



# River Mall (Templemore) Drainage Scheme

## Non - Technical Summary

### Volume 1

January 2015

TOBIN CONSULTING ENGINEERS



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# REPORT

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**PROJECT:**

**River Mall (Templemore) Drainage Scheme**

**CLIENT:**

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Dublin 2.

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# 1 INTRODUCTION

## 1.1 Overview of the Project

The town of Templemore, County Tipperary, lies on the Mall River and has a long history of flooding, with a number of flood events having been reported over the last 150 years. The most significant floods over the last 50 years occurred in December 1968 and then more recently in November 2000, when approximately 40 properties were inundated.

In order to address the flooding problem in Templemore, the Office of Public Works (OPW) has designed a flood relief scheme. The proposed scheme is located in Templemore Town, County Tipperary; refer to Figure 1-1. The proposed scheme diverts the Mall River at Templemore Town through a long diversion channel approximately 805m in length that begins in Shortt's Field and finishes approximately 230m downstream of Small's Bridge. The scheme consists of proposed works including river drainage works, flood embankments, culverts and channel maintenance works at a number of locations.

An Environmental Impact Statement (EIS) has been prepared by TOBIN Consulting Engineers on behalf of the OPW for flood relief works on the Mall River in Templemore Town, County Tipperary.

## 1.2 Environmental Impact Statement

An Environmental Impact Assessment (EIA) is required to ensure that projects that are likely to have significant effects on the surrounding area and on the environment are properly assessed. Any significant impacts discovered in the assessment must be minimised and avoided where possible. The findings and outcome of the EIA are presented as a report known as an Environmental Impact Statement (EIS).

TOBIN Consulting Engineers has undertaken the EIA and prepared the resultant EIS in accordance with the relevant and specific legislation, guidance and advice notes. The assessment has been fully undertaken in consultation with statutory bodies, interested parties and the local community. Further details on the consultation process are detailed in Section 1.4.

This document is Volume 1 of the EIS. It is a Non Technical Summary (NTS) which provides a brief description of the project and the assessment of the relevant environmental matters in non technical language. The rest of the Volumes contain information as described below.

Volume 2: The Main EIS – Contains detailed information relation to the proposed scheme and the findings of the Environmental Impact Assessment on the surrounding area. Volume 2 also contains figures and maps.

Volume 3: Appendices - This Volume contains information and data that has been used in the Environmental Impact Assessment and is referred to in Volume 2.

Volume 4: Photomontages – This Volume contains photomontages of what the surrounding landscape will look like with the proposed scheme in place.

The purpose of this NTS is to provide a concise overview, in non technical terms, of the issues, impacts and mitigation measures highlighted by the EIA and presented in the main EIS in Volume 2.

### 1.3 Scoping of the Environmental Impact Assessment

The scoping of the EIA is a process of characterising the broad setting of the development, identifying the key impacts to be addressed and setting the boundaries of the EIA.

As part of the scoping process, a Public Information Day was held in Templemore on the 28<sup>th</sup> March 2014 to inform the local population and general public about the project.

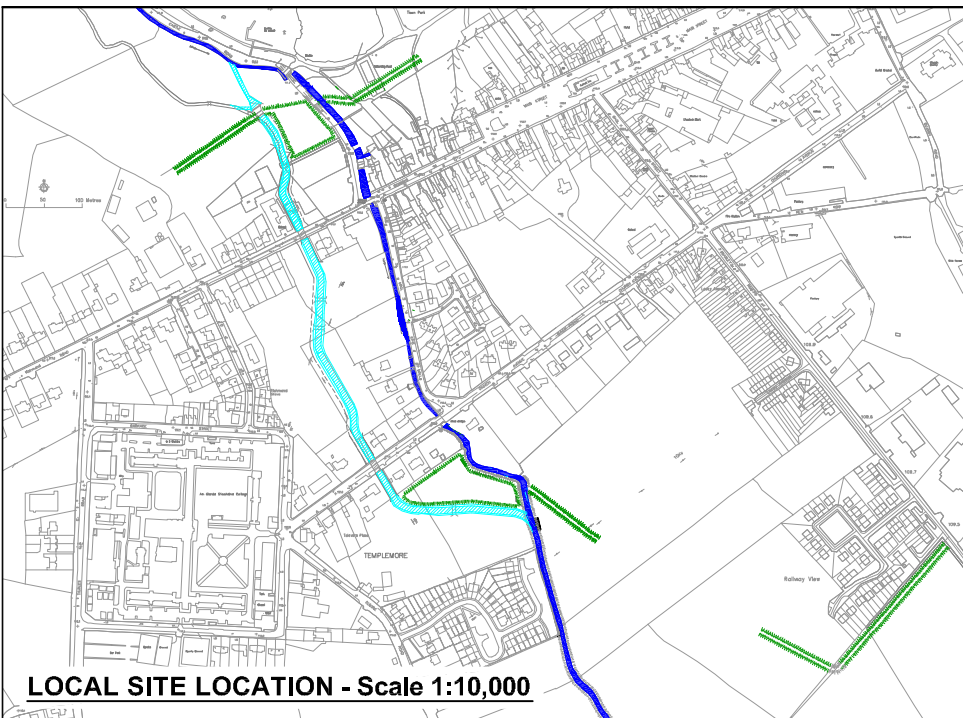
### 1.4 Consultation

The consultation process consisted of consultation with competent bodies, statutory bodies and interested parties. Consultation letters were sent to the list of Consultees listed in Table 1-1 in the main Environmental Impact Statement (Volume 2).

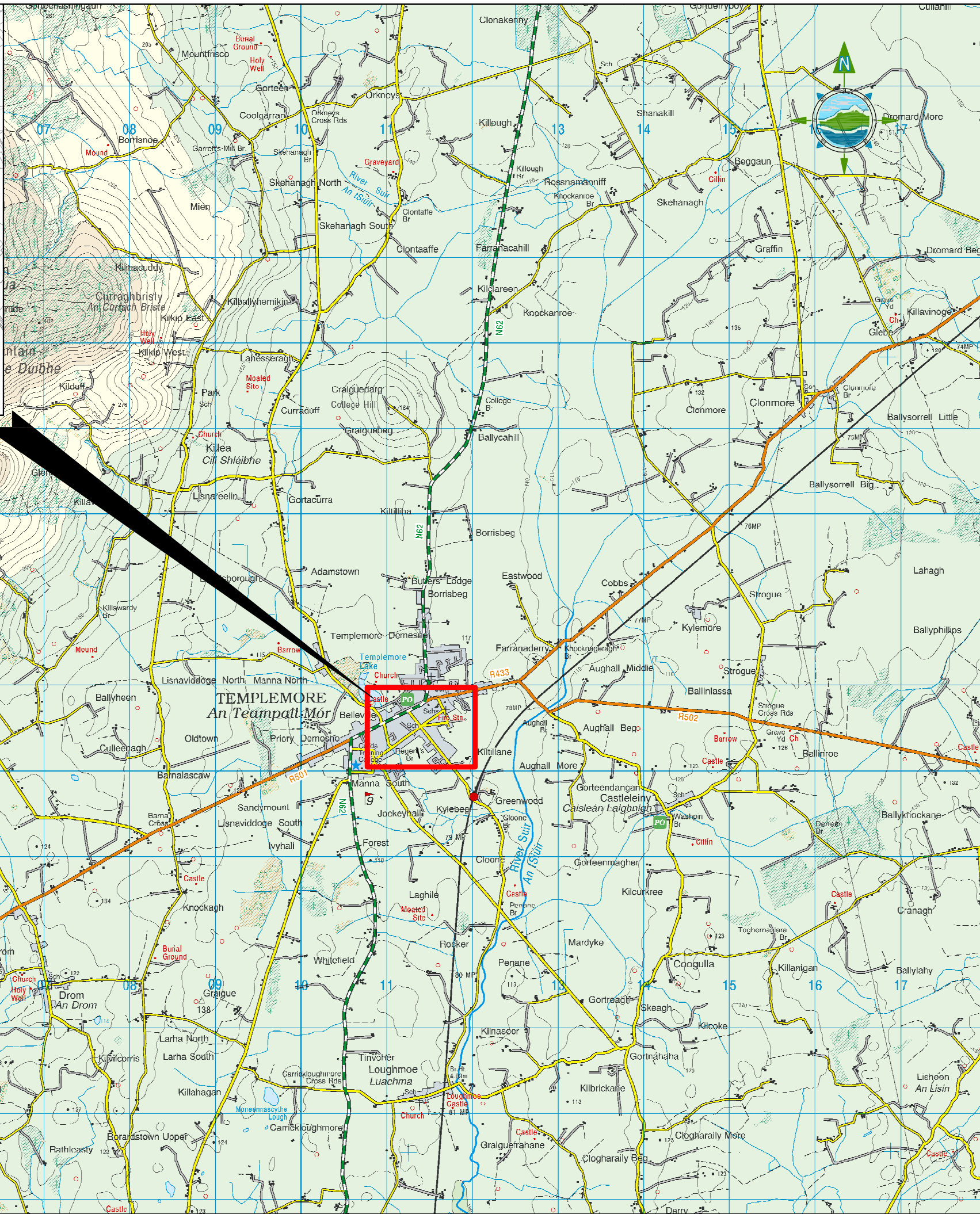
All comments, observation or issues raised by Consultees on the scheme design and impact assessment were addressed in the EIS, with specific responses directed onto the relevant specialist for consideration.



THE INFORMATION ON THIS DRAWING IS TO THE ORDNANCE SURVEY IRELAND ITM COORDINATE SYSTEM



LOCAL SITE LOCATION - Scale 1:10,000



REGIONAL SITE LOCATION - Scale 1:50,000

NOTES:

1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING.
2. ALL DRAWINGS TO BE CHECKED BY THE CONTRACTOR ON SITE.
3. ENGINEER/EMPLOYERS REPRESENTATIVE, AS APPROPRIATE, TO BE INFORMED BY THE CONTRACTOR OF ANY DISCREPANCIES BEFORE ANY WORK COMMENCES.
4. THE CONTRACTOR SHALL UNDERTAKE A THOROUGH CHECK FOR THE ACTUAL LOCATION OF ALL SERVICES/UTILITIES, ABOVE AND BELOW GROUND, BEFORE ANY WORK COMMENCES.
5. ALL LEVELS SHOWN RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD.

Rev	Date	Description	By	Chk'd
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Client:



Project:

**TEMPLEMORE FLOOD RELIEF SCHEME**

Title:


**SITE LOCATION MAP**

Scale @ A3: As Shown

Prepared by: M. Nolan  
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Date: February 2015

Project Director: D. Grehan

Drawing Status: Draft



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Drawing No: **Figure 1.1**

Revision: **A**



## 2 DESCRIPTION OF PROPOSED DEVELOPMENT AND EXISTING ENVIRONMENT

### 2.1 Description of Existing Environment & Proposed Drainage Scheme

The proposed scheme diverts the Mall River at Templemore Town through a long diversion channel approximately 805m in length that begins in Shortt's Field and finishes approximately 230m downstream of Small's Bridge (refer to Figures 2-1 and 2-2 overleaf).

#### 2.1.1 Overview of proposed scheme

A 4m wide connector channel will start approximately 60m upstream of Shortt's Bridge and run directly south to the line of upstream defences in Shortt's Field (refer to Figure 2-1). A culvert is placed in-line with the flood defence embankment in Shortt's Field and the diversion channel route starts here with a bed level of 109.18m OD. The diversion channel route will then proceed south-southeast for approximately 78m until it reaches the drain at Young's garage compound. It takes an easy bend (approximately 30 degrees) and heads directly south for approximately 40m to line up with the school yard boundary wall, where it returns to its original direction for approximately 50m to reach Richmond Road by cutting through the workshop of Hassett's garage (refer to Figure 2-1).

Its bed level is 108.48m OD as it crosses the road just west of two houses using a culvert with a 15m carriageway. It then maintains its line for 26m south of the road. To minimise land take, this stretch just north and south of the road has vertical sides 8.4m apart. It turns directly south for 172m and, as shown, a 4.5m-wide access bridge is required here to avoid land severance. It changes again to line-up just west of a line of electricity poles and follows their south-easterly direction for 120m to Church Avenue. The exact route depends on practicalities such as the electricity poles and hugging field boundaries to reduce land loss. Its route through these gardens and those to the south of the road has vertical sides 8.4m apart (to minimise land take). To reduce the cost of bridging the avenue's 13.5m carriageway, this route meets the road at right angles; its bed level here is 107.8m OD. The overflow from the chamber (just to the west) will be redirected to the diversion, just downstream of the culvert.

It then cuts through the private gardens on the south side of the road and curves to the southeast where it again needs a 4.5m-wide access bridge to avoid land severance (refer to Figure 2-1). It runs just over 190m to meet the river about 230m downstream of Small's Bridge, with a bed level of 107.33m OD. The intention is to align the channel as far as possible to the direction of the main channel. The opposite bank of the Mall to the outlet may have to be reinforced to protect it from erosion; this could be achieved using a placed stone revetment or gabions. This will also reduce reflected wave effects that could result in erosion to the bank further downstream.

### Thalweg or Inset Fish Channel

The excavated river and diversion channel could result in wide, shallow flow conditions unfavourable for fish. River excavation will inset a 0.3m deep, 2m wide Thalweg (the connected line of low-points that runs down along a channel with deeper water and faster flow during general flow conditions) to improve aeration and fish movement. This channel will be designed and constructed in consultation with Inland Fisheries Ireland and along the channel may be higher or lower and its width may vary.

### The inlet to the Flood Diversion Route and Control Weir

The 4m wide connector channel will start approximately 60m upstream of Shortt's Bridge and run directly south to the line of upstream defences in Shortt's Field (refer to Figure 2-1). At the upstream end, it will share the present riverbed level of 109.84m OD, however, at its downstream end, its bed level will be 0.5m higher than the diversion channel's level of 109.07m OD, as a consequence, a control weir is needed to protect this step-down in bed level. The weir will be approximately 0.75m in height. A fish pass will be installed in this area in consultation with the Inland Fisheries Ireland (IFI).

### Dedicated Sediment (Gravel) Trap

River gravel is a feature of the Mall River so a gravel trap will be required. A trap will be located in the area where the connector channel meets the defence embankment. This trap will be formed by gradually widening out the lower 20m of the connector channel to approximately 12m. Because a significant amount of flood flow will enter the diversion from the floodplains, this widened section will be protected by a wall that rises from the bed up to bank height. This wall will have two functions. Firstly it will act as a small weir for flood flows from the floodplains and secondly it will form the foundations of much of the Debris Trap.

### Dedicated Debris Trap

Debris, including flood debris such as tree branches or even whole trees, can reduce the efficiency of flood defence works therefore a dedicated debris trap will be installed at the downstream end of the connector channel to prevent this. This structure will mainly use the channel-side protection walls as foundations and comprise of three lines of approximately 2m high posts, set approximately 1.5m apart. The line along the left bank (east side of channel) will provide protection from debris carried by the wave of water that might result from a breach of the Town Park lake impoundment while the line along the right bank will protect against debris carried down the floodplain. The third line running diagonally within the debris trap will catch debris coming down the river.

### Culverts

The proposed scheme includes for a new culvert to be placed in-line with the new defence embankment in Shortt's Field. It also includes for culverts at Richmond Road, Church Avenue and four 4m carriageway, private access culverts; one in each of the areas of open land below the new bridges

and two (replacement) culverts over the Mall River below the diversion. These culverts will need to pass the full climate change flow of 21.63m<sup>3</sup>/s.

### Upstream Defences

The town centre sits on the river's floodplain, so a flood defence line will run north of the town to shut off floodplain flows (refer to Figure 2-1). Embankments will have a rounded berm, with a 4m-wide crest and 1 in 5 side slopes on their open sides, but 1 in 3 (or less) where adjacent to a property boundary, if space is an issue. Landscaping can be employed to allow them better integrate with their surroundings.

An embankment (1.5m above ground level at most) will run approximately 150m from Blackcastle Road, through the river, to high ground to the south east of the lake in the Town Park. The primary function of the embankment will be to divert waters away from the town in case of a breach of the lake's impoundment (i.e. dam break).

A ramp will be constructed across Blackcastle Road to divert flood waters away from the town in case of a dam break. The exact location and slopes are a matter of road safety and will be finalised in detailed design stage. The building of this ramp will require the removal and rebuilding of road walls on either side; approximately 43m alongside Shortt's Field and approximately 66m on the riverside.

To close off flood defences at the upstream end of the town, an embankment (approximately 1.4m above ground level at most) is to be constructed to prevent flow from Shortt's Field entering Richmond Road. It will begin a little south of Shortt's Bridge and run 195m due west from Blackcastle Road to high ground (refer to Figure 2-1).

### Downstream Defences

Just upstream of its re-entry point, a 90m long embankment will shut off the redundant river and tie into high ground to the east. Further east, the Railway View Estate will be defended by an embankment that runs approximately 110m along its southwest side and then turns and runs approximately 217m along the southeast and finishes at the road (refer to Figure 2-2).

The opposite river bank of the Mall to the outlet will have to be reinforced to protect it from erosion. This will be achieved using a placed stone revetment or gabions. This will also reduce reflected wave effects that could result in erosion to the bank further downstream.

Starting at the confluence (approximately 230m downstream of Small's Bridge) with a bed level of 107.3m OD, the riverbed will be re-profiled to finish at 106.1m OD 480m further downstream. The riverbed will be widened to 7.5m base-width from the diversion for approximately 450m and from there a transition returns to the existing 4.5m base wide over a further 250m (or so).

Channel maintenance is being designated from just upstream of the scheme works to where the Mall discharges to the Suir to prevent future growth of woody vegetation encroaching into the river or crowding-out the flowing floodplain.

### 2.1.2 Summary

To summarise, the proposed scheme involves:

- A 60m-long inlet channel with debris and gravel traps and a small drop weir.
- A new outflow from the town lake to run under Blackcastle Road to the inlet channel.
- A flood –defence line north of the town, in-line with a culvert over the new diversion.
- Relocating the river by constructing a new 805m long channel (with a 7.5m base-width) that begins in Shortt's Field and finishes approximately 230m downstream of Small's Bridge.
- The road and access bridges will need to pass the full Climate Change flow of 21.63m<sup>3</sup>/s.
- As the bypassed stretch of the river is no longer required, there are no residual flood risks from wall failure, etc and no need to sluice its drainage outlets.
- At Richmond Road and Church Avenue, separated by 8.4m, walls along both banks of the diversion both up- and downstream.
- Re-grading 480m of the channel from the new confluence to 740m below Small's Bridge. Over the same reach, widening the river to 7.5m and a further 250m from there to transition back to the existing 4.5m base width.
- A 90m-long embankment on the left bank (east side) below properties at Small's Br.
- A 320m-long embankment to defend the Railway View Estate area.
- To improve aeration and fish movement along the excavated river and diversion, a fish channel (Thalweg) will be dug and partially backfilled with gravels. While this will likely be about 0.3m deep with a 2m wide bed and up to 5 to 1 side slopes, it will be designed and constructed in consultation with the IFI and along the channel may be higher or lower and its width may vary.
- The channel from the upstream works to where the Mall discharges to the Suir is being designated for maintenance to prevent further growth of woody vegetation encroaching into the river or crowding –out the flowing floodplain.
- Impacts to the landscape will be reduced by using high quality finishes to works, grassed finishes to embankments and open channel sections, and by planting replacement and new vegetation; including in-channel, where possible.



Figure 2-1 Upstream Defences and the River Diversion

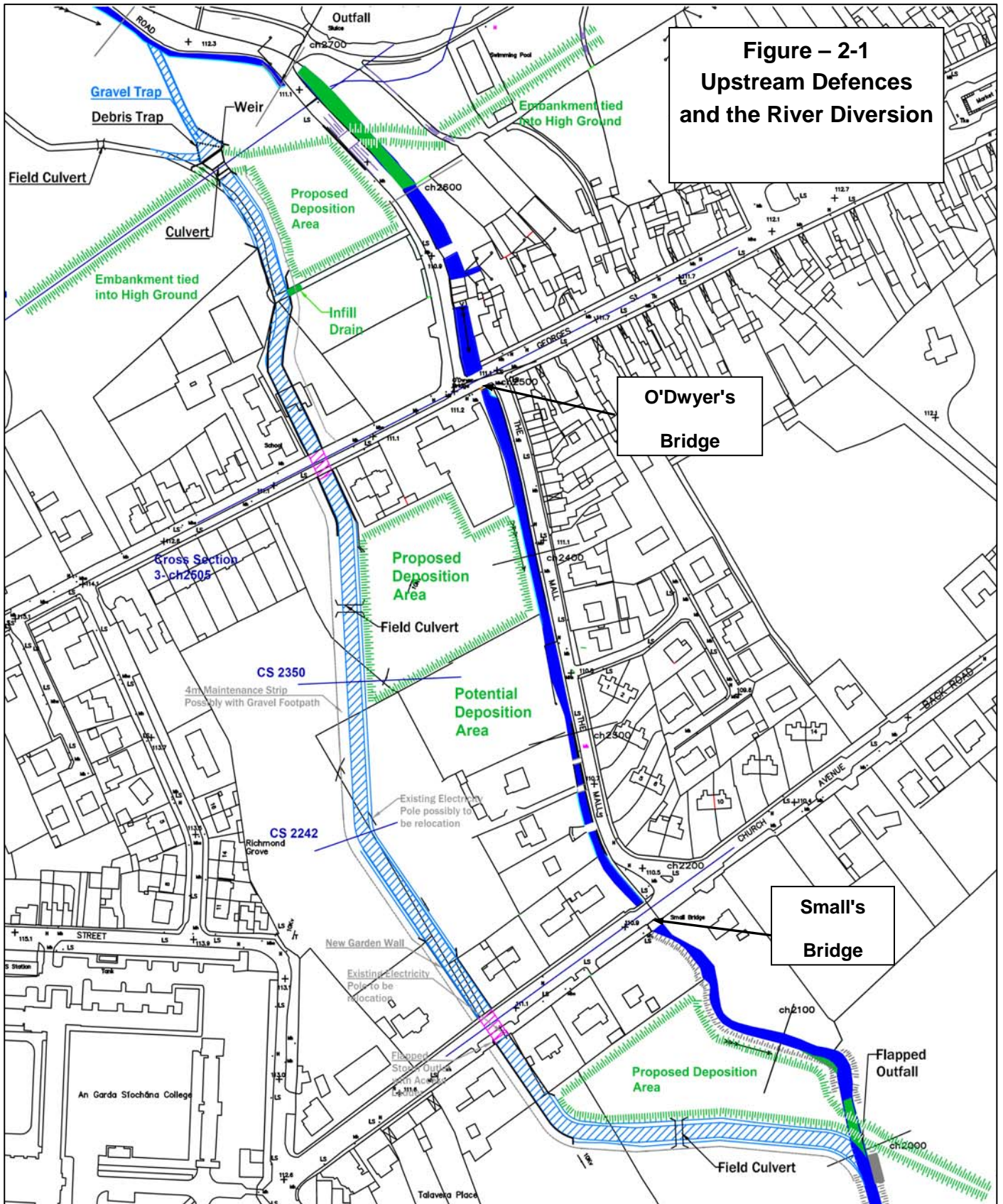
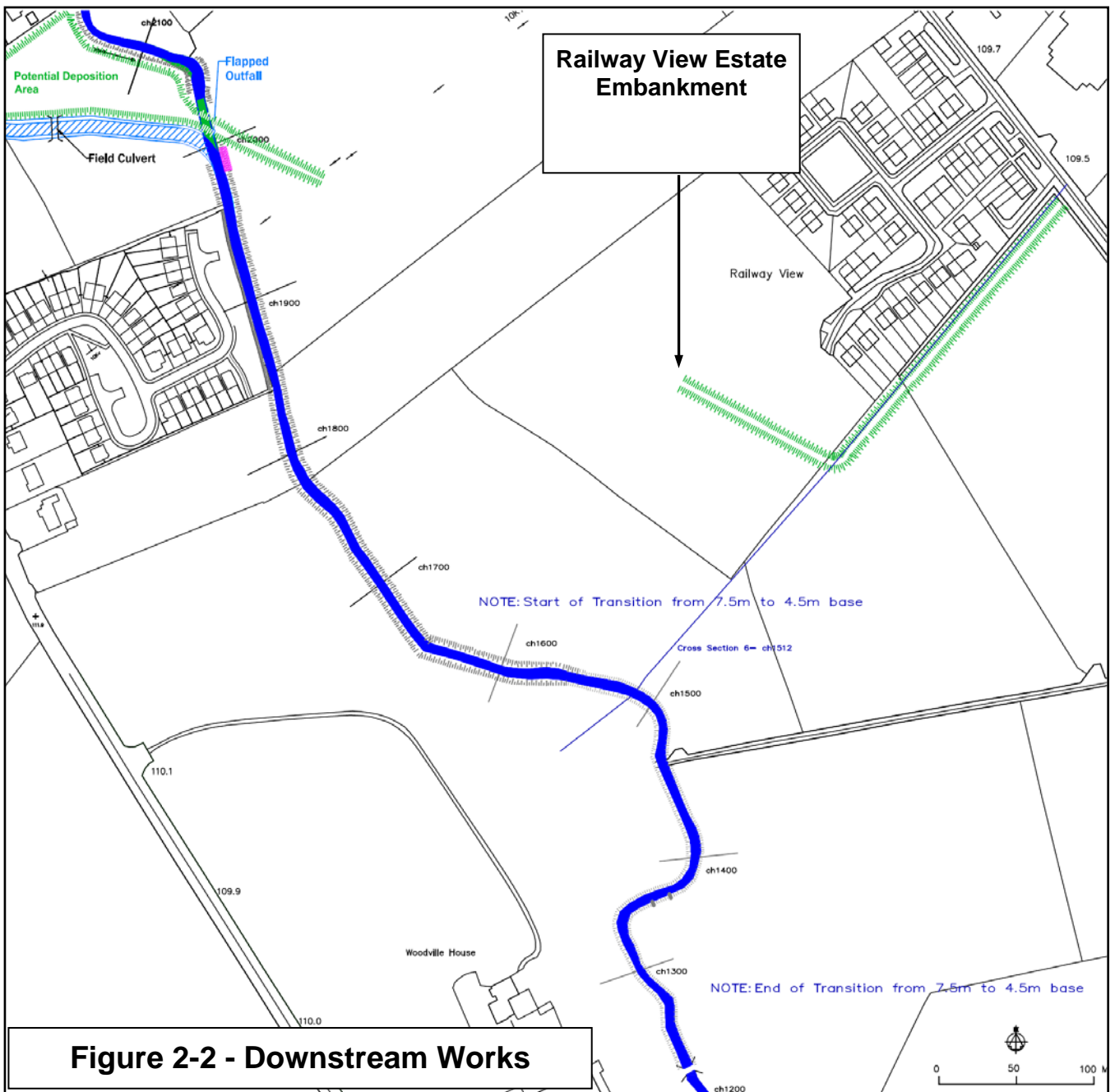


Figure – 2-1  
Upstream Defences  
and the River Diversion

O'Dwyer's  
Bridge

Small's  
Bridge

**Figure 2-2 Downstream Works**



**Figure 2-2 - Downstream Works**

## 2.2 Hours of Operation

Construction work will be confined to the hours of 8am to 6pm, Monday to Friday and 8am to 12 noon on Saturday. Works will not be permitted outside of these hours unless in exceptional circumstances or in an emergency.

## 2.3 Plant and Equipment Requirements

During the construction programme, the following plant and equipment will be required on site for use or contingency.

Plant Equipment	Activity
Excavators, rock breaking and piling attachments (for excavators), mobile crane, pumps, well pointing equipment (for dewatering if required), roller, compacting plates, mats (for excavators), lorries, low loader, dump trucks, dumpers, tractors and trailers, signage and traffic lights, hand held equipment and tools, scaffolding, shuttering and formwork, lighting, generators, cement mixers, power washers, fencing equipment, road saw, blawnax (for laying asphalt), road sweeper	<p>Dredging works within Mall River.</p> <p>Bank grading works on Mall River.</p> <p>Ongoing stream maintenance on Mall River.</p> <p>Cut and fill works for new culverts.</p> <p>New flood defence embankments.</p> <p>Equipment for channel works and wall pointing.</p> <p>Creation of new access tracks.</p> <p>Temporary traffic controls.</p> <p>Fencing for health and safety maintenance.</p>

## 2.4 Health and Safety

The OPW and any contractors engaged under this construction contract will comply with the appropriate health and safety regulations. A detailed Health and Safety Plan and Risk Assessment will be required for the development.

## 2.5 Site Security Arrangements and Public Health and Safety

The OPW will implement documented strategies in compliance with Safety and Health Regulations to provide a safe and secure site. The works will be maintained in such condition so as to ensure public safety and local amenity.



## 2.6 Construction Facilities

Prefabricated temporary buildings will be provided for on-site workers over the course of the construction programme. These facilities will be for sanitary and for canteen purposes. A site office and reception will also operate from such temporary buildings.

Any effluent or dirty water generated within the temporary buildings will be drained to an effluent holding tank. This tank will be emptied periodically and the effluent exported by a permitted haulier to an approved wastewater treatment plant.

## 2.7 Construction Programme

It is anticipated that construction works will follow the following programme:

1. Consultation with relevant statutory authorities (including Inland Fisheries Ireland) to agree a works programme and detailed design which minimises impacts to aquatic ecology;
2. Secure site, establish construction reception, erect security fencing and notices;
3. Site clearance of vegetation. Clearance of woody vegetation will only extend to areas required within the site works area;
4. Construct new weir and culverts. Utilise excavated material for new embankments. Import material if required; and
5. Excavation of the Mall River and constructions here and in adjacent areas. This will aim to minimise impacts on aquatic ecology through appropriate mitigation (refer to Chapter 7).

The estimated construction period for the project is 12 months, as per indications provided by the OPW, however, it may be phase over a number of years; excluding planned stoppages and any periods lost due to bad weather. This allows for several elements of the work which are highly weather dependent and also allows for probable environmental time constraints.

## 2.8 Construction Methods

The construction of this development largely involves excavation and movement of material. For project planning purposes it is intended to maximise dry excavation of materials during “dry” periods, to ensure minimum soil runoff to the Mall River. Material dug out for the proposed culverts will be used as far as possible for the embankment construction. Other proposed works include a road ramp, weir, fish pass, gravel trap, debris trap, culverts, channel constriction, possible bridge underpinning and reinforcement and works to the channel walls.

Temporary storage of material may also be necessary though this will take place away from the river and follow requirements detailed in the method statements to minimise surface water runoff. A temporary access/haul road will be constructed, where required, to allow transfer of material to more

distant embankments at the south of the works area. In addition a temporary bridge over the river south of the town will be required to access embankments on the left bank of the river. It is not anticipated that any material encountered during the construction works will be so wet that it would require mechanical dewatering.

Where possible, excavated material will be incorporated into the embankments and final landscaping of the works area or spread locally. This will depend however on the suitability of the excavated material, and unsuitable material will be removed off site for disposal in permitted facilities. Any material requiring disposal offsite will be disposed of at a permitted licensed facility based on its level of contamination.

Material dredged from the river bed will be very wet. It is expected that stockpiling will reduce the water content to an acceptable limit for transport.

The commitments to restoration and aftercare are as follows:

- During all stages of construction within the site, all reasonable measures will be adopted to confine workings to within as defined a construction corridor as possible, so as to minimise impacts on the surrounding environment;
- The excavation programme will be designed to take cognisance of the soft ground conditions existing within parts of the site;
- The construction programme and measures will also take account of the environmental sensitivities existing within the site;
- On cessation of works, the lands within the works footprint will be landscaped to a pre-construction landform, sympathetic to the surrounding landscape character;
- All exposed soil surfaces will be seeded; and
- The OPW will work in association with the environmental consultants to ensure that all appropriate mitigation measures are carried out in accordance with this EIS.

## 2.9 Construction Environmental Management Plan (CEMP)

A Construction Environment Management Plan (CEMP) will be drawn up prior to the commencement of construction activities, in order to minimize the impacts to the environment during construction. The CEMP will detail the allowable working day, construction traffic, parking arrangements, requirements of contractors and will incorporate environmental protection measures and will be included as a part of the contract for any part of these works. The CEMP will be a live document and will be reviewed and updated as necessary.

## 3 EXAMINATION OF ALTERNATIVE OPTIONS

### 3.1 Project History

A Flood Relief Feasibility Study was undertaken by the OPW for the town of Templemore, County Tipperary. The purpose of this engineering study was to identify, if possible, a preferred flood relief scheme to reduce the frequency or impact of flooding in the town, and to develop the scheme to outline design. The process of identifying the preferred scheme included an assessment of the range of measures and scheme options available to determine their technical, economic and environmental viability.

TOBIN Consulting Engineers was appointed by the OPW as a specialist environmental consultant to assist the OPW with the environmental aspects of the engineering study. The environmental aspects of the study included identification of any environmental constraints and assessment of the environmental impacts of the possible flood relief options. TOBIN Consulting Engineers prepared a Constraints Study to identify any key environmental issues that exist within the study area and that may be impacted upon by possible flood relief measures. The results and constraints determined in the Constraints Report informed the final flood relief scheme design by the OPW.

The Environmental Impact Statement (EIS) examines the impacts of the preferred flood relief scheme option (Viable Option 4- Long Diversion). To adequately consider the potential environmental impacts of the Long Diversion scheme each section of the EIS considers using the new channel for two scenarios;

- A. The Mall River will be left in its current channel route, with the new channel taking only flood flows;  
and
- B. The Mall River is diverted in full to the new channel.

### 3.2 Alternative Options

#### 3.2.1 *Choice of Inlet Option*

The inlet configuration sets important rules on how a flow diversion will operate, such as the amount of water that will need to run down the river before the need to bring the diversion into use. As part of this project design, six different options were considered. The final option though, minimises land-take and has other features which make it the preferred choice.

#### 3.2.2 *Viable Drainage Scheme Options*

The flood situation in Templemore has been subjected to detailed analysis. Engineering and environmental studies have concluded that viable flood relief scheme options do exist and that these require a diversion of flows through the town.

Sufficient space is available for two possible diversion routes, these are:

- A 805m Long Diversion, discharging approximately 230m downstream of Small's Bridge; and
- A 380m Short Diversion, discharging just upstream of the Mall Road private bridges.

The upstream stretch of both flood-diversion routes are the same with different works required in each down-stream.

The two diversion route options were subsequently divided into four potentially viable options for consideration. Viable Option 1 transports peak flows down a 6.5m-base-width Long Diversion whereas Viable Option 4, has a 7.5m-base-width and transports the entire river's flow down the Long Diversion; possibly reduced by a Sweetening Flow. Viable Option 2 transports peak flows down a 6.5m-base-width Short Diversion whereas Viable Option 3, has a has a 7.5m-base-width and transports the entire river's flow down the Short Diversion; possibly reduced by a Sweetening Flow.

The four viable options can be summarised in terms of their combination of works within the town, namely, diversion, excavation and works at private access bridges as follows:

1. Viable Option 1: A flood-defence line upstream of the town, the Long Diversion, excavate the river to just upstream of Shortt's Bridges and raise the decks of the three private access bridges.
2. Viable Option 2: A flood-defence line upstream of the town, the Short Diversion, excavates the river to above the three bridges and replaces them with one bridge.
3. Viable Option 3: Same as option 2, only the entire river is diverted. This avoids the risk of riverside walls along the by-passed stretch collapsing and causing flooding.
4. Viable Option 4: Same as Option 1, only the entire river is diverted. This avoids the risk of riverside walls along the by-passed stretch collapsing and causing flooding.

Options 2 and 3 employ a Short Diversion that rejoins the river approximately 110m upstream of Small's Bridge. These have however, significant channel works in that area, a total river length of one third of a kilometre. They also both require two private access bridges to be removed and for Small's Bridge to be converted into a 4m-wide flume. This has unfortunate consequences of inducing Critical Flow conditions through the bridge and the need to dissipate the resulting extra flow energy immediately downstream, within the river. This gives rise to Health and Safety concerns if someone was unfortunate to fall in, therefore long stretches of high walls or railings along both banks of the river and the provision of lifebuoys would be necessary.

Options 1 and 4 employ a Long Diversion. Option 1 sends flood flows down a 6.5m-base-width and requires the extension of the Richmond Road culvert downstream by approximately 60m and at Church Avenue, culverts under the small access road, the avenue and a private garden to its south. Option 4 uses the same diversion (with a 7.5m-base width) for full river flows, possibly reduced by a Sweetening Flow in the existing river channel. Option 4 requires culverts at Richmond Road and Church Avenue, two 4m field access bridges, one in each area of open land below the new bridges. Because the bypassed stretch of the Mall River is no longer required with Option 4, there is no need to sluice its drainage outlets. In addition, Option 4 has no residual risks in that area relating to the collapse of riverside walls. Another advantage to Option 4 is that it does not need river works or defensive walls in the area around Small's Bridge and adjacent properties. In terms of 'all in cost' Option 4 is the Preferred Viable Option for dealing with flooding in Templemore.

The preferred flood relief scheme option is Viable Option 4: Long Diversion.

### *3.2.3 Disadvantages of Sweetening Flow in old channel*

Viable Options 3 and 4 described above, both consider diverting the entire river down the new channel while potentially leaving a Sweetening Flow of  $0.5 \text{ m}^3/\text{s}$  within the old river channel. This EIS considers the Sweetening Flow as part of the preferred flood relief scheme option, Viable Option 4. It is however considered that the diversion of a Sweetening Flow will act essentially as an abstraction to flows within the new channel. If the Mall River continues to receive discharges from storm runoff and other sources, by reducing its waste assimilation capacity, this abstraction could potentially impact the Mall River's ecological status; it could become more polluted. In addition, as this level of abstraction is significant in terms of low summer flows, the hydro-ecological impacts on the diversion channel could be severe, as it would dry-out each year.

If a Sweetening Flow remains within the flood relief scheme, there would only be river flow in the diversion channel for approximately 100 days a year, and clearly for a greater overall total in a wet year. As these days will not be successive, it is likely to lead to environmental issues, where, each year, aquatic vegetation and invertebrates, etc. get to colonise the diversion only to die out during fine weather; when flow from the catchment drops below  $0.5 \text{ m}^3/\text{s}$  on a sustained basis, and only the existing river channel would remain wet.

Also Viable Option 4 involves a Long Diversion. The Long Diversion needs to trench across Church Avenue. Here, a Combined Sewer is the overflow from a chamber just to the west. This Combined Sewer cannot be re-laid along the western side of Church Avenue to gain elevation, nor can it be strapped to the side of the bridge as it is approximately 1.5m below the road. The option being considered allows this overflow discharge directly to the new channel. To ensure appropriate flow levels

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are in place in order to enable the diversion channel to 'clean itself', keeping a Sweetening Flow, which would act as an abstraction to the new channel flow, is not suitable.

Given that the flow exceeded 95% of the time is only 0.004 m<sup>3</sup>/s (about 18 days a year has less flow), it is not possible to divide the low flows between two channels and keep them both environmentally healthy.

Fundamentally, a Sweetening Flow is not sustainable and following consideration it will not be included within the preferred scheme; Viable Option 4.

## 4 POLICY PLANNING AND DEVELOPMENT CONTEXT

### 4.1 Planning and Development Context of Development

#### 4.1.1 National Level

The Office of Public Works (OPW) is the body through which the Irish Government exercises its statutory responsibilities under the Arterial Drainage Act 1945, and the Amendment to the Arterial Drainage Act 1995, in respect of river drainage and flood relief.

Templemore Town has been subject to significant flood events (detailed previously) which have caused significant economic impacts. The proposed scheme is a response to these risks, to provide flood protection up to the 1:100 year event.

In September 2004 the Government confirmed the OPW as the State's lead agency on flooding, to be tasked with delivering an integrated multi-faceted programme aimed at mitigating flood risk and impacts. The selected flood relief scheme for Templemore Town follows investigations detailed in the constraints reports over the last number of years to determine the best flood relief option which balances economic, environmental and technical issues; and consultation with Tipperary County Council (including previous liaison with North Tipperary County Council and Templemore Town Council), the Department of Environment, Community and Local Government (DoECLG) and Inland Fisheries Ireland.

National guidelines (2009)<sup>1</sup> entitled *The Planning System and Flood Risk Assessment – Guideline for Planning Authorities*, have been published by the OPW and Department of Environment, Heritage and Local Government (DoEHLG), for building on river floodplains.

These guidelines require the planning system at national, regional and local levels to:

- (1) Avoid development in areas at risk of flooding by not permitting development in flood risk areas, particularly floodplains, unless where it is fully justified that there are wider sustainability grounds for appropriate development and unless the flood risk can be managed to an acceptable level without increasing flood risk elsewhere and where possible, reducing flood risk overall;
- (2) Adopt a sequential approach to flood risk management based on avoidance, reduction and then mitigation of flood risk as the overall framework for assessing the location of new development in the development planning processes; and
- (3) Incorporate flood risk assessment into the process of making decisions on planning applications and planning appeals.

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<sup>1</sup> <http://www.flooding.ie/media/The%20Planning%20System%20and%20Flood%20Risk%20Management.PDF>

#### 4.1.2 Regional Level

Tipperary County Council does not have any specific plans relating to existing flood risks. General policies detailed are aimed at minimising risks of flooding and are detailed below.

Policies detailed below are taken from the North Tipperary County Development Plan (2010- 2016).

##### *Policy ENV 18: Flooding*

It is the policy of the Council to implement the recommendations of the DoEHLG Guidelines entitled *The Planning System and Flood Risk Management* in the management of development within the County.

##### *Policy ENV 19: Protection of the Flood Plain*

It is the policy of the Council to operate a sequential approach to the assessment of proposed developments on established flood plains. No development shall be permitted on such lands, in the absence of a justification test which demonstrates that the proposals comply with the DoEHLG guidelines on Flooding entitled *The Planning System and Flood Risk Management*. Where development is considered appropriate adjacent to the existing flood plain and would result in the alteration of natural drainage systems, the Council will require mitigation measures to minimise the risk of flooding.

##### *Policy ENV 19a: Flood Alleviation and Mitigation Measures*

It is the policy of the County Council to ensure that development does not increase the risk of flooding, and development in low-lying areas or known flood plains will be required to produce a Site Specific Flood Risk Assessment and a Justification Test to demonstrate that the development will not contribute to flooding within the immediate or wider catchment area. Regard will also be had to Policies ENV 18 and ENV 19 and to the *Planning System and Flood Risk Management Guidelines*.

##### *Policy SERV 9: Flood Risk Assessment*

The Council will require a comprehensive Flood Risk Assessment for proposals in an area at risk of flooding, adjoining same or where cumulative impacts may result in a flood risk elsewhere. Regard will also be had to Policies ENV18 and ENV19 and to the *Planning System and Flood Risk Management Guidelines*.

#### 4.1.3 Local Level

The Templemore and Environs Development Plan 2012–2018 sets out the framework for proper planning and sustainable development and use of land within Templemore Town and Environs up to 2018 and beyond.



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Objective WS9: Floods Directive

It is an objective of the Council to implement the Floods Directive at a local level, and to have regard to the *Preliminary Flood Risk Assessment (PRFA)* and the *Catchment-based Flood Risk Assessment and Management (CFRAM)* when these documents are finalised.

Objective WS10: Flood Relief Measures

It is an objective of the Council to co-operate with the OPW and seek the implementation of the flood relief measures which will serve to protect the town for potential flood events. On implementation of the scheme, it is the Council's intention to re-examine the zoning objectives of the plan and in particular lands, which will be afforded flood protection close to the town centre.

Objective WS10a: Flood Risk Management

It is the policy of the Council to implement a sequential approach to the assessment of development in area of Flood Risk. Development shall not be permitted, unless it is demonstrated that the development satisfies the justification test as outlined in *Planning System and Flood Risk Management Guidelines – Guidelines for Planning Authorities, 2009*. The Council will require proposals, on a site specific basis and where deemed necessary, to be accompanied by a Flood Impact Assessment to enable the Council make a full determination of the risk of development proposals.

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## 5 HUMAN BEINGS

### 5.1 Introduction and Existing Environment

Human beings are a vital element to be considered as part of the Environmental Impact Assessment process. The purpose of this assessment is to examine the existing environment, the current and the potential impacts of the proposed flood relief scheme on human beings. This will focus on population, employment, tourism and amenities during the construction and operational phases of the proposed works.

Templemore Park is located just northwest of the Templemore Town centre. This town park comprises a disused swimming pool, athletic track, playing fields and a pitch and putt course. The lake within the park is utilised by anglers and is host to various bird wildlife. The Mall River, which is a vital tributary to the River Suir, contains spawning Salmon and Trout and other species of fish. The Mall River does not currently provide any known employment in the town.

A Slí na Sláinte route is located within the town centre. Templemore Park contains walking paths which traverse the wood and circle around the lake and contains an unmarked Slí na Sláinte route which follows the path along the lakeshore.

### 5.2 Potential Impacts and Mitigation Measures

The site of the proposed flood relief scheme is located upstream, downstream, and within the town of Templemore. The construction of this scheme will therefore have impacts on residents and businesses within the town and on the properties and lands affected by the construction of the proposed scheme. The day-to-day operation of the construction activities, including the workings associated with all machinery and on-site vehicles, and how visitors are to present and conduct themselves when undertaking visits to the site, will be in compliance with all health and safety laws and regulations pertaining to the OPW's Safety Statement. The construction activities will generate and retain employment either directly in the construction of the flood relief scheme or in the supply of services, machinery and construction materials. The proposed flood relief scheme will have minimal construction impacts on tourism and amenities in the area surrounding the scheme.

The proposed flood relief scheme will have an overall positive impact on the population of Templemore and its environment. The proposed flood relief scheme will not generate any significant employment activities during its operation. It will have a positive long-term impact on landuse in the area. This is in terms of flood relief. Minor changes to the current landuse will occur but these proposals are required in order to protect properties and in the long-term will have a positive effect on the existing dwellings.

The proposed works will be developed in a manner such that the impact on human beings is minimised. Access ramps will be constructed on some of the proposed embankments to maintain access to properties and land. Access to existing properties will be maintained during the construction and operational phases of the project.

### 5.3 Conclusions

The proposed flood relief scheme will have an overall positive impact on the population of Templemore and its environment.

## 6 TERRESTRIAL ECOLOGY

### 6.1 Introduction and Existing Environment

This chapter was prepared by TOBIN Consulting Engineers and considers terrestrial ecology. It involves the evaluation of the potential impacts from the proposed scheme and details appropriate mitigation where an impact is predicted. The assessment of aquatic ecology is addressed separately in Chapter 7 and was conducted by ECOFACT Consultants.

The proposed flood relief works on the Mall River at Templemore Town will potentially impact local terrestrial ecology.

Two flood relief scheme scenarios were considered in this ecology assessment:

- A. The river will be left in its current channel route, with the new channel taking only flood flows; and
- B. The river is diverted in full to the new channel.

The assessment was informed by a detailed desk survey, field surveys and consultation with relevant authorities. The objectives of these assessments were to identify baseline ecology features, identify the key ecological receptors and to assess the likely impacts of the proposed works on terrestrial ecology.

Field surveys were conducted in 2009 and 2014 and consisted of a habitat assessment including rare and protected species of flora, a faunal assessment including birds, mammals (including otter and bats), amphibians, reptiles and invertebrates.

Designated conservation sites within a 15km radius of the proposed development were identified. These sites included:

- Templemore Wood (proposed Natural Heritage Area (pNHA));
- Kilduff, Devil'sbit Mountain (Special Area of Conservation (SAC/NHA));
- Ormond's Mill, Loughmore, Templemore (pNHA);
- Cabragh Wetlands (pNHA);
- Aghsmear House (pNHA); and
- Lower River Suir (SAC).

The habitat assessment identified nine habitat types within the works area of the proposed scheme. The dominant habitat types present are wet grassland, buildings and artificial surfaces and improved agricultural grassland.

Otters are known to be present in the Mall River area and an Irish hare was sighted in wet grassland within the study area. Bats are present in the area although no signs of roosting bats were recorded in the vicinity of the site including bridge structures and riparian habitats which potentially will be disturbed by proposed works.

## 6.2 Potential Impacts and Mitigation Measures

There are six nature conservation designated sites located within 15km of the site. No impacts are likely to Kilduff Devilsbit Mountain (SAC and NHA), Ormond's Mill (pNHA), Aghsmear House (pNHA) or Cabragh Wetlands (pNHA). Templemore Wood (pNHA) is of National importance and occurs immediately adjacent to proposed embankments in an area of amenity parkland to the south of the site. Mitigation is detailed and includes the avoidance of direct impacts to this pNHA. In addition construction work practises will aim to avoid/ minimise indirect impacts such as silt runoff and disturbance to this area and associated species.

A Natura Impact Statement (NIS) has been prepared with respect to potential impacts to the designated features of the Lower River Suir SAC located 22km downstream of the proposed works. The NIS concludes that following implementation of precautionary water pollution control measures, it is considered that there would be no significant direct or indirect impacts, alone and/or in combination with other plans and projects on the integrity of relevant European Sites. Such mitigation measures include, but are not limited to, the production of a Construction Environmental Management Plan (CEMP) prior to commencement of works on-site, design and implementation of silt/sedimentation traps, surface water quality monitoring and supervision by an Ecologist.

The key ecological receptors determined regarding potential impacts from the proposed scheme include; the Mall River (river and riparian woodland habitat), aquatic fauna including salmon, white clawed crayfish, brook/river lamprey and eel, along with Templemore Wood pNHA. The key impacts identified are affects on aquatic ecology (refer to Chapter 7). Mitigation measures are proposed to limit impacts on identified ecological receptors to include replanting, water pollution protection measures, monitoring and supervision by an Ecologist (during and post works) to ensure effective habitat reinstatement and use of new culvert by terrestrial and aquatic species.

The main terrestrial ecology impacts identified are loss of approximately 0.5ha of wet grassland and approximately 1325m of hedgerow/ treeline habitat including trees growing adjacent to the River Mall. These habitats are not identified as key ecological receptors. It is proposed to replant areas where

feasible (e.g. deposition areas) with similar species. Species like otter and riparian birds would be expected to use the new culverts once natural vegetation establishes and aquatic species re-establish in the new river habitat.

### 6.3 Conclusions

The key ecological impacts associated with the proposed scheme are affects on aquatic ecology (refer to Chapter 7).

In terms of terrestrial ecology including river habitats, the key conclusions (including any residual impacts) include the following.

Direct negative impacts will be avoided to Templemore Wood (pNHA) as works are outside the site boundary. No works are proposed for Templemore Lake and no impacts on this water body are predicted.

Short term temporary disturbance is likely to occur to local fauna including otter, amphibians and birds during the works phase although impacts are not likely to be significant.

There will be direct permanent impacts to areas of wet grassland in Shortt's Field and south of Patrick Street. Habitat loss is likely to occur at this location due to use as a deposition area during the works, but a degree of habitat recovery may take place post construction around the new channel.

Loss of riparian woodland and sections of hedgerow during construction will be compensated where possible by natural re-growth or if required native tree planting, the mix of which will be similar to existing tree/ shrub species. The existing riparian woodland strip along much of the Mall River in the vicinity of the works footprint will be retained except where ongoing maintenance work is required

It is recognised that the proposed scheme can be constructed while avoiding significant impacts on local terrestrial ecology by adhering to the design, construction and operation phase mitigation. If the suggested mitigation measures are implemented there should be no significant residual impacts from the proposed works to local terrestrial ecology.

## 7 AQUATIC ECOLOGY

### 7.1 Introduction and Existing Environment

ECOFACT were commissioned to carry out an aquatic ecological assessment of the Mall River corridor, in the vicinity of the proposed Templemore Town, County Tipperary. This was prepared as part an overall Environmental Impact Assessment (EIA) of proposed Office of Public Works (OPW) flood relief works on the Mall River channel. The proposed works will involve river engineering works to the channel to include the provision of a bypass culvert to divert flood waters away from the existing channel. Two flood relief scheme scenarios were considered in this aquatic ecology assessment:

- A. The river will be left in its current channel route, with the new channel taking only flood flows; and
- B. The river is diverted in full to the new channel.

The Mall River is part of the Suir catchment and rises approximately 6km upstream of Templemore Town in the vicinity of the Devilsbit Mountains Special Area of Conservation (SAC); however the river itself is not designated as a conservation site. The Templemore Woods proposed Natural Heritage Area (pNHA) lies adjacent to Templemore Lake, directly north of Templemore Town. The River Suir is designated as a SAC downstream of Thurles, County Tipperary, approximately 16km downstream from the confluence with the Mall River.

The Mall River corridor was found to be highly modified and has been deepened and chanelised in the past. Most of the affected stretch is walled and does not have natural riparian areas. In-stream physical diversity is also reduced, and water quality is unsatisfactory and was generally rated as being moderately polluted or of poor status. However, despite these limitations the Mall River was found to contain three species listed on Annex II of the EU Habitats Directive; brook lamprey, white-clawed crayfish and Atlantic salmon. Although densities of these species were low the presence of these species is significant. The river also contained good numbers of juvenile and adult brown trout, despite the degraded physical and biological conditions. The protection of these species and the improvement of aquatic habitats and water quality within the river are considered to be the primary considerations in regard to the conservation aspects of the Mall River corridor.

### 7.2 Potential Impacts and Mitigation Measures

Mitigation measures will be required for the conservation of sensitive aquatic ecological receptors and to minimise the predicted impact of the proposed works. It was concluded that both scenarios can be constructed while avoiding significant impacts on aquatic ecology by adhering the design, construction

and operation phase mitigation. However, the chosen scenario is Scenario B and this has been fully assessed.

### 7.3 Conclusions

The proposed flood relief scheme can be constructed while avoiding significant impacts on aquatic ecology by adhering the design, construction and operation phase mitigation. It is predicted that Scenario B would bring permanent significant benefits to aquatic ecology through the creation of a physically and ecological diverse new channel.



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## 8 SOILS AND GEOLOGY

### 8.1 Introduction and Existing Environment

This chapter addresses the soil and geology aspects of the environment and assesses the impacts of the proposed flood relief scheme on the existing soil, subsoil and bedrock environments. In this Chapter the potential impact on the geological environment resulting from development of this area for the flood relief scheme are assessed and mitigation measures are proposed to reduce any significant impacts. The information available is considered sufficiently detailed to adequately characterise the geological environment of the site and its surrounds.

The river catchment varies dramatically from the Devilsbit Mountain to within the River Valley and around Templemore Town. The topographic nature of the project and surrounding lands is generally of low - moderate relief and gently undulating.

Reference to the Environmental Protection Agency (EPA) data, indicates that the principal soil type along the Templemore River is comprised of poorly drained soils. The underlying geology is comprised of limestone based on published information from and site observations. Reference to the National Aquifer Map prepared by the Geological Survey of Ireland indicates the limestones are classified as locally important Aquifers. No major springs were encountered during the field surveying along the Mall River. Water usage within the area is primarily supplied by Tipperary County Council from their groundwater water abstractions at the College Hill public water supply, approximately 3km north of the town. There are no public water supplies within 1km of the proposed scheme. Based on a review of available data there are no private wells along the proposed scheme.

The Geological Survey Ireland (GSI) provides scientific appraisal and interpretative advice on geological and geomorphological sites, and is responsible for the identification of important sites that are capable of being conserved as Natural Heritage Area (NHA). The National Parks and Wildlife service (NPWS) of the Department of Arts, Heritage and the Gaeltacht (DAHG) has the responsibility of designation and management of sites, with appropriate advice from GSI. At present, the GSI have not compiled a list of sites proposed for designation as Natural Heritage Areas (pNHAs) for Tipperary. There are no sites of geological interest within the proposed scheme development boundary.

An evaluation undertaken to determine the presence and extent of potentially contaminated land in the proposed scheme study area is based on the identification of potential sources, pathways and receptors along the line route. If all three elements (source, pathway and receptor) are present, there is a contaminant linkage and there is a potential for the contamination to represent a risk to the receptor(s) and for the site to be considered as contaminated.

Two sites were identified as having a potential for land contamination in the immediate area of the proposed scheme alignment. The sites are a garage and infill area to the north of Patrick Street and an infill area to south of Patrick Street. No evidence of contamination was noted. In addition to specific sites, it should be noted that there is a general potential for pollution from entrained agricultural chemicals on present and past agricultural land, and from buried material which may occur almost anywhere along the proposed scheme.

### Development Characteristics

The Office of Public Works (OPW) has designed for a flood relief scheme for Templemore Town in accordance with the Arterial Drainage Act (1945) and the Arterial Drainage (Amendment) Act (1995).

In summary, the proposed Scheme will comprise of:

- Embankments upstream of the town, together with a ramp on Blackcastle Road, to prevent water flooding across the fields and down the Blackcastle Road into the town;
- A diversion channel to take the river from the embankments upstream of the town, through the town, to downstream of Small's Bridge;
- Walls and embankments upstream of Small's Bridge to protect properties;
- An embankment adjacent to Railway View Estate;
- Channel widening and regrading works within the Mall River south of Templemore Town; and
- Maintenance of channel and flood relief works.

## 8.2 Potential Impacts and Mitigation Measures

Two flood relief scheme scenarios were considered in this assessment:

- A. The river will be left in its current channel route, with the new channel taking only flood flows; and
- B. The river is diverted in full to the new channel.

It should be noted that the potential impacts of a full diversion or partial diversion are similar in both scenarios and are therefore assessed together.

During construction of the scheme, the potential impact on the geological environment will be low. Implementation of the proposed scheme will result in the removal of made ground and soils from parts of the subject site to facilitate the construction of the diversion channel and other components proposed. This is a direct, permanent impact but is not considered to be a significant negative impact. The proposed scheme will have no impact on the surrounding geological environment; therefore there will be no short to long-term impacts outside the site boundary.

Potential short term impacts during the construction phase include activities associated with the movement, excavation and disposal of soils, contaminated materials (if present) and bedrock, compaction of soils and temporary construction of temporary access routes. It is considered that the vast majority of this material will consist of sub-soil and naturally excavated alluvial soils, till deposits and bedrock.

As it is anticipated that >95% of the excavated materials would comprise natural uncontaminated soils, there would be no contamination restrictions on the ability of landfills to accept the materials. Made ground material will be taken off-site and deposited at an appropriately licensed/permitted waste management site.

### Constructed Embankments

It is proposed to construct approximately 727m of embankments to prevent water flooding residential dwellings. A total of approximately 5,053m<sup>3</sup> of material will be required for this purpose.

It is currently proposed that the excavated natural subsoil material, where possible, will be reused as fill material for flood embankment purposes. The overall impact of backfilling and landscaping of indigenous subsoil (in accordance with general engineering practice) on completion of the scheme is expected to be imperceptible.

It is envisaged that the proposed scheme would take place in a phased manner, thus reducing the area of the site that will be stripped at any one time. The diversion of flood flows along the new channel will have a moderate/high beneficial impact along the existing river course where buildings and roads are currently being eroded and undermined by flood flows.

Provided the mitigation measures described below are implemented, it can be concluded therefore that the construction of the proposed scheme will have no significant negative impact on the soil or geological environment.

Due to the nature of the development, the proposed scheme will have a neutral residual impact on the soils and geology environment.

Potential impacts include erosion of the embankment by inappropriate landuse. Potential impacts which may affect the function of the embankment include erosion by animals, borrowing animals, trees and settlement. Key to this is the geotechnical design and a long term management plan.

Mitigation measures are designed to address the temporary impacts associated with the construction phase of the flood relief scheme. Works will be undertaken in accordance with CIRIA 650 'Environmental good practice on site'.

Planned construction works will be carried out with the minimum disturbance of soils. It is envisaged that topsoil would be retained on site where possible as fill material and for landscaping purposes. The use of excavated materials in this manner ensures that the potential environmental impact of the scheme is minimised, as the requirement to import significant amounts of materials from outside the site will be minimised, as will the requirement to transport material off the site.

To minimise any impact on the underlying subsurface strata from material spillages, all oils, solvents and paints used during construction, will be stored within specially constructed dedicated temporary bunded areas.

Refuelling of construction vehicles and the addition of hydraulic oils or lubricants to vehicles, will take place in a designated area, away from surface water gullies or drains. Spill kits and hydrocarbon adsorbent packs will be stored in this area and operators will be fully trained in the use of this equipment.

The combined application of these measures will ensure that inputs to, and subsequent contamination of, the soil environment do not occur during normal and/or emergency conditions.

Settlement of runoff and groundwater from the construction site will be required as part of the site works. Works will be undertaken in accordance with CIRIA 650 'Environmental good practice on site'. Where excavation are undertaken <5m from existing structures, the design may require an number of measures to provide stability of the excavations including sheet piling and auger piling adjacent to existing structures. A detailed condition survey should be conducted on properties within 5m of the diversion prior to and post construction.

### 8.3 Conclusions

In terms of Soils and Geology the potential construction impacts for developing the flood relief scheme are the same for both scenarios as mentioned above. The Implementation of mitigation measures will be required to ensure that the river is not impacted during the construction and operational works. No residual impacts to the soil and geology environments are foreseen during the operational phase of the proposed flood relief scheme.

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## 9 WATER

### 9.1 Introduction and Existing Environment

This chapter assesses the impact of the proposed flood relief scheme on the water environment during the construction and operational phases and addresses and mitigates any possible sources of pollution from each phase. This section describes the hydrological setting of the site and refers to the information available from a number of published sources.

The study area is situated within the catchment area of the Mall River. The principal area is the channel, floodplain and immediate surrounding areas of the Mall River extending along the main channel upstream and downstream of Templemore Town. The river is fed from groundwater baseflow and surface water run-off from within its catchment. The source of the Mall River is in the Devilsbit and Kilduff Mountain ranges located to the northwest of the subject site.

The Mall River is a tributary of the River Suir. The Mall River joins the River Suir downstream of Cloone Bridge at Greenwood.

Within the specified study area there is one large surface water feature of note. There is an artificial lake to the north of Templemore Town that has been developed as part of Templemore Park. Inflows into this lake and outflows (to the Mall River) are controlled by manually operated sluices

The proposed scheme will require the diversion of a number of services including foul and storm water diversions. At present a Combined Sewer Outfall (CSO) discharges to the Mall River adjacent to Smalls Bridge. While the frequency of discharge to the Mall River is unknown, it is understood to discharge storm flow from buildings, roads and hardstand areas to the west of Templemore Town. As no upgrade works are planned for the CSO, it is proposed to connect the CSO to the full or partial diversion. The impact of the full diversion would have a negligible/neutral potential impact on the Mall River. A partial diversion would have a minor negative potential impact on the scheme in comparison to the existing situation. This is principally due to the potential discharge of the CSO to an empty channel. CSOs typically coincide with periods of high river flows which would mitigate the potential impact however the discharge characteristics are not known for the CSO.

Relatively recent flooding is reported and documented for the Mall River. Floodwaters frequently exceed the riverbank height along the river course upstream of Templemore. Flooding of roads normally occurs about once a year. Flooding of properties has occurred three times in the last 15 years, with the November 2000 flood event being the most severe, resulting in 39 properties being flooded. The December 1968 flood produced the worst flooding in living memory causing water levels about 0.5m higher than those experienced during the November 2000 flood event in the George's Street area.

The extent of flooding and flooding mechanisms is discussed in more detail in the Office of Public Works (OPW) Engineer's Report which is available from the OPW.

The EPA Water Quality Database indicates that the water quality in the River Suir varies from Unpolluted to Moderately Polluted. In relation to protected areas under the Water Framework Directive, it indicates the following:

- There are no 'Registered Protected Areas'(RPA) nutrient sensitive rivers at or downstream of the proposed development;
- There are RPA habitat rivers at or immediately downstream of the proposed scheme; and
- There are no RPA nutrient sensitive lakes at or downstream of the proposed scheme.

Based on the available information, the Mall River catchment is 'at Poor Status' in relation to Surface Water. It is proposed to restore the Mall River to good status by 2021. Based on the available information, the groundwater is 'at Good Status'. It is proposed to maintain the groundwater at good status. The main pressures on the Mall River are agricultural and waste water treatment plants (Suir upper water management Unit - SERBD, 2010).

## 9.2 Potential Impacts and Mitigation Measures

Two flood relief scheme scenarios were considered in this assessment:

- A. The river will be left in its current channel route, with the new channel taking only flood flows; and
- B. The river is diverted in full to the new channel.

It should be noted that the potential impacts are similar in both scenarios and they are therefore assessed together below.

### Construction Phase Potential Impacts

The construction phase will entail the excavation of material for the installation of the diversion, installation of the diversion and construction of walls and embankments and construction of weir, channel constriction, road ramp, erosion protection works, channel widening and channel regrading, possible bridge works, and channel wall works. During the construction period, potential exists for discharge of sediment laden water from the site. This sediment laden water will be generated due to exposure of soil surfaces.

There is also the potential for a range of other pollutants to enter the river during construction work. Such pollutants would include uncured concrete, oils and construction debris. Machinery working within

and near the river has the potential to produce pollutants both directly (from leaking fuels, oil spills, etc.) and indirectly, as a result of the drainage maintenance work (i.e. suspended solids, leached pollutants etc.). Any pollutants or accidental spills could potentially run untreated into the Mall River and subsequently the River Suir with serious negative consequences.

Mitigation measures will be undertaken to alleviate all potential impacts including silts traps. Details are outlined below.

#### Operational Phase Potential Impacts

Potential impacts on the existing fisheries have been identified and mitigated in consultation with the Inland Fisheries Ireland including stranding of fish, modification of watercourses and impacts on low flows. Both the full diversion and partial diversion are analysed below.

#### Scenario A: Partial diversion into new channel (Flood Flow Diversion)

The potential impacts of a storm flow diversion are similar to a full diversion scheme. By preventing extreme flood water events from flooding properties, there will be a positive impact on the various properties within Templemore Town which have been flooded on a number of occasions within the last 150 years.

By diverting the storm flow from flooding the town to a downstream location, the diversion has the potential to increase flood events at discharge point. This diversion will have the effect of removing the man made flow restriction (bridges, roads and buildings) on the Mall River.

As no upgrade works are planned for the Combined Sewer Outfall (CSO), it is proposed to connect the CSO to the new diversion channel. A partial diversion would have a minor negative potential impact on the scheme in comparison to the existing situation. This is principally due to the potential discharge of the CSO to an empty channel. CSOs typically coincide with periods of high river flows which would mitigate the potential impact however the discharge characteristics are not known for the CSO.

#### Scenario B: Full river diversion into new channel

This new river, thalweg and river corridor will take the waters to a point downstream of the town. The proposed diversion will have a capacity of 21.63 m<sup>3</sup>/s. By preventing extreme flood water events from flooding properties, there will be a positive impact on the various properties and water quality within Templemore Town which have been flooded on a number of occasions within the last 150 years. The proposed diversion will also have a potential positive impact on water quality. By diverting the flood waters via the diversion, potential contaminants located within the flood prone areas will not become entrained within the flood waters.

In addition during low flows the deepening of the river will have a minor beneficial impact on the low flows. Based on the hydrogeological characteristics of the soils and bedrock, low flow volumes may increase.

When the diversion is in use, there is a potential for channel bank erosion during flooding events at the discharge point. Potential erosion of the bank and channel at this point will be mitigated against by a combination of gabion baskets and rock riprap. Where appropriate, riprap will be used instead of gabions for bank armouring works. The provision of riprap has significant benefits for fish (O'Grady, 2006).

By diverting the storm flow from flooding the town to a downstream location, the diversion has the potential to increase flood events at discharge point. This diversion will have the effect of removing the man made flow restriction (bridges, roads and buildings) on the Mall River.

It is proposed to mitigate the potential impacts by improving flood defences at the downstream discharge point and by increasing the capacity of the river by channel widening. Mitigation measures are proposed and the resultant impacts will be localised and low impact. The full river diversion also has a minor positive impact by eliminating erosion of the banks of the existing Mall River, which are being eroded by flood surge flows.

As no upgrade works are planned for the CSO, it is proposed to connect the CSO to the new diversion channel. The impact of the full diversion would have a negligible/neutral potential impact on the Mall River. CSOs typically coincide with periods of high river flows which would mitigate the potential impact however the discharge characteristics are not known for the CSO.

#### Construction Phase Mitigation Measures

Many of the mitigation measures required are detailed in Chapter 7 - Aquatic Ecology and in Section 8 Soils and Geology of the main EIS. The construction phase of the proposed scheme will include the construction of the diversion channel and embankments and associated works adjacent to the Mall River, with channel works to the Mall River downstream. Without appropriate mitigation measures the magnitude of this impact is considered moderate. Appropriate mitigation measures are proposed to ensure that discharges from the site are managed and regulated, so as to reduce the magnitude of the potential impact.

With regard to on-site storage facilities and activities, any raw materials, fuels and chemicals, will be stored within structurally sound warehousing buildings and/or bunded areas if appropriate to guard against potential accidental spills or leakages. All equipment and machinery will have regular checking for leakages and quality of performance.



Appropriate measures are required during the construction period to ensure that all potential run-off is diverted through appropriate settlement tanks/grit traps.

### Channel Works

Measures to be used to protect the water environment during the construction works will follow the relevant section of the NRA's documents '*Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes*' (NRA, 2005). The fisheries board documents "*Maintenance and protection of the inland fisheries resource during road construction and improvement works. Requirements of the Southern Regional Fisheries Board*' (Kilfeather, 2007) and '*Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites*' (Murphy, 2004) would also be followed where relevant.

The river channel works will be carried out during dry weather and halted during heavy rainfall events to reduce suspended solids in the river and flowing to other parts e.g. the River Suir. Spoil and removed vegetation material from the river is to be stored no less than 5m back from the river and vegetation within this 5m buffer zone is to be retained, in order to reduce the run-off of suspended solids back into the watercourse.

All in-stream works must be carried out in accordance with an approved method statement and under the direction of Inland Fisheries Ireland personnel.

### Operational Phase Mitigation Measures

The design of the proposed scheme has taken into account the potential impacts associated with the construction and operation of the development on the water environment.

Routine channel maintenance would be conducted as part of the operational phase. Routine channel maintenance will be based on guidance from the Regional Fisheries Board Guidelines (Murphy, D.F, 2004) and the Fishery Guidelines for Local Authority works (1998) where appropriate.

## 9.3 Conclusions

The proposed flood relief scheme has developed a range of mitigation techniques to minimise impacts during construction and operational phases. These combined actions will provide benefits to the properties subject to flood both upstream of Templemore, within the town and to the water quality of the water down gradient of the town. Flood relief measures will remove the flow restrictions on the Mall River caused as a consequence of narrow bridges. Mitigation 'compensatory' measures will ensure that the diversion channel will not cause harm to aquatic life. The benefits of the proposed flood relief scheme far outweigh the short term disruption of the flood relief works. It is considered that the proposed works will have a moderate beneficial impact on the water environment overall.

No works are proposed for Templemore Lake and no impacts on this water body are predicted.

Monitoring

During the works undertaken at the outset of the project, strict monitoring of all potential polluting materials used will be maintained.

Reinstatement

Subject to the development of the site in lines with the proposed plans, there is no scope for reinstatement. The site will be permanently altered as a result of the scheme.

## 10 NOISE AND VIBRATION

### 10.1 Introduction and Existing Environment

An assessment of the potential noise and vibration impacts associated with the proposed Mall River (Templemore) flood relief scheme has been conducted on behalf of the Office of Public Works (OPW).

The purpose of this assessment has been to:

- Establish existing noise levels in the area into which the scheme will be introduced;
- Address potential noise and vibration impacts to sensitive receptors; and
- Identify relevant attenuation measures were deemed necessary.

This evaluation was prepared in accordance with the Environmental Protection Agency's (EPA) *Guidelines on the Information to be contained in Environmental Impact Statements* (March 2002) and *Advice Notes on Current Practice (in the preparation of EIS)* (2003).

#### Methodology

A number of factors can influence the potential for noise impact from any proposed development such as the duration of the works, noise characteristics and perception. The impact and its effects is a subjective consideration. In order to minimise the impact on sensitive receptors, the potential for noise and vibration impact has been assessed, and a range of mitigating measures, which will ensure that acceptable noise limits are met, have been provided.

Noise surveys were recorded on the 24<sup>th</sup> of April 2014 at three locations along the proposed scheme route. The locations of the noise monitoring surveys are shown in Figure 10-1.

Potential for noise and vibration impact in both the construction and operational phases of the proposed scheme has been assessed and specific noise and vibration mitigation measures have been presented.

#### Characteristics of the development

The proposed scheme involves:

- A 60m-long inlet channel with Debris and Gravel Traps and a small Drop Weir.
- A new outflow from the lake to run under Blackcastle Road to the inlet channel.
- A flood-defence line north of the town, in line with a culvert over the new diversion.
- Relocating the river by constructing a new 805m long channel (with a 7.5m base width) that begins in Short's field and finishes approximately 230m downstream of Small's Bridge.

- The road and access bridges need to pass the full Climate Change flow of 21.63 m<sup>3</sup>/s.
- As the bypassed stretch of the river is no longer required, there are no residual flood risks from wall failure, etc. and no need to sluice its drainage outlets.
- At Richmond Road and Church Avenue, separated by 8.4m, walls along both banks of the diversion both up- and downstream.
- An embankment on the left bank (east side) below properties at Small's Bridge.
- Re-grading 480m of the channel from the new confluence to 740m below Small's Bridge. Over the same reach, widening the river to 7.5m and a further 250m from there to transition back to the existing 4.5m base width.
- Defence embankment in the Railway View Estate area.
- To improve aeration and fish movement along the excavated river and diversion, a 'Fish Channel' (Thalweg) will be dug and partially backfilled with gravels. While this will likely be about 0.3m deep with a 2m wide bed and up to 5 to 1 side slopes, it will be designed and constructed in consultation with the region's Fishery Board and, along the channel, may be higher or lower and its width may vary.
- Future growth of woody vegetation in the area downstream of the town must not encroach the river or damage the flowing floodplain. The channel from the upstream works to where the Mall discharges to the Suir is being designated for maintenance.
- Impacts to the landscape will be reduced by using high quality finishes to works, grassed finishes to embankments and open channel sections, and by planting replacement and new vegetation; including in-channel, where possible.

### Baseline Noise Survey

Attended noise measurements were recorded during day time at each noise monitoring location. The measurements taken were deemed to be representative of typical noise levels in the vicinity of the noise monitoring locations. The equipment used during this survey was a Cirrus Optimus Type CR171 Type 1 sound level meter.

### Noise Survey Results

Noise surveys were undertaken at three locations along the proposed route of the scheme. These locations are as shown in Table 10-1 and Figure 10-1 overleaf.



Figure 10-1 Noise Monitoring Locations

Table 10-1 Noise Monitoring Locations

Baseline Noise Monitoring Locations	
Description	
NSL1	Private house at northern end of Má Téine Housing estate
NSL2	Private house on Talavara Road
NSL3	Outside St Sheehan's College on N62 National Primary Road

Table 10-2 Baseline Noise Monitoring Results

Baseline Noise Monitoring Results						
	Time	L <sub>Aeq</sub>	L <sub>A90</sub>	L <sub>A10</sub>	L <sub>Amax</sub>	L <sub>Amin</sub>
NSL1	12:35	47.0	35.7	47.2	77.0	28.8
NSL2	13:10	59.8	39.4	64.5	78.1	31.7
NSL3	13:44	62.2	49.1	65.1	83.9	41.3

### Location NSL1

Location NSL1 is a private dwelling situated at the Northern end of the Má Téine housing estate. This is the closest receptor to the proposed branch point from the existing natural river channel to the proposed realignment channel of the scheme.

The noise climate at NSL1 was characterised during the survey by birdsong, children playing on the grassed areas within the estate and by dogs barking. A train passed on the adjacent railway track along the river, and sounded its horn during the survey. Distant road traffic noise was audible from outside the estate.

### Location NSL2

Location NSL2 is a private dwelling on Talavara Road. The noise climate at this location was dominated by passing local traffic, birdsong and passing pedestrians. The noise climate at this location is dominated by road traffic noise as the elevated 64.5dB  $L_{A10}$  in Table 10-2 shows.

### Location NSL3

Location NSL3 is located outside St. Sheehan's College on the N62 near the point where the proposed scheme will traverse the N62 National Primary Road. Noise at his location was dominated by passing traffic on the N62, passing pedestrians and noise from Hassett's garage next door to the school. The noise climate at this location is dominated by road traffic noise as the elevated 65.1dB  $L_{A10}$  shows.

## 10.2 Potential Impacts and Mitigation Measures

During the preparation of this Environmental Impact Statement (EIS), an evaluation of the likely significant effects of all aspects of the proposed scheme has been undertaken. The noise and vibration characteristics of the proposed scheme will be divided between the construction and the operational phases. The principal predicted impacts for both noise and vibration will occur during the construction phase of the scheme works.

The construction phase will involve excavation and general construction activities and is discussed further below. The operational phase will not have any vibration impacts and will only have the potential for minimal noise impact, as described later in this chapter.

### Construction Phase Noise

The construction phase of the proposed scheme has the potential to temporarily increase noise levels at noise sensitive locations surrounding the proposed scheme route. The nearest noise sensitive locations are located approximately 10m from proposed works.

The lists of machinery as detailed in Tables 10-3 and 10-4 will form the significant plant which will be in operation during the construction phase.

**Table 10-3 Construction Phase Noise levels for trenching and channel excavation works**

BS5228 Calculations			Estimated Construction noise levels at varying distances		
Plant	Number of plant	Equipment on time	L <sub>Aeq,1hour</sub>		
			10m	20m	50m
Site Dump Trucks (x2)	2	25%	60	52	43
Articulated Dump Trucks (x2)	2	25%	62	54	45
Rigid Road Lorries (x3)	3	10%	52	44	34
25T Tracked Excavators (x4)	4	75%	65	57	48
14T Tracked Excavators (x2)	2	75%	54	46	37
Crane	1	20%	59	51	42
Concrete Pump	1	20%	59	51	42
Compressor	1	500%	57	49	40
<b>Combined Level dB L<sub>Aeq,1hour</sub></b>			<b>69</b>	<b>62</b>	<b>52</b>

**Table 10-4 Construction Phase Noise levels for bridging and culvert works**

BS5228 Calculations			Estimated Construction noise levels at varying distances		
Plant	Number of plant	Equipment on time	L <sub>Aeq,1hour</sub>		
			10m	20m	50m
Site Dump Truck	1	25%	57	49	40
Rock breaker on Tracked Excavator	1	25%	70	62	53
Crane	1	10%	59	51	42
Concrete Pump	1	75%	59	51	42
Compressor	1	75%	57	49	40
<b>Combined Level dB L<sub>Aeq,1hour</sub></b>			<b>71</b>	<b>63</b>	<b>54</b>

Predicted noise levels have been estimated using the methodology described in the British Standard BS5228: *Noise and vibration on construction and open sites*, Part 1 (2009). Predictions are based on typical equipment used during various construction stages of the proposed development. Predictions are based on a L<sub>Aeq,1hour</sub> value with all machinery listed in Tables 10-3 and 10-4 operating for a proportional periods of 1 hour.

The National Roads Authority (NRA) *Guidelines for the Treatment of Noise and Vibration in National Road Schemes* (2004) outlines recommended noise levels for construction noise during the construction of National Road Schemes. Table 10-5 overleaf details these recommended limits.



**Table 10-5 Typical Maximum Permissible Noise Levels at the Façade of Dwellings during Construction Activities**

Day & Times	L <sub>Aeq,1hour</sub> dB	L <sub>Amax</sub> dB
Monday – Friday (07:00 to 19:00 hrs)	70	80
Monday – Friday (19:00 to 22:00 hrs)	60 <sup>1</sup>	65 <sup>1</sup>
Saturday (08:00 to 16:30 hrs)	65	75
Sundays and Bank Holidays (08:00 to 16:30 hrs)	60 <sup>1</sup>	65 <sup>1</sup>

<sup>1</sup> Construction activities at these times, other than that required in respect of emergency works, will normally require the explicit permission of the relevant local authority. Source: NRA *Guidelines for the Treatment of Noise and Vibration in National Road Schemes* 2004.

The assessment is considered to be worst case as the temporary nature of the construction period and the variety of machinery used should ensure that no construction activity is operational for long periods at individual receptors. Similarly all of the plant listed in Tables 10-3 and 10-4, will not be in use at the same stage of construction, as it is a phased process. Hence, the noise impact to be expected at the nearest noise sensitive receptor would be less than the worst case scenario described in Tables 10-5 and 10-6. This construction phase will therefore result in a significant, temporary, transient noise impact.

#### Construction Phase Road Traffic Noise

There is a logarithmic relationship between noise levels and traffic volume whereby the higher the existing traffic volume, the greater the traffic increase required to produce a perceptible noise change. Typically, doubling the traffic flow produces a 3 dB(A) change in noise level. The maximum predicted HGV movements for the construction phase is of the order of 16 movements per day during the building of the access roads. After this there will be a reduced number of HGV movements for the remainder of the construction phase.

The increase in noise levels resulting from construction road traffic on nearby roads will not be significant based on the road traffic noise levels in the existing environment. There will be no night-time construction traffic noise. There will be no significant noise and vibration impact from the operational phase of the scheme with regards to road traffic.

#### Construction Phase Vibration

There is potential for ground vibration due to the construction phase works, this will mainly be derived from excavation works at certain locations. Vibration may be defined as regularly repeated movement of a physical object about a fixed point. The magnitude of vibration is expressed in terms of Peak Particle Velocity (PPV) expressed in millimetres per second (mm/s).

In order to ensure that there is no potential for vibration damage during construction, the NRA recommends that vibration from road construction activities be limited to the values set out in Table 10-6. These values have been derived through consideration of the various international standards.



Compliance with this guidance should ensure that there is little to no risk of even cosmetic damage to buildings.

**Table 10-6 Allowable Vibration during Construction in Order to Minimise the Risk of Building Damage**

Allowable vibration velocity (Peak Particle Velocity) at the closest part of any sensitive property to the source of vibration, at a frequency of:		
Less than 10Hz	10 to 50Hz	50 to 100Hz and above
8mm/s	12.5mm/s	20mm/s

#### Operational Phase Noise

There is no significant noise impact predicted to be emitted from the operational phase of the proposed scheme.

#### Operational Phase Vibration

There is no significant vibration impact predicted to be emitted from the operational phase of the proposed scheme.

#### Construction Phase Noise Mitigation

With regard to construction activities, the contractor appointed will ensure that all plant items used during the construction phase will comply with standards outlined in *European Communities (Construction Plant and Equipment) (Permissible Noise Levels) Regulations* (1990). The mitigation measures are outlined in *BS5228: Noise Control on Construction and Open Sites* (2009), which offers detailed guidance on the control of noise from construction activities.

It is proposed that various practices be adopted during construction including:

- Night time working will typically not occur, but there is the unlikely possibility that there may be a necessity to continue to operate generator, pumps or other equivalent machinery at a number of locations, where excavations etc may cause activity to remain in one location for a longer period of time;
- On these infrequent occasions, should they arise at all, screening and enclosures can be utilised. For maximum effectiveness, a screen should be positioned as close as possible to either the noise source or receiver. The screen should be constructed of material with a mass of  $>7\text{kg/m}^2$  and should have no gaps or joints in the barrier material. This can be used to limit noise impact to any noise sensitive receptors, if required by agreement with the local authority;

- Appoint a site representative responsible for matters relating to noise, and establish channels of communication between the contractor / developer, local authority and resident i.e. for notification of requirement of night works, should this be required; and

Furthermore, it is envisaged that a variety of practicable noise control measures will be employed, these may include:

- Selection of plant with low inherent potential for generation of noise and / or vibration;
- Erection of temporary barriers around items such as generators or high duty compressors. For maximum effectiveness, a barrier should be positioned as close as possible to either the noise source or receiver. The barrier should be constructed of material with a mass of  $>7\text{kg/m}^2$  and should have no gaps or joints in the barrier material; an example is shown below in Figure 10-2.



**Figure 10-2 Example of a Section of Temporary Noise Barrier**

- As a rough guide, the length of a barrier should be five times greater than its height. A shorter barrier should be bent around the noise source, to ensure no part of the noise source is visible from the receiving location; and
- Locating of noisy plant as far away from sensitive receptors, as permitted by site constraints.
- Noise and vibration monitoring works should be carried out during the construction phase to ensure adherence to the guidelines values for noise and vibration described above.

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### Construction Phase Vibration Mitigation

Any construction works that have the potential to cause vibration at sensitive receptors will be carried out in accordance with the limit values as set out in Table 10-6 at the most affected sensitive receptor.

### Operational Phase Mitigation

Since no significant noise or vibration impacts are predicted for the operational phase of the proposed scheme, no mitigation measures for this phase are deemed necessary.

### Residual Impacts

Adherence to the mitigation measures as described above will ensure there are no residual noise and vibration impacts associated with the proposed scheme.

## 10.3 Conclusions

An evaluation of the potential for noise and vibration impact to sensitive receptors from the proposed scheme has been carried out. It is predicted that the proposed scheme as designed, inclusive of the mitigation measures described in this evaluation, will not have a significant noise and vibration impact on sensitive receptors.

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## 11 AIR QUALITY AND CLIMATE CHANGE

### 11.1 Introduction and Existing Environment

An air quality assessment was undertaken for the construction and operation of the proposed flood relief scheme. The impact of the air emissions has been compared to the relevant air quality standards including the EU Ambient Air Quality Standards.

A desktop baseline ambient air quality survey was carried out using EPA baseline monitoring data for similar sized urban based centres. Currently, trends suggest that the air quality is good with levels of criteria pollutants for traffic, industrial and residential derived pollution (Benzene, Toluene, NO<sub>2</sub>, CO, and PM<sub>10</sub>) below the relevant Irish and European Union limits. The main source of air pollution in this area would be from motor vehicle exhausts, construction and industrial activities, heating and associated urban emissions. Baseline depositional dust monitoring was undertaken at the location of the proposed scheme. The EPA guideline value of 350 milligram per square metre per day was not exceeded at any of the survey monitoring locations.

### 11.2 Potential Impacts and Mitigation Measures

The construction phase of the project will emit some dust and vehicle exhaust emissions. There is the risk that emissions from dust and traffic could result in short term air quality impacts in the vicinity of the proposed scheme during the build phase. A series of mitigation measures including monitoring will be applied to minimise any impact associated with dust.

No impacts are predicted to climate.

The implementation of the mitigation including dust monitoring into a Construction Environment Management Plan (CEMP) will be an effective mitigation measure and as a result the impact of the construction phase on air quality will not be significant. It is anticipated that no long-term associated impacts on air quality will occur in the area as a result of the development of the proposed scheme.

### 11.3 Conclusions

Providing suggested mitigation measures are followed, no impacts to air quality or climate will occur as a result of developing the proposed flood relief scheme.

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## 12 LANDSCAPE AND VISUAL IMPACT ASSESSMENT

### 12.1 Introduction and Existing Environment

The landscape and visual impact assessment chapter of the Environmental Impact Statement (EIS) was undertaken by URS Ireland and focuses on the landscape and visual aspects of the proposed flood relief scheme for Templemore, County Tipperary. The following aspects will be addressed:

- Potential visual impact of the various measures on identified views;
- Potential impact on existing landscape character; and
- Proposed mitigation measures to reduce visual and landscape impacts.

This report uses the 'Guidelines on the Information to be contained in Environmental Impact Statements' prepared in March 2002 on behalf of the Environmental Protection Agency (EPA) as the basis for the landscape and visual impact assessment.

The proposed scheme is made up of the following elements:

- The construction of a flood defence ramp and raising of walls on Blackcastle Road;
- The construction of flood defence embankments in Shortt's Field;
- The construction of flood defence embankment in the Town Park;
- The construction of Inlet to flood diversion, with culvert, weir, and fish pass;
- Proposed culvert and open-channel sections through the Templemore Town;
- The construction of embankment at the junction of new channel and existing river channel;
- The construction of embankment to the rear of properties at Railway View; and
- The construction of flood defence walls and reinforcing of river bank to protect properties.

Templemore is a small rural town, with the surrounding landscape consisting of medium to large agricultural fields with pastureland being the dominant land-use. The layout of the main streets is typical of many towns of similar size throughout Ireland, containing a mixture of traditional and modern shop fronts, and buildings are not higher than two stories. Within the main streets of the town, buildings face directly on to the road, and there is little street vegetation. The more residential parts of the town offer space for front gardens and vegetation facing the road. A network of roads ranging from a National road (N62) to third class and private roads, cross the study area. A number of fields are bounded by limestone walls.

There are no protected views and prospects or scenic routes listed within the study area.

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## 12.2 Potential Impacts and Mitigation Measures

### Visual Impacts

The main visual impacts as a result of the scheme are listed below.

- The experience on Blackcastle Road will be altered with the addition of a road ramp and the raising of walls at Shortt's Bridge.
- Views of embankments in both the Town Park and Shortt's Field will be visible from Blackcastle Road.
- The footprint of the Town Park will be increased towards the road at the in-filled section of river north of Templemore.
- Low walls above the culvert and weir in Shortt's field will be visible from Blackcastle Road.
- Open views to the new channel will be clearly visible from both Richmond Road and Church Avenue.
- Low embankment will be visible from Railway Road in the land to the rear of properties in Railway View.
- Low embankment at properties upstream of Small's Bridge will be visible from road users and properties on the Mall.
- The removal of all water from the existing river channel if a full river diversion is employed.

### Landscape Impacts

The main landscape impacts as a result of the scheme are listed below.

- A slightly altered landscape approach to Templemore along Blackcastle Road, with the insertion of road ramp and views of embankments, raised walls.
- Open views of the channel route will change the experience on Richmond Road. The current streetscape will be altered with the removal of vegetation and buildings.
- Open views of the channel route will be experienced on Church Avenue.
- The removal of mature vegetation at different points around the town will leave notable open spaces in its absence.
- A moderate change in the character of the existing river channel with the full diversion option.

### Mitigation Measures

The following mitigation measures have been recommended in order to minimise the negative impacts of the development:

- Ramps to be designed with gradual slopes and appropriate materials in order to minimise visual impact;

- Materials, pointings and finishes to match the existing materials in walls, footpaths and roadways;
- Flood defence embankments should be rounded off at the top and softened with vegetation to match existing; and
- Vegetation should be retained where possible, and where it has to be removed, should be replaced with like type and size.

#### Residual Impacts (After Mitigation)

On completion of all mitigation measures, it is anticipated that any negative impacts of the proposal will be significantly reduced. Embankments in Shortt's Bridge, the Town Park, and at the Railway View Estate area, will be of shallow grade and covered in appropriate vegetation to tie in with the surroundings. Wall rebuilding and new walls at Shortt's Bridge, Richmond Road and Church Avenue will be constructed and finished with local stone in keeping with the character of the existing environment. Vegetation will be replaced where necessary to match existing size and type around the town.

### 12.3 Conclusions

The proposed scheme has been assessed in terms of its potential visual and landscape impact on the existing environment. Upon identifying the potential impacts, mitigation measures have been recommended which would significantly reduce any negative impacts of the development.

## 13 MATERIAL ASSETS / TRAFFIC

### 13.1 Introduction and Existing Environment

This chapter was prepared by TOBIN Consulting Engineers and aims to identify and classify any potential impacts upon the traffic and transportation in the town of Templemore by the proposed flood relief scheme.

The town of Templemore is situated on the N62 National route which joins Athlone with Thurles and is the centre point on the N62 linking the M7 (Dublin to Limerick) with the M8 (Dublin to Cork). The main traffic route through the town is along the Main Street onto George Street, crossing over Mall River and onto Richmond Road. A number of smaller roads lead off these major roads to provide access to local residential areas such as The Mall. The Annual Average Daily Traffic (AADT) on the N62 has been calculated as 5737 with a 5.5% Heavy Goods Vehicle traffic volume.

The proposed diversion channel crosses underneath two roads within the town, the first crossing passes under the N62 Richmond Road between Richmond Grove and The Mall, the second crossing is located on the local road, Church Avenue.

Two embankments are proposed as a flood defence line north of the town to shut off the floodplain flow:

- 1) West of Blackcastle Road at Shortt's field; and
- 2) East of Blackcastle Road to the south east of the lake in the Town Park.

A ramp is to be constructed on Blackcastle Road. The creation of the ramp requires the removal and rebuilding of roadside boundary walls; alongside Shortt's field and on the riverside. These new walls may require the provision of a safety barrier (to be determined at detailed design). An additional two downstream embankments are to be constructed at Smalls Bridge and Railway View Estate.

### 13.2 Potential Impacts and Mitigation Measures

Two flood relief scheme scenarios were considered in this assessment:

- A. The river will be left in its current channel route, with the new channel taking only flood flows; and
- B. The river is diverted in full to the new channel.

It should be noted that the potential impacts are similar in both scheme options with regards to traffic and transportation.



There will be deliveries to and from site throughout the estimated 12 month duration of works which will include concrete, structural reinforcement, materials for temporary road construction, road surfacing materials and precast culvert units. The most substantial element of work will be the removal of soil from the riverbed and banks between months 2 and 12 of construction. It has been estimated that there will be an average of three truck loads of material being removed off site each day, based on a 200 working day construction program. Construction of the embankment at the Town Park, over a one month period, will require short duration hauls by three trucks daily to the embankment location.

In addition to materials being removed off site, truck movements for the delivery of materials to site, to facilitate construction, equates to a total of 186 Heavy Goods Vehicle movements to the site. It is envisaged that the delivery of materials to the site would occur at varying times throughout the construction program i.e. for the construction of site haul roads, construction of culverts and the provision of ready mix concrete.

For a robust calculation, the peak traffic will occur during the construction of the Town Park embankment over the envisaged one month duration. During this time, the ongoing removal of excavated materials (over a 10 month period) and the other ongoing material deliveries (over a 9 month period) will occur simultaneously. The peak combined AADT for these construction vehicles is 5,774 AADT for this one month period of construction. This is an increase in the existing AADT of 0.6% (i.e. an additional 16 HGV movements daily).

The relatively small number of vehicles, estimated to be travelling to and from the works, compared to the current volume of traffic on the road network means that there is a slight negative impact during the construction period. When completed, the proposed scheme will not impact upon the current traffic and transportation routes within the town.

The construction of the culvert at N62 (Richmond Road) and Church Avenue will require lane closures to facilitate the installation of the culvert units over half road widths to facilitate traffic movement. The construction of the ramp on the Blackcastle Road will require a road closure. A temporary traffic diversion will be put into operation for the duration of the road closure. This road closure will be of a temporary nature and will have a slight negative impact on traffic and transportation during construction. Due to the vertical elevation of the proposed road ramp on Blackcastle Road there will be permanent impacts to the flow rate of traffic at this location.

The positive impacts of the development on traffic and transportation centre on the fact that the risk of flooding to roads and other infrastructure in the town will be greatly reduced following construction of the flood relief scheme.

All possible mitigation measures will be undertaken to minimise the impacts upon the local traffic and transportation networks. The deliveries to and from site will be undertaken to a programme agreed with the Contractor prior to works commencing to minimise disruption to the roads network particularly during times of peak traffic flow. The Design Team / Contractor will liaise with relevant local authority, National Roads Authority (NRA) and residents groups and advance notice will be given to the general public through local media before any road closures take place. Advance warning signs will highlight the presence of the new road ramp. The advance warning signs will be designed in accordance with Chapter 8, Temporary Traffic Measures and Signs for Roadworks, of the Traffic Signs Manual.

### 13.3 Conclusions

Mitigation measures will minimise the potential impacts upon traffic flow. Continuous monitoring will be required to ensure that the Traffic Management Plan proposed by the Contractor does not result in unnecessary delays to traffic using the surrounding road network. This will be done by visual inspection of traffic queues during peak times and then an adjustment of the plan if required.

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## 14 CULTURAL HERITAGE

### 14.1 Introduction and Existing Environment

This chapter of the EIS describes the results of cultural heritage assessment carried out in various townlands in Templemore Town, County Tipperary in May and June, 2014. The work was undertaken by Moore Archaeological and Environmental Services (Moore Group) for TOBIN Consulting Engineers on behalf of the Office of Public Works.

The project involves the creation of a number of embankments, a new culvert and spillway channel, deposition areas, field culverts, debris and gravel traps as part of the proposed flood relief scheme for Templemore. All designated archaeological, architectural and cultural heritage sites, structures, monuments or features have been avoided by the design team as far as was practicably possible, taking into account all the environmental constraints.

Moore Group was requested to undertake a site specific cultural heritage survey to:

- Determine the cultural heritage potential of the study area;
- Determine how the cultural heritage resource would be affected by the proposed scheme; and
- Recommend further action.

A field walkover was initially carried out by Moore Group in 2004 and again in 2014 and covered the entire area to be impacted by the proposed scheme. It noted the proximity of the works to the surrounding RMP sites and also topographical undulations which may be indicative of the presence of previously un-recorded archaeological deposits. Eight Cultural Heritage sites were identified along the proposed route of the scheme. These sites include bridges, demesnes, architectural features and an earthen anomaly of archaeological potential. The proposed scheme commences very close to Site 1, which is comprised of three recorded monuments (RMP TN029-062002 -Castle, TN029-062004-Bawn & TN029-062003 –House).

### 14.2 Potential Impacts and Mitigation Measures

It is noteworthy that the proposed works including a new channel, culvert, proposed deposition areas and embankments will not directly impact on the upstanding remains of any previously recorded monuments (RMP), Protected Structures (RPS), National Inventory of Architectural Heritage (NIAH) structures or Architectural Conservation Area (ACA).

The following potential direct impacts were noted in relation to the proposed development:

- Impacts on archaeological deposits associated with construction works in the vicinity of Site 1 associated with three previously recorded archaeological monuments (RMP TN029-062002 - Castle, TN029-062004-Bawn & TN029-062003 –House);
- Inadvertent impacts to architectural features (Sites 2 to 8) during the construction phase;
- Impacts on previously unrecorded archaeological deposits associated with Site 3, a site of high archaeological potential;
- Impacts on previously unrecorded archaeological deposits in greenfield areas; and
- Impacts on archaeological deposits or stray finds in the riverbed or riverbank of the existing river where it is to be regraded and widened,

In areas where there is the potential that archaeological, architectural or cultural heritage site, structures, monuments or features could be impacted, one or more of the following mitigations measures have been recommended:

- Archaeological monitoring – in areas of moderate archaeological potential, excavations associated with construction works and / or facilitating access to the construction site and / or stringing areas will be monitored by a suitably qualified archaeologist;
- Archaeological testing – best practice in areas of high archaeological potential demands caution, to ensure that archaeological deposits are identified as early as possible, thereby ensuring that any loss from the archaeological record is minimised. Under a monitoring remit, an archaeologist will observe normal construction works, usually undertaken with a toothed excavator bucket, which makes it more difficult to identify archaeological deposits. During archaeological testing a licence eligible archaeologist supervises excavations undertaken with a toothless grading bucket, under licence to the National Monuments Service of the Department of Arts, Heritage and Gaeltacht, thereby ensuring the early identification of archaeological deposits and minimal loss to the archaeological record. Undertaking this work preconstruction, will ensure that sufficient time can be allowed within the construction schedule for the excavation of any archaeological deposits discovered;
- Note importance of site in Construction Environmental Management Plan (CEMP) and inform on site personnel – where there are sites located in close proximity to the proposed development that could be inadvertently impacted during the construction phase these will be noted in the CEMP and on site personnel be made aware of the sites significance and due care and attention will be taken to prevent any inadvertent damage during construction work;
- Dry riverbed survey – once the diverted section of existing river has dried up a suitably qualified archaeologist will undertake a metal detection and visual survey of the riverbed to see if there are any stray archaeological finds or architectural fragments *in situ*; and

- Underwater archaeological assessment and monitoring – where the existing riverbed is to be regraded and the river widened, an underwater archaeological assessment will be undertaken pre construction and underwater archaeological monitoring will take place during construction.

It was also noted that indirectly, as a result of the proposed development, there is a potential that stray finds or architectural fragments that may exist in the river where it is to be diverted could be impacted upon. If such items are removed from the river once it has dried up and not brought to the attention of the relevant authorities then they could be lost to the archaeological or architectural record. This potential impact will be mitigated by a suitably qualified archaeologist undertaking a metal detection and visual survey of the river bed once the diverted section has dried out.

### 14.3 Conclusions

Following mitigation there will be no direct physical impacts on the upstanding remains of any known archaeological or architectural sites, monuments, structures or features during the construction or operation phases of the proposed scheme. However there is potential that a previously unknown site (Site 3) identified during the walkover survey, along with archaeological deposits in the vicinity of known archaeological monuments (Site 1) or in greenfield areas may encounter archaeological deposits during construction of the proposed scheme. Mitigation measures recommended will ensure that these will be dealt with in accordance with best practice and in full consultation with the National Monuments Service of the Department of Arts Heritage and Gaeltacht and the National Museum of Ireland.

Mitigation will also ensure that where the existing riverbed and riverbanks are to be impacted upon that should archaeological stray finds or deposits be discovered that these will be dealt with in accordance with best practice and in full consultation with the National Monuments Service of the Department of Arts Heritage and Gaeltacht and the National Museum of Ireland

And, where the existing river is to be diverted, should any archaeological stray finds or architectural fragments be found to exist these will be recovered and recorded, and reported to the relevant authorities.

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## 15 INTERACTIONS OF THE FOREGOING

### 15.1 Introduction

The EIA Directive requires that the interactions and interrelationships between environmental factors be considered. Interactions have been clearly identified in the early stages of the project and where the potential exists for interaction between environmental impacts, the environmental specialists have taken the interactions into account when making their assessment.

### 15.2 Discussion of Interactions

A summary of the main interrelationships of aspects of the environment with the potential to be significantly affected by the proposed scheme is contained in this chapter.

#### ***Human Beings***

Human Beings will interact with other relevant topics given the nature of the works. Noise and vibration, aspects related to air and water quality regimes and the impact on climate and flora and fauna, have minimal potential to change the receiving environment. Natural re-colonisation of flora and fauna will occur from the surrounding areas within the restored lands and Mall River, following cessation of operations. Native tree planting will take place if required.

Noise and dust control will be in accordance with Environmental Protection Agency guidelines and the OPW will implement any recommendations from Tipperary County Council.

There will be temporary visual impacts on views during the construction phase of the project. There will be permanent impacts associated with the addition of embankments, culverts, and walls in views from different locations around Templemore, in particular Blackcastle Road, Church Avenue, Richmond Road, The Mall, and Railway Road. The nature of these views may at times be intermittent due to intervening vegetation and buildings. Mitigation is proposed to limit any impacts.

Social and travel patterns, pedestrian or otherwise will temporarily be impacted during specific phases of the culvert and ramp construction, specifically where the scheme requires crossing of the N62 road and Church Avenue and at Blackcastle Road.

The proposed works may provide temporary employment for a small number of people. Indirect temporary economic benefits will also be generated as a result of the works, in terms of contracts with local hauliers, suppliers of products and services, such as fuel and oil suppliers, machinery suppliers, environmental monitoring etc. This employment will have a positive effect on the area.

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### ***Flora & Fauna (Terrestrial and Aquatic)***

This scheme has the potential to bring permanent significant benefits to ecology through the creation of a physically and ecologically diverse new channel.

It is recognised that this scheme can be constructed while avoiding significant impacts on local ecology by adhering to the design, construction and operation phase mitigation. If the mitigation measures detailed in the EIS within Chapter 7 (Aquatic Ecology), Chapter 8 (Terrestrial Ecology) and Chapter 9 (Water) are implemented there should be no significant residual impacts from the proposed works.

Dust impacts on adjacent habitats and fauna are expected to be minor as dust control measures will be in place.

### ***Soil and Geology***

Where possible excavated material will be incorporated into the embankments and final landscaping of the works area or spread locally. This will depend however on the suitability of the excavated material, and unsuitable material will be removed off site for disposal in permitted facilities. Removal of unsuitable material from site will have short term negative impacts on local traffic and noise levels. A Traffic Management Plan will be put in place to minimise impacts.

The implementation of mitigation measures will be required to ensure that the river is not impacted during the construction and operational works. No residual impacts to the soil and geology environments are foreseen during the operational phase of the proposed scheme.

### ***Water***

Mitigation measures are proposed to minimise impacts to water quality and aquatic ecology. It is considered that the benefits of the proposed flood relief scheme far outweigh the temporary disruption of the flood relief works.

### ***Air & Climate***

The proposed works are likely to generate some dust emissions, especially from traffic and mechanical works. In order to ensure that no dust nuisance occurs, a series of dust control measures will be implemented. A full Traffic Management Plan and Dust Management Plan will be implemented into the Construction Environmental Management Plan (CEMP) in order to minimise such emissions as a result of the construction phase of the development. This will be generated specifically for the proposed scheme works when detailed design is completed. It is not anticipated that there will be any significant impacts from dust following completion of the works.

### ***Noise & Vibration***

Noise will emanate from construction machinery employed throughout the works and from vehicular movements to and from the site. This has the potential to temporarily interact with ecology in terms of faunal impact. It is predicted that the proposed scheme as designed, inclusive of the mitigation measures described in this report, will not have a significant noise and vibration impact on sensitive receptors or local ecology.

### ***Traffic***

Traffic generated during the construction phase will slightly increase noise and vibration levels for a very short term in the locality of the works. A full Traffic Management Plan will be put in place to minimise impacts including limiting dust levels. Short term temporary diversions will be required on the N62 and Church Avenue in order to construct the culvert crossings at these roads and on Blackcastle Road to construct the ramp. Road markings and road signage, located at the works access junction, will be included as part of the associated development works. These measures will ensure that road safety for all road users is maintained.

### ***Landscape & Visual Assessment***

The implementation of the flood defence measures will have numerous impacts on the current landscape of Templemore both at a construction phase and after works are complete. The series of proposed embankments to both the north and south of the town will not only change the local topography of the area concerned, but will also interact with local ecology as some trees and mature hedgerows will have to be removed. However, replacement of this removed vegetation will greatly reduce landscape impact in the long term.

There is also the potential for landscape changes to interact with human beings as a result of increased traffic in the area during construction and some of the proposed features of the scheme being visual. However the overall landscape change as a result of the proposed scheme is not considered significant, considering the underlying context of an urban and agricultural landscape which undergoes change over time.

### ***Cultural Heritage & Archaeological Heritage***

Following mitigation there will be no direct physical impacts on any known archaeological or architectural monuments by the development of the proposed scheme. However there is potential that a previously unknown site identified during the walkover survey, along with archaeological deposits in the vicinity of known archaeological monuments or in areas of high archaeological potential may be encountered during the excavation for the proposed development. Following mitigation these will be dealt with in accordance with best practice and in full consultation with the National Monuments Service of the Department of Arts, Heritage and Gaeltacht and the National Museum of Ireland. As the scheme



will be subsurface during its operational phase, the impact on the landscape setting of the cultural heritage sites will be negligible.

### 15.3 Conclusions

While there is potential for the above impacts to interact and result in a cumulative impact, it is unlikely that any of these cumulative impacts will result in significant environmental degradation.

It should be noted that throughout the EIS potential interaction between various environmental criteria are discussed. The baseline assessment for this project has been completed in advance of the final construction plan for these works. The impact and mitigation measures proposed are designed to further ameliorate the impact of the proposed works on the wider environment.



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