

5.0 ASPECTS OF THE ENVIRONMENT CONSIDERED

5.1 HUMAN BEINGS

5.1.1 CONTEXT

Human Beings form one of the most important aspects of the environment to be considered. Therefore, any significant impact on the status of human beings that may be potentially caused by a flood defence scheme must be comprehensively addressed.

A wide range of positive and adverse impacts (both direct, indirect and cumulative) can be associated with flood defence schemes. Positive impacts on property, Landuse and public safety need to be balanced with potential impacts on amenities and induced flooding effects downstream. According to the EPA's Advice Notices on current practise in the preparation of EIS's (2003), it is considered that typical significant impacts likely to affect human beings include:-

- The displacement of properties and rights to access or use;
- The creation or loss of amenities;
- Landuse intensification in flood protected areas.

The threat of flooding at Bray is an issue of increasing concern in the absence of a full flood defence scheme. Therefore, it is important to ensure that the risk to life; property; and economic activities as a result of flooding is comprehensively addressed under any proposed flood defence scheme.

The impact of the flood defence scheme on the various communities within Bray will also be assessed in terms of access to the river; visual amenity; recreational facilities; and the socio-economic development of the town.

5.1.2 METHODOLOGY

For discussion purposes, the Study Area has been divided into the following five areas:-

- Area 1 – Harbour Bridge to Bray Bridge (Figure 5.1.1);
- Area 2 – Bray Bridge (Figure 5.1.2);
- Area 3 – Bray Bridge to the western end of People's Park (Figure 5.1.3);
- Area 4 – Western end of People's Park through the Slang/Rehills Land to La Vallee (Figure 5.1.4); and
- Area 5 – La Vallee to N11 Bridge (Figure 5.1.5).

Within each of the five areas, a number of engineering measures are required to provide flood defences along the river. The impact of each engineering measure has been assessed in terms of the impact on the immediate area affected. The criteria used to describe the impacts on Human Beings are based on the EPA Advice Notes on Current Practice (in the preparation of Environmental Impact Statements).

The impacts in relation to visual amenity; residential amenity; and access to the River Dargle and People's Park were assessed in terms of the impact on a) the residents of Bray; b) people working in Bray; and c) visitors to the town.

5.1.3 DESCRIPTION OF THE RECEIVING ENVIRONMENT

The scheme area extends along the River Dargle from the Railway Bridge to just downstream of the N11. The area in the vicinity of the river is for the most part, developed, with the exception of the Bray Golf Club Lands; the People's Park and the Rehills Lands. While the Golf Club Lands and Rehills Lands are currently undeveloped, both of these land banks are currently zoned for development under the Bray Town Council Development Plan 2005-2011. (Refer to Chapter 4 for a more detailed description of the type of development envisaged for these development areas which are the subject of Action Area Plans under the 2005 Bray Town Development Plan).

Census figures from 2006 recorded the population of Bray at 28,814 (27,041 within the Bray Town Council area). Between 2002 and 2006, the population of Bray increased from 28,002 to 28,814, an increase of 3%.

The *Regional Planning Guidelines* have identified Bray as a Metropolitan Consolidation Town, the only town at this level in County Wicklow. As a Metropolitan Consolidation Town, Bray will therefore be one of the main growth centres within the Metropolitan Area and experience significant levels of population growth.

The Wicklow County Development Plan 2004-2010 sets out indicative population targets for Bray. According to the Development Plan the population of Bray is predicted to reach 32,012 by 2010 and 35,000 (maximum) by 2016. Such an increase in population levels will result in continued demand for housing and employment in the town.

Bray Town Council also sets out population targets of 31,000 by 2016 (Town Council Area). However, it is also noted under the 2005 Development Plan that a) insufficient lands are zoned to accommodate anticipated levels of growth and b) the development of zoned lands is restricted by the risk of flooding within the central area of the town.

There are a number of residential communities adjoining the river at risk of flooding and who will experience directly any impacts arising from the proposed flood defence scheme. These areas include Seapoint Court; Ravenswell Road; the Maltings; Glenwood; Killarney Glen; Coburg; and La Vallee.

In addition to the residential development, there is a significant amount of commercial activity adjoining the river, including Castle Street and Main Street, which will also experience impacts arising from the flood defence scheme.

Visitors to Bray will also be affected by the flood defence scheme. Bray is an important commercial centre within the north Wicklow County Area, providing a range of employment and retail services. Bray is also a tourist destination for day-trippers, who avail of the recreational and leisure activities available within the town and surrounding area.

5.1.4 POTENTIAL IMPACTS (DIRECT, INDIRECT, CUMULATIVE)

Area I – Bray Harbour to Bray Bridge

Within this area it is proposed to provide the following measures:-

Measure A4 - Bray Golf Club	<p>This measure seeks to provide reinforced concrete wall along the perimeter of the Golf Club lands where it adjoins Ravenswell Road. A new embankment will be provided behind the retaining wall.</p> <p>The retaining wall and embankment will cut into the Golf Club lands for up to 12 m for a stretch of 150m north of the Railway Bridge. This is to provide a more efficient approach to the bridge.</p> <p>It is also proposed to provide a flood relief route along the northern side of the flood defence wall, within the Golf Club Lands.</p> <p>Any planting that is lost during construction will be replaced.</p>
Measure A5 - Seapoint Court Defences	<p>A new embankment is to be provided above a sheetpile wall.</p> <p>Any planting that is lost during construction will be replaced.</p> <p>A landscaped walkway will be provided to link Seapoint Court with the river corridor</p>
Measure A6 - Abattoir Defences	<p>This measure seeks to provide a reinforced concrete wall along the perimeter of the former Abattoir Site (where this site adjoins the river).</p> <p>The existing overgrown planting will be removed. The area will be landscaped to a detail agreed between the landowner and the Design Team.</p>
Measure R5 - River Regrading	<p>The river regarding will involve lowering the existing bed level by up to 0.6m over a length of approximately 80 m upstream of the railway bridge.</p> <p>Any planting that is lost during construction will be replaced. The riverbed will be planted with reed bed planting.</p>
Measure R4 - River Regrading 4	<p>This river regarding will involve the removal of the existing weir located approximately 170m downstream of Bray Bridge. Any planting that is lost during construction will be replaced. The riverbed will be planted with reed bed planting.</p>

Construction Phase

During construction it is likely that there will be a temporary negative impact on existing residents in this area as a result of increased noise; dust emissions; and possible increase in rodent activity. These impacts will be significant in the short-term.

In the event of flooding during construction the “Emergency Procedure in the Event of Flooding” will be implemented by Bray Town Council.

Operational Phase

Each of these measures will have a positive longterm impact on Area I in that they will protect all adjoining lands and properties from flooding and substantially reduce the risk to life and property during a flooding event. This impact is considered to be a significant positive and permanent impact on Human Beings.

In addition it is considered that the ancillary landscaping treatment proposed in this area (which will incorporate a walkway along the southern bank of the River) will have a positive longterm impact by a) improving the visual amenity along this stretch of the river; b) improving access to the river for local residents; c) complying with the objectives of Bray Town Council to promote the use of the Dargle Riverbank between La Vallee and Bray Harbour as a leisure and natural amenity area through the Development of a Dargle River Walk.

It is noted that during a flooding event, Ravenswell Road will be flooded. As a result of this access to the Golf Club lands will be restricted. This will have a significant negative impact on the future resident, working and visiting community of Golf Club lands (should these lands be developed in accordance with the Bray Golf Club Action Area Plan 2005).

Area 2 – Bray Bridge

<p>Measure B2 - Deepen River Bed Locally at Bridge</p>	<p>This measure involves regrading of the river bed at Bray Bridge. Bray Bridge will remain operational during these works.</p> <p>The bridge will require extensive underpinning to allow the regarding to take place.</p> <p>These works will require a piling rig being brought into the river.</p> <p>The riverbed will be planted with reed bed planting.</p>
<p>Measure B3- New Culvert Bray Bridge</p>	<p>A concrete culvert 7.4m wide and 4m deep by c. 80 m long will be constructed on the northern side of Bray Bridge to act as a 4th Arch for the bridge.</p> <p>These works will be phased to minimise traffic construction.</p> <p>Any planting that is lost during construction will be replaced.</p>

The works proposed within this area relate entirely to the area in the immediate vicinity of Bray Bridge. A cantilevered Walkway is proposed to the north of the Bridge along the northern bank.

Construction Phase

The proposed works to Bray Bridge are to be phased to minimise disruption to Traffic and Pedestrian Flows. Temporary road closures and diversions will nevertheless impact negatively on the local resident, working and visiting community by a) restricting access to areas north and south of the bridge; b) increasing drive times within the central area of the town; c) traffic congestion within the central area of the town with associated noise and air pollution. It is noted however that such significant negative impacts will be temporary in nature.

The proposed construction activities will also negatively impact on the local resident, working and visiting community in the vicinity as a result of noise; dust emissions; and possible increase in rodent activity. These impacts will be significant in the short-term.

In the event of flooding during construction the “Emergency Procedure in the Event of Flooding” will be implemented by Bray Town Council.

Operational Phase

The proposed measures will have a positive long term impact on Area 2 in that they will protect all adjoining lands and properties from flooding and substantially reduce the risk to life and property during a flooding event. This impact is considered to be a significant positive and permanent impact on Human Beings.

In addition it is considered that the ancillary landscaping treatment proposed in this area (which will incorporate a walkway along the northern bank of the River) will have a positive longterm impact by a) improving the visual amenity along this stretch of the river; b) improving access to the river for local residents; c) complying with the objectives of Bray Town Council to promote the use of the Dargle Riverbank between La Vallee and Bray Harbour as a leisure and natural amenity area through the Development of a Dargle River Walk.

Area 3 – People’s Park and the Maltings

Measure C1- People’s Park	<p>This measure involves the excavation of the steps, trees and low lying narrow strip of the Park, immediately upstream of Bray Bridge. This measure also requires the construction of a secant pile concrete wall along the Lower Dargle Road boundary with the Park. The existing stone wall along the boundary of the Park will be replaced with a sheetpile wall, up to 0.5m above the existing wall height.</p> <p>Some trees will be removed as part of the excavation (referred to above). New trees will be planted. Reed Bed Planting is proposed.</p> <p>A high level pedestrian walkway will be provided to replace the loss of the recreational amenity of this small portion of the Park.</p>
Measure C4 - Maltings Housing – Excavate Bank	<p>This measure seeks to replace the existing gabion lined stone wall at the Maltings (which is structurally unstable under hydraulic loading) with a new stone clad concrete wall built over a sheetpile wall. The existing strip of land along by the river will be excavated to increase flow capacity.</p> <p>Reed planting will be provided along the newly formed river bank. The area behind the walls will be planted with native tree and shrub species creating a more visually attractive area along the river compared to the overgrown situation that exists at present.</p>
Measure C5 - Maltings Upstream – Excavate Bank	<p>This measure involves widening the river channel by up to 20m in this area.</p> <p>Native shrub planting will be provided along the river bank with reed planting</p>
Measure C7- Glenwood Excavation	<p>This measure involves the widening of the river channel by up to 20m in this area, to tie in with Measure C5.</p> <p>Native shrub planting will be provided along the river bank with reed planting</p>

The works proposed for this area extend along both banks of the river by Peoples Park and the Maltings.

Construction Phase

The proposed works will have a negative impact during construction due to increased noise; dust emissions; possible increase in rodent activity; and impact on recreational amenity. These impacts will be significant in the short-term.

A programme in the event of flooding during construction will be implemented, as outlined in Section 2.5.5 of this EIS.

Operational Phase

The proposed measures will have a positive longterm impact on Area 3 in that they will protect all adjoining lands and properties from flooding and substantially reduce the risk to life and property during a flooding event. This impact is considered to be a significant positive and permanent impact on Human Beings.

In addition it is considered that the ancillary landscaping treatment proposed in this area (which will incorporate a walkway along the northern bank of the River) will have a positive longterm impact by a) improving the visual amenity along this stretch of the river; b) improving access to the river for local residents; c) complying with the objectives of Bray Town Council to promote the use of the Dargle Riverbank between La Vallee and Bray Harbour as a leisure and natural amenity area through the Development of a Dargle River Walk

Area 4 – Western end of People’s Park through the Slang/Rehills Land to La Vallee

Measure D1-Coburg Estate Wall	<p>This measure involves improving the retaining wall at Coburg. The new sheetpile wall will vary in heights from 6.5 to 6.9m OD and will be timberclad above ground level. (The existing wall at Coburg is 0.5-0.75m above Ground Level. The new wall will be approximately 1.5-1.75m above Ground Level).</p> <p>A 1500m wide shrub planting strip will be provided along the river edge with reed bed planting inserted along the regarded river bed, creating a new ecological habitat location.</p> <p>Any other planting removed on the Corburg Side of the wall during construction will be replaced.</p>
Measure D2-County Brook	<p>This measure seeks to culvert the County Brook Stream with a non-return valve. This will allow the construction of defences and prevent water back surcharging during flood events.</p> <p>Any planting removed during construction will be replaced.</p>
Measure D3-Upper Dargle Road Residence Embankment	<p>Apart from the first property upstream of Coburg, the properties along Upper Dargle Road do not require constructed defences as the existing ground profile provides sufficient protection. The first property upstream of Coburg will require an earthen embankment. The embankment will be constructed to a level of 7m OD (Malin) to an agreed detail between the resident and the Design Team.</p> <p>Any planting removed during construction will be replaced</p>
Measure R3 – River Regrading 3 – The Slang/Killarney Glen / Peoples Park	<p>This river regarding will involve lowering the bed level by up to 1.5m over a length of approximately 1,000 m.</p> <p>When the river regarding is completed, reed bed planting will be inserted along the newly formed river bed.</p>
Measure D5 – The Slang Northern Bank	<p>The existing gabion baskets and low level wall on the northern bank of the Slang will be retained and repaired as required. A degree of underpinning will be required due to regarding.</p> <p>Any planting removed during construction will be replaced</p>
Measure D7-Killarney Glen Sheetpile	<p>This measure involves the construction of a new sheetpile wall to the rear of the residences at Killarney Glen.</p>

	Shrub planting will be provided along the river bank and reed bed planting will be inserted along the regarded river bed. Any planting removed during construction will be replaced
Measure D8-Rehills Land – Excavate South Bank	This measure involves extensive excavation of the existing embankment at Rehills. As the Rehills Lands are currently undeveloped. Any planting removed during construction will be replaced along the newly formed river bank
Measure D9-Debris Trap	This measure involves the provision of a debris trap in the river channel at Rehills Land, which will prevent trees from becoming an obstruction to the flow of the river. Any planting removed during construction will be replaced
Measure R2 - River Regrading 2 – The Slang	This measure involves regrading the river bed. Reed bed planting will be inserted along the regarded river bed.

The works as proposed relate to both the northern and southern banks of the river and the river channel.

Construction Phase

The proposed works will have a negative impact during construction due to increased noise; dust emissions; possible increase in rodent activity; and impact on recreational amenity. These impacts will be significant in the short-term.

In the event of flooding during construction the “Emergency Procedure in the Event of Flooding” will be implemented by Bray Town Council.

Operational Phase

The proposed measures will have a positive longterm impact on Area 4 in that they will protect all adjoining lands and properties from flooding and substantially reduce the risk to life and property during a flooding event. This impact is considered to be a significant positive and permanent impact on Human Beings.

In addition it is considered that the ancillary landscaping treatment proposed in this area (which will incorporate a walkway along the northern bank of the River; the rejuvenation of peoples park; and the upgrading of the river bank along by the Maltings) will have a positive longterm impact by a) improving the visual amenity along this stretch of the river; b) improving access to the river for local residents; c) complying with the objectives of Bray Town Council to promote the use of the Dargle Riverbank between La Vallee and Bray Harbour as a leisure and natural amenity area through the Development of a Dargle River Walk; d) Improve the quality of Peoples Park both visually and functionally in accordance with Development Plan Objectives (Sectio9.4.5 of the Development Plan refers).

Area 5 – La Vallee to N11 Bridge

Measure E2 - Excavate South Bank	<p>This measure involves the excavation of the southern bank along La Vallee.</p> <p>Trees identified as posing a risk or being vulnerable to eroding ground will be felled.</p> <p>Existing planting which is removed during construction will be replaced and reed planting will be inserted along the regarded river bed.</p>
Measure R1 - River Regrading – Upstream of La Vallee	<p>This river regrading will involve the lowering of the bed by up to 1m. A proportion of this regarding will require excavation of bedrock</p> <p>Existing planting which is removed during construction will be replaced and reed planting will be inserted along the regarded river bed.</p>

Construction Phase

The proposed works will have a negative impact during construction due to increased noise; dust emissions; possible increase in rodent activity; and impact on recreational amenity. These impacts will be significant in the short-term.

Operational Phase

The proposed measures will have a positive long-term impact on Area 5 in that they will protect all adjoining lands and properties from flooding and substantially reduce the risk to life and property during a flooding event. This impact is considered to be a significant positive and permanent impact on Human Beings.

In addition it is considered that the ancillary landscaping treatment proposed in this area will have a positive long-term impact by improving the visual amenity along this stretch of the river.

5.1.5 MITIGATION MEASURES

The flood defence scheme is in itself a mitigation measure against the risk of flooding along the River Dargle. Landscape treatments will further enhance the quality of the public realm and amenity value of the river. No further mitigation measures will be required.

Once the flood defence scheme is constructed, rigorous monitoring and maintenance will be carried out by Bray Town Council to ensure that the flood defences do not deteriorate.

In the event of flooding during construction it is proposed that an “Emergency Procedure in the Event of Flooding During Construction” will be implemented by Bray Town Council to ensure that health and safety is not compromised during the construction period.

5.1.6 RESIDUAL IMPACTS (DIRECT, INDIRECT, CUMULATIVE)

The proposed measures will have a positive long-term impact on the area immediately adjoining the River Dargle in that they will protect all adjoining lands

and properties from flooding and substantially reduce the risk to life and property during a flooding event. This impact is considered to be a significant positive and permanent impact on Human Beings.

During construction any potential increased risk of flooding will be mitigated by the measures proposed by OCSC, as set out in the programme in the event of flooding during construction. As a result the overall impact of the proposed scheme is considered to be significantly positive.

5.1.7 THE DO NOTHING SCENARIO

The 'do nothing' scenario is assessed in terms of the impacts of:-

- a) a 1 in 100 year flood event; and
- b) a 1 in 200 year tidal event.

While the 1 in 200 year tidal event would have a significant impact, the impact would be more localised, affecting lands to the north and south of the river, between the Harbour and Bray Bridge. The impact of the 1 in 100 year river flood event would be more widespread, affecting lands to the north and south of the river, between the Harbour and the N11 Interchange.

1:100 Year River Flood Event

The occurrence of a one in one hundred year river flood event would result in extensive flooding of residential lands along the river including Seapoint Court; Ravenswell Road; Belton Terrace; Dwyer Park; Barboza Terrace; St Laurences Terrace; Adelaide Villas; Loretto Terrace; Fairgreen Court; Fairgreen Terrace; Fairgreen Road; Gertrude Terrace; Herbert View; Sutton Road; Sutton Villas; Matland Street; Ardee Court; Dangan Street; Pearse Road; Pearse Square; the Maltings; Glenburgh Terrace; Coburg; Dargle Road; Killarney Glen and River Vale. Therefore, the occurrence of such an event in an area occupied by residential development could potentially result in damage to property and possibly loss of life.

A 1 in 100 year flood event would also cause significant damage to commercial property along Castle Street, between Bray Bridge and Cronan's Road, including Castle Street Shopping Centre and commercial property to the north of People's Park. As Bray Bridge would also be affected, access to and egress from the town would be severely limited, therefore impacting upon commercial activity within the town as a whole.

Therefore, in the event of a 1 in 100 year flood event, there would be extensive damage to the town. This would have a significant impact on day-to-day activity within the town and access to and egress from the town. Such an event would therefore have a significant negative impact on visitors to the town.

In the event of a 1 in 100 year flood event, approximately 646 residential properties and 9 commercial properties will be flooded.

1:200 Year Tidal Flood Event

In the event of a one in two hundred year tidal flood event, there would be extensive flooding of the residential areas of Seapoint Court; Ravenswell Road; Belton Terrace; Dwyer Park; and Milton Terrace. Therefore, if such an event were

to occur, there would be potential for significant flooding damage and possibly loss of life.

Such an event would also have an impact on commercial activity. Lands affected would include the Harbour Area; the former Abattoir site; the Golf Club Lands; and Castle Street.

Visitors to Bray would also be affected by such an event. Flooding of the Harbour Area would make tourist activity inoperable from this location.

5.1.8 THE WORST CASE SCENARIO

The worst case scenario would arise where flood defence measures were not put in place and the town was not protected from flooding. As flooding in Bray occurs with an approximate frequency of once every 25 to 30 years, Bray would continue to be at risk of flooding. The worst case scenario is therefore considered to be the do-nothing scenario.

5.1.9 POSITIVE IMPACTS

Once the flood defence scheme is completed, there will be a positive impact longterm on the health and safety of human beings; property; and economic activities due to reduced risk of flooding.

5.1.10 REINSTATEMENT

The flood defence scheme will involve reinstating and improving existing flood defence measures along the River Dargle and upgrading People's Park.

5.1.11 MONITORING

Continuous monitoring will be required to ensure that the flood defence scheme is maintained to the highest quality and therefore ensuring the health and safety of human beings is not compromised. Maintenance of the River Dargle and its environs is currently undertaken by Bray Town Council and will continue following the completion of the proposed scheme. A preliminary maintenance programme is set out in Section 2.6 of the EIS.