management options.

6 Conclusions and Screening Statement

No likely significant effects on Natura 2000 sites are reasonably foreseeable as a result of the implementation of flood risk management measures in UoM 19.

Table 6.1: Screening Matrix for UoM 19

Screening Matrix	
Project	
Brief description of the project or plan	<p>Castlemartyr AFA:</p> <ul style="list-style-type: none"> Option 1- Flood defences and flow diversion - diverting excess flows (in excess of 7m³/sec) from the Kiltha River around the town through an existing bypass channel which is currently disused (Killamucky Stream). A new flow diversion structure will be required to reconnect to the flow diversion channel. Flood walls would also be constructed within the town north of the confluence of the Killamucky stream and the River Kiltha ranging in height from 1.1m to 1.4m Option 2- Flood walls and embankments ranging in height from 1.1m to 1.5m within the town. <p>Ballingeary AFA</p> <ul style="list-style-type: none"> Option 1-Flood walls and embankments ranging in height from 0.7m to 1.5m within the village Option 2- Storage - Storm attenuation of flood waters on the River Lee and its tributary Bunsheelin through construction of storage areas of 450,700m² and 257,500m² respectively. This work will involve stream realignment, construction of embankments to contain flood waters and installation of a sluice gates to control flow from the storage Flood Storage. <p>Inchigeelagh AFA</p> <ul style="list-style-type: none"> Option 1- Flood walls and embankments ranging in height from 0.6m to 1.9m within the village. This option also includes the sealing of a culvert within the village
Natura 2000 Site	
Brief description of the Natura 2000 site(s)	<p>Ballymacoda Bay SPA (004023)</p> <p>The site comprises of the estuary of the Womanagh River. The inner part of the site is well sheltered by a stabilised sandy peninsula (Ring peninsula) and includes the tidal section of the river as far as Crompaun Bridge. Sediments here are mostly muds or muddy sands, and salt marshes are well developed. The outer part of the site is well exposed and sediments here are mostly fine, rippled sands. An area of shallow marine water is included. Ballymacoda Bay is the second most important site for wintering waterfowl on the south coast after Cork Harbour. It is also an important site for wintering gulls, especially <i>Larus canus</i>. The site provides both feeding and roosting areas for the waterfowl species and habitat quality for most of the estuarine habitats is very good.</p> <p>Ballymacoda (Clonpriest and Pillmore) SAC (000077)</p>

Screening Matrix

This site comprises the estuary of the Womanagh River. Intertidal flats are well represented, with a good diversity of macro-invertebrate species and range of intertidal biotopes. Atlantic salt meadows are particularly well developed and currently extending in parts of site. Salicornia and other annuals of intertidal sand and mud flats also occur. The site is very important for wintering waterfowl. Qualifying features are Estuaries [1130], Mudflats and sandflats not covered by seawater at low tide [1140], Salicornia and other annuals colonizing mud and sand [1310] and Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330].

The Gearagh SAC (000108)

This site is located on the River Lee in Co. Cork, extending westwards and southwards from the Lee Bridge, which is about 1.5 km south of Macroom. It extends for about 7 km of river, to Dromcarra Bridge. The Gearagh occupies a wide, flat valley of the River Lee, on a bed of limestone overlain with sand and gravel. Qualifying features are Water courses of plain to montane levels with the *Ranunculus fluitantis* and *Callitriche-Batrachion* vegetation [3260], Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0], Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae) [91E0] and *Lutra lutra* (Otter) [1355]. Gearagh still represents the only extensive alluvial woodland in Ireland or Britain, or indeed west of the Rhine in Europe. For this reason it is a unique site and has been designated also as a Statutory Nature Reserve. The international importance of the site is recognised by its designation both as a Ramsar site and as a Biogenetic Reserve. The reservoir is also a Wildfowl Sanctuary.

The Gearagh SPA (004109)

The boundary of the site overlaps to some extent with the Gearagh SAC. The site includes the Annahala lough. The qualifying features include: Wigeon (*Anas penelope*) [A050], Teal (*Anas crecca*) [A052], Mallard (*Anas platyrhynchos*) [A053], Coot (*Fulica atra*) [A125], and Wetland and Waterbirds [A999].

Assessment Criteria

Describe the individual elements of the project (either alone or in combination with other plans or projects) likely to give rise to impacts on the Natura 2000 site.

In-stream works and removal of river bed and riparian habitat to accommodate flood management measures.
Sediment release to the watercourse due to works within and in proximity to rivers and streams.
Temporary disruption resulting from noise from construction machinery

Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the Natura 2000 site by virtue of:

No likely impacts are determined for the Castlmartyr, Ballingearry or Inchigeelagh AFAs

Size and scale;

Land-take;

Screening Matrix	
Distance from the Natura 2000 site or key features of the site; Resource requirements (water abstraction etc); Emissions (disposal to land, water or air); Excavation requirements; Transportation requirements; Duration of construction, operation, decommissioning etc; Other.	No likely changes to the SAC / SPA are determined
Describe any likely changes to the site arising as a result of: Reduction in habitat area; Disturbance to key species; Habitat or species fragmentation; Reduction in species density; Changes in key indicators of conservation value (water quality etc); Climate change.	No likely changes to the SAC / SPA are determined
Describe any likely impacts on the Natura 2000 site as a whole in terms of: Interference with the key relationships that define the structure of the site; Interference with key relationships that define the function of the site.	No likely impacts are determined
Provide indicators of significance as a result of the identification of effects set out above in terms of: Loss; Fragmentation; Disruption; Disturbance; Change to key elements of the site.	No significant impacts are determined
Describe from the above those elements of the project or plan, or combination of elements, where the above impacts are likely to be significant or where the scale or magnitude of impacts is not known.	No significant effects have been determined

7 References

DEHLG (2009) Appropriate Assessment of Plans and Projects in Ireland Guidance for Planning Authorities;

Department of Environment, Heritage and Local Government, 2010. Appropriate Assessment of Plans & Projects - Guidance for Planning Authorities. [online] Available at:

<<http://www.npws.ie/media/npws/publications/codesofpractice/AA%20Guidance%2010-12-09.pdf>>

[Accessed 20 May 2014]

EC (2000) Managing Natura 2000 Sites: The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC.

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.

European Commission, 2000. Managing Natura 2000 sites: The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC. [online] Office for Official Publications of the European Communities. Available at:

<http://ec.europa.eu/environment/nature/natura2000/management/docs/art6/provision_of_art6_en.pdf>

[Accessed 20 May 2014]

European Commission, 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.

[online] Office for Official Publications of the European Communities. Available at:

<http://ec.europa.eu/environment/nature/natura2000/management/docs/art6/natura_2000_assess_en.pdf>

[Accessed 20 May 2014]

Falvey J. P., Costello M. J. and Dempsey S. (1997) A survey of intertidal sediment biotopes in estuaries in Ireland. Unpublished report to the National Parks and Wildlife Service, Dublin, 258 pp.

Fossitt (2000) A Guide to Habitats in Ireland

Institute of Estuarine & Coastal Studies, University of Hull (2009) Construction and Waterfowl: Defining Sensitivity, Response, Impacts and Guidance. Report to Humber INCA

Institute of Ecology and Environmental Management, 2006. Guidelines for Ecological Impact Assessment in the United Kingdom (version 7 July 2006). [online] Available at:

<http://www.cieem.net/data/files/Resource_Library/Technical_Guidance_Series/EcIA_Guidelines/TGSEcIA-EcIA_Guidelines-Terrestrial_Freshwater_Coastal.pdf> [Accessed 20 May 2014]

Holman *et al* (2014). *IAQM Guidance on the assessment of dust from demolition and construction*, Institute of Air Quality Management, London. www.iaqm/wp-content/uploads/guidance/dust_assessment.pdf.

King J. J. and Linnane S. M. (2004) The status and distribution of lamprey and shad in the Slaney and Munster Blackwater SACs. Irish Wildlife Manuals, No. 14. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.

Martin J. R., Perrin P.M., Delaney A. M., O'Neill F.H., McNutt K.E. (2008) Irish Semi-Natural Grasslands Survey. Annual Report No. 1: Counties Cork and Waterford

NPWS (2013) The status of EU Protected habitats and Species in Ireland. Backing Documents, Article 17 forms, Maps. Volumes 1, 2 and 3.

NPWS (2012) Marine Natura Impact Statements in Irish Special Areas of Conservation, A working Document.

NPWS (2015). Conservation Objectives: Ballymacoda (Clonpriest and Pillmore) SAC 000077. Version 2.0. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

NPWS (2015). Conservation Objectives: Ballymacoda Bay SPA 004023. Version 1.0. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

NPWS (2014). Conservation Objectives: Ballymacoda Bay SPA 004023-supporting document. Version 1.0. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht

NPWS (2015). Conservation Objectives: The Gearagh SAC 000108. Generic Version 1.0. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht

NPWS (2015). Conservation Objectives: The Gearagh SPA 004109. Generic Version 1.0. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht

NPWS (2012) Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters (Draft)

NPWS (2011) Conservation objectives for Ballymacoda Bay SPA [004023]. Generic Version 4.0. Department of Arts, Heritage & the Gaeltacht.

NRA, 1st June, 2009 Guidelines for Assessment of Ecological Impacts of National Roads Schemes. Revision 2

Office of Public Works (April 2011) Arterial Drainage Maintenance Service Environmental Management Protocols & Standard Operating Procedures

Office of Public Works (April 2014) National Screening of Freshwater Pearl Mussels as part of the CFRAM programme (Unpublished Report)

Reid, N., Dingerkus, S.K., Stone, R.E., Pietravalle, S., Kelly, R., Buckley, J., Beebee, T.J.C. & Wilkinson, J.W. (2013) National Frog Survey of Ireland 2010/11. Irish Wildlife Manuals, No. 58. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

Ruddock M. & Whitfield D.P. (2007) A Review of Disturbance Distances in Selected Bird Species. A report from Natural Research (Projects) Ltd to Scottish Natural Heritage

Ryle T., Murray A., Connolly K., Swann M. (2009) Coastal Monitoring Project 2004-2006. Report to the National Parks and Wildlife Service.

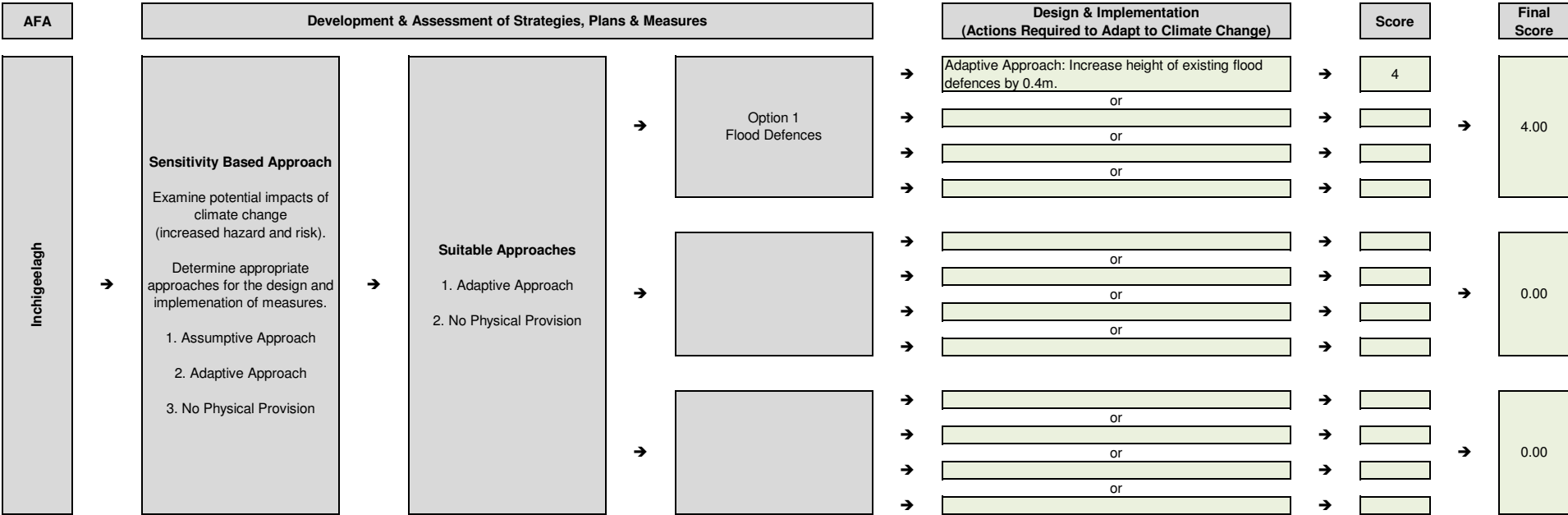
Weilgart, L. (2013). A review of the impacts of seismic airgun surveys on marine life. Submitted to the CBD Expert Workshop on Underwater Noise and its Impacts on Marine and Coastal Biodiversity, 25-27 February 2014, London, UK. Available at: <http://www.cbd.int/doc/?meeting=MCBEM-2014-01>

Appendix E. Climate Change Adaptability

Climate Change Adaptability

AFA		Development & Assessment of Strategies, Plans & Measures				Design & Implementation (Actions Required to Adapt to Climate Change)		Score	Final Score	
Ballingeary	→	Sensitivity Based Approach Examine potential impacts of climate change (increased hazard and risk). Determine appropriate approaches for the design and implementation of measures. 1. Assumptive Approach 2. Adaptive Approach 3. No Physical Provision	→	Option 1 Flood Defences	→	Adaptive Approach: Increase height of existing flood defences (by 0.4m on Bunsheelin or 0.2m on Lee).	→	4	→	4.00
					→	or	→			
					→	or	→			
					→	or	→			
				Option 2 Storage	→	Adaptive Approach: Increase height of storage embankments and structures. Lee increase is 2m, Bunsheelin Increase is 1.7m	→	3	→	3.00
					→	No Physical Provision: Provide additional storage areas to store additional flow	→	0		
					→	or	→			
					→	or	→			
					→		→		→	0.00
					→	or	→			
					→	or	→			
					→	or	→			

Climate Change Adaptability



Climate Change Adaptability

AFA	Development & Assessment of Strategies, Plans & Measures			Design & Implementation (Actions Required to Adapt to Climate Change)	Score	Final Score
Castlemartyr	Sensitivity Based Approach Examine potential impacts of climate change (increased hazard and risk). Determine appropriate approaches for the design and implementation of measures. 1. Assumptive Approach 2. Adaptive Approach 3. No Physical Provision	Suitable Approaches 1. Adaptive Approach 2. No Physical Provision	Option 1 Flood Defences	Adaptive Approach: Increase height of existing flood defences (Score 4) No Physical Provision: Construct 115m of new flood defences (Score 0) or No Physical Provision: Construct flow diversion works or or	2 0 	2.00
			Option 2 Flow Diversion & Flood Defences	No Physical Provision: Construct new flood defences or or or	0 	
				or or or	 	
						0.00
						0.00
						0.00

Appendix F. Multi Criteria Assessment

F.1 Local Weighting Data

AFA: Ballingeary

Objective	Local Weighting	Code	Rationale
Technical			
Ensure flood risk management options are operationally robust	5.00	1a1	Constant, as per Guidance Note 29
Reduce and where possible eliminate health and safety risks associated with the construction and operation of flood risk management options	5.00	1b1	Constant, as per Guidance Note 29
Ensure flood risk management options are adaptable to future flood risk	5.00	1c1	Constant, as per Guidance Note 29
Economy			
Minimise economic risk	5.00	2a1	937936/75000
Minimise risk to transport infrastructure	5.00	2b2	Motorway 250() + National Primary 150() + (National Secondary 75() + Regional 25(.5) + Local Rural 10(.02) + Local Urban 20(.2)
Minimise risk to utility infrastructure	5.00	2c3	Power Stations 500() + HV Sub-Stations 250() + Gas Assets - High Priority 100() + Gas Assets - Medium Priority 25() + Water Treatment Plants 250() + WwTP and Primary Pumping Facilities 250(.5) + Core Telecommunications Exchanges 100() + Non-Core Telecommunications Exchanges 25()
Manage Risk to Agriculture	3.75	2d1	Based on agriculture at risk
Social			
Minimise risk to human health and life of residents	5.00	3a1	Nr. at risk from 50% AEP 2*.5(6) + Nr. at risk from 20% AEP 2*.2(7) + Nr. at risk from 10% AEP 2*.1(3) + Nr. at risk from 5% AEP 2*.05(2) + Nr. at risk from 2% AEP 2*.02(1) + Nr. at risk from 1% AEP 2*.01(2) + Nr. at risk from .5% AEP 2*.005(1) + Nr. at risk from .1% AEP 2*.001(6)
Minimise risk to high vulnerability properties	1.05	3a2	Nr. at risk from 50% AEP 0.5*() + Nr. at risk from 20% AEP 0.2*() + Nr. at risk from 10% AEP 0.1*() + Nr. at risk from 5% AEP 0.05*() + Nr. at risk from 2% AEP 0.02*50(1) + Nr. at risk from 1% AEP 0.01*() + Nr. at risk from .5% AEP 0.005*() + Nr. at risk from .1% AEP 0.001*50(1)
Minimise risk to social infrastructure and amenity	5.00	3b1	Nr. at risk from 50% AEP 25*.5(1) + Nr. at risk from 20% AEP 25*.2(1) + Nr. at risk from 10% AEP 25*.1() + Nr. at risk from 5% AEP 25*.05() + Nr. at risk from 2% AEP 25*.02() + Nr. at risk from 1% AEP 25*.01() + Nr. at risk from .5% AEP 25*.005() + Nr. at risk from .1% AEP 25*.001(1)
Minimise risk to local employment	5.00	3b2	Nr. at risk from 50% AEP 5*.5(9) + Nr. at risk from 20% AEP 5*.2(9) + Nr. at risk from 10% AEP 5*.1(4) + Nr. at risk from 5% AEP 5*.05() + Nr. at risk from 2% AEP 5*.02(2) + Nr. at risk from 1% AEP 5*.01(1) + Nr. at risk from .5% AEP 5*.005(1) + Nr. at risk from .1% AEP 5*.001(4)
Environmental			
Provide no impediment to the achievement of water body objectives and, if possible, contribute to the achievement of water body objectives.	5.00	4a1	As per Guideline No. 28
Avoid detrimental effects to, and where possible enhance, Natura 2000 network, protected species and their key habitats, recognising relevant landscape features and stepping stones.	0.00	4b1	The AFA boundary does not overlap with any Natura 2000 site boundary
Avoid damage to and where possible enhance the flora and fauna of the catchment	2.00	4c1	Flora and Fauna of local importance. Otters recorded within 10km of AFA and River is salmonid
Maintain existing, and where possible create new, fisheries habitat including the maintenance or improvement of conditions that allow upstream migration for fish species.	4.00	4d1	The River Lee is a salmonid river. River is noted for its fishery potential.
Protect, and where possible enhance, visual amenity, landscape protection zones and views into / from designated scenic areas within the river corridor.	3.00	4'e1	The landscape value is considered to be high value and sensitivity with local importance. There are a number of protected scenic routes on the approach roads.
Avoid damage to or loss of features, institutions and collections of architectural value and their setting and improve their protection from extreme floods.	0.00	4f1	There are a no NIAH/RPS at risk from flooding
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.	3.00	4f2	There are a number of protected bridges RMP's at risk from flooding

AFA: Inchigeelagh

Objective	Local Weighting	Code	Rationale
Technical			
Ensure flood risk management options are operationally robust	5.00	1a1	Constant, as per Guidance Note 29
Reduce and where possible eliminate health and safety risks associated with the construction and operation of flood risk management options	5.00	1b1	Constant, as per Guidance Note 29
Ensure flood risk management options are adaptable to future flood risk	5.00	1c1	Constant, as per Guidance Note 29
Economy			
Minimise economic risk	2.97	2a1	222765/75000
Minimise risk to transport infrastructure	5.00	2b2	Motorway 250() + National Primary 150() + (National Secondary 75() + Regional 25(0.02) + Local Rural 10() + Local Urban 20(.5)
Minimise risk to utility infrastructure	0.00	2c3	Power Stations 500() + HV Sub-Stations 250() + Gas Assets - High Priority 100() + Gas Assets - Medium Priority 25() + Water Treatment Plants 250() + WwTP and Primary Pumping Facilities 250() + Core Telecommunications Exchanges 100() + Non-Core Telecommunications Exchanges 25()
Manage Risk to Agriculture	4.00	2d1	Based on agriculture at risk
Social			
Minimise risk to human health and life of residents	4.78	3a1	Nr. at risk from 50% AEP 2*.5(2) + Nr. at risk from 20% AEP 2*.2(5) + Nr. at risk from 10% AEP 2*.1(2) + Nr. at risk from 5% AEP 2*.05(3) + Nr. at risk from 2% AEP 2*.02(1) + Nr. at risk from 1% AEP 2*.01(1) + Nr. at risk from .5% AEP 2*.005(1) + Nr. at risk from .1% AEP 2*.001(7)
Minimise risk to high vulnerability properties	0.00	3a2	Nr. at risk from 50% AEP 0.5*() + Nr. at risk from 20% AEP 0.2*() + Nr. at risk from 10% AEP 0.1*() + Nr. at risk from 5% AEP 0.05*() + Nr. at risk from 2% AEP 0.02*() + Nr. at risk from 1% AEP 0.01*() + Nr. at risk from .5% AEP 0.005*() + Nr. at risk from .1% AEP 0.001()
Minimise risk to social infrastructure and amenity	0.25	3b1	Nr. at risk from 50% AEP 25*.5() + Nr. at risk from 20% AEP 25*.2() + Nr. at risk from 10% AEP 25*.1() + Nr. at risk from 5% AEP 25*.05() + Nr. at risk from 2% AEP 25*.02() + Nr. at risk from 1% AEP 25*.01(1) + Nr. at risk from .5% AEP 25*.005() + Nr. at risk from .1% AEP 25*.001()
Minimise risk to local employment	5.00	3b2	Nr. at risk from 50% AEP 5*.5(1) + Nr. at risk from 20% AEP 5*.2(1) + Nr. at risk from 10% AEP 5*.1(1) + Nr. at risk from 5% AEP 5*.05(2) + Nr. at risk from 2% AEP 5*.02(6) + Nr. at risk from 1% AEP 5*.01(3) + Nr. at risk from .5% AEP 5*.005(1) + Nr. at risk from .1% AEP 5*.001(7)
Environmental			
Provide no impediment to the achievement of water body objectives and, if possible, contribute to the achievement of water body objectives.	5.00	4a1	As per Guidelines No. 28
Avoid detrimental effects to, and where possible enhance, Natura 2000 network, protected species and their key habitats, recognising relevant landscape features and stepping stones.	0.00	4b1	The Inchigeelagh AFA boundary does not overlap with any Natura 2000 site boundary
Avoid damage to and where possible enhance the flora and fauna of the catchment	2.00	4c1	Flora and Fauna of local importance. River is salmonid
Maintain existing, and where possible create new, fisheries habitat including the maintenance or improvement of conditions that allow upstream migration for fish species.	4.00	4d1	The River Lee is a salmonid river. River is noted for its fishery amenity potential
Protect, and where possible enhance, visual amenity, landscape protection zones and views into / from designated scenic areas within the river corridor.	3.00	4'e1	The landscape value is considered to be high value and sensitivity with local importance.
Avoid damage to or loss of features, institutions and collections of architectural value and their setting and improve their protection from extreme floods.	0.00	4f1	There are no known NIAH/RPS at risk from flooding
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.	3.00	4f2	There is an RMP at risk from flooding

AFA: Castlemartyr

Objective	Local Weighting	Code	Rationale
Technical			
Ensure flood risk management options are operationally robust	5.00	1a1	Constant, as per Guidance Note 29
Reduce and where possible eliminate health and safety risks associated with the construction and operation of flood risk management options	5.00	1b1	Constant, as per Guidance Note 29
Ensure flood risk management options are adaptable to future flood risk	5.00	1c1	Constant, as per Guidance Note 29
Economy			
Minimise economic risk	1.29	2a1	97074/75000
Minimise risk to transport infrastructure	5.00	2b2	Motorway 250() + National Primary 150(.1) + (National Secondary 75() + Regional 25(.05) + Local Rural 10(.2) + Local Urban 20()
Minimise risk to utility infrastructure	0.00	2c3	Power Stations 500() + HV Sub-Stations 250() + Gas Assets - High Priority 100() + Gas Assets - Medium Priority 25() + Water Treatment Plants 250() + WwTP and Primary Pumping Facilities 250() + Core Telecommunications Exchanges 100() + Non-Core Telecommunications Exchanges 25()
Manage Risk to Agriculture	0.00	2d1	Based on agriculture at risk
Social			
Minimise risk to human health and life of residents	3.20	3a1	Nr. at risk from 50% AEP 2*.5() + Nr. at risk from 20% AEP 2*.2(5) + Nr. at risk from 10% AEP 2*.1(5) + Nr. at risk from 5% AEP 2*.05(1) + Nr. at risk from 2% AEP 2*.02(2) + Nr. at risk from 1% AEP 2*.01() + Nr. at risk from .5% AEP 2*.005(1) + Nr. at risk from .1% AEP 2*.001(3)
Minimise risk to high vulnerability properties	0.00	3a2	Nr. at risk from 50% AEP 0.5*() + Nr. at risk from 20% AEP 0.2*() + Nr. at risk from 10% AEP 0.1*() + Nr. at risk from 5% AEP 0.05*() + Nr. at risk from 2% AEP 0.02*() + Nr. at risk from 1% AEP 0.01*() + Nr. at risk from .5% AEP 0.005*() + Nr. at risk from .1% AEP 0.001()
Minimise risk to social infrastructure and amenity	0.50	3b1	Nr. at risk from 50% AEP 25*.5() + Nr. at risk from 20% AEP 25*.2() + Nr. at risk from 10% AEP 25*.1() + Nr. at risk from 5% AEP 25*.05() + Nr. at risk from 2% AEP 25*.02(1) + Nr. at risk from 1% AEP 25*.01() + Nr. at risk from .5% AEP 25*.005() + Nr. at risk from .1% AEP 25*.001()
Minimise risk to local employment	4.90	3b2	Nr. at risk from 50% AEP 5*.5() + Nr. at risk from 20% AEP 5*.2(4) + Nr. at risk from 10% AEP 5*.1(1) + Nr. at risk from 5% AEP 5*.05() + Nr. at risk from 2% AEP 5*.02(2) + Nr. at risk from 1% AEP 5*.01(2) + Nr. at risk from .5% AEP 5*.005(3) + Nr. at risk from .1% AEP 5*.001(4)
Environmental			
Provide no impediment to the achievement of water body objectives and, if possible, contribute to the achievement of water body objectives.	5.00	4a1	As per Guidelines No. 28
Avoid detrimental effects to, and where possible enhance, Natura 2000 network, protected species and their key habitats, recognising relevant landscape features and stepping stones.	1.00	4b1	The AFA boundary does not overlap with any Natura 2000 site boundary
Avoid damage to and where possible enhance the flora and fauna of the catchment	4.00	4c1	Otter are frequent in the area. Pigeon Wood, an area long established woodland
Maintain existing, and where possible create new, fisheries habitat including the maintenance or improvement of conditions that allow upstream migration for fish species.	2.00	4d1	The river is not classified as a salmonid river under the Salmonid Regulation and is not known as a river for high salmon/lamprey potential. There is local fishing value along the river
Protect, and where possible enhance, visual amenity, landscape protection zones and views into / from designated scenic areas within the river corridor.	3.00	4'e1	Castlemartyr is defined within the Cork County Development Plan" a Broad Fertile lowland valley". This landscape character type is classified as having local value and medium sensitivity and value
Avoid damage to or loss of features, institutions and collections of architectural value and their setting and improve their protection from extreme floods.	3.00	4f1	Castlemartyr is classified in the Cork County Development Plan as an area of architectural importance. There are a number of sites/features listed on the record of structures and NIAH within the town and potentially affected with a high to moderate vulnerability
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.	2.00	4f2	Castlemartyr is of local archaeological value and vulnerability. There are no RMP at risk from flooding

F.2 MCA Matrices

AFA	Ballingeary
-----	-------------

Multi-Criteria Assessment								Do Nothing			
Criteria	Objective	Sub-Objective	Indicator	Basic Requirement	Aspirational Target	Global Weighting	Local Weighting	Score	Rationale	Wtd Score	
Technical	Ensure flood risk management options are operationally robust	Ensure flood risk management options are operationally robust	Level of operational risk of option- Degree of reliance on mechanical, electrical or electronic systems, or on human intervention, action or decision, for the option to operate or perform successfully, - Non-numeric			20.00	5.00	0.00	Do nothing option	0.00	
	Minimise health and safety risk of flood risk management options	Reduce and where possible eliminate health and safety risks associated with the construction and operation of flood risk management options	Degree of health and safety risk during construction and operation	Moderate to high, but acceptable and manageable, level of health and safety risk during construction, maintenance or operation	Negligible risk to health and safety during construction,maintenance or operation	20.00	5.00	0.00	Do nothing option	0.00	
	Ensure flood risk management options are adaptable to future flood risk, and the potential impacts of climate change	Ensure flood risk management options are adaptable to future flood risk	Sustainability and adaptability of the flood risk management measure in the face of potential future changes, including the potential impacts of climate change	Option should not hinder future interventions that may be required to manage potential future increases in risk	Option to provide for, or be adaptable to, the HEFS in terms of maintaining the standard of protection at no or negligible cost	20.00	5.00	0.00	Do nothing option	0.00	
Technical Score								0.00			
Economic	Minimise economic risk	Minimise economic risk	Annual Average Damage (AAD) expressed in Euro / year	AAD is not increased	100% reduction in AAD	24.00	5.00	0.00	Do nothing option	0.00	
	Minimise risk to transport infrastructure	Minimise risk to transport infrastructure	Length of infrastructure at risk from flooding in the 0.1% AEP event	Do not increase length of infrastructure at risk from flooding	Reduce the length of infrastructure at risk from flooding by 50%	10.00	5.00	0.00	Do nothing option	0.00	
	Minimise risk to utility infrastructure	Minimise risk to utility infrastructure	Utilities at risk from flooding	No increase number of utility receptors at risk from flooding	Reduce number of utility receptors at risk to 0	14.00	5.00	0.00	Do nothing option	0.00	
	Manage Risk to Agriculture	Manage Risk to Agriculture	Agricultural prodction	Do not increase in negative impact of flooding on agricultural production	Provide the potential for enhanced agricultural production	12.00	0.00	0.00	Do nothing option	0.00	
Economic Score								0.00			
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	27.00	5.00	0.00	Do nothing option	0.00	
		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	17.00	1.05	0.00	Do nothing option	0.00	
	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	9.00	5.00	0.00	Do nothing option	0.00	
		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	7.00	5.00	0.00	Do nothing option	0.00	
Social Score								0.00			
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.	water body status	Provide no constraint to the achievement of water body objectives	Contribute to the achievement of water body objectives	16.00	5.00	-2.00	The Bunsheelin stream and River Lee flows through Ballingeary These are classified as good status under the WFD. The River Lee is designated as salmonid and considered sensitive. Spawning grounds for salmonid are likely upstream along the River Lee. There is one significant polluting source at risk from flooding in the 1% AEP. in the do nothing scenario this will continue to be at risk.	-160.00	
	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	10.00	0.00	0.00	AFA do not occur within the boundary of any Natura 2000 sites. The Gearagh SPA and SAC are located approximately 15km east of Ballingeary. The sites are hydrological connected via the River Lee.	0.00	
	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 implimentation of option	Creation of new or improved condition of existing sites due to implementation of option	5.00	2.00	0.00	Otters have not been recorded within 10km of the village. It is extremely unlikely that Otter use the habitat in proximity to the village. The River Lee is a salmonid river. Do nothing will have no signficiant long term impact on the value ecological of the river. potential short term impacts during flood event	0.00	
	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	13.00	4.00	-2.00	The River Lee is a salmonid river. River is noted for it importance of fishery potential.	-104.00	
	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 charecteristics of the receiving environment	1. No change to the existing landscape form. 2. Enhancement of existing landscape or landscape feature	8.00	3.00	0.00	The village occurs in a landscape character zone " Ridged and Peaked upland". The landscape value is considered to be high value and sensivity with local importance. There are a number of protected scenic routes on the approach roads.	0.00	
	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 settin 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.	4.00	0.00	0.00	There are a no RPS at risk from flooding .	0.00	
		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.	4.00	3.00	0.00	There are a number of protected bridges RMP's at risk from flooding.	0.00	
Environmental Score										-264.00	
MCA Benefit Score											-264.00
Option Selection MCA Score											-264.00
MCA benefit Cost Ratio											0.00
Economic Benefit Cost Ratio											0.00

Multi-Criteria Assessment								Do Nothing		
Criteria	Objective	Sub-Objective	Indicator	Basic Requirement	Aspirational Target	Global Weighting	Local Weighting	Score	Rationale	Wtd Score
Technical	Ensure flood risk management options are operationally robust	Ensure flood risk management options are operationally robust	Level of operational risk of option- Degree of reliance on mechanical, electrical or electronic systems, or on human intervention, action or decision, for the option to operate or perform successfully, - Non-numeric			20.00	5.00	0.00	Do nothing option	0.00
	Minimise health and safety risk of flood risk management options	Reduce and where possible eliminate health and safety risks associated with the construction and operation of flood risk management options	Degree of health and safety risk during construction and operation	Moderate to high, but acceptable and manageable, level of health and safety risk during construction, maintenance or operation	Negligible risk to health and safety during construction, maintenance or operation	20.00	5.00	0.00	Do nothing option	0.00
	Ensure flood risk management options are adaptable to future flood risk, and the potential impacts of climate change	Ensure flood risk management options are adaptable to future flood risk	Sustainability and adaptability of the flood risk management measure in the face of potential future changes, including the potential impacts of climate change	Option should not hinder future interventions that may be required to manage potential future increases in risk	Option to provide for, or be adaptable to, the HEFS in terms of maintaining the standard of protection at no or negligible cost	20.00	5.00	0.00	Do nothing option	0.00
Technical Score								0.00		0.00
Economic	Minimise economic risk	Minimise economic risk	Annual Average Damage (AAD) expressed in Euro / year	AAD is not increased	100% reduction in AAD	24.00	1.29	0.00	Do nothing option	0.00
	Minimise risk to transport infrastructure	Minimise risk to transport infrastructure	Length of infrastructure at risk from flooding in the 0.1% AEP event	Do not increase length of infrastructure at risk from flooding	Reduce the length of infrastructure at risk from flooding by 50%	10.00	5.00	0.00	Do nothing option	0.00
	Minimise risk to utility infrastructure	Minimise risk to utility infrastructure	Utilities at risk from flooding	No increase number of utility receptors at risk from flooding	Reduce number of utility receptors at risk to 0	14.00	0.00	0.00	Do nothing option	0.00
	Manage Risk to Agriculture	Manage Risk to Agriculture	Agricultural production	Do not increase in negative impact of flooding on agricultural production	Provide the potential for enhanced agricultural production	12.00	0.00	0.00	Do nothing option	0.00
Economic Score								0.00		0.00
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	27.00	3.20	0.00	Do nothing option	0.00
		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	17.00	0.00	0.00	Do nothing option	0.00
	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	9.00	0.50	0.00	Do nothing option	0.00
		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	7.00	4.90	0.00	Do nothing option	0.00
Social Score								0.00		0.00
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	16.00	5.00	0.00	The River Womanagh and Kilath are classified as having a moderate to good water status under the WFD. The waterbodies are considered sensitive bodies. The rivers discharges into Youghal Bay a shellfish sensitive area. Ballymacoda Bay is a SAC. The do nothing scenario would not contribute to the achievement of water body objectives. There are no significant polluting sources at risk from flooding. (0)	0.00
	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	10.00	1.00	0.00	The Castlemartyr AFA boundary does not overlap with any Natura 2000 site boundary. No potential impacts are envisaged in the do-nothing scenario.	0.00
	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 implimentation of option	Creation of new or improved condition of existing sites sites due to implimentation of option	5.00	4.00	0.00	The existing scenario has no distinguishable impact on the flora and fauna of the catchment	0.00
	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	13.00	2.00	0.00	Castlemartyr Woamangh is not classified as a salmonoid river is not known as a river for high salmon/lamprey potential. There may be local fishing value along the river.	0.00
	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 charactenistics of the receiving environment	1. No change to the existing landscape form. 2. Enhancement of existing landscape or landscape feature	8.00	3.00	0.00	castlemartyr is classified within the Development plan as been within a Broad Fertile lowland valley. This landscape character type is classified as having local value and medium sensitivity and value. There are no scenic routes within the town. Do nothing scenario will have no impact	0.00
	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 settin 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.	4.00	3.00	-3.00	Castlemartyr is classified in the cork development plan as an area of architectural importance. There are a number of sites/features listed on the record of structures and NIAH within the town and potentially affected with a high to moderate vulnerability.	-36.00
		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.	4.00	2.00	0.00	There are no RMP at risk from flooding	0.00
Environmental Score										-36.00
MCA Benefit Score										-36.00
Option Selection MCA Score										-36.00
MCA benefit Cost Ratio										0.00
Economic Benefit Cost Ratio										0.00

Flood Risk Management Options	Castlemartyr
-------------------------------	--------------

Multi-Criteria Assessment								Option 1 - Flow Diversion & Flood Defences		
Criteria	Objective	Sub-Objective	Indicator	Basic Requirement	Aspirational Target	Global Weighting	Local Weighting	Score	Rationale	Wtd score
Technical	Ensure flood risk management options are operationally robust	Ensure flood risk management options are operationally robust	Level of operational risk of option-Degree of reliance on mechanical, electrical or electronic systems, or on human intervention, action or decision, for the option to operate or perform successfully, - Non-numeric			20.00	5.00	4.00	Flood defences and flow diversion, no moving parts, potential for sedimentation	400.00
	Minimise health and safety risk of flood risk management options	Reduce and where possible eliminate health and safety risks associated with the construction and operation of flood risk management options	Degree of health and safety risk during construction and operation	Moderate to high, but acceptable and manageable, level of health and safety risk during construction, maintenance or operation	Negligible risk to health and safety during construction,maintenance or operation	20.00	5.00	2.00	Risk of falling from a height, drowning and electrocution	200.00
	Ensure flood risk management options are adaptable to future flood risk, and the potential impacts of climate change	Ensure flood risk management options are adaptable to future flood risk	Sustainability and adaptability of the flood risk management measure in the face of potential future changes, including the potential impacts of climate change	Option should not hinder future interventions that may be required to manage potential future increases in risk	Option to provide for, or be adaptable to, the HEFS in terms of maintaining the standard of protection at no or negligible cost	20.00	5.00	0.00	Not adaptable to climate change without additional flood defence works	0.00
Technical Score								0.00		600.00
Economic	Minimise economic risk	Minimise economic risk	Annual Average Damage (AAD) expressed in Euro / year	AAD is not increased	100% reduction in AAD	24.00	1.29	4.33	As calculated	134.48
	Minimise risk to transport infrastructure	Minimise risk to transport infrastructure	Length of infrastructure at risk from flooding in the 0.1% AEP event	Do not increase length of infrastructure at risk from flooding	Reduce the length of infrastructure at risk from flooding by 50%	10.00	5.00	4.08	As calculated	203.75
	Minimise risk to utility infrastructure	Minimise risk to utility infrastructure	Utilities at risk from flooding	No increase number of utility receptors at risk from flooding	Reduce number of utility receptors at risk to 0	14.00	0.00	0.00	As calculated	0.00
	Manage Risk to Agriculture	Manage Risk to Agriculture	Agricultural prodction	Do not increase in negative impact of flooding on agricultural production	Provide the potential for enhanced agricultural production	12.00	0.00	0.00	As calculated	0.00
Economic Score								0.00		338.23
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	27.00	3.20	4.77	As calculated	411.75
		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	17.00	0.00	0.00	As calculated	0.00
	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	9.00	0.50	3.75	As calculated	16.88
		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	7.00	4.90	4.67	As calculated	160.13
Social Score								0.00		588.75
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	16.00	5.00	-2.00	The River Womanagh and Kilath are classified as having a moderate to good water status under the WFD. The waterbodies are considered to be sensitive bodies. The rivers discharges into Youghal Bay a shellfish sensitive area. Ballymacoda Bay is a SAC. There are no significant polluting sources at risk from flooding. (-2) There are short term negative impacts associated with the construction. There is a permanent concrete structure being placed in the river which will have a permanent impact on the local flow and morphology. However it is not considered that this structure will significantly alter the attainment of good water status in the long term.	-160.00
	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	10.00	1.00	0.00	The Castlemartyr AFA boundary does not overlap with any Natura 2000 site boundary. The Ballymacoda Bay SPA and Ballymacoda (Clonpriest and Pillmore) SAC are located approximately 10km east of Castlemartyr. There will be no requirement for land take within a Natura 2000 site for the construction of flood protection works. Therefore there is no potential for direct damage to Annex I habitat. Potential removal of riparian habitat to accommodate the works will not impact the qualifying features of the SAC or SPA. The Kiltha River (which flows through Castlemartyr) is hydrologically connected to Ballymacoda Bay via the Womanagh River. Sediment release / accidental pollution of the Kiltha River could potentially enter the Bay. The release of sediment into the bay is extremely unlikely to impact the qualifying features of the SAC. These habitats are habitually inundated with sediment during tidal exchanges and are adapted to such conditions. Pollutants e.g. concrete / oil leaks will be diluted by flows in the Kiltha River, the Womanagh River and also by estuarine water in the bay. It is highly unlikely that pollutants would reach the Bay at such concentrations what would cause habitat damage.	0.00
	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 implimentation of option	Creation of new or improved condition of existing sites sites due to implimentation of option	5.00	4.00	-1.00	Potential removal of riparian habitat to accommodate the works will impact on the local flora and fauna of the catchment (-1)	-20.00
	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	13.00	2.00	-3.00	The Ballymacoda Bay SAC is not designated for lamprey / salmon. Castlemartyr Woamangh is not classified as a salmonoid river and is not known as a river for high salmon/lamprey potential. There may be local fishing value along the river. (-1). The measures will result in increase risk of flooding downstream of Castlemartyr and potential limiting access to fishing activity in the area during flooding. (-1) The construction of the measures on the river may require excavation of the bank of stream and diversion of the river during the construction stage this would result in significant short term emissions of sediment to the waterbody and downstream without treatment. The flood defence structure will result in a permanent loss of fisheries habitat. (-3) The diversion of the flow during high flow constitutes an intermittent negative impact to the hydrological regime of the river.	-78.00
	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 charactenistics of the receiving environment	1. No change to the existing landscape form. 2. Enhancement of existing landscape or landscape feature	8.00	3.00	-1.00	castlemartyr is classified within the Development plan as been within a Broad Fertile lowland valley. This landscape character type is classified as having local value and medium sensitivity and value. There are no scenic routes within the town. existing vegetation will be removed to facilitate the construction of the structure. there are wide expansive views from the road . There will be short term impacts during construction and where is opportunity to design natural riparian around the structure.	-24.00
	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 settin 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.	4.00	3.00	3.00	Castlemartyr is classified in the Cork Development Plan as an area of architectural importance. There are a number of sites/features listed on the record of structures and NIAH within the town and potentially affected with a high to moderate vulnerability. However these sites are not within 1%AEP risk. The proposed measures will however provide protection to the ACA.	36.00
		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.	4.00	2.00	3.00	The proposed measures will have no impact on the risk of flooding on archeological heritage.	24.00
Environmental Score										-222.00
MCA Benefit Score										704.98
Option Selection MCA Score										1304.98
MCA benefit Cost Ratio										0.0005
Economic Benefit Cost Ratio										1.66

Flood Risk Management Options	Castlemartyr
-------------------------------	--------------

Multi-Criteria Assessment								Option 2 - Flood Defences		
Criteria	Objective	Sub-Objective	Indicator	Basic Requirement	Aspirational Target	Global Weighting	Local Weighting	Score	Rationale	Wtd score
Technical	Ensure flood risk management options are operationally robust	Ensure flood risk management options are operationally robust	Level of operational risk of option-Degree of reliance on mechanical, electrical or electronic systems, or on human intervention, action or decision, for the option to operate or perform successfully, - Non-numeric			20.00	5.00	5.00	Flood walls and embankments, no moving parts	500.00
	Minimise health and safety risk of flood risk management options	Reduce and where possible eliminate health and safety risks associated with the construction and operation of flood risk management options	Degree of health and safety risk during construction and operation	Moderate to high, but acceptable and manageable, level of health and safety risk during construction, maintenance or operation	Negligible risk to health and safety during construction,maintenance or operation	20.00	5.00	2.00	Risk of falling from a height, drowning and electrocution	200.00
	Ensure flood risk management options are adaptable to future flood risk, and the potential impacts of climate change	Ensure flood risk management options are adaptable to future flood risk	Sustainability and adaptability of the flood risk management measure in the face of potential future changes, including the potential impacts of climate change	Option should not hinder future interventions that may be required to manage potential future increases in risk	Option to provide for, or be adaptable to, the HEFS in terms of maintaining the standard of protection at no or negligible cost	20.00	5.00	2.00	Adaptable but new flood defence works required to defend against climate change scenario	200.00
Technical Score							0.00			900.00
Economic	Minimise economic risk	Minimise economic risk	Annual Average Damage (AAD) expressed in Euro / year	AAD is not increased	100% reduction in AAD	24.00	1.29	4.33	As calculated	134.48
	Minimise risk to transport infrastructure	Minimise risk to transport infrastructure	Length of infrastructure at risk from flooding in the 0.1% AEP event	Do not increase length of infrastructure at risk from flooding	Reduce the length of infrastructure at risk from flooding by 50%	10.00	5.00	4.08	As calculated	203.75
	Minimise risk to utility infrastructure	Minimise risk to utility infrastructure	Utilities at risk from flooding	No increase number of utility receptors at risk from flooding	Reduce number of utility receptors at risk to 0	14.00	0.00	0.00	As calculated	0.00
	Manage Risk to Agriculture	Manage Risk to Agriculture	Agricultural production	Do not increase in negative impact of flooding on agricultural production	Provide the potential for enhanced agricultural production	12.00	0.00	0.00	As calculated	0.00
Economic Score							0.00			338.23
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	27.00	3.20	4.77	As calculated	411.75
		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	17.00	0.00	0.00	As calculated	0.00
	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	9.00	0.50	3.75	As calculated	16.88
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	7.00	4.90	4.67	As calculated	160.13	
Social Score							0.00			588.75
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	16.00	5.00	-2.00	The River Womanagh and Kilath are classified as having a moderate to good water status under the WFD. The waterbodies are considered to be sensitive bodies. The rivers discharges into Youghal Bay a shellfish sensitive area. Ballymacoda Bay is a SAC. There are no significant polluting sources at risk from flooding. (-2) There are short term negative impacts associated with the construction	-160.00
	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	10.00	1.00	0.00	The Castlemartyr AFA boundary does not overlap with any Natura 2000 site boundary. The Ballymacoda Bay SPA and Ballymacoda (Clonpriest and Pillmore) SAC are located approximately 10km east of Castlemartyr. There will be no requirement for land take within a Natura 2000 site for the construction of flood protection works. Therefore there is no potential for direct damage to Annex I habitat. Potential removal of riparian habitat to accommodate the works will not impact the qualifying features of the SAC or SPA. The Kiltha River (which flows through Castlemartyr) is hydrologically connected to Ballymacoda Bay via the Womanagh River. Sediment release / accidental pollution of the Kiltha River could potentially enter the Bay. The release of sediment into the bay is extremely unlikely to impact the qualifying features of the SAC. These habitats are habitually inundated with sediment during tidal exchanges and are adapted to such conditions. Pollutants e.g. concrete / oil leaks will be diluted by flows in the Kiltha River, the Womanagh River and also by estuarine water in the bay. It is highly unlikely that pollutants would reach the Bay at such concentrations what would cause habitat damage.	0.00
	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 sites due to implementation of option	5.00	4.00	-3.00	Potential removal of riparian habitat to accommodate the works will impact on the local flora and fauna of the catchment (-1) . This option has significantly more barriers required and so will result in a more significant impact	-60.00
	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	13.00	2.00	-1.00	TheBallymacoda bay SAC is not designated for lamprey / salmon. Castlemartyr Woamangh is not classified as a salmonoid river and is not known as a river for high salmon/lamprey potential. There may be local fishing value along the river. (-1). The measures will result in increase risk of flooding downstream of Castlemartyr and potential limiting access to fishing activity in the area during flooding. (-1) The construction of the measures on the river may require excavation of the bank of stream during the construction stage this would result in significant short term emissions of sediment to the waterbody and downstream without treatment.	-26.00
	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	8.00	3.00	-4.00	Castlemartyr is classified within the Development plan as been within a Broad Fertile lowland valley. This landscape character type is classified as having local value and medium sensitivity and value. There are no scenic routes within the town. existing vegetation will be removed to facilitate the construction of the structure. there are wide expansive views from the road . There will be short term impacts during construction however there may by opportunity to design natural riparian around the structure. This measure includes for a 1.1-1.4m high barrier is likely to need to remove existing riparian zone to facilitate the construction (-1) and there will be a permanent impact on the visual amenity in the town centre due to the proposed walls up to 1.5m in height	-96.00
	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 settin 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.	4.00	3.00	2.00	Castlemartyr is classified in the cork development plan as an area of architectural importance. There are a number of sites/features listed on the record of structures and NIAH within the town and potentially. affected with a high to moderate vulnerability. The proposed measures will however provide protection to the ACA. There is potential setting impact by the proposed flood defences on the Castlemartyr bridge (-1)	24.00
		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.	4.00	2.00	2.00	Castlemartyr is classified in the cork development plan as an area of architectural importance. There are a number of sites/features listed on the record of structures and NIAH within the town and potentially. affected with a high to moderate vulnerability. The proposed measures will however provide protection to the ACA. There is potential setting impact by the proposed flood defences on the Castlemartyr bridge (-1)	16.00
Environmental Score										-302.00
MCA Benefit Score										624.98
Option Selection MCA Score										1524.98
MCA benefit Cost Ratio										0.0002
Economic Benefit Cost Ratio										0.68

AFA	Inchegeelagh
-----	--------------

Multi-Criteria Assessment								Do Nothing		
Criteria	Objective	Sub-Objective	Indicator	Basic Requirement	Aspirational Target	Global Weighting	Local Weighting	Score	Rationale	Wtd Score
Technical	Ensure flood risk management options are operationally robust	Ensure flood risk management options are operationally robust	Level of operational risk of option- Degree of reliance on mechanical, electrical or electronic systems, or on human intervention, action or decision, for the option to operate or perform successfully, - Non-numeric			20.00	5.00	0.00	Do nothing option	0.00
	Minimise health and safety risk of flood risk management options	Reduce and where possible eliminate health and safety risks associated with the construction and operation of flood risk management options	Degree of health and safety risk during construction and operation	Moderate to high, but acceptable and manageable, level of health and safety risk during construction, maintenance or operation	Negligible risk to health and safety during construction,maintenance or operation	20.00	5.00	0.00	Do nothing option	0.00
	Ensure flood risk management options are adaptable to future flood risk, and the potential impacts of climate change	Ensure flood risk management options are adaptable to future flood risk	Sustainability and adaptability of the flood risk management measure in the face of potential future changes, including the potential impacts of climate change	Option should not hinder future interventions that may be required to manage potential future increases in risk	Option to provide for, or be adaptable to, the HEFS in terms of maintaining the standard of protection at no or negligible cost	20.00	5.00	0.00	Do nothing option	0.00
Technical Score								0.00		
Economic	Minimise economic risk	Minimise economic risk	Annual Average Damage (AAD) expressed in Euro / year	AAD is not increased	100% reduction in AAD	24.00	2.97	0.00	Do nothing option	0.00
	Minimise risk to transport infrastructure	Minimise risk to transport infrastructure	Length of infrastructure at risk from flooding in the 0.1% AEP event	Do not increase length of infrastructure at risk from flooding	Reduce the length of infrastructure at risk from flooding by 50%	10.00	5.00	0.00	Do nothing option	0.00
	Minimise risk to utility infrastructure	Minimise risk to utility infrastructure	Utilities at risk from flooding	No increase number of utility receptors at risk from flooding	Reduce number of utility receptors at risk to 0	14.00	0.00	0.00	Do nothing option	0.00
	Manage Risk to Agriculture	Manage Risk to Agriculture	Agricultural prodction	Do not increase in negative impact of flooding on agricultural production	Provide the potential for enhanced agricultural production	12.00	4.00	0.00	Do nothing option	0.00
Economic Score								0.00		
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	27.00	4.78	0.00	Do nothing option	0.00
		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	17.00	0.00	0.00	Do nothing option	0.00
	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	9.00	0.25	0.00	Do nothing option	0.00
		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	7.00	5.00	0.00	Do nothing option	0.00
Social Score								0.00		
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	16.00	5.00	0.00	The River Lee is designated as salmonid and considered a sensitive waterbody spawning grounds for salmonid are likely upstream along the River Lee. There is one significant polluting source at risk from flooding in the 1% AEP. in the do nothing scenario this will continue to be at risk	0.00
	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	10.00	0.00	0.00	no impacts on Natura 2000 sites.	0.00
	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 implimentation of option	Creation of new or improved condition of existing sites sites due to implementation of option	5.00	2.00	-2.00	Otters have not been recorded within 10km of the village. It is extremely unlikely that Otter use the habitat in proximity to the village. The River Lee is a salmonid river. Do nothing will have no signifcant long term impact on the value ecological of the river. potential short term impacts during flood event	-20.00
	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. Imnpovement of habitat quality / quantity. Enhanced upstream accessibility	13.00	4.00	0.00	The River Lee is a salmonid river. River is noted for it importance of fishery potential.	0.00
	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	8.00	3.00	0.00	The village occurs in a landscape character zone " Ridged and Peaked upland". The landscape value is considered to be high value and sensivity with local importance. There is scenic routes on the approach road from Ballingeary.	0.00
	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 settin 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.	4.00	0.00	0.00	There are a number of NIAH within the town. However these are not at risk from flooding.	0.00
		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.	4.00	3.00	-2.00	There are two RMP at risk (Bridge and Church) from flood event.	-24.00
Environmental Score										-44.00
MCA Benefit Score										-44.00
Option Selection MCA Score										-44.00
MCA benefit Cost Ratio										0.00
Economic Benefit Cost Ratio										0.00

