O'Hanrahan Bridge Widening

Planning Report | March 2023

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Wexford County Council

O'Hanrahan Bridge Widening

Planning Report

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EXECUTIVE SUMMARY

O'Hanrahan Bridge is a 9-span post-tensioned concrete beam and reinforced concrete slab bridge over the River Barrow in New Ross town, Co. Wexford. The overall length of the bridge is 175m with an out-to-out width of 11.6m. The existing bridge does not have adequate cycling facilities and as such it is proposed to widen the bridge deck by approx. 1m in order to accommodate an enhanced combined pedestrian and cycleway which will connect to the future 'South East' Greenway. To facilitate the widening, a 20m section of the existing quay wall on the south-east corner of the bridge will be reconstructed up to 2m out from the existing quay wall. Similarly, an approximately 60m section of the southwest corner will be reconstructed approximately 1m from the existing wall.

This Planning Report has been prepared to provide a description of the nature and extent of the proposed development, assess and consider any potential environmental effects that may arise as a result of the proposed O'Hanrahan Bridge Widening Works, referred to hereafter as the 'Proposed Development'. An environmental assessment has been undertaken across a range of environmental topics to include: traffic; population and human health; biodiversity; hydrology; soils, geology and hydrogeology; landscape and visual; air quality and climate; noise and vibration; archaeology, architectural and cultural heritage; material assets; major accidents and disasters; and cumulative effects. A summary of the likely environmental effects and recommended mitigation measures are detailed at the end of each environmental topic. The construction stage Contractor will be required to demonstrate how it addresses the likely environmental effects and will be required to include suitable mitigation measures to be detailed as part of a Construction Environmental Management Plan (CEMP) and a Construction Traffic Management Plan (CTMP) which will be agreed with Kildare County Council prior to the works commencing. This assessment found that there are no likely significant environmental effects as a result of the proposed development.

1. INTRODUCTION

Roughan & O'Donovan (ROD) have been commissioned by Kildare County Council to lead the O'Hanrahan Bridge Widening Works in New Ross, County Wexford to accommodate pedestrian and cyclist facilities along the bridge, and to undertake all required engineering and environmental services acting on behalf of Kildare County Council through a Section 85 Agreement under the Local Government Act, 2001 (as amended).

As part of this, ROD has prepared this Planning Report on behalf of Kildare County Council for the proposed O'Hanrahan Bridge Widening Works, hereafter referred to as "the proposed development". The report is to be submitted as part of the planning application for this proposed development to An Bord Pleanála for local authority developments under Section 177AE (relating to appropriate assessment (AA)) of the Planning and Development Act, 2000, as amended.

The structure of this report is based on the 'Guidelines for Local Authorities Applications for approval for Local Authority Developments made to An Bord Pleanála under Section 177AE of the Planning and Development Act, 2000, as amended (Appropriate Assessment)'.

The purpose of this Planning Report is to report on the identified environmental effects from the proposed development that are likely to occur during the construction and operational phases and ensure mitigation measures, as appropriate, will be put in place during both construction and operation of the proposed development.

A separate EIA Screening has been completed and determined that the proposed development is not likely to have significant effects on the environment by virtue of its characteristics, location, size or potential impacts and does not require an Environmental Impact Assessment Report (EIAR) to be undertaken.

A separate Screening for Appropriate Assessment (AA) has been prepared for the proposed development, which concluded that *"on the basis of objective information, that the proposed development, either individually or in combination with other plans or projects, has the potential to give rise to impacts which would constitute likely significant effects on the River Barrow and River Nore SAC and the River Nore SPA, in view of their Conservation Objectives"*. A Natura Impact Statement (NIS) has been prepared for the proposed development.

1.1 Development Overview

O'Hanrahan Bridge is a 9-span post-tensioned concrete beam and reinforced concrete slab bridge over the River Barrow in New Ross town, Co. Wexford. The overall length of the bridge is 175m with an out-to-out width of 11.6m. The proposed works aim to widen the bridge deck by approx. 1m in order to accommodate an enhanced combined pedestrian and cycleway which will connect to the future 'South East' Greenway as shown in Plate 1-1 and on Drawing no. WBRC-ROD-ENV-S101-DR-CB-30001 in Appendix A. To facilitate the widening of the bridge, the proposed development requires for a 20m long section of the existing quay wall on the south-east corner of the bridge to be reconstructed up to 2m out from the existing quay wall. Similarly, an approximately 60m section of the south-west corner of the bridge will require widening works by approximately 1m out from the existing wall.

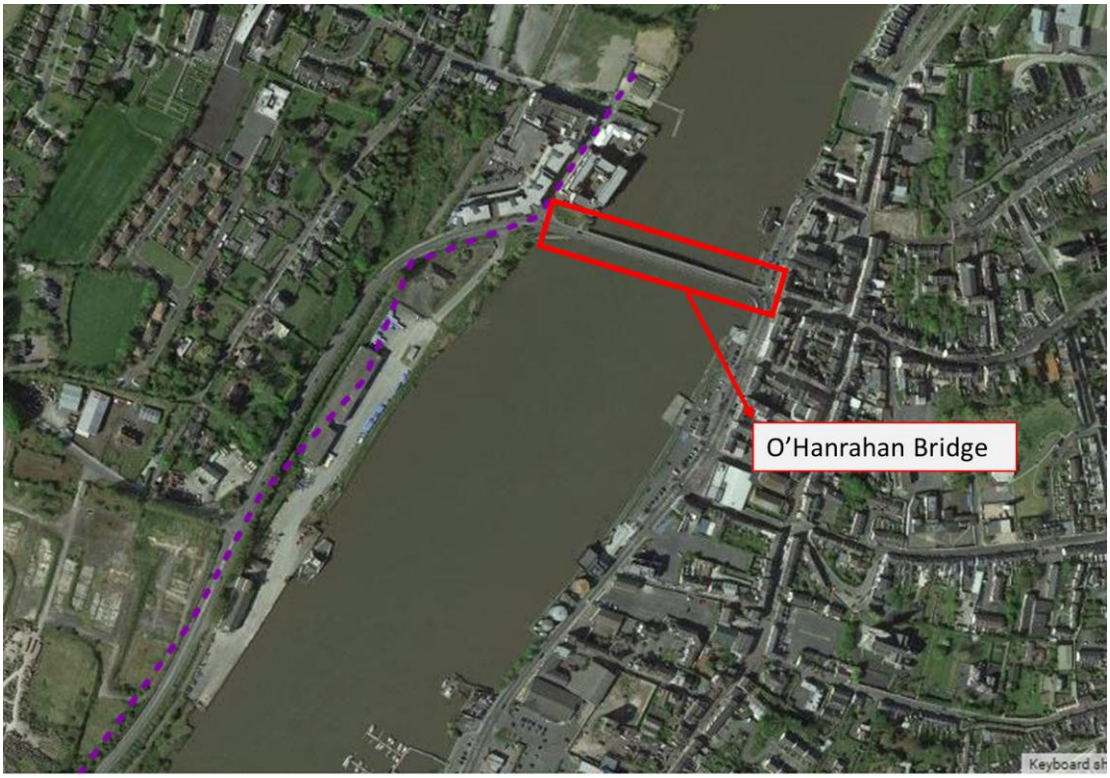

Plate 1-1 **Section 1 (Mount Elliot – New Ross (South)) of future South East Greenway (in purple)** [1]

Plate 1-2 **View of existing bridge deck**

1.2 Need for the Proposed Development

The purpose of the proposed development is to provide shared pedestrian and cycleway facilities along the existing O'Hanrahan Bridge. The key objectives of the proposed development are as follows:

- To carry out rehabilitation works on the existing O'Hanrahan Bridge to strengthen the structure.

[1] Source: http://southeastgreenway.net/sections/

- To provide enhanced shared pedestrian cycling facilities along the existing O'Hanrahan Bridge.
- To provide a pedestrian and cyclist connection between the future 'South East Greenway' and the population of New Ross town.
- To replace the bridge parapets to meet current Transport Infrastructure Ireland (TII) safety barrier standards (DN-REQ-03034).
- To support the sustainable transport aims and objectives of Wexford County Council.

1.2.1 Supporting Studies

Previous studies carried out that are relevant to this project review are listed below:

- O'Hanrahan Bridge Post Tensioned Special Inspection (PTSI) – Phase 1, Desk Study [2019].
- O'Hanrahan Bridge PTSI – Phase 2, Preliminary Site Inspection [2020].
- O'Hanrahan Bridge PTSI – Appropriate Assessment Screening Report [2020].
- O'Hanrahan Bridge PTSI – Phase 3, Project Managers Report [2022, pending].
- O'Hanrahan Bridge Quay-Wall Options Reports (South-East & South-West) [2021/22].

1.3 Planning Policy

The need for the proposed development is addressed under the following headings:

- **European Policy Context**
  - EU Cycling Strategy, 2017-2030.
- **National Policy Context**
  - National Planning Framework to 2040.
  - National Development Plan 2021 – 2030.
  - National Investment Framework for Transport in Ireland (NIFTI).
  - National Sustainable Mobility Policy.
  - Climate Action Plan, 2023.
  - People, Place and Policy growing Tourism to 2025.
- **Regional Policy Context**
  - Southern Region Regional Spatial and Economic Strategy (S-RSES).
  - The Southern and Eastern Regional Operational Programme, 2014 – 2020.
  - The South East Economic Development Strategy (SEEDS), 2013 – 2023.
- **Local Policy Context**
  - Wexford County Development Plan, 2022 – 2028.
  - County Wexford Tourism Strategy, 2019 – 2023.
  - New Ross Town and Environs Development Plan, 2011 – 2017.

1.3.1 European Policy

EU Cycling Strategy, 2017-2030

The EU Cycling Strategy constitutes the first consolidation of a systematic review of all EU policies related to cycling. It reviews the current scenario and trends in cycling in the EU and identifies the benefits offered by greater uptake of cycling. It

subsequently sets out its vision for cycling in the EU to 2030 through its four overall policy objectives, as follows:

1. *"Cycling should be an equal partner in the mobility system. Users pay for the full external costs of motorised transport while the societal benefits of active mobility are fully taken into account in transport planning and investment decisions. In addition, it will show the path towards prioritising cycling over individual motorised transport."*
2. *"Cycle use in the EU will increase by 50% in the decade from 2019/2020–2030. Its share in the transport modal split will be at least 12%, which means 0.48 cycle trips per person per day on average."*
3. *"The rates of fatalities and seriously injured among cyclists (per kilometre cycled) will be halved in the decade 2019/2020–2030."*
4. *"The EU should double its investments in cycle projects to EUR 3 billion during the Multiannual Financial Framework 2021–2027 (from EUR 1.5 billion in 2014–2020) and aim for another doubling to EUR 6 billion during the 2028–2034 period."*

In order to achieve these objectives, the Strategy sets out a suite of recommended policy changes for EU, national, regional and local levels, including to *"Develop and maintain regional and local cycle route networks"*, and to *"Adopt a clear hierarchy of transport users in urban area, giving priority to safety, convenience and comfort needs of pedestrians, cyclists and public transport users"*.

By providing enhanced cycling infrastructure along O'Hanrahan Bridge, to tie in with the existing and future cycle network in New Ross, the proposed development will contribute to the achievement of the policy objectives of the EU Cycling Strategy.

1.3.2 National Policy

National Planning Framework to 2040 (NPF)

The NPF sets out a strategic plan to accommodate future growth and development of Ireland to the year 2040. The NPF is a framework to provide guidance to investors from public and private sectors in relation to development, to promote opportunities for the residents, as well as protecting and conserving the national environment. The NPF incorporates the policies and objectives of the National Development Plan 2018 – 2027 and has adapted from the pitfalls of the National Spatial Strategy 2002 – 2020. The ambition of the NPF is to create a single vision and a shared set of goals for every community across the country. These goals are expressed in the NPF as National Strategic Outcomes (NSOs), through the Strategic Investment Priorities (SIPs), detailed in Figure 1-1 below and are supported by a range of National Policy Objectives (NPOs) within the NPF.

Figure 1-1 National Strategic Outcomes and Priorities of the NPF

The need for investment in walking and cycling infrastructure is prevalent in several NSOs, including Compact Growth, Strengthened Rural Economies and Communities, Sustainable Mobility, and Amenities and Heritage which are ranked on Strategic Investment Priorities as Priorities 1, 4, and 7 respectively:

- **Compact Growth NSO 1** '*Ensure transition to more sustainable modes of travel (Walking, cycling, public transport) and energy consumption (efficiency,*

renewables) within smaller towns and villages and rural areas.

'*Improve accessibility to and between centres of mass and scale and better integration with their surrounding areas*.'

Crucially NSO 1 emphasizes the requirement to secure the sustainable growth of more compact urban and rural settlements supported by jobs, housing, community services, and amenities, rather than sprawl and unplanned, uneconomic growth.

- **NSO 4 Sustainable Mobility**. '*Develop a comprehensive network of safe cycling routes in metropolitan areas to address travel needs and to provide similar facilities in towns and villages where appropriate'*.

  '*Expand attractive public transport alternatives to car transport to reduce congestion and emissions and enable the transport sector to cater for the demands associated with longer term population and employment growth in a sustainable manner through the following measures*.'

  The NPF aims to deliver this sustainable alternative by directing investment towards a number of public transport and transport infrastructure projects, including development of *"a comprehensive network of safe cycling routes in metropolitan areas"* (p. 143). The need for enhanced cycling and pedestrian infrastructure is further emphasised in National Policy Objective (NPO) 27, to *"Ensure the integration of safe and convenient alternatives to car into the design of our communities, by prioritising walking and cycling accessibility to both existing and proposed developments"* (p. 82).

- **NSO 7 Enhanced Amenity and Heritage** *'Implementation of planning and transport strategies for the five cities and other urban areas will be progressed with a major focus on improving walking and cycling routes, including continuous greenway networks and targeted measures to enhance permeability and connectivity'*: and

  'Invest in and enable access to recreational facilities, including trails networks, designed and delivered with a strong emphasis on conservation, allowing the protection and preservation of our most fragile environments and providing a wellbeing benefit for all'.

By providing improved pedestrian and cycling infrastructure on O'Hanrahan Bridge, the proposed development is aligned with the principles and objectives of the National Planning Framework to 2040.

National Development Plan 2021 – 2030

The *National Development Plan* (NDP) sets out the Government's overarching investment strategy as part of *Project Ireland 2040*. One of the major focuses of the plan is improving the delivery of infrastructure projects. The NPF sets out ten National Strategic Outcomes (NSOs), among which are NSO No. 4, Sustainable Mobility, and NSO No. 7, Enhanced Amenity and Heritage. This NDP details a new National Active Travel Programme that will complement active travel investments in cities, towns, and villages, as described in NSO 3: Strengthened Rural Economies and Communities and NSO 4: Sustainable Mobility. The NDP will aim to provide significant additional walking and cycling infrastructure across the country by 2025. As part of that, the NDP details the development of a new National Cycling Network Strategy by end-2022, which will: "*map existing cycling infrastructure in both urban and rural areas, including Greenways, and will serve to inform future planning and project delivery decisions in relation to walking and cycling infrastructure for the remainder of the decade"* (p.61).

As stated in respect of Active Travel, National Active Travel Programme:

> *"The Government is firmly committed to encouraging the use of walking, cycling and other active travel methods, and this has been signalled by the recent increase in the active travel budget. Whole-of- Government funding equivalent to 20% of the 2020 transport capital budget, or €360 million, has been committed annually for the period 2021-2025"* (p.62).

The National Cycle Network Strategy is outlined in the NDP, with the goal of identifying areas where future investment may be focused in order to create a complete and integrated cycling network throughout Ireland. Given its national focus, this Strategy will: "*encompass both urban and rural areas, and will be a valuable resource in relation to active travel connectivity around Ireland*."

The proposed development is aligned with the principles and objectives of the National Development Plan 2021-2030, by providing improved pedestrian and cycling infrastructure on O'Hanrahan Bridge and connection from the 'South East Greenway' to New Ross and its tourist attractions in the future.

National Investment Framework for Transport in Ireland (NIFTI)

The Department of Transport in December 2021 adopted the National Investment Framework for Transport in Ireland (NIFTI), which seeks to prioritise future investment in the land
transport network to support the delivery of the National Strategic Outcomes of the National Planning Framework (NPF).

To address the challenges, NIFTI establishes four investment priorities that future transport projects must align with to secure funding, namely:

- Decarbonisation.
- Protection and Renewal.
- Mobility of People and Goods in Urban Areas.
- Enhanced Regional and Rural Connectivity.

In addition, NIFTI also contains a Modal Hierarchy, and Intervention Hierarchy as indicated below.

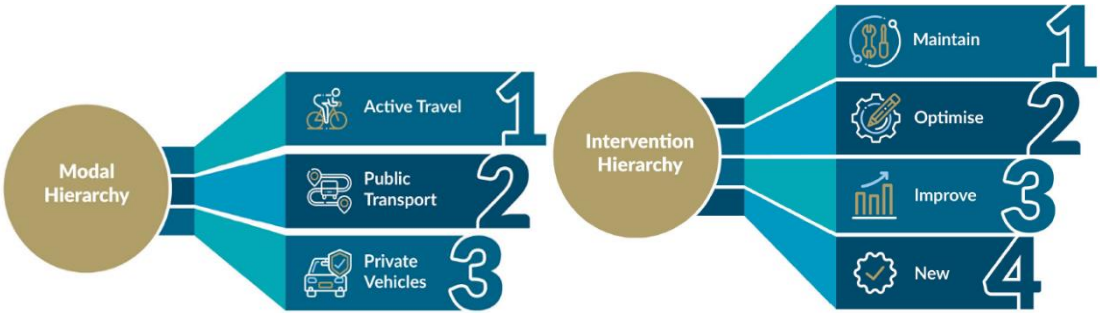

Figure 1-2 NIFTI Modal (left) and Intervention (right) Hierarchy

As per the Modal Hierarchy, developments which seeks to promote active travel are prioritised over public transport and private vehicles, while maintenance of existing assets is prioritised over optimising, improving or new construction in accordance with the Intervention Hierarchy.

Projects going forward will be required to demonstrate how the project impacts on the National Strategic Outcomes, including how the potential negative impacts will be

mitigated and how the project aligns with one or more of the NIFTI priorities. NIFTI published 14 Background Papers which reproduce themes from the National Planning Framework to support its vision.

The proposed development will provide infrastructure for active modes of travel and is therefore at the top tier of the NIFTI Modal Hierarchy. The proposed development also had regard to the NIFTI Intervention Hierarchy and will improve the existing asset, O'Hanrahan Bridge by optimising and improving the existing structure.

National Sustainable Mobility Policy

The National Sustainable Mobility Policy (NSMP) was published in April 2022 as a replacement to the Smarter Travel – A Sustainable Transport Future, considering the significant changes in legislation during the intervening period.

The NSMP aligns with current policy, such as the NPF, NDP, Climate Action Plan, Road Safety Strategy 2021-2030 and National Investment Framework for Transport in Ireland (NIFTI) and its vision is *"to connect people and places with sustainable mobility that is safe, green, accessible and efficient"*.

The policy is guided by three key principles which are underpinned by 10 high level goals, namely:

Safe and Green Mobility

1. Improve mobility safety.
2. Decarbonise public transport.
3. Expand availability of sustainable mobility in metropolitan areas.
4. Expand availability of sustainable mobility in regional and rural areas.
5. Encourage people to choose sustainable mobility over the private car.

People Focused Mobility

6. Take a whole of journey approach to mobility, promoting inclusive access for all.
7. Design infrastructure according to Universal Design Principles and the Hierarchy of Road Users model.
8. Promote sustainable mobility through research and citizen engagement.

Better Integrated Mobility

9. Better integrate land use and transport planning at all levels.
10. Promote smart and integrated mobility through innovative technologies and development of appropriate regulation.

The O'Hanrahan Bridge Widening project supports goals 1, 3, 5, 7 and 9 of the NSMP by providing enhanced pedestrian and cyclist infrastructure over O'Hanrahan Bridge. The proposed works are likely to promote active travel in New Ross, whilst also providing a connection to the future Kilkenny (the South East) Greenway.

Climate Action Plan, 2023

The Climate Action Plan 2023 (CAP23) sets out a roadmap of specific actions in various sectors including road transport. This plan is the first to be prepared under the Climate Action and Low Carbon Development (Amendment) Act 2021, which commits Ireland to a legally binding target of net-zero greenhouse gas emissions no

later than 2050 and a reduction of 51 percent by 2030 (compared to 2018 levels) and is required to be reviewed and updated annually to ensure it is responsive. Under the Climate Act 2021, Ireland's national climate objective requires the State to pursue and achieve, by no later than the end of the year 2050, the transition to a climate-resilient, biodiversity rich, environmentally sustainable and climate-neutral economy.

In relation to the transport sector, a number of targets have been identified in CAP23 to reduce the emissions in relation to transport, namely:

- Increase daily active travel journeys by 50% by 2030.
- Increase daily public transport journeys by 130% by 2030.
- Reduce daily car journeys by 25% by 2030.
- Shift 30% of all escort to education car journeys to sustainable modes.
- Reduce total vehicle kms by 20%.
- Reduce total car kms by 20%.
- Reduce fuel usage by 50%.

67 no. actions developed for the transport sector, including TR/23/29 "*Advance roll-out of 1,000 km walking/cycling infrastructure"*. By providing enhanced pedestrian and cycling infrastructure along O'Hanrahan Bridge, the proposed development will contribute to increasing the daily sustainable travel journeys set out in the Climate Action Plan. The proposed development will also create a linkage into New Ross from the future Kilkenny (the South East) Greenway promoting the use of sustainable modes of travel in New Ross and the environs.

People, Place and Policy growing Tourism to 2025

During the 2002-2007 period, Ireland experienced a surge of tourism which sharply declined in 2008 due to the worldwide economic crisis. Since 2011, in response to the economic crisis the Government placed tourism at the centre of its economic recovery plan. The Government identified that '*the warmth and welcome of our people, complemented by the richness of beauty of our places, landscape and heritage'* are the three focal aspects which will draw more tourism into Ireland.

The Government aspires to generate a €5 billion overseas tourism revenue in real terms (i.e. in 2014 prices) by 2025 or *'10 million overseas visitors per year by 2025,* compared *to 7.6million in 2014'*. The employment in the sector is desired to reach 250,000 by 2025. To reach this goal, the Plan supports a range of investments to enhance the visitor experience, including the *'development of greenways*.'

The provision of enhanced walking and cycling facilities on O'Hanrahan Bridge will enable the exploration of Ireland's cultural heritage and landscapes along the route by also providing connection from the South-East Greenway to New Ross and its tourism attractions in the future.

1.3.3 Regional Policy

Southern Region Regional Spatial and Economic Strategy (S-RSES)

The Regional Spatial and Economic Strategy for the Southern Region of Ireland (S-RSES) outlines how the policies and objectives from the National Planning Framework (NPF) and any other relevant Government policies and objectives will be implemented in the Southern Region. The S-RSES intends to implement these policies and objectives through economic and spatial strategies targeted specifically at the Southern Region.

The provision of walking and cycling routes within urban centres and rural areas is targeted as they endorse a healthy lifestyle for the population and create an opportunity for attracting tourism to the area. Regional Policy Objectives (RPOs) within the S-RSES has been identified to promote the development of walking and cycling routes as well as Blueways, Greenways and Peatways in the region. RPOs of the RSES support investment of greenway as follows:

- **RPO 53 Tourism** support developments in relation to the enhancement of tourism and leisure amenities including investment in walking and cycling infrastructure and includes the following objectives:
    - *"Sustainably develop walking and cycling trails opening greater accessibility to the marine and countryside environment by sustainable modes of and promote the sustainable designation and delivery of Greenway and Blueway Corridors"*.
    - *"Facilitate appropriate tourism development and in particular a National Greenways, Blueways and Peatways Strategy, prioritising sustainable projects that achieve maximum impact and connectivity at national and regional level"*.
- **RPO 125 Green infrastructure corridors** *"Transport infrastructure provides potential opportunities to act as green infrastructure corridors. It is an objective to support Local Authorities acting together with relevant national infrastructure providers to co-develop infrastructural management plans to enhance biodiversity".*
- **RPO 201: National Trails, Walking Routes, Greenway and Blueway Corridors** *"It is an objective to support investment in the development of walking and cycling facilities, greenway and blueway corridors within the Region between our Region's settlements and potential for sustainable linkages to create interregional greenways. Proposals for investment in walking and cycling facilities, greenway and blueway corridors should be based on rigorous site/route selection studies and Local authorities should ensure that decision-making in relation to such developments is informed by an appropriate level of environmental assessment, including all necessary reports to assess the potential impact on designated European sites and on biodiversity outside of formal protections such that proposed development does not contribute to loss of biodiversity. Local authorities and other public agencies shall seek to promote and support access to rural areas including upland areas, forestry, coastal areas and the development of existing walking routes, pilgrim paths, mountain trails and nature trails in conjunction with other public bodies, representative agencies and community groups and shall identify and protect existing paths, walkways and rights of way".*
- **RPO 174 Walking and Cycling** This RPO supports investment for developing walking and cycling infrastructure in the region.
- **RPO 46** relates to digital and physical infrastructure in rural areas and is supported by the proposed development as it will allow for a more *'enhanced transport connectivity including rural public transport services and* greenway *walking and pedestrian corridors between settlements'* which reduces the reliance of private cars over shorter journeys within the rural landscape.

The construction of the proposed development will support the listed RPOs by promoting walking and cycling activities in the area. It will also provide better connectivity between the future South East Greenway and New Ross which will further support the tourism sector.

The Southern and Eastern Regional Operational Programme, 2014 – 2020

The Southern and Eastern Regional Operational Programme 2014 – 2020 was prepared in co-operation with a wide range of partners and stakeholders as required under Article 5 of the Common Provisions Regulation and as detailed in the 'Code of Conduct on Partnership' which is intended to support and facilitate Member States and Managing Authorities in the implementation of the partnership principle.

The programme is composed of six investment priorities. Priority 5 is concerned with Sustainable Integrated Urban Development and has an allocated budget of €52 million with objectives to:

- Support low carbon sustainable, multimodal urban mobility in designated urban centres; and
- To revitalise, regenerate and improve the urban environment in the designated urban centres as part of integrated urban strategies.

The Designated Urban Centres Grant Scheme under Priority 5 has an objective to increase the number of integrated urban regeneration initiatives to improve the urban environment and revitalise urban areas including those in Wexford and Waterford. The proposed development supports the Programme as it will improve accessibility, promote sustainable mobility, and will regenerate the surrounding area.

The South East Economic Development Strategy (SEEDS), 2013 – 2023

This Strategy is an Action Plan for the south-east arising from the Joint Committee on Jobs Enterprise and Innovation, in response to the unemployment crisis in the region. The objective of the strategy is to identify the economic needs of the southeast, prioritising the urban centres, recognising disparities, addressing geographical inequalities and driving balanced regional development.

The aim is to focus on the Southeast's key strengths in tourism, developing a critical mass of expertise through improved educational attainment, delivery of a Technological University and strong research and development. The strategy aims to promote and develop eco-tourism in the region, including developing further walking or cycling trails, better promoting such attractions as New Ross's John F. Kennedy Arboretum.

1.3.4 Local Policy

Wexford County Development Plan, 2022 – 2028

The Wexford County Development Plan (CDP) 2022 – 2028 sets out a 6-year sustainable development plan for the region, detailing its intentions for future land development including measures to improve the natural and physical environment of the county as well as provision of infrastructure.

To improve the county's economic competitiveness and quality of life, the Wexford CDP sets out a range of policies and objectives to address its transportation sector to *'provide an effective and sustainable transport system which is accessible to all'.* The Wexford CDP advocates for a modal shift from private car use to sustainable transport by promoting public transport as well as investing in walking and cycling infrastructure. Walking and cycling are low carbon modes of transportation and permits for independent travel within County Wexford. The following objectives have been outlined within the Wexford CDP:

Objective TS07 *'To plan for the appropriate development of all aspects of the transport network for all modes and to ensure that the design and investment decisions prioritise sustainable transport modes*.'

Objective TM14 aims to "*To support and develop our town and villages and rural heritage sites including our beaches for tourism purposes through the facilitation of links by public transport, greenways, blueways and associated infrastructure subject to compliance with the Habitats Directive and normal planning and environmental criteria"*.

The following development approaches have been set out in the development plan in relation to New Ross Town:

- *'Prepare a local transport plan that will inform zoning decisions, include the development of the town bus network improvements to cycling and walking infrastructure and rural transport services into the town and secure investment to deliver the plan.'*
- *'Protect and enhance amenities, heritage, green infrastructure and biodiversity in all new development.'*

The plan also aims to prepare a local transport plan that will inform zoning decisions, including the development of the town bus network, enhancements to cycling and pedestrian infrastructure and rural transportation services into the town, as well as securing funding to carry out the plan.

The proposed development will improve accessibility and promote sustainable mobility in the town of New Ross and will encourage active travel as opposed to travelling by private car over short distances.

Kilkenny City and County Development Plan 2021-2027

The Kilkenny City and County Development Plan (CCDP) 2021-2027 sets out a 6-year plan for the proper planning and sustainable development of the area. Sections of New Ross town on the western banks of the River Barrow are with the jurisdiction of Kilkenny County Council and as such, the policies and objectives contained in the Kilkenny CCDP are applicable to the proposed development.

The Kilkenny CCDP supports integration of land use transportation to reduce the overall demand for transport, or promote travel by alternative modes other than the car by supporting the development of a more efficient land use pattern. **Objective 12A** of the CCDP aims *'to plan for and progressively implement a sustainable, integrated and low carbon transport system by enhancing the existing transport infrastructure in terms of road, bus, rail, cycling and pedestrian facilities and interfacing different modes as the opportunity arises'.*

With regards to modal share targets for the transport sector, the Kilkenny CCDP sets targets for modal shift to be achieved by 2040 which includes a 9% increase in walking from the 2016 baseline, a 13.8% increase in cycling, and a 12% increase in public transport usage. The Kilkenny CCDP also aims for car usage to be reduced by 20% by 2040 from the 2016 figures.

The Plan also supports the development of greenways and recognises that they are *"an important element of cycling infrastructure"*. **Objective 8J** of the Kilkenny CCDP aims to *"To complete the construction of the Kilkenny Greenway, connecting to New Ross to Waterford".* The proposed development supports this Objective as it will

create a linkage into New Ross from the future Kilkenny (the South East) Greenway promoting the use of sustainable modes of travel in New Ross and the environs.

County Wexford Tourism Strategy, 2019 – 2023

Tourism is vital sector of the Irish economy and plays a significant role in the local economy of County Wexford. 6,000 jobs are supported by the tourism industry in the county and it contributes 207 million annually to local revenue. The growth rate of the tourism industry in Wexford has shown a positive dynamic but is significantly behind national growth rates from the industry. Wexford tourism has significant reliance on domestic visitors and does not perform as highly as neighbouring counties in attracting foreign tourism. In light of the untapped potential that the county holds, the Wexford County Council and other significant stakeholders from government and industry have generated a tourism strategy for the period 2019-2023. The main ambitions of the plan are to raise the quality of life for locals and the attractiveness of the county to visitors. This will be achieved through infrastructure creation, including cycling and walking trails, and improvement to extend the tourist season and bring together people and communities. The economy of the county will also be diversified. The statistical aim of the strategy is to improve tourism revenue by 18.7% and visitor numbers by 12%, this should lead to approximately 800 new jobs across the county.

The following strategic goal has been identified in the Plan:

> '*To strengthen, develop and elevate Wexford's range of compelling, unique and must do visitor experiences, creating real standout and competitive differentiation.'*

Cycling has been identified as an area for growth as the trends for cycling worldwide show it growing in popularity as a method of transport and recreation. Wexford is well placed for the development of cycling and walking trails linking together major sights and amenities. Key infrastructure upgrades in relation to cycling will help to improve its popularity and accessibility by locals and tourists alike. The proposed development will connect to the South East Greenway following its completion in the future.

New Ross Town and Environs Development Plan, 2011 – 2017 (as extended)

The New Ross Town and Environs Development Plan lays out the strategy for the area of the settlement for the period 2011-2017 (as extended). The plan aims to promote balanced development with a balance of residential, economic, tourism and recreational development. The plan aims to create a greener and more efficient urban area more suited for the challenges of a balanced urban settlement in 21st century Ireland. This is to be achieved with due consideration to the unique aspects of the local environment. The plan focuses on the development of the town in relation to the economy, environment, society, and urban form. One of the key aspects of the development plan is to shift the model form of transport from personal motorcar to walking and cycling.

The New Ross Town and Environs Development Plan sets out the following opportunities in relation to sustainable infrastructure:

- *Introduce an efficient transport system which offers a choice of transport modes, reducing congestion and car dependency in the town centre and developing a pedestrian and cycle friendly environment which will achieve a reduction in CO2 emissions;*

- *Facilitate consolidated growth and renewal while also protecting the rich and architectural and natural heritage of the town;*

Furthermore, some key objectives of the plan include:

- *'Build on existing strategic infrastructure, by seeking to develop good transport links with other urban centres in the southeast region and within the plan area.'*
- *'Encourage the development of primary tourist attractions and secondary support facilities (such as transport/accommodation) to enhance these attractions.'*
- *'Encourage a modal shift from private modes of transport to public transport, cycling and walking.'*
- *'Facilitate ease of movement, minimise car journeys and CO2 emissions and provide a pedestrian friendly environment.'*

The proposed development will potentially increase accessibility and promote sustainable mobility in New Ross, encouraging users to walk and cycle instead of driving short distances in a private mode of transport.

2. ALTERNATIVES CONSIDERED

2.1 Introduction

This section has identified the options considered during the project development and the reasons why the proposed design was chosen.

2.2 Study Area

The study area encompasses the existing O'Hanrahan Bridge which connects the eastern and western banks of New Ross in County Wexford over the River Barrow as shown in Plate 2-1 below.

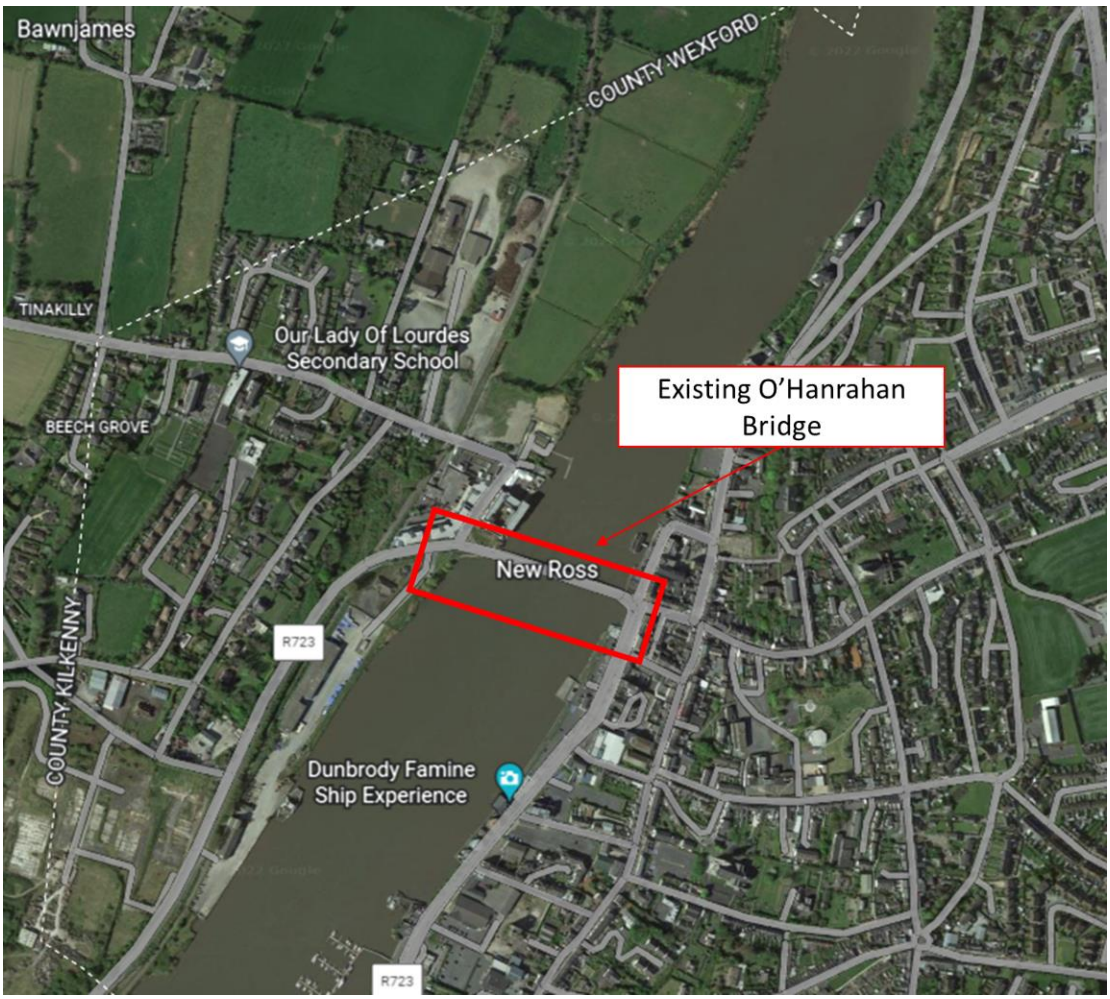

Plate 2-1 Study Area – existing O'Hanrahan Bridge

2.3 O'Hanrahan Bridge

2.3.1 Do – Nothing Option

The Do-Nothing Option for the project consists of the existing O'Hanrahan Bridge with no modifications. Under this option, the pedestrian facilities along the bridge will be unchanged. No cycling facilities are currently provided on the bridge. The Do-Nothing Option does not meet the project objectives and is not considered to be a feasible option for the following reasons:

- There are no segregated cycling facilities along the existing bridge, disrupting connectivity between New Ross town centre and the South-Eastern Greenway.

- The existing pedestrian facilities are inadequate due to the narrow widths of the footpaths across the bridge.
- Does not support the sustainable transport aims and objectives of Wexford County Council.
- The existing parapets along the bridge do not meet the current TII vehicular restraint standards.

2.3.2 Do- Minimum Option

The Do-Minimum Option for the project consists of providing enhanced pedestrian and cyclist facilities within the existing bridge deck width. The Do-Minimum Option is not considered to be a feasible option as it will reduce the road carriageway width to 5.4m causing unacceptably high traffic congestion as well as an increased risk of collision for motorists.

2.3.3 Do-Something Option

A number of do-something options were considered for the proposed development. Option A considers a new structure, whereas Options B-D consider widening of the existing bridge (Plate 2-2). These are described below:

Option A: New standalone pedestrian bridge – the construction of a standalone pedestrian / cycle bridge was ruled out due to the construction costs associated compared to widening the existing bridge deck.

Option B: Widen existing O'Hanrahan Bridge by 1860mm – This option consists of increasing the carriageway width from 7.3m to 7.5m, provide a 3.0m shared surface (pedestrian and cycleway) on the southern edge of the bridge, and a 2.0m wide footway on the northern edge of the bridge. This would involve a total widening of around 1430mm on the downstream end and 430mm on the upstream end. This option was ultimately ruled out as it placed too much additional load on the existing bridge.

Option C: Widen existing O'Hanrahan Bridge by 1360mm – This option consists of increasing the carriageway width from 7.3m to 7.5m, provide a 2.7m shared surface on the southern edge of the bridge and maintain the northern footway width of 1.8m. This would involve a total widening of around 1130mm on the downstream end and 230mm on the upstream end. This option was also ruled out due to the additional load on the existing bridge.

Option D: Widen existing O'Hanrahan Bridge by 930mm – This option consists of reducing the carriageway width from 7.3m to 6.5m, providing a 3.0m shared surface on the southern edge of the bridge, and a 2.0m wide footway on the northern edge of the bridge. This would involve a total widening of 930mm on the downstream end only. A structural assessment of the existing bridge deck found that this option was feasible. As a result, it was decided to progress with this option as it allows for a safe carriageway width to be maintained, is economically advantageous compared to constructing a new standalone footbridge, meets the project objectives and is within the structural limits of the existing bridge. This option also has the advantage of being more sustainable from a materials perspective as it involves reusing existing infrastructure instead of building a new structure. Furthermore, the intensity of any negative effects arising from this option on biodiversity within the River Barrow which is designated as the River Barrow and River Nore SAC will be much lower than those produced from the other Do- Something options considered.

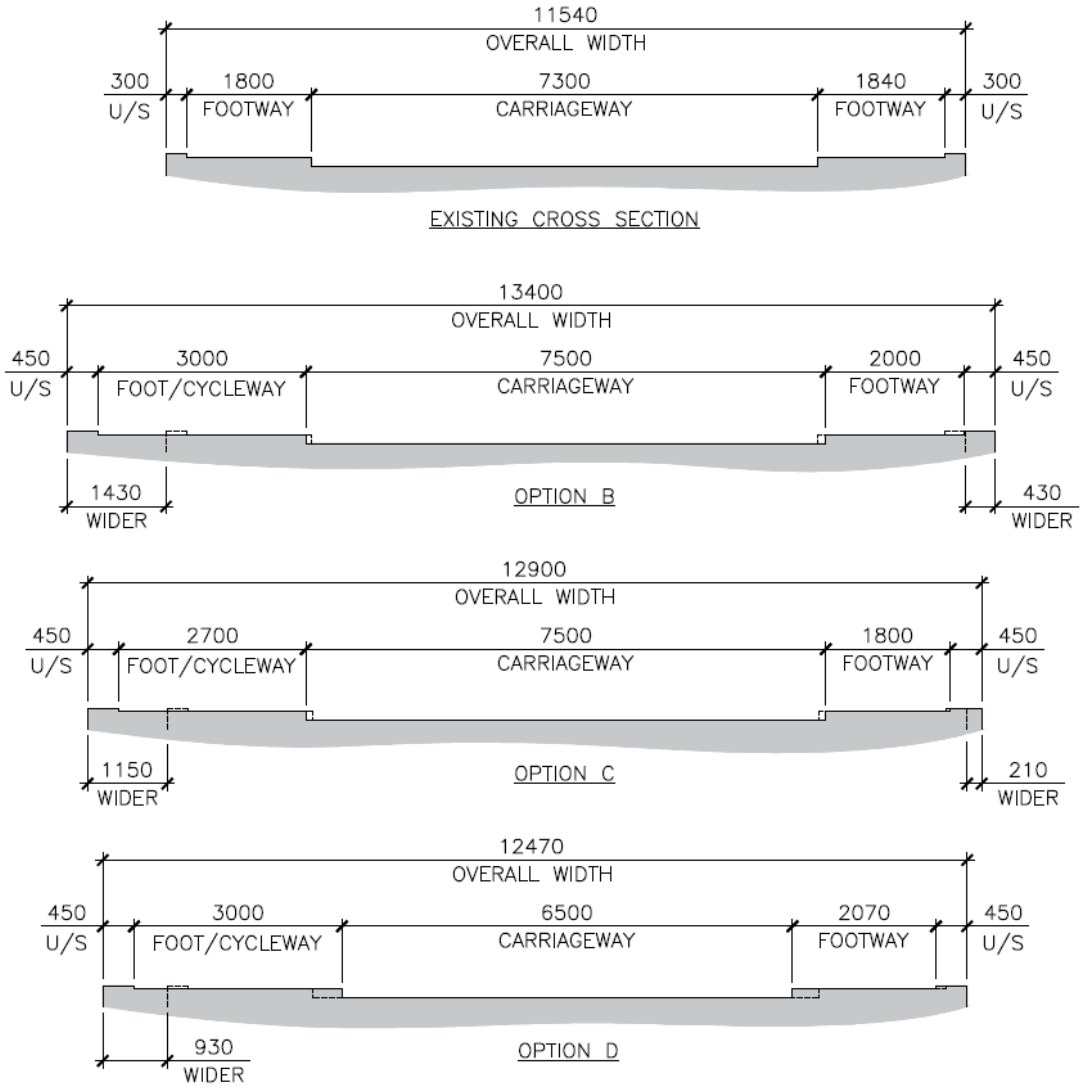

Plate 2-2 Comparison of Widening Options

2.4 Options Assessment of Southern Corners

To facilitate the bridge deck widening works proposed as part of the Do-Something Option, the south-east corner and the south-west corner of the bridge will also need to be widened. D ue to the environmental implications, the options considered for the widening works in these areas are considerably more detailed and are described in sections 2.4.2 and 2.4.3 respectively. The comparative assessment methodology is described in section 2.4.1.

2.4.1 Assessment Methodology

Each of the corner options proposed are rated separately based on the following criteria, upon which the preferred options were selected:

- Economic.
- Aesthetic.
- Durability and Maintenance.
- Environmental, including:
  - Population and Human Health.
  - Biodiversity.

- Hydraulics and Water Resources.
- Air Quality and Climate.
- Noise and Vibration.
- Material Assets.
- Archaeological, Architectural and Cultural Heritage.
- Landscape and Visual Amenity.

- Health and Safety.
- Construction and Buildability (incl. soils and geology).

For each individual criteria, options were compared against each other based on the five-point comparative scale, ranging from having 'significant advantages over other options' to having 'significant comparative disadvantages over other options. The 5 point rating scale is presented in Table 2-1. Where there is a substantial difference between two options, with the third being neither as advantageous nor as disadvantageous as the other two, a neutral ranking of 3 'neutral' is assigned to highlight that it is generally in the middle of the two other options.

Table 2-1 Options Assessment Rating Scale

Point Scale	Description
5	Significant advantages over the other options
4	Some advantages over the other options
3	Neutral compared to the other options
2	Some disadvantages over other options
1	Significant disadvantages over other options.

2.4.2 South- East Quay Wall Options

The following options are proposed to facilitate the transition from the widened section of O'Hanrahan Bridge (southern edge) to the existing quay wall on the eastern end of the bridge.

Design Option 1 – Sheet Piling

This option involves the construction of a new quay wall in front of the existing quay wall via the installation of sheet piles to match the width of the widening of O'Hanrahan Bridge. The width of the widening will vary from 930mm (at O'Hanrahan Bridge) to approximately 1500mm at the interface with the existing quay wall and glazed flood defence panels. The existing flood defence wall will be taken down below footway level and replaced by a matched flood defence wall along the line of the widened quay wall. This will be supported by a new capping beam on the widened section. The new sheet pile will be backfilled with compacted fill material. Option 1 is shown on Drawing No. WBRC-ROD-ENV-S101-DR-CB-30002 in Appendix A.

Option 2 – Cantilever Bridge

This option involves the construction of a cantilever deck supported by a large concrete counterweight behind the existing quay wall. This will involve extensive work in the area of the existing flood defence wall. To reduce the overturning moment on the cantilever, the parapet wall proposed in Option 1 will be replaced with

a continuation of the glazed flood defence panels on the adjacent quay wall. Option 2 is shown on Drawing No. WBRC-ROD-ENV-S101-DR-CB-30003 in Appendix A.

Option 3 – Footbridge

This option involves the construction of a 3m wide lightweight steel deck outside of the existing flood defence wall, representing a larger overall widening scheme than Options 1 and 2. This option would be propped off the capping beam of the existing quay wall with tension restraint provided in the form of ground anchors. The superstructure would comprise a perforated aluminium decking supported on longitudinal steel hollow sections. These sections would bear onto primary transverse steel members which interface with the existing quay wall as previously described. Option 3 is shown on Drawing No. WBRC-ROD-ENV-S101-DR-CB-30004 in Appendix A.

2.4.2.1 Economic Evaluation

The options were assessed on a comparative cost basis, with estimated construction costs for each design option considered provided in Table 2-2. Option 1 was identified as the most economically advantageous option.

The cost estimate for the options has been produced on the following basis;

- Costs are based on 2020 rates and exclude VAT.
- Excludes land acquisition and rights of way.
- Excludes costs associated with possible services diversion, which will be most significant for Option 2.
- The Construction Cost Estimate does not include for fees associated with the following:
    - Additional Site Investigation and Topographical Survey.
    - Environmental Assessment.
    - Preliminary Design.
    - Detailed Design and Checking.
    - Contract Administration.
    - Site Supervision during Construction.

Table 2-2 Construction Costs Comparison

Item	Option 1	Option 2	Option 3
Total Construction Cost	Most Economical	+22%	+41%

2.4.2.2 Aesthetic Evaluation

The overall intention is to ensure the proposed widening does not detract from the historic New Ross waterfront and complements the existing quay-side developments, including the adjacent John F. Kennedy Statue and the Dunbrody Famine Ship.

Option 1

This option offers the least visual intrusion to the current environment, as it will be mimicking the existing quay wall and flood defence scheme. It offers no visual enhancement to the area, however, unlike Option 3 and Option 2, to a lesser extent. The scale of the widening is sensitive to the area in that it will provide a smooth transition from the widened O'Hanrahan Bridge to the already widened footpath at the termination of the solid flood defence wall.

Option 2

This option offers visual continuity from the cantilever widening on O'Hanrahan Bridge, and visually ties into the existing quayside through a continuation of the glazed flood defence panels. The scale of this widening is similar to that of Option 1, but again is short of the visual enhancement that Option 3 can provide.

Option 3

This option offers the most visual intrusion but allows for improved aesthetic design beyond Options 1 and 2, as the parapet design it is not bound by flood defence requirements due to the widening being outside of the existing defences. This allows for improved detailing that pedestrians and cyclists will be exposed to. The form of the superstructure itself will be largely hidden except for river users.

This option is wider than Options 1 and 2 and has the additional requirement of modifying the existing flood defence wall. Careful detailing will be required here to ensure the transition is well defined. The interface between the pedestrian parapet and the proposed N2 parapet on O'Hanrahan Bridge will need to be carefully considered.

Aesthetic Conclusion

Option 3 is considered to provide the greatest aesthetic impact and visual improvement to the area. Option 2 provides a degree of continuity between the existing quayside and O'Hanrahan Bridge, while Option 1 provides the least visual impact in that it retains the existing appearance but for a widened structure.

2.4.2.3 Evaluation of Durability and Maintenance Requirements

All structures require regular inspections and routine maintenance during their life. The structural arrangements outlined in this report should be subject to regular principal inspections and routine maintenance during their design life by suitably experienced and qualified personnel.

The options presented can be designed to achieve the required 120-year design life. In addition, the specification of suitable materials will enhance durability and reduce the maintenance liability. The following measures are proposed:

(i) Provide grade 50% Ground Granulated Blast Furnace (GGBS) cement replacement in the exposed concrete.

(ii) Exposed concrete will be surface impregnated and buried concrete surfaces will be waterproofed in accordance with the TII Specification for Roadworks. In addition, the Contract Documents should make allowance for impregnation and coatings of concrete.

(iii) Elements which are subject to regular de-icing will require careful detailing and the consideration of additional durability requirements.

(iv) Structural steel will be grade S355J2 to EN 10025 and hollow sections will be S355J2JH to EN10210.

(v) A protective coating system will be applied to all exposed structural steelwork, which gives a period to major maintenance of 20 years in accordance with the TII Specification for Roadworks.

(vi) Formwork for exposed concrete surfaces shall be type F4/F3 in accordance with Series 1700 of TII publications.

(vii) Ensure structural steel sections are adequately sealed and free from durability problems and verify with adequate leak testing to be specified in the contract documents.

(viii) Careful detailing of the steelwork will minimise the risk of any corrosion occurring. However, the risk of condensation within box sections is an issue which will have to be negated in order to reduce the probability of corrosion initiated by the build-up of condensation.

(ix) Provide sacrificial thickness to the steelwork to account for design life.

For Option 3, the bridge deck consists of fabricated structural steel with steel deck. The decking is likely to be stainless steel, aluminium, or galvanised steel; while the superstructure will be painted steel, which will need to be repainted as part of a structure management plan. In order to mitigate the future maintenance burden, the superstructure can be designed to comprise stainless steel elements; however, this will have a larger capital cost. In addition, given the tidal nature of the site, weathering steel is not considered to be appropriate for use, unless site-specific salinity tests are conducted to confirm the corrosion aggressiveness of the area. Furthermore, articulation points (bearings/joints) will need to be inspectable for future maintenance.

Option 1 requires the least amount of future maintenance intervention, in that the sheet piles will be designed with a sacrificial thickness allowance to account for accelerated low water corrosion (ALWC) and environmental effects. The concrete capping and masonry wall will be largely maintenance free. Option 2 also has a relatively low maintenance burden, with the exception of the glazed parapets; which will require regular cleaning and replacement of components within the life-cycle of the structure.

2.4.2.4 Environmental Considerations

Population *and Human Health*

The O'Hanrahan Bridge provides the main crossing of the River Barrow within New Ross town. What was formally the N25 and the main connection between Wexford and Waterford, has now been changed to the R723 Regional Road, with the opening of the New Ross Bypass which now crosses the River Barrow approx. 6.4km downstream of New Ross. The bridge is therefore located within an urban environment with the adjacent land use mainly comprising commercial and residential use.

Option 1 will have the least impact on road users and pedestrians during construction as most of the works will be carried out in-stream, however some traffic management will be required during the transportation of structural steelwork to the lay down area. The need for piling within the river will have temporary impacts on local premises due to increased noise and vibration during construction.

Option 2 will require traffic management/diversion of the carriageway during construction which will have a negative effect on population as journey times will likely increase. Substantial works will also occur on the landside of the quay wall, causing diversions for pedestrians, which may have temporary effects on the local population. The need for piling will have temporary impacts on local premises due to increased noise and vibration during construction.

Option 3 will require a crane to be set up on the R723 during construction for the lifting of structural steelwork which will require road closures, thus negatively impacting local road users due to traffic diversions potentially resulting in increased journey time.

All three options will likely result in traffic diversions for short durations throughout the construction stage, however Option 1 overall will have the least impact on traffic movement and journey times as the construction of the sheet piled wall will be undertaken from the river side. Option 2 is likely to have the most impact on traffic and population compared to the other two options.

Biodiversity

O'Hanrahan Bridge spans the River Barrow in New Ross. The river is tidal at this location and is considered to be an Estuary, which is a protected habitat listed under Annex I of the Habitats Directive (92/43/EEC). The river is bordered by quay walls on the east bank, and a narrow fringe of reed beds and a vegetated bank supporting grassy verges with a cluster of Willow (*Salix* spp.*)* trees on the west bank. Himalayan Balsam (*Impantiens glandulifera*) is an invasive species listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. 477/2011) and can be found growing amongst the Willow trees. The wider area is primarily composed of built land. The river at this location supports a number of rare and protected species including Twaite Shad (*Alosa fallax fallax*), Atlantic Salmon (*Salmo salar*), Lamprey sp., European Eel (*Anguilla Anguilla*) and Otter (*Lutra lutra*).

The bridge is located within the lower reaches of the River Barrow and River Nore SAC [0002162]. This Special Area of Conservation (SAC) consists of the freshwater stretches of the Barrow and Nore River catchments as far upstream as the Slieve Bloom Mountains, and it also includes the tidal elements and estuary as far downstream as Creadun Head in Waterford. Many of the rare and protected species and habitats mentioned above are listed as Qualifying Interests of this SAC. In addition to this, the transitional waters of the River Barrow are designated as the Barrow River Estuary pNHA [000698].

The following impacts are likely to arise from proposed works in the absence of mitigation:

- Water quality impacts will arise in the event of an accidental spillage of wet concrete/mortar while being poured/applied over water. Wet concrete and mortar can have toxic effects on all aquatic life within receiving water bodies and can indirectly impact species that depend on this aquatic life as a food source (i.e., Otter).
- Local species will be impacted through disturbance due to noise and vibration effects and disturbance of the riverbed from sheet piling efforts, in-river scaffolding and the use of a jack-up barge. High levels of noise can cause injury to fish species and can alter their behaviour (i.e., leaving safe shallow areas to avoid high levels of disturbance) which can result in increased rates of predation of these species. Noise and vibration effects can also displace Otter and any impacts on fish species will have an indirect negative effect on Otter as they rely on the local fish populations as a food source.
- Habitat loss due to land reclaimed from the river using sheet piles.

Option 1 will result in the greatest impact out of the three options, primarily due to noise and vibration effects and the permanent loss of habitat that would result from the installation of sheet piles. Furthermore, this option will involve the application of a considerable quantity of wet concrete over water which has the potential to result in water quality impacts in the event of a spillage. Option 1 is the least favourable option in terms to biodiversity.

Option 2 will result in some noise and vibration effects from piling activities. Nevertheless, the noise and vibration effects from this option will be much less than those produced from Option 1 as the piling will take place on land where the intensity of these effects will be absorbed by solid ground before reaching the water column. Option 2 has the potential to have the greatest water quality impact as there will be more wet concrete poured above water than any other option.

Option 3 will only require some in-stream scaffolding and potentially a jack-up barge which will result in some noise and vibration effects. However, the intensity of these effects will be much lower than those produced from the other two options. Option 3 will require the least amount of wet concrete to be applied over water. Therefore, Option 3 is the most favourable compared to the other options in terms of biodiversity.

In respect of the proposed options, Option 1 poses the greatest threat to biodiversity as it involves considerable temporary and permanent in-rivers works, the loss of some Annex I habitat and has potential for considerable water quality impacts; Option 2 will result in less noise and vibration effects when compared to Option 1 but has the highest potential for water quality impacts, and; Option 3 is the most favourable of the three options as it requires the most discreet in-river works and has the least potential for water quality impacts. Neither Options 2 nor 3 will result in any loss of Annex I habitat.

Hydraulics and Water Resources

As Option 1 involves modification of the existing channel, this option may be subject to Section 50 Approval under the Arterial Drainage Act, 1945.

Option 1 poses the greatest impact on the hydraulic profile of the river channel when compared to other options, as the full height widening of the quay wall locally narrows the width of the river. However, this location is outside of the channel proper due to the recess between the projecting quay front to the south and eastern abutment of O'Hanrahan Bridge.

Option 2 does not narrow the river channel in the same way Option 1 does, but the cantilever slab will be subject to buoyant forces during full flood flows, as the soffit of the slab will not have any freeboard to this flooding level. Lateral forces will be resisted by the glazed flood defence parapets.

Option 3 poses the smallest hydraulic impact, as the perforated deck will allow flood flows to permeate through the soffit and flood flows will generally be unencumbered. However, this option results in the walkway being impassable to pedestrians in large flood flows. In addition, demountable flood barriers will need to be installed at the interface with the existing flood defence wall and glazed panels to ensure flood waters cannot be conveyed through the new structure.

All options require construction works adjacent to the River Barrow, and as such there is a risk of temporary/short-term negative impacts to water quality. Option 1 requires in-stream works while Option 2 requires more wet concrete to be poured above water than any other option which can cause water quality impacts in the event of accidental spillages. Option 3 has lower potential for water quality impacts in comparison to Options 1 and 2 as works will be carried out on land, and requiring the least amount of wet concrete to be poured over water.

Air and Climate

The closest air quality monitoring station is located approx. 680m from the proposed development. The baseline air quality is good based on EPA data collected on the 25/05/2021. Air quality readings from 10/10/21 show PM_{10} measurements were 12.7µg/m^3 and $PM_{2.5}$ measurements were 2.33µg/m^3, also demonstrating good air quality. The main emissions to Air Quality and Climate that currently exist within the site are from vehicular emissions along the R 723.

Option 1 and Option 3 do not require significant ground excavations, while Option 2 will require significant excavation to allow for the diversion of services and utilities.

All three options will have the potential to release dust particles into the air, negatively affecting air quality, however Option 2 is likely to result in the most impact due to the above reason.

There is no difference between the three options in relation to Air Quality and Climate during the operation phase.

Noise and Vibration

The proposed development is located adjacent to the R723 in an urban environment with the predominant source of noise arising from vehicular traffic. Wexford County Council Noise Action Plan 2019-2023 has identified the area in which the proposed development is situated as a potential noise hotspot.

Option 1 will require sheet piles to be driven, which will result in high levels of noise and vibration for short periods during construction. Due to the urban nature, this will have likely effects on adjacent properties for the duration of the pile driving works. This option is therefore the least favourable in terms of noise and vibration.

Option 2 may possibly require the use of mini-CFA (Continuous Flight Augur) piles drilled into the ground behind the existing quay wall. This option is preferable to Option 1, as the CFA piles will not cause the same level of noise and vibration compared to the sheet piles.

Option 3 does not require the use of piles; therefore, this option is considered to have the least impact and therefore is the most preferable option in terms of noise and vibration.

Option 3 is the preferred option for noise and vibration due to there being no piling works required.

Material Assets

A significant number of utilities are present within the southern footpath of the bridge, as shown in Section 15.3.4.

Option 1 will require the least disruption to utilities as most of the works will take place in-stream, and therefore is the preferable option in relation to material assets. During the construction phase, the existing flood defences will be maintained.

Option 2 will cause significant disruption or diversion of services to facilitate the construction of the concrete counterweight and thus is the least favourable option in relation to material assets. During the construction phase, temporary flood defence measures will be required.

Option 3 will require crane operations during the construction phase, which will likely require temporary road closure during the installation of the steel deck. During the construction phase, temporary flood defence measures will be required.

Option 1 is the preferred option in terms of material assets as there will be minimal diversion to existing utilities.

Archaeological, Architectural and Cultural Heritage

New Ross has a rich Archaeological, Architectural and Cultural Heritage history. New Ross port was established in the 13th Century, and supported trade with Baltic ports and Canada. New Ross port also facilitated the transport of emigrants from Ireland to North America and Canada.

O'Hanrahan Bridge is not located within an Architectural Conservation Area, however the south quays and the south-eastern tie in of the bridge are located in a Zone of Archaeological Potential. The closest known wreck is located approx. 85m south of the proposed works. The proposed works fall within a Zone of Notification (Section 12). There are no monuments or places on the Record of Monuments and Places (RMP) within the development area. There are numerous buildings in the vicinity of the proposed development that are listed on the National Inventory of Architectural Heritage.

All options will require some level of in-stream works. Option 1 will require sheet piles to be driven into the riverbed which has the potential to impact on any unrecorded archaeological sites within the riverbed. During the construction phase a jack up barge will be required to facilitate the piling works. The use of a jack up barge also has the potential to disturb unrecorded archaeological features in the riverbed.

Option 2 may require piles to be driven into the ground behind the existing quay wall, as opposed to the riverbed, which is preferable to Option 1 as it will not disturb the riverbed, however there is still potential to disturb any unrecorded archaeological features present behind the quay wall.

Option 3 will likely cause the least disturbance to the riverbed of all 3 options as no piling works are required, though it should be noted that all options will require the installation of scaffold footings in the river channel which will also have the potential to disturb any unrecorded archaeological features in the riverbed. However this option is considered preferable as there are no piling works required.

All three options will have impacts on the existing quay wall. Option 3 will have the least impact on potential underwater Archaeological, Architectural and Cultural Heritage, while Option 1 will have the potential for the most impact on underwater Archaeological, Architectural Heritage due to the need for sheet piles.

Landscape and Visual Amenity

The proposed development is located in an urban environment, overlooking the river Barrow.

Option 1 will have minimal effect on landscape and visual amenity as the works provide no visual enhancement during the operation phase. During the construction phase a jack-up barge, piling rig and scaffolding will be required which will temporarily impinge on landscape and visual amenity in the area.

During the operation phase, Option 2 will have a minimal effect on landscape and visual amenity as the works provide visual continuity and the design will tie into the existing quayside through the continuation of glazed flood defence panels. During the construction phase Option 2 will require scaffolding which will temporarily impinge on landscape and visual amenity.

Option 3 has the potential to improve aesthetics and enhance the public realm during the operation phase. During the construction phase, Option 3 requires the use of a crane to lift the structural steelwork and scaffolding which will temporarily impinge on landscape and visual amenity.

All three options will have short term effects on landscape and visual amenity during construction, however option 3 is considered to be the preferred option as it will have the greatest benefit during operation.

Environmental Consideration Conclusion

The options considered has been evaluated and rated on a 5 point scale as per Table 2-1, relative to their effect on the receiving environment under each environmental factor. A score of 3 has been assigned to option(s) that have a 'neutral' effect on the receiving environment under the relevant environmental factor. An overall environmental average score has been given to each Option, based on the average of the environmental rankings.

Table 2-3 Environmental Rating and Evaluation of Options

Environmental Factor	Option 1	Option 2	Option 3
Population and Human Health	4	2	3
Biodiversity	2	3	4
Hydraulics and Water Resources	2	4	4
Air and Climate	3	2	3
Noise and Vibration	1	2	4
Material Assets	4	1	3
Archaeological, Architectural and Cultural Heritage	1	2	4
Landscape and Visual Amenity	3	3	4
Total	**20**	**19**	**29**
Average Environment Score	**2.5**	**2.4**	**3.6**

2.4.2.5 Health and Safety Considerations

During the development of the options considered in this report particular risks have been identified and where possible these have been eliminated or mitigated by design. Residual risks that have not been eliminated are given below.

The following risks identified in the First Schedule of the Safety, Health and Welfare at Work (Construction) Regulations are applicable:

- Risk of burial or engulfment or falling from height.
- Chemical or biological substances giving rise to a particular risk or a requirement for health monitoring.
- Work with Ionising radiation.
- Work near high voltage power lines.

- Work exposing persons to the risk of drowning.
- Assembly and dismantling of heavy prefabricated components.

Further residual risks resulting from the proposed options identified at this stage include the following:

- Erection of significant crane on the R723 to permit lifting of structural steelwork adjacent to the river.
- Transportation and erection of significant prefabricated elements with craneage requirements in an urban environment.
- Traffic Management and diversions of traffic.
- Working adjacent to live traffic.
- Unauthorised access to the site.
- Noise and Vibration.
- Handling.
- Exposure to construction plant.
- Working adjacent to the river.
- Working in the river.
- Working off a barge.
- Piling Activity on the river bank and from a barge.
- Installation and testing of piles (to be confirmed on receipt of SI).
- Stability of existing river walls and proposed structures in the temporary condition during construction and in the permanent condition.
- Fabrication of Structural Steelwork in workshop conditions and on site.
- Application of protective systems to structural steel and steel guardrails (painting to be completed in a controlled environment whether in the fabrication workshop or on site).
- Welding and painting steel members (to be completed in a controlled environment whether in the fabrication workshop or on site).
- Installation of parapets/pedestrian guardrails at height.
- Working within constrained sites in an urban environment.
- Anti-social behaviour.
- Site clearance in an urban areas associated risks of Weils disease, disused syringes etc.
- Working in the vicinity of existing services.
- In-situ concrete construction including requirement for temporary works.
- Services diversion.
- Diversion of gas distribution main.
- Working on, over, adjacent to watercourses.

The Project Supervisor Construction Stage (PSCS) is required to take specific measures to mitigate and manage residual risks during construction.

In addition, it is considered that the Contract Documents should specify Independent Category 3 checks of all major elements of temporary works and the transportation and erection of prefabricated elements.

The Information Pack documentation should include a detailed indicative construction sequence, which fully describes the construction sequence assumed in the analysis.

A safety file is required to be produced by the PSDP. The following is a non-exhaustive list of contents that should be included in the safety file:

- Health and Safety Plan.
- Preliminary Design Report.
- As Built Drawings.
- As Built Erection Sequence.
- Data sheets for proprietary products.
- Specification.
- Details of temporary works including drawings, calculations and design/check certificates.
- Statement of General Design Criteria.
- Details of Equipment and Operation/Maintenance requirements.
- Maintenance Procedures and Manuals.
- Relevant Certificates from Suppliers / Manufacturers / Specialist Contractors etc.
- Details of Location and Nature of Utilities and Services.

Evaluation

In regard to road user safety, Option 2 proposes to replace the existing reinforced concrete parapet with a light-weight glazed parapet. However, this parapet will require a Departure from Standard and provide the lowest containment level of each of the three options.

Option 1 will require the least amount of disruption to existing road users and services during the construction works. In addition, flood defence measures will be maintained throughout the works without the need for temporary measures; such as in Options 2 and 3.

2.4.2.6 Construction and Buildability

The feasibility of constructing each of the proposed structure types in such a constrained environment must be considered as part of the technical evaluation. Although the final construction sequence and activity associated with the bridge option will be decided by the contractor building the bridge, the following sets out in outline the anticipated construction sequence associated with the bridge work for each option.

Option 1

- Procurement of sheet piles.
- Mobilisation of piling rig and jack-up barge.
- Transportation of structural steelwork to lay down area (traffic management required).
- Installation of sheet piles to required embedded depth.
- Back-filling behind newly installed sheet piles and monitoring for movement.
- Construction of reinforced concrete capping beam to sheet piles and upstand wall to match existing flood defence wall.

- Taking down of existing flood defence wall.
- Completion of footway pavement and masonry cladding to new flood defence wall.

Option 2

- Diversion of carriageway and/or traffic management.
- Excavation and diversion of services beneath footway.
- Construction of concrete counterweight (preceded by the installation of piles, if required).
- Taking down of existing flood defence wall and installation of temporary flood defence measures.
- Construction of cantilever deck slab.
- Erection of glazed flood defence parapets.
- Bridge deck waterproofing and finishes to pavement.

Option 3

- Fabrication and protection of superstructure steelwork off-site.
- Erection of scaffolding and installation of ground anchors and anchor slabs, if required (traffic management, service diversions).
- Installation of compression bearing pads.
- Modification of existing flood defence wall at approaches, including temporary measures to maintain flood protection.
- Transportation of structural steelwork to a lay down area (traffic management).
- Erection of structural steelwork in sections (traffic management).
- Erection of parapets and installation of perforated grating.

Soils and Geology

No evidence of hazardous/contaminated ground has been encountered in previous historical GI in the area. All the proposed options would require a comparable and minor amount of soil to be excavated.

However, Option 1 will require the installation of river side sheet piles (20-25m) in front of the existing quay wall in comparison to no sheet piling for Option 2 and 3. The gap between the new riverside sheet pile wall and the existing quay wall will need to be backfilled with clean granular material. As such the import fill material for Option 1 is higher than for Option 2 and 3. Options 2 and 3 are comparable in terms of fill material.

Evaluation

Option 1 requires the most conventional construction methodology, with the least amount of impact to pedestrians, road users, and underground services; for which Option 2 will be the most disruptive. Option 3 will require significant crane operations on the quay/bridge in order to install the steel deck, which will likely require temporary road closures during installation. In terms of soils and geology, the import fill material for Option 1 is higher than for Option 2 and 3. Options 2 and 3 are comparable in terms of fill material.

2.4.2.7 Options Evaluation Summary

The impact assessment rating has been assigned for options under the criteria listed in Table 2-4 below. In addition, these ratings have been weighted according to the importance of the criteria being evaluated. For instance, the highest weighting of 40% was assigned to the 'Environmental' criteria due to the potential impact on the footprint of the River Barrow and River Nore SAC and the potential of disturbing features of archaeological significance within the mudflats of the river. 'Health and Safety' criteria was assigned the second highest weighting of 25% due to the potential interaction of the construction works with the users of the road network, as well as the risks of working on and near a waterbody. 'Economic' and 'Construction & Durability' criteria where each assigned a 10% weighting, while a weighting of 7.5% was assigned to 'Aesthetic' and 'Durability & Maintenance' criteria.

When the weightings are applied to the individual ranking scores and combined for each option, and overall score is developed to compare the relative advantages of the options; with the highest score being classified as the most advantageous. These are detailed in Table 2-4 below and were developed in consultation with TII and the Kildare County Council.

Table 2-4 Rating and Evaluation of Options

Criteria	Weighting	Option 1	Option 2	Option 3
Economic	10%	5	3	1
Aesthetic	7.5%	2	3	4
Durability & Maintenance	7.5%	5	3	1
Environmental*	40%	2.5	2.4	3.6
Health & Safety	25%	5	3	3
Construction & Buildability	10%	4	2	2
Total	**100%**	**3.92**	**2.73**	**2.43**
Ranking		**1**	**2**	**3**

*NOTE: Environmental ratings as per Table 2-3

Option 1 is recommended to be progressed based on the following:

- Options 1 and 2 provide the simplest transition to the adjacent structures and, of these two options, Option 1 is the simplest construction methodology. Option 3 requires extensive modifications to the approaches to the flood defence walls.
- Option 1 is independent of the existing quay wall, and the services underneath the existing footway will not need to be diverted or protected in the temporary case. Option 2 will require invasive work to these areas.
- There will be no apparent visual difference between the current quay wall and the widened section under Option 1. While Option 3 offers a modern design alternative, its aspect in the environment means it will be largely hidden from view.
- Option 1 has the least onerous maintenance requirement, as the sheet pile wall will account for corrosion induced section loss by the provision of sacrificial thickness to the wall thickness and will therefore not require strengthening over time.
- Option 1 is the most economical solution from a construction cost perspective.

2.4.3 South - West Quay Wall Options

The following options are proposed to facilitate the transition from the widened section of O'Hanrahan Bridge (southern edge) to the existing quay wall on the western end of the bridge.

Option 1

Option 1 consists of the installation of sheet piles outside of the existing wing wall and flood defence wall, with infilling over the width of the widening. This is similar in approach to the design and construction of the south-eastern corner at the other side of the river. Over the wing-wall section of the alignment, the proposed sheet piles will be tied back to the existing sheet piles; whereas over the embankment section at the flood defence wall, ground anchors will be required to control lateral movement of the wall.

This option offers the simplest construction methodology as the installation of driven sheet piles is a standard construction technique and allows the permanent works and temporary works to be combined. Construction work being largely confined to outside of the existing quay wall would minimise the impact on the existing services beneath the existing footway.

The existing flood defence wall could be left in place until completion of the construction of the new flood defence wall, and therefore provide continuous flood protection without the provision of a temporary structure.

Installation of the sheet piles at the wing-wall could be completed via a jack-up barge in order to minimise the impact of road users and pedestrians along the quays and at O'Hanrahan Bridge. This option requires extensive in-river working in comparison to Option 2. For the flood defence wall portion, installation would likely be required on the embankment side, necessitating the provision of a working platform. Ground anchors will also be installed from the embankment section and require the provision of a mobile drilling rig. Option 1 is shown on Drawing No. WBRC-ROD-ENV-S101-DR-CB-30005 in Appendix A.

Option 2

Option 2 consists of the construction of a cantilever slab from the existing reinforced concrete capping beam/wall on the sheet-piled southern wing-wall. This would involve breaking out of sections of the existing wall and providing an in-situ concrete stitch to the cantilever section. In addition, the existing flood defence wall and restraining slab on the approach to the wing wall would be demolished and reconstructed along the widened alignment.

This option offers continuity of construction methodology across O'Hanrahan Bridge which will comprise a cantilever widening. In-river working will not be required as the superstructure will be cantilevering from the existing wing- wall, and so no permanent structure will be encroaching into the River Barrow.

As substantial construction will be required on the landside of the quay wall, this option will require significant disruption or diversion of services, as per the widening of O'Hanrahan Bridge. It would also likely require strengthening works to the existing upstand wall by the provision of additional anchors to resist lateral forces.

Taking down the existing flood defence walls will also be required, however, unlike Option 1, temporary flood defence measures would need to be put in place for the duration of time between taking down the current wall and installation of the new one

on the widened alignment. These can be in the form of demountable or inflatable barriers. Option 2 is shown on Drawing No. WBRC-ROD-ENV-S101-DR-CB-30006 in Appendix A.

2.4.3.1 Economic Evaluation

The options were assessed on a comparative cost basis, with estimated construction costs for each design option considered provided in Table 2-5. The cost estimate for the options has been produced on the basis described in section 2.4.2.1 in this Planning Report.

Option 2 is the most economically advantageous option.

Table 2-5 Construction Costs Comparison

Item	Option 1	Option 2
Total Construction Cost	+21%	Most Economical

2.4.3.2 Aesthetic Evaluation

Option 1 offers the least visual intrusion to the current environment, as it will be mimicking the existing quay wall and flood defence scheme. Option 2 offers visual continuity from the cantilever widening on O'Hanrahan Bridge

Both options are functional in nature and in-keeping with the existing bridge and approaches, therefore both are considered to be of equal aesthetic merit.

2.4.3.3 Evaluation of Durability and Maintenance Requirements

All structures require regular inspections and routine maintenance during their life. The structural arrangements outlined in this report should be subject to regular principal inspections and routine maintenance during their design life by suitably experienced and qualified personnel.

The options presented can be designed to achieve the required 120-year design life. In addition, the specification of suitable materials will enhance durability and reduce the maintenance liability. The following measures are proposed:

(i) Provide grade 50% Ground Granulated Blast Furnace (GGBS) cement replacement in the exposed concrete.

(ii) Exposed concrete will be surface impregnated and buried concrete surfaces will be waterproofed in accordance with the TII Specification for Roadworks. In addition, the Contract Documents should make allowance for impregnation and coatings of concrete.

(iii) Elements which are subject to regular de-icing will require careful detailing and the consideration of additional durability requirements.

(iv) Structural steel will be grade S355J2 to EN.

(v) A protective coating system will be applied to all exposed structural steelwork, which gives a period to major maintenance of 20 years in accordance with the TII Specification for Roadworks.

(vi) Exposed formed concrete surfaces shall be F4/F3.

(vii) Provide sacrificial thickness to the steelwork to account for design life.

Both options offer a reasonably low maintenance burden. For Option 1, sheet piles will be designed with a sacrificial thickness allowance to account for accelerated low water corrosion (ALWC) and environmental effects.

2.4.3.4 Hydraulic Considerations

The proposed widening may be subject to a Section 12 Approval from the Office of Public Works (OPW) under the Arterial Drainage Act (1949); which covers the modification of flood defence structures. As Option 1 involves modification of the existing channel, this option may be subject to Section 50 Approval under the same act.

Option 1 poses the greatest impact on the hydraulic profile of the river channel, as the full height widening of the quay wall widens the width of the abutment along the river channel.

Option 2 does not pose any impact on the hydraulic performance of the river.

2.4.3.5 Environmental Considerations

This section provides an overview of the environmental issues which have the potential to impact the design, construction method and successful passage through the planning process of the proposed options.

Population and Human Health

Option 1 will have the least impact on road users and pedestrians during construction as most of the piling works will be carried out in-stream, however some traffic management will be required to widen the footpath and potentially to install sections of sheet pile wall from landside. The need for piling within the river will have temporary impacts on local premises due to increased noise and vibration during construction.

Option 2 will require extended traffic management/diversion of the carriageway during construction when compared to Option 1 which will have a negative effect on population as journey times will likely increase. Substantial works will also occur on the landside of the quay wall, causing diversions for pedestrians, which may have temporary effects on the local population.

Both options will likely result in traffic diversions for short durations throughout the construction stage, however Option 1 overall will have the least impact on traffic movement and journey times as the construction of the sheet piled wall will be undertaken from the river side. Option 2 is likely to have the most impact on traffic and population compared to Option 1.

Biodiversity

Option 1 requires the removal of some of the existing rock armour on the southwest embankment, the use of sheet piling in the river, in-stream scaffolding and potentially a jack-up barge. Species will be impacted through disturbance due to noise and vibration effects from these construction activities. High levels of noise can cause injury to fish species and can alter their behaviour (i.e. leaving safe shallow areas to avoid high levels of disturbance) which can result in increased rates of predation of these species. Noise and vibration effects can also displace Otter and any impacts on fish species will have an indirect negative effect on Otter as they rely on the local fish populations as a food source. Minor losses of Annex I habitats 'Estuaries' and 'Mudflats and sandflats not covered by seawater at low tide' will also occur due to land being reclaimed from the river using sheet piles. These habitats may also be indirectly impacted due to changes in the hydraulic profile of the river channel, which will occur as a result of Option 1. Additionally, water quality impacts may also arise from sedimentation during in-river works and rock armour removal. While estuaries already have a high level of turbidity, excess sedimentation can magnify the effects

of other pollutants, which may arise in the event of accidental spillage of wet concrete/mortar while being applied over water. Wet concrete and mortar can have toxic effects on all aquatic life within receiving water bodies and can indirectly impact species that depend on this aquatic life as a food source (i.e. Otter). Option 1 is the least favourable option in terms of biodiversity.

Option 2 will require the removal of some existing rock armour, but not the use of sheet piles, in-stream scaffolding or a jack-up barge. Therefore, there will be no disturbance to species due to noise and vibration effects. There will also be no loss of Annex I habitats from this option. However, this option has the potential to have greater water quality impacts as there will be more wet concrete poured above water in comparison to Option 1. Option 2 is the most favourable option in terms of biodiversity.

Hydraulics and Water Resources

As Option 1 involves modification of the existing channel, this option may be subject to Section 50 Approval under the Arterial Drainage Act, 1945.

Option 1 poses the greater impact on the hydraulic profile of the river channel when compared with Option 2, as the full height widening of the quay wall widens the width of the abutment along the river channel.

Option 2 does not pose any impact on the hydraulic performance of the river.

Both options require construction works adjacent to the River Barrow, and as such there is a risk of temporary/short-term negative impacts to water quality. Option 1 requires extensive in-stream works. These works pose a risk of water quality impacts from sedimentation during in-river works and rock armour removal. Option 2 does not require in-stream works however, it has the potential to have greater water quality impacts than Option 1 as there will be more wet concrete poured above water.

Air Quality and Climate

Both options have the potential to release dust particles into the air during the construction phase, negatively affecting air quality. Option 2 requires greater ground excavation works when compared to Option 1 to allow for the diversion of services and utilities. Some ground breaking of rock armour will be required as part of Option 1, however overall Option 1 is likely to result in less dust nuisance when compared to Option 2. There is no difference between both options in relation to Air Quality and Climate during the operation phase. Option 1 is the preferred option in relation to Air Quality and Climate.

Noise and Vibration

Option 1 will require rock breaking of some sections of the rock armour and the installation of a sheet piled wall, which will result in high levels of noise and vibration for short periods during construction. Due to the urban nature of the location, this will likely have negative effects on adjacent properties for the duration of the piling works. This option is therefore least favourable in terms of noise and vibration.

The predominant source of construction noise for Option 2 is ground excavations which is likely to cause less nuisance on sensitive noise receptors than Option 1, which requires sheet piling. Therefore Option 2 is preferred under Noise and Vibration.

Material Assets

Option 1 will require the least disruption to utilities, requiring only partial demolition of the footpath, and therefore is the preferred option in relation to material assets.

Option 2 will require greater disruption or diversion of services during construction period when compared to Option 1 to accommodate the removal of the existing restraining slab. This option is least preferred in relation to material assets. During the construction phase, temporary flood defence measures will be required.

Option 1 is the preferred option in terms of material assets as there will be reduced risk of disruption to existing utilities.

Archaeological, Architectural and Cultural Heritage

Option 1 will require sheet piles to be driven into the riverbed which has the potential to impact on any unrecorded archaeological sites within the riverbed. During the construction phase a jack up barge will be required to facilitate the piling works. The use of a jack up barge also has the potential to disturb unrecorded archaeological features in the riverbed.

Option 2 does not require pile driving or in-stream works, which is preferable to Option 1 as it will not disturb the riverbed, however there is still potential to disturb any unrecorded archaeological features present behind the existing quay wall.

Option 2 will have the least impact on potential underwater cultural heritage features of significance compared to Option 1.

Landscape and Visual Amenity

Option 1 will have minimal effect on landscape and visual amenity during the operation phase as the works provide no visual enhancement and the design mimics the existing bridge features. During the construction phase a jack-up barge, piling rig and scaffolding will be required which will temporarily impinge on landscape and visual amenity in the area.

During the operation phase, Option 2 will have a minimal effect on landscape and visual amenity as the works provide visual continuity. During the construction phase Option 2 will require scaffolding which will temporarily impinge on landscape and visual amenity.

Both options will have short term effects on landscape and visual amenity during the construction phase. Both options are considered to be neutral when compared.

Environmental Consideration Conclusion

Each option presented has been evaluated and rated on a 5 point scale as per Table 2-1, relative to its effect on the receiving environment. A score of 3 has been assigned to option(s) that have a 'neutral' effect on the receiving environment under the relevant environmental factor. An overall environmental average score has been given to each Option, based on the average of the environmental rankings.

Table 2-6 Environmental Rating and Evaluation of Options

Environmental Factor	Option 1	Option 2
Population and Human Health	4	2

Environmental Factor	Option 1	Option 2
Biodiversity	1	5
Hydraulics and Water Resources	2	4
Air and Climate	4	2
Noise and Vibration	1	5
Material Assets	1	5
Archaeological, Architectural and Cultural Heritage	1	5
Landscape and Visual Amenity	3	3
Total	**15**	**27**
Average Environmental Score	**2.1**	**3.9**

2.4.3.6 Health and Safety Considerations

During the development of the options considered in this report, particular risks have been identified and where possible these have been eliminated or mitigated by design. Residual risks that have not been eliminated are listed in Section 2.4.2.5 in this Planning Report.

Option 1 allows for the integration of permanent and temporary works, in that the sheet piles can be constructed without demolition of the existing or risk to the stability of the existing footway and services. Option 2 will require temporary shoring of the footway and services over the length of the wing-wall during demolition and construction of the cantilever slab.

2.4.3.7 Construction and Buildability

The feasibility of constructing each of the proposed structure types in such a constrained environment must be considered as part of the technical evaluation. Although the final construction sequence and activity associated with the option will be decided by the contractor building the bridge, the following sets out in outline the anticipated construction sequence associated with the construction work for each option.

Option 1

- Procurement of sheet piles.
- Mobilisation of piling rig and jack-up barge.
- Transportation of structural steelwork to lay down area (traffic management required).
- Preparation of embankment and rock armour for installation of sheet piles, including removal of layer of rock armour.
- Installation of sheet piles to required embedded depth.
- Back-filling behind newly installed sheet piles and monitoring for movement.
- Installation of ground anchors along the embankment portion of the wall.
- Construction of reinforced concrete capping beam to sheet piles and upstand wall to match existing flood defence wall.
- Installation of N2 parapet along wing-wall section.
- Taking down of existing flood defence wall and parapet.

- Completion of footway pavement and masonry cladding to new flood defence wall.

Option 2

- Diversion of carriageway and/or traffic management.
- Excavation and diversion of services beneath footway.
- Demolition of existing concrete capping beam and restraining slab and temporary shoring of footway.
- Strengthening of existing wall via installation of additional ground anchors.
- Installation of temporary flood defence systems.
- Construction of reinforced concrete cantilever slab and in-situ stitch over the wing-wall section and restraining slab with flood defence wall over the remainder.
- Installation of N2 parapet over wing-wall section.
- Completion of footway pavement and masonry cladding to new flood defence wall.

Soils and Geology

No evidence of hazardous/contaminated ground has been encountered in previous historical GI in the area. Both options 1 and 2 would require a comparable and minor amount of soil to be excavated.

However, Option 1 will require the installation of river side sheet piles (40-50m) in front of the existing bridge sheet pile wall in comparison to no sheet piling for Option 2. The gap between the new riverside sheet pile wall and the existing sheet pile wall will need to be backfilled with clean granular material. As such the import fill material for Option 1 is higher than for Option 2.

Evaluation

Option 1 requires the most conventional construction methodology, with the least amount of impact to pedestrians, road users, and underground services; for which Option 2 will be the most disruptive due to the necessity to remove the existing restraining slab for the flood defence wall. Option 1 also will require significant preparatory work to the embankment and rock armour to allow driving of sheet piles and the installation of ground anchors. As a result, Option 1 is preferred under construction and buildability criteria. With regards to soils and geology, the import fill material for Option 1 is higher than for Option 2.

2.4.3.8 Options Evaluation Summary

The impact assessment rating has been assigned for options under the criteria listed in Table 2-7 below. In addition, these ratings have been weighted according to the importance of the criteria being evaluated. For instance, the highest weighting of 40% was assigned to the 'Environmental' criteria due to the potential impact on the footprint of the River Barrow and River Nore SAC and the potential of disturbing features of archaeological significance with the mudflats of the river. 'Health and Safety' criteria was assigned the second highest weighting of 25% due to the potential interaction of the construction works with the users of the road network, as well as the risks of working on and near a waterbody. 'Economic' and 'Construction & Durability' criteria where each assigned a 10% weighting, while a weighting of 7.5% was assigned to 'Aesthetic' and 'Durability & Maintenance' criteria.

When the weighting are applied to the individual ranking scores and combined for each option, and overall score is developed to compare the relative advantages of the options; with the highest score being classified as the most advantageous. These are detailed in Table 2-7 below and were developed in consultation with TII and the Kildare County Council.

Table 2-7 Rating and Evaluation of Options

Criteria	Weighting	Option 1	Option 2
Economic	10%	3	3
Aesthetic	7.5%	3	3
Durability & Maintenance	7.5%	3	3
Environmental*	40%	2.1	3.9
Health & Safety	25%	4	2
Construction & Buildability	10%	4	2
Total	**100%**	**3.18**	**2.82**
Ranking		**1**	**2**
*NOTE: Environmental ratings as per Table 2-6			

Based on the above scoring and comparative discussions throughout the report, Option 1 is recommended to be progressed based on its advantages over Option 2.

3. DESCRIPTION OF THE PROPOSED DEVELOPMENT

3.1 Overview of the Proposed Development

O'Hanrahan Bridge is a 9-span post-tensioned concrete beam and reinforced concrete slab bridge over the River Barrow in New Ross town, Co. Wexford. The overall length of the bridge is 175m with an overall width of 11.6m. The proposed works aim to widen the bridge deck by approx. 1m in order to accommodate an enhanced combined pedestrian and cycleway. The widening works are to take place on the southern side of the bridge through the replacement of the existing bridge deck cantilever and parapet edge beam. As a result, the instream piers will not be affected. However, in order to tie the new widened section into the quays at the eastern end and ensure continuity of the new cycleway, the proposed development requires for a 20m long section of the existing quay wall on the south-east corner of the bridge to be reconstructed up to 2m out from the existing quay wall. This section will require working instream. Similarly, approx. 60m section of the south-west corner of the bridge will require widening works by approximately 1m out from the existing wall. The length of new sheet piles in front of the wingwalls will be approximately 19m, of which 5m will be located directly in the river. The remaining 41m of new wall will be constructed in front of the existing flood wall, all driven at the top of the embankment above the water level.

In addition, the edge beam on the northern side of the bridge will be strengthened to accommodate upgrading of the existing parapet. The existing surfacing and footways will be removed to allow the provision of bridge deck waterproofing and joint replacements before the widened footways are constructed and carriageway surfacing reinstated. The works will involve a number of service diversions and upgrades in both footways. Finally, it is also proposed to replace the existing bridge lighting.

Concrete repair works will also be undertaken on the existing O'Hanrahan bridge in areas where minor concrete defects are identified.

3.2 Location of the Proposed Development

O'Hanrahan Bridge is located in the urban centre of New Ross, in Co. Wexford, where it carries the single carriageway R723 Regional Road over the River Barrow as shown in Figure 3-1 below. The River Barrow system rises in the Slieve Bloom Mountains in Co. Laois and flows predominantly through undulating lowlands before entering the sea along the border of Co. Waterford and Co. Wexford. The river forms the boundary between County Wexford and County Kilkenny for the most part, the catchment includes a considerable amount of arable land, as well as pasture, woodland and large towns such as New Ross.

The bridge is located within the urban environment of New Ross town, with the adjacent land use mainly consisting of commercial and residential use. The setting is urban with the bridge site surrounded by a mix of historic buildings and structures, tourism sites and commercial properties on the eastern side; and residential, commercial, and industrial properties on the western side.

The N25 National Road previously travelled over O'Hanrahan Bridge as the main link between County Wexford and County Waterford until January 2020 when the New Ross Bypass was officially opened.

The primary function of the proposed development is to provide a shared pedestrian and cycleway from the New Ross quay front to Rosbercon Quay on the southern side of the bridge (see Figure 3-1), that is accommodated along the widened section of O'Hanrahan Bridge.

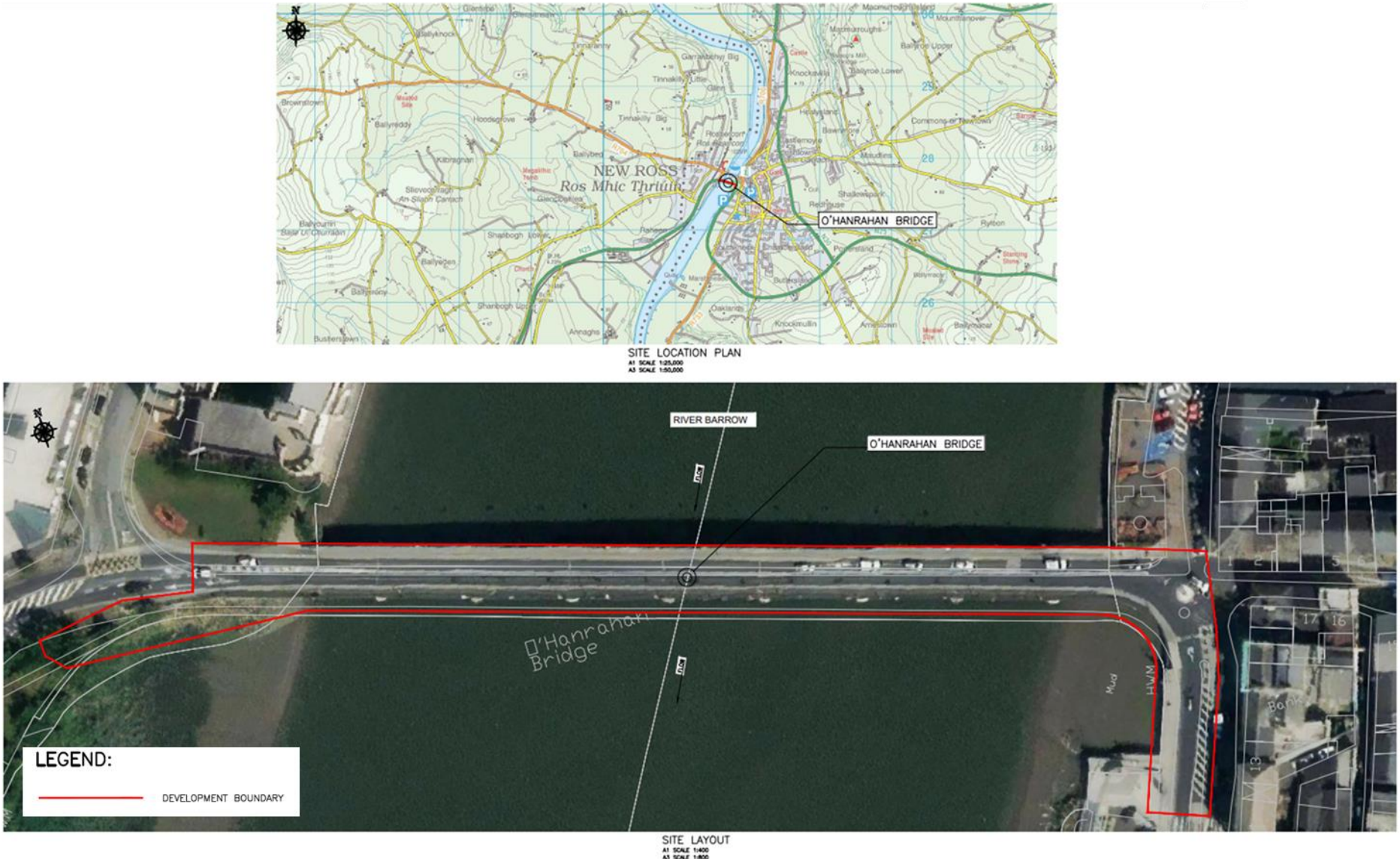

Figure 3-1 Location of the proposed development © Google Maps

Plate 3-1 **New Ross Quay with view to the north. In the foreground are the existing road, footpath and the existing flood defence wall at the south-east corner that is within the proposed development. In background is the O'Hanrahan Bridge. © Google Street View**

Plate 3-2 **O'Hanrahan Bridge with view to the north-west. In the foreground are the existing road of the bridge and the narrow footpaths along the sides that are proposed to be widened as part of the development. The existing parapets are proposed to be replaced. © Google Street View**

Plate 3-3 **New Ross Quay with views to the south. In the foreground are the existing road, parking spaces, existing flood defence wall and a public realm consisting of a small square with benches and flower beds. In the background is the O'Hanrahan Bridge and the Rosbercon Quay. © Google Street View**

Plate 3-4 **Rosbercon Quay with view to the east. The proposed development will provide a connection to the South – East Greenway that will be part of the existing road in the foreground. In the background is the O'Hanrahan Bridge. © Google Street View**

3.3 Design of the Proposed Development

3.3.1 Ground Investigations

A separate Ground Investigation (GI) works contract will be undertaken prior to the commencement of the main works. The proposed GI is focused on the southeast and southwest quay wall to inform the design of the proposed sheet pile wall and

consists of three river boreholes BH01, BH02 and BH03, see Drawing No. WBRC-ROD-ENV-S101-DR-CB-30012 in Appendix A for more details. A trial pit (TP01) will also be carried out on the land side to survey the utilities at this location.

3.3.2 Widening of the Bridge Deck

The widening works on the bridge itself consist of an approx. 1m wide reinforced concrete cantilever slab made integral with the existing deck slab, see Drawing No. WBRC-ROD-ENV-S101-DR-CB-30007 and 30008 in Appendix A. The cantilever slab includes an upstand edge beam to support the proposed N2 parapet. The proposed footway / cycleway will be provided up to this edge beam. The design of the widening works to the bridge will prioritise the use of precast concrete as opposed to in-situ concrete in order to minimise the risk of any spills or debris from entering the River Barrow. However, some in-situ concrete will be required to stitch together the widened section and existing structure.

Refer to Table 3-1 and Figure 3-2 below for details of the existing and proposed cross section. Also refer to Drawing no. WBRC-ROD-ENV-S101-DR-CB-30009 in for road cross section and Drawing no. WBRC-ROD-ENV-S101-DR-CB-30010 deck cross section in Appendix A.

Table 3-1 Cross Section of Existing and Proposed Carriageway of the Bridge

Element width	Existing (m)	Proposed (m)
Parapet Edge Beam (southern)	0.3m	0.5m
Footpath (Southern, proposed as new shared cycleway / footway)	1.8m	3m (min)
Carriageway	7.3m	6.5m
Footpath (Northern)	1.84m	2m (min)
Parapet Edge Beam (Northern)	0.3m	0.5m
Overall Bridge Width	**11.54m**	**12.5m**

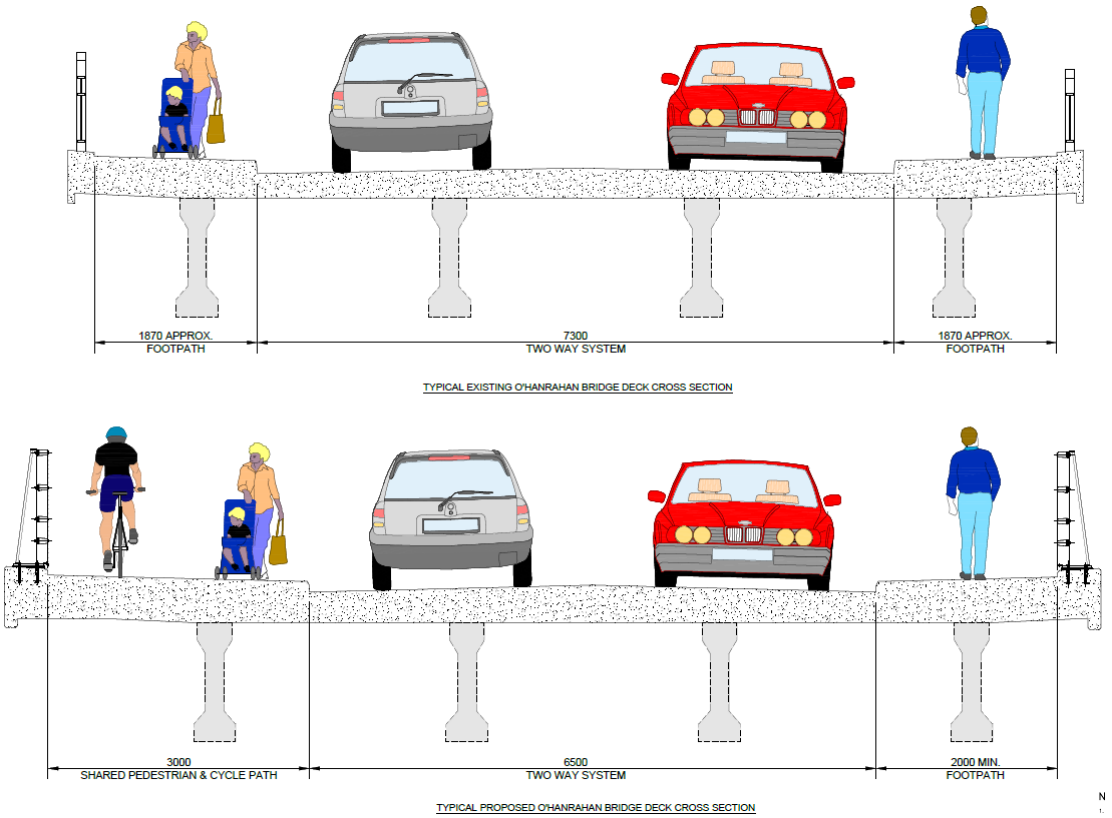

Figure 3-2 Cross Section of Existing and Proposed Carriageway (dimensions in mm)

The extent of the widening was largely dictated by current and future traffic levels, the requirements to provide connectivity between New Ross and the South-Eastern Greenway, and also the load carrying capacity of the existing bridge beams for the additional dead load.

Following reclassification of Bridge Street, which was previously a national road, to a regional road due to the opening of the new bypass outside New Ross (leading to a reduction in traffic levels), a reduction in carriageway width was considered acceptable (and permit a 3m shared surface) given the reduced traffic volumes. Without reducing the carriageway, the 3m shared surface would not have been achievable as the extent of the widening is limited by the structural capacity of the existing bridge.

3.3.3 Parapet Replacement

The existing parapets, approximately 1m high, constructed of painted steel, were constructed in the 1960s as part of the main bridge. As part of a structural assessment of the bridge in 2020, these were deemed incapable of withstanding collisions from modern vehicles. Due to the level of traffic crossing the bridge, it was decided to replace these with 1.4m high N2 containment level parapets in accordance with DN-REQ-03034 (formerly NRA TD 19). The new parapets will likely be comprised of either steel or aluminium. This involves strengthening the existing reinforced concrete parapet edge beams. Whilst the new parapet edge beam on the southern (downstream) end of the bridge will be reconstructed as part of the widening works, it is also necessary to reconstruct the parapet edge beam on the northern (upstream) side of the bridge in order to facilitate the higher containment parapet. Refer to Drawing No. WBRC-ROD-ENV-S101-DR-CB-30015 in Appendix A for details.

The existing plaque, see Plate 3-5 below, located on the northwest corner of the bridge will be relocated to facilitate the upgrade of the bridge parapets. The plaque will be imbedded into the concrete wing wall on the southwest corner of the bridge, see Appendix F Photomontages.

Plate 3-5 Existing Plaque located on the northeast corner of O'Hanrahan Bridge

3.3.4 Widening of quay/wing walls (south-east corner)

The existing O'Hanrahan Bridge abutments, constructed in 1967, are founded on sheet-piles which also act as wing walls to interface with the quay on the eastern end of the bridge. The original railings on the south-east corner were recently replaced with a solid masonry clad reinforced concrete parapet wall as part of the New Ross Flood Alleviation Scheme as shown in Plate 3-6 below.

Plate 3-6 Masonry clad reinforced concrete parapet wall developed as part of the New Ross Flood Alleviation Scheme (southeast corner)

The function of the proposed quay wall extension (varying from 1m to 2m) on the southeast corner is to facilitate the transition from the widened section of O'Hanrahan Bridge (southern edge) to the existing quay wall on the eastern end of the bridge.

The works in this area involve the construction of a new quay wall in front of the existing via the installation of sheet piles to match the width of the widening of O'Hanrahan Bridge as shown in Figure 3-3, and in Drawing No. WBRC-ROD-ENV-S101-DR-CB-30013 in Appendix A. The width of the widening will vary from approx. 1m (at O'Hanrahan Bridge) to 2m at the interface with the existing quay wall and glazed flood defence panels, in order to maintain the 3m combined pedestrian and cycleway from the bridge onto the quays.

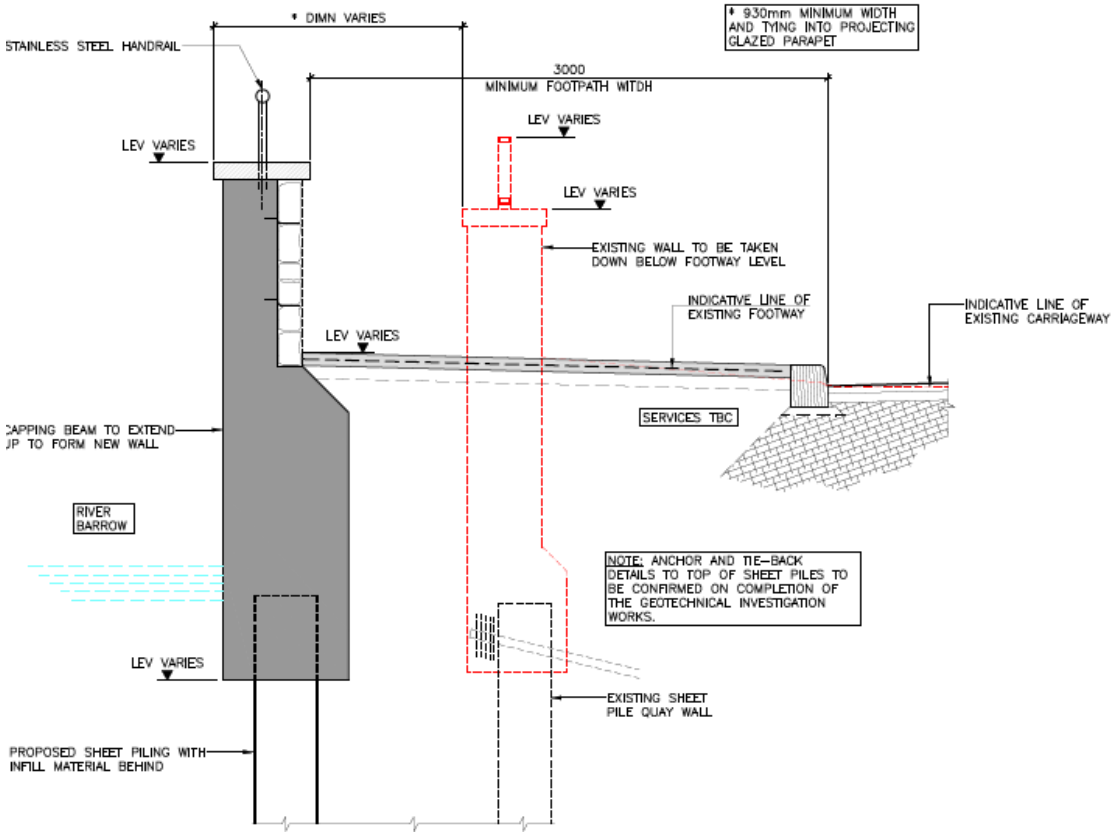

Figure 3-3 Cross Section of Proposed Southeast Quay Wall (existing in red)

The sheet piled design of the flood defence wall (see Figure 3-3) offers the simplest construction methodology as the installation of driven sheet piles is a standard construction technique and allows the permanent works and temporary works to be combined. Construction work being largely confined to outside of the existing quay wall would minimise the impact on the existing services beneath the existing footway.

The existing flood defence wall will be taken down below footway level and replaced by a matching flood defence wall along the line of the widened quay wall. This new wall will be supported by a new reinforced concrete capping beam on the sheet piles. The existing flood defence wall can be left in place until completion of the construction of the new flood defence wall.

Installation of the sheet piles will be completed via a piling rig from a river jack-up barge. The sheet piles will be driven into the riverbed as far as rock level and will be backfilled with compacted fill material.

With the exception of the flood defence wall being taken down below footway level, there will be no demolition works to the existing quay wall. The proposed wall will be structurally separate from the existing and will not impose any additional active earth pressures on the existing structure.

3.3.5 Widening of quay/wing walls (south-west corner)

Similar to the eastern end of the bridge, the western abutments are founded on sheet-piles which also act as wing walls to interface with the quay on the western end of the bridge. On the approaches to the wingwalls on the southwest corner, a reinforced concrete restraining slab acts as a flood wall as part of the New Ross Flood Alleviation Scheme. The restraining slab, constructed in the last decade, includes a masonry clad wall and guardrail. As part of the proposed widening works to O'Hanrahan Bridge, it is proposed to widen the southwestern end of the bridge by approximately 1m in order to continue the shared pedestrian and cycleway from the bridge to the South-Eastern Greenway, refer to Drawing no. WBRC-ROD-ENV-S101-DR-CB-30014 in Appendix A.

The works in this area involve the construction of a new sheet piled quay wall in front of the existing via the installation of sheet piles, similar to the south-eastern corner. The existing rock armour will be removed prior to commencement of piling works. The sheet piles will be installed approximately 1m in front of the existing southwestern wingwalls (beginning at the line of the abutments where the bridge widening ends) and continuing in front of the existing flood wall for a total distance of approximately 60m. The length of new sheet piles in front of the wingwalls will be approximately 19m, of which 5m will be located directly in the river. The remaining 41m of new wall will be constructed in front of the existing flood wall, all driven at the top of the embankment above the water level.

The existing wingwall parapet will be taken down below footway level and replaced by an N2 parapet as per the proposed bridge upgrade. Similarly, beyond the wingwall, the existing flood defence wall will be taken down below footway level and replaced by a matching flood defence wall along the line of the widened quay wall. These will be supported by a new reinforced concrete capping beam on the sheet piles. The new sheet piled wing wall will be tied back to the existing and backfilled with compacted fill material. The sheet pile section in front of the existing flood wall will require ground anchors to prevent excessive lateral movement under accidental vehicle impact. The existing flood defence wall and wingwall parapet can be left in place until completion of the construction of the new flood defence wall / wingwall parapet.

Installation of the sheet piles will be completed via a piling rig either from the landside, a river barge, or a combination of both. The sheet piles will be driven into the riverbed as far as rock level and will be backfilled with compacted fill material.

With the exception of the flood defence wall and parapet being taken down below footway level, there will be no demolition works to the wingwall or restraining slab, the proposed wall will be structurally separate from the existing and will not impose any additional active earth pressures on the existing structure.

On the north-western corner of the bridge, the proposed parapet on the bridge will continue for approximately 20m. This will involve permanently closing off a private entrance to the Riverside Apartment complex. Currently, this entrance poses a risk for road users as it exits onto the main R723 Regional Road just before the main bridge itself.

3.3.6 O'Hanrahan Bridge The Quay Mini Roundabout Junction

The general arrangement of the O'Hanrahan Bridge The Quay Mini Roundabout Junction currently requires large commercial vehicles to either mount the near side kerb or take a wide turn into the opposing traffic lane to perform a left turn movement onto O'Hanrahan Bridge.

It is proposed to modify the proposed O'Hanrahan Bridge The Quay Mini Roundabout Junction to increase the safety of vulnerable road users on the new proposed active travel facilities by easing the movement of commercial vehicles at the junction. This will be achieved by removing the median traffic island approaching the mini roundabout on The Quay and building out the road edge with road marking and frangible bollards.

3.3.7 Drainage

The proposed surface water drainage system of the bridge will follow the existing longitudinal profile of the deck. There is a vertical fall from a high point in the centre of the bridge towards the abutments at either end. Transverse falls in the carriageway and footpaths/cycle paths will also be provided to facilitate surface water drainage. Any runoff from the bridge (rainfall intensity also accounting for future effects of climate change) will flow into an approved combined kerb/drainage unit which is provided at the interface of the carriageway and footpaths/cycleways. Inspection units will be provided to allow inspection, rodding and maintenance. Water from the kerb/drainage system will flow into gullies / manholes at the ends of the bridge, which will tie into Wexford County Council's drainage network.

The proposed system will replace the existing drainage system on the bridge whereby the surface water flows to gullies adjacent to the existing footway kerbs and is discharged directly into the River Barrow via outlet pipes cast into the soffit of the bridge deck. The proposed system will contain all surface water and divert it to the drainage network on the east and west approaches of the bridge.

Where there are outfalls on the existing south-eastern quay wall that are obstructed by the proposed sheet piled wall, these outfalls will be extended through the new wall.

3.3.8 Utilities

3.3.8.1 Existing Utilities

A significant number of services are present underneath the existing footpaths of O'Hanrahan Bridge which continue through the abutments and into the quays. These services were identified as part of a previous Ground investigation contract undertaken in 2020.

At the southern (downstream) end where the widening works are taking place, the following services have been identified:

- 1 No. 150mm dia. public lighting duct.
- 3 No. 150mm dia. water mains (not in use).
- 1 No. 150mm dia. Aurora duct.
- 1 No. 150mm dia. existing duct (unknown, possibly spare).

On the northern (upstream) end of the bridge, the following services have been identified:

- 2 No. 150mm dia. water mains (in use).

- 5 No. 80mm dia. existing ducts (unknown function).
- 3 No. 150mm dia. existing ducts (unknown function).
- 1 No. 200mm dia. pipe (unknown function).

In addition to the above, there is also an existing foul sewer suspended from the underside of the northern deck cantilever.

All existing services will be protected and / or diverted prior to, and during construction. Phasing of the works will be required (see construction sequence in Section 4).

On the southern (downstream) end, the existing Aurora duct, lighting duct and 150mm dia. spare duct shall remain in place and be protected throughout the works. In addition, it is proposed to provide 2 no. new 100mm dia. HDPE watermains.

On the northern (upstream) end, it is proposed to temporarily divert the 2 no. existing 150 mm dia. watermains in use to the southern end whilst works are taking place on the northern end. The other remaining ducts (3 No. 150 mm dia. existing ducts, 5 No. 80 mm dia. existing ducts and 1 No. 200mm dia. pipe) shall be protected throughout the works. The foul sewer suspended from the underside of the deck cantilever, shall be unaffected during the edge beam reconstruction, and shall be protected. Refer to the services drawings and general arrangement drawings for further details.

3.3.8.2 Lighting

It is proposed to replace the existing lighting columns on the bridge. The proposed columns will be installed on reinforced concrete corbels which will protrude out from the new parapet edge beams, see Drawing no. WBRC-ROD-ENV-S101-DR-CB-30011 in Appendix A. The lighting columns will be of a similar height and spacing to the existing, will utilise the existing lighting duct in the footpath and will provide a lighting intensity similar to what is already in place.

4. CONSTRUCTION & OPERATIONAL PHASE

4.1 Construction Sequence and Methodology

The following section describes the likely construction sequence and timescales for the works at O'Hanrahan Bridge.

4.1.1 Timescale for Construction

The works are expected, subject to An Bord Pleanála approval, to commence in late 2023, with construction likely to be approximately 9 months in duration.

4.1.2 Construction sequence and methodology

The works will consist of the widening and upgrade of the main bridge itself, and the construction of the south-east and south-west quay wall. Due to the length of the bridge, and the need to keep traffic open with at least one lane open at all times, it is likely that the work will consist of at least four phases on the bridge itself and a possible fifth phase for the quay walls. The proposed works will be undertaken on a live carriageway and will necessitate the use of lane closures and potential night works to complete the construction. Refer to Drawing No. WBRC-ROD-ENV-S101-DR-CB-30017 to 30021 in Appendix A for construction traffic management phases.

4.1.3 Ground Investigations

A separate GI contract will be carried out prior to the commencement of the main works. GI river works will be undertaken in the following sequence (river borehole):

- Drilling equipment and personnel to be loaded onto jack-up barge at access point as agreed with the Client.
- The drilling rig will be positioned and secured over the moon pool (an opening inside the barge).
- Geotextile membrane will be placed on the working area.
- Absorbing padding and drip tray will be positioned beside/below rig engine.
- Positioning of barge and securing of jack-up legs once GPS location has been confirmed.
- Drilling will be carried out at low tide only using geobor-s rotary drilling and sample recovery of rock and soil.
- Once the scheduled depth is reached and upon approval from the Engineer, the drilling will stop, the barge will be positioned and secured at the next location and the process will be repeated.

GI road works will be undertaken in the following sequence (road trial pit):

- Appropriate Road Opening License (ROL) will be applied and received before commencing of the works.
- Traffic Management will be implemented.
- The engineer will CAT scan the location of the works and mark the location of the existing utility services.
- The excavator will move into position and excavate to the required depth.
- If services are encountered impeding or preventing the full excavation of the trial pit relocation may be required.
- Excavated material will be logged and sampled for laboratory testing.
- Backfilling will be carried out immediately after the completion of the excavation.

4.1.4 Main Bridge Work Sequencing

(1) Implement traffic management measures and lane closures for south-eastern side of bridge.

(2) Implement protective measures to prevent debris entering the river.

(3) Remove existing footpaths, road surfacing, waterproofing, expansion joints whilst protecting / diverting existing services and expose concrete deck.

(4) Remove existing lighting columns, parapets and breakout parapet edge beam and deck cantilever.

(5) Construct new widened cantilever slab, edge beams and lighting column corbels. Scaffolding to construct this slab will be propped/cantilevered off the existing bridge structure.

(6) Carry out concrete deck repairs where necessary.

(7) Install new parapets and lighting columns.

(8) Install new waterproofing.

(9) Construct new footpath/cycleway and drainage system.

(10) Install new carriageway surfacing and expansion joints.

(11) Switch traffic management to south-western end of bridge and repeat steps 2 to 11.

(12) Switch traffic management to north-eastern end of bridge.

(13) Implement protective measures to prevent debris entering the river, such as the use of silt-screens to trap and arrest any falling debris.

(14) Remove existing footpaths, road surfacing, waterproofing, expansion joints whilst protecting / diverting existing services and expose concrete deck.

(15) Divert existing watermain on northern side of bridge to southern side.

(16) Remove existing lighting columns, parapets and breakout parapet edge beam.

(17) Construct new edge beams and lighting column corbels.

(18) Carry out concrete deck repairs where necessary.

(19) Install new parapets and lighting columns.

(20) Install new waterproofing.

(21) Construct new footpath and drainage system.

(22) Install new carriageway surfacing and expansion joints.

(23) Switch traffic management to north-western end of bridge and repeat steps 14 to 24.

(24) Redivert watermain to northern side of bridge.

(25) Remove traffic management.

(26) Undertake concrete repairs to bridge abutments, piers and underside of deck as necessary.

(27) Remove protective measures in river.

4.1.5 Construction Sequence of Southeast Quay Wall

(1) Procurement of sheet piles and traffic management set up.

(2) Mobilisation of piling rig.

(3) Transportation of structural steelwork to lay down area.

(4) Installation of sheet piles to required embedded depth (approx. 22 linear m in length).

(5) Back-filling behind newly installed sheet piles with compacted granular 6N/P fill (approx. 150m^3), monitoring for movement.

(6) Following the installation of the sheet piled wall, scaffolding will be erected to facilitate the construction of the reinforced concrete capping beam (new flood wall). The scaffolding will be cantilevered off of the sheet pile in order to avoid further instream work and also to prevent any concrete spillage or debris from entering the river.

(7) Erect formwork for reinforced concrete capping beam and tie reinforcement steel.

(8) Pour in-situ concrete for new capping beam and upstand wall to match existing flood defence wall (approx. 40m^3 of concrete).

(9) Take down existing flood defence wall to below footpath level (reuse existing stonework where possible).

(10) Completion of footway pavement and erection of stone cladding to new flood defence wall (approx. 10m^3 of stonework).

(11) Removal of traffic management.

Piling Methodology

Piling is anticipated to be carried out from a jack-up barge positioned in the River Barrow to avoid disruptions to traffic and costly traffic management. The typical dimensions of such a barge are 25m x 15m (length x width). The barge will carry a crane and/or long reach excavator equipped with a vibratory hammer that drives piles into the ground by vibration. In case of reaching a lower pile toe level than the specified impact driving may be required. The stack of sheet piles will be placed on an additional pontoon placed next to the barge, which can be tugged by a tugboat from a loading / unloading point on the west side of the River Barrow either at the marina, or on lands south of the O'Hanrahan bridge..

Piling works will start from the southern end and progress towards the south-eastern abutment. It is proposed to complete the closing sheet pile at low tide so as to reduce impacts on aquatic species (i.e. avoid trapping fish).

The work process involves the barge anchoring and stabilising itself, for which the barge shall be position / repositioned during high tide. Similarly, all the necessary material and personnel shall be transported during high tide.

The pile is lowered to a position and the vibrating clamp is attached to the head of the pile. The vibrations generated by vibratory hammer drive the pile into the ground. The vibration and noise generated by this process are continuous during the driving time but are less than those induced by impact driving. With the extent of piling works limited to approximately 20-25m in length, barge relocations are anticipated to be minor, or not required.

The sheet pile alignment is set so that the back side of the sheet piles is at a distance of approximately 1m from the front face of the existing quay wall. Localised obstacles such as dislodged blocks in the mudflats will be removed by an excavator bucket prior to piling works.

The gap between the sheet pile wall and the existing quay wall will be backfilled with clean imported granular fill, TII Specification for Road Works Series 600 Class 6. The top of the fill is envisaged to be flush with existing ground level or up to 500mm lower. The backfilling can be carried out once the entire sheet pile wall has been

installed or can progress simultaneously with sheet piling – once a segment of sheet piles has been installed, the gap can be filled. A temporary transversal pile can be installed at the end of each segment to prevent washout of the backfill. Alternatively, the fill can be placed once all piling is completed.

It is envisaged that piles will be embedded into the upper layer of weathered rock or dense gravels anticipated at ca. 15-20m below ground level (to be confirmed by the ground investigation). Sheet piles will meet the required top of wall level matching the existing quay wall level.

The construction is assumed to be carried out during normal working hours (daytime), 6 days a week. The estimated timeframe for 20-25m sheet pile driving is approximately 4 weeks. This excludes set up and other activities on site, either prior to, or after pile driving. The piling will occur intermittently throughout the day, with the remainder of the time spent on ancillary processes such as setting up the barge, positioning the piles, checking tolerances, delivering material and personnel, and similar.

Piling durations to satisfy environmental requirements

The following general procedure will be followed for any pilling activities ("piling event" means any period of continuous piling; "quiet period" means any period in which there is no piling by any rig):

- Piling works shall not be undertaken between the 1st of April and the 31st May;
- There shall be no night-time piling;
- Vibratory piling shall be the standard method for the installation of all piles. Impact piling shall only be employed where the required pile toe level cannot be achieved by vibratory piling;
- The duration of any vibratory piling event shall not exceed 180 piling minutes;
- The length of any impact piling event shall not exceed 200 strikes; and
- Following every piling event, there shall be a quiet period of at least 30 minutes. Only following 30 minutes of no piling whatsoever can the cumulation of piling minutes be re-zeroed.

The above limitations apply to all piling activity for the proposed widening of the quay wall.

Based on the time expected to be required for the installation of each pile (including ancillary processes), the limits prescribed above will not prolong the proposed programme for riverside or landside piling.

4.1.6 Construction Sequence of Southwest Quay Wall

(1) Temporary removal of existing rock armour using an excavator.

(2) Procurement of sheet piles and traffic management set up.

(3) Mobilisation of piling rig.

(4) Transportation of structural steelwork to lay down area.

(5) Installation of sheet piles to required embedded depth (60 linear m).

(6) Back-filling behind newly installed sheet piles with compacted granular 6N/P fill (approx. 100m^3) and reinstatement of rock armour, monitoring for movement.

(7) Erect formwork for reinforced concrete capping beam and tie reinforcement steel.

(8) Following the installation of the sheet piled wall, scaffolding will be erected to facilitate the construction of the reinforced concrete capping beam (for new flood wall and parapet). The scaffolding will be cantilevered off of the sheet pile in order to avoid further instream work and also to prevent any concrete spillage or debris from entering the river.

(9) Pour in-situ concrete for new capping beam and upstand wall to match existing flood defence wall (approx. 60m x $1.5m^2 = 90m^3$ of concrete).

(10) Install new N2 parapet.

(11) Take down existing flood defence wall and existing parapet to below footpath level (reuse existing stonework where possible).

(12) Completion of footway pavement and erection of stone cladding to new flood defence wall (approx. $10m^3$ of stonework).

(13) Removal of traffic management.

Piling methodology for the southwest corner is as described in Section 4.1.5.

4.1.7 Resurfacing and waterproofing of bridge deck

- To facilitate the waterproofing of the bridge deck, the existing road surface will be excavated to expose the top of the bridge deck.
- Deck surface will be prepared, cleaned and primed for application of bridge deck waterproofing.
- Spray-applied bridge deck waterproofing will be installed on the primed surface.
- New (narrower) road surfacing material will be laid and rolled and footpaths will be reconstructed.
- Road markings will be reapplied.

4.1.8 Concrete repairs to Piers, Abutments and Deck Soffit

- Concrete repairs will be carried out where minor areas of defective concrete are identified.
- Defective concrete will be broken out by handheld drill/impact hammer or other specified method.
- The exposed surfaces will be suitably primed and an approved proprietary prebagged repair mortar/concrete will be placed by hand and allowed to dry.
- Protective measures will be in place at all times during construction to prevent debris from falling into the river.

4.2 Overview of Construction Programme

Table 4-1 Construction Programme

Construction Element	Approx. Duration of each task
Mobilisation, compound set up	2 weeks
Works on southern side of bridge	Approx. 4 months
Works on northern side of bridge	Approx. 4 months
Works on southeast quay wall*	Approx. 2 months (incl. 4 weeks of pile-driving)
Works on southwest quay wall**	Approx. 2 to 2.5 months (incl. 4 to 6 weeks of pile driving)

Construction Element	Approx. Duration of each task
Concrete repairs to underside of bridge*	4-6 weeks
Total Construction Phase	**Approx. 9 months**
* These works can be carried out in parallel with the main bridge works ** These works can be carried out following completion of the southeast corner and in parallel with the main bridge widening works	

4.3 Construction Materials

Sustainable decisions made during the design process will have a positive impact on the cost and carbon footprint of the scheme. To support sustainable construction, the following principles have been embedded in the design:

- Design for minimum waste.
- Aim for lean efficient design and construction methodology.
- Minimise energy in construction by adoption of blended mixes.
- Conservation of water resources by the adoption of water reducing admixtures.
- Use of precast construction off site as much as possible.

Estimated Quantities

- Structural concrete: approx. 328 m^3
- Reinforcement steel: approx. 66 t
- Fill material: approx. 250 m^3
- Sheet piles: approx. 85 lin. m
- Road surfacing: approx. 145 m^3
- Verge concrete: approx. 346 m^3
- Temporary formwork for concrete: approx. 2,301 m^2
- Masonry stonework for cladding: approx. 23 m^3
- Bridge deck waterproofing: approx. 2,202 m^2
- Steel / Aluminium parapets: approx. 406 m
- RC wall with handrail: 59 m
- Expansion joint: approx. 125 m
- Steel / aluminium lighting columns: approx. 16 no.

4.3.1 Sourcing of Materials

All imported material will be sourced from the nearest possible locations, where possible. Concrete, backfill and surfacing materials can be found from a number of manufacturers / quarries locally. Only those quarries that conform to all necessary statutory consents will be used in the construction phase.

It is assumed that the Contractor will source the sheet piles directly from the manufacturer/supplier. While Irish-based sheet pile suppliers exist, there is a greater range of sheet piles from the manufacturers/suppliers that exist in the UK.

4.4 Temporary Construction Compound

The temporary construction compound will be set up and maintained by the successful Contractor. The construction compound and the associated temporary

access road is located within lands on the west side of the River Barrow, with access onto the R704 Regional Road as shown in Figure 4-1 below, and in Drawing No. WBRC-ROD-ENV-S101-DR-CB-30016 in Appendix A. The lands are in the ownership of Wexford County Council.

At the time of writing, these lands are currently used as a construction compound for the separately proposed South East Greenway project. If the construction phases of both projects overlap, arrangements will be made to ensure both projects can effectively use this construction compound.

Figure 4-1 Location of the Construction Compound

4.4.1 Site Access and Haulage Routes

Access to the proposed construction compound will be from the R704 / R723 Regional Road connecting to the N25 National Road as shown in Drawing no. WBRC-ROD-ENV-S101-DR-CB-30016 in Appendix A.

4.5 Working Hours

The permitted working hours arising from construction works is as shown in the following table. The Contractor may propose night-time works outside of these hours provided it is agreed with Kildare County Council. On O'Hanrahan bridge, night works will likely be confined to the eastern half and underside of the structure only due to the close proximity of residential apartments on the western side.

Table 4-2 Working Hours

Period	Hours
Mon to Thurs	08:00 - 19:00
Mon to Thurs (where evening working is approved by KCC)	19:00 - 22:00
Fri	08:00 - 17:00
Sat	08:00 - 16:00
Sun and Bank Holiday	Not permitted

4.6 Operation of the Proposed Development

O'Hanrahan Bridge was previously under the remit of Transport Infrastructure Ireland's EIRSPAN Bridge Management System due to its classification as a National Route. Since reclassified as a regional route, it is under the remit of Wexford County Council and will be maintained and managed in accordance with the bridge management procedures of Wexford County Council.

4.7 Project Change and Decommissioning

There are no plans proposed for the decommissioning of the proposed development given the nature of the project – i.e. the widening of O'Hanrahan Bridge can in this instance, be considered as a 'permanent' operation. The decommissioning of the proposed development is likely to form part of subsequent planning consent procedures and in the unlikely event that specific decommissioning requirements are necessary, appropriate mitigation can be applied to those consents.

4.8 Construction Environmental Management Plan

Appendix B contains the Construction and Environmental Management Plan (CEMP) which shall be finalised by the Contractor, in agreement with Kildare County Council, prior to the commencement of the construction phase.

A CEMP deals with the Contractor's overall management and administration of a construction project in addition to any environmental control measures required during construction. A CEMP is prepared by the Contractor during the pre-construction phase, to ensure that the project is completed on-time and within budget. The CEMP will include a detailed programme of works. The CEMP is also developed to ensure that all construction activities are undertaken in a satisfactory and safe manner, to a delivery program meeting the Clients requirements. The Contractor will be required to include details under the following headings;

- Details of working hours and days.
- Details of emergency plan - in the event of fire, chemical spillage, cement spillage, collapse of structures or failure of equipment or road traffic incident within an area of traffic management. The plan must include contact names and telephone numbers for: Local Authority (all sections/departments); Ambulance; Gardaí and Fire Services.
- Details of chemical/fuel storage areas, (including location and bunding to contain runoff of spillages and leakages).
- Details regarding refuelling areas for machinery and vehicles.
- Details of construction plant storage, temporary offices.
- Traffic management plan (to be developed in conjunction with the Local Authority – Roads Section) including details of routing of network traffic;

temporary road closures; temporary signal strategy; routing of construction traffic; programme of vehicular arrivals; on-site parking for vehicles and workers; road cleaning; other traffic management requirements such as traffic calming where necessary.

- Truck wheel wash details (including measures to reduce and treat runoff).
- Dust management to prevent nuisance and harmful effects (demolition & construction).
- Site run-off and drainage management plan.
- Noise and vibration management to prevent nuisance (demolition & construction).
- Landscape management.
- Soil management plan.
- Management of contaminated land and assessment of risk for same by suitably qualified, trained and licenced personnel.
- Management of demolition of all structures and assessment of risks for same;
- Stockpiles.
- Project procedures & method statements for:
    - Site clearance, site investigations, excavations and working with asbestos containing materials (ACMS).
    - Management and removal of ACMs.
    - Demolition & removal of buildings, services, pipelines (including risk assessment and disposal).
    - Diversion of services.
    - Excavation.
    - Piling.
    - Construction of pipelines.
    - Temporary hoarding & lighting.
    - Disposal of surplus geological material (peat, soils, rock etc.).
    - Protection of watercourses from contamination and silting during construction.
- Site Compound:
    - Temporary car parks for staff and site workers.
    - Material processing areas / Material storage areas / plant storage.

The production of the CEMP will also detail areas of concern with regard to Health and Safety and any environmental issues that require attention during the construction phase. Adoption of good management practices on site during the construction and operation phases will also contribute to reducing environmental impacts.

The CEMP has been appended (Appendix B). This is a preliminary document, which will be updated and finalised by the successful Contractor. Appended to the CEMP are the following constituent plans, also to be finalised by the Contractor:

- **Appendix C:** Environmental Operating Plan (EOP)
- **Appendix D:** Incident Response Plan (IRP)

Each of these plans is discussed in the following sections. The obligation to develop, maintain and implement the CEMP and all of the above-listed plans will form part of the contract documents for the construction phase.

Environmental Operating Plan

The Environmental Operating Plan (EOP) is a document that outlines procedures for the delivery of environmental mitigation measures and for addressing general day-to-day environmental issues that can arise during the construction phase of developments. Essentially the EOP is a project management tool. It is prepared, developed and updated by the Contractor during the construction stage and will be limited to setting out the detailed procedures by which the mitigation measures proposed as part of the EIAR and NIS and arising out of the Board's decision (if approving the proposed development) will be achieved. The EOP will not give rise to any reduction of mitigation measures or measures to protect the environment.

Before any works commence on site, the Contractor will be required to prepare an EOP in accordance with the TII/NRA Guidelines for the Creation and Maintenance of an Environmental Operating Plan. The EOP will set out the Contractors approach to managing environmental issues associated with the construction of the road and provide a documented account to the implementation of the environmental commitments set out in the EIAR and measures stipulated in the planning conditions. Details within the plan will include, as a minimum:

- All environmental commitments and mitigation stipulated in the planning documentation in respect of the proposed development, including sediment controls and other measures to ensure that water quality in the River Barrow is not degraded.
- Any requirements of statutory bodies such as the NPWS and IFI, including adherence to *Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters* (IFI, 2016).
- A detailed Biosecurity Protocol.
- A list of all applicable legislative requirements in relation to environmental protection and a method of documenting compliance with these requirements.
- Outline methods by which construction activities will be managed in such a manner as to avoid, reduce or remedy potential negative impacts on the environment.

To oversee the implementation of the EOP, the Contractors will be required to appoint a person to ensure that the mitigation measures included in this Planning Report, the EOP and the statutory approvals are executed in the construction of the works and to monitor that those mitigation measures employed are functioning properly.

Incident Response Plan

The Incident Response Plan (IRP) describes the procedures, lines of authority and processes that will be followed to ensure that incident response efforts during the construction stage of the proposed development are prompt, efficient, and appropriate to particular circumstances.

The Contractor will finalise the IRP prior to the commencement of the proposed works to include the following information, at a minimum:

- Contact names and telephone numbers for the local authority, i.e. Kildare County Council (all sections and departments), An Garda Síochána and ambulance and fire services.
- Method statements for weather forecasting and continuous monitoring of water levels in the River Barrow. The plan must outline how the Contractor will respond to forecasted flood events, including but not limited to, details of removal of site materials, fuels, tools, vehicles and persons from flood zones.
- The measures to be taken to avoid or reduce the incident risk potential.
- Reference to the method statement and management plans for construction activities, insofar as they are relevant for the purposes of mitigating against health and safety and pollution incidents.
- Procedures to be adopted to contain, limit and mitigate any adverse effects, as far as reasonably practicable, in the event of a health and safety or pollution incident.
- Persons responsible for dealing with incidents and their contact details.
- Procedures for alerting key staff, appropriate emergency services, authorities, the Employer's Representative and clean-up companies, where required, and contact details of same.
- Procedures for notifying relevant statutory bodies, environmental regulatory bodies, local authorities and local water and sewer providers of pollution incidents, where required, and contact details of same.
- Standby / rota systems.
- The types and location of emergency response equipment available and appropriate personal protective equipment to be worn.

An IRP has been appended to the CEMP (i.e., Appendix D of Appendix B of this Planning Report). The document in its current form will be finalised by the successful Contractor prior to the commencement of the construction phase of the proposed development.

Implementation of the EOP

It will be a condition of the Contract for the construction of the proposed development that the successful Contractor fully implement the EOP throughout the works. To oversee the implementation of the EOP, the Contractor will be required to appoint a responsible Site Environmental Manager (SEM) to ensure that the environmental commitments (as described above) and the EOP are fully executed for the duration of works, and to monitor whether the mitigation measures employed are functioning properly (i.e. are effectively addressing the environmental impact(s) which they were prescribed for).

5. ENVIRONMENTAL ASSESSMENT

5.1 Environmental Assessment Methodology

A key document that has informed this environmental assessment methodology for this Planning Report includes the Guidelines on the information to be contained in Environmental Impact Assessment Reports (May, 2022) produced by the Environmental Protection Agency (EPA). Section 3.7 of these Guidelines and specifically Table 5-1 (below) forms the basis for describing the impacts as part of this assessment. The consideration of potential impacts includes direct, indirect, secondary, and cumulative impacts as appropriate, with reference to the appropriate guidance.

Where specialists' topics have recognised different guidance / standards relating to the description of effects and significance these are set out in the respective sections as part of the environmental topic as appropriate.

Table 5-1 Description of Effects

Quality of Effects:	
Positive	A change which improves the quality of the environment.
Neutral	No effects, or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.
Negative	A change which reduces the quality of the environment.
Describing Significance of effect:	
Imperceptible	An effect capable of measurement but without significant consequences.
Not Significant	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Slight effects	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Moderate effects	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
Significant Effects	An effect which, by its character, magnitude, duration or intensity significantly alters a sensitive aspect of the environment.
Very significant Effects	An effect which, by its character, magnitude, duration or intensity significant alters most of a sensitive aspect of the environment.
Profound Effects	An effect which obliterates sensitive characteristics.
Describing the Extent and Context of Effects:	
Extent	Describe the size of the area, the number of sites, and the proportion of a population affected by an effect.
Context	Describe whether the extent, duration, or frequency will conform or contrast with established (baseline) conditions (is it the biggest, longest effect ever?)
Describing the Probability of the Effects:	
Likely Effects	The effects that can reasonably be expected to occur because of the planned project if all mitigation measures are properly implemented.
Unlikely Effects	The effects that can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented.

Describing the Duration and Frequency of Effects:	
Momentary Effects	Effects lasting from seconds to minutes
Brief Effects	Effects last less than a day
Temporary Effects	Effects lasting less than a year
Short-term Effects	Effects lasting one to seven years
Medium-term Effects	Effects lasting seven to fifteen years
Long-term Effects	Effects lasting fifteen to sixty years.
Permanent Effects	Effects lasting over sixty years
Describing the Duration and Frequency of Effects:	
Reversible effects	Effects that can be undone, for example through remediation or restoration.
Frequency of Effects	Describe how often the effect will occur. (once, rarely, occasionally, frequently, constantly – or hour, daily, weekly, monthly, annually).

5.2 Environmental Factors

The environmental factors have been assessed in this Planning Report in the following sections:

Section 6 – Traffic and Transport

Section 7 – Population and Human Health

Section 8 – Biodiversity

Section 9 – Hydrology

Section 10 – Soils, Geology, and Hydrogeology

Section 11 – Landscape and Visual

Section 12 – Air Quality and Climate

Section 13 – Noise and Vibration

Section 14 – Archaeology, Architecture and Cultural Heritage

Section 15 – Material Assets and Land

Section 16 – Majors Accidents and Disasters

Section 17 – Cumulative Effects

6. TRAFFIC AND TRANSPORT

6.1 Introduction

This section considers and assesses the potential traffic and transportation impacts associated with the proposed development.

6.2 Methodology

The section has been prepared in line with the following documents:

- Wexford County Development Plan 2022-2028.
- Transport Infrastructure Ireland (TII) 'Traffic and Transport Guidelines' (PE-PDV-02045).
- Traffic Signs Manual Chapter 8, Temporary Traffic Measures and Signs for Roadworks published by The Department of Transport, Tourism and Sport, August 2019.
- Temporary Traffic Management Design Guidance published by The Department of Transport, Tourism and Sport, August 2019.

Data relating to any collisions in the vicinity of the development site during the 12-year period between 2005 and 2016 was collected from the Road Safety Authority (RSA) online mapping tool and analysed.

A manual classified junction turning count survey was carried out at both ends of the O'Hanrahan Bridge on Wednesday the 04th of March 2020. These counts reflect the traffic conditions at O'Hanrahan Bridge subsequent to the opening of the Rose Kennedy Fitzgerald Bridge and the N25 bypass which opened in January 2020. The survey took place for 12 hours between 7am and 7pm. Short-term survey expansion factors have been used to estimate the AADT in accordance with TII publication PE-PAG-02039 (PAG Unit 16.1). This data is used to analyse the traffic impact of the proposed development.

This traffic assessment determines the additional traffic loading resulting from the proposed development and considers the potential impact on the surrounding road network and traffic conditions.

6.3 Baseline Environment

6.3.1 Road Infrastructure

The site of the proposed development is located on O'Hanrahan Bridge, Co Wexford. O'Hanrahan Bridge is the only river crossing in New Ross and thus forms a crucial transportation link. The next available river crossing is the N25 Rose Fitzgerald Kennedy Bridge located 6km downstream. O'Hanrahan Bridge is located on the R723 Regional Road which runs from the N25 Glenmore Roundabout approximately 6km southeast of New Ross Town Centre to the N25 Ballymacar Roundabout approximately 3km east of New Ross Town Centre. The R723 previously formed part of the N25 national route but its road category was amended to regional road with the opening of the New Ross by-pass in January 2020. Its present function is to provide a regional link between New Ross and the N25.

O'Hanrahan Bridge is a single carriageway road, with a posted speed limit of 50km/hr. There are footpaths on both sides of the carriageway with a typical width of 1.875m. There are no dedicated provisions for cyclists. The typical layout of O'Hanrahan Bridge carriageway and footpaths is presented in Plate 6-1.

Plate 6-1 **R273 O'Hanrahan Bridge looking West - Existing Carriageway and Footpaths (google street view)**

The R273 shown in Plate 6-2 continues onto The Quay at the eastern end of O'Hanrahan Bridge. This provides access to a number of one-way side streets and town centre car parks. The Quay is typically a three-lane urban carriageway with a single traffic lane in each direction and an additional lane for turning movements. The Quay has good quality provisions for pedestrian with footpaths provided on both sides of the street and appropriate crossing facilities along pedestrian desire lines.

There are no dedicated cycle facilities on The Quay.

Plate 6-2 **R273 The Quay looking South (google street view)**

The R273 O'Hanrahan Bridge/ The Quay forms a 4 arm mini-roundabout junction with North Quay and Quay Street at the eastern end of O'Hanrahan Bridge. The mini roundabout general arrangement, see Plate 6-3 requires large commercial vehicles

to either mount the nearside kerb or take a wide manoeuvre into the opposing traffic lane if taking a left turn onto O'Hanrahan Bridge.

Plate 6-3 **Broken Kerbs and Footway are Evidence of Commercial Vehicle Overrun**

North Quay (Plate 6-5) and Quay Street (Plate 6-4) which connect to O'Hanrahan Bridge via the mini roundabout are narrow urban single carriageway streets with inbound traffic on North Quay and outbound traffic on Quay Street. Quay Street, shown in Plate 6-4 has good quality pedestrian facilities with wide footpaths on both sides of the street. North Quay has on-street parking on both sides of the street. The pedestrian facilities on North Quay are moderate with a narrow footpath provided on only one side of the street. Street furniture in the footpath create frequent pinch points with the building line.

There are no dedicated cycle facilities on North Quay or Quay Street.

Plate 6-4 **Quay Street (google street view)**

Plate 6-5 North Quay (google street view)

O'Hanrahan Bridge connects to R723 Bridge Street on the western bank of the River Barrow. R723 Bridge Street is typically a two-way single carriageway with footpaths on both sides of the street and a 50kph posted speed limit. It provides a link to the N25 national road approximately 6.5km southwest of the Town Centre.

R704 Thomastown Road (Plate 6-6) forms a priority-controlled junction with R723 Bridge Street approximately 40m west of O'Hanrahan Bridge. Thomastown Road is also a two-way single carriageway with a 50kph posted speed limit. The R704 provides a regional road link between New Ross and the M9 at Mullinavat approximately 18km west of the Town Centre.

Plate 6-6 R704 Thomastown Road (google street view)

R723 Bridge Street and R704 Thomastown Road (Plate 6-7) form a staggered priority controlled junction with the direct access to Grassland Agro's site west of

O'Hanrahan Bridge. The junction is rural in form with ghost island right turn lanes and large conner radii for large commercial vehicles.

Plate 6-7 **R723 Bridge Street and R704 Thomastown Grassland Argo Direct Access Staggered Junction (google street view)**

6.3.2 Public Transport Facilities

O'Hanrahan Bridge provides a vital link to bus services serving New Ross. These include services operated by Bus Eireann and private bus operators. A list of the available bus services are provided in the table below.

Table 6-1 List of Public Bus Services in New Ross

Bus No.	Operator	Route Details
40	Expressway	Tralee Bus Station – Rosslare Harbour
340	Wexford Bus	Wexford, Redmond Square – Waterford Regional Hospital
368	Local Link Wexford	Tullow (Carlow) – New Ross (The Quay)
370	Bus Éireann	Outer Ring Road (Dunmore Rd Roundabout) – Rosslare Harbour
371	Bus Éireann	New Ross (The Quay) – Wexford Station
372	Bus Éireann	Waterford Bus Station – Wexford Station
373	Bus Éireann	New Ross (The Quay) – Waterford Station
374	Bus Éireann	New Ross (The Quay) – Killkenny Station
375	Bus Éireann	New Ross (The Quay) – Enniscorthy
882	Michael Kilbride	New Ross (The Quay) – Kilkenny, Ormond Road
UL01	Ardcavan Coach Tours	Enniscorthy, Island Road Ennis - Mary Immaculate College
X4	Expressway	New Ross (The Quay) - Dublin Airport

6.3.3 Road Safety

Between 2005 and 2016 a total of 10 minor incidents were recorded on the R273 in the vicinity O'Hanrahan Bridge. These include 1 incident west of O'Hanrahan Bridge at the junction of Waterford Road and Thomastown Road, 1 incident at western end of O'Hanrahan Bridge at the junction with North Quay and Quay Street, 4 incidents on The Quay at the junction of Charles Street, and 4 incidents further south on The Quay at the junction with Sugarhouse Lane. There is no unusual pattern or trend of

incidents to suggest that there is an existing reoccurring hazard or fault on the network which requires immediate consideration.

The locations of the collisions on the road network near the site are indicated in Plate 6-8.

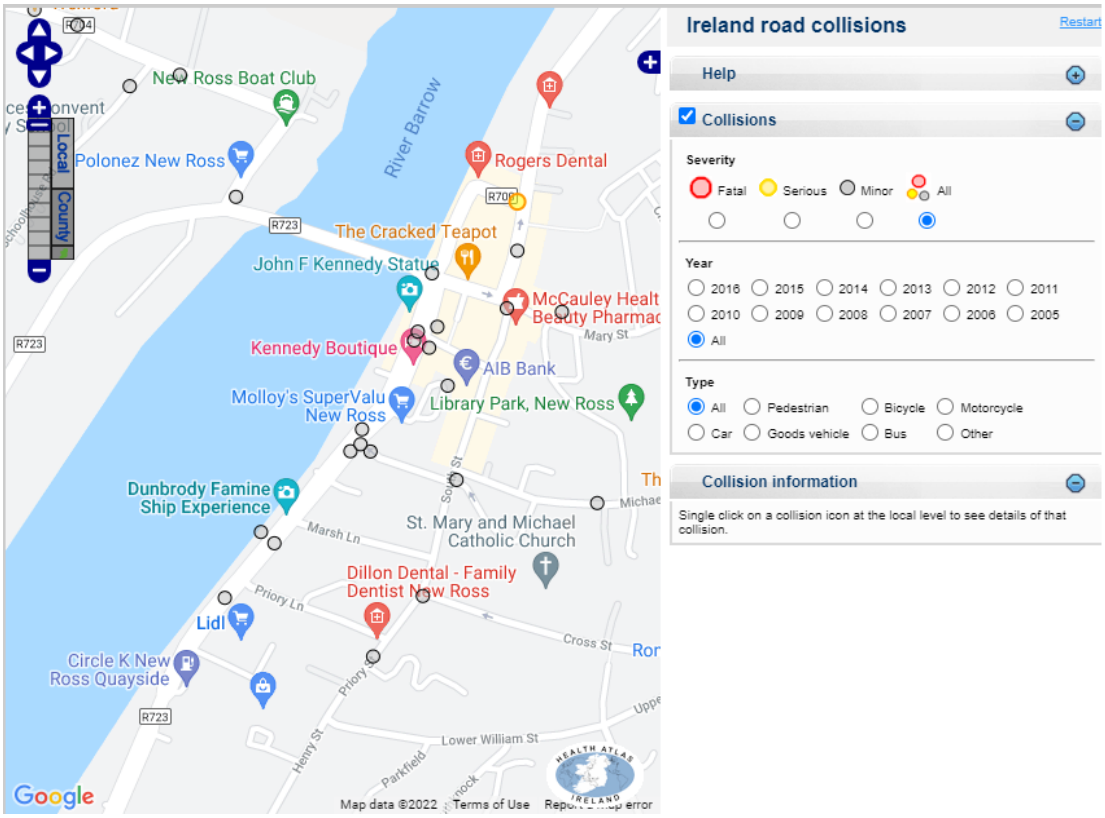

Plate 6-8 **Road Safety Authorities (RSA) Records of Road Traffic Incidents in New Ross**

6.3.4 Existing Traffic

A summary of the JCT traffic survey undertaken in March 2020 and the estimated AADT in Passenger Car Units (PCU) and Heavy Goods Vehicles (HGV) is provided in Table 6-2 to Table 6-5 below.

Table 6-2 Summary of JTC at the O'Hanrahan Bridge, The Quay, North Quay and Quay Street Junction

Link	AM PEAK TRAFFIC FLOWS 0800 to 0900			PM PEAK TRAFFIC FLOWS 1700 to 1800			AADT (PCU/day)
	Inbound (PCU/hr)	Outbound (PCU/hr)	Two-way (PCU/hr)	Inbound (PCU/hr)	Outbound (PCU/hr)	Two-way (PCU/hr)	
R700 North Quay	0	313	313	0	273	273	3,760
R700 Quay Street	153	0	153	318	0	318	2,788
R723 The Quay	388	277	565	476	382	858	9,637
R723 O'Hanrahan Bridge	395	346	741	470	609	1,079	11,615
Total Throughput	936			1,264			13,900

Table 6-3 HGVs Flows during AM and PM Peak Hour Traffic at the O'Hanrahan Bridge, The Quay, North Quay and Quay Street Junction

Link	AM PEAK TRAFFIC FLOWS 0800 to 0900			PM PEAK TRAFFIC FLOWS 1700 to 1800			AADT (HGV /day)
	Inbound (HGV/hr)	Outbound (HGV /hr)	Two-way (HGV /hr)	Inbound (HGV /hr)	Outbound (HGV /hr)	Two-way (HGV /hr)	
R700 North Quay	0	0	0	0	0	0	0
R700 Quay Street	0	0	0	0	0	0	3
R723 The Quay	11	11	22	9	19	28	372
R723 O'Hanrahan Bridge	11	11	22	19	9	28	375
Total Throughput	22			28			375

Table 6-4 Summary of JTC at the Waterford Road and Thomastown Road Junction

Link	AM PEAK TRAFFIC FLOWS 0800 to 0900			PM PEAK TRAFFIC FLOWS 1700 to 1800			AADT (PCU/day)
	Inbound (PCU/hr)	Outbound (PCU/hr)	Two-way (PCU/hr)	Inbound (PCU/hr)	Outbound (PCU/hr)	Two-way (PCU/hr)	
R704 Thomastown Road	198	180	378	143	143	286	3395
R723 Waterford Road – west arm	389	387	776	360	502	862	8884
R723 Waterford Road – east arm	531	551	1082	612	470	1082	11618
Total Throughput	1118			1,115			11,949

Table 6-5 HGVs Flows during AM and PM Peak Hour Traffic at the Waterford Road and Thomastown Road Junction

Link	AM PEAK TRAFFIC FLOWS 0800 to 0900			PM PEAK TRAFFIC FLOWS 1700 to 1800			AADT (HGV /day)
	Inbound (HGV /hr)	Outbound (HGV /hr)	Two-way (HGV /hr)	Inbound (HGV /hr)	Outbound (HGV /hr)	Two-way (HGV /hr)	
R704 Thomastown Road	0	0	0	0	1	1	6
R723 Waterford Road – west arm	11	11	22	19	10	29	375
R723 Waterford Road – east arm	11	11	22	9	19	28	375
Total Throughput	22			29			378

An analysis of the traffic survey found that O'Hanrahan Bridge has an estimated AADT of 11,615 PCUs including 375 HGVs. The total traffic throughput of the O'Hanrahan Bridge, The Quay, North Quay and Quay Street Junction is 13,900 PCU/day and 375 HGV/day. The total traffic throughput on the Waterford Road and Thomastown Road Junction is 11,949 PCU/day including 378 HGV/day.

The AM and PM peak hours were found to commence at 08:00 and 17:00. The AM and PM peak hour traffic flows on O'Hanrahan Bridge are 741 PCU/ hour and 1,079 PCU/ hour.

6.4 Potential Impacts

6.4.1 Construction Stage

6.4.1.1 Delivery of Construction Materials

The delivery of construction materials will generate HGV movements along the haul route described in section 4 'Construction & Operation Phase' of the report. The number of HGV trips generated from the delivery of construction materials was estimated based on the quantities described in Section 4.3 of this report. The estimated HGV trip generation are summarised in Table 6-6 below. The HGV trip calculations are provided in full in Appendix C of this Report.

Table 6-6 HGVs Flows during AM and PM Peak Hour Traffic at the Waterford Road and Thomastown Road Junction

Construction Activity	Parallel Construction Activities	Duration as per Table 4-1	Total No. of HGV Round Trips (Two-way)	Avg. No. HGV Round Trips per day (Two-way)
Works on southern side of bridge	Works on South Quay Wall Repairs to underside of bridge	4 months or 122 days	236	2
Works on northern side of bridge	Repairs to underside of bridge	4 months or 122 days	225	2

The delivery of construction material will generate an average daily increase of only 2 round trips per day. This amounts to an increase of less than 0.1% on the baseline AADT traffic flows on O'Hanrahan Bridge, and less than 0.5% of the baseline HGV traffic flows. Thus, the effects on existing traffic flows in the vicinity of the site are considered temporary and imperceptible.

6.4.1.2 Construction Traffic Management Plan

The construction stage of the development will be broken up into at least five phases to facilitate existing traffic. Each phase will require a lane closure of up to approximately 100m in length. The remaining traffic lane in each phase will be used to maintain existing traffic under a one-way shuttle flow arrangement. The shuttle flow will be controlled with remotely operated stop/ go batons or traffic signals.

The capacities of stop/ go shuttle flow arrangements are outline in Table 0.5.2.1 of the Temporary Traffic Management Design Guidance document published August 2019 by the Department of Transport, Tourism and Sport. The table below compares the capacity of 100m and 200m long one-way shuttle flows against baseline traffic flows on O'Hanrahan Bridge.

Table 6-7 Impact of One-way Shuttle Arrangement on O'Hanrahan Bridge Traffic

Coned area length	100m	200m
Capacity of a One-way Shuttle Arrangement	1,400 veh/hr	1,260 veh/hr
Daily Peak Baseline Traffic Flows	1,079 PCU	
Reserve Capacity	321 veh/hr or 33%	181veh/hr or 14%

The results indicate that the proposed stop/go shuttle arrangement on straight sections of O'Hanrahan Bridge will operate well within capacity, with 14% to 33% of capacity in reserve.

The widening of the bridge abutments and quay walls and both ends of the bridge will be carried out in two construction phases which will require signalising the O'Hanrahan Bridge, North Quay Wall Junction and the O'Hanrahan Bridge Thomastown Road Junction. These widening works will take approximately 2 months each to complete. The temporary works stage traffic management plan drawings are provided in Appendix C.

A Linsig junction capacity analysis was carried out on the temporary arrangement at both junctions to predict its impacts. A summary of the junction capacity analysis is provided in Table 6-8. The junction capacity analysis can be viewed in full in Appendix C of this Report.

Table 6-8 Summary of O'Hanrahan Bridge, The Quay, Quay Street and North Quay Junction Capacity Analysis

		Baseline Mini roundabout			Construction Stage TMP Junction 150s signal cycle		
AM PEAK HOUR	**Lane Description**	**% DoS**	**Max Mean Queue, (PCU)**	**Av. Delay Per PCU (s/pcu)**	**% DoS (% impact)**	**Max Mean Queue, (PCU)**	**Av. Delay Per PCU (s/pcu)**
	O'Hanrahan Bridge	13%	0.1	1.2	87% (74%↑)	23.6	68.6
	The Quay	34%	0.3	2.4	88% (54%↑)	24.2	63.5
	North Quay	25%	0.2	2.0	22% (3%↓)	4.5	9.6
PM PEAK HOUR	**Lane Description**	**% DoS**	**Max Mean Queue, (PCU**	**Av. Delay Per PCU (s/pcu)**	**% DoS (% impact)**	**Max Mean Queue, (PCU)**	**Av. Delay Per PCU (s/pcu)**
	O'Hanrahan Bridge	33%	0.3	1.5	86% (53%↑)	26.3	60.1
	The Quay	32%	0.2	2.3	87% (55%↑)	21.2	69.1

		Baseline Mini roundabout			Construction Stage TMP Junction 150s signal cycle		
	North Quay	35%	0.3	3.6	22% (13%↓)	4.8	12.1

Table 6-9 Summary of O'Hanrahan Bridge, Bridge Street, Thomastown Road Junction Capacity Analysis

		Baseline Priority Controlled Junction			Construction Stage TMP Junction 180s signal cycle		
AM PEAK HOUR	**Lane Description**	**% DoS**	**Max Mean Queue, (PCU)**	**Av. Delay Per PCU (s/pcu)**	**% DoS (% impact)**	**Max Mean Queue, (PCU)**	**Av. Delay Per PCU (s/pcu)**
	O'Hanrahan Bridge	10%	0.1	1.1	85% (75%↑)	11.8	124.9
	Bridge Street	20%	0.1	1.2	85% (65%↑)	21.6	90.2
	Thomastown Road	45%	0.4	2.7	85% (40%↑)	28.7	72.8
PM PEAK HOUR	**Lane Description**	**% DoS**	**Max Mean Queue, (PCU**	**Av. Delay Per PCU (s/pcu)**	**% DoS (% impact)**	**Max Mean Queue, (PCU)**	**Av. Delay Per PCU (s/pcu)**
	O'Hanrahan Bridge	8%	0	1	79% (41%↑)	9.1	120.1
	Bridge Street	25%	0.2	1.2	82% (57%↑)	25	10.1
	Thomastown Road	35%	0.3	2.2	82% (47%↑)	1.6	0.8

The junction capacity analysis found that that % DOS will increase by a maximum of 74% on baseline figures during peak hours on the O'Hanrahan Bridge, The Quay, Quay Street and North Quay Junction and a maximum of 75% on the O'Hanrahan Bridge, Bridge Street, Thomastown Road Junction.

The average delay in the AM and PM peak hours on the O'Hanrahan Bridge, The Quay, North Quay, Quay Street Junction will increase by 58 - 67 seconds per PCU, with a maximum increase of 21-26 PCUs in the maximum mean queue length.

The average delay in the AM and PM peak hours on the O'Hanrahan Bridge, Bridge Street, Thomastown Road Junction will increase by 89 –124 seconds per PCU with a maximum increase of 22 - 25 PCUs in the maximum mean queue length.

However, a signalised junction is considered to be performing satisfactorily if the Degree of Saturation (DoS) is at or below 90%. A % DoS of 88% and 87% in the AM and PM peak hours indicates that stop/ go shuttle arrangement will operate within

capacity, with the majority of vehicles getting through the junction in a single green phase.

Thus, the Construction Traffic Management Plan for junctions at both ends of O'Hanrahan Bridge is considered to have a moderate temporary effect lasting 2 months.

6.4.1.3 Construction Stage Pedestrian and Cyclists Impacts

The construction works will require one footpath to be closed for the duration of the construction stage which will alternate in line with the traffic lane closures. Pedestrians will be required to use the footpath on the opposite side of the bridge with wheelchair users and other mobility impaired users being diverted to suitable crossing locations.

There are no dedicated cycle facilities currently on O'Hanrahan Bridge. Cyclists are required to either integrate with vehicular traffic or dismount and walk along the footways with their bicycles. The construction works will not alter this regime. Road cyclists are likely to experience delays similar to that for vehicular traffic.

Thus, the construction stage traffic management is considered to have a slight temporary effect on pedestrian and cyclists using the bridge.

6.4.2 Operation Stage

6.4.2.1 Active Travel Impacts

The proposed development will provide a safe, comfortable, and attractive pedestrian and cycle link along O'Hanrahan Bridge which will connect New Ross to the future South-East Greenway planned along the western banks of the River Barrow. Thus, the proposed development is considered to have a very significant positive impact on active travel and on achieving the vision set out in the National Cycle Policy Framework.

6.4.2.2 Vehicular Traffic Impacts

The proposed cycle facilities may enhance the attractiveness and convenience of cycling as a feasible form of everyday travel, but the positive effects on traffic are likely to be non-significant.

6.5 Mitigation Measures

6.5.1 Construction Stage Traffic Management Plan

As with any construction project, the contractors shall carry out a comprehensive Construction Traffic Management Plan (CTMP) in consultation with the local authority, Wexford Co. Co. before the commencement of the construction phase. The purpose of such a plan is to outline the measures to manage the expected construction traffic during the construction period and will be revised accordingly as works progress. The CTMP will also detail how facilities for existing road users will be maintained whilst construction operations are proceeding. The CTMP will ensure at least one footpath on O'Hanrahan Bridge always remains open and appropriate infrastructure and signage is provided to ensure the safe passage of pedestrian across the bridge, including people with mobility impairments.

6.6 Residual Impacts

There are no residual traffic and transport impacts to be considered in the proposed development.

7. POPULATION AND HUMAN HEALTH

7.1 Introduction

This section addresses the potential impacts on population and human health as a result of the construction and operation of the proposed development. Actual and perceived impacts of the proposed development may arise on population and human health from various aspects of the proposed development. These impacts are dealt with throughout this Planning Report in particular, the following Section of this report: Landscape and Visual (Section 11), Air Quality and Climate (Section 12), Noise and Vibration (Section 13); and Material Assets and Land (Section 15).

7.2 Methodology

A study of population and human health impacts generally addresses impacts at the community level rather than for individuals or identifiable properties. The assessment of impacts at a local level has focused on the communities adjacent to, or in the general environs of, the proposed development. The proposed development is described in Sections 3 and 4 of this Planning Report.

Particular emphasis has been given to the impacts on local vehicle journeys, pedestrians, cyclists and local residents in terms of the following five headings:

- *Journey characteristics*: an assessment of the impact of the proposed development on journey time, journey time reliability and travel patterns.
- *Community severance*: an assessment of the impact of the proposed development with regard to community severance, including impacts on the use of community facilities, particularly those used by older people, children or other vulnerable groups. The category includes both new severance and relief from existing severance.
- *Amenity:* An assessment of the impact on general amenity arising from the proposed development including traffic conditions and people's exposure to traffic (i.e. safety, noise, dirt, air quality). This category also includes impacts on sites used for amenity purposes and general impacts on local quality of life.
- *Economic impacts*: an evaluation of the proposed development in the context of economic prospects and employment.
- *Human Health:* considered with reference to and interactions with other environmental receptors contained in corresponding sections such as air, noise, traffic, as appropriate.

7.3 Study Area

There is no national guidance available on an appropriate study area to focus the assessment of population and human health. The study area has been defined with reference to the potential for impact from the proposed development based on the availability of relevant information. There are two Electoral Divisions (EDs) partially contained within 500m of the proposed development, New Ross Urban ED and Rosbercon Urban ED, see Figure 7-1. The area contained in these Electoral Divisions forms the study area for the population and human health assessment.

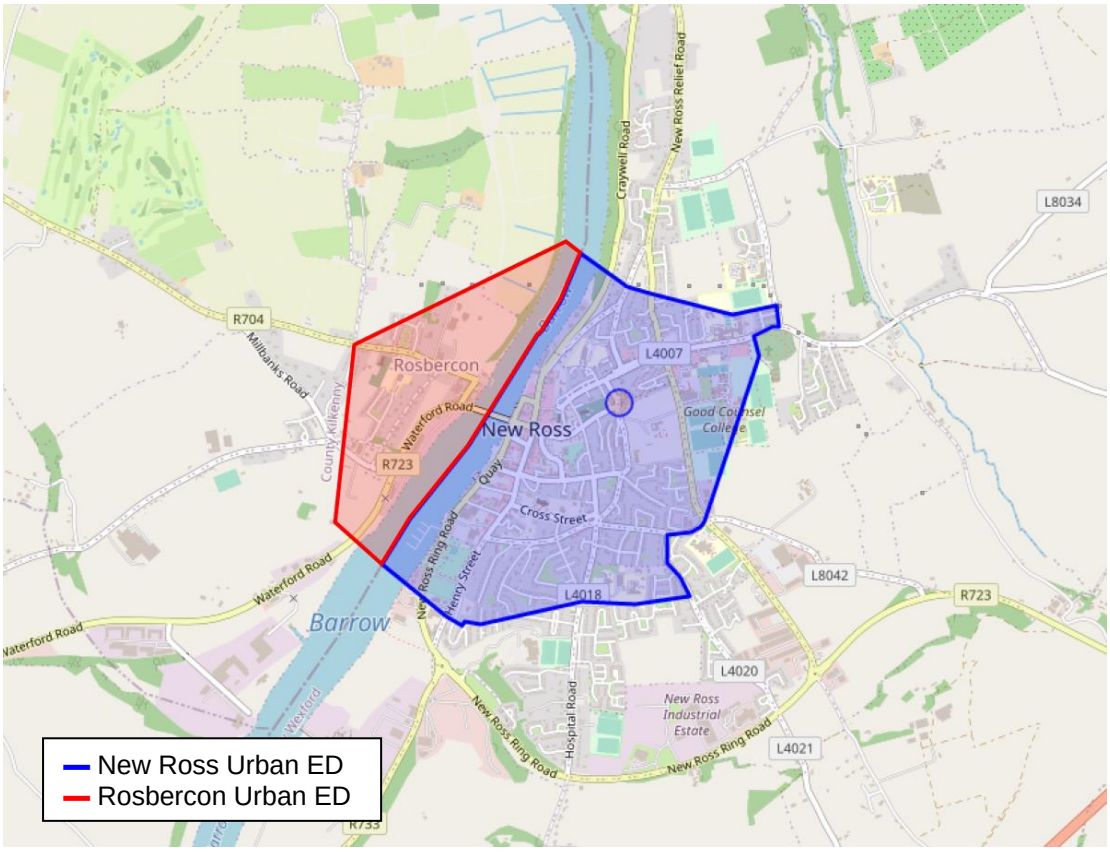

Figure 7-1 Electoral Divisions within the proposed development

Data Collection Method

A desk study was carried out to determine the various elements of the existing receiving environment, including population, economic activity, employment, modes of transport and general amenities. The following data sources were consulted to inform this section:

- Central Statistics Office; Census 2022 (preliminary results), Census 2016 and Census 2011.
- Health Service Executive.
- Google Maps.
- Myplan.ie.
- Ordnance Survey Ireland GeoHive Map.

7.4 Baseline Environment

7.4.1 Population

The proposed development is located in New Ross, County Wexford. According to Census 2022, the population for County Wexford increased by 9.2% between 2016-2022, from 149,722 to 163,527 persons.

The total population in 2016 in the settlement of New Ross was 8,040 persons (CSO, 2016). The population within the study area of proposed development decreased by 3.7%, from 4,533 in 2011 to 4,411 in 2016, see Table 7-1 below.

Table 7-1 Population Change from 2011 to 2016 (Census 2011 and 2016)

Region	2011 Population	2016 Population	Population Change	% Population Change
State	4,588,252	4,761,865	173,613	3.8%
County Wexford	145,320	149,722	4,402	2.9%
New Ross	Data not available	8,040	n/a	n/a
Study Area[2]	4,533	4,411	(-)122	2.7%
New Ross Urban ED	3,907	3,768	(-)139	-3.6%
Rosbercon Urban ED	626	643	17	2.6%

Table 7-1 shows that while the population in Rosbercon Urban ED increased by 17 persons, the population in New Ross Urban ED experienced a decrease of 139 persons. Combined, the population change in both of those EDs resulted in the study area experiencing a population decrease of 122 persons between 2011 and 2016.

Age Profile

The age profile for the study area is shown in Table 7-2 below. According to the Census 2016 data, the percentage of the population within each age band for the study area is broadly comparable to that of the State and County Wexford. The percentage of people aged 25-44 however is higher for Rosbercon Urban ED at 38% compared to the State (30%) and Co. Wexford (27%), while the population aged 65+ is lower in the ED at 9% in comparison, see Table 7-2 below.

Table 7-2 Age Group as % of the Population (Census, 2016)

EDs within proposed development boundary	Age Groups as % of the Population				
	0-14	15-24	25-44	45-64	65 +
State	21%	12%	30%	24%	13%
County Wexford	22%	11%	27%	25%	15%
Study Area average[3]	16%	11%	27%	27%	19%
New Ross Urban ED	16%	11%	26%	28%	20%
Rosbercon Urban ED	18%	13%	38%	21%	9%

Travel to Work, School or College

The modes of transport used within New Ross Urban ED and Rosbercon Urban ED (study area) for commuting to work, school or college were compared to that of the State and County Wexford as shown in Table 7-3. According to the 2016 Census data, the most common means of commuting to work in the study area is by private vehicle at 60%. This is slightly lower than the equivalent statistic for the State (69%) and County Wexford (72%), as shown in the Table 7-3 below. The next highest means of commuting within the study area is by foot, which is much higher than the equivalent statistic for the State (9%) and Co. Wexford (11%). Cycling is the least preferred mode of travel, with the percentage of people commuting by bicycle within

[2] Study Area consists of combined data for New Ross Urban ED and Rosbercon Urban ED
[3] Study Area average consists of New Ross Urban ED and Rosbercon Urban ED

the study area equates to approx. 1%, similar to Co. Wexford which is notably lower than that of the State (3%).

Table 7-3 Modes of Commuting (Census 2016)

Region	Modes of Commuting					
	On Foot	Bicycle	Public Transport (incl. Bus and Rail)	Private Vehicle	Do not Commute (work mainly at or from home)	Not Stated
State	9%	3%	9%	69%	5%	5%
Co. Wexford	11%	1%	8%	72%	5%	3%
Study Area Average[4]	27%	1%	4%	60%	2%	6%

General Amenity

The proposed development is located in the urban centre of New Ross, in Co. Wexford, along O'Hanrahan Bridge. The bridge is situated in the centre of the town where it carries the single carriageway R723 Regional Road over the River Barrow.

On the eastern side of the bridge, there is a mix of historic buildings, tourism sites and commercial properties. The western side consists of residential, commercial and industrial properties.

The local amenities, such as community facilities, including schools, GAA and other sports clubs, youth clubs and recreational areas situated within the study area of the proposed development are identified in Table 7-4 below. The approximate distance (in metres) from the proposed development to the general amenities are also identified.

Table 7-4 Distance from Proposed Development to General Amenities within the Study Area[5]

Type	Name	Electoral Division (ED)	Approximate distance from Proposed Development (m)
Schools	Little Munchkins Play School	Rosbercon Urban	50
	CBS Secondary School	New Ross Urban	440
	Michael Street Pre School	New Ross Urban	310
	Good Counsel College	New Ross Urban	1,000
	Coláiste Laighean	New Ross Urban	980
	St Marys Secondary School	New Ross Urban	1,000
	St Canices Convent	Rosbercon Urban	300

[4] Study Area average consists of data for New Ross Urban ED and Rosbercon Urban ED
[5] Study Area average consists of data for New Ross Urban ED and Rosbercon Urban ED

Type	Name	Electoral Division (ED)	Approximate distance from Proposed Development (m)
	Our Lady of Lourdes Secondary School	Rosbercon Urban	360
Church	Church of the Assumption	Rosbercon Urban	400
	Grace Church New Ross	New Ross Urban	200
	Church of the Immaculate Conception	New Ross Urban	200
	St. Mary's Church	New Ross Urban	340
	Carmelite Nuns New Ross	New Ross Urban	650
	St. Mary and Michael Catholic Church	New Ross Urban	380
Sports Ground	New Ross Town FC	New Ross Urban	970
Post Office	An Post New Ross	New Ross Urban	70
Marine Amenities	New Ross Marina	New Ross Urban	540
	Dunbrody Famine Ship Experience	New Ross Urban	305
	New Ross Boat Club	Rosbercon Urban	110
Park	New Ross Park (Pearse Park)	New Ross Urban	750
	Library Park, New Ross	New Ross Urban	280

Tourism

The historical significance of New Ross town provides tourism opportunities and locations for recreational activities. A memorial on the south quays presents a bronze statue of John F Kennedy following his visit to New Ross in 1963, as the birthplace of his grandfather. The Dunbrody Famine Ship is also located on the banks of the River Barrow in New Ross, which is a popular tourist attraction. The Port of New Ross is home to a number of river festivals and offers berths for boating enthusiasts travelling up the estuary. The New Ross Boat Club and the New Ross Marina are also situated approximately 105m north and 550m south of the O'Hanrahan Bridge respectively, and provide residents and visitors with recreational amenities. New Ross is also a well-suited location for import and export of goods to and from Ireland.

The proposed development will provide with a link to the South East Greenway on the western bank of New Ross Town (Figure 7-2). The South East Greenway will be an off-road 24km cycling and walking route, starting from New Ross, Co. Wexford and travelling through South Kilkenny towards Ferrybank, Co. Waterford. The greenway is being developed by Kilkenny County Council, Wexford County Council and Waterford City Council and will be constructed along the disused railway line between Waterford and New Ross. The construction works for the greenway started in February 2021 and the development is currently under construction.

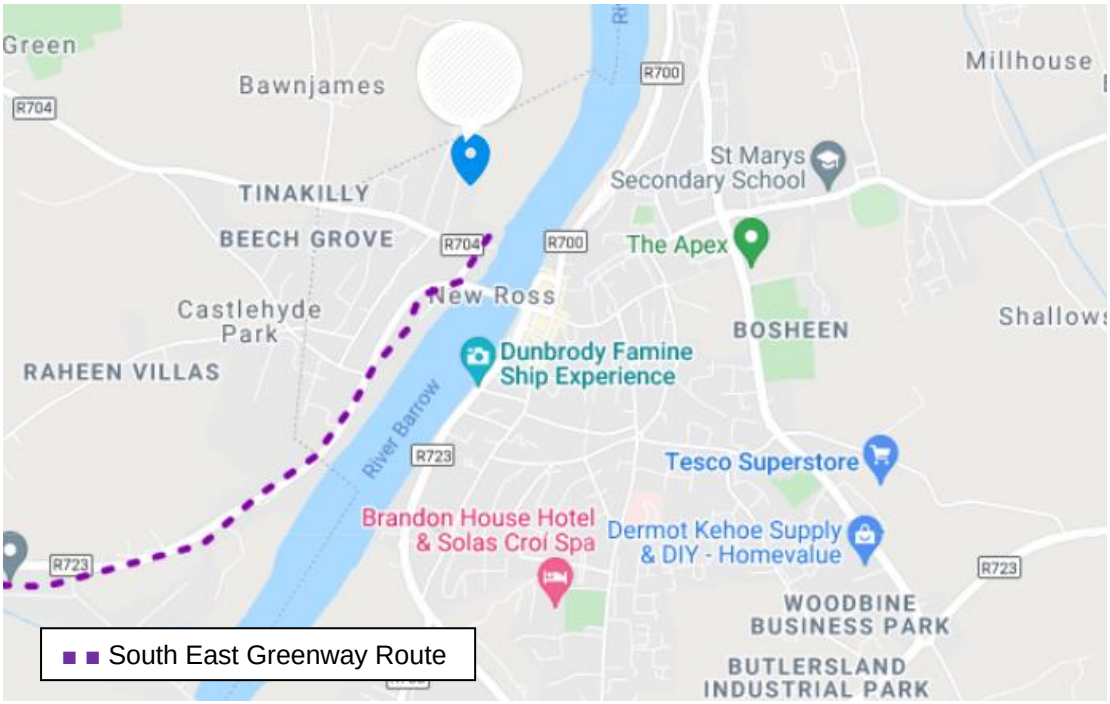

Figure 7-2 South East Greenway in New Ross (Source: southeastgreenway.net)

7.4.2 Human Health Profile

The World Health Organisation (WHO)[6] defines Human Health as *"a state of complete physical, mental and social well-being and not merely the absence of disease and infirmity"*.

According to Census 2016, 82% of the population within the study area reported that they had very good or good health, which is slightly lower than the State average as shown in Table 7-5. 3% of the population in the study area stated that they had bad or very bad health, which is slightly higher than the equivalent statistic for County Wexford and the State at 2%.

Table 7-5 General Health of Population

Region	General Health			
	Very Good/Good	Fair	Bad or Very Bad	Not Stated
State	87%	8%	2%	3%
Co. Wexford	87%	9%	2%	2%
Study Area Average	82%	12%	3%	3%

In 2015, the Irish Health Repository, Lenus, carried out a countrywide health profile for the Health Service Executive (HSE) (Lenus (2015a and b)). The Lenus profile for County Wexford was consulted in order to inform a human health profile for the general area.

The key facts for the County Wexford include:

- The rate of lone parent households, 11.7, is higher than the national average of 10.9.

[6] WHO, (2022). Constitution of the World Health Organization (who.int)

- There was a high birth rate to females aged 20 and under. Rate per 1,000 of the population in Wexford was 16.7 versus nationally 12.3 between 2007-2012.
- Incidence rates for all cancers are lower or close to the national rate, except for female malignant melanoma which is highest nationally.
- Death rates for all causes and all ages are above the national average.
- Suicide rate of 15.9 is higher than the national rate of 11.3 (2007-2013).
- Immunisation uptake at 24 months and measles mumps rubella (MMR) are higher than the national rates at 97%. It also confirms that the county is marginally below affluence.

The highest rate of deaths per 100,000 for the four principal causes of death over the period 2007-2012 for all ages compared to Ireland are illustrated in Figure 7-3 below. The figure illustrates that the deaths rates for all ages are higher in County Wexford compared to the national rates for all principal causes. The highest rate of death is attributed to heart disease and stroke, followed by cancer and respiratory disease, injury and poisoning.

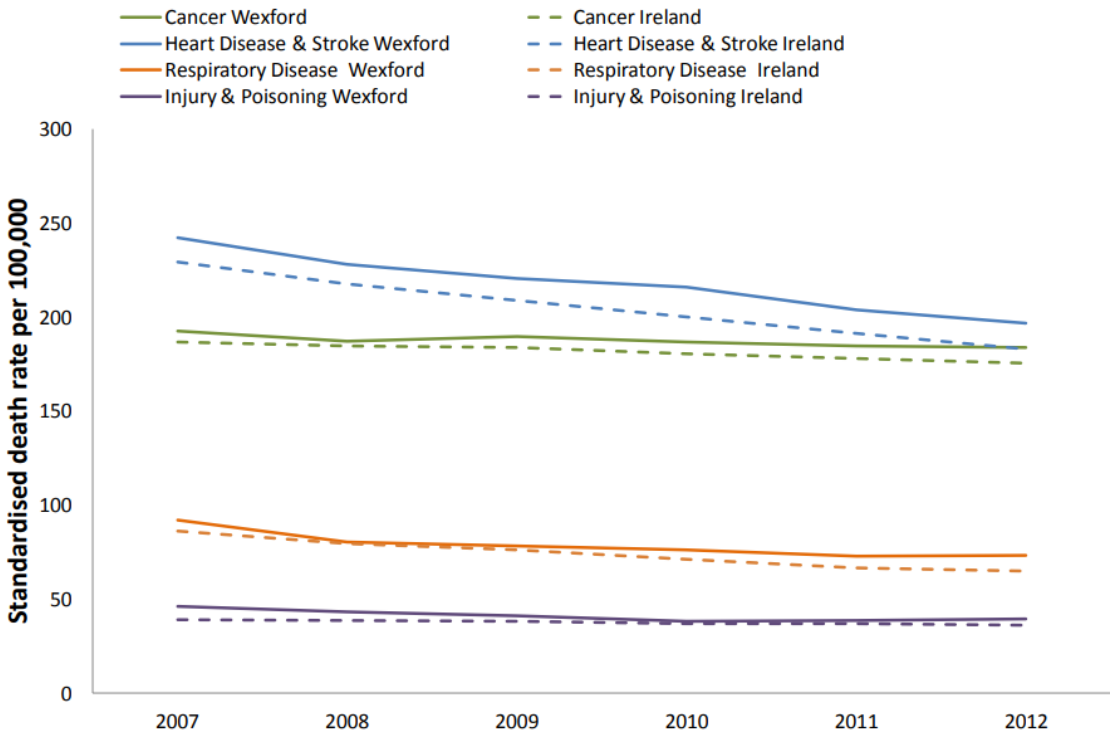

Figure 7-3 Death rate per 100,000 in Co. Wexford for the four principal causes of deaths of all ages over the 2007-2012 period. Source: Lenus, (2015)

One other indicator taken into account when analysing population and human health of an area is the deprivation index. The deprivation score measures an area's deprivation level by considering domains such as income, employment, infrastructure, housing, education, and demographics. According to Pobal Deprivation Maps 2016, New Ross ED is listed as 'disadvantaged' and Rosbercon ED is as 'marginally below average' with deprivation scores of -14.43 and -7.32 respectively.

The age dependency ratio is the age population ratio of those typically not in the labour force (0-14 and 65+) and those typically in the labour force (15-64). It indicates the pressure on the productive population to support services for younger and older age cohorts. According to Pobal data from Census 2016, the age

dependency ratio for New Ross Urban and Rosbercon Urban is 35.32 and 26.83 respectively. This indicates an increase in New Ross Urban from 34.91 in 2011 and a slight decrease in Rosbercon Urban from 27.48 in 2011.

7.5 Potential Impacts

This section provides an assessment of predicted impacts on population and human health in relation to the construction and operation phases of the proposed development.

7.5.1 Construction Phase

The following headings assess the predicted impacts on population and human health as a result of the construction stage of the proposed development, prior to mitigation measures.

Journey characteristics and journey amenity*:* There will be some temporary traffic disruptions during the construction phase of the proposed development.

Access to O'Hanrahan bridge will be restricted to one-lane while construction works are ongoing. Pedestrian and vehicular access will be facilitated along one side of the bridge at all times during the construction through the implementation of the Traffic Management Plan. The construction of the proposed development will result in site traffic travelling to and from the site for the materials and services, which may cause nuisance to residents and road users due to noise and dust pollution. Any impacts on journey amenity during and as a result of the construction phase are predicted to be moderate, temporary, negative effects.

The potential effect on journey characteristics and journey amenity of all users is *negative, moderate and temporary*.

Community Severance*:* Pedestrian and vehicle access to properties and community facilities will be maintained at all times during construction phase, however one-lane road and footpath closures along O'Hanrahan Bridge will be required to facilitate the works. No significant effects on communities are likely to occur during the construction of the proposed development.

General Amenity*:* Access to the local amenities in the area, such as schools, parks and sports grounds will be maintained during the construction of the proposed development, however local diversions may be put in place. The construction works will have no direct impacts on marine amenities. However, the works may have an indirect impact on marine amenities such as the New Ross Boat Club and the New Ross Marina due to the presence of the barge within the River Barrow and the general construction works. Access will be maintained along the River Barrow for any marine traffic, however, the construction of the proposed development may result in temporary, not significant negative impacts on the recreational facilities. Noise emissions generated during the construction phase may cause nuisance to New Ross marina users, particularly due to piling works at the southeast corner. Potential effects on general amenities as a result of the construction are likely to be *negative, not significant – slight and temporary*.

Economy*:* The construction phase will create indirect and direct employment opportunities, which will result in a temporary, positive impact on the local economy. Local expenditure by construction workers during the construction phase and local purchasing of construction materials will also contribute to the local economy and may have *slight, temporary positive* effects. Additional indirect employment and

economic activity is likely to occur due to provision of goods and services during the construction phase. Access to local businesses will be maintained at all times during construction stages, however, local diversions put in place may result in additional journey times for customers and suppliers. This may have a *slight, temporary negative impact* on local businesses. Construction activities may cause nuisance and disruption to tourists' general amenity close to the construction site, however, these effects are predicted to be *negative*, *slight, and temporary.*

***Human Health**:* Works during the construction stages have the potential to cause congestion or risk of collision and hazards. There is potential for nuisance and disruption caused by noise and dust generated from construction in the absence of mitigation measures. Any potential risks have been assessed as per the relevant sections of this Planning Report (Air Quality and Climate (section 12), Noise and Vibration (section 13), Traffic and Transport (section 6)), and will be managed as part of the Construction Environmental Management Plan (CEMP), Environmental Operating Plan (EOP), and Construction Traffic Management Plan (CTMP) accordingly. The potential effects on the human health during the construction phase are likely to be *negative, slight and temporary*.

7.5.2 Operational Phase

The following headings assess the predicted impacts on population and human health as a result of the operational phase of the proposed development, prior to mitigation measures.

***Journey Characteristics and Journey Amenity**:* by providing enhanced pedestrian and cycling infrastructure along O'Hanrahan Bridge, the proposed development will promote walking or cycling in New Ross over short distances. Vehicle access to facilities on either side of the river will not be impeded, with connectivity remaining across the bridge. As part of the proposed development, the carriageway lanes will be reduced, however, no significant negative effects on road users are likely, as sufficient space for two vehicle widths will be maintained. It is likely that there will be positive effects in the journey amenity for walkers and cyclists due to the proposed shared walkway and cycleway, which will be particularly beneficial for cyclists who will be segregated from vehicular traffic. The proposed development is likely to have *moderate, long-term, positive effects* on journey characteristics and journey amenity for all users.

***Community Severance**:* No community severance is expected to occur as a result of the proposed development. The provision of an enhanced public realm in the area will result in *long-term moderate positive effects* by providing a continuous cycle track and walkway which will provide walking and cycling connectivity in the centre of New Ross. The existing private side entrance to the Riverside Apartment complex will be permanently removed. Currently, this entrance poses a risk for road users as it exits onto the main R723 just before the main bridge itself. Residents of the apartment complex will continue to avail of the main entrance to the apartments and therefore, no significant effects on community severance is envisaged.

***General Amenity**:* The proposed development will result in improved access for pedestrians and cyclists to the general amenities on both sides of New Ross across the River Barrow. Access to the New Ross Boat Club will be improved by rehabilitating the bridge and providing active travel options for tourists and locals alike. The path to some of the local amenity areas such as the New Ross Marina will be connected by a dedicated pedestrian and cyclist route travelling across the bridge from the side of Rosbercon Urban ED.

Furthermore, the proposed development will provide segregated pedestrian and cyclist facilities along O'Hanrahan Bridge that will connect to the future South East Greenway on the west bank of River Barrow in New Ross. The link with the South East Greenway could attract the greenway users to travel to the east bank of New Ross into New Ross Urban ED. The proposed development is likely to result in *positive, slight and long-term, effects* on the general amenities of New Ross.

Economy: The proposed development will provide alternative travel modes for residents and visitors who are interested in walking and cycling, and will provide an additional segregated link for pedestrians and cyclists between the two EDs in New Ross. The proposed facilities will offer a connection to the future South East Greenway and could encourage visitors and greenway users to explore New Ross across the River Barrow. This may promote and connect tourism attractions and increase in recreational activities in the area, and will potentially result in an *indirect, positive, slight and long-term* effect on economy in New Ross.

Human Health: The proposed development will aim to encourage physical activity by providing sustainable modes of transport like walking and cycling in the centre of New Ross. By providing enhanced walking and cycling facilities along O'Hanrahan Bridge, which is dominated by vehicular traffic, the proposed development will also improve safety for all users travelling along the bridge. Journeys by foot or bicycle will particularly become safer due to the segregated walkway and cycleway facilities across the bridge. The proposed development will also result in improved connectivity by linking the eastern bank of New Ross town to the South East Greenway in the future. This could further promote active travel, which may benefit the health of the population by promoting walking and cycling modes of travel in New Ross.

7.6 Mitigation and Monitoring Measures

7.6.1 Construction Mitigation and Monitoring Measures

The mitigation and monitoring measures to be implemented for population and human health during the construction phase are as follows:

- A Construction Environmental Management Plan (CEMP) will be implemented as part of the construction stages to account for all works associated with the construction of the proposed development, including pre-construction site clearance works. This plan will ensure construction practices and measures are put in place to minimise any effects on road users.
- A Construction Traffic Management Plan (CTMP) will be submitted for approval to Kildare County Council by the appointed contractor prior to the commencement of any construction works as part of the Environmental Management Plan. This plan will ensure that required diversions are put in place during temporary road closures and that temporary traffic works and road safety measures will be in place during the duration of the construction phase to minimise the impact on local road users. The CTMP will be required to minimise disruption to economic and residential amenities. The plan will ensure access is maintained along O'Hanrahan Bridge for vehicles, pedestrians, cyclists and economic operators at all times.
- An Environmental Operating Plan (EOP) will be implemented prior to construction works. This plan will outline procedures for the delivery of environmental mitigation measures and for addressing day-to-day environmental issues that can arise from construction. The EOP will ensure

that appropriate measures relating to working at heights and near water are implemented during the construction stages.

- In order to minimise air quality impacts, a Dust Management Plan will be implemented as outlined in section 12.
- Noise and vibration mitigation measures are detailed in Section 13. A comprehensive Construction Environmental Management Plan, which includes adopting appropriate mitigation measures, will manage the risk of noise impacting the local community. The plan will outline stringent construction limits and guidelines to protect residential and commercial amenities, including the application of binding noise limits and hours of operation. These measures will ensure that noise and vibration impacts will be reduced to the greatest possible extent.
- All construction areas, including the proposed temporary construction compound, will be suitably fenced and screened, and access to the site will be limited to authorised personnel in the interest of public health and safety.
- Safe working practices, in accordance with the relevant legislation, will be in place during the construction phase to protect the workers and visitors to the construction sites.

With the application of the mitigation measures identified in this section, along with those specific mitigation measures related to Population and Human Health described in other sections of this report, no likely significant effects are envisaged during construction stage.

7.6.2 Operational Mitigation and Monitoring Measures

There are no operational stage mitigation measures required for population and human health. The proposed development is aimed at pedestrians and cyclists use only.

7.7 Residual Impacts

The residual impacts are the final or intended effects which occur after the proposed mitigation measures have been implemented. There is likely to be *negative, slight, and temporary* effects to the community due to disruption during construction stage. It is envisaged that there will be *positive, slight to moderate and long-term effects* on population associated with the proposed development.

Positive social and health outcomes are likely as a result of the improved pedestrian and cyclist access, which may also encourage sustainable travel into the future and further expansion of walking and cycling facilities with the wider area over time. There are no likely significant negative residual effects with respect to human health.

7.8 References

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8. BIODIVERSITY

8.1 Introduction

8.1.1 Background

This section contains the Ecological Impact Assessment (EcIA) which has been prepared by Roughan & O'Donovan (ROD) in respect of the proposed O'Hanrahan Bridge Widening Works as part of the Planning Report and provides an assessment of the baseline ecological conditions in the area likely to be impacted by the proposed development and of the nature, magnitude and significance of those impacts. This EcIA also proposes appropriate mitigation measures to eliminate those impacts or, where this has not been possible, to minimise their effects as to no longer be considered significant. Ecological surveys were carried out for the proposed development between September 2021 and January 2023. The purpose of the surveys was to identify, quantify and evaluate the potential impacts that the proposed development might have on the biodiversity and ecology in the local area.

The surveys and assessments were led by Kalvin Townsend-Smyth QualCIEEM with assistance from Rachel Heaphy. Patrick O'Shea was the technical reviewer. Kalvin is an Ecologist with over three years' experience in ecological assessment. He holds a BSc (Hons) in Wildlife Biology from Munster Technological University and is a Qualifying member of CIEEM (QualCIEEM). Rachel is a Graduate Ecologist with one year's experience in ecological assessment. She holds a BSc (Hons) in Zoology from University College Cork and an MRes degree (with distinction) from the University of Roehampton. She is a Qualifying member of CIEEM (QualCIEEM). Patrick is a Senior Ecologist with ten years' experience in ecological assessment. He holds a degree in Botany from Trinity College Dublin and an MSc in Ecological Management and Conservation Biology from Queen's University Belfast. Patrick is a Full member of the Chartered Institute of Ecological and Environmental Management (CIEEM).

8.1.2 Legislation

The European Communities (Birds and Natural Habitats) Regulations, 2011 (as amended) ("the Habitats Regulations") transpose into Irish law Directive 2009/147/EC (the Birds Directive) and Council Directive 92/43/EEC (the Habitats Directive), which list priority habitats and species of Community importance and that require protection. This protection is afforded in part through the designation of areas that represent significant populations of listed species within a European context, i.e., Natura 2000 sites. An area designated for bird species is classed as a Special Protection Area (SPA), and an area designated for other protected species and habitats is classed as a Special Area of Conservation (SAC). Birds in SPAs for which they are designated features and habitats and species listed on Annexes I and II, respectively, of the Habitats Directive in SACs for which they are designated features have full European protection. Species listed on Annex IV of the Habitats Directive are strictly protected wherever they occur, whether inside or outside the Natura 2000 network. Annex I habitats outside of SACs are still considered of national and international importance and, under Article 27(4)(b) of the Habitats Regulations, public authorities have a duty to strive to avoid the pollution or deterioration of Annex I habitats and habitats integral to the functioning of SPAs.

The Wildlife Act, 1976 (as amended) ("the Wildlife Act") is the principal mechanism for the legislative protection of wildlife in Ireland and outlines strict protection for species that have significant conservation value. In summary, the Wildlife Act protects species from injury, disturbance, and damage to breeding and resting sites.

All species listed in the Wildlife Act must, therefore, be a material consideration in the planning process.

The Flora (Protection) Order, 2022 ("the FPO") is an important piece of national legislation for the protection wild flora, i.e., vascular plants, mosses, liverworts, lichens and stoneworts, and makes it illegal to cut, uproot or damage a listed species in any way or to alter, damage or interfere in any way with their habitats. This protection applies wherever the species listed in the Schedules to the Order are found.

Sites of national importance for nature conservation are afforded protection under planning policy and the Wildlife Act. Natural Heritage Areas (NHAs) are sites that are designated under statute for the protection of flora, fauna, habitats and geological interest.

Proposed Natural Heritage Areas (pNHAs) are published sites identified as of similar conservation interest but have not been statutorily proposed or designated – pNHAs are nonetheless afforded some protection under planning policies and objectives.

8.1.3 Policy

This section summarises National policy relevant to this EcIA, including national policy documents and policies and objectives in the relevant county development plans.

Ireland's *National Biodiversity Action Plan 2017-2021* (DAHG, 2017), in accordance with the Convention on Biological Diversity, is a framework for the conservation and protection of Ireland's biodiversity, with an overall objective to secure the conservation, including, where possible, the enhancement and sustainable use of biological diversity in Ireland and to contribute to collective efforts for conservation of biodiversity globally. Action 1.1.3 of the National Biodiversity Strategy aspires that "all Public Authorities and private sector bodies move towards no net loss of biodiversity through strategies, planning, mitigation measures, appropriate offsetting and/or investment in Blue-Green infrastructure". This is particularly relevant to developments.

Ireland's 4th National Biodiversity Action Plan has been in development since October 2021. The Plan will be published in early 2023 and will set the national biodiversity agenda for the period 2023-2027. The Draft National Biodiversity Action Plan 2023-2027 contains six Objectives:

1. Adopt a Whole of Government, Whole of Society Approach to Biodiversity.
2. Meet Urgent Conservation and Restoration Needs.
3. Secure Nature's Contribution to People.
4. Embed Biodiversity at the Heart of Climate Action.
5. Enhance the Evidence Base for Action on Biodiversity.
6. Strengthen Ireland's Contribution to International Biodiversity Initiatives.

The *All-Ireland Pollinator Plan 2015-2021* (NBDC, 2015) seeks to halt the decline in pollinators through a range of objectives. This plan is supplemented by the guidance document *Councils: Actions to Help Pollinators* (NBDC, 2016).

The *Wexford County Development Plan 2022 – 2028* (WCC, 2022) sets out the overall strategy for the proper planning and sustainable development of County Wexford for the plan period and beyond. The Plan relates to the whole functional

area of Wexford County Council including the areas previously under the jurisdiction of Wexford Borough Council, New Ross Town and Enniscorthy Town. The Plan builds on the strategies and objectives of the previous County Development Plan 2013-2019 and reflects on the current challenges and the opportunities facing the county. The Plan seeks to reconcile the need to protect the environment with the development required to meet the needs and aspirations of the people of County Wexford.

The *Kilkenny City and County Development Plan 2021 – 2027* (KCC, 2021) sets out the policies and objectives for the proper planning and sustainable development of the City and County from 2021 – 2027. In the preparation of this Plan, the County Council had regard to relevant national plans, policies and strategies which relate to the proper planning and sustainable development of the area. Regard was also given to the plans of adjoining authorities. The plan provides for the mandatory objectives which are to be included in Development Plans as set out in the Planning and Development Acts.

The *County Wexford Biodiversity Action Plan 2013 – 2018* (WCC, 2013) was prepared to address the way in which wildlife resources for the County, including native plants, animals and the ecosystems that they combine to produce, will be managed and protected over the next five years. This plan shares the goals of the Convention on Biological Diversity and the National Biodiversity Plan and translates them into actions at a local level. The overall aim for this first Biodiversity Action Plan for County Wexford is "*To protect County Wexford's Biodiversity through actions and raising awareness".*

To achieve this overall aim, the County Wexford Biodiversity Action Plan outlines a series of actions which are listed under each of the 5 key objectives of the plan:

- **Objective 1:** To identify Biodiversity information and fill data gaps for the County, to prioritise habitats and species for protection and to inform conservation action and decision making.
- **Objective 2:** To make information on biodiversity available.
- **Objective 3:** To raise awareness across all sectors, groups and ages, for the following; (a) Wexford's Biodiversity, (b) its value, (c) the issues facing it, and (d) encourage people through using various media, training, and innovative initiatives to support biodiversity conservation.
- **Objective 4:** To promote and support best practice in biodiversity conservation, taking into account national and local priorities.
- **Objective 5:** To incorporate and raise the profile of biodiversity conservation issues in the local authority's actions and policies.

8.1.4 Guidance

The process of identifying, quantifying and evaluating the potential impacts of the proposed development on habitats, species and ecosystems followed best practice guidance on ecological surveys and assessment, as well as recognised guidance on EIA. This provided for an appropriately defined scope and evaluation process. The main sources of guidance are as follows:

- CIEEM (2019) *Guidelines for Ecological Impact Assessment in the UK and Ireland. Version 1.1 - Updated September 2019.* Chartered Institute of Ecology and Environmental Management. Chartered Institute of Ecology and Environmental Management, Winchester.

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- TII (2008d) *Guidelines for the Crossing of Watercourses During the Construction of National Road Schemes*. Transport Infrastructure Ireland, Dublin.
- TII (2009) *Guidelines for Assessment of Ecological Impacts of National Road Schemes*. Transport Infrastructure Ireland, Dublin.
- TII (2020a) *the Management of Invasive Alien Plant Species on National Roads – Standard.* Transport Infrastructure Ireland, Dublin.
- TII (2020b) *The Management of Invasive Alien Plant Species on National Roads – Technical Guidance.* Transport Infrastructure Ireland, Dublin.

8.2 Methodology

This section describes the approach, objectives, terminology and methodologies that were followed in collecting information, in describing the baseline ecological conditions and in assessing the likely effects of the proposed development.

8.2.1 Establishing the Zone of Influence

The zone of influence (ZoI), or distance over which a likely significant effect may occur will differ across the key ecological receptors, depending on the predicted impacts and the potential impact pathway(s).

The key variables determining whether Key Ecological Receptors (KERs) will be subject to impacts through development are:

- The physical distance of the proposed development to the ecological receptors.
- The sensitivities of the ecological receptors within the receiving natural environment.
- The potential for cumulative effects.

The zone of influence was defined as:

- The entire area within 550 m of the proposed development.
- The entire extent of the transitional waters of the River Barrow and the River Nore upstream and downstream of the proposed development.
- The transitional waters of the River Suir as far as the Lower Suir Estuary (Little Island-Cheekpoint)

This area was defined as the zone of influence and extends to the maximum distance at which potential impacts may occur, including via hydrological connections, i.e., surface water pathways. Beyond this limit, noise and visual disturbance to birds will not occur.

The zone of influence is presented in Drawing no. WBRC-ROD-ENV-S101-DR-CB-30022 in Appendix A and Figure 8-1 below.

8.2.2 Establishing the Study Area

The study area was defined by the findings of the desk study (presence/absence of protected habitats, flora or fauna within the zone of influence) and material reference above for assessing effects on those ecological features. The study area includes the site of the proposed development and a 150 m buffer.

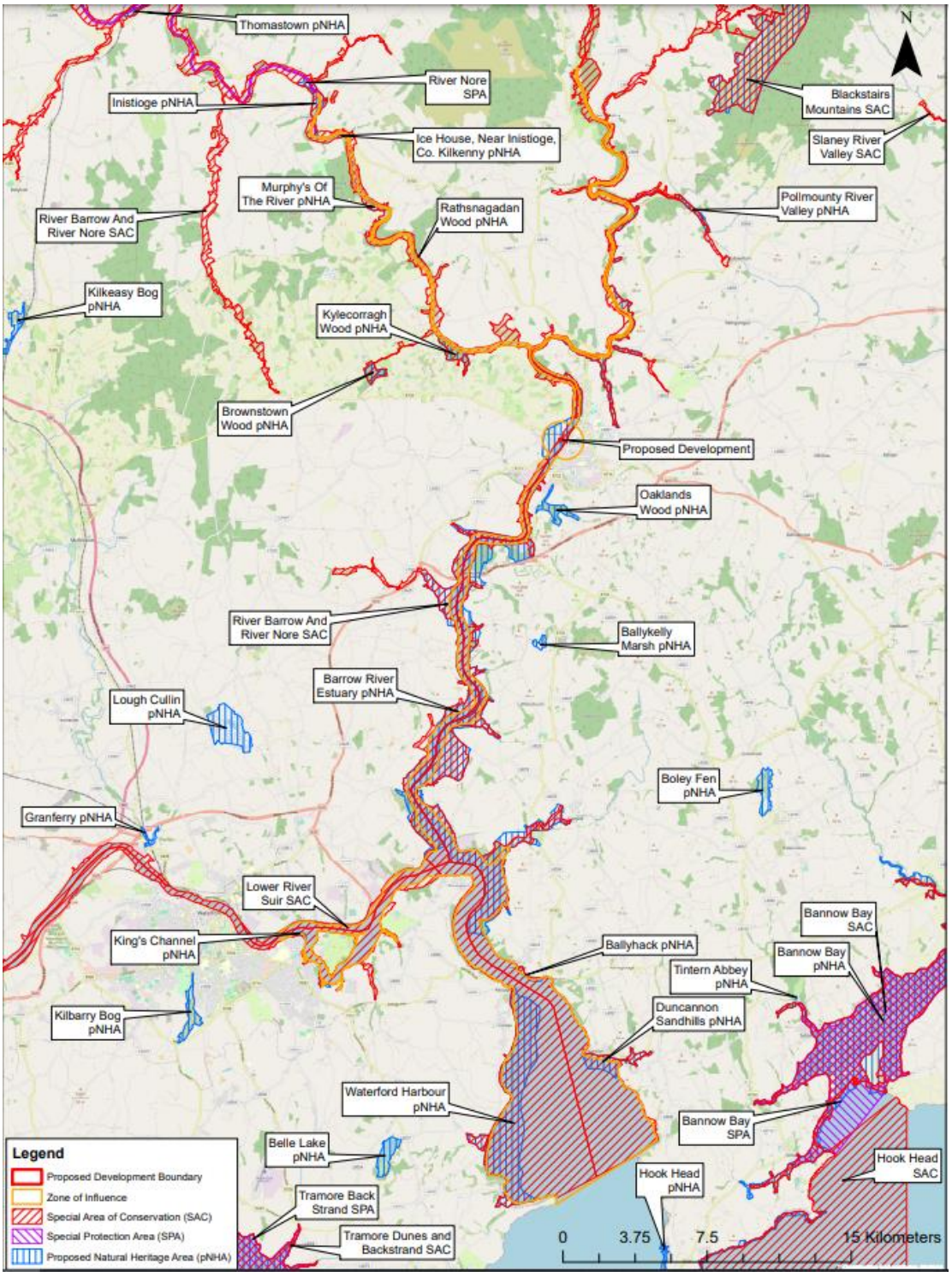

Figure 8-1 The boundaries of Designated sites relative to the zone of influence of the proposed development

8.2.3 Approach and Objectives to Ecological Impact Assessment

A 'habitat' is the environment in which an animal or plant lives and is generally defined in terms of vegetation and physical structures. Habitats and species of ecological significance occurring, or likely to occur within the defined zone of influence and study area of the proposed development are classified as Key Ecological Receptors (KERs).

In accordance with Transport Infrastructure Ireland (TII) *Guidelines for Assessment of Ecological Impacts of National Road Schemes* (2009), an impact assessment is undertaken of Key Ecological Receptors within the zone of influence of the proposed development. According to these guidelines, the zone of influence is the 'effect area' over which change resulting from the proposed development is likely to occur. The Key Ecological Receptors are defined as features of sufficient value as to be material in the decision-making process for which potential impacts are likely.

In the context of the proposed development, a Key Ecological Receptor is defined as any feature valued as follows:

- International Importance.
- National Importance.
- County Importance.
- Local Importance (Higher Value).

Features of local importance (Lower Value) and features of no ecological value are not considered to be Key Ecological Receptors. The assessment presented in this Section does not consider any other type of environmental effects other than those on biological diversity (of flora and fauna). This Section quantifies the potential effects on identified Key Ecological Receptors and prescribes mitigation measures required to avoid and reduce any negative effects identified.

Determining the ecological issues to be addressed for the assessment was informed by early engagement with relevant stakeholders. During this scoping process, selected consultees were provided the opportunity to input into the proposed development through preliminary discussions on Key Ecological Receptors that could potentially be affected; strategies to avoid negative impacts; and possible compensation or enhancement measures. Further details of the consultation process, including a list of the statutory and non-statutory consultees, can be found in Section 8.2.7.1.

On completion of scoping, a desk study was undertaken to review all available published data describing ecological conditions within the zone of influence. The desk study cross-referenced this published data with publicly available maps and aerial orthophotography from Ordnance Survey Ireland (OSi), National Parks & Wildlife Service (NPWS) and Environmental Protection Agency (EPA) to identify Key Ecological Receptors. During preparation of this assessment, the statutory conservation agency, the NPWS, provided data on nature conservation designations, habitats and species of conservation interest. The baseline information obtained from the desk study was the first stage in defining the zone of influence of the proposed development.

In addition to this desk study, field surveys were carried out in 2021 and 2022 to obtain primary data regarding the baseline environment with respect to biodiversity and to identify potential effects thereon. Section 8.2.6 presents details of these surveys.

Where potential significant negative effects were identified, detailed and specific mitigation measures have been proposed in accordance with the hierarchy of options suggested in the European Commission 2021 report '*Assessment of plans and projects in relation to Natura 2000 Sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC*'. Accordingly, the avoidance of effects at their source is the prioritised approach. Where this is not

possible, the following approaches are adopted, in order of decreasing preference: (i) reduction of effects at source; (ii) on-site abatement, and finally; (iii) abatement at receptor. These mitigation measures (as set out in Section 8.8 of this EcIA) have been incorporated into the design of the proposed development.

The information provided in this EcIA accurately and comprehensively describes the baseline ecological environment, provides an accurate prediction of the likely significant ecological effects of the proposed development, prescribes specific mitigation, as necessary, and describes the residual ecological effects.

8.2.3.1 Terminology

The evaluation of Key Ecological Receptors and the criteria used to determine ecological value is in accordance with aforementioned guidelines (TII, 2009). The description of effects is in accordance with the EPA Guidelines *Information to be Contained in Environmental Impact Assessment Reports* (EPA, 2022).

8.2.4 Desk Study

A desktop study was carried out to collate information on the ecology in the zone of influence that will potentially be impacted by the proposed development. Information on species listed on Annexes II and IV to the Habitats Directive, the Wildlife Acts, the Flora (Protection) Order, 2015, Annex I to the Birds Directive, Red and Amber-listed Birds (Gilbert et al., 2021), and the Third Schedule to the Habitats Regulations were sourced from the statutory consultee, the NPWS, and the National Biodiversity Data Centre. The NPWS online interactive map viewer provided information relating to designated sites of conservation importance within the zone of influence. The NBDC provided rare and protected species data from within 2 km of the proposed development. The NPWS provided rare and protected species records from the 10 km grid squares that intersect the proposed development. The desk studyundertaken for this EcIA included a review of available ecological data from the following sources:

- EPA publicly available data relating to the Water Framework Directive status of waterbodies within the zone of influence.
- Gilbert G., Stanbury A. and Lewis L. (2021) *Birds of Conservation Concern in Ireland 4: 2020-2026*. Irish Birds 9: 523-544
- IFI (2018) *National Programme: Habitats Directive and Red Data Book Fish Species. Summary Report 2018.* Inland Fisheries Ireland, 3044 Lake Drive, Citywest Business Campus, Dublin 24, Ireland.
- IFI (2017) *National Programme: Habitats Directive and Red Data Book Fish Species. Summary Report 2017.* Inland Fisheries Ireland, 3044 Lake Drive, Citywest Business Campus, Dublin 24, Ireland.
- IFI (2016) *National Programme: Habitats Directive and Red Data Book Fish Species. Summary Report 2016.* Inland Fisheries Ireland, 3044 Lake Drive, Citywest Business Campus, Dublin 24, Ireland.
- IFI (2011) *National Programme: Habitats Directive and Red Data Book Fish Species. Executive Report 2011.* Inland Fisheries Ireland, 3044 Lake Drive, Citywest Business Campus, Dublin 24, Ireland.
- IFI (2010) *Sampling Fish for the Water Framework Directive: Barrow, Nore and Suir Estuaries.* Inland Fisheries Ireland, 3044 Lake Drive, Citywest Business Campus, Dublin 24, Ireland.

- IFI (2010) *Sampling Fish for the Water Framework Directive: Summary Report 2010.* Inland Fisheries Ireland, 3044 Lake Drive, Citywest Business Campus, Dublin 24, Ireland.
- Irish Wetland Bird Survey (I-WeBS) Site Inventory.
- Kelly, F.L., Connor, L., Matson, R., Feeney, R., Morrissey, E., Wogerbauer, C. and Rocks, K. (2012). *Sampling Fish for the Water Framework Directive: Summary Report 2012.* Inland Fisheries Ireland, 3044 Lake Drive, Citywest Business Campus, Dublin 24, Ireland.
- King, J.J., (2006). *The status and distribution of lamprey in the River Barrow SAC*. Irish Wildlife Manuals No. 21. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.
- King, J.J. and Roche, W.K. (2008) *Aspects of anadromous Allis shad (Alosa Linnaeus) and Twaite shad (Alosa fallax Lace´pe`de) biology in four Irish Special Areas of Conservation (SACs): status, spawning indications and implications for conservation designation*. Hydrobiologia. **602:** 145 – 154.
- National Biodiversity Data Centre (NBDC) *Biodiversity Maps.*
- NPWS *Designations Viewer*.
- NPWS documents related to national and European protected sites within the zone of influence.
- O'Gorman, N.M., Rooney, S.M., Cierpial, D. and King, J.J. (2015) *National Programme: Habitats Directive and Red Data Book Species Executive Report 2014*. Inland Fisheries Ireland, 3044 Lake Drive, Citywest, Dublin 24, Ireland.
- Rooney, S., King, J.J. (2013). *Behaviour of diadromous twaite shad (*Alosa fallax) *during their upriver spawning migration.* Inland Fisheries Ireland, 3044 Lake Drive, Citywest Business Campus, Dublin 24, Ireland.

As with all desk studies, the data considered were only as good as the data supplied by the recorders and recording schemes. The recording schemes provide disclaimers in relation to the quality and quantity of the data they provide, and these were considered when examining outputs of the desk study.

8.2.5 Overview of Ecological Surveys

Table 8-1 below lists the ecological surveys undertaken, dates and personnel involved.

Table 8-1 Ecological Survey Details

Survey	Date	Surveyor
Habitats	9th September 2021 & 19th January 2023	Kalvin Townsend-Smyth
Bats	9th September 2021	Kalvin Townsend-Smyth & Daniel Ahern
Otter	9th September 2021	Kalvin Townsend-Smyth
Birds	9th September 2021	Kalvin Townsend-Smyth
Invasive Species	9th September 2021	Kalvin Townsend-Smyth
Benthic Habitats (eastern river bank)	14th January 2022	Aquatic Services Unit
Benthic Habitat (western river bank)	21st September 2022	Aquatic Services Unit

8.2.6 Survey Methodology

Subsections 8.2.6.1 – 8.2.6.6 below outline the methodologies applied during the surveys.

8.2.6.1 Habitat Survey

Habitats within 150m of the proposed development were surveyed in 2021 during the optimum habitat survey season i.e., April to September (Smith et al., 2011) and within and adjacent to the construction site compound in January 2023, which is sub-optimal timing. Habitats were classified according to *A Guide to Habitats in Ireland* (Fossitt, 2000) and any habitats corresponding to types listed on Annex I to the Habitats Directive were identified using the *Interpretation Manual of European Union Habitats* (EC, 2013).

8.2.6.2 Bats

Bat Roost Suitability Assessment

The bat suitability assessment focussed on identifying built or natural features within the footprint of the proposed development and a 30m buffer, where accessible. The bat suitability assessment was conducted adhering to best practice guidelines (TII, 2006a, b; Collins (ed.), 2016) and involved a visual assessment and categorisation of suitable features on trees and structures capable of supporting roosting bats. Trees and structures were assessed using the recognised criteria outlined in Collins (ed.) (2016). The locations of features that provide roosting potential were recorded and photographed.

Emergence Surveys

Following the bat roost suitability assessment, the bridge itself, which was the only feature considered suitable for bats to roost in was surveyed. The emergence survey was undertaken between 15 minutes before sunset and 105 minutes after sunset. The emergence survey adhered to best practice guidelines (Collins (ed.), 2016).

The survey was carried out by two surveyors. The surveyors used an Anabat Walkabout and a Song Meter EM3+ bat detectors. Both detectors allow visual validation of echolocation recordings (species identification) in real time and all audio files are linked to a GPS and digitally geospatially referenced.

Following the survey, recordings (detections) were processed using Kaleidoscope Pro Analysis software to extract information including sound recordings, sonograms, GPS coordinates, time, date and species identification confidence values. Recordings with low confidence values or of rare species were validated manually.

8.2.6.3 Otter

An Otter survey was conducted adhering to best practice guidelines (TII, 2008b, c), and involved a systematic search of the footprint of the proposed development and a 50 m buffer, where accessible. It also included 150 m upstream and downstream of O'Hanrahan Bridge along the River Barrow. The survey involved a search for signs of otter activity (prints, spraints, trails, holts, couches, slides, feeding remains etc.).

8.2.6.4 Birds

Birds were recorded incidentally during the field surveys both within and outside of the footprint of the proposed development. All bird species were recorded using standard species codes from the British Trust of Ornithology (BTO). Breeding evidence for each species was also collected, noting 'possible', 'probably' and 'confirmed' breeding sites outlined in *Bird Atlas 2007-11* (BTO, 2011).

8.2.6.5 Invasive Alien Species

The focus of the invasive species survey was to identify species subject to restrictions under Section 49 of the European Communities (Birds and Natural Habitats) Regulations, 2011 (as amended). Other invasive species which can negatively impact biodiversity were also recorded. The distribution of recorded species was sketched on field maps and target notes were taken which detailed height, density, and any signs of previous management.

8.2.6.6 Benthic Habitats

UCC Aquatic Services Unit carried out surveys at low tide. A site walkover was undertaken to identify any hard benthos habitats and to obtain general overview of the site. Soft sediment sampling was undertaken at three locations, which were selected from the high water to low water level. At each of the three sampling locations, replicate core samples were taken and an area was marked out and dug through to identify any large fauna. A small sample of sediment was also collected from each site for granulometric and loss on ignition analyses. The full methodology used during the benthic habitat survey is detailed in the report provided in Appendix D.

8.2.7 Assessment Methodology

The ecological evaluation and impact assessment methodology within this EcIA follows the methodology that is set out in Chapter 3 of *Guidelines for Assessment of Ecological Impacts of National Roads Schemes* (TII, 2009).

Evaluation of Ecological Resources

The criteria used for the ecological evaluation follow those set out in Section 3.3 of TII (2009). These guidelines set out the context for the determination of value on a geographic basis, with a hierarchy assigned in relation to the importance of any receptor based on the following scale:

- International Importance.
- National Importance.
- County Importance.
- Local Importance (Higher Value).
- Local Importance (Lower Value).

The Guidelines clearly set out the criteria by which each geographic level of importance can be assigned. For example, Locally Important (Lower Value) receptors contain habitats and species that are widespread and of low ecological significance and only of importance in the local area. Conversely, Internationally Important sites are either designated for conservation as part of the Natura 2000 network (SACs or SPAs) or provide the best examples of habitats or internationally important populations of protected species.

All habitats and species within the zone of influence and study area were assigned a level of significance on the above basis, and Key Ecological Receptors were established and classified on this basis.

Characterisation of Ecological Impacts

The impact assessment herein uses the EPA (2022) guidelines and is based on the criteria listed in Annex III of the amended EIA Directive, but also has regard to the EPA (2015) Guidelines in relation to characterising the impact of the proposed

development on the receiving environment. The parameters used to characterise ecological impacts are:

- The magnitude and spatial extent of the impact (for example geographical area and size of the population likely to be affected).
- The nature of the impact.
- The transboundary nature of the impact.
- The intensity and complexity of the impact.
- The probability of the impact.
- The expected onset, duration, frequency and reversibility of the impact.
- The cumulation of the impact with the impact of other existing and/or approved project.
- The possibility of effectively reducing the impact.

Definitions of terms used when quantifying duration and frequency of effects are defined below, as per EPA (2022):

- Momentary – seconds to minutes.
- Brief – less than a day.
- Temporary – up to 1 year.
- Short-term – 1 to 7 years.
- Medium-term – 7 to 15 years.
- Long-term – 15 to 60 years.
- Permanent – over 60 years.

It is necessary to ensure that any assessment of impacts takes account of the construction and operational phases; direct, indirect and cumulative impacts; and impacts that are temporary, reversible and irreversible.

Assessing the Significance of Effects

The significance of effects was determined following guidelines set out in Section 6.2.20 of TII (2009), whereby effects are assigned significance based on the characterisation of impacts, irrespective of the value of the receptor. Significance is determined by effects on conservation status or integrity, regardless of geographical level at which these would be relevant.

Quality and Significance are the most relevant criteria for the assessment of effects on biodiversity. These criteria are defined in EPA (2022) and reproduced in Table 8-2 and Table 8-3 respectively.

Table 8-2 Criteria for assessing quality (EPA, 2022).

Quality	Criteria
Positive	A change which improves the quality of the environment (for example, by increasing species diversity; or the improving reproductive capacity of an ecosystem, or by removing nuisances or improving amenities).
Neutral	No effect or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.

Quality	Criteria
Negative / Adverse	A change which reduces the quality of the environment (for example, lessening species diversity or diminishing the reproductive capacity of an ecosystem, or damaging health or property or by causing nuisance).

Table 8-3 Criteria for describing the significance of effects (EPA, 2022).

Quality	Criteria
Imperceptible	An effect capable of measurement but without significant consequences.
Not Significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.
Slight	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Moderate	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
Significant	An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
Ver Significant	An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment.
Profound	An effect which obliterates sensitive characteristics.

Mitigation, Compensation and Enhancement

The proposed development has been designed to specifically avoid, reduce and/or minimise impacts on all Key Ecological Receptors. The potential impacts of the proposed development have been considered and assessed to ensure that all impacts on Key Ecological Receptors are adequately addressed. Where potential significant impacts on Key Ecological Receptors are predicted, mitigation has been prescribed to ameliorate such impacts. Proposed best practice and mitigation measures are specifically set out in this section and are realistic in terms of cost and practicality. Mitigation measures follow best practice and have a high probability of success in terms of addressing the impacts on the identified Key Ecological Receptors.

The need for compensation and/or enhancement measures has also been considered. Compensatory measures are those which 'offset' significant residual (post-mitigation) impacts. Enhancement measures are those which "*seek to provide net benefits for biodiversity over and above requirements for avoidance, mitigation or compensation*" (CIEEM, 2018 p. 12).

8.2.7.1 Consultation

Statutory and non-statutory consultation has informed the design, the NIS and this EcIA. Consultees were invited to submit observations in relation to ecology and nature conservation. The purpose of the consultation was to:

- Identify any relevant information that consultees held, including the presence of data on protected species or species of conservation concern.
- Identify any concerns that consultees may have about the proposed development.
- Identify any issues that the consultees would like to see addressed during the ecological impact assessment process.

Observations received relevant to this section are summarised in Table 8-4 below. Concerns raised by the consultees have been addressed as far as possible.

Table 8-4 Details of Consultations

Consultee	Date	Summary of Response or Meeting
National Parks & Wildlife Service (NPWS) / Development Application Unit (DAU)	27th January 2022	The NPWS provided records of rare and protected species and habitats in the zone of influence.
	23rd February 2022	In the response from the DAU on the 23rd February 2022, the DAU made the following points in relation to Appropriate Assessment: • No significant details of the project or its construction may be deferred to the post-consent stage as this may suggest the impacts are not fully known at consent stage. • In-combination effects of this project should be included as required and appropriate. • The quantum and proportion of Annex I habitat which will be permanently lost should be provided and an impact assessment be made with reference to the targets of the SAC's Conservation Objectives. • The views of Inland Fisheries Ireland should be sought at pre-planning stage. • Impacts to Otter including disturbance from any increase in lighting of the bridge must be assessed as it is an offence to disturb these Annex IV species wherever they occur, particularly during breeding, rearing, hibernation and migration. • Control or management of invasive alien species should be undertaken with *'The Management of Invasive Alien Plant Species on National Roads – Standard'* and *'The Management of Invasive Alien Plant Species on National Roads – Technical Guidance'* (TII 2020). The DAU also made the following points in relation to Environmental Impact Assessment: • The Department advises that if the proposed development screens out for EIA, then an Ecological Impact Assessment (EcIA) must be carried out. • The bridge structure must be subject to a comprehensive bat survey. Artificial lighting at night may negatively impact bat species in the area and these impacts must be assessed with reference to *'Guidance Note 08/18 on Bats and Artificial Lighting in the UK'* (Bat Conservation Trust, 2018). • Impacts to nesting bird species, within the bridge structure and zone of influence of the project must be assessed. Any works which are liable to impact Breeding birds must be undertaken outside the bird nesting season (1st March – 31st August inclusive).

Consultee	Date	Summary of Response or Meeting
		• Impact to marine mammals, such as Common Porpoise, must be assessed. • The impacts of the proposed development on flooding and flood risk must be assessed. Run-off of pollutants from vehicles may impact water quality and measures (including Sustainable Drainage measures) should be implemented where possible and appropriate. • Consult the IFI guidance document *'Planning for Watercourses in the Urban Environment'*. • Consideration should be given to the enhancement of the ecological corridor in the vicinity of the proposed development site, as per the *National Biodiversity Action Plan*, including, the incorporation of nature-based SuDS, bird and bat boxes and the greening of the riparian margin.
Inland Fisheries Ireland (IFI)	20th December 2021	In the response from IFI on the 20th December 2021, the Fisheries Environmental Officer for the south-eastern River Basin District of IFI, made the following points: • Consideration for the potential for suspended solids to enter the waterbody. • Noise and vibration impacts associated with the works. • The storage of fuels, oils, materials and equipment associated with the works.
	26th January 2022	A meeting was held with IFI over Microsoft Teams on 26th January 2022. IFI made the following points and requests: • '*Guidance to manage the risk of marine mammals from man-made sound sources in Irish waters*' (NPWS, 2014), *'Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters''* (IFI, 2016) and IFI's standard mitigation measures should be followed during the construction phase. • Avoid works during April – May as eel species migrate along banks during this time. • Once appropriate mitigation measures are in place, there should be no issues in relation to other migratory fish species. • No-net deterioration of artificial light spill onto water should be allowed from existing conditions of the bridge. • Method statements should be prepared in accordance with the construction methodology outlined in the planning report and the NIS. • Allowing area to dewater naturally is acceptable to provide fish time and routes to escape during piling. • IFI should be kept informed throughout the development of the project and be made

Consultee	Date	Summary of Response or Meeting
		aware of any issues that may arise.

8.2.8 Difficulties Encountered / Limitations

Standard survey methods were followed, and no difficulties were encountered during the completion of the surveys described above. However, any biases or limitations associated with these methods could potentially affect the results collected. While every effort was made to provide a full assessment and comprehensive description of the study area, ecological trends (e.g., population trends) may not be fully reflected due to the instantaneous/short-term nature of the field surveys. However, the data obtained from field surveys coupled with the desk study provides a robust representation of the baseline for the habitats and species within the zone of influence.

8.3 Receiving Environment – Desk Study Results

8.3.1 General Description and Context

The proposed development is in the centre of New Ross town and crossed the River Barrow. The area is urban in nature. The River Barrow is tidal in New Ross and flows in a north-south direction before discharging into the sea *c.* 20 km downstream. In New Ross, the river has artificial banks with small areas of intertidal habitat at the base of the quay walls.

Despite the urban location, the river is an important ecological feature, connecting the sea with the Slieve Bloom Mountains and it is home to rare and protected species including Kingfisher, Otter and migratory fish.

8.3.2 Designated Sites

The NPWS online map viewer was consulted in order to identify the boundaries of designated sites within the zone of influence.

It was determined that three European sites, namely the River Barrow and River Nore SAC, Lower River Suir SAC and the River Nore SPA occur within the zone of influence.

Nine nationally designated sites: the Barrow River Estuary pNHA, Kylecorragh Wood pNHA, Rathsnagadan Wood pNHA, Murphy's of The River pNHA, Inistioge pNHA, Ballyhack pNHA, Waterford Harbour pNHA, Duncannon Sandhills pNHA and King's Channel pNHA lie within the zone of influence.

The designated sites within the zone of influence are presented in Figure 8-1 and Drawing no. WBRC-ROD-ENV-S101-DR-CB-30022 in Appendix A of this Planning Report. The designated sites are presented in the Table 8-5 and in the following sections.

Table 8-5 Designated Sites within the zone of influence

Designated site [site code]	Distance from Proposed Development Site
European sites	
River Barrow and River Nore SAC [002162]	The River Barrow and River Nore SAC lies within the boundary of the development.
Lower River Suir SAC	The absolute shortest distance from the proposed

Designated site [site code]	Distance from Proposed Development Site
[002137]	development site is 14.2 km south. This distance is over land. The proposed development is approximately 16.5 km downstream from the site via hydrological connections (Through the River Barrow and the River Suir).
River Nore SPA [04233]	The shortest distance from the proposed development location is 9.25 km north-west. This distance is over land. The proposed development is approximately 12.8 km upstream from the site via hydrological connections (Through the River Barrow and River Nore).
Nationally designated sites	
Barrow River Estuary pNHA [000698]	The Barrow River Estuary pNHA lies within the boundary of the development.
Kylecorragh Wood pNHA [000842]	The shortest absolute distance from the proposed development site is 3.80 km north-west. This distance is over land. The proposed development is approximately 6 km north-west upstream from the site via a hydrological connection (Through the River Barrow and River Nore).
Rathsnagadan Wood pNHA [000409]	The shortest distance from the proposed development site is 7.10 km north-west. This distance is over land. The proposed development is approximately 9.2 km upstream from the site via hydrological connections (Through the River Barrow and River Nore).
Murphy's Of The River pNHA [000844]	The shortest absolute distance from the proposed development site is 9.28 km north-west. This distance is over land. The proposed development is approximately 12.9 km upstream from the site via hydrological connections (Through the River Barrow and River Nore).
Inistioge pNHA [000837]	The shortest distance from the proposed development site is 12.5 km north-west. This distance is over land. The proposed development is approximately 16.9 km upstream from the site via hydrological connections (Through the River Barrow and the River Nore).
Ballyhack pNHA [000695]	The shortest absolute distance from the proposed development site is 16.9 km south. This distance is over land. The proposed development is approximately 21.2 km downstream from the site via hydrological connections (Through the River Barrow)
Waterford Harbour pNHA [000787]	The shortest distance from the proposed development site is 17.6 km south. This distance is over land. The proposed development is approximately 21.3 km downstream from the site via hydrological connections (Through the River Barrow).
King's Channel pNHA [001702]	The shortest absolute distance from the proposed development site is 17.6 km southwest. This distance is over land. The proposed development is approximately 22.2 km downstream from the site via hydrological connections (Through the River Barrow and the River Suir).
Duncannon Sandhills pNHA [001738]	The shortest absolute distance from the proposed development site is 19.6 km south. This distance is over land. The proposed development is approximately 24.4 km downstream from the site via hydrological connections (Through the River Barrow).

The descriptions of the European designated sites in Section 8.3.3 below are based on the Site Synopses, Conservation Objectives and Natura 2000 Standard Data Forms, as well as the Conservation Objectives supporting documents, where applicable. The descriptions of the pNHAs in Section 8.3.4 are based on the respective Site Synopses, where available.

8.3.3 European Designated Sites

River Barrow and River Nore SAC [002162]

The description of the River Barrow and River Nore SAC provided here is based on the Site Synopsis (NPWS, 2016), Conservation Objectives (NPWS, 2011a) and Natura 2000 Standard Data Form (NPWS, 2018) for the site, as well as the Conservation Objectives Supporting Documents (NPWS, 2011b, c & e). Pathways for negative effects exist between the proposed development and this European site. This European site has been considered under the Key Ecological Receptor headings 'River Barrow and River Suir, including Annex I 'Estuaries', 'Intertidal Habitats including Annex I Mudflats and sandflats not covered by seawater at low tide', 'Migratory Fish and Marine Mammals', and 'Otter'.

Site Overview

This site consists of the freshwater stretches of the Barrow and Nore River catchments as far upstream as the Slieve Bloom Mountains, and it also includes the tidal elements and estuary as far downstream as Creadan Head. The site passes through eight counties: Offaly, Kildare, Laois, Carlow, Kilkenny, Tipperary, Wexford and Waterford. Towns along the edge of the site include Mountmellick, Portarlington, Monasterevin, Stradbally, Athy, Carlow, Leighlinbridge, Graiguenamanagh, New Ross, Inistioge, Thomastown, Callan, Bennettsbridge, Kilkenny and Durrow. The larger of the many tributaries include the Lerr, Fushoge, Mountain, Aughavaud, Owenass, Boherbaun and Stradbally Rivers of the Barrow, and the Delour, Dinin, Erkina, Owveg, Munster, Arrigle and King's Rivers on the Nore.

Overall, the River Barrow and River Nore SAC is of considerable conservation significance for the occurrence of good examples of habitats and of populations of plant and animal species that are listed on Annexes I and II to the Habitats Directive. Furthermore, it is of high conservation value for the populations of bird species that use it. The occurrence of several plant species listed in *Ireland Red List No. 10:* Vascular *Plants* (Wyse Jackson et al., 2016), including three rare plants in the salt meadows and the population of the hard water form of the Freshwater Pearl Mussel, which is limited to a 10km stretch of the Nore, add further interest to this site.

Qualifying Interests of the Site

[1130] Estuaries

[1140] Mudflats and sandflats not covered by seawater at low tide

[1170] Reefs

[1310] *Salicornia* and other annuals colonising mud and sand

[1330] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)

[1410] Mediterranean salt meadows (*Juncetalia maritimi*)

[3260] Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation

[4030] European dry heaths

[6430] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels

[7220] *Petrifying springs with tufa formation (*Cratoneurion*)

[91A0] Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles

[91E0] *Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*)

[1016] Desmoulin's Whorl Snail (*Vertigo moulinsiana*)

[1029] Freshwater Pearl Mussel (*Margaritifera margaritifera*)

[1092] White-clawed Crayfish (*Austropotamobius pallipes*)

[1095] Sea Lamprey (*Petromyzon marinus*)

[1096] Brook Lamprey (*Lampetra planeri*)

[1099] River Lamprey (*Lampetra fluviatilis*)

[1103] Twaite Shad (*Alosa fallax*)

[1106] Atlantic Salmon (*Salmo salar*)

[1355] European Otter (*Lutra lutra*)

[1421] Killarney Fern (*Trichomanes speciosum*)

[1990] Nore Freshwater Pearl Mussel (*Margaritifera durrovensis*)

'Estuaries' (1130) and the other Annex I habitats within it form a large component of the site. Extensive areas of 'Mudflats and sandflats not covered by seawater at low tide' (1140), comprised of substrates ranging from fine, silty mud to coarse sand with pebbles/stones are present. Good quality intertidal sand and mudflats have developed on a linear shelf on the western side of Waterford Harbour, extending for over 6km from north to south between Passage East and Creadan Head and are over 1km wide in places. The sediments are mostly firm sands, though grade into muddy sands towards the upper shore. They have a typical macro-invertebrate fauna, characterised by polychaetes and bivalves. Common species include *Arenicola marina*, *Nephtys hombergii*, *Scoloplos armiger*, *Lanice conchilega* and *Cerastoderma edule*. An extensive area of Honeycomb Worm biogenic reef, i.e., 'Reefs' (1170), occurs adjacent to Duncannon, on the eastern shore of the estuary.

'*Salicornia* and other annuals colonising mud and sand' (1310) are found in the creeks of the saltmarshes and at their seaward edges. The habitat also occurs in small amounts on some stretches of the shore free of stones.

'Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)' (1330) and 'Mediterranean salt meadows (*Juncetalia maritimi*)' (1410) occur at the southern section of the site in old meadows where the embankment has been breached, along the tidal stretches of in-flowing rivers below Stokestown House, in a narrow band on the channel side of Common Reed beds and in narrow fragmented strips along the open shoreline. In the larger areas of salt meadow, notably at Carrickcloney, Ballinlaw Ferry and Rochestown on the west bank, and Fisherstown, Alderton and Great Island to Dunbrody on the east bank, the Atlantic and Mediterranean sub-types are generally intermixed. At the upper edge of the salt meadow, in the narrow ecotonal areas bordering the grasslands where there is significant percolation of salt water, the legally protected Borrer's Saltmarsh-grass and Meadow Barley are found. The very rare and also legally protected Divided Sedge is also found. Sea Rush is also present. Other plants recorded and associated with salt meadows include Sea Aster, Thrift, Sea Couch, Spear-leaved Orache, Lesser Sea-spurrey, Sea Arrowgrass and Sea Plantain.

'Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation' (3260) are well represented in the River Barrow

and in the many tributaries of the site. In the River Barrow, the species found include water-starworts, Canadian Pondweed, Bulbous Rush, water-milfoils, the pondweed *Potamogeton* × *nitens,* Broad-leaved Pondweed, Fennel Pondweed, Perfoliate Pondweed and crowfoots. The water quality of the River Barrow has improved since the vegetation survey was carried out in 1996.

'European dry heaths' (4030) occurs in pockets along the steep valley sides of the rivers, especially in the Barrow Valley and along the Barrow tributaries where they occur in the foothills of the Blackstairs Mountains. The dry heath vegetation along the slopes of the riverbank consists of Bracken and Gorse, with patches of acidic grassland vegetation. Additional typical species include Heath Bedstraw, Foxglove, Common Sorrel and Creeping Bent. On rocky outcrops, Bilberry and Great Wood-rush are present. At Ballyhack, a small area of dry heath is interspersed with patches of lowland dry grassland. Dry heath at the site generally grades into wet woodland or wet swamp vegetation lower down the slopes on the riverbank.

'Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels' (6430) occurs in association with the various areas of alluvial forest and elsewhere where the floodplain of the river is intact. Characteristic species of the habitat include Meadowsweet, Purple Loosestrife, Marsh Ragwort, Ground Ivy and Hedge Bindweed. Himalayan Balsam, an alien invasive species, is abundant in places.

A good example of '*Petrifying springs with tufa formation (*Cratoneurion*)' (7220) occurs at Dysart Wood along the River Nore. This is a rare habitat in Ireland, and one listed with priority status on Annex I of the Habitats Directive. These hard-water springs are characterised by lime encrustations, often associated with small waterfalls. A rich bryophyte flora is typical of the habitat and two diagnostic species, *Palustriella commutata* and *Eucladium verticillatum*, have been recorded.

The best examples of 'Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles' (91A0) are seen in the ancient Park Hill woodland in Abbeyleix Estate, at Kyleadohir on the Delour, Forest Wood House, Kylecorragh and Brownstown Woods along the River Nore, and at Cloghristic Wood, Drummond Wood and Borris Demesne along the River Barrow, though other patches occur throughout the site.

Good examples of '*Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*)' (91E0) occur at Rathsnagadan, Murphy's of the River, Abbeyleix Estate and along other shorter stretches of both the tidal and freshwater elements of the site. Typical species seen include Almond Willow, White Willow, Rusty Willow, Crack Willow and Osier, along with Yellow Iris, Hemlock Water-dropwort, Wild Angelica, Thin-spiked Wood-sedge, Pendulous Sedge, Meadowsweet, Common Valerian and the Red Data Book species Nettle-leaved Bellflower.

Other habitats found throughout the site include wet grassland, marsh, reed swamp, improved grassland, arable land, quarries, coniferous plantations, deciduous woodland, scrub and ponds.

Seventeen Irish Red List plant species have been recorded within the site: Killarney Fern, Divided Sedge, Clustered Clover, Basil Thyme, Red Hemp-nettle, Borrer's Saltmarsh-grass, Meadow Barley, Opposite-leaved Pondweed, Meadow Saffron/Autumn Crocus, Wild Clary/Sage, Nettle-leaved Bellflower, Saw-wort, Bird Cherry, Blue Fleabane, Fly Orchid, Ivy Broomrape and Greater Broomrape. Of these, the first nine are protected under the Flora (Protection) Order, 2015. Other

plants that do not have a wide distribution in the country are found in the site, including Thin-spiked Wood-sedge, Field Garlic and Summer Snowflake. Six rare lichens, indicators of ancient woodland, are found including *Lobaria laetevirens* and *L. pulmonaria.* The rare moss *Leucodon sciuroides* also occurs.

The site is very important for the presence of a number of Annex II species, including Freshwater Pearl Mussel (both *Margaritifera* and *M. durrovensis*), White-clawed Crayfish, Atlantic Salmon, Twaite Shad, Sea Lamprey, Brook Lamprey, River Lamprey, Desmoulin's Whorl Snail and European Otter. This is the only site in the world for the hard-water margaritiferid, the Nore Freshwater Pearl Mussel, and one of only a handful of spawning grounds in the country for Twaite Shad. The freshwater stretches of the River Nore (main channel) is a designated salmonid river. The River Barrow/ River Nore is mainly a grilse fishery though spring salmon fishing is good in the vicinity of Thomastown and Inistioge on the River Nore. The upper stretches of the River Barrow and River Nore, particularly the Owenass River, are very important for spawning.

The site supports many other important animal species. Those which are listed in the Irish Red Lists include Daubenton's Bat, Badger, Irish Hare and Common Frog. The rare Red List fish species Smelt occurs in estuarine stretches of the site. In addition to Freshwater Pearl Mussel, the site also supports two other freshwater mussel species, *Anodonta anatina* and *A. cygnea*.

The site is of ornithological importance for a number of Annex I (Birds Directive) species, including Greenland White-fronted Goose, Whooper Swan, Bewick's Swan, Bar-tailed Godwit, Peregrine and Kingfisher. Nationally important numbers of Golden Plover and Bar-tailed Godwit are found during the winter. Wintering flocks of migratory birds are seen in Waterford Harbour. There is also an extensive autumnal roosting site in the reedbeds of the Barrow Estuary used by Swallows before they leave the country. The reedbed at Woodstown supports populations of typical waterbirds including Mallard, Snipe, Sedge Warbler and Water Rail.

Sensitivities of the Site and its Qualifying Interests

Land use within the SAC consists mainly of agricultural activities, mostly intensive and principally grazing and silage production. Slurry is spread over much of the area. Arable crops are also grown. The spreading of slurry and fertiliser poses a threat to water quality and populations of Annex II species within the site. Many of the woodlands along the rivers belong to old estates and support many non-native species. Fishing is a main tourist attraction along stretches of the main rivers and their tributaries and there are a number of angling clubs, some with a number of beats. Both commercial and leisure fishing takes place on the rivers. There is net fishing and a mussel bed in the estuary. Other recreational activities such as boating, golfing and walking, particularly along the Barrow towpath, are also popular. There is a golf course on the banks of the River Nore at Mount Juliet and sports pitches at Inistioge and Thomastown. There are active and disused sand and gravel pits throughout the site. Several industrial developments, which discharge into the river, border the site. New Ross is an important shipping port and shipping to and from Waterford and Belview ports also passes through the estuary.

The main threats to the SAC and current damaging activities include high inputs of nutrients into the river system from agricultural run-off and several sewage plants, over-grazing in the woodland areas, and invasion by non-native species, e.g., Cherry Laurel and Rhododendron. Water quality remains vulnerable. Good quality water is necessary to maintain the populations of Annex II species and is dependent on

controlling fertilisation of the grasslands, particularly along the River Nore. It also requires that sewage be properly treated before discharge. Drainage activities in the catchment can lead to flash floods which can damage the many Annex II species present. Capital and maintenance dredging within the lower reaches of the system pose a threat to migrating fish species such as Lamprey and Shad. Land reclamation also poses a threat to the salt meadows and the protected species therein.

Lower River Suir SAC [002137]

The description of the Lower River Suir SAC provided here is based on the Site Synopsis (NPWS, 2013), Conservation Objectives (NPWS, 2017) and Natura 2000 Standard Data Form (NPWS, 2020) for the site, as well as the Conservation Objectives Supporting Documents (NPWS, 2017). Pathways for negative effects exist between the proposed development and this European site. This European site has been considered under the Key Ecological Receptor headings 'River Barrow and River Suir including Annex I 'Estuaries', 'Migratory Fish and Marine Mammals', and 'Otter'.

Site Overview

The Lower River Suir SAC consists of the freshwater stretches of the River Suir south of Thurles, the tidal stretches as far as the confluence with the Barrow/Nore east of Cheekpoint, and many tributaries including the Clodiagh, Lingaun, Anner, Nier, Tar, Aherlow and Multeen. The River Suir and its tributaries flow through the counties of Tipperary, Kilkenny and Waterford.

The Lower River Suir SAC contains excellent examples of a number of Annex I habitats, including the priority habitats[7] alluvial forest and yew woodland. The site also supports populations of several important animal species, some listed on Annex II to the Habitats Directive or in *Ireland Red List No. 12: Terrestrial Mammals* (Marnell et al., 2019). The presence of two plant species protected under the Flora (Protection) Order, 2015 and the ornithological importance of the site adds further to its ecological interest and importance.

Qualifying Interests of the Site

[1330] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)

[1410] Mediterranean salt meadows (*Juncetalia maritimi*)

[3260] Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation

[6430] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels

[91A0] Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles

[91E0] *Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*)

[91J0] **Taxus baccata* woods of the British Isles

[1029] Freshwater Pearl Mussel (*Margaritifera margaritifera*)

[1092] White-clawed Crayfish (*Austropotamobius pallipes*)

[1095] Sea Lamprey (*Petromyzon marinus*)

[7] An asterisk (*) in the title of an Annex I habitat denotes that it is a "priority habitat", i.e. an Annex I habitat in danger of disappearing and for the conservation of which the EU has particular responsibility in view of the proportion of its natural range which falls within the European territory of Member States.

[1096] Brook Lamprey (*Lampetra planeri*)

[1099] River Lamprey (*Lampetra fluviatilis*)

[1103] Twaite Shad (*Alosa fallax*)

[1106] Atlantic Salmon (*Salmo salar*)

[1355] European Otter (*Lutra lutra*)

'Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)' (1330) and 'Mediterranean salt meadows (*Juncetalia maritimi*)' (1410) occur below Waterford City in old meadows where the embankment is absent, or has been breached, and along the tidal stretches of some of the in-flowing rivers below Little Island. There are very narrow, non-continuous bands of this habitat along both banks. More extensive areas are also seen along the south bank at Ballinakill, the east side of Little Island, and in three large salt meadows between Ballinakill and Cheekpoint. The Atlantic and Mediterranean sub-types are generally intermixed. The species list is extensive and includes Red Fescue, oraches, Sea Aster, Sea Couch, frequent Sea Milkwort, occasional Wild Celery, Parsley Water-dropwort, English Scurvygrass and Sea Arrowgrass. These species are more representative of the Atlantic sub-type of the habitat. Common Cord-grass is frequent along the main channel edge and up the internal channels. Meadow Barley, which is protected under the Flora (Protection) Order, 2015, grows at the landward transition of the saltmarsh. Sea Rush, an indicator of the Mediterranean salt meadows, also occurs.

'Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation' (3260) is evident in the freshwater stretches of the River Suir and along many of its tributaries. Typical species found include Canadian Pondweed, water-milfoils, Fennel Pondweed, Curled Pondweed, Perfoliate Pondweed, Pond Water-crowfoot, other crowfoots and the Greater Water-moss. At a couple of locations along the river Opposite-leaved Pondweed occurs. This species is protected under the Flora (Protection) Order, 2015.

'Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels' (6430) occurs in association with the various areas of alluvial forest and elsewhere where the floodplain of the river is intact. Characteristic species of the habitat include Meadowsweet, Purple Loosestrife, Marsh Ragwort, Ground Ivy and Hedge Bindweed.

'Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles' (91A0) are also of importance at the site. The best examples are seen in Portlaw Wood on both sides of the Clodiagh River. On the south side, the stand is more open, and the oaks (mainly Pedunculate Oak) are well grown and spreading. Ivy and Bramble are common on the ground, indicating relatively high light conditions. Oak regeneration is dense, varying in age from 0-40 years, and Holly is common but mostly young. Across the valley, the trees are more closely spaced and poorly grown. There are no clearings; large oaks extend to the boundary wall. In the darker conditions, Ivy is much rarer and Holly much more frequent, forming a closed canopy in places. Oak regeneration is uncommon since there are few natural clearings. The shallowness of the soil on the north-facing slope probably contributes to the poor tree growth there. The acid nature of the substrate has induced a mountain-type oakwood community to develop. The site is quite species-rich, including an abundance of mosses, liverworts and lichens. The rare lichen *Lobaria pulmonaria*, an indicator of ancient woodlands, is found here.

The best examples of '*Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*)' (91E0) are found on the islands just below Carrick-on-Suir and at Fiddown Island. Species occurring here include Almond Willow, White Willow, Rusty Willow, Osier, Yellow Iris, Hemlock Water-dropwort, Wild Angelica, Pendulous Sedge, Meadowsweet and Common Valerian. The terrain is littered with dead trunks and branches and intersected with small channels that carry small streams to the river. The bryophyte and lichen floras appear to be rich. A small plot is currently being coppiced and managed by the NPWS. In the drier areas, species such as Ash, Hazel, Hawthorn and Blackthorn occur.

Two stands of '**Taxus baccata* woods of the British Isles' (91J0), a rare habitat in Ireland and the EU, occur within the site. These are on limestone ridges at Shanbally and Cahir Park.

Other habitats within the Lower River Suir SAC include wet and dry grassland, marsh, reed swamp, improved grassland, coniferous plantations, deciduous woodland, scrub, tidal river, stony shore and mudflats. The most dominant habitat adjoining the river is improved grassland, although there are wet fields with species such as Yellow Iris, Meadowsweet, rushes, Meadow Buttercup and Cuckooflower.

The site is of particular conservation interest for the presence of a number of Annex II species, including Freshwater Pearl Mussel, White-clawed Crayfish, Salmon, Twaite Shad, Sea Lamprey, Brook Lamprey and River Lamprey and Otter. This is one of only three known spawning grounds in the country for Twaite Shad.

Parts of the Lower River Suir SAC have been identified as of ornithological importance for a number of Annex I (Birds Directive) species, including Greenland White-fronted Goose, Golden Plover, Whooper Swan and Kingfisher. Flocks are seen in Coolfinn Marsh and along the reedbeds and saltmarsh areas of the Suir. Coolfinn supports nationally important numbers of Greylag Goose on a regular basis. Other species occurring include Mallard, Teal, Wigeon, Tufted Duck, Pintail, Pochard, Little Grebe, Black-tailed Godwit, Oystercatcher, Lapwing, Dunlin, Curlew, Redshank, Greenshank and Green Sandpiper. Nationally important numbers of Lapwing were recorded at Faithlegg in the winter of 1996-1997. Kingfisher, a species listed on Annex I to the Birds Directive, occurs along some of the many tributaries throughout the site.

Sensitivities of the Site and its Qualifying Interests

Land use within the site consists mainly of agricultural activities including grazing, silage production (with the use of fertilisers) and land reclamation. The grassland is intensively managed, and the rivers are, therefore, vulnerable to pollution from run-off of fertilisers and slurry. Arable crops are also grown. Fishing is one of the main tourist attractions along stretches of the River Suir and some of its tributaries, and there are a number of angling clubs, some with a number of beats. Fishing stands and styles have been erected in places. Both commercial and leisure fishing takes place on the rivers. The Aherlow River is a designated Salmonid Water under the Freshwater Fish Directive (2006/44/EC). Other recreational activities such as boating, golfing and walking are also popular. Several industrial developments, which discharge into the river, border the site, including three dairy-related operations and a tannery.

River Nore SPA [04233]

The description of the River Nore SPA provided here is based on the Site Synopsis (NPWS, 2011e), Generic Conservation Objectives (NPWS, 2022) and Natura 2000 Standard Data Form (NPWS, 2020) for the site. Pathways for negative effects exist between the proposed development and this European site. This European site has been considered under the Key Ecological Receptor headings 'River Barrow and River Suir, including Annex I 'Estuaries', and 'Migratory Fish and Marine Mammals'.

Site Overview

The River Nore SPA is a long, linear site that includes the following river sections: the River Nore from the bridge at Townparks, (north-west of Borris in Ossory) to Coolnamuck (approximately 3 km south of Inistioge) in Co. Kilkenny; the Delour River from its junction with the River Nore to Derrynaseera bridge (west of Castletown) in Co. Laois; the Erkina River from its junction with the River Nore at Durrow Mills to Boston Bridge in Co. Laois; a 1.5 km stretch of the River Goul upstream of its junction with the Erkina River; the Kings River from its junction with the River Nore to a bridge at Mill Island, Co. Kilkenny. The site includes the river channel and marginal vegetation.

For a large part of its course the River Nore traverses Carboniferous limestone plains; it passes over a narrow band of Old Red Sandstone rocks below Thomastown. The site is a Special Protection Area (SPA) under the E.U. Birds Directive of special conservation interest for the following species: Kingfisher. A survey in 2010 recorded 22 pairs of Kingfisher (based on 16 probable and 6 possible territories) within the SPA. Other species which occur within the site include Mute Swan (35), Mallard (267), Cormorant (14), Grey Heron (45), Moorhen (14), Snipe (17) and Sand Martin (1,029) – all figures are peak counts recorded during the 2010 survey.

Qualifying Interests of the Site

[A229] Kingfisher (*Alcedo atthis*)

The River Nore SPA is of high ornithological importance as it supports a nationally important population of Kingfisher, a species that is listed on Annex I of the E.U. Birds Directive.

Sensitivities of the Site and its Qualifying Interests

This site is particularly sensitive to natural system modifications such as landfill, land reclamation and drying out, general transportation and service corridors such as port areas.

8.3.4 Nationally Designated Sites

None of the pNHAs found in the zone of influence have a site synopsis. The descriptions of these sites are considered to be similar to those described in the sections above relating to the River Barrow and River Nore SAC and the River Nore SPA. These pNHAs have been considered under the Key Ecological Receptor heading 'Nationally Designated Sites'.

8.3.5 Rare and Protected Species

This section lists the rare and protected species of flora and fauna recorded in the desk study.

National Parks & Wildlife Service

Post 1990-records of rare and protected species from within the 10 km grid squares that intersect the zone of influence, S61, S62, S63, S70, S71, S72 and S73, were provided by the NPWS and are listed in Table 8-6 below.

Table 8-6 Records of Rare and Protected Species (NPWS, 2022)

Common Name	Scientific Name	Status*
Flora		
Betony	*Betonica officinalis*	FPO, NT
Borrer's Saltmarsh-grass	*Puccinellia fasciculata*	FPO, NT
Broad-fruited Cornsalad	*Valerianella rimosa*	CR
Basil Thyme	*Clinopodium acinos*	FPO, NT
Chives	*Allium schoenoprasum*	FPO, VU
Clustered Clover	*Trifolium glomeratum*	FPO, EN
Common Wintergreen	*Pyrola minor*	NT
Corky-fruited Water-dropwort	*Oenanthe pimpinelloides*	NT
Devon Whitebeam	*Sorbus devoniensis*	EN
Divided Sedge	*Carex divisa*	FPO, EN
Dwarf Spurge	*Euphorbia exigua*	NT
Fiddle Dock	*Rumex pulcher*	VU
Fly Orchid	*Ophrys insectifera*	NT
Greater Broomrape	*Orobanche rapum-genistae*	NT
Green-flowered Helleborine	*Epipactis phyllanthes*	EN
Henbane	*Hyoscyamus niger*	NT
Irish Spleenwort	*Asplenium onopteris*	VU
Irish Whitebeam	*Sorbus hibernica*	VU
Killarney Fern	*Trichomanes speciosum*	FPO, LC
Knotted Hedge-parsley	*Torilis nodosa*	NT
Lesser Centaury	*Centaurium pulchellum*	FPO, NT
Little-robin	*Geranium purpureum*	NT
Meadow Barley	*Hordeum secalinum*	FPO, VU
Meadow Brome	*Bromus commutatus*	NT
Meadow Saffron	*Colchicum autumnale*	FPO, EN
Milk Thistle	*Silybum marianum*	NT
Opposite-leaved Pondweed	*Groenlandia densa*	FPO, NT
Pennyroyal	*Mentha pulegium*	FPO, EN
Perennial Glasswort	*Sarcocornia perennis*	FPO, VU
Rough Clover	*Trifolium scabrum*	NT
Saw-wort	*Serratula tinctoria*	RE

Common Name	Scientific Name	Status*
Sea Pea	*Lathyrus japonicus*	FPO, VU
Small Cudweed	*Filago minima*	FPO, NT
Smooth Brome	*Bromus racemosus*	NT
Vervain	*Verbena officinalis*	NT
Weasel's-snout	*Misopates orontium*	FPO, EN
Mammals		
Badger	*Meles meles*	WA
Irish Hare	*Lepus timidus hibernicus*	Annex V HD, WA
Grey Seal	*Halichoerus grypus*	WA
Hedgehog	*Erinaceus europaeus*	WA
Otter	*Lutra lutra*	Annex II, IV HD, WA
Red Squirrel	*Sciurus vulgaris*	WA
Pine Marten	*Martes martes*	Annex V HD, WA
Irish Stoat	*Mustela erminea hibernica*	WA
Amphibians		
Common Frog	*Rana temporaria*	Annex V HD, WA
Smooth Newt	*Lissotriton vulgaris*	WA
Reptiles		
Lizard	*Zootoca vivipara*	WA
Leatherback Turtle	*Dermochelys coriacea*	Annex IV, WA
Birds (all wild birds are protected under the Wildlife Acts)		
Kingfisher	*Alcedo atthis*	Annex I BD, Amber
Teal	*Anas crecca*	Amber
Mallard	*Anas platyrhynchos*	Amber
Dunlin	*Calidris alpina*	Red
Mute Swan	*Cygnus olor*	Amber
House Martin	*Delichon urbica*	Amber
Little Egret	*Egretta egretta*	Annex I BD, Green
Swallow	*Hirundo rustica*	Amber
Herring Gull	*Larus argentatus*	Amber
Lesser Black-backed Gull	*Larus fuscus*	Amber
Cormorant	*Phalacrocorax carbo*	Amber
Willow Warbler	*Phylloscopus trochilus*	Amber
Sand Martin	*Riparia riparia*	Amber
Grey Wagtail	*Motacilla cinerea*	Red
Fisheries and Aquatic Fauna		
Sea Lamprey	*Petromyzon marinus*	Annex II HD

Common Name	Scientific Name	Status*
Brook Lamprey	*Lampetra planeri*	Annex II HD
River Lamprey	*Lampetra fluviatilis*	Annex II, V HD
Twaite Shad	*Alosa fallax*	Annex II, V HD
Allis Shad	*Alosa alosa*	Annex II, V HD
White-clawed Crayfish	*Austropotamobius pallipes*	Annex II, V HD

**Abbreviations: FPO = Flora (Protection) Order, 2015; NT = Near Threatened, VU = Vulnerable, EN = Endangered, CR = Critically Endangered, RE = Regionally Extinct on Ireland Red Lists; Annex II/IV/V (non-avian species) = Habitats Directive (HD); Annex I, II, III = Birds Directive (BD); Red/Amber/Green = Birds of Conservation Concern in Ireland 2020-2026 (BOCCI) (Gilbert et al., 2021).*

National Biodiversity Data Centre

Table 8-7 lists the rare and protected species records obtained from the NBDC within 10km grid squares that intersect the zone of influence. To avoid replication, all records of species represented in the NPWS dataset have been removed from the displayed NBDC data. Only those bird species which are listed on Annex I to the Birds Directive and/or are Amber- or Red-listed *Birds of Conservation Concern in Ireland* (BoCCI) 2020-2026, and/or are raptors have been listed here. Table 8-8 lists the invasive species recorded within 10km grid squares that intersect the zone of influence.

Table 8-7 Records of Rare and Protected Species (NBDC, 2022)

Common Name	Scientific Name	Status*
Mammals		
Bottle-nosed Dolphin	*Tursiops truncatus*	Annex II, IV HD
Common Dolphin	*Delphinus delphis*	Annex IV HD
Common Porpoise	*Phocoena phocoena*	Annex II, IV HD
Fin Whale	*Balaenoptera physalus*	Annex IV HD
Harbour Seal	*Phoca vitulina*	Annex II, V HD
Brown Long-eared Bat	*Plecotus auritus*	Annex IV HD
Daubenton's Bat	*Myotis daubentonii*	Annex IV HD
Common Pipistrelle	*Pipistrellus pipstrellus*	Annex IV HD
Leisler's Bat	*Nyctalus leisleri*	Annex IV HD
Natter's Bat	*Myotis nattereri*	Annex IV HD
Soprano pipistrelle	*Pipistrellus pygmaeus*	Annex IV HD
Whiskered Bat	*Myotis mystacinus*	Annex IV HD
Pygmy Shrew	*Sorex minutus*	WA
Birds		
Barn Owl	*Tyto alba*	Red
Bar-tailed Godwit	*Limosa lapponica*	Red
Black Guillemot	*Cepphus grylle*	Amber
Black-headed Gull	*Chroicocephalus ridibundus*	Amber
Black-legged Kittiwake	*Rissa tridactyla*	Red

Common Name	Scientific Name	Status*
Black-tailed Godwit	*Limosa limosa*	Red
Common Guillemot	*Uria aalge*	Amber
Coot	*Fulica atra*	Amber
Curlew	*Numenius arquata*	Red
Gadwall	*Mareca strepera*	Red
Goldeneye	*Bucephala clangula*	Red
Golden Plover	*Pluvialis apricaria*	Annex I BD, Red
Great-crested Grebe	*Podiceps cristatus*	Annex I BD, Amber
Great Northern Diver	*Gavia immer*	Amber
Greater Scaup	*Aythya marila*	Red
Grey Plover	*Pluvialis squatarola*	Red
Hen Harrier	*Circus cyaneus*	Annex I BD, Amber
House Sparrow	*Passer domesticus*	Amber
Kestrel	*Falco tinnunculus*	Red
Lapwing	*Vanellus vanellus*	Red
Light-Bellied Brent Goose	*Branta bernicula*	Amber
Linnet	*Linaria cannabina*	Amber
Merlin	*Falco columbarius*	Annex I BD, Amber
Mew Gull	*Larus canus*	Amber
Northern Shoveler	*Anas clypeata*	Red
Northern Wheatear	*Oenanthe oenanthe*	Amber
Oystercatcher	*Haematopus ostralegus*	Red
Peregrine Falcon	*Falco peregrinus*	Annex I BD
Pochard	*Aythya ferina*	Red
Razorbill	*Alca torda*	Red
Red-billed Chough	*Pyrrhocorax pyrrhocorax*	Amber
Red-breasted Merganser	*Mergus serrator*	Amber
Red Kite	*Milvus milvus*	Annex I BD, Red
Red Knot	*Calidris canutus*	Red
Redshank	*Tringa totanus*	Red
Red-throated Diver	*Gavia stellata*	Annex I BD, Amber
Ringed Plover	*Charadrius hiaticula*	Amber
Sand Martin	*Riparia riparia*	Amber
Sandpiper	*Actitis hypoleucos*	Amber
Scoter	*Melanitta nigra*	Red
Shag	*Gulosus aristotelis*	Amber
Shelduck	*Tadorna tadorna*	Amber

Common Name	Scientific Name	Status*
Skylark	*Alauda arvensis*	Amber
Snipe	*Gallinago gallingo*	Red
Starling	*Sturnus vulgaris*	Amber
Spotted Flycatcher	*Muscicapa striata*	Amber
Swift	*Apus apus*	Red
Tufted Duck	*Aythya fuligula*	Amber
Whooper Swan	*Cygnus cygnus*	Annex I BD, Amber
Wigeon	*Anas penelope*	Amber
Woodcock	*Scolopax rusticola*	Red
Yellowhammer	*Emberiza citrinella*	Red
Invertebrates		
Marsh fritillary	*Euphydryas aurinia*	Annex II HD
Fisheries and Aquatic Fauna		
Atlantic Salmon	*Salmo salar*	Annex II, V HD

**Abbreviations: Annex II/IV/V (non-avian species) = Habitats Directive (HD); Annex I, II, III = Birds Directive (BD); WA = Wildlife Acts; and Red/Amber/Green = Birds of Conservation Concern in Ireland 2020-2026 (BOCCI) (Gilbert et al., 2021).*

Table 8-8 Records of invasive species restricted under the Habitats Regulations or under EU Regulation 1143/2014 (denoted by *) (NBDC, 2022).

Common Name	Scientific Name
American Mink*	*Neovison vison*
American Skunk-cabbage*	*Lysichiton americanus*
Asian Clam	*Corbicula fluminea*
Brazilian Giant-rhubarb*	*Gunnera manicata*
Canadian Waterweed*	*Elodea canadensis*
Chinese Mitten Crab*	*Eriocheir sinensis*
Chinese Muntjac*	*Muntiacus reevesi*
Common Cord-grass*	*Spartina anglica*
Dace	*Leuciscus leuciscus*
Giant Hogweed*	*Heracleum mantegazzianum*
Giant Knotweed*	*Fallopia sachalinensis*
Giant-Rhubarb*	*Gunnera tinctoria*
Grey Squirrel*	*Sciurus carolinensis*
Greylag Goose	*Anser anser*
Himalayan Balsam*	*Impatiens glandulifera*
Himalayan Knotweed*	*Persicaria wallichii*
Japanese Knotweed sp.*	*Reynoutria japonica* x *sachalinensis* = *F.* x *bohemica*

Common Name	Scientific Name
Japanese Knotweed*	*Reynoutria japonica*
New Zealand Pigmyweed*	*Crassula helmsii*
Nuttall's Waterweed*	*Elodea nuttallii*
Rhododendron*	*Rhododendron ponticum*
Sea-buckthorn*	*Hippophae rhamnoides*
Spanish bluebell*	*Hyacinthoides hispanica*
Three-cornered Leek*	*Allium triquetrum*
Traveller's Joy*	*Clematis vitalba*
Water Fern*	*Azolla filiculoides*
Wireweed*	*Sargassum muticum*

8.3.6 EPA and WFD Watercourse Assessments

The proposed development crosses the River Barrow estuary and is hydrologically connected to the Lower River Suir estuary. Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy (the Water Framework Directive or 'WFD') requires that each Member State protect and improve water quality in all waters so that good ecological status is achieved. Additionally, proposed actions (within discrete River Basin Management Plans) are also required, to secure national natural water resources for the future. The EPA is the competent authority responsible for monitoring, protecting, and improving the water environment in the Republic of Ireland.

In accordance with WFD guidelines, water quality 'Status' is assigned using a variety of available data on aquatic flora and fauna (including fish), the availability of nutrients, and aspects like salinity, temperature and pollution by chemical pollutants. Morphological features, such as quantity, water flow, water depths and structures of the riverbeds, are also taken into account.

The original EPA water quality classification system (the 'Quality Rating System' or 'Q values') is also used to assess water quality in Irish rivers, taking into account aquatic macrophytes, phytobenthos and hydromorphology. The Quality Rating System has been shown to be a robust and sensitive measure of riverine water quality and has been linked with both chemical status and land-use pressures in catchments. Individual macroinvertebrate species are ranked for their sensitivity to organic pollution and the Q-value is assessed based, primarily, on their relative abundance within a biological sample. A review of both the internal EPA Q value status and WFD surface water status for the relevant watercourses was undertaken.

The EPA's online map viewer provides access to information at individual waterbody level in Ireland. Waterbodies can relate to surface waters (these include rivers, lakes, estuaries [transitional waters], and coastal waters) or to groundwater. Table 8-9 shows the information recorded in watercourses crossed by the proposed development, at the closest point. 'The River Barrow and River Suir, including Annex I Estuaries' is included as a Key Ecological Receptor of the proposed development.

Table 8-9 EPA and WFD Water Quality Status (Source: EPA)

Transitional Waterbody	WFD Status (2010 – 2012)	WFD Status (2013 – 2018)	WFD Risk
Barrow Nore Estuary Upper	Moderate	Moderate	At Risk
New Ross Port	Poor	Moderate	At Risk
Upper Barrow Estuary	Good	Good	Review
Nore Estuary	Moderate	Good	At Risk
Lower Suir Estuary (Little Island – Cheekpoint)	Moderate	Good	At Risk
Barrow Suir Nore Estuary	Moderate	Moderate	At Risk
River Waterbody Name	**Station Name**	**Q Value**	
Barrow_240	St. Mullins	4	Good
Nore_240	Brownsbarn Br	4	Good

8.3.7 Fisheries and Aquatic Fauna

The River Barrow and River Suir catchments are internationally important for the presence of fish species including Twaite Shad (*Alosa fallax*), Atlantic Salmon (*Salmo salar*), Lamprey species, European Eel (*Anguilla anguilla*) and European Smelt (*Osmerus eperlanus*). The status and occurrence of these species within the study area is described below. These species have been considered under the Key Ecological Receptor heading 'Migratory Fish and Marine Mammals'.

Twaite Shad

Adult shad move from the sea into estuaries in spring and spawn just above the top of tidal waters in May and June. During the breeding season, large numbers of adult shad move up and down the estuary with the tide. Most adults return to the lower estuary within days of spawning and to sea by the end of the summer. Juvenile shad spend one or two years in the estuary, moving up and down with the tides and feeding on planktonic crustaceans and other invertebrates. Twaite Shad is classed as vulnerable to extinction in Ireland (King et al., 2011).

As part of its national monitoring programme for Habitats Directive: Annex II and Red Data Book fish species, IFI has been studying the ecology and behaviour of Twaite Shad in the estuaries of the larger rivers in the south-east of Ireland since 2010. The following reports describe the methods used to survey for shads and their respective degrees of success:

- King, J.J. and Linnane, S.M. (2004) *The status and distribution of lamprey and shad in the Slaney and Munster Blackwater SACs*. *Irish Wildlife Manuals* 14. National Parks & Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin.
- Kelly, F., Harrison, A., Connor, L., Matson, R., Morrissey, E., Feeney, R., Wogerbauer, C., O'Callaghan, R. and Rocks, K. (2011) *Sampling Fish for the Water Framework Directive – Summary Report 2010*. Inland Fisheries Ireland, Dublin.
- IFI (2011) *Sampling Fish for the Water Framework Directive – Transitional Waters 2010: Barrow, Nore and Suir Estuaries.* Inland Fisheries Ireland, Dublin.

- IFI (2012) *National Programme: Habitats Directive and Red Data Book Fish species. Executive Report 2011. IFI Report Number: IFI/2012/1-4103.* Inland Fisheries Ireland, Dublin.
- Rooney, S.M., O'Gorman, N.M., King, J.J. (2013) *National Programme: Habitats Directive and Red Data Book Species Executive Report 2012.* Inland Fisheries Ireland, Dublin.
- Rooney, S.M., O'Gorman, N.M., Cierpial, D. and King, J.J. (2014) *National Programme: Habitats Directive and Red Data Book Species Executive Report 2013.* Inland Fisheries Ireland, Dublin.
- O'Gorman, N.M., Rooney, S.M., Cierpial, D. and King, J.J. (2015) *National Programme: Habitats Directive and Red Data Book Species Executive Report 2014.* Inland Fisheries Ireland, Dublin.
- Rooney, S. and King, J.J. (2015) *A poster on acoustic tracking of twaite shad by the Habitats Directive and Red Data Book Species team presented at the 3rd International Conference on Fish Telemetry (ICFT) in Halifax, Nova Scotia in 2015.* Inland Fisheries Ireland, Dublin.
- Gallagher, T., O'Gorman, N.M., Rooney, S.M., Coughlan, B., and King, J.J. (2016) *National Programme: Habitats Directive and Red Data Book Species Executive Report 2015.* Inland Fisheries Ireland, Dublin.
- IFI (2022a) *Twaite Shad* <https://www.fisheriesireland.ie/species/twaite-shad-alosa-fallax> [Accessed 25/03/2022]. Inland Fisheries Ireland, Dublin.
- IFI (2022b) *Juvenile Shad Monitoring* <https://www.fisheriesireland.ie/Habitats-and-Red-Data-Book/juvenile-shad-monitoring.html> [Accessed 25/03/2022]. Inland Fisheries Ireland, Dublin.
- IFI (2022c) *Adult Shad Monitoring* <https://www.fisheriesireland.ie/Habitats-and-Red-Data-Book/adult-shad-monitoring.html> [Accessed 25/03/2022]. Inland Fisheries Ireland, Dublin.

Monitoring of juvenile Twaite Shad is challenging due to the small size of the fish and large extent of their estuarine habitat, as well as other environmental factors such as flooding and tidal influences. Given these challenges, IFI's monitoring programme has focussed primarily on sampling young-of-the-year fish in Waterford Harbour and the Suir, Barrow and Nore Estuaries. The main survey technique used to target post-larval and young-of-the-year fish is fine-mesh zooplankton or bongo netting. Other techniques include beach seining, fyke netting and beam trawling, though only bongo and seine netting have produced positive results.

During the period from March to May, inclusive, adult Twaite Shad are expected to migrate upstream through the works area in significant numbers during daylight hours. Later in the summer, i.e., in June and July, spent adult shad are likely to be present in significant numbers on their return from their spawning grounds to the lower estuary and, eventually, the sea. The timing of the arrival of young-of-the-year (0+) shad at the location of the proposed development is not known, but it is thought that they gradually move down the tidal reaches of the river from June to August/September. Similarly, little is known of the behaviour and ecology of juvenile Twaite Shad during their residency in the estuary. Therefore, following the Precautionary Approach, juveniles are assumed to move upstream and downstream through the works area at all times of the year and to be most active during daylight. Owing to their sensitive auditory systems, diurnal habit and year-round presence, as well as their small body size, juvenile Twaite Shad are considered highly vulnerable to noise impacts arising from pile driving.

Salmonids

While the River Barrow at the location of the proposed development does not provide suitable spawning habitat for salmonids, e.g., Atlantic Salmon (*Salmo salar*) and Brown Trout (*S. trutta*), it is an important link between the estuarine, coastal and oceanic feeding grounds for these species and their spawning beds further upstream. Salmonid species may be present at the proposed development location at any time of year but occur in most significant numbers during their upstream spawning migration (predominantly in autumn and winter) and out-migration of smolts (almost entirely in spring). In addition, sea or slob trout (Brown Trout with a marine or estuarine adult phase) may be present at any time of the year.

Like shads, Atlantic Salmon is an anadromous species, i.e., the adult life stage is marine, with mature fish returning to their natal freshwater streams to spawn. Adults can begin their spawning migration at any time of year, but there are two main migration periods: fish who have spent one winter at sea, known as "grilse", ascend rivers in late winter, while fish who have spent more than one winter at sea, known as "multi-sea-winter (MSW)" (or "spring" salmon, if they enter fresh water before 1st June), generally enter rivers earlier in the year. Movement of spawning salmon upstream through the estuary is predominantly nocturnal and usually occurs on the ebb tide (Smith & Smith, 1997). Once spawning has occurred, most adults die, though as many as 36% may survive and return to sea as kelts (Hendry & Cragg-Hine, 2003). Only 3-6% survive to spawn in subsequent years (Mills, 1989; Hubley et al., 2008).

The eggs hatch in spring and the young, known as "alevins", remain within the gravel until the yolk-sac is depleted, which takes a number of weeks, at which point the rise to the surface and begin their free-swimming phase. At this point the juvenile fish are known as "fry". At the end of their first summer these fish develop parr marks on their sides and are thereafter known as "parr". Juveniles spend 2-4 years in fresh waters (Hendry & Cragg-Hine, 2003), normally undergoing smoltification (a series of physiological changes or metamorphosis which prepares the young salmon for life in the marine environment) and migrating to sea in the spring (March-June) of their third year (King et al., 2011). Out-migrating smolts are predominantly nocturnal (Moore et al., 1995). However, they become increasingly active during daylight hours with increasing water temperatures (Thorpe et al., 1994; Ibbotson et al., 2006, 2011; Haraldstad et al., 2017). Smolts do not require a period of acclimation to saline conditions and so tend not to delay in the estuary, preferring to move directly to sea (Moore et al., 1995).

As the up-estuary section of the migration of adult Atlantic Salmon is predominantly nocturnal, the vast majority of individuals will migrate past the proposed development location during the hours of darkness. Similarly, any out-migrating kelts are likely to migrate at night. In addition, these fish are likely to spend only a very short time in the estuary, instead migrating directly from the river to the sea.[8] Furthermore, only a very small portion of kelts contribute to future spawning, and so impacts on kelts are generally imperceptible at the population scale.

Smolts are likely to pass through the construction area in significant numbers on their migration from the river to the sea in the period from March to May, inclusive. As with adult salmon, smolts migrate mostly at night. As with kelts, smolts do not tend to delay in the estuary, preferring to migrate directly to sea.

[8] Atlantic Salmon kelts occasionally spend longer periods (up to several weeks) in estuaries on their post-spawning migration to the sea (Lindberg, 2011).

Lamprey

Sea Lamprey (*Petromyzon marinus*) and River Lamprey (*Lampetra fluviatilis*) are both likely to be present at the proposed development location in significant numbers during their upstream spawning migrations and downstream migrations following metamorphosis. The major upstream movements of Sea Lamprey occur in April, May and, to a lesser extent, June, while those of River Lamprey occur earlier, beginning in August and continuing over the winter and spring. The downstream migration of Sea Lamprey occurs in September and October, while that of River Lamprey occurs over an extended period from late winter to early summer.

Two lamprey species, Sea Lamprey and River Lamprey, migrate past the proposed development. Brook Lamprey is restricted to the freshwater stretches of the River Suir, the River Barrow, and the River Nore and, therefore, will not be affected by the proposed development. Sea Lamprey is present at the proposed development location at two key phases in its life cycle: 1) adults migrate upstream from the sea to their spawning grounds in the freshwater stretches of the river; and 2) newly metamorphosed adults migrate downstream from their juvenile habitats to the sea to feed as adults. River Lamprey is also present at the proposed development location during its migrations between its spawning and juvenile habitats in the freshwater reaches and its adult habitats in the estuary, as well as during its adult phase, when it resides in the estuary. All lamprey species are semelparous (Maitland, 2003a), i.e., adults undergo a single spawning event and then die. Thus, no spent adults occur in the vicinity of the proposed development.

The upstream migration of adult Sea Lamprey is concentrated in the months of April, May and June (Maitland, 2003a; King et al., 2008). The upstream migration period of River Lamprey is less well-known and may occur over a long period beginning in August and continuing throughout autumn and winter, until the spawning season in spring (King et al., 2008). Peak migration periods have been proposed as being from October to December (Maitland, 2003a). In the case of both Sea Lamprey and River Lamprey, upstream migration is almost exclusively nocturnal (Maitland, 2003a; Andrade et al., 2007; Quintella et al., 2009; Vrieze et al., 2011).

Lamprey larvae, known as "ammocoetes", burrow into fine sediments at the bottom of fresh waters and live as filter-feeders. Metamorphosis occurs after *c.* 5 years in Sea Lamprey and after 3-5 years in River Lamprey (Maitland, 2003a). The downstream migration of recently metamorphosed lampreys, known as "macrophthalmia", is not well-studied, but it appears to vary between years and river systems. MOR (2010) stated that Sea Lamprey begin their downstream migration once metamorphosis is complete (usually by September) and most arrive in the estuary in October. MOR (2010) also suggested that newly metamorphosed River Lamprey "*begin their downstream migration over an extended period from late winter to early summer*". Downstream migration by both Sea Lamprey and River Lamprey is predominantly nocturnal (Maitland, 2003a; Potter, 1980; Lucas & Bracken, 2010; Silva et al., 2013; Moser et al., 2014; Dawson et al., 2015).

European Eel

Unlike salmonids and lampreys, European Eel (*Anguilla anguilla*) has a catadromous life history, i.e., spawning occurs at sea and juveniles migrate into fresh waters to feed and mature. The major influx of juvenile eels occurs in April and May. Large numbers of eels are expected to be present at the proposed development location during this time.

European Smelt

Another species which is known to use the River Barrow in the vicinity of the proposed development is European Smelt (*Osmerus eperlanus*). This estuarine species is most likely to be present in significant numbers at the proposed development location during March and April.

8.3.8 Marine Mammals

Harbour Porpoise, Common Dolphin and Grey Seal are present in Waterford Harbour on a regular basis. Harbour porpoise have been recorded in the River Barrow adjacent to the study area and Grey Seal has been recorded in the River Barrow, *c.* 5km downstream of the proposed development. Minke Whale and Long-finned Pilot Whale have also been recorded within the zone of influence, however these larger cetaceans are unlikely to be in such close proximity and would only be exposed to underwater noise from the proposed development up to 10 km away (DAHG, 2014). Considering Waterford Harbour is located at least 20 km downstream from the proposed development site, the potential for hydroacoustic impacts on large cetaceans can be ruled out.

Based on the above, the smaller cetaceans, i.e., Harbour Porpoise, Common Dolphin and Grey Seal are most likely to occur in close proximity to the proposed development. Therefore, the potential for hydroacoustic impacts on these species must be considered. In relation to Grey Seal, Common Dolphin and Harbour Porpoise, the occurrence of these species within close proximity to the proposed development is sporadic and it is extremely unlikely that any would be exposed to potential impacts from the proposed development on account of the presence of barges in the river. Nevertheless, the potential for hydroacoustic impacts on Harbour Porpoise, Common Dolphin and Grey Seal are mitigated for under KER 3 'Migratory Fish and Marine Mammals'.

8.3.9 Terrestrial Mammals

Bats

Seven of the nine bat species found in Ireland have been recorded within the zone of influence. Brown Long-eared Bat and Leisler's Bat has been recorded in the study area, as part of the *Atlas of Mammals in Ireland* (NBDC, 2016).

Otter

There are frequent and widespread records of Otter throughout the study area (NPWS, 2022; NBDC, 2022). Otter are protected under the Wildlife Act; and are listed on Annex II and IV of the Habitats Directive.

8.3.10 Amphibians and Reptiles

Common Frog (*Rana temporaria*) and Smooth Newt (*Lissotriton vulgaris*) are common and widespread in Ireland. Common Frog and Smooth Newt have been recorded in the zone of influence and are likely to use the waterbodies and drainage ditches in the wider area. Viviparous Lizard (*Zootoca vivipara*) has not been recorded in the zone of influence.

8.3.11 Birds

The data retrieved from the NBDC database (Table 8-7 above) contains records of a considerable number of bird species within the zone of influence, all of which are Red-listed or Amber-listed in *Birds of Conservation Concern in Ireland 2020-2026 (*Gilbert, G. et al., 2021) and some of which are listed on Annex I to the Birds Directive. Many of these birds are wetland species which spend the winter in the

Suir-Barrow-Nore Estuary, while others are riparian species more likely to occur along the freshwater stretches of the River Barrow, e.g., Kingfisher.

BirdWatch Ireland provided Irish Wetland Bird Survey (I-WeBS) data for the subsite close to the proposed development. The subsites and the years for which data was received are present in Table 8-10 below.

Table 8-10 I-WeBS sub-sites reviewed.

Subsite name	Subsite Code	Years of surveys	Distance from the proposed development
Barrow Bridge-Passage East	OM496	2013/14	16 km downstream

No species have been recorded occurring in nationally or internationally important numbers at subsite OM496, which is located 16 km downstream of the proposed development. There was no data available from subsite OM498 (Barrow Bridge – Creadan Strand, *c.* 21 km downstream).

8.3.12 Invasive Alien Species

The NBDC provided data on the known Invasive Alien Species in the vicinity of the proposed development. The data retrieved from the NBDC database (Table 8-8 above) contains records of a considerable number of Invasive Alien Species within the zone of influence. Invasive Species Ireland and the Northern Ireland Environment Agency databases also provided information on known Invasive Alien Species, including aquatic Invasive Alien Species such as the Chinese Mitten Crab (*Eriocheir sinensis*). Chinese Mitten Crab has been recorded in the Waterford Estuary as recently as January 2021 (ISI, 2021). This species has been included as a Key Ecological Receptor under the heading 'Invasive Alien Species'.

8.4 Receiving Environment – Field Survey Results

8.4.1 Habitats

The following section describes the habitats recorded during field survey in September 2021 and January 2023. A total of 14 different habitats were recorded within the study area (Table 8-11). Habitats corresponding to an Annex I habitat are denoted with an asterisk (*). Habitat mapping is presented in Drawing no. WBRC-ROD-ENV-S101-DR-CB-30023 in Appendix C of this Planning Report. Habitats were classified according to *A Guide to Habitats in Ireland* (Fossitt, 2000).

Table 8-11 Habitats recorded during field survey.

Habitat Name	Fossitt Code
Buildings and artificial surfaces	BL3
Sea walls, piers and jetties	CC1
Tidal rivers*	CW2
Recolonising bare ground	ED3
Reed and large sedge swamps	FS1
Improved agricultural grassland	GA1
Amenity grassland	GA2
Mud shores*	LS4

Habitat Name	Fossitt Code
(Mixed) broadleaved woodland	WD1
Scattered trees and parkland	WD5
Hedgerows	WL1
Treelines	WL2
Scrub	WS1
Immature woodland	WS2

Buildings and artificial surfaces (BL3)

Much of the land surrounding the proposed development is built land consisting of the urban centre of New Ross. Further away from the river, the majority of the surrounding area comprises built areas including roads and buildings. Generally, built habitats are not considered to be of high ecological significance.

Sea walls, piers and jetties (CC1)

This category is used for all coastal constructions that are partially or totally inundated by sea water at high tide. This habitat was recorded along both banks of the River Barrow at the location of the proposed development as a masonry, concrete sea walls and rock armour. In addition to this, a small jetty is located *c.* 50m upstream of the bridge on the eastern bank which is included in this habitat category.

Aquatic Services Unit (2022a & 2022b) surveyed the hard intertidal surfaces within and adjacent to the footprint of the proposed sheet pile walls in January and September 2022. The description of these habitats is reproduced below, and the full reports are presented in Appendix D.

South-east corner:

> "*The quay walls were covered in green algae […], the majority of which was* Vaucheria *sp., a genus of alga common in freshwater and estuarine sites. In addition, there were trace amounts of filamentous green algae and very small amounts of* Ulva intestinalis *also present. Higher up on the quay walls were scattered small amounts of the moss* Cinclidotus fontinaloides*, a species often found on rocks and other hard substrates above the water line but subject to frequent inundation. The only higher plant visible were very scarce amounts of stunted plants of an* Oenanthe *species, possibly* O. crocata *(Hemlock waterdropwort) a common species in freshwater sites. There were no rare or unusual plants noted*."

South-west corner:

> *"Along the foreshore below the bridge there has been the import of protective rocks and an area of artificially made ground associated with the base of the bridge. Here vegetation has developed that is more typical of recolonising ground and is an eclectic mix of species. Species that indicate the coastal nature of the area include Sea Aster (*Aster tripolium*) and Common Mallow (*Malva sylvestris*). Also, several species of disturbed ground occur including a variety of species of yellow* asteraceae*, Dandelions, Hawkbits, Sow thistles, docks (*Rumex *species),* Brassicaceae*, rank grasses Couch Grass, Cock's foot grass, False Oat Grass, Teasel, Willowherbs, Thistles, Plantains, Red Valerian, occasional woody saplings e.g., Ash."*

While these habitats are not species-rich or of a very natural or locally distinct character, they are one of the principal ecosystem features which define this part of the River Barrow and support the integrity of habitats and species of conservation interest in the River Barrow and River Nore SAC.

Tidal rivers (CW2)

The proposed development runs along the northern bank of the River Barrow. The river within the extents of the proposed development is subject to the influence of the tides and is designated as part of the River Barrow and River Nore SAC. This habitat class contains other habitat types within it, namely 'Sea walls, piers and jetties' (CC1), and 'Mud shores' (LS4). In addition, the River Barrow at this location corresponds to the Annex I habitat 'Estuaries' (1130) which is listed as a Qualifying Interest of the River Barrow and River Nore SAC. EC (2013) describes this habitat as the downstream part of a river valley, subject to the tide and extending from the limit of brackish waters. Therefore, the Annex I type applies to the intertidal areas.

Specialist surveys of these habitats were undertaken by UCC Aquatic Services Unit in January and September 2022, and the results are included as relevant.

Plate 8-1 Tidal River flowing under O'Hanrahan Bridge.

Reed and large sedge swamps (FS1)

This category includes species-poor stands of herbaceous vegetation that are dominated by reeds and/or other large grasses or large, tussock-forming sedges. An area of this habitat (*c.* 180m^2) is present along the western bank of the River Barrow, approximately 40m south of O'Hanrahan Bridge. UCC Aquatic Services Unit (2022b) surveyed this habitat in September 2022. The description of this habitat from the survey report is reproduced below and the full data are presented in Appendix D.

"*The River Barrow is tidal at New Ross and is considered to be at the upper estuarine extent of the Barrow. Fringing the muddy river channel of the Barrow River at Hanrahan's Bridge is typical reed bed vegetation which is common in upper estuarine environments on muddy substrates and where saline influence is more limited.* Phragmites *reed beds are an important component of emergent vegetation communities in estuarine systems. Here at the upper portion of the Estuary Common Reed (*Phragmites australis*) dominates over more halophytic plants which occur in more saline conditions such as Cord grasses (*Spartina *spp.).*

*Common Reed (*P. australis*) is tall and a dominant competitor for light, so that dense stands of the common reed tend to be species poor in other plants but at the fringes of the reedbed trees (i.e., willows* Salix *spp.) occur at the inland edge of the shore.*

Fringing the reedbed towards the estuary side species such as Soft Stem Bulrush Schoenoplectus *spp. (likely* tabermontani*) and Club Rush (*Bolboschoenus maritimus*) grow on the open mud and shoreward species such as some Reed Canary-grass (*Phalaris arundinacea*), Buck's horn plantain (*Plantago coronopus*) and Willowherbs (*Epilobium *spp.) also occur*."

Plate 8-2 Reedbed and Intertidal Mudflats.

Improved agricultural grassland (GA1)

This category includes highly modified or intensively managed agricultural grasslands. This habitat can be found on the northern and eastern sides of the construction site compound.

Amenity grassland (GA2)

This category includes improved or species poor grasslands including amenity, recreational or landscaped grasslands. UCC Aquatic Services Unit (2022b) surveyed this habitat in September 2022. The description of this habitat from the survey report is reproduced below and the full data are presented in Appendix D.

> "*A small area of amenity grassland (improved) occurs adjacent to the Bridge. This habitat is dominated by a variety of grasses including* Poa *species and with broadleaved herbs such as Daisy (*Bellis perennis*), Dandelion (*Taraxacum *spp.), clovers (*Trifolium *spp.) and plantains (*Plantago *spp.) are common*."

Mud shores (LS4)

Mud shores are formed primarily of very fine sediment and usually occur along the most sheltered sections of coastline. The silt/clay fraction of the sediment is typically found in the upper reaches of estuaries. They are subject to variable, reduced or low salinity conditions. Mud shores are often characterised by elevated mudflats that are dissected by networks of shallow channels associated with flooding and drainage. This habitat is present in the intertidal areas of the River Barrow, including within the footprint of the proposed development.

UCC Aquatic Services Unit (2022a & 2022b) surveyed the mudflats within the extents of the proposed sheet pile wall in January and September 2022. The description of the mudflats from the survey reports is reproduced below and the full data are presented in Appendix D.

> "*The infaunal and granulometric results point to a single habitat type within the survey area. This has been identified as* Tubificoides benedii *and other oligochaetes in littoral mud [LS.LMu.UEst.Tben] (Conner et al., 2004). This habitat type has been described as extremely species-poor. Consisting almost exclusively of oligochaetes. It is known to occur at the head of estuaries, in sheltered locations with no strong river flow and a strong freshwater influence, which is consistent with the conditions in the survey area at O'Hanrahans Bridge*."

This habitat corresponds to the Annex I habitat 'Mudflats and sandflats not covered by seawater at low tide' (1140) and is listed as a Qualifying Interest of the River Barrow and River Nore SAC. While the mudflat habitats at this location are very species-poor and do not represent best examples of this habitat type, they support the integrity of other habitats and species that are listed as Qualifying Interests of the River Barrow and River Nore SAC.

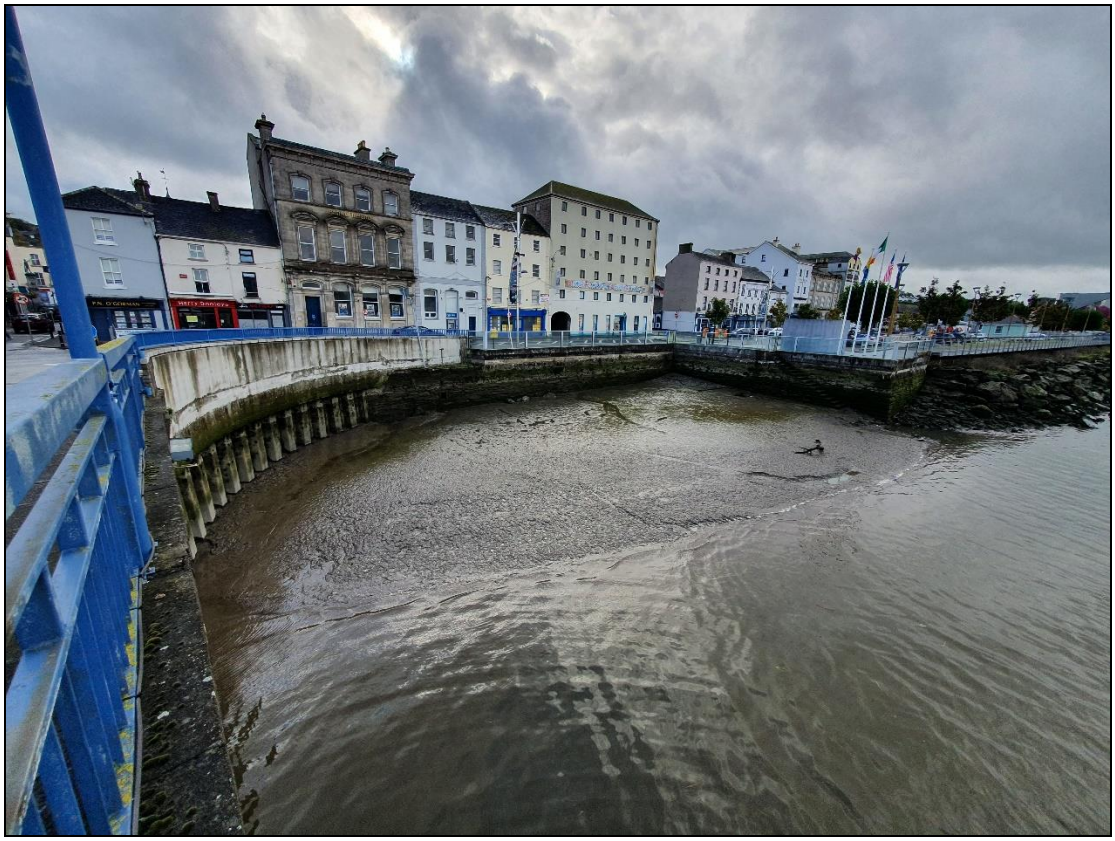

Plate 8-3 **Mud Shores, Sea Walls, Piers and Jetties, and Buildings and Artificial Surfaces at the south-eastern corner of O'Hanrahan Bridge.**

(Mixed) broadleaved woodland (WD1)

This woodland type includes woodlands which are composed of a mixture of both native and non-native tree species. Examples of this habitat can be found within and adjacent to the residential areas to the west of the site.

Scattered Trees and Parkland (WD5)

This category can be used in situations where scattered trees, standing alone or in small clusters, cover less than 30% of the total area under consideration but are a prominent structural or visual feature of the habitat. This usually occurs in areas of cultivated grassland, particularly amenity areas. This habitat has been created for amenity use on the western banks of the River Barrow on both sides of the bridge. Within the study area, this habitat included Silver Birch (*Betula pendula*) and Sweet Chestnut (*Castenea sativa*) trees.

Hedgerows (WL1)

This habitat type includes linear strips of shrubs with occasional trees that form field and property boundaries. Examples of this habitat type can be found along throughout the residential and agricultural areas within the study area.

Treelines (WL2)

Treelines are narrow rows or single lines of trees that are greater than 5m in height and typically form property of field boundaries. Examples of this habitat type can be found throughout the residential and agricultural areas within the study area.

Scrub (WS1)

This category includes areas that are dominated by shrubs, stunted trees or brambles where canopy height is less than 5m. This habitat is present along the western bank of the River Barrow on the southern side of O'Hanrahan Bridge. UCC Aquatic Services Unit (2022a & 2022b) surveyed this habitat in September 2022. The description of this habitat from the survey report is reproduced below and the full data are presented in Appendix D.

> "*At the upper extent of the Reed bed a small patch of White Willow (*Salix alba*) occurs this is associated with some bramble (*Rubus fruticosus *agg.) on the landward side. The herbaceous layer consists of herbs, including nettle (*Urtica dioica*), Hogweed (*Heracleum sphondylium*), Willowherbs e.g., (*Epilobium hirsutum*) Hedge woundwort (*Stachys sylvatica*), Docks (*Rumex *spp.) and rank grasses Couch Grass, False Oat Grass, etc*."

Himalayan Balsam (*Impatiens glandulifera*) was recorded growing beneath the trees which is an invasive species restricted under Section 49 of the Habitats Regulations.

Immature woodland (WS2)

Immature woodlands are areas dominated by young or sapling trees. This habitat type can be on the northern boundary of the construction site compound. This habitat is dominated by silver birch.

Character and Significance of Habitats

The site of the proposed development has been highly modified from its natural state over centuries of urbanisation, navigation, dredging and reclamation. Its character is typical of urbanised estuarine environments. The River Barrow itself, although highly modified, is the habitat with the highest biodiversity value within the site as it supports a number of habitats and species of conservation importance, some of which are Qualifying Interests of the River Barrow and River Nore SAC and other connected sites. Other habitats are of considerably lower significance.

Benthic Habitats

Benthic biological surveys on the downstream side of the south-eastern and south-western corners of O'Hanrahan Bridge were carried out for ROD by UCC Aquatic Services Unit on the 14th January and 21st September 2022 respectively (Aquatic Services Unit, 2022). The Aquatic Services Unit (ASU) is a constituent unit within the Environmental Research Institute of University College Cork. ASU has been undertaking environmental consultancy and research for over 20 years.

Granulometry Results

South-eastern corner

Sample station 1, immediately adjacent to the south-eastern quay wall was the closest station to the proposed development. At this point the sediment was approximately 94% silt-clay and 6% sand. This was also true for sample station 2, which was just west of sample station 1. At sample station 3 which was immediately west of sample station 2, the sediment was approximately 78% silt-clay and 22% sand. Sample station locations are displayed in Figure 1 of Appendix D (2022a). Some gravel, brick and other debris were also observed in the south-east corner of the site.

South-western corner

Sample station 1, immediately adjacent to the south-western quay wall was the closest station to the proposed development. At this point the sediment was approximately 73% silt-clay and 27% sand. At sample station 2 which is immediately west of sample station 1, the sediment was approximately 82% silt-clay and 18% sand. At sample station 3 which was west of sample station 2, the sediment was approximately 78% silt-clay and 22% sand. Sample station locations are displayed in Figure 1 of Appendix D (2022b).

Soft Sediment Habitat Assessment Results

The benthic habitat at the proposed development location was identified as '*Tubificoides benedii* and other oligochaetes in littoral mud'. This habitat type has been described as extremely species-poor, consisting almost exclusively of oligochaetes. It is known to occur at the head of estuaries, in sheltered locations with no strong river flow and a strong freshwater influence, which is consistent with the conditions in the survey area at O' Hanrahan Bridge.

The benthic fauna was low in diversity and numbers. The mud was devoid of visible signs of infaunal activity. There were no visible burrows, worm casts or bivalve irrigation holes. There were no algae or other aquatic plans on the mud or gravel. The quay walls were covered in green algae (*Vaucheria* sp.), a common genus of alga in freshwater and estuarine sites. There were no rare or unusual plants noted. Three species were identified in the samples including a species of earthworm, a species of mud snail and a species of small crustacean. Benthic habitats have been considered under the Key Ecological Receptor headings 'River Barrow and River Suir, including Annex I Estuaries' and 'Intertidal Habitats including Annex I Mudflats and sandflats not covered by seawater at low tide'.

8.4.2 Flora

No species protected under the Flora (Protection) Order, 2022 were recorded within the study area. Species identified within specific habitats are detailed in Section 8.4.1 above.

Invasive Alien Plant Species

Two species restricted under Regulation 49 of the Habitats Regulations, namely Common Cordgrass (*Spartina anglica)* and Himalayan Balsam (*Impatiens glandulifera*), were recorded on the bank of the River Barrow *c*. 15m downstream of the bridge. Common Cordgrass was identified growing within reed beds which covers a total area of *c.* 750m^2 within proximity of the bridge. Himalayan Balsam was recorded growing along a 15m stretch of the riverbank under a treeline *c.* 30m south of the proposed development. These species have potential to be spread as a result of construction works and are considered under the Key Ecological Receptor heading 'Invasive Alien Species'.

8.4.3 Fauna

Terrestrial Mammals

Bats

Bat Roost Suitability Assessment

Table 8-12 below displays information on the structure that was assessed for bat suitability.

Table 8-12 Structures inspected for bat roost potential.

Feature	Suitability	Notes
O'Hanrahan Bridge	Low	9-span post-tensioned concrete beam and reinforced concrete slab bridge over the River Barrow in New Ross town. This bridge contains a number of gaps in the design of the structure which provide potentially suitable roosting opportunity for bats. The bridge is located in the urban centre of New Ross and the quality of habitat connectivity for most bat species is low. Daubenton's bats may commute along the River Barrow.

Emergence survey

One emergence survey was carried out at the structure due to its low suitability for roosting bats as per Collins (eds.) 2016. Table 8-13 below presents the details of the emergence survey.

Table 8-13 Details of emergence survey

Feature	Date	Sunset Time	Start Time/ End Time	Weather	Notes
O'Hanrahan Bridge	09/09/21	19:57	19:45 – 21:45	17°C, Calm, 100% Cloud Cover, Dry, Few insects	First bat recorded at 20:11. Common Pipistrelles were recorded passing from 20:11 to 21:44. One Soprano Pipistrelle was recorded at 21:32 and one Leisler's Bat was recorded at 20:49. No bats were observed emerging from the structure.

In total, three species, Common Pipistrelle (*Pipistrellus pipistrellus*), Soprano Pipistrelle (*Pipistrellus pygmaeus*) and Leisler's Bat (*Nyctalus leisleri*) were recorded. While bats were recorded during the survey, none were recorded emerging from the bridge structure.

Otter

No evidence of Otter including prints, couches, spraints or potential holts were recorded within 150 m of the proposed development during the survey, although they are likely to occur within the study area on occasion. Development projects, by their nature, can negatively impact on Otter by creating barriers to connectivity and through disturbance. Otter are protected by Annex II and IV of the Habitats Directive. Accordingly, 'Otter' has been included as a Key Ecological Receptor.

Birds

Approximately 150 No. Starlings *(Sturnus vulgaris*) were recorded roosting underneath O'Hanrahan Bridge. The survey did not identify any other habitats that would support important assemblages or significant populations of other breeding or wintering bird species. There is no Kingfisher nesting habitat in the study area. Considering the availability of other appropriate habitats within the zone of influence for birds and the relatively small total area and low faunal biodiversity within the footprint of the proposed development, birds have not been included as a Key Ecological Receptor.

Table 8-14 below lists the bird species that were recorded during the field surveys.

Table 8-14 Bird Species Recorded During the Surveys

Common Name	Scientific Name	BoCCI Listing
Starling	*Sturnus vulgaris*	Amber
Black-headed Gull	*Larus ridibundus*	Amber

**Abbreviations: Red/Amber/Green = Birds of Conservation Concern in Ireland 2020-2026 (BoCCI) (Gilbert et al., 2021).*

Amphibians and Reptiles

The multidisciplinary walkover surveys did not record any evidence of Common Frog (*Rana temporaria*), Smooth Newt (*Lissotriton vulgaris*) or Common Lizard (*Zootoca vivipara*) within the study area. Further survey/assessment was not deemed necessary due to the lack of suitable habitat or previous records of these species in the area. Therefore, amphibians and reptiles have not been included as Key Ecological Receptors.

8.5 Key Ecological Receptors

This section provides details of the Key Ecological Receptors that were identified during the desk study and the subsequent field survey. Table 8-15 below presents a list, description, and evaluation of the Key Ecological Receptors.

8.5.1 Evaluation of Key Ecological Receptors Identified

Table 8-15 Evaluation of Key Ecological Receptors

Key Ecological Receptor (KER)	Description	Evaluation of Importance (TII, 2009a)
KER 1 River Barrow and River Suir, including Annex I 'Estuaries'	The proposed development traverses the River Barrow and is hydrologically connected to the River Suir. These rivers form integral parts of the River Barrow and River Nore SAC and the Lower River Suir SAC. The Qualifying Interests of these SACs include habitats and species likely to be impacted upon by the proposed development, such as Salmon, Twaite Shad and Otter. The River Barrow at the location of the proposed development and the River Suir downstream of the proposed development correspond to the Annex I habitat 'Estuaries'. The River Barrow and River have also been identified as important ecological features and as an ecological corridor. The channel of the River Barrow will be permanently altered by the proposed development and there is a risk of pollution of both rivers during the construction phase of the proposed development.	**International Importance** on the basis that these watercourse forms integral parts of the River Barrow and River Nore SAC and the Lower River Suir SAC and host habitats and populations of species listed on Annexes I and II, respectively, of the Habitats Directive.

Key Ecological Receptor (KER)	Description	Evaluation of Importance (TII, 2009a)
KER 2 Intertidal Habitats including Annex I 'Mudflats and sandflats not covered by seawater at low tide'	Intertidal habitats in the vicinity of the proposed development include both hard and soft substrates, i.e., the existing quay wall and the mudflats, respectively. The mudflats represent examples of the Annex I habitat 'Mudflats and sandflats not covered by sea water at low tide' (1140). These habitats support a range of biological communities, comprising benthic macroalgae and invertebrates, as well as species which feed on them. Species supported by these intertidal habitats include rare and protected species, including species listed as Qualifying Interests of the River Barrow and River Nore SAC, such as lamprey species, Twaite Shad, Atlantic Salmon and Otter.	**International Importance** on the basis that intertidal habitats in the vicinity of the proposed development include an Annex I habitat and provide support for populations of Annex II and IV species, which are Qualifying Interests of the River Barrow and River Nore SAC.
KER 3 Migratory Fish and Marine Mammals	Sea Lamprey, River Lamprey, Brook Lamprey, Twaite Shad, Atlantic Salmon, European Eel, Smelt, Common Dolphin, Harbour Porpoise and Grey Seal are likely to be present in the vicinity of the proposed development.	**International Importance** on the basis that these species are listed on Annex II and/or IV to the Habitats Directive and are Qualifying Interests of the River Barrow and River Nore SAC and the Lower River Suir SAC.
KER 4 Otter	Otter is listed on Annexes II and IV to the Habitats Directive and is a Qualifying Interest of the River Barrow and River Nore SAC and the Lower River Suir SAC. This species is known to occur in the vicinity of the proposed development.	**International Importance** on the basis that this species is listed on Annex II and IV to the Habitats Directive and is a Qualifying Interest of the River Barrow and River Nore SAC and the Lower River Suir SAC.
KER 5 Bat Species	All nine resident breeding bat species in Ireland are legally protected and roost sites (whether in use or not) are also protected under both European and Irish legislation. All bat species occurring in Ireland are protected under the Wildlife Acts and are listed in Annex IV of the Habitats Directive. A number of bat species are known to roost within 10 km of the proposed development and more common species, e.g., Soprano Pipistrelle, were recorded feeding in low numbers in the vicinity of the proposed development. Linear features such as rivers are of particular importance for bat feeding and commuting.	**Local Importance (Higher Value)** as these species are listed on Annex IV to the Habitats Directive and protected under the Wildlife Act and are present within the study area.

Key Ecological Receptor (KER)	Description	Evaluation of Importance (TII, 2009a)
KER 6 Invasive Alien Species	Invasive alien species which are restricted under Section 49 of the Habitats Regulations, e.g., Himalayan Balsam (*Impatiens glandulifera*) and Cord-grass (*Spartina* spp.) are known to occur in the vicinity of the proposed development. A high-impact aquatic invasive species, Chinese Mitten Crab (*Eriocheir sinensis*), has been recorded in Waterford Estuary as recently as January 2021 (ISI, 2021). Such species pose a threat to native biodiversity, including rare and protected habitats and species. The introduction of new invasive alien species or export of these species to other sites is a significant threat to Biodiversity.	Invasive plants have the potential to impact negatively on biodiversity locally.
KER 7 Nationally Designated Sites	There are a number of pNHAs that intersect the zone of influence and are hydrologically connected to the proposed development. These sites include the Barrow River Estuary pNHA, Kylecorragh Wood pNHA, Rathsnagadan Wood pNHA, Murphy's of The River pNHA, Inistioge pNHA, Ballyhack pNHA, King's Channel pNHA, Waterford Harbour pNHA and Duncannon Sandhills pNHA.	**National Importance** on the basis that these are nationally designated sites and likely support examples of Annex I habitats and populations of Annex II, Annex IV and other protected species. Given that all of these sites are remote from the proposed development and connected to it by the same pathway for impacts, i.e., the River Barrow, the River Suir and River Nore, they are assessed collectively.

8.6 The "Do-Nothing" Scenario

If the proposed development does not proceed, there will be no loss of the existing habitats on the site. There would be no increase in the noise and visual disturbance from construction traffic and the addition of people to the undisturbed area.

8.7 Description of Potential Impacts (Unmitigated)

8.7.1 Effects on European Sites

The zone of influence overlaps with three European sites; the River Barrow and River Nore SAC, the Lower River Suir SAC and the River Nore SPA. As likely significant effects could not be excluded at the screening stage, a Natura Impact Statement (NIS) was prepared. The NIS presents all of the predicted effects on these sites and their Qualifying Interests and also provides a detailed analysis and evaluation of these effects in the context of the relevant Conservation Objectives. The NIS also prescribes mitigation measures to address any negative effects identified. As such, there is some overlap between this EcIA which has been incorporated into the Planning Report and the NIS for the proposed development. However, both the Planning Report and NIS for the proposed development are standalone documents which do not rely on each other. Impacts on the relevant European sites are dealt with under KER 1 'River Barrow and River Suir, including Annex I Estuaries', KER 2 'Intertidal Habitats including Annex I Mudflats and sandflats not covered by sea water at low tide', KER 3 'Migratory Fish and Marine Mammals', and KER 4 'Otter'.

8.7.2 General Impacts on Key Ecological Receptors

General impacts on biodiversity that are typical of development are described in this section. Negative effects on specific Key Ecological Receptors are discussed in Table 8-16.

Construction Phase

Habitat Loss

The proposed development will result in the loss of *c.* 22 m^2 of intertidal mudflats and estuary habitat on the eastern bank of the River Barrow, south of O'Hanrahan Bridge. A further 60 m^2 of estuarine habitat, of which 10 m^2 is also intertidal mudflats and will be lost on the western bank of the River Barrow, south of O'Hanrahan Bridge.

The total loss of habitat as a result of the proposed development is 82m^2 of estuarine habitat, of which 32 m^2 is also intertidal mudflat. These habitats correspond to Annex I habitats, namely, 'Mudflats and sandflats not covered by seawater at low tide' (1140) and 'Estuaries' (1130).

A small area of hard intertidal substrates (i.e., the existing quay wall on the eastern banks and rock armour on the western bank) and their associated biological communities will be permanently lost as a result of the proposed development.

Additionally, the proposed development will result in the loss of recolonising bare ground (ED3) and built land (BL3) as these are the habitats found within the construction site compound. However, as the compound site is currently in use as a construction compound for the separately proposed South-east Greenway project, habitat loss at this location is expected to be minimal.

Disturbance/Displacement

The use of barges or vessels and sheet piling poses a risk of hydroacoustic impacts on fauna in the River Barrow, most notably Twaite Shad, which is particularly sensitive to hydroacoustic impacts given that it is a hearing-specialist species and that juveniles are likely to be present in the estuary at all times of the year. The NIS contains a detailed analysis of the likely hydroacoustic impacts arising from sheet piling, which is the loudest of the proposed construction activities. This assessment considered the implications of using one piling rig, using mostly vibratory piling but also allowing for a number of strikes (maximum 200 strikes) from an impact hammer to achieve the required depth for some piles.

Artificial lighting poses a risk of negative impacts on biodiversity, particularly Otter, bats and fish, by fragmentation of commuting/foraging corridors, disruption of circadian rhythms and increased risk of predation. Over a prolonged period, such impacts can lead to reduced reproductive success/recruitment.

Owing to the scale of the proposed development, neither its construction nor its operation has the potential to give rise to significant shading impacts on the River Barrow or the species it supports.

Water Quality

Due to the use of barges and other construction machinery on and in close proximity to the River Barrow, there is a risk of pollution to the river during construction. This could be in the form of spilled fuel, oil, concrete or grout or disturbance of contaminated ground. These water quality impacts also have the potential to be

carried downstream into the River Suir. The aspects of the construction of the proposed development which pose the greatest risk of such impacts include:

- Elevated silt/sediment loading within watercourses from construction site runoff and sheet piling. Sheet piling will be undertaken from a barge for river-side installation. Elevated silt loading can lead to long-term damage to aquatic ecosystems by smothering spawning grounds and gravel beds and clogging the gills of fish. Increased silt load in receiving watercourses stunts aquatic plant growth, limits dissolved oxygen capacity and overall reduces the ecological quality with the most critical period associated with low flow conditions. Other pollutants in the watercourse can bind to silt which can lead to increased bioavailability of these pollutants. Effects on erosion and deposition processes during construction are likely to be *negative, temporary, imperceptible to slight* and highly localised to the works area.
- Spillage of concrete, grout and other cement-based products. These cement-based products are highly alkaline (releasing fine highly alkaline silt) and extremely corrosive and can result in significant impact to watercourses altering the pH, smothering the stream bed and physically damaging fish through burning and clogging of gills due to the fine silt.
- Accidental spillage of hydrocarbons from construction plant and at storage depots / construction compound have the potential to enter drainage ditches/land drains and subsequently the River Barrow, via surface water runoff.
- Faecal contamination arising from inadequate treatment of on-site toilets and washing facilities.
- There is also potential for pollutants derived from construction materials to be mobilised by flood waters.

Given the naturally high sediment load in the River Barrow at this location, sedimentation is not considered to pose a significant risk. However, the synergistic effects of the naturally occurring sediment with any pollutants must be considered. Any pollution incident could have significant negative impacts on aquatic and shoreline life depending on the severity of the pollution. Pollution can also have indirect negative impacts on water-dependent terrestrial habitats and species that are hydrologically connected to the source of the pollution.

Invasive Alien Species

Construction activities pose a risk of the spread of invasive alien species to, from or within the vicinity of the works. A species of particular concern is the Chinese Mitten Crab, which could be spread within the Barrow-Nore-Suir Estuary by barges and other vessels associated with the construction of the proposed development.

Operational Phase

Disturbance/Displacement

The proposed development has the potential to lead to disturbance from noise, vibration, visual cues, and lighting, which would lead to the displacement of certain species from the general area. Artificial lighting poses a risk of negative impacts on biodiversity, particularly bats and fish species by fragmentation of commuting / migration / foraging corridors, disruption of circadian rhythms and increased risk of predation.

Hydrological Impacts

New in-stream structures have the potential to cause permanent disturbance to river channels, floodplains and the flood regime. Watercourse crossings and embankments, if not appropriately designed, create an obstacle to flow, particularly under flood conditions resulting in increased flood risk and damage in the vicinity of the proposed development. Such structures can locally alter channel morphology resulting in changes in flow velocity and water depth. These structures can also result in localised riverbed and riverbank erosion, resulting in long-term changes to the morphology of the river channel.

As described in Section 3.3.4 and Section 3.3.5 of this Planning Report, the widening of quay walls (by approx. 1 m) will require sheet piling within the Barrow channel. The finish of the widened quay wall will replicate the existing smooth concrete and sheet piling currently present. Given the minor scale of the intervention, the proposed layout of the development will likely have negligible impact on channel cross section and resultant flow and sediment transport characteristics.

The proposed development will not alter the cross-sectional area of the bridge openings and general flow characteristics will not be affected. A section of the existing flood defences on the east quays will be altered where they tie into the abutment. The standard of protection (1 in 200 year coastal) will be reinstated. The proposed widening of quay walls will displace some flood waters, though the volume is considered negligible in the context of the Barrow system. Conversely, the widening of quay walls will also increase the area of defended lands though this is also seen as insignificant.

8.7.3 Impacts on Key Ecological Receptors

Table 8-16 below describes the likely impacts from the proposed development on each of the Key Ecological Receptors.

Table 8-16 Characterisation and evaluation of likely impacts on Key Ecological Receptors, following EPA (2022) and TII (2009).

Key Ecological Receptor	Construction phase impacts	Operational phase impacts	Ecological significance if unmitigated
KER 1 River Barrow and River Suir, including Annex I 'Estuaries'	The presence of the proposed development will result in the permanent direct loss of *c*. 82 m^2 of habitats in the River Barrow, including Annex I 'Estuaries'. At the National level, the most recent Article 17 report (NPWS, 2019b) states that the total area of Annex I 'Estuaries' in Ireland is 761 km^2, 640 km^2 of which is within SACs. The overall conservation status of this habitat is Inadequate, on the basis that while its range and area are Favourable, its specific structure and functions are Inadequate, and its overall trend is deteriorating. The main pressures and threats are marine pollution and invasive alien species. The loss of 82 m^2 represents a 0.00021% reduction in the total habitat area within the River Barrow and River Nore SAC. Given the extremely small proportion of this habitat to be lost and the fact that reclamation is not one of the main pressures or threats to this habitat, the conservation status will not be significantly affected. Construction activities, particularly piling activities, which will involve the use of spud-can or jack-up barges, will disturb habitats and species in the River Barrow, through noise, light and physical disturbance. Water quality impacts arising from any accidental pollution incident associated with the construction of the proposed development would likely affect the overall structure and function of the estuarine ecosystem. The characteristics of this impact would depend on the nature and quantities of pollutants and	Artificial lighting during the operation of the proposed development will negatively impact on nocturnal species within this habitat by fragmenting commuting/migratory corridors, disruption of circadian rhythms and increased risk of predation. Over a prolonged period, such impacts can lead to negative effects at the population level.	The permanent direct loss of estuarine habitats, including Annex I 'Estuaries' is considered to constitute a **Permanent Significant Negative Impact** in the area where the habitat loss occurs. However, the impact of this loss a River, County level or above will be **Imperceptible** given the small proportion of these habitats being lost. The disturbance to the River Barrow, including Annex I 'Estuaries', associated with the construction of the proposed development is considered to constitute a **Temporary Slight-Imperceptible Negative Impact** as it involves fully reversible impacts over a very small area and short duration. Water quality impacts which could arise in the event of accidental pollution from the proposed development could constitute **Short-term Significant Negative Impacts**, if they were to occur, as they would have the potential to significantly impact on sensitive receptors over a very wide area but would likely recover in the short term. The impact of disturbance to estuaries during the operation of the proposed development as a result of artificial lighting would constitute a **Permanent Moderate Negative Impact** on the basis that it could negatively impact the species within this habitat.

Key Ecological Receptor	Construction phase impacts	Operational phase impacts	Ecological significance if unmitigated
	the timing and duration of their input into the River Barrow and River Suir.		
KER 2 Intertidal Habitats, including Annex I 'Mudflats and sandflats not covered by seawater at low tide'	The presence of the proposed development will result in the permanent direct loss of intertidal habitats, including *c.* 32 m^2 of Annex I 'Mudflats and sandflats not covered by seawater at low tide' and a *c.* 82 m length of upper intertidal habitat on quay walls and rock armour. At the National level, the most recent Article 17 report (NPWS, 2019b) states that the total area of Annex I 'Mudflats and sandflats not covered by seawater at low tide' in Ireland is 646 km^2, 545 km^2 of which is within SACs. The overall conservation status of this habitat is Inadequate, on the basis that while its range and area are Favourable, its specific structure and functions are Inadequate, and its overall trend is deteriorating. The main pressure and threat is marine pollution. The loss of 32 m^2 represents a 0.00034% reduction in the total habitat area within the River Barrow and River Nore SAC. Given the extremely small proportion of this habitat to be lost and the fact that reclamation is not one of the main pressures or threats to this habitat, the conservation status will not be significantly affected. Construction activities will disturb intertidal habitats within the proposed development extents through noise, light and physical disturbance. Noise/vibration and lighting will cause disturbance to invertebrate fauna on the hard and soft intertidal substrates while works are ongoing but will recover almost immediately. Physical disturbance to such fauna from piling and other construction activities may result in mortality of small numbers of individuals of these	Artificial lighting during the operation of the proposed development will negatively impact on nocturnal species within this habitat by fragmenting commuting / migratory corridors, disruption of circadian rhythms and increased risk of predation. Over a prolonged period, such impacts can lead to negative effects at the population level.	The permanent direct loss of intertidal habitats, including Annex I 'Mudflats and sandflats not covered by seawater at low tide' is considered to constitute a **Permanent Significant Negative Impact** in the River Barrow. However, the impact of this loss at the National level will be **Imperceptible** for the reasons outlined in the preceding column. The disturbance to intertidal habitats, including Annex I 'Mudflats and sandflats not covered by seawater at low tide', associated with the construction of the proposed development is considered to constitute a **Short-term Slight-Moderate Negative Impact** as it involves fully reversible impacts over a small area and short duration. Water quality impacts which could arise in the event of accidental pollution from the proposed development could constitute **Short-term Significant Negative Impacts**, if they were to occur, as they would have the potential to significantly impact on sensitive receptors over a very wide area but would likely recover in the short term. The impact of disturbance to intertidal habitats during the operation of the proposed development as a result of artificial lighting would constitute a **Permanent Moderate Negative Impact** on the

Key Ecological Receptor	Construction phase impacts	Operational phase impacts	Ecological significance if unmitigated
	species. However, there will be no impacts at the population scale and these biological communities will recover fully within 1 year of the disturbance. Water quality impacts arising from any accidental pollution incident associated with the construction of the proposed development would likely affect the overall structure and function of the intertidal habitat. The characteristics of this impact would depend on the nature and quantities of pollutants and the timing and duration of their input into the River Barrow but could involve impacts such as pH stress in the event of spillage of cementitious material or contamination of soft sediments with hydrocarbons in the event of a petrol spill.		basis that it could negatively impact the species within this habitat.
KER 3 Migratory Fish and Marine Mammals	The presence of the proposed development will result in the permanent direct loss of intertidal habitats, including *c.* 32 m^2 of habitats which support fish species. These comprise intertidal habitats of hard and soft substrate, hosting biological communities upon which fish species depend for food, e.g., planktonic larvae of encrusting invertebrates. These habitats also provide shelter for fish species, particularly small fish such as juvenile shad, as well as for migratory fish resting at the channel edge during the day between nightly movements upstream. The loss of these habitats represents a reduction in food availability and shelter for these species. The construction of the proposed development would cause hydroacoustic disturbance to fish species and marine mammals.	Artificial lighting during the operation of the proposed development will negatively impact on fish species by disruption of circadian rhythms and increased risk of predation.	The loss of habitat is considered to constitute a **Permanent Significant Negative Impact** on the basis that there would be a permanently reduced food supply and lack of channel edge shelter for fish species, including Qualifying Interests of the River Barrow and River Nore SAC and the Lower River Suir SAC. In the event of prolonged periods of continuous piling or where breaks between pile drives are not sufficiently long, the hydroacoustic impacts on Twaite Shad and other fish species would constitute a **Short-term Moderate-Significant Negative Impact** on the basis that injury may occur to fish and marine mammal species of conservation importance. Given the short duration of the construction works

Key Ecological Receptor	Construction phase impacts	Operational phase impacts	Ecological significance if unmitigated
	Artificial lighting during construction, particularly during nightworks, will negatively impact on fish species by disruption of circadian rhythms and increased risk of predation. Over a prolonged period, such impacts can lead to negative effects at the population level. Fish species are particularly sensitive to water quality impacts, which might arise from accidental pollution incident associated with the construction of the proposed development. The characteristics of this impact would depend on the nature and quantities of pollutants and the timing and duration of their input into the River Barrow and the River Suir but could involve significant physiological stress which could affect local populations.		and very short duration of nightworks, artificial lighting is considered to constitute a **Temporary Slight Negative Impact** on fish species, including Annex II migratory species. Water quality impacts which could arise in the event of accidental pollution from the proposed development could constitute **Short-term Significant Negative Impacts**, if they were to occur, as they would have the potential to significantly impact on sensitive receptors over a very wide area but would likely recover in the short term.
KER 4 Otter	The direct and permanent loss of *c.* 32 m^2 of upper intertidal mudflat represents a loss of some habitat for otters, as otters may walk along the mudflats to avoid high flow velocities during mid-ebb and mid-flood. However, the majority of this habitat will still exist at low tide, and it does not provide a link between other suitable otter habitat at this location. Additionally, the analysis undertaken as part of the hydrological impact assessment, see Section 9.4.2 of this Planning Report states that the proposed layout of the development will likely have negligible impact on channel cross section and resultant flow. Otters are already capable of swimming against current flows, so there is no significant barrier to commuting. Noise and lighting associated with the construction of the proposed development will potentially cause	Artificial lighting during the operation of the proposed development will negatively impact on Otter by fragmenting commuting corridors. The potential reduction in habitat quality for fish and other aquatic fauna poses a risk of indirect impacts on otters through reduced food availability.	The loss of habitats on the south-eastern edge of the River Barrow would constitute a **Permanent Slight Negative Impact** on otters for the reasons outlined for KER 3 in the preceding column. Disturbance of otters during the construction of the proposed development would constitute a **Short-term Slight-Moderate Negative Impact** on the basis that it is limited to the short duration of the works and due to the opportunity for otters to avoid these impacts within the River Barrow, as well as otters' known tolerance for human presence in the urban environment. Water quality impacts, if they were to occur, would constitute a **Medium-term Slight Negative Impact** on otters as this would result in reduced

Key Ecological Receptor	Construction phase impacts	Operational phase impacts	Ecological significance if unmitigated
	disturbance to otters in the vicinity of the construction site. However, the effect on any otters disturbed will be limited due to the large area within the River Barrow for otters to pass the construction site at a distance, as well as the ability of otters to habituate to human presence, as evidenced by their presence in many urban centres. Water quality impacts arising from any accidental pollution incident associated with the construction of the proposed development may impact otters indirectly, through reduced prey availability if populations of fish and other aquatic fauna, e.g., crustaceans and molluscs, are significantly impacted.		populations of prey species, but would be fully reversible in time. The impact of disturbance to Otter during the operation of the proposed development as a result of artificial lighting would constitute a **Permanent Moderate Negative Impact** on the basis that it will reduce the commuting corridor for Otter. The reduction in aquatic habitat quality would constitute a **Permanent Slight-Imperceptible Negative Impact** on otters through reduced food availability if populations of prey species were impacted, which would likely be of a very small magnitude. Otters are known to be able to switch prey items quickly in response to availability (Bailey & Rochford, 2006).
KER 5 Bat Species	The construction of the proposed development will involve noise and lighting impacts on the banks of the River Barrow where bats are likely to commute and forage. This risk of disturbance to bats from noise and lighting is particularly high if nightworks are carried out during the warmer half of the year (April-October) when bats are more likely to be active. Based on the results of the desk study and bat suitability assessment, disturbance to any bat roosts is very unlikely. Bats are very unlikely to be subject to any water quality or invasive alien species impacts as a result of the proposed development.	Artificial lighting during the operation of the proposed development will negatively impact on bat species by fragmenting commuting and foraging corridors and disruption of circadian rhythms. Over a prolonged period, such impacts can lead to negative effects at the population level.	The impact of disturbance to bats during the construction of the proposed development is considered to constitute a **Temporary Slight Negative Impact** on foraging and commuting bats on the basis that the number of bats likely to be affected is very low and that, based on the assessment above, those bats are very unlikely to be rare species, e.g., Lesser Horseshoe. Furthermore, the disturbance will end once the construction programme is complete, and bats will be able to use this area as before. The impact of disturbance to bats during the operation of the proposed development as a result of artificial lighting would constitute a **Permanent Slight Negative Impact** on foraging and

Key Ecological Receptor	Construction phase impacts	Operational phase impacts	Ecological significance if unmitigated
			commuting bats on the basis that the number of bats likely to be affected is very low and that, based on the assessment above, those bats are very unlikely to be rare species, e.g., Lesser Horseshoe.
KER 6 Invasive Alien Species	Construction activities, particularly the haulage and export of equipment, plant and materials to and from the construction site, present a risk of the introduction or spread of invasive alien species in the vicinity of the proposed development. The impacts that these species can have on native biodiversity include competition for food and other resources, increased predation pressure, disease, and reduced habitat integrity (specific structure and function). These impacts can occur over large areas and over long durations (including permanently) and can include the local elimination of some habitats and species.	The operation of the proposed development does not itself provide for the instruction or spread of invasive alien species. However, the impoverished biological communities likely to develop on the steel sheet pile wall are more susceptible to invasion by such species (due to lower competition generally associated with the low diversity of these communities). Therefore, the nature of the steel sheet pile wall creates a weak point in the resilience of the habitats in the estuary against invasive alien species, increasing the ongoing risk of establishment and spread should an invasive species be introduced at some point in the future.	The impacts of invasive alien species, if there were to be significant spread, could constitute **Permanent Profound Negative Impacts** on the basis that sensitive receptors of International Importance could be profoundly impacted, e.g., if Salmon Fluke (*Gyrodactylus salaris*) were to be introduced it could cause the local extinction of Atlantic Salmon from the River Barrow and River Nore SAC.
KER 7 Nationally Designated Sites	Due to the distance between the proposed development and these nationally designated sites, there is no risk of disturbance impacts. The only sources and pathways from the construction	There is a very small risk of indirect affects through ecological connections via species populations which might be affected by the operation of the proposed	All of the impacts on nationally designated sites relate to either water quality impacts, invasive alien species or ecological connections to impacts on the other receptors, which have already been assessed above. This could lead to a **Long-term**

Key Ecological Receptor	Construction phase impacts	Operational phase impacts	Ecological significance if unmitigated
	of the proposed development to the sites in question relate to the water quality and invasive alien species impacts discussed above, which pose a risk of reductions in overall habitat quality, and species populations and distributions in these sites.	development.	**Significant Negative Impact.**

8.8 Mitigation Measures

This section describes the measures that are in place to mitigate any harmful or negative impacts associated with the proposed development and the identified Key Ecological Receptors, as described in the preceding sections. General mitigation measures which will apply during the construction and operational phases are described first, followed by mitigation measures which relates specifically to the Key Ecological Receptors is described.

The proposed development has been developed having regard to EU and Irish legislation and all relevant guidelines in relation to ecology and engineering best practice for the planning and construction. These guidelines provide practical measures that can be incorporated into the design to minimise impacts and protect the receiving environment. The design has followed the basic principles outlined above to eliminate the potential for ecological impacts, where possible, and to minimise such impacts where total elimination is not possible. The design has followed the TII Publications (Standards) and the TII Environmental Assessment and Construction Guidelines.

8.8.1 General Mitigation Measures

Mitigation by Avoidance

The proposed development minimises land-take from ecologically sensitive areas and has been constraints-led from the initial phase, through an iterative design process, and into the final proposed development. The design has followed the basic principles outlined below to eliminate the potential for impacts on Key Ecological Receptors where possible, and to minimise such impacts where total elimination is not possible. The proposed development has been designed to minimise direct or indirect impacts on any habitats or species or other ecological features that were classified as being of Local Importance (Higher Value) or above. The widening of the bridge deck and quay wall has been designed to avoid, as far as possible, direct, indirect or secondary adverse effects on European sites and other designated sites for nature conservation. All piling works within the river will avoid the periods between the 1st April and the 31st May as advised by IFI, in order to avoid impacts on European Eel, which migrate along banks during this time along with other fish species including Sea Lamprey, River Lamprey, Twaite Shad and Atlantic Salmon.

Mitigation by Design

The proposed development has been designed having regard to European and national legislation and all relevant guidelines in relation to ecology and engineering best practice for the planning and construction of developments. These guidelines and best practice provide practical measures that can be incorporated into the design to minimise the impact and protect the receiving environment. The following is an overview of the design measures that will be employed to minimise and avoid significant impacts on the ecological receptors within the zone of influence.

- A Construction and Environmental Management Plan (CEMP), Environmental Operating Plan (EOP) and Incidence Response Plan (IRP) have been produced to ensure that the construction does not lead to any unanticipated negative impacts on the environment.
- Vibratory driven sheet piles forming the new quay wall have been selected as their installation is generally quieter than impact piling and minimises disturbance and land take from benthic habitats and mudflats. Noise levels from vibratory piling rise slowly, and for this reason vibratory piling is frequently employed as a mitigation measure where impact piling was originally proposed. In this case, while almost all piling is expected to be vibratory piling, impact

piling shall only be employed where the required pile toe level cannot be achieved by vibratory piling. The length of any impact piling event shall not exceed 200 strikes.

- The proposed lighting columns will be of a similar height and spacing to the existing, will utilise the existing lighting duct in the footpath and will provide a lighting intensity similar to what is already in place. The lighting plan will be designed in accordance with *Bats and artificial lighting in the UK* (BCT, 2018). There will be ongoing disturbance impacts, although there will be no net-deterioration in terms of light spill onto the River Barrow as a result of the proposed development.
- The Contractor will appoint a Site Environmental Manager to carry out environmental monitoring and to ensure that the mitigation measures proposed in this planning report is followed.

Construction Phase

Artificial Lighting

As discussed in the assessment of impacts above, artificial lighting associated with the construction of the proposed development poses a risk of potential negative impacts on habitats and species within and adjacent to the River Barrow. Therefore, the following limits on construction lighting is proposed:

- Subject to any Health & Safety and/or navigational requirements, construction lighting over the river channel shall be turned off outside of working hours.
- Construction lighting shall be limited to the minimum area required to be lit and minimise light spill to areas not required for construction.

Given the implementation of the above measures, these works are unlikely to give rise to significant impacts beyond the duration of the works and, therefore, no additional mitigation is proposed in relation to these works.

Water Quality

As is normal practice with infrastructure projects, a Construction Environmental Management Plan (CEMP) has been prepared for the proposed development and are included in Appendix B of this Planning Report. These will be updated and finalised by the selected contractor to suit the detailed construction methodology and allocate responsibilities to individuals in the construction team. In doing so, the measures detailed in the appended reports will be considered minimum requirements to be considered and improved upon. The level of detail provided within the Plans is sufficient to allow an assessment of the anticipated impacts including residual impacts.

The following will be implemented as part of this plan:

- An Environmental Operating Plan (EOP) (Appendix C of the CEMP) outlines procedures for the delivery of environmental mitigation measures and for addressing general day-to-day environmental issues that can arise during the construction phase of developments.
- An Incident Response Plan (see Appendix D of the CEMP) detailing the procedures to be undertaken in the event of spillage of chemical, fuel or other hazardous wastes, non-compliance with any permit or license, or other such risks that could lead to a pollution incident, including flood risks.

- All necessary permits and licenses for in-stream construction work for provision of the proposed development will be obtained prior to the commencement of construction.
- Inform and consult with the National Parks and Wildlife Service and Inland Fisheries Ireland.

During construction, cognisance will have to be taken of the following guidance documents for construction work on, over or near water.

- *Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters* (IFI, 2016)
- *C532 Control of water pollution from construction sites: guidance for consultants and contractors* (CIRIA, 2001)
- *CIRIA C648 Control of water pollution from linear construction projects: technical guidance* (CIRIA, 2006)
- *Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes* (NRA, 2006)

Based on the above guidance documents, the following principal mitigation measures will be adhered to for the construction phase:

Sedimentation and surface water run-off

- Sheet piling for the new quay wall shall be installed prior to any excavation on the landward side and demolition of the existing quay wall boundary. This will form an effective barrier to run-off from the site during construction.
- Any material stockpiled shall be located a minimum of 30 m from the edge of the river and shall also be covered and remain stockpiled for as short a time as possible.
- The Contractors shall provide method statements for weather and tide/storm surge forecasting and continuous monitoring of water levels in Waterford Harbour and the removal of site materials, fuels, tools, vehicles and persons from flood zones in order to minimise the risk of input of sediment or construction materials into the river during flood events.
- The works area (including the site compound) will be limited to the minimum required to undertake the necessary elements of the project.
- Surface water flowing onto the construction area will be minimised through the provision of berms, diversion channels or cut-off ditches.
- Protection of waterbodies from silt load will be carried out through the use of gully silt/sediment filters and shallow berms in hardstanding areas to provide adequate treatment of runoff to watercourses.
- Settlement tanks/ponds, silt traps/bags and bunds will be used. Where pumping of water is to be carried out, filters will be used at intake points and discharge will be through a sediment trap.
- The anticipated site compound/storage facility will be fenced off at a minimum distance of 5 m from the top of the edge of the watercourse bank. Any works within the 10 m buffer zone will require measures to be implemented to ensure that silt laden or contaminated surface water runoff from the compound does not discharge directly to the watercourse. CEMP has been drafted and will need to be finalised by the appointed Contactor. See the CEMP in Appendix B for further detail.

- Protection measures will be put in place to ensure that all hydrocarbons used during the construction phase are appropriately handled, stored and disposed of in accordance with the TII document "*Guidelines for the crossing of watercourses during the construction of National Road Schemes*". All chemical and fuel filling locations will be contained within bunded areas.
- Foul drainage from all site offices and construction facilities will be contained and disposed of in an appropriate manner, off site, to prevent pollution.
- The construction discharge will be treated such that it will not reduce the environmental quality standard of the receiving watercourses.
- Water quality monitoring will be undertaken in the River Barrow, with weekly samples being taken from at least 2 months prior to commencement of construction until at least 4 months post-completion. Water samples will be taken from at least two locations. The final number and location of sampling points will be determined by the Site Environmental Manager. The results of the water quality monitoring programme will be reviewed by the Site Environmental Manager on an ongoing basis during construction. In the event of any non-compliance with regulatory limits for any of the water quality parameters monitored, an investigation will be undertaken to identify the source of this non-compliance and corrective action will be taken where the this is deemed to be associated with the proposed development.

Concrete Works

The use and management of concrete in or close to watercourses must be carefully controlled to avoid spillage which has a deleterious effect on water chemistry and aquatic habitats and species. As the use of concrete cannot be avoided, the following control measures will be employed:

- Hydrophilic grout and quick-setting mixes or rapid hardener additives shall be used to promote the early set of concrete surfaces exposed to water;
- When working in or near the surface water and the application of in-situ materials cannot be avoided, the use of alternative materials such as biodegradable shutter oils shall be used;
- Any plant operating close to the water will require special consideration on the transport of concrete from the point of discharge from the mixer to final discharge into the delivery pipe (tremie). Care will be exercised when slewing concrete skips or mobile concrete pumps over or near surface waters;
- The weather forecast will be consulted prior to commencing concrete pours. No such works will be undertaken if inclement weather is forecast such that precipitation may make it difficult to maintain a dry working area.
- There will be no spills of concrete, cement, grout or similar materials hosed into surface water drains. Such spills shall be contained immediately, and runoff prevented from entering the watercourse;
- Concrete waste and wash-down water will be contained and managed on site to prevent pollution of all surface watercourses;
- On-site concrete batching and mixing activities will only be allowed at the identified construction compound areas;
- Washout from concrete lorries, with the exception of the chute, will not be permitted on site and will only take place at the construction compound (or other appropriate facility designated by the manufacturer);
- Chute washout will be carried out at designated locations only. These locations will be signposted. The Concrete Plant and all Delivery Drivers will

be informed of their location with the order information and on arrival to site; and

- Chute washout locations will be provided with an appropriate designated, contained impermeable area and treatment facilities including adequately sized settlement tanks. The clear water from the settlement tanks shall be pH corrected prior to discharge (which shall be by means of one of the construction stage settlement facilities) or alternatively disposed of as waste in accordance with the Contractor's Waste Management Plan.

Hydrocarbons and other chemicals (See also Section 9 of this Planning Report)

- Land-based vehicles and plant shall be refuelled off-site, where possible.
- All land-based fuelling of machinery shall be undertaken on an impermeable base in bunded areas at least 50 m from the edge of the river.
- Marine based fuelling will only be undertaken using specifically designed nozzles to prevent spillages and spill kits will be available.
- All fuelling equipment shall be regularly inspected and serviced.
- Any petrol- or diesel-fuelled pumps or other machinery shall be located within temporary bunded units.
- All fuel, oils, chemicals, hydraulic fluids, on-site toilets etc. shall be stored in the construction site compound, on an impermeable base which shall be bunded to 110% capacity and appropriately secured.
- All plant and construction vehicles shall be inspected daily for oil leaks and a full-service record shall be kept for all plant and machinery.
- Spill kits shall be available on-site during construction, including on the jack-up barge during pile driving.
- All waste oils, empty oil containers and hazardous wastes shall be disposed of in accordance with the Waste Management Act, 1996 (as amended).
- Owing to the presence of contaminants within the construction site, excavation shall be limited to the absolute minimum necessary.

Operational Phase

Artificial Lighting

During the operation of the proposed development, lighting columns will be of a similar height and spacing to the existing and will utilise the existing lighting duct in the footpath. The following mitigation measures will be integrated into the lighting design:

- Lighting outside the intended area of illumination will be minimised. Where light spill cannot be avoided, louvres, cowls or shields will be fitted to the columns.
- Lighting will be LED and have no upward light spill (apart from intentional up-lighting) and a sharp horizontal cut off.
- Lighting will be a warm-white colour of 2700K or less.

8.8.2 Specific Mitigation Measures

KER 1 River Barrow and River Suir, including Annex I 'Estuaries'

In addition to the mitigation measures described under construction and operational phase mitigation measures, the following measures will apply to KER 1.

Habitat Loss

As discussed in the assessment of impacts above, the principal impact of the proposed development on the River Barrow relates to loss of intertidal and estuarine habitats. The direct loss of *c.* 82 m^2 of estuarine habitat cannot be avoided through design or be mitigated for. Despite the permanent loss of these habitats, this overall impact is considered insignificant given the total, *c*. 0.00021% of the estimated total area of 'Estuaries' within the River Barrow and River Nore SAC.

KER 2 Intertidal Habitats, including Annex I 'Mudflats and sandflats not covered by seawater at low tide'.

In addition to the mitigation measures described under construction and operational phase mitigation measures, the following measures will apply to KER 2.

Habitat Loss

As discussed above, the principal impact of the proposed development on the River Barrow relates to loss of intertidal and estuarine habitats. The direct loss of *c.* 32 m^2 of intertidal mudflats cannot be avoided through design or be mitigated for. Despite the permanent loss of these habitats, this overall impact is considered insignificant given the total, *c*. 0.00034% of the estimated total area of 'Mudflats and sandflats not covered by seawater at low tide' within the River Barrow and River Nore SAC. Furthermore, these habitats have low faunal diversity (Aquatic Services Unit, 2022a & 2022b).

KER 3 Migratory Fish and Marine Mammals

In addition to the mitigation measures described under construction and operational phase mitigation measures, the following measures will apply to KER 3.

The rationale for this mitigation is fully detailed in the NIS for the proposed development (included as part of this Planning Application).

Hydroacoustic Impacts

The mitigation for hydroacoustic impacts is as follows ("piling event" means any period of continuous piling by one or two rigs; "quiet period" means any period in which there is no piling by any rig):

- Piling works shall not be undertaken between the 1st April and the 31st May as advised by IFI during consultation.
- There shall be no piling between sunset and sunrise.
- Vibratory piling shall be the standard method for the installation of all piles. Impact piling shall only be employed where the required pile toe level cannot be achieved by vibratory piling.
- The duration of any vibratory piling event shall not exceed 180 piling minutes.
- The length of any impact piling event shall not exceed 200 strikes.
- An appropriate soft-start/ramp-up procedure shall be used for all impact piling events. Where it is possible according to the operational parameters of the equipment and materials concerned, the underwater acoustic energy output shall commence from a lower energy start-up (i.e., a peak sound pressure level not exceeding 170 dB re: 1µPa @1m) and, thereafter, be allowed to gradually build up to the necessary maximum output over a period of 20 – 40 mins.

- Following every piling event, there shall be a quiet period of at least 30 minutes. Only following 30 minutes of no piling whatsoever can the cumulation of piling minutes be re-zeroed.
- Rotary drilling will be the method used to drill the boreholes over other methods such as percussion drilling which give rise to higher levels of noise. Furthermore, these works will take place at low tide to allow for greater attenuation of noise within the mud in the absence of water. This mitigation will ensure that any hydroacoustic impacts will not give rise to a significant barrier to the movements of Twaite Shad or other species, or other significant effects on such species, in the Barrow Estuary as a result of the ground investigations.

KER 4 Otter

The mitigation measures outlined under general mitigation measures are sufficient to reduce any potential negative effects on Otter to slight, not significant or imperceptible levels. Therefore, no further specific mitigation is required for KER 4.

KER 5 Bat Species

The mitigation measures outlined under general mitigation measures are sufficient to reduce any potential negative effects on Bat species to slight or imperceptible levels. Therefore, no further specific mitigation is required for KER 5.

KER 6 Invasive Alien Species

In addition to the mitigation measures described under construction and operational phase mitigation measures, the following measures will apply to KER 6.

Terrestrial Plant Species

In order to minimise the risk of the introduction or spread of invasive alien plant species (IAPS) during construction, all land-based works shall be executed in accordance with best practice for biosecurity in construction. In particular, prior to commencement, the Contractor shall prepare a detailed Biosecurity Protocol describing his/her proposed approach to ensuring that IAPS are not imported or spread during the construction of the proposed development. The Biosecurity Protocol shall include, as a minimum, the following measures to prevent the spread of invasive species:

- Good construction site hygiene will be employed to prevent the introduction and spread of problematic IAPS by thoroughly washing vehicles prior to leaving any site.
- All plant and equipment employed on the construction site (e.g., excavators, piling equipment etc.) will be thoroughly cleaned down using a power washer unit prior to arrival on site to prevent the spread of IAPS.
- All washing must be undertaken in areas with no potential to result in the spread of IAPS, as detailed in the Construction Environmental Management Plan.
- Any soil and topsoil required on the site will be sourced from a stock that has been screened for the presence of any IAPS and where it is confirmed that none are present.
- All site staff shall be made aware of the Contractor's Biosecurity Protocol and receive training in the importance of good site biosecurity.

Aquatic Species

The use of barges during the construction of the proposed development poses the risk of introducing invasive alien species to the aquatic environment both in the

vicinity of the works and in the wider Suir-Barrow-Nore Estuary. This has the potential to significantly affect the integrity of aquatic and intertidal habitats in the zone of influence.

In order to minimise the risk of either the introduction or spread of aquatic invasive alien species and thereby avoid negative impacts on these habitats, the owner or operator of the barge or barges shall provide documentary evidence (in the form of a completed and signed Marine Institute "*Cleaning and Disinfection Declaration Form*") that the vessel was fully de-fouled within the 6 months immediately preceding its engagement in the construction of the proposed development.

In relation to other construction activities the principles and appropriate measures in the IFI guidance document *Biosecurity Protocol for Field Survey Work* (IFI, 2010) shall be followed and shall form part of the Contractor's Biosecurity protocol.

8.9 Implementation

In order to give effect to the mitigation prescribed in this EcIA, it should be a condition of any consent granted in respect of the proposed development that all of the mitigation, including monitoring and enforcement, prescribed in this EcIA be binding, during the construction phase, on the Contractor and, during operational phase, on Wexford County Council. Accordingly, all of the mitigation prescribed in this EcIA shall be transposed into the Contract Documents for the construction of the proposed development.

During construction, all works must comply with relevant legislation and guidelines in order to reduce and minimise environmental impacts and to protect all ecological receptors. In particular, there must be full compliance with the following:

- The CEMP.
- The Schedule of Commitments.
- The mitigation prescribed in this EcIA and in the NIS.
- Any conditions which might be attached to the proposed development's planning consent.
- Any requirements of stakeholders and statutory bodies, e.g., the NPWS and IFI, including:
    - *Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters* (IFI, 2016)
- All applicable legislative requirements in relation to environmental protection.
- All relevant construction industry guidelines, including:
    - *C532 Control of water pollution from construction sites: guidance for consultants and contractors* (CIRIA, 2001)
- Any biosecurity requirements arising from the preceding points.
- The Transport Infrastructure Ireland (TII) and National Roads Authority (NRA) Environmental Assessment and Construction Guidelines, specifically:
    - *Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes*
    - *Guidelines for the Testing and Mitigation of the Wetland Archaeological Heritage for National Road Schemes*
    - *Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes*

- *The Management of Invasive Alien Plant Species on National Roads – Technical Guidance*
- *Guidelines for the Treatment of Noise and Vibration in National Road Schemes*
- *Guidelines for the Treatment of Otters Prior to the Construction of National Road Schemes*
- *Management of Waste from National Road Construction Projects*
- *Guidelines for the Creation, Implementation and Maintenance of an Environmental Operating Plan*

This list is non-exhaustive. All environmental commitments/requirements and relevant legislation and guidelines which are current at the time of construction will be followed.

8.10 Residual Impacts on Key Ecological Receptors

Table 8-17 below assesses the significance of the residual impacts on the Key Ecological Receptors following the inclusion of the mitigation measures described in Section 8.8.

Table 8-17 Assessment of significance of residual impacts, following EPA (2017) and NRA (2009).

Key Ecological Receptor	Pre-mitigation impacts	Ecological significance following mitigation
KER 1 River Barrow and River Suir, including Annex I 'Estuaries'	The permanent direct loss of estuarine habitats, including Annex I 'Estuaries' is considered to constitute a **Permanent Significant Negative Impact** on the River Barrow. However, the impact of this loss at the National level will be **Imperceptible**. The temporary habitat degradation through disturbance to the River Barrow, including Annex I 'Estuaries', associated with the construction of the proposed development is considered to constitute a **Temporary Slight-Imperceptible Negative Impact**. Water quality impacts which could arise in the event of accidental pollution from the proposed development could constitute **Short-term Significant Negative Impacts**, if they were to occur. The impact of disturbance to estuaries during the operation of the proposed development as a result of artificial lighting would constitute a **Permanent Moderate Negative Impact** on the basis that it could negatively impact the species within this habitat.	The temporary habitat degradation through disturbance to the River Barrow, including Annex I 'Estuaries', from the construction of the proposed development will still constitute a **Temporary Slight-Imperceptible Negative Impact at a National Level**. The mitigation described in Section 8.8 will significantly reduce the risk of accidental pollution, eliminating all of the most serious risks, including input of cementitious materials or hydrocarbons to the River Barrow and River Suir. Furthermore, any water quality impacts which could arise in the unlikely event of accidental pollution would constitute **Temporary Imperceptible-Slight Negative Impacts at a National Level**, if they were to occur at all. The change in the nature of estuarine habitats constitute a **Permanent Slight Negative Impact at a National Level** on the River Barrow. The impact on the conservation status of Annex I 'Estuaries' at the International level will be **Imperceptible**. The impact of disturbance to estuaries during the operation of the proposed development as a result of artificial lighting would constitute a **Permanent Slight-Imperceptible Positive Impact at a National Level.**
KER 2 Intertidal Habitats, including Annex I 'Mudflats and sandflats not covered by seawater at low tide'	The disturbance to intertidal habitats, including Annex I 'Mudflats and sandflats not covered by seawater at low tide', associated with the construction of the proposed development is considered to constitute a **Short-term Slight-Moderate Negative Impact**. Water quality impacts which could arise in the event of accidental pollution from the proposed development could constitute **Short-term Significant Negative Impacts**, if they were to occur, as they would have the potential to significantly impact on sensitive	The disturbance to intertidal habitats, including Annex I 'Mudflats and sandflats not covered by seawater at low tide', associated with the construction of the proposed development will still constitute a **Short-term Slight-Moderate Negative Impact at a National Level**. The mitigation described in Section 8.8 will significantly reduce the risk of accidental pollution, eliminating all of the most serious risks, including input of cementitious materials or hydrocarbons to the

Key Ecological Receptor	Pre-mitigation impacts	Ecological significance following mitigation
	receptors over a very wide area but would likely recover in the short term. The permanent direct loss of intertidal habitats, including Annex I 'Mudflats and sandflats not covered by seawater at low tide' is considered to constitute a **Permanent Significant Negative Impact** in the River Barrow. However, the impact of this loss at the National level will be **Imperceptible** for the reasons outlined in the preceding column. The impact of disturbance to intertidal habitats during the operation of the proposed development as a result of artificial lighting would constitute a **Permanent Moderate Negative Impact** on the basis that it could negatively impact the species within this habitat.	River Barrow. Furthermore, any water quality impacts which could arise in the unlikely event of accidental pollution would constitute **Temporary Imperceptible-Slight Negative Impacts at a National Level**, if they were to occur at all. The permanent change in the nature of intertidal habitats is considered to constitute a **Permanent Slight Negative Impact at a National Level** in the River Barrow. The impact on the conservation status of Annex I 'Mudflats and sandflats not covered by seawater at low tide' at the International level will be **Imperceptible**. The impact of disturbance to intertidal habitats during the operation of the proposed development as a result of artificial lighting would constitute a **Permanent Moderate Negative Impact at a National Level**.
KER 3 Migratory Fish and Marine Mammals	In the event of prolonged periods of continuous piling or where breaks between pile drives are not sufficiently long, the hydroacoustic impacts on Twaite Shad, other fish species and marine mammals would constitute a **Short-term Moderate-Significant Negative Impact**. Given the short duration of the construction works and very short duration of nightworks, artificial lighting is considered to constitute a **Temporary Slight Negative Impact** on fish species. Water quality impacts which could arise in the event of accidental pollution from the proposed development could constitute **Short-term Significant Negative Impacts**, if they were to occur. The impact of disturbance to fish species during the operation of the proposed development as a result of artificial lighting would constitute a **Permanent Significant Negative Impact** on the	The hydroacoustic impacts on Twaite Shad, other fish species and marine mammals would constitute a **Short-term Slight Negative Impact at a National Level**. The impacts of artificial lighting would constitute a **Temporary Slight-Imperceptible Negative Impact at a National Level**. The mitigation described in Section 8.8 will significantly reduce the risk of accidental pollution, eliminating all of the most serious risks, including input of cementitious materials or hydrocarbons to the River Barrow and River Suir. Furthermore, any water quality impacts which could arise in the unlikely event of accidental pollution would constitute **Temporary Imperceptible-Slight Negative Impacts at a National Level**, if they were to occur at all. The impact of disturbance to Fish Species during the operation of the proposed development as a result of artificial lighting would

Key Ecological Receptor	Pre-mitigation impacts	Ecological significance following mitigation
	basis that it could fragment commuting corridors, increase the risk of predation and disrupt circadian rhythms.	constitute a **Permanent Slight-Imperceptible Positive Impact at a National Level**.
KER 4 Otter	The loss of habitats on the south-eastern edge of the River Barrow would constitute a **Permanent Slight Negative Impact** on otters for the reasons outlined for KER 3 in the preceding column. Disturbance of otters during the construction of the proposed development would constitute a **Short-term Slight-Moderate Negative Impact** on the basis that it is limited to the short duration of the works and due to the opportunity for otters to avoid these impacts within the River Barrow, as well as otters' known tolerance for human presence in the urban environment. Water quality impacts, if they were to occur, would constitute a **Medium-term Slight Negative Impact** on otters as this would result in reduced populations of prey species, but would be fully reversible in time. The impact of disturbance to Otter during the operation of the proposed development as a result of artificial lighting would constitute a **Permanent Moderate Negative Impact** on the basis that it will reduce the commuting corridor for Otter. The reduction in aquatic habitat quality would constitute a **Permanent Slight-Imperceptible Negative Impact** on otters through reduced food availability if populations of prey species were impacted, which would likely be of a very small magnitude. Otters are known to be able to switch prey items quickly in response to availability (Bailey & Rochford, 2006).	The impact on habitat connectivity, zonation and heterogeneity would constitute a **Permanent Not-Significant Negative Impact at a National Level**. Disturbance of otters during the construction of the proposed development would constitute a **Short-term Slight Negative Impact at a National Level**. The mitigation described in Section 8.8 will significantly reduce the risk of accidental pollution, eliminating all of the most serious risks, including input of cementitious materials or hydrocarbons to the River Barrow and River Suir. Furthermore, any water quality impacts which could arise in the unlikely event of accidental pollution would constitute **Temporary Imperceptible- Slight Negative Impacts at a National Level**, if they were to occur at all. The impact of disturbance to Otter during the operation of the proposed development as a result of artificial lighting would constitute a **Permanent Sight-Imperceptible Positive Impact at a National Level.** The reduction in aquatic habitat quality would constitute a **Permanent Imperceptible Negative Impact at a National Level.**
KER 5 Bat Species	The impact of disturbance to bats during the construction of the proposed development is considered to constitute a **Temporary**	The impact of disturbance to bats during the construction of the proposed development will constitute a **Temporary**

Key Ecological Receptor	Pre-mitigation impacts	Ecological significance following mitigation
	Slight Negative Impact. The impact of disturbance to bats during the operation of the proposed development as a result of artificial lighting would constitute a **Permanent Slight Negative Impact** on foraging and commuting bats on the basis that the number of bats likely to be affected is very low and that, based on the assessment above, those bats are very unlikely to be rare species, e.g., Lesser Horseshoe.	**Imperceptible-Slight Negative Impact at a Local Level**. The impact of disturbance to bats during the operation of the proposed development as a result of artificial lighting would constitute a **Permanent Sight-Imperceptible Positive Impact at a Local Level.**
KER 6 Invasive Alien Species	The impacts of invasive alien species, if there were to be significant spread, could constitute **Permanent Profound Negative Impacts**.	No residual impact on this Key Ecological Receptor at any scale.
KER 7 Nationally Designated Sites	All of the impacts on nationally designated sites relate to either water quality impacts, invasive alien species or ecological connections to impacts on the other receptors, which have already been assessed above. The significance of these impacts is potentially up to a **Long-term Significant Negative Impact.**	No residual impact on this Key Ecological Receptor at any scale.

8.11 Conclusion

This EcIA has assessed the ecological impacts of the construction and operation of the proposed O'Hanrahan Bridge Widening Works on Biodiversity. The assessment described herein has examined the receiving natural environment and identified eight Key Ecological Receptors likely to be impacted upon by the proposed development, namely:

- River Barrow and River Suir, including Annex I 'Estuaries'.
- Intertidal Habitats, including Annex I 'Mudflats and sandflats not covered by seawater at low tide'.
- Fish Species, including Annex II migratory species.
- Otter.
- Bat Species.
- Invasive Alien Species.
- Nationally Designated Sites.

Each Key Ecological Receptor was characterised, and its ecological importance was evaluated on a geographical scale. This EcIA has analysed the potential impacts of the proposed development on the Key Ecological Receptors, characterised them in terms of their magnitude, extent, duration, frequency and reversibility, and assessed their significance on a geographical scale. Where negative impacts were identified, mitigation measures have been proposed to avoid or minimise these impacts. Provided that the proposed development is constructed and operated in accordance with the mitigation measures described in this EcIA and the NIS, there will be no significant residual impacts on ecological receptors which are of Local (Higher Value), County, National or International Importance, either from the proposed development individually or in combination with other past, present or reasonably foreseeable plans or projects. While there will be a permanent loss of two Annex I habitats, namely 'Estuaries' (82m^2) and 'Mudflats and sandflats not covered by seawater at low tide' (32m^2), there will be no effect on the conservation status of these habitats nationally.

The NIS for the proposed development concluded, that, "*in making its AA in respect of the proposed widening of O'Hanrahan Bridge, An Bord Pleanála, as the Competent Authority in this case, should determine that, given the full and proper implementation of the mitigation prescribed in this NIS, the proposed development, either individually or in combination with other plans or projects, will not adversely affect the integrity of the River Barrow and River Nore SAC the Lower River Suir SAC, the River Nore SPA or any other European site*."

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9. HYDROLOGY

9.1 Introduction

This section describes the natural characteristics of the site of the proposed development and its immediate surroundings, in terms of hydrology. The likely significant impacts of the proposed development on hydrology are assessed and where required, mitigating measures are put in place to avoid, reduce or minimise the impact of the proposed development.

9.2 Methodology

The hydrological impact assessment methodology is in general agreement with the guidance outlined in the NRA (now Transport Infrastructure Ireland (TII)) 'Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes' (2009). The impact category, duration and nature of impact have been taken into account in this assessment, as per the guidelines. The range criteria for assessing the importance of hydrological features within the study area and the criteria for quantifying the magnitude of impacts follow these guidelines.

The hydrological assessment includes a desktop review of published literature available from various sources, including a web-based search for relevant material. Site specific topographical information and aerial photography has been reviewed to locate any potential features of hydrological interest.

Available topographical and hydrometric information (desk-based) has been used to perform a hydrological impact assessment of the proposed watercourse crossing. All watercourses and water bodies which could be affected directly (i.e. crossed or realigned / diverted) or indirectly (i.e. within 300m of the proposed development, see Figure 9-1) were assessed through a detailed desk study and hydrological assessment.

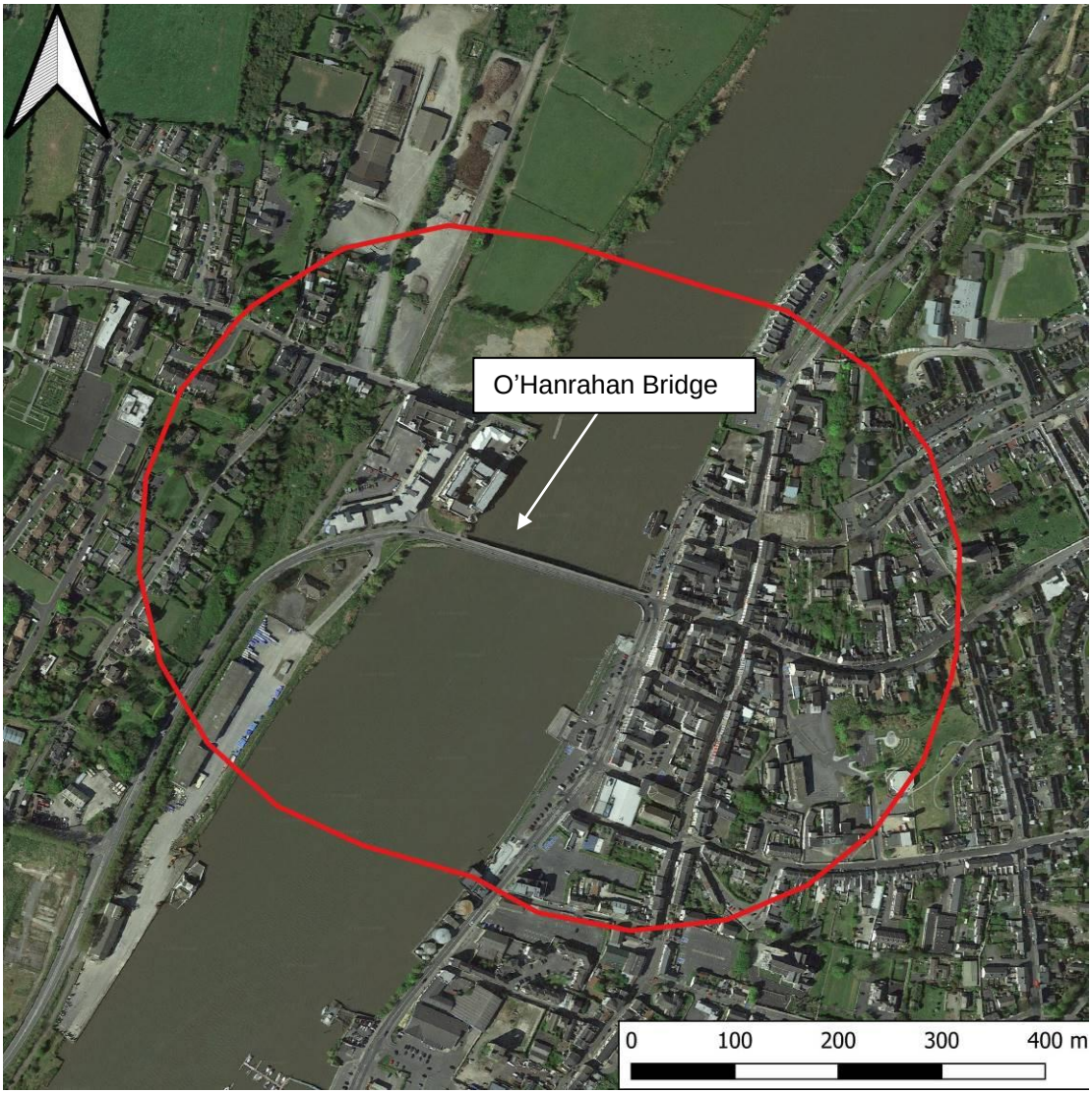


Figure 9-1 Study Area

Impact Characterisation

Types of hydrological impact fall into two broad categories of quantitative and qualitative impacts.

Quantitative Impacts

Hydraulic structures such as bridges, culverts, channel diversions and outfalls can, if not appropriately designed, impact negatively on upstream water levels and downstream flows. If a bridge opening is too narrow it may impede flow during times of floods, thus causing water levels upstream of the structure to be raised above what would occur in the absence of the structure.

Surface water drainage from the bridge deck and landings can also lead to localised increased flows and flooding in the receiving watercourses.

Qualitative Impacts

The drainage network may convey contaminants to receiving waterbodies. Depending on the hydrological and ecological sensitivities of the proposed outfall receiving waters, treatment of storm water via silt traps and hydrocarbon interceptors

may be required upstream to protect water quality, particularly from spillage and first flush events.

Bridge crossings may cause permanent disturbance of rivers and floodplains at bridge abutments and where they connect to the bank. These structures can, if not appropriately designed, create an obstacle to flow, particularly under flood conditions resulting in increased flood risk and damage as a result of afflux by such structures. Such structures can locally alter bed levels and channel dimension resulting in changes in flow velocity and water depth which can, during low flow periods, represent a barrier to fish passage. These structures can result in localised bed and bank erosion, resulting in long-term changes to the morphology of the stream channel.

9.2.1 Desk Study

A desk study was completed using the following information sources:

- Geological Survey of Ireland (GSI) – bedrock geology.
- Teagasc – subsoil map.
- Aerial photography.
- EPA Maps – surface water quality.
- EPA Maps – Water Framework Directive Status.
- OPW Catchment Flood Risk Assessment and Management (CFRAMs) mapping.
- OPW Flood Hazard Mapping.
- GSI web-based mapping.

This section has been prepared having due regard to relevant legislation listed below:

- The EU Water Framework Directive (2000/60/EC) requires all Member States to protect and improve water quality in all waterbodies so that they achieve good ecological status by 2015 or, at the latest, by 2027. It was given legal effect in Ireland by the European Communities (Water Policy) Regulations 2003 (S.I. No. 722 of 2003). It applies to rivers, lakes, groundwater, transitional and coastal waters. The Directive requires that management plans be prepared on a river basin basis and specifies a structured method for developing these plans.
- The EU Floods Directive (2007/60/EC) which came into force in 2007, aims to reduce the adverse consequences of flooding on human health, the environment, cultural heritage and economic activity. The EU Floods Directive was transposed into Irish law by the European Communities (Assessment and Management of Flood Risks) Regulations 2010, S.I. No. 122 of 2010 and amended by the European Communities (Assessment and Management of Flood Risks) (Amendment) Regulations 2015, S.I. No. 495 of 2015.

9.2.2 Guidance Documents

This section has been prepared having due regard to relevant guidance and specific policy documents listed below:

- Transport Infrastructure Ireland (TII 2009) Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes.

- Transport Infrastructure Ireland (TII 2008) Guidelines for the crossing of watercourses during the construction of National Road Schemes.
- DoEHLG (Nov 2009) The Planning System and Flood Risk Management – Guidelines for Planning Authorities.

9.3 Baseline Environment

9.3.1 Hydrological Regime and Water Quality

The O'Hanrahan Bridge spans the River Barrow within New Ross. This watercourse and adjoining catchments are discussed below.

The study area spans two Water Framework Directive (WFD) Catchments, the east bank of the River Barrow is the boundary of the Barrow catchment while the west bank is part of the Nore Catchment. The study area comprises two sub-catchments, the Barrow_SC_150 along the east bank and the Nore_SC_140 along the west bank. The River Barrow is the main waterbody within the study area with a catchment of approximately 5,400km^2 at New Ross. The River Barrow is tidal at this point. The proposed development within the Barrow Nore Upper Estuary Waterbody and is 290m upstream of the New Ross Port Waterbody, see Figure 9-2. Both waterbodies are considered below.

The EPA water quality status for the years 2013 – 2018 (as accessed on catchments.ie on 02/03/2022) is stated as "Moderate" for both waterbodies within the study area. The EPA has identified key pressures in the study area including Agriculture and Urban Runoff. Both watercourses within the study area have also been given a WFD risk score of being 'at risk'. This means that they are at risk of deteriorating or being at less than 'Good' status (or Good Ecological potential) in the future, contrary to the objective of the WFD.

Hydromorphology is a key consideration in defining waterbody status as per the WFD. The Barrow estuary shows indications of historic alterations and the New Ross Port waterbody is characterised as a "Highly Modified Waterbody" under the Water Framework Directive.

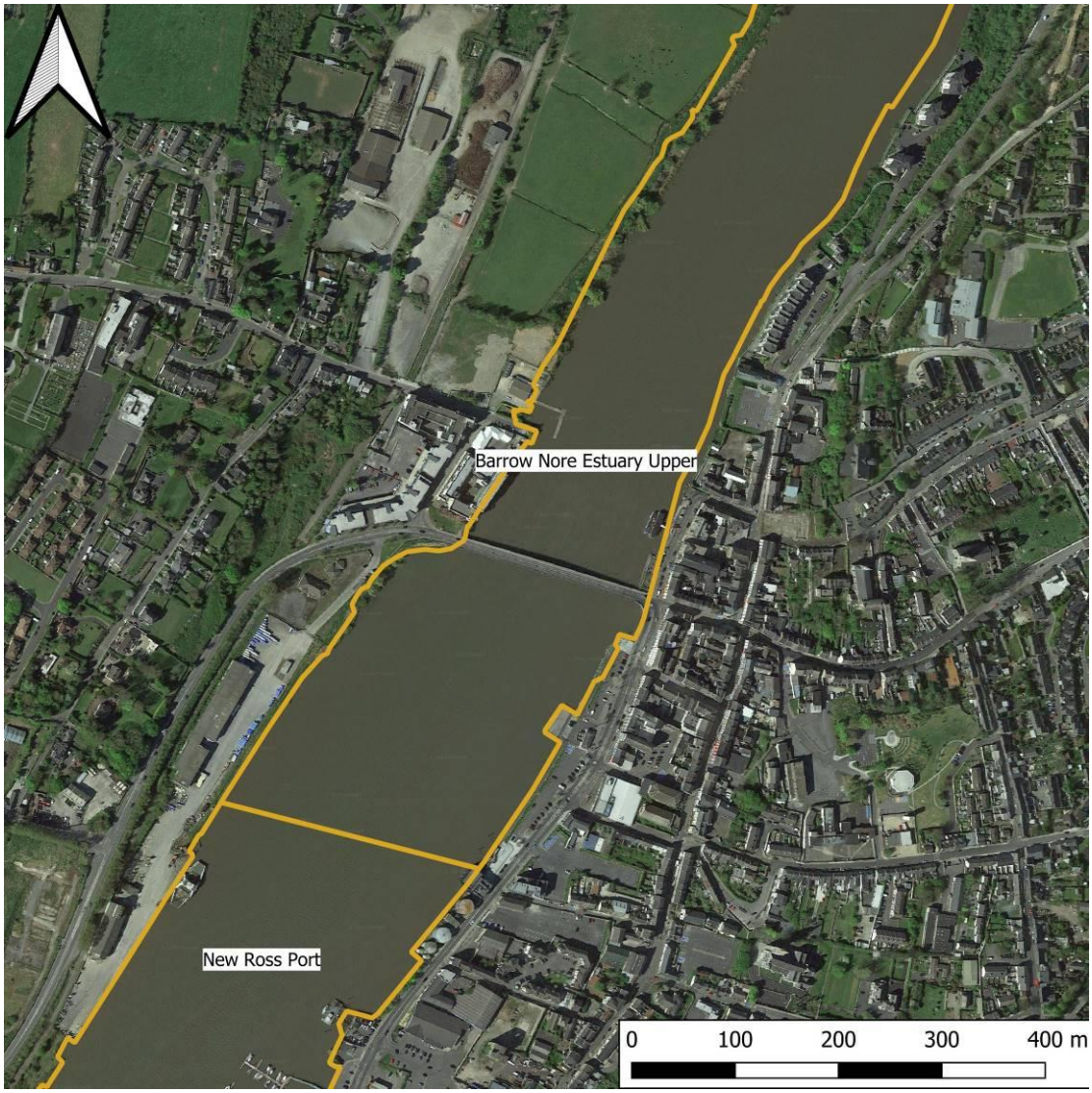
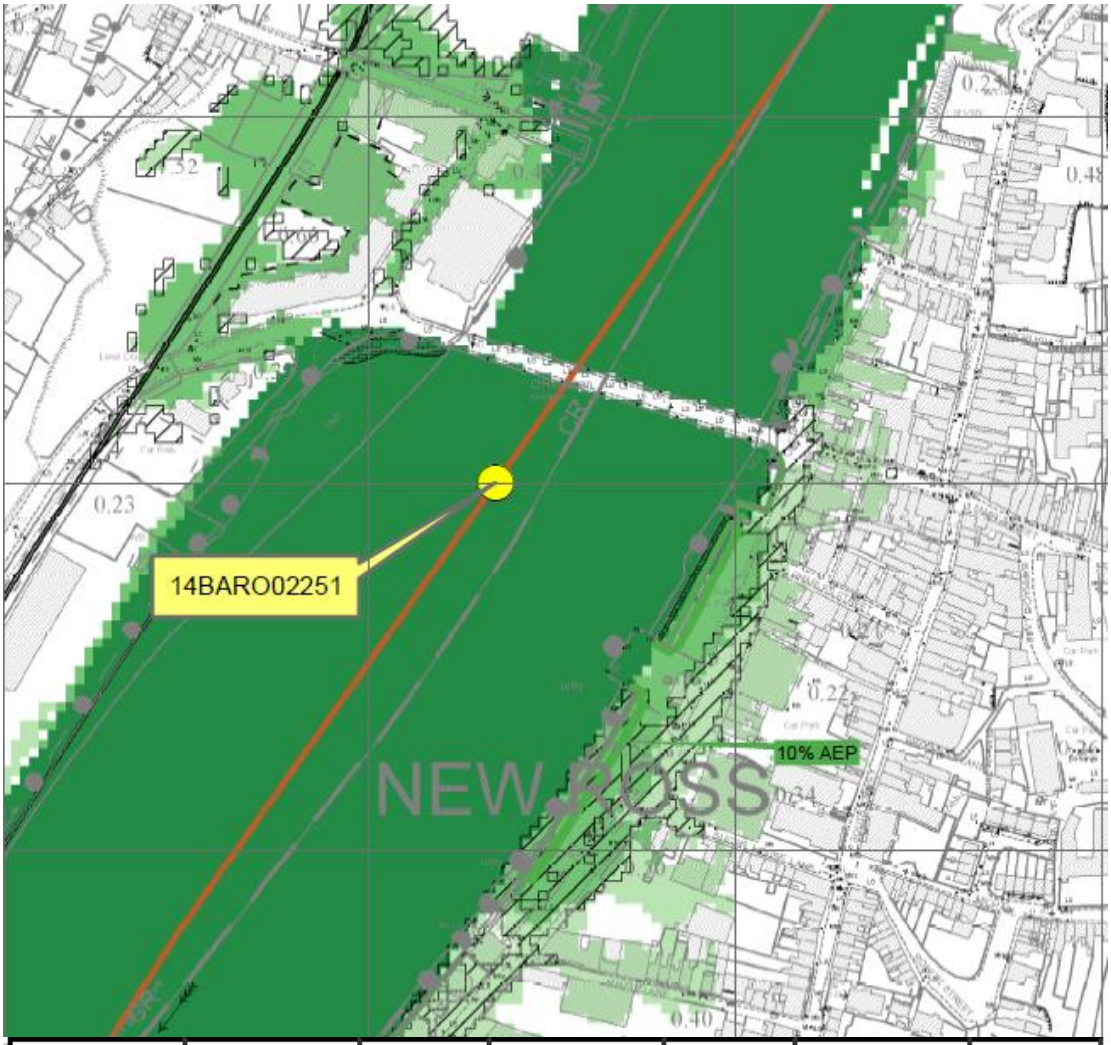


Figure 9-2 Waterbodies at the location of the proposed development

Flooding

As part of this assessment several historical and predictive flood indicator datasets have been reviewed including floodinfo.ie, Benefitting Land maps, Ordnance Survey of Ireland (OSi) flood indicators, and Catchment Flood Risk Assessment and Management (CFRAM) mapping. All datasets indicate elevated levels of flood risk immediately adjacent to the River Barrow within the study area.

The detailed hydraulic modelling undertaken as part of the CFRAMS assessment indicates that flooding within the study area is primarily derived from tidal sources. The area surrounding the east and west abutments are indicated to flood in the 1 in 200 year coastal event. The coastal flood extent mapping prepared as part of the CFRAM study including flood levels is reproduced in Figure 9-3 below. However, subsequent to the CFRAM study a series of flood defence measures were completed within New Ross including flood defence walls along the eastern quays which tie into O'Hanrahan Bridge east abutment. These defend the land in the immediate vicinity to the 1 in 200 year coastal event. As per the OPW Guidelines the lands immediately adjacent to the bridge abutments are within Flood Zone A.



Node Label	Water Level (OD) 10% AEP	Flow (m³/s) 10% AEP	Water Level (OD) 0.5% AEP	Flow (m³/s) 0.5% AEP	Water Level (OD) 0.1% AEP	Flow (m³/s) 0.1% AEP
14BARO02251	2.63	N/A	2.90	N/A	3.01	N/A
14BARO02204	2.63	N/A	2.90	N/A	3.01	N/A
14BARO02159	2.63	N/A	2.90	N/A	3.01	N/A

Figure 9-3 Coastal flood extents

Drinking Water Supply

A review of available sources does not indicate any active public or private supply abstracted from surface within the vicinity of the study area.

Existing Road Drainage

The existing bridge deck drainage incorporates a series of gullies that discharge directly through the deck slab and into the River Barrow below. The proposed drainage system will provide a combined kerb drain system that will discharge the surface water from the bridge deck to the existing surface water network on the approach roads on either side of the bridge.

9.4 Potential Impacts

9.4.1 Construction Phase

Water Quality and Sediment Regime

Construction activities pose a significant risk to watercourses, particularly contaminated surface water runoff from construction activities entering the watercourse.

Construction activities within and alongside surface waters associated with bridge widening, can contribute to the deterioration of water quality and can physically alter the stream/river bed and bank morphology with the potential to alter erosion and deposition rates locally and downstream. Activities within or close to the watercourse channels can lead to increased turbidity through re-suspension of bed sediments and release of new sediments from earthworks. The potential impact is moderate to significant.

The main contaminants arising from construction runoff include:

- Elevated silt/sediment loading within watercourses from construction site runoff and sheet piling. Sheet piling will be undertaken from a barge for river-side installation. Elevated silt loading can lead to long-term damage to aquatic ecosystems by smothering spawning grounds and gravel beds and clogging the gills of fish. Increased silt load in receiving watercourses stunts aquatic plant growth, limits dissolved oxygen capacity and overall reduces the ecological quality with the most critical period associated with low flow conditions. Other pollutants in the watercourse can bind to silt which can lead to increased bioavailability of these pollutants. Effects on erosion and deposition processes during construction are likely to be *negative, temporary, imperceptible to slight* and highly localised to the works area.
- Spillage of concrete, grout and other cement based products. These cement based products are highly alkaline (releasing fine highly alkaline silt) and extremely corrosive and can result in significant impact to watercourses altering the pH, smothering the stream bed and physically damaging fish through burning and clogging of gills due to the fine silt.
- Accidental Spillage of hydrocarbons from construction plant and at storage depots / construction compound.
- Faecal contamination arising from inadequate treatment of on-site toilets and washing facilities.
- There is also potential for pollutants derived from construction materials to be mobilised by flood waters.

In the absence of mitigation measures, the potential impact is *negative, temporary moderate to significant*.

Flood Risk

Flood mapping produced as part of the CFRAM Study indicates that O'Hanrahan Bridge Abutments are within the 1 in 200-year coastal flood extents emanating from the River Barrow. There is potential for flood events to occur during the construction phase. The construction works will increase the number of people near a known source of flooding, thus increasing the potential for flood risk related impacts on human health. This has the potential to have a *negative, temporary, slight to moderate* impact.

9.4.2 Operational Impacts

Bridge works have the potential to cause permanent disturbance to river channels, floodplains and the flood regime. Watercourse crossings and embankments, if not appropriately designed, create an obstacle to flow, particularly under flood conditions resulting in increased flood risk and damage in the vicinity of the proposed development. Such structures can locally alter channel morphology resulting in changes in flow velocity and water depth. These structures can also result in localised riverbed and riverbank erosion, resulting in long-term changes to the morphology of the river channel.

Water Quality and Sediment Regime

The existing drainage pathways for the bridge and abutments will be maintained. The impact of increased impermeable area as part of the bridge deck is negligible given the short drainage runs required from the bridge deck to outfall to the River Barrow. There will be limited potential for impacts to the water quality of receiving waterbody and potential impacts are likely *negative, long term and imperceptible*.

As described in section 3.3.4 pf this Planning Report, the widening of quay walls (by approx. 0.98-1.5m) will require sheet piling within the Barrow channel. The finish of the widened quay wall will replicate the existing smooth concrete and sheet piling currently present on the eastern quay and rock armour on the western bank. Given the minor scale of the intervention, the proposed layout of the development will likely have negligible impact on channel cross section and resultant flow and sediment transport characteristics. This has the potential to have a *negative, long-term, imperceptible to not significant* impact.

Flooding

The proposed development will not alter the cross sectional area of the bridge openings and general flow characteristics will not be affected. A section of the existing flood defences on the quays will be altered where they tie into the abutment. The standard of protection (1 in 200 year coastal) will be reinstated. The proposed widening of quay walls will displace some flood waters, though the volume is considered negligible in the context of the Barrow system. Conversely, the widening of quay walls will also increase the area of defended lands though this is also seen as insignificant. Overall, the potential impact is *neutral, long-term, and imperceptible*.

9.5 Mitigation Measures

9.5.1 Construction Phase

As is normal practice with infrastructure projects, an Environmental Operating Plan (EOP) and Construction Environmental Management Plan (CEMP) will be prepared for the scheme. A CEMP is included in Appendix B. These will be developed by the selected contractor to suit the detailed construction methodology and allocate responsibilities to individuals in the construction team. In doing so, the measures detailed in the appended reports will be considered minimum requirements to be considered and improved upon. The level of detail provided within the current drafts of the Plans is sufficient to allow an assessment of the anticipated impacts including residual impacts.

The following will be implemented as part of this plan:

- An Incident Response Plan (see requirements outlined in the CEMP) will be finalised by the contractor detailing the procedures to be undertaken in the event of spillage of chemical, fuel or other hazardous wastes, non-compliance

with any permit or license, or other such risks that could lead to a pollution incident, including flood risks.

- All necessary permits and licenses for in stream construction work for provision of the flood defences will be obtained prior to the commencement of construction.
- During construction, cognisance will have to be taken of the following guidance documents for construction work on, over or near water.
- *Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites* (Eastern Regional Fisheries Board)
- *Central Fisheries Board Channels and Challenges – The enhancement of Salmonid Rivers.*
- *CIRIA C532 Control of Water Pollution from Construction Sites Guidance for Consultants and Contractors.*
- *CIRIA C648 Control of Water Pollution from Constructional Sites.*
- *Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes (TII, 2006).*

Based on the above guidance documents concerning the control of construction impacts on the water environment, the following outlines the standard mitigation measures that will be adhered to for the construction phase, in order to protect all catchments and watercourses from direct and indirect impacts.

Standard Mitigation Measures

- The works area (including the site compound) will be limited to the minimum required to undertake the necessary elements of the project.
- Surface water flowing onto the construction area will be minimised through the provision of berms, diversion channels or cut-off ditches.
- Protection of waterbodies from silt load will be carried out through the use of gully silt/sediment filters and shallow berms in hardstanding areas to provide adequate treatment of runoff to watercourses.
- Settlement tanks/ponds, silt traps/bags and bunds will be used. Where pumping of water is to be carried out, filters will be used at intake points and discharge will be through a sediment trap.
- The anticipated site compound/storage facility will be fenced off at a minimum distance of 5m from the top of the edge of the watercourse bank. Any works within the 10m buffer zone will require measures to be implemented to ensure that silt laden or contaminated surface water runoff from the compound does not discharge directly to the watercourse. CEMP has been drafted and will need to be finalised by the appointed Contactor. See the CEMP in Appendix B for further detail.
- Protection measures will be put in place to ensure that all hydrocarbons used during the construction phase are appropriately handled, stored and disposed of in accordance with the TII document "*Guidelines for the crossing of watercourses during the construction of National Road Schemes*". All chemical and fuel filling locations will be contained within bunded areas.
- Foul drainage from all site offices and construction facilities will be contained and disposed of in an appropriate manner, off site, to prevent pollution.
- The construction discharge will be treated such that it will not reduce the environmental quality standard of the receiving watercourses.

- Water quality monitoring will be undertaken in the River Barrow, with weekly samples being taken from at least 2 months prior to commencement of construction until at least 4 months post-completion. Water samples will be taken from at least two locations. The final number and location of sampling points will be determined by the Site Environmental Manager. The results of the water quality monitoring programme will be reviewed by the Site Environmental Manager and Ecological Clerk of Works on an ongoing basis during construction. In the event of any non-compliance with regulatory limits for any of the water quality parameters monitored, an investigation will be undertaken to identify the source of this non-compliance and corrective action will be taken where this is deemed to be associated with the proposed development.

Specific Mitigation Measures - Concrete Works

The use and management of concrete in or close to watercourses must be carefully controlled to avoid spillage which has a deleterious effect on water chemistry and aquatic habitats and species. As the use of concrete cannot be avoided, the following control measures will be employed:

- Hydrophilic grout and quick-setting mixes or rapid hardener additives shall be used to promote the early set of concrete surfaces exposed to water.
- When working in or near the surface water and the application of in-situ materials cannot be avoided, the use of alternative materials such as biodegradable shutter oils shall be used.
- Any plant operating close to the water will require special consideration on the transport of concrete from the point of discharge from the mixer to final discharge into the delivery pipe (tremie). Care will be exercised when slewing concrete skips or mobile concrete pumps over or near surface waters.
- Placing of concrete in or near watercourses will be carried out only under the supervision of the Ecological Clerk of Works (ECoW).
- The weather forecast will be consulted prior to commencing concrete pours. No such works will be undertaken if inclement weather is forecast such that precipitation may make it difficult to maintain a dry working area.
- There will be no spills of concrete, cement, grout or similar materials hosed into surface water drains. Such spills shall be contained immediately and runoff prevented from entering the watercourse.
- Concrete waste and wash-down water will be contained and managed on site to prevent pollution of all surface watercourses.
- On-site concrete batching and mixing activities will only be allowed at the identified construction compound areas.
- Washout from concrete lorries, with the exception of the chute, will not be permitted on site and will only take place at the construction compound (or other appropriate facility designated by the manufacturer).
- Chute washout will be carried out at designated locations only. These locations will be signposted. The Concrete Plant and all Delivery Drivers will be informed of their location with the order information and on arrival to site.
- Chute washout locations will be provided with an appropriate designated, contained impermeable area and treatment facilities including adequately sized settlement tanks. The clear water from the settlement tanks shall be pH corrected prior to discharge (which shall be by means of one of the

construction stage settlement facilities) or alternatively disposed of as waste in accordance with the Contractor's Waste Management Plan.

9.5.2 Flooding

The Contractor will provide method statements for weather forecasting and continuous monitoring of water levels in the River Barrow. The Contractor will also provide method statements for the removal of site materials, fuels, tools, vehicles and persons from flood zones in order to minimise the risk to persons working on the site as well as potential input of sediment or construction materials into the river during flood events.

9.5.3 Operational Phase Mitigation

There are no mitigation measures proposed for the operational phase of the proposed development.

9.6 Residual Impacts

The residual hydrological impacts associated with the proposed development following the implementation of the mitigation measures outlined in section 9.5, are outlined below.

9.6.1 Water Quality

Following the implementation of the measures outlined in the CEMP in Appendix B, there will be a *negative, slight, temporary* residual impact on water quality during the construction of the proposed development.

9.6.2 Flooding

Mitigation in place during the construction phase will limit flood risk and reduce the potential for pollution events. With the inclusion of mitigation during the construction phase, the proposed development will have a *temporary negative imperceptible to slight* impact.

9.7 References

Central Fisheries Board Channels and Challenges – The enhancement of Salmonid Rivers.

CIRIA C532 Control of Water Pollution from Construction Sites Guidance for Consultants and Contractors.

CIRIA C648 Control of Water Pollution from Constructional Sites.

Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes (TII, 2006).

Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites (Eastern Regional Fisheries Board)

10. SOILS, GEOLOGY AND HYDROGEOLOGY

10.1 Introduction

This section of the Planning Report describes the natural characteristics of the receiving environment of O'Hanrahan Bridge Widening (hereafter the 'proposed development') and its immediate surroundings, in terms of soils, geology and hydrogeology. The likely significant impacts of the proposed development on these resources are assessed and where required, mitigation measures are put in place to avoid, reduce or minimise the impact of the proposed development on soils, geology and hydrogeology.

This section outlines the existing ground and groundwater conditions, with the predicted impacts assessed on the basis of the relevant construction methodology, particular soil characteristics and hydrogeology.

10.2 Methodology

10.2.1 Methodology, Directives and Guidance documents

This section is prepared having regard to the Environmental Impact Assessment (EIA) Directive 2011/92/EU (as amended by Directive 2014/52/EU) and the following guidance documents:

- Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (TII, 2008).
- Guidelines on the Information to be contained in Environmental Impact Assessment Reports (EPA, 2022).
- Draft Advice Notes for Preparing Environmental Impact Statements (EPA, 2015).
- Advice Notes on Current Practice in the Preparation of Environmental Impact Statements (EPA, 2003).
- Guidelines on the information to be contained in environmental impact statements (EPA, 2002).

10.2.2 Available Information and Data Collection

Desk Study

Geological mapping from the Geological Survey of Ireland (GSI), covering the subsoils, solid geology and groundwater characterises of the location of the proposed development was reviewed using the online viewer at www.gsi.ie/mapping.

Open source (Google Earth, Bing Maps) and Ordnance Survey Ireland (OSI) aerial photography was reviewed in order to identify large scale ground characteristics and built environment in the area.

Historical maps dating back to 1830s were reviewed using online viewer at www.geohive.ie/ in order to identify the changes to topography, extents, land use and built environment.

Review of EPA monitoring and assessment of groundwater quality and classification under the Water Framework Directive. Available at https://gis.epa.ie/EPAMaps/Water.

Ground Investigations

Historical ground investigation information for the proposed development area was collated and reviewed using the National Borehole Database available on GSI's Geotechnical web viewer. Previous ground investigation commissioned by T.J. O'Connor (TJOC) consulting engineers and carried out by IGSL Ltd in 2004 to inform the main drainage scheme at New Ross, and the historical GI carried out to inform the design of the O'Hanrahan Bridge (W.J.L O'Connell ME Consulting Engineer, 1961), were consulted to provide an additional body of data to inform the assessment.

The amount of available GI is considered to be insufficient to complete the design of the new quay wall as part of the proposed development, therefore prior to the detailed design stage of the proposed development, additional ground investigation is planned as described in Section 3 of this Planning Report. The additional ground investigation is focused on the proposed quay wall location and consists of:

- 3 no. rotary core boreholes (geobor-s) at river side.
- 1 no. trial pit at roadside.
- 2 no. groundwater monitoring standpipes including a datalogger.
- A suite of laboratory testing including environmental/contamination tests.

10.3 Baseline Environment

The assessment of the existing ground conditions is based on both the desk study and ground investigations conducted on the proposed development area.

10.3.1 Soils and Geology

Topography

The proposed development is located within the urban area of New Ross, and crosses the River Barrow approximately 20km upstream from the river mouth. Elevations are consistent throughout the footprint of the proposed development varying from 2.0mOD at south-eastern end to 5.0mOD at the north-western end of O'Hanrahan Bridge.

Historical 1960s GI (W.J.L O'Connell ME Consulting Engineer, 1961) completed a set of boreholes within the riverbed. Ground level varies from -7.8 mOD to 2.4mOD (shown in Figure 10-2) with lower levels being present at the centre of the river.

Bedrock Geology

The bedrock geology was identified from the GSI's Bedrock Geology maps indicating Lower-Middle Ordovician slate, sandstone, greywacke, conglomerate of the Lower – Middle Ordovician (Palaeozoic). At the proposed development location, GSI's Bedrock Geology describes rock as being green, red-purple, buff slate, siltstone of the Oaklands Formation.

Bedrock was encountered at 16.75m below ground level or -14.74mOD (RC04 from IGSL Ground Investigation Report no. 8863, 2004) in the vicinity of the south-eastern abutment of the existing O'Hanrahan Bridge, and described as *"strong to moderately strong, medium bedded to locally thinly laminated, very fine-grained, blue/grey Siltstone*", see Figure 10-1.

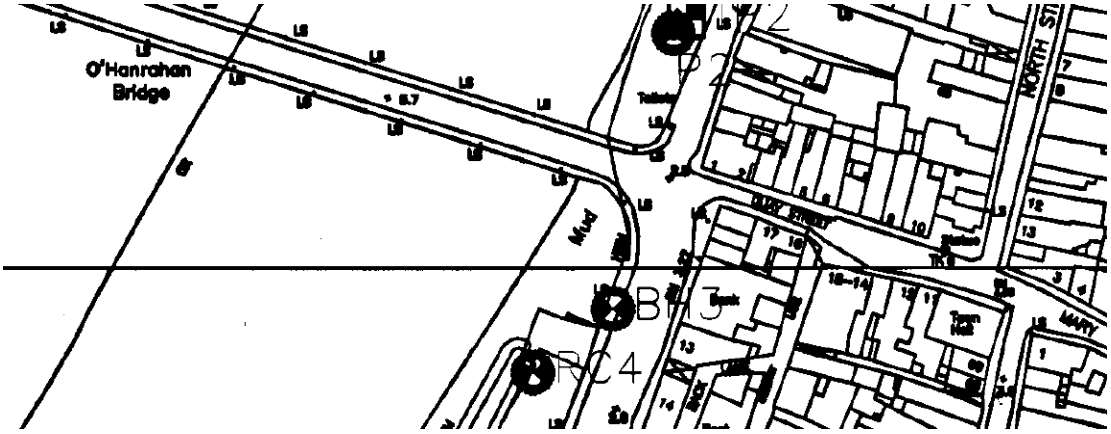


Figure 10-1 Location plan of RC04 (IGSL Ground Investigation Report no. 8863, 2004)

Historical 1960s GI completed for the construction of O'Hanrahan Bridge consisted of 15 no. river boreholes across the River Barrow. Rock was uncovered at depths varying from 8.2 to 24.1m bgl, with shallower rock proven at the south-eastern end (8.2 to 15.7m bgl) and consistent rock depths in the mid and north-western end of the scheme (20.6 to 24.1m bgl), as shown in Figure 10-2 below.

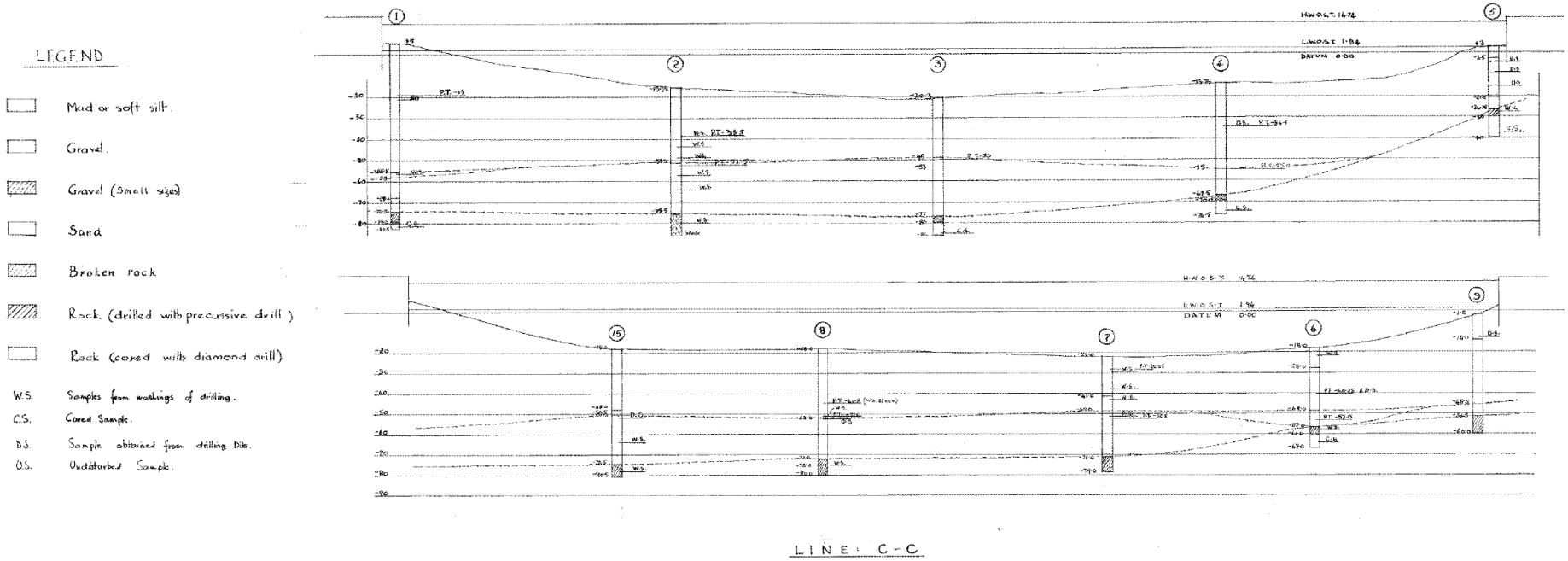


Figure 10-2 Geological long section across River Barrow at O'Hanrahan Bridge (W.J.L O'Connell Consulting Engineer drawings, 1960/61)

Quaternary Sediments

Borehole BH03 (shown in Figure 10.1) from IGSL's Ground Investigation Report no. 8863 (2004) identifies the quaternary sediments at the roadside. Quaternary sediments consist of a variable layer of medium dense to dense coarse-grained made ground (slightly clayey, sandy, gravelly angular Cobles) to approximately 5m below ground level (bgl), over very soft to soft alluvial river terrace deposits. Glacial deposits have been proven immediately above bedrock being thin in nature (approximately 2m in thickness).

River side quaternary deposits are anticipated to be comprised of alluvial river terrace deposits over glacial deposit, below which weathered and competent rock are encountered. The proposed Ground Investigation will focus on identifying the river side ground and rock conditions.

Contaminated Soils

No environmental samples were retrieved from the previous historical GI (1960/61, 2003/04). Environmental sampling and testing are proposed as part of GI for the proposed development, including but not limited to, WAC (Waste Acceptance Criteria) analysis. Due to the urban location of the proposed development and the corresponding traffic usage in the area, there is a potential for elevated levels of contaminants in the ground, particularly hydrocarbons.

10.3.2 Hydrogeology

Groundwater Bodies and Bedrock Aquifers

Groundwater is defined as water, which is stored in, or moves through, the cracks and pores of geologic formations of soils, rocks, and sand. The potential of rocks to transport and store water underground is highly dependent on the degree of permeability: the more permeable the rock, the greater the water transport ability. A description of the groundwater features identified within the study area is presented below.

Aquifer Classification

The River Barrow forms a groundwater divide which divides groundwater bodies connectivity in terms of flow and productivity. The bedrock aquifer classifications for the study area were found using the Geological Survey Ireland (GSI) mapper website. Aquifers on the west bank of the Barrow are indicated to be Poor Aquifer - Bedrock which is Generally Unproductive except for Local Zones while the east bank aquifer is stated as locally Important Aquifer – Bedrock which is Moderately Productive only in Local Zones.

Groundwater Quality

The Inistoge Groundwater Body (GWB) (European Code IE_SE_G_076) is located along the western bank of the River Barrow. The New Ross GWB (European Code IE_SE_G_152) contains areas within the eastern quays of the town. Under Water Framework Directive (WFD), both the Inistioge and New Ross GWBs were classified as having an overall good status for water quality and quantity for the 2013-2018 assessment period. The Inistoge GWB is described as "Not at Risk" of not achieving at least good ecological or good chemical status/potential. The objective for New Ross GWB is currently under review with regard to risk status.

Groundwater Vulnerability

The Geological Survey of Ireland (GSI) uses a matrix comprising four groundwater vulnerability categories to classify aquifer vulnerability. These categories are

extreme (E), high (H), moderate (M) and low (L). The categories are based on the thickness of overburden which provides some reduction for contaminants migrating toward the groundwater table from the surface or near sub-surface. The 'Extreme' vulnerability classification is defined as overburden depths of less than 3m. A subset of the 'extreme' category termed 'Extreme with bedrock outcrop/subcrop' (X), relates to areas of bedrock outcrop or sub-crop of less than 1m, or within 30m of a location of point recharge i.e., a karst feature.

Groundwater vulnerability within the study area ranges from moderate to extreme vulnerability to pollution at the ground surface. This signifies that the subsoil cover along the River Barrow forms a thin layer of low to moderate permeability subsoil or made ground. Table 10-1 below identifies the groundwater vulnerability of areas where the proposed development requires groundworks such as piling.

Table 10-1 Groundwater Vulnerability Within Study Area

Proposed Works	Groundwater Vulnerability Rating
Sheet Pile Installation (Riverside)	High (H)
Landside works	High (H)

Groundwater Recharge

Groundwater recharge differs slightly across the River Barrow though both banks have relatively low recharge capacity (<150mm per year). This is likely further reduced due to the impermeable surfaces within the study area.

Groundwater Abstractions

There are no recorded public groundwater supplies or public water schemes located within the study area. Three boreholes are recorded to the east of the study area which are described as for industrial and agricultural uses. The boreholes are listed as 2611NWW204, 2611NWW207 and 2611NWW203. Drill dates are recorded between 1977 and 1981. According to the GSI records, the three boreholes are categorised as good yield classes with yields below 109m^3/day.

Site Hydrogeology

Given the proximity to the river and the topographical orientation towards the Barrow estuary, discharge from the Inistioge and New Ross GWB will be to the River Barrow. Groundwater flow paths will be short due to the bedrock generally being poorly permeable with the exception of fracture zones.

Groundwater Dependant Terrestrial Ecosystems (GWDTE) /Special Areas of Conservation (SAC)

The hydrogeological sensitivity of European Sites which form part of the Natura 2000 Network were assessed with regard to the proposed development. The River Barrow and River Nore Special Area of Conservation (SAC) (site code 002162) is the only European site located within the study area of the proposed development (see Section 7 Biodiversity of this Planning Report for a detailed assessment of all European sites). This SAC consists of the freshwater stretches of the Barrow and Nore River catchments as far upstream as the Slieve Bloom Mountains, and it also includes the tidal elements and estuary as far downstream as Creadun Head in Waterford.

There are no GWDTE present within the vicinity of the site.

Summary of Hydrogeological Features

The main features of importance identified at the site and in the study area are summarised in Table 10-2.

Table 10-2 Features of Importance

Feature	Importance	Criteria / Justification
Bedrock aquifer classified by the GSI as a Poorly Productive Aquifer which is productive only in local zones (Pl)	Low	A poorly productive aquifer is considered to be of low value on a local scale.
Bedrock aquifer classified by the GSI as a Locally Important aquifer which is moderately productive in local zones	High	A locally important aquifer is considered to have a medium quality or value on a local scale
River Barrow and River Nore SAC	High	European Site forming part of the Natura 2000 network*

*The River Barrow is a hydrological feature of importance. The Institute of Geologists of Ireland (IGI) guidance does not designate importance ranking to hydrological features, however the Transport Infrastructure Ireland (TII) (Guidelines for Hydrology for National Road Schemes, TII 2019) guidance states that if groundwater supports a river or surface water body ecosystem protected by EU legislation (e.g., River Barrow and River Nore Special Area of Conservation (SAC)) that it should be considered an attribute of extremely high importance.

10.4 Potential Impacts

10.4.1 Construction Stage

Soils and Geology

A large extent of the flood defence measures proposed consist of driven steel sheet piles. These linear driven elements, with very slim thickness (up to 20mm) will not require pre-boring, excavation or preparation of in situ ground, and as such, the impact from sheet piling to soils and geology will be neutral. The selected installation method (vibration rather than impact driving) and the designed offset from the existing quay wall will ensure there is no impact to stability of soils.

Where sheet piles will be driven on the river side of the existing quay wall, a gap between the quay wall and sheet piles, typically 1m wide from the face of the existing quay wall to the back of the proposed sheet pile wall, will be infilled with imported clean granular fill to the existing ground level. Approximately 400m^3 of fill will be placed over a length of 140-145m of sheet pile wall. Suitable local quarries are located in the vicinity of the proposed development (i.e. Oakland Quarries). The importation of fill will result in a likely *negative, non-significant and permanent* impact due to alteration of the existing geology.

Up to 346m^3 of concrete will need to be imported and placed for completing the verge construction. Approximately 328m^3 of in-situ concrete will be required for the remaining structural elements (parapets, corbels, slabs etc.). The importation of concrete will result in a likely *negative, non-significant* and *permanent* effect to the quarry from which aggregates are extracted to be used within the concrete and cement production.

Made ground excavation is anticipated to be minor (<25m^3) with most of the waste originating from construction demolition. Approximately 330m^3 of construction and demolition waste will be generated during removal of existing paving, pavement,

footpaths and parapets. The disposal of made ground will result in a likely *negative, non-significant* and *permanent* effect to the receiving environment.

The proposed development does not include embankments, or load bearing structures, that would induce the compaction of in-situ material. Furthermore, there will be no compaction of ground from construction machinery as the piling works are anticipated to be completed from the river side. It is proposed to infill the area between the existing quay wall and the new riverside sheet pile wall comprising a narrow stretch of ground (up to 1m) over approx. 140-145m. As the infill material is granular in nature, it will allow continued percolation of surface water into the ground. Overall, there will be no significant impact related to compaction and sealing from the proposed development.

Unmitigated, there is a potential risk of localised contamination from construction materials leeching into the underlying soils by exposure or construction related spillages resulting in a *permanent negative* impact on the soils. In the case of soils, the potential impact is *temporary negative* and *slight* as the requirement of good construction practices will necessitate the immediate excavation/remediation of any such spillage resulting in a very low risk of pollution to the soils and consequently the underlying aquifers.

Contamination of Groundwater

Construction runoff from the site can pose a risk to groundwater due to potential infiltration of contaminated surface water to groundwater. The installation of sheet pile walls may provide a pathway to the shallow groundwater table from overlaying soils. The impact associated with driven piles is slight, as contaminated material will be dragged down into the underlying soil layers by shaft friction, however the displacement of these contaminants is not likely to be significant. The potential impact is *negative, slight* and *temporary*.

As sheet piles move through soils in order to reach their target depths, they may penetrate previously impervious soils that acted as a confining layer to contaminants, preventing their mobilization into the groundwater. This potential is considered *slight negative* effect on a localised area immediately surrounding the impacts due to the minimal amount of contaminants that could be transmitted to the underlying groundwater.

The River Barrow and River Nore SAC is hydrologically linked to the proposed development as a section of the proposed sheet piling is located within the mudflats of the SAC. Given that this SAC is predominantly a surface water system and is not sensitive in relation to groundwater flows, the main potential impact would relate to construction related contamination of the aquifer impacting the SAC water quality. The potential impact to the SAC water quality from construction related groundwater contamination would be *negative, imperceptible* and *temporary*.

10.4.2 Operation Stage

Soils and Geology

No further operational phase impacts are expected in relation to soils and geology. The permanent impacts of ground excavation, importation and compacting the characteristics of surcharged soil are addressed in Construction Phase section.

Groundwater Flow/Seepage

The steel sheet pile wall may act as a barrier for natural groundwater flow towards the River Barrow during low tide and may locally impact groundwater levels. While

the groundwater seepage into the river at a local level may be restricted, it will be of minimal significance given that the majority of the outfall into the river is from precipitation and surface run-off from stormwater conveyance systems. Groundwater flow and seepage behind the proposed sheet pile wall will be redirected to the north and south behind the sheet pile wall. The potential effect of the proposed development on groundwater flow is likely to be *negative, imperceptible* and *permanent*.

Contamination of Groundwater

During the operational phase, the area will be an urban environment covered in hard standing (sheet piles on the water edge with hard standing on the landward side of the piles). There are therefore no perceived activities which pose a risk of contamination to the hydrogeological features of importance during the operational phase of the proposed development.

10.5 Mitigation Measures

10.5.1 Mitigation by Design

The construction works will be carried out with the least feasible disturbance of soils to avoid any requirement for excavation of in-situ ground and creation of waste.

The quantity of imported backfill for the gap between the sheet piles and the existing quay wall, is minimised by design, as the alignment of the sheet pile wall was carefully selected as close as possible to the existing wall without compromising wall stability or the proposed alignment.

10.5.2 Specific Mitigation Measures

Approximately 330m^3 of construction and demolition waste will be generated during the demolition of existing paving, pavement, parapets and footpaths which will be exported from site. The quantity is very small given the scale of the project, and will be disposed of by the contractor who will ensure that all subsurface materials excavated during the construction phase of the proposed development are managed in accordance with the relevant waste management legislation. The successful contractor will ensure that all subsurface materials are removed from the site and sent to authorised waste management facilities (i.e. which hold all relevant, valid permits / licences) which accept the corresponding types of waste. The contractor will be required to submit a Construction and Demolition Waste Management Plan (CDWMP) to the local authority for approval, which will address all types of material to be disposed of. The contractor will undertake the environmental testing of the material to be disposed of in order to determine the waste acceptability characteristics.

All imported material will be sourced from the nearest possible locations. A number of suitable active quarries with all necessary statutory consents exist across County Wexford and southwest County Wexford, such as Oaklands Quarry in Ballykelly, New Ross. The mentioned quarry is accessible through R733 which links to the proposed development via R723. There may be other suitable quarries, in addition to the quarry identified above, that the Contractor may select as the source for construction materials. Only those quarries that conform to all necessary statutory consents may be used in the construction phase by the appointed Contractor.

A project-specific Construction Environmental Management Plan (CEMP) will be prepared for the development by the contractor. It will be maintained by the contractor for the duration of the construction phase. The CEMP will cover all

potentially polluting activities and include an emergency response procedure. All personnel working on the site will be trained in the implementation of the procedures. As a minimum, the CEMP for the proposed development will be formulated in consideration of the standard best practice. The CEMP will include a range of site-specific measures which include:

- Safety measures for working from barges in-river, including but not limited to risk of pollutants from the machinery stationed on the barge and operating with bulk materials such as backfill gravel on the barge.
- Runoff will be controlled and treated to minimise impacts to groundwater and the River Barrow.
- Temporary storage of any contaminated material on-site shall be carefully managed so as to limit any risk of contaminated surface water runoff leaving the site or infiltrating to groundwater. Runoff from the material shall be directed to a lined pond or temporary sewer/tank and the water shall be disposed of off-site for treatment at an appropriate licenced facility in accordance with the relevant waste management legislation. Alternatively, the material shall be covered while stored to remove the risk of surface water contamination.
- All hazardous materials will be stored within secondary containment, designed to retain at least 110% of the storage contents. Temporary bunds for oil/diesel storage tanks will be used on the site during the construction phase.
- The successful contractor will ensure that spill kits and hydrocarbon absorbent packs are stored in the site compound, and that operators will be fully trained in the use of this equipment.
- The successful contractor will ensure that silt and sediment barriers are installed (and maintained in proper working order) at the perimeter of earthworks areas to limit transport of erodible soils to watercourses.
- Where soils are being excavated and removed from site, the successful contractor will ensure that dust generation will be avoided, by damping down material during excavation and loading onto trucks for off-site removal, if necessary.
- Safe materials handling of all potentially hazardous materials will be emphasised to all construction personnel employed during construction, including the usage of appropriate PPE.
- The successful contractor will prepare an Incident Response Plan (IRP) which outlines measures to be implemented to prevent and address spillages of hazardous substances.

10.6 Residual Impacts

Soils and Geology

Residual impacts to soil and geology include the permanent addition of backfill material (clean imported granular TII Specification for Road Works Series 600 Class 6 material) between the sheet pile wall and existing quay wall. Residual impacts will be *negative*, *non-significant* and *permanent* as a result of covering the soft silts in the mudflats.

10.7 References

IGSL (2014) Geotechnical Investigation Report, Main Drainage Scheme, New Ross, Co. Wexford, project no. 8863.

New Ross Bridge Reconstruction Trial Borings Drawings (dwg no. 4/6 and 4/5, 1960/61), W.J.L O'Connell ME Consulting Engineer.

GSI maps: www.gsi.ie/mapping, accessed 10/02/2022

GeoHive historical mapping: www.geohive.ie, accessed 10/02/2022

11. LANDSCAPE AND VISUAL

11.1 Introduction

This landscape and visual impact assessment has been prepared in respect of the proposed widening of O'Hanrahan Bridge in the centre of New Ross town, Co. Wexford. For more information on the proposed development, please refer to Section 3 and 4.

This section describes the townscape/visual context of the proposed development and assesses the likely impacts of the scheme on the receiving environment, in terms of both townscape character and visual amenity.

Landscape/townscape assessment relates to changes in the physical environment, brought about by a proposed development, which may alter its character. This requires a detailed analysis of the individual elements and characteristics of a landscape/townscape that go together to make up the overall character of that area. By understanding the aspects that contribute to this character it is possible to make judgements in relation to its quality (integrity) and to identify key sensitivities. This, in turn, provides a measure of the ability of the landscape / townscape in question to accommodate the type and scale of change associated with the proposed development, without causing unacceptable adverse changes to its character.

Visual Impact Assessment relates to changes in the composition of views as a result of changes to the landscape/townscape, how these are perceived and the effects on visual amenity. Such impacts are population-based, rather than resource-based, as in the case of landscape impacts.

11.1.1 Statement of Authority

This Landscape/Townscape and Visual Assessment report was prepared by Macro Works Ltd of Cherrywood Business Park, Loughlinstown, Dublin 18; a consultancy firm specialising in Landscape and Visual Assessment and associated maps and graphics. Relevant experience includes a vast range of infrastructural, industrial and commercial projects since 1999, including numerous residential mixed-used development projects.

11.2 Methodology

Preparation of this Landscape/Townscape and Visual Impact Assessment involved:

- A desktop study to establish an appropriate study area and relevant landscape and visual designations in the Wexford County Development Plan 2022-2028 and the New Ross & Environs Development Plan 2011-2017.
- Fieldwork undertaken in January 2022 to study the receiving environment.
- Assessment of the significance of the landscape impact of the proposed development as a function of landscape sensitivity weighed against the magnitude of the landscape impact.
- Assessment of the significance of the visual impact of the proposed development as a function of visual receptor sensitivity weighed against the magnitude of the visual impact.

This landscape and visual assessment uses methodology as prescribed in the Institute of Environmental Management and Assessment (IEMA) and landscape

Institute (UK) 'Guidelines for Landscape and Visual Impact Assessment' (GLVIA-2013).

Although this is principally a 'townscape' assessment, it utilises the same outline methodology as would be employed for the more familiar Landscape and Visual Impact Assessment (LVIA) of developments in rural settings. The justification for this approach is provided below.

It is important to note that the Guidelines for Landscape and Visual Impact Assessment' (GLVIA-2013) follow the European Landscape Convention (ELC) definition of landscape: *'Landscape is an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors' (Council of Europe, 2000)*. Thus, GLVIA-2013 covers all landscapes from *"high mountains and wild countryside to urban and fringe farmland (rural landscapes), marine and coastal landscapes (seascapes) and the landscapes of villages towns and cities (townscapes)"* - whether protected or degraded.

In the case of this project, the study area is peri-urban in nature, but with a marginally more dominant urban setting or 'townscape.' This is defined in GLVIA-2013 (Section 2.7) as:

> *"'Townscape' refers to areas where the built environment is dominant. Villages, towns and cities often make important contributions as elements in wider-open landscapes but townscape means the landscape within the built-up area, including the buildings, the relationships between them, the different types of urban spaces, including green spaces, and the relationship between buildings and open spaces. There are important relationships with historic dimensions of landscape and townscape, since evidence of the way the villages, towns and cities change and develop over time contributes to their current form and character."*

11.2.1 Landscape/townscape Impact Assessment Criteria

When assessing the potential impacts on the townscape resulting from a proposed development, the following criteria are considered:

- Landscape/townscape character, value and sensitivity.
- Magnitude of likely impacts.
- Significance of landscape effects.

The sensitivity of the townscape to change is the degree to which a particular setting can accommodate changes or new elements without unacceptable detrimental effects to its essential characteristics. Landscape/townscape Value and Sensitivity is classified using the following criteria set out in Table 11-1, which are derived from the Guidelines for Landscape and Visual Impact Assessment.

Table 11-1 Landscape/Townscape Value and Sensitivity

Sensitivity	Description
Very High	Areas where the townscape character exhibits a very low capacity for change in the form of development. Examples of which are high value townscapes, protected at an international or national level (e.g., World Heritage Site), where the principal management objectives are likely to be protection of the existing character.

Sensitivity	Description
High	Areas where the townscape character exhibits a low capacity for change in the form of development. Examples of which are high value townscapes, protected at a national or regional level, where the principal management objectives are likely to be considered conservation of the existing character.
Medium	Areas where the townscape character exhibits some capacity and scope for development. Examples of which are townscapes, which have a designation of protection at a county level or at non-designated local level where there is evidence of local value and use.
Low	Areas where the townscape character exhibits a higher capacity for change from development. Typically, this would include lower value, non-designated townscapes that may also have some elements or features of recognisable quality, where management objectives include, enhancement, repair and restoration.
Negligible	Areas of townscape character that include derelict sites and degradation where there would be a reasonable capacity to embrace change or the capacity to include the development proposals. Management objectives in such areas could be focused on change, creation of townscape improvements and/or restoration.

The magnitude of a predicted landscape/townscape impact is a product of the scale, extent or degree of change that is likely to be experienced as a result of the proposed development. The magnitude takes into account whether there is a direct physical impact resulting from the loss of landscape/townscape components and/or a change that extends beyond the immediate setting that may have an effect on the townscape character. Table 11-2 includes criteria for assessing the magnitude of landscape / townscape impacts, which are derived from the Guidelines for Landscape and Visual Impact Assessment.

Table 11-2 Magnitude of Landscape/Townscape Impacts

Sensitivity	Description
Very High	Change that would be large in extent and scale with the loss of critically important landscape elements and features, that may also involve the introduction of new uncharacteristic elements or features that contribute to an overall change of the townscape in terms of character, value and quality.
High	Change that would be more limited in extent and scale with the loss of important townscape elements and features, that may also involve the introduction of new uncharacteristic elements or features that contribute to an overall change of the townscape in terms of character, value and quality.
Medium	Changes that are modest in extent and scale involving the loss of landscape characteristics or elements that may also involve the introduction of new uncharacteristic elements or features that would lead to changes in landscape character, and quality.
Low	Changes affecting small areas of landscape character and quality, together with the loss of some less characteristic landscape elements or the addition of new features or elements.
Negligible	Changes affecting small or very restricted areas of landscape character. This may include the limited loss of some elements or the addition of some new features or elements that are characteristic of the existing landscape or are hardly perceivable.

Sensitivity	Description
Positive	Changes that restore a degraded landscape or reinforce characteristic landscape elements.

The significance of a landscape/townscape impact is based on a balance between the sensitivity of the landscape receptor and the magnitude of the impact. The significance of landscape impacts is arrived at using the following graph set out in Table 11-3.

Table 11-3 Impact Significance Graph

	Sensitivity of Receptor				
Scale/Magnitude	***Very High***	***High***	***Medium***	***Low***	***Negligible***
Very High	Profound	Profound-substantial	Substantial	Moderate	Minor
High	Profound-substantial	Substantial	Substantial-moderate	Moderate-slight	Slight-imperceptible
Medium	Substantial	Substantial-moderate	Moderate	Slight	Imperceptible
Low	Moderate	Moderate-slight	Slight	Slight-imperceptible	Imperceptible
Negligible	Slight	Slight-imperceptible	Imperceptible	Imperceptible	Imperceptible

Note: The significance matrix provides an indicative framework from which the significance of impact is derived. The significance judgement is ultimately determined by the assessor using professional judgement. Due to nuances within the constituent sensitivity and magnitude judgements, this may be up to one category higher or lower than indicated by the matrix. Judgements indicated in orange are considered to be 'significant impacts' in EIA terms.

11.2.2 Visual Impact Assessment Criteria

As with the landscape/townscape impact, the visual impact of the proposed development will be assessed as a function of sensitivity versus magnitude. In this instance the sensitivity of the visual receptor weighed against the magnitude of the visual effect.

Sensitivity of Visual Receptors

Unlike landscape sensitivity, the sensitivity of visual receptors has an anthropocentric (human) basis. It considers factors such as the perceived quality and values associated with the view, the landscape/townscape context of the viewer, the likely activity they are engaged in and whether this heightens their awareness of the surrounding landscape. A list of the factors considered by the assessor in estimating the level of sensitivity for a particular visual receptor is outlined below to establish visual receptor sensitivity at each viewpoint.

Susceptibility of Receptors

In accordance with the Institute of Environmental Management and Assessment ("IEMA") Guidelines for Landscape and Visual Assessment (3rd edition 2013) visual receptors most susceptible to changes in views and visual amenity are:

- *"Residents at home;*

- *People, whether residents or visitors, who are engaged in outdoor recreation, including use of public rights of way, whose attention or interest is likely to be focussed on the landscape and on particular views;*
- *Visitors to heritage assets, or to other attractions, where views of the surroundings are an important contributor to the experience;*
- *Communities where views contribute to the landscape setting enjoyed by residents in the area;*
- *Travellers on road rail or other transport routes where such travel involves recognised scenic routes and awareness of views is likely to be heightened".*

Visual receptors that are less susceptible to changes in views and visual amenity include;

- *"People engaged in outdoor sport or recreation, which does not involve or depend upon appreciation of views of the landscape;*
- *People at their place of work whose attention may be focussed on their work or activity, not their surroundings and where the setting is not important to the quality of working life".*

Values Associated with Views

Recognised scenic value of the view: (County Development Plan designations, guidebooks, touring maps, postcards etc). These represent a consensus in terms of which scenic views and routes within an area are strongly valued by the population because in the case of County Developments Plans, for example, a public consultation process is required;

Views from within highly sensitive townscape areas: These are likely to be in the form of Architectural Conservation Areas, which are incorporated within the Development Plan and therefore subject to the public consultation process. Viewers within such areas are likely to be highly attuned to the townscape around them.

Primary views from residential receptors: Even within a dynamic city context, views from residential properties are an important consideration in respect of residential amenity.

Intensity of use, popularity: This relates to the number of viewers likely to experience a view on a regular basis and whether this is significant at a national or regional scale.

Viewer connection with the townscape: This considers whether or not receptors are likely to be highly attuned to views of the townscape i.e. commuters hurriedly driving on busy roads versus tourists focussed on the character and detail of the townscape.

Provision of vast, elevated panoramic views: This relates to the extent of the view on offer and the tendency for receptors to become more attuned to the surrounding landscape at locations that afford broad vistas.

Sense of remoteness and/or tranquillity: Receptors taking in a remote and tranquil scene, which is likely to be fairly static, are likely to be more receptive to changes in the view than those taking in the view of a busy street scene, for example.

Degree of perceived naturalness: Where a view is valued for the sense of naturalness of the surrounding landscape it is likely to be highly sensitive to visual intrusion by distinctly manmade features.

Presence of striking or noteworthy features: A view might be strongly valued because it contains a distinctive and memorable landscape / townscape feature such as a cathedral or castle.

Historical, cultural and / or spiritual significance: Such attributes may be evident or sensed by receptors at certain viewing locations, which may attract visitors for the purposes of contemplation or reflection heightening the sense of their surroundings.

Rarity or uniqueness of the view: This might include the noteworthy representativeness of a certain townscape type and considers whether the receptor could take in similar views anywhere in the broader region or the country.

Integrity of the townscape character: This looks at the condition and intactness of the townscape in view and whether the townscape pattern is a regular one of few strongly related components or an irregular one containing a variety of disparate components.

Sense of place: This considers whether there is special sense of wholeness and harmony at the viewing location.

Sense of awe: This considers whether the view inspires an overwhelming sense of scale or the power of nature.

Those locations which are deemed to satisfy many of the above criteria are likely to be of higher sensitivity. No relative importance is inferred by the order of listing. Overall sensitivity may be a result of a number of these factors or, alternatively, a strong association with one or two in particular.

Visual Impact Magnitude

The visual impact magnitude relates to the scale and nature of the visual change brought about by the proposal and this is reflected in the criteria contained in Table 11-4 below.

Table 11-4 Magnitude of Visual Impacts

Criteria	Description
Very High	The proposal alters a large proportion or critical part of the available vista and is without question the most distinctive element. A high degree of visual clutter or disharmony is also generated, strongly reducing the visual amenity of the scene.
High	The proposal alters a significant proportion or important part of the available vista and is one of the most noticeable elements. A considerable degree of visual clutter or disharmony is also likely to be generated, appreciably reducing the visual amenity of the scene.
Medium	The proposal represents a moderate alteration to the available vista, is a readily noticeable element and/or it may generate a degree of visual clutter or disharmony, thereby reducing the visual amenity of the scene.
Low	The proposal alters the available vista to a minor extent and may not be noticed by a casual observer and/or the proposal would not have a marked effect on the visual amenity of the scene.
Negligible	The proposal would be barely discernible within the available vista and/or it would not detract from, and may even enhance, the visual amenity of the scene.
Positive	Changes that enhance the available vista by reducing visual clutter or restoring degraded features.

Visual Impact Significance

As stated above, the significance of visual impacts is a function of visual receptor sensitivity and visual impact magnitude. This relationship is expressed in the same

significance matrix and applies the same EPA definitions of significance as used earlier in respect of townscape impacts (Table 11-3 refers).

11.2.3 Quality of Effects

In addition to assessing the significance of landscape/townscape effects and visual effects, 2022 EPA Guidance for EIAs requires that the quality of the effects is also determined. This could be negative/adverse, neutral, or positive/beneficial.

Whereas the introduction of new built elements into countryside areas more often results in negative landscape and visual effects, in urban and peri-urban settings, development proposals are often replacing one built feature with another or developing 'brownfield' sites with specific zoning objectives. The consequence for the townscape character and visual amenity is often beneficial, or may be a combination of positive effects and negative effects for different receptors. In the context of this assessment, the judgment of the quality of the effects is made in combination with the significance judgement for both landscape/townscape impacts and visual impacts e.g., Moderate / Positive or Moderate / Negative.

11.2.4 Extent of Study Area

Due to the minor scale and nature of the proposed works, it is anticipated that the proposed development is not likely to give rise to significant landscape/townscape or visual impacts beyond approximately 100m. However, out of an abundance of caution, a 300m-radius study area is used in this instance, as measured from the centre of O'Hanrahan Bridge (refer to Plate 11-1, below).

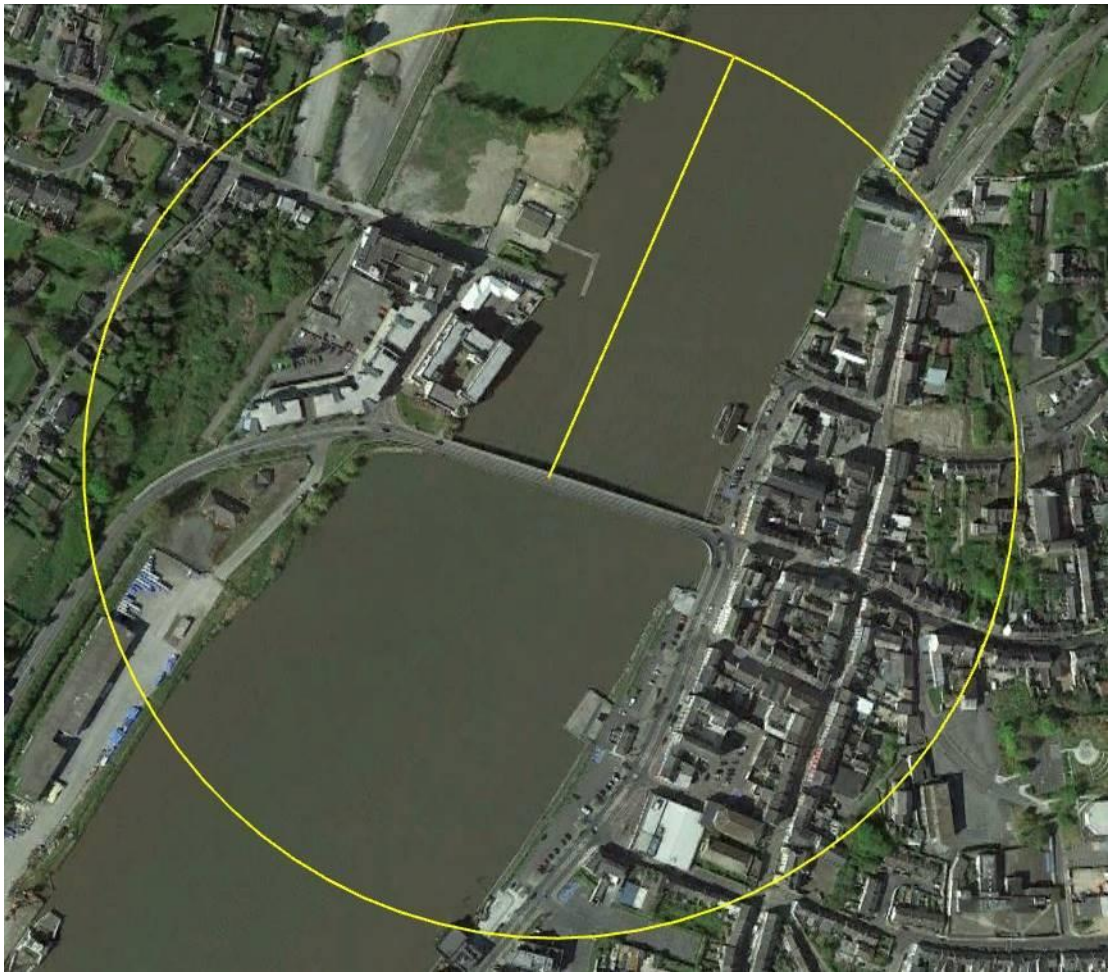


Plate 11-1 300m study area, as measured from the centre of O'Hanrahan Bridge

11.3 Baseline Environment

11.3.1 Receiving Environment

New Ross is a town of approx. 8,000 residents, making it one of the largest towns in Co. Wexford. The town dates back to the 6th Century and is strategically located along a wide and navigable lower section of the River Barrow, allowing ease of access to the Celtic Sea and beyond. It is located on the western periphery of Co. Wexford, with the Co. Kilkenny border aligning the western flanks of the town. While the centre of River Barrow mostly separates the two Counties, the Wexford County boundary extends westwards across the river at New Ross, to incorporate a small section of land (Co. Kilkenny remains outside the study area), refer to Plate 11-2, below. However, it is worth noting that the study area is a highly modified, utilitarian and anthropomorphic landscape that, like most urban centres, is and will continue to be in a regular state of evolution and change.

Plate 11-2 Google Earth capture showing the County boundary split between Kilkenny and Wexford at New Ross.

New Ross has deep, settled roots for over 1000 years, but came to prominence when the Anglo-Normans conquered the region in the 12th Century. Like many other settlements across the southeast of Ireland, the Normans left an indelible imprint upon the history, culture and evolution of the town, particularly in terms of growth and strength of trade and migration; for example, it was Ireland's busiest port up until the 14th Century. New Ross is often cited as being "Ireland's only inland port," located

32km from the sea, and as well as having a working port it also has a small marina approx. 600m south of the bridge. The town started to flourish after the building of the first bridge (across the Barrow) at New Ross in the late 12th Century, located approx. 100m north of the current/O'Hanrahan Bridge. It was this original bridge from which the town gets its name (i.e., the town of the new bridge) and was then granted a Royal Charter in 1207. In that regard, a bridge crossing over the river at the town centre has served as, and remains, a pivotal part of the town's identity, economy and evolution to this day.

Plate 11-3 New Ross's town centre, as seen from the western bank of the Barrow

O'Hanrahan Bridge is the only bridge across the River Barrow at New Ross and carries the single carriageway R723 Regional Road (see Plate 11-4, below). However, prior to the opening in January 2020 of the New Ross Bypass, the N25 previously travelled over O'Hanrahan Bridge, as the main link between County Wexford and County Waterford, as well as southern County Kilkenny, and a key, congested, link between the Rosslare-Cork City link.

Plate 11-4 **O'Hanrahan Bridge, looking eastwards.**

Plate 11-5 **View towards apartment complex on the western bank of the River Barrow, when viewed from north quay of New Ross town centre**

Plate 11-6 View of the southern side of O'Hanrahan Bridge, when viewed from the western bank of the Barrow

In terms of landform within the study area, terrain lifts from less than 5m Above Ordinance Datum (AOD) at the river, to over 50m AOD on the eastern side of the river, and over 30m AOD on the western side. The River Barrow system, which is the dominant drainage pattern within the town, has its source in the Slieve Bloom Mountains in Co. Laois and eventually enters the sea along the border of Co. Waterford and Co. Wexford.

Within the town centre, land use mainly consists of commercial and residential use. There is an assortment of historic buildings and structures within the town centre, as well as more recent buildings on its periphery. As a general principle, the eastern bank of the river is rich with recreational spaces and tourism sites and commercial/retail properties, while the western bank of the river is more characterised by residential and industrial properties.

Plate 11-7 View of "The Quay" south of the bridge along the eastern bank

South of the bridge along the eastern bank is "the quay," a waterside recreational space (see Plate 11-7, above), replete with pathway, benches, lighting and street trees. Within 50m south of the bridge along the Quay is a statue and memorial wall/sculpture in memory of former US President, John F. Kennedy, as the original Kennedy ancestral home is located approx. 8km south of the town and that family have long and celebrated ties with the town. In terms of major tourist attractions for the town, the Quay is also home to the Ros Tapestry Exhibition Centre. This is a series of 15 embroidered Tapestry panels depicting Celtic Ireland. In addition, the Dunbrody replica famine ship is moored on the Quay, and open to the public.

11.3.2 Planning Policy Context

Wexford County Development Plan 2022-2028

A Landscape Character Assessment has been prepared for County Wexford and this is incorporated into the current Wexford County Development Plan 2022-2028. Within the current County Development Plan (CDP) the council notes that it is *"As both a National Landscape Character Assessment and Guidelines for Planning Authorities on the preparation of Landscape Character Assessments are pending it was decided that it was prudent to wait until those documents emerge to carry-out a full review of the LCA"*. In the CDP, the landscape of County Wexford is divided into four different landscape units: Uplands, Lowlands, River Valleys and Coastal. The proposed site is located in the 'River Valley' Landscape Character, being within the 'Barrow/Suir River Valley'.

In section 3.2 of the landscape Character Assessment 'Landscape Sensitivity' it states:

> *"River Valley Landscapes are classed as having a Moderate to High sensitivity …. In Moderate and High Sensitivity areas development has the potential to have significant individual or cumulative impacts. Applications for development in these areas must demonstrate an awareness of these inherent limitations by having a very high standard of site selection, siting layout, selection of materials and finishes. Development in these areas which is likely to have an individual or cumulative visual impact on the landscape will only be permitted where the applicant has demonstrated an overriding need for the development, including transport and energy infrastructure, in the proposed location (refer rural housing section where such applications relates to rural housing."*

In section 5.0 Scenic routes & protected views, it states:

> *"A Development Plan must contain objectives for 'the preservation of views and prospects'. This plan does not designate specific routes but notes that scenic routes may fall into a number of categories:*
>
> *•Routes through Uplands, Coastal, River Valleys and Distinctive Landscapes*
>
> *•Trails such as the Eurovelo, Norman Way, Greenways and Wexford Walking Trails. Sightseeing visitors are more likely to be concentrated along these routes.*
>
> *Other scenic views include might include:*
>
> *•views to the sea and views towards land for from the sea and rivers in locations*
>
> *•views from landmark structures such a bridges and urban settlements*
>
> *•Planned views and vistas such as those associated with planned settlement and heritage properties and gardens."*

The following Objectives are considered relevant;

- **L07** - To encourage appropriate development which would enhance an existing degraded landscape and/or which would enhance views to or from an Upland, River Valley, Coastal or Distinctive Landscape Character Unit from public viewpoints.
- **L10** - To protect planned views and vistas, such as those that might be associated with planned settlements, heritage properties and monuments and ensure that that new development does not detract from such views as may be identified within towns, formal settings and designated landscapes. In evaluating planning applications for development in the foreground of such views and vistas, consideration shall be given to the effect such development may have on the view or prospect.
- **L15** - To require Landscape and Visual Impact Assessment Reports to be submitted for developments which may have a significant negative impact on the landscape.

New Ross Town and Environs Development Plan 2011-2017 (as extended)

Chapter 11 of this Plan pertains to 'Conservation and Heritage.' Within Section 11.8.1, 'landscape' is addressed within the framework of 'Urban Landscape.'

Landscape

It is the **policy** of the Councils:

L01	Seek to enhance the landscape character, quality and distinctiveness of New Ross and ensure that new development will contribute to scenic vistas.
L02	Recognise landscape as an essential component of people's surroundings, an expression of the diversity of their shared cultural and natural heritage, and as a foundation of their identity.
L03	Raise awareness of the values of landscapes and actively involve the public in all policy decisions affecting the landscape.
L04	Require a landscape-centred approach to new development with good spatial layout, high quality landscape design and green infrastructure linkages.
L05	Identify and protect historic landscapes.

Landscape

It is the **objective** of the Councils:

L01	Implement the impending National Landscape Strategy and any Ministerial Guidelines concerning the protection, management and planning of the landscape.
L02	Require that any necessary assessments, including visual impact assessments, are made when undertaking, authorising or approving applications for significant development.

In addition, the New Ross ACA (Architectural Conservation Area), which is on the eastern bank of the River Barrow, extends to approx. 20m east of the proposed development site. However, it is important to note that neither the O'Hanrahan bridge, nor the quay, are within the ACA.

Chapter 11.9 of the Plan pertains to 'Protected Views,' and is as follows:

11.9 Protected Views

Due to the topography of the town there are certain aspects and views which contribute to its unique character. From the Rosbercon side of the town the Church Spires and Quayfront to the east of the river provide important views. There are also views towards Rosbercon Castle to the west of the river. It is important that, as the town is developed, certain views and vistas are protected and enhanced where possible. New development should not negatively impinge upon the views or character, in particular the riverscape, quayfront and the general architectural heritage of the town.

Protected Views

It is the **policy** of the Councils:
PV01 To ensure that important views and vistas are protected and enhanced where possible.

National Parks & Wildlife Service (NPWS)

According to the NPWS, within the study area there are two NPWS designations, in which the site is also located:

- River Barrow and River Nore SAC.
- Proposed Natural Heritage Area: Barrow River Estuary.

Whilst the above designations predominantly relate to habitat conservation, they also indicate landscape areas which are valued for naturalistic character.

11.4 Potential Landscape Impacts

11.4.1 Landscape/townscape value and sensitivity of the study area

In accordance with Section 5.5 of the GLVIA-2013, a townscape character assessment requires a particular understanding of, among other criteria, *"the context or setting of the urban area and its relationship to the wider landscape."*

In a town that has been settled for well over 1,000 years, New Ross's townscape is a warren of medieval street patterns along its west facing slopes, containing multiple heritage buildings and structures, as well as an ACA, while its western bank is somewhat less historic and distinguished. Land uses in the study area vary between an assortment of historic buildings and structures, as well as more recent buildings on its periphery. As a general principle, the eastern bank of the river is rich with recreational spaces and tourism sites and commercial/retail properties, while the western bank of the river is more characterised by residential and industrial properties. While townscape values are likely to be, overall, more utilitarian than scenic or amenity based, the rich river valley setting is the key facet driving the evolution of the town, as it has done for over 1,000 years.

The bridge itself is a 9-span post-tensioned concrete beam and reinforced concrete slab bridge that is understood to have been constructed in 1967. In that regard, the bridge itself holds no landscape, visual, heritage or architectural value, but the banks to which it connects do, while the grand river flows over (and is constructed within), holds considerable landscape and visual merit. It should be noted, however, that the New Ross ACA does not extend to the bridge, nor the quay.

As previously covered in Section 11.3, the site itself is a highly modified, utilitarian and anthropomorphic landscape whose integrity and landscape condition has been considerably degraded this century.

In summary, the study area is considered to have a **Medium** landscape sensitivity.

11.4.2 Construction Stage

The works will consist of the widening and upgrade of the main bridge itself, and the construction of the southeast quay wall. Due to the length of the bridge, and the need to keep traffic open with at least one lane open at all times, it is likely that the work will consist of at least four phases on the bridge itself and a possible fifth phase for the new quay wall. The proposed works will be undertaken on a live carriageway and will necessitate the use of lane closures and potential night works to complete the construction.

There will be permanent, but modest, physical effects to the physical fabric of the site, which are not readily reversible. However, during the construction stage of the proposed development, which is estimated to take 9 months, there will be intense construction-related activity within and around the site, including approach roads. This will include, but is not limited to:

- HGVs transporting materials to and from the site.
- Movement of heavy earth-moving machinery and tower cranes on-site.
- Temporary storage of excavated materials and construction materials on-site.
- Demolition of existing parapet and south east segment of quay/wing wall.
- Security hoarding and site lighting.

Whilst the physical impacts to the bridge will be permanent, and not readily reversible, the site is already a much-modified, anthropomorphic site. Construction stage impacts on landscape/townscape character will be 'temporary' (i.e., lasting less than 1 year), in accordance with the EPA definitions of impact duration.

On the basis of the reasons outlined above, the magnitude of construction stage landscape/townscape impacts is deemed to be **Medium-Low**.

When sensitivity and magnitude judgements are combined in accordance with the criteria contained in Section 11.2, it results in a **Slight** significance of townscape impact at construction stage for the site, and the wider study area.

11.4.3 Operational Stage

Following the completion of the proposed works, landscape/townscape impacts will relate entirely to the development's impact on the character of the receiving landscape/townscape and whether this is positive or negative.

The primary function of the proposed development is to provide a shared pedestrian and cycleway from the New Ross quay front to Rosbercon Quay on the north-western side of the bridge, that is accommodated along the widened section of O'Hanrahan Bridge. As both walkers and runners are routinely, if not consistently, using/crossing the bridge at present, the associated townscape use or character will remain unaltered. In addition, the widening of a 10.6m-wide, heavily frequented, 175m-long, 1960s' concrete slab bridge by a further 1 metre (and using comparable materials, finishes and heights), in a heavily built-up urban town core that is continually evolving, is likely to have a negligible impact upon the character of the receiving landscape/townscape, whilst facilitating an upgrade to the appearance of the bridge and improved functionality. The scheme also requires the construction of a c.20m long section of a new sheet pile flood defence wall up to 2m in front of an existing quay wall on the south-east corner of the bridge, which will also likely have a negligible impact upon the character of the receiving landscape/townscape.

The magnitude of operational stage landscape/townscape impacts is deemed to be **Negligible** within the context of the site and the study area.

When sensitivity and magnitude judgements are combined in accordance with the criteria contained in Section 11.2, it results in an **Imperceptible/positive** significance and quality of townscape impact at operational stage for the site and the wider study area.

11.5 Potential Visual Impacts

11.5.1 Visual Receptor Sensitivity

In this instance, the two selected viewpoints are located within close proximity to each other and the site. Consequently, the receptors being represented, and their associated viewing scenarios are similar for both of them and are deemed to be of **Medium** visual sensitivity as they consist of strongly anthropogenic urban scenes, but involving the iconic corridor of the River Barrow. There are other viewpoints that afford views across O'Hanrahan Bridge, including from its western side, but none are considered to be more sensitive than the representative views selected from the town-side of the bridge. Furthermore, two viewpoints are considered sufficient to gain an understanding of the scale and nature of the visual effects from the proposed O'Hanrahan Bridge widening and for a robust visual impact assessment.

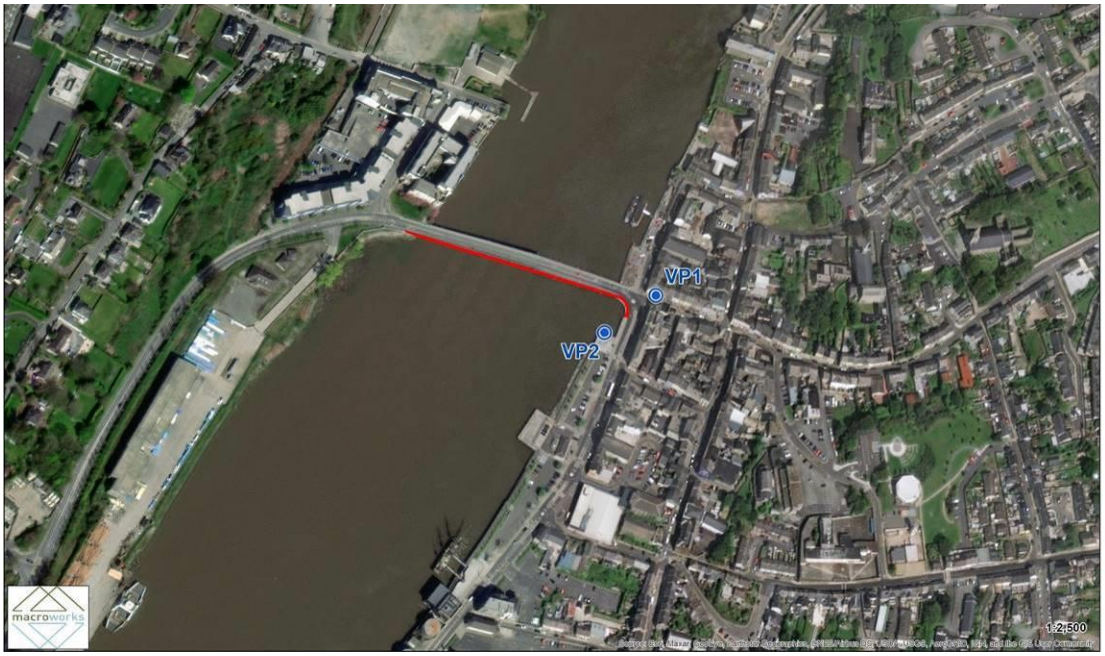


Plate 11-8 Viewpoint Location Map

11.5.2 Magnitude of Construction Stage Visual effects

The scale and nature of construction stage works is described in section 11.4.2 in the context of landscape effects. These temporary construction works are likely to impart similar visual impacts relating to clutter, complexity and movement of vehicles and workers. Consequently, construction stage visual impacts are also deemed to be of Slight significance and of a negative quality.

11.5.3 Magnitude of Operational Stage Visual Effects

The assessment of visual impacts presented in Table 11-5 and Table 11-6 below at both of the selected viewpoints is aided by photomontages of the proposed development (see Appendix F). Photomontages are a 'photo-real' depiction of the

scheme within the view, utilising a rendered three-dimensional model of the development, which has been geo-referenced to allow accurate placement and scale. For each viewpoint, the following images have been produced:

(i) Existing View.

(ii) Montage View.

Table 11-5 VP1 Visual Assessment

Viewshed Reference Point		**Direction of View**
VP1	R700/Quay Street, see Plate 11-8	West
 Existing view from VP1 – also see Appendix F Photomontages		
Representative of:	• Major route • Local community views • Heritage & amenity feature	
Receptor Sensitivity	**Medium**	
Existing View	The context of this setting is that of the narrow, busy Quay Street (i.e., the R700), very close to its junction with the R723/the Quay, near the eastern end of O'Hanrahan Bridge. This location is also near the western edge of the aforementioned New Ross ACA. Quay Street is heavily used for retail, and this view is representative of those travelled west along this road. In this scene, the arterial foreground is marked by a small, tight roundabout, with the Quay visible to the south/left and O'Hanrahan Bridge to the west (i.e., straight ahead). Although almost no facet of the river itself can be seen in this view, it is strongly inferred through the typology of the bridge, the pier walls and the parapet. Between these three built elements, along with the accompany lighting across the bridge, it is a development that infers a mid- 20th Century, muscular arterial aesthetic.	
Visual Impact	Following the 1m widening of the bridge, the parapet will appear less 'dense' and more transparent, allowing for segments of visual amenity on the river banks beyond. The increase in height of both the parapet and the 20m section of pier/wing wall to the southeast of the bridge, which will also be extended outwards by up to 2m, will have no material bearing upon the visual amenity of the scene. Overall, the proposal is likely to marginally enhance the visual amenity of the scene. By upgrading the width and typology of the bridge, it will be a fitting and supportive addition to this well-regarded, town centre context. As a result of these factors, the magnitude of visual impact is deemed to be **Negligible,** with the quality of the impact being **Positive**.	
Summary	Based on the assessment criteria and matrices outlined at **Section 11.2** the significance of residual visual impact is summarised below.	

Viewshed Reference Point				Direction of View
VP1	R700/Quay Street, see Plate 11-8			West
	Visual Receptor Sensitivity	Visual Impact Magnitude	**Significance / Quality of Visual Impact**	
Impact Significance	Medium	Negligible/positive	**Imperceptible/positive**	

Table 11-6 VP2 Visual Assessment

Viewshed Reference Point		Direction of View
VP2	The Quay/R723	West
 Existing view from VP2 – also see Appendix F Photomontages		
Representative of:	• Major route • Local community views • Heritage & amenity feature	
Receptor Sensitivity	**Medium**	
Existing View	The context of this setting is that of the walkway and recreational space along the Quay, south of O'Hanrahan Bridge, which extends from this location approx. 260m south to the Dunbrody replica ship. This location is very close to the aforementioned John F. Kennedy memorial statue, with a large decorative, memorial wall separating this scene from the statue. In this scene, the sizeable stretch of O'Hanrahan Bridge is evident across the 175m width of the Barrow. It's concrete spans and blue parapet and lighting are apparent, as the bridge reads as a mid- 20th Century, muscular arterial aesthetic. On the western (i.e., far) bank, the scale of relatively multi-storey apartment complex development is evident above the bridge, while what is visible of the town centre at the eastern end of the bridge is not one of strong aesthetic or architectural merit, in comparison to some other locations within the town centre. The main source of visual amenity in this scene is the river itself.	
Visual Impact	Following the 1m widening of the bridge, the likely visibility of the river will remain unchanged/unaffected. The increase in height of both the parapet, the extension of a 20m section of pier/wing wall to the southeast of the bridge by up to 2m outwards, and the extensions of an approx. 60m section of the pier/wing wall to the southwest of the bridge by approx. 1m is likely to marginally enhance the visual amenity of the scene. By upgrading the typology of the bridge, as well as the render of the south-facing pier/wing wall, it will be a fitting and compatible addition to this renowned quay side. As a result of these factors, the magnitude of visual impact is deemed to be **Negligible,** with the quality of the impact being **Positive**.	
Summary	Based on the assessment criteria and matrices outlined at **Section 11.2** the	

Viewshed Reference Point				Direction of View
VP2	The Quay/R723			West
	significance of residual visual impact is summarised below.			
	Visual Receptor Sensitivity	Visual Impact Magnitude	**Significance / Quality of Visual Impact**	
Impact Significance	Medium	Negligible/positive	**Imperceptible/positive**	

Other Views

The views from the western end of the bridge will be very similar in nature (but reversed), for receptors which include apartments blocks fronting the river and also setback from it on the northern side of the road (see Plate 11-9 below) as well as a pocket park on the southern side of the road (see Plate 11-6 above).

Plate 11-9 View of Apartment blocks near western approach to the bridge (source Streetview)

The view from the apartment block will be most similar to VP1 because they are aligned with the bridge and slightly elevated. Furthermore, the main extension works to the bridge will occur on the opposite side to the apartment receptors in the same manner as for VP1. For these reasons, the visual impact is also deemed to be same – Imperceptible / Positive.

The view from the pocket park on the southern side of the road will be similar in nature to VP2 as it is at bridge level and slightly oblique to the bridge alignment. It will also be afforded views of the new wing wall and parapet as occurs from VP2 at the other end of the bridge. Whilst there will be some temporary negative visual impacts from the view of construction works, once completed the widened approach to the bridge from the pocket park is considered to be a minor improvement. For these reasons, the visual impact is deemed to be – Imperceptible / Positive.

11.6 Mitigation Measures

11.6.1 Construction Stage

No specific landscape and visual mitigation measures are deemed necessary for the temporary construction stage works because these will be minor and short-lived.

11.6.2 Operational Stage

Mitigation measures are "embedded" into the scale, setting, design, tone, material and finish of the proposed development, in order to avoid any adverse landscape or visual impact. Thus, no specific mitigation measures are required, in this instance.

11.7 Residual Impacts

As there are no specific landscape or visual mitigation measure required and because mitigation is inherent in the design of the proposed bridge extension that has been assessed, residual impacts can be deemed the same as predicted impacts in this instance (see Sections 11.4 and 11.5).

11.8 Overall Significance of Impact

Overall, it is considered that the proposed development is an appropriate contribution to both the built fabric of this urban area and it will not result in any significant townscape or visual impacts.

12. AIR QUALITY AND CLIMATE

12.1 Introduction

This section of the Planning Report assesses the potential air quality and climate impacts associated with the proposed development in New Ross, in Co. Wexford. The proposed development primarily comprises the widening of O'Hanrahan Bridge deck by approx. 1m and widening the abutment/wingwalls at their interface with the existing quay wall on the south-east and south west corner of the bridge to accommodate the on-street footpath. Full description of the proposed development is provided in Sections 3 and 4 of the Planning Report.

12.2 Methodology

12.2.1 Criteria for Rating of Impacts

12.2.1.1 Air Quality

In order to reduce the risk to health from poor air quality, National and European statutory bodies have set limit values in ambient air for a range of air pollutants. These limit values or "Air Quality Standards" are health or environmental-based levels for which additional factors may be considered. For example, natural background levels, environmental conditions and socio-economic factors may all play a part in the limit value which is set. Air quality significance criteria are assessed on the basis of compliance with the appropriate standards or limit values. The applicable standards in Ireland include the Air Quality Standards Regulations 2022 (S.I. No. 739/2022), which incorporate EU Directive 2008/50/EC, which has set limit values for a number of pollutants. The limit values in relation to Nitrogen Dioxide (NO_2) and Particulate Matter (PM_{10} and $PM_{2.5}$) are applicable to the proposed development (see Table 12-1 and Appendix 12.1).

With regards to larger dust particles that can give rise to nuisance dust, there are no statutory guidelines regarding the maximum dust deposition levels that may be generated during the construction phase of a development in Ireland. Furthermore, no specific criteria have been stipulated for nuisance dust in respect of this development.

With regard to dust deposition, the German TA-Luft standard for dust deposition (non-hazardous dust) (German VDI, 2002) sets a maximum permissible emission level for dust deposition of 350 mg/m^2/day averaged over a one year period at any receptors outside the site boundary. Recommendations from the Department of the Environment, Heritage & Local Government (DEHLG, 2004) apply the Bergerhoff limit value of 350 mg/m^2/day to the site boundary of quarries. This limit value can also be implemented with regard to potential dust impacts from construction of the proposed development.

Table 12-1 Ambient Air Quality Standards 2011 & Dust Deposition Limits

Pollutant	Regulation	Limit Type	Value
Nitrogen Dioxide (NO_2)	S.I.No. 739/2022	Hourly limit for protection of human health - not to be exceeded more than 18 times/year	200 µg/m^3
		Annual limit for protection of human health	40 µg/m^3
Nitrogen Oxide (NO_X)	S.I.No. 739/2022	Critical level for protection of vegetation	30 µg/m^3 $NO + NO_2$

Pollutant	Regulation	Limit Type	Value
Particulate Matter (as PM_{10})	S.I.No. 739/2022	24-hour limit for protection of human health - not to be exceeded more than 35 times/year	50 µg/m^3
		Annual limit for protection of human health	40 µg/m^3
Particulate Matter (as $PM_{2.5}$)	S.I.No. 739/2022	Annual limit for protection of human health	25 µg/m^3
Dust Deposition	TA Luft (German VDI 2002)	Annual average limit for nuisance dust deposition at site boundary	350 mg/m^2/day

12.2.1.2 Climate

In 2015, the Climate Action and Low Carbon Development Act 2015 (No. 46 of 2015) (Government of Ireland, 2015) was enacted (the Act). The purpose of the Act was to enable Ireland 'to pursue, and achieve, the transition to a low carbon, climate resilient and environmentally sustainable economy by the end of the year 2050' (3.(1) of No. 46 of 2015). This is referred to in the Act as the 'national transition objective'. The Act made provision for a national mitigation plan, and a national adaptation framework. In addition, the Act provided for the establishment of the Climate Change Advisory Council with the function to advise and make recommendations on the preparation of the national mitigation and adaptation plans and compliance with existing climate obligations.

The first Climate Action Plan (CAP) was published by the Irish Government in June 2019 (Government of Ireland, 2019). The Climate Action Plan 2019 outlined the current status across key sectors including Electricity, Transport, Built Environment, Industry and Agriculture and outlined the various broadscale measures required for each sector to achieve ambitious decarbonisation targets. The 2019 CAP also detailed the required governance arrangements for implementation including carbon-proofing of policies, establishment of carbon budgets, a strengthened Climate Change Advisory Council and greater accountability to the Oireachtas. The Government published the second Climate Action Plan in November 2021 (Government of Ireland, 2021a) and a third update in December 2022 (Government of Ireland, 2022).

Following on from Ireland declaring a climate and biodiversity emergency in May 2019, and the European Parliament approving a resolution declaring a climate and environment emergency in Europe in November 2019, the Government approved the publication of the General Scheme in December 2019, followed by the publication of the Climate Action and Low Carbon Development (Amendment) Bill 2021 (hereafter referred to as the 2021 Climate Bill) in March 2021. The Climate Act was signed into Law on the 23rd July 2021, giving statutory effect to the core objectives stated within the CAP.

The purpose of the 2021 Climate Act (Government of Ireland, 2021b), is to provide for the approval of plans *"for the purpose of pursuing the transition to a climate resilient, biodiversity rich and climate neutral economy by no later than the end of the year 2050"*. The 2021 Climate Act will also *"provide for carbon budgets and a decarbonisation target range for certain sectors of the economy"*. The 2021 Climate Act defines the carbon budget as *"the total amount of greenhouse gas emissions that are permitted during the budget period"*.

In relation to carbon budgets, the 2021 Climate Action and Low Carbon Development (Amendment) Act states "*A carbon budget, consistent with furthering the achievement of the national climate objective, shall be proposed by the Climate Change Advisory Council, finalised by the Minister and approved by the Government for the period of 5 years commencing on the 1 January 2021 and ending on 31 December 2025 and for each subsequent period of 5 years (in this Act referred to as a 'budget period')*". The carbon budget is to be produced for 3 sequential budget periods, as shown in Table 12-2. The carbon budget can be revised where new obligations are imposed under the law of the European Union or international agreements or where there are significant developments in scientific knowledge in relation to climate change. In relation to the sectoral emissions ceiling, the Minister for the Environment, Climate and Communications (the Minister for the Environment) shall prepare and submit to government the maximum amount of GHG emissions that are permitted in different sectors of the economy during a budget period and different ceilings may apply to different sectors. The sectorial emission ceilings for 2030 were published in July 2022 and are shown in Table 12-2. Transport has a 50% reduction requirement between 2018 and 2030.

Table 12-2 5-Year Carbon Budgets 2021-2025, 2026-2030 and 2031-2025

Sector	Reduction Required	2018 Emissions ($MtCO_2eq$)
2021-2025	295 Mt CO_2eq	Reduction in emissions of 4.8% per annum for the first budget period.
2026-2030	200 Mt CO_2eq	Reduction in emissions of 8.3% per annum for the second budget period.
2031-2035	151 Mt CO_2eq	Reduction in emissions of 3.5% per annum for the third provisional budget.

Table 12-3 Sectoral Emission Ceilings 2030

Sector	Reduction Required	2018 Emissions ($MtCO_2eq$)	2030 Emission Ceiling ($MtCO_2eq$)
Electricity	75%	10.5	3
Transport	50%	12	6
Buildings (Commercial and Public)	45%	2	1
Buildings (Residential)	40%	7	4
Industry	35%	7	4
Agriculture	25%	23	17.25
Other (F-Gases, Waste & Petroleum refining)	50%	2	1

In December 2022, CAP23 was published (Government of Ireland 2022). This is the first CAP since the publication of the carbon budgets and sectoral emissions ceilings, and it aims to implement the required changes to achieve a 51% reduction in carbon emissions by 2030. The CAP has six vital high impact sectors where the biggest savings can be made: renewable energy, energy efficiency of buildings, transport, sustainable farming, sustainable business and change of land-use. CAP23 states that the decarbonisation of Irelands manufacturing industry is key for Ireland's economy and future competitiveness. There is a target to reduce the embodied carbon in construction materials by 10% for materials produced and used in Ireland

by 2025 and by at least 30% for materials produced and used in Ireland by 2030. CAP23 states that these reductions can be brought about by product substitution for construction materials and reduction of clinker content in cement. Cement and other high embodied carbon construction elements can be reduced by the adoption of the methods set out in the Construction Industry Federation 2021 report Modern Methods of Construction. In order to ensure economic growth can continue alongside a reduction in emissions, the IDA Ireland will also seek to attract businesses to invest in decarbonisation technologies.

The Wexford City Council Climate Change Adaptation Strategy (2019 - 2024) published in 2019 (Wexford County Council 2019) aims to allow Wexford County Council to plan for climate related severe weather events and to make the Council and its communities more sustainable and climate resilient going forward.

Chapter 2 of the Wexford County Development Plan (2022-2028) deals with Climate Action (Wexford County Council 2021). The plan notes that as a Planning Authority, Wexford County Council can ensure that spatial planning, through strategies and objectives in development plans and local area plans, address mitigation and adaptation to climate change which are the two terms usually used to explain climate change. Objective CA01 aims to ensure that the spatial planning of County Wexford provides for a county that is resilient to climate change. It also aims to enable the decarbonisation of the county's economy and reduces the county's carbon footprint. Objective CA10 aims for the implementation of future transportation strategies in urban and rural areas which reduce energy demand. Objective TS02 includes aims of active travel and the implementation of the 10 Minute Town concept.

12.2.2 Air Quality and Climate Guidance Updates

This assessment has been prepared based on the following TII Air Quality guidance:

- PE-ENV-01106: Air Quality Assessment of Specified Infrastructure Projects; (TII 2022a).
- PE-ENV-01107: Air Quality Assessment Standard for Proposed National Roads (TII 2022b).
- TII Roads Emissions Model (REM) and Model Development Report (GE-ENV-01107) (TII 2022b).

The climate assessment has been prepared based on the following TII Climate guidance:

- PE-ENV-01104: Climate Guidance for National Roads, Light Rail and Rural Cycleways (offline & Greenways) – Overarching Technical Document (TII 2022d).
- PE-ENV-01105: Climate Assessment of Proposed National Roads – Standard (TII 2022e).
- GE-ENV-01106: TII Carbon Assessment Tool for Road and Light Rail Projects and User Guidance Document (TII 2022f).

These Air Quality and Climate guidance documents were issued in December 2022 and supersede the 2011 Transport Infrastructure Ireland 'Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes', or TII Air Quality Guidelines (TII 2011). The primary aspects of the assessment relate to the existing ambient air quality, proximity of sensitive locations and a review of the overall significance of potential changes in air quality.

Section 1.9 of PE-ENV-01107 (Air Quality Assessment Standard for Proposed National Roads):

> *'where projects requiring approval under Section 51, Section 177AE or Part 8 have, at the date of publication of this SD, commenced planning and design, and in particular, where technical advisor contracts have been executed, this SD should be:*
>
> - *treated as advice and guidance;*
> - *employed to the greatest extent reasonably practicable; and*
> - *applied in a proportionate manner, having regard to the characteristics and location of the project/maintenance works and the type and characteristics of potential impacts.'*

The same statement is contained within Section of 1.5 of PE-ENV-01105 (Climate Assessment Standard for Proposed National Roads) (TII 2022e).

This document and the air quality and climate assessment of the development was drafted and reviewed prior to the new TII guidance being issued. As per Section 1.9 and 1.5 of PE-ENV-01107 and PE-ENV-01105 respectively as stated above, it is considered appropriate to employ the updated guidance to a reasonably practicable extent. As such, where possible, the air quality and climate assessments have been updated to align with the new TII guidance however, it was not possible to implement all elements of the new guidance.

12.2.3 Construction Stage Methodology

12.2.3.1 Air Quality

The Institute of Air Quality Management in the UK (IAQM) guidelines (2014) outline an assessment method for predicting the impact of dust emissions from demolition, earthworks, construction and haulage activities based on the scale and nature of the works and the sensitivity of the area to dust impacts. The IAQM methodology has been applied to the construction phase of this development in order to predict the likely magnitude of the dust impacts in the absence of mitigation measures. The IAQM guidance and assessment methodology is recommended for use by TII in their document PE-ENV-01106: Air Quality Assessment of Specified Infrastructure Projects (TII 2022a).

Construction stage traffic has the potential to impact air quality through vehicle exhaust emissions. Impacts are assessed at sensitive receptors (i.e. residential properties, schools, hospitals, sensitive ecology) that are within 200m of an 'affected' road link as per TII Guidance (TII 2022a). The TII Guidance (TII 2022a) states that road links meeting one or more of the following criteria can be defined as being 'affected' by a proposed development and should be included in the local air quality assessment.

- Annual Average Daily Traffic (AADT) changes by 1,000 or more.
- Heavy duty vehicle (HDV) (vehicles greater than 3.5 tonnes, including buses and coaches) changes by 200 AADT or more.
- Peak hour speed change by 20 kph or more.
- Daily average speed change by 10 kph or more.
- A change in carriageway alignment by 5m or greater.

The construction stage traffic was reviewed in line with the above screening criteria and it was determined that there are no road links impacted as a result of the proposed development. Therefore, no assessment using the REM model was required for the proposed development as there is no potential for significant impacts to air quality as a result of traffic emissions. The construction stage traffic does not meet the above scoping criteria as there are no impacts within 200m of a sensitive receptor and the changes in traffic are below the scoping criteria. Therefore, traffic impacts have been scoped out from any further assessment as there is no potential for significant impacts to air quality.

12.2.3.2 Climate

As per PE-ENV-01104 (TII 2022d) the climate assessment is broken into two main headings:

- Greenhouse Gas Assessment (GHGA) – Quantifies the GHG emissions from a project over its lifetime. The assessment compares these emissions to relevant carbon budgets, targets and policy to contextualise magnitude.
- Climate Change Risk Assessment (CCRA) – Identifies the impact of a changing climate on a project and receiving environment. The assessment considers a projects vulnerability to climate change and identifies adaptation measures to increase project resilience.

Greenhouse Gas Assessment (GHGA)

The assessment set out in PE-ENV-01104 (TII 2022d) aims to quantify the difference in GHG emissions between the Proposed Scheme and the baseline scenario (the alternative project/solution in place of the Proposed Scheme). The assessment process is guided by the following documents:

- Publicly Available Specification (PAS) 2080:2016 on Carbon Management in Infrastructure (BSI 2016): this provides a framework that allows all parties involved in the development of an infrastructure project to work together to quantify the project's overall carbon impact.
- The Institute of Environmental Management and Assessment (IEMA) Assessing Greenhouse Gas Emissions and Evaluating their significance (2nd Edition) (IEMA 2022): lays out the process of assessing GHG emissions to understand their significance in the context of an EIA.

The IEMA EIA guidance (IEMA 2022) does not recommend a particular approach for undertaking a GHG assessment due to variations of situations but instead it sets out advice for the key common components necessary for undertaking a GHG emissions assessment. During the assessment IEMA recommend the use of a reasonable worst-case scenario rather than an absolute worst-case scenario. The TII GHGA (TII 2022d) should incorporate the following steps into any climate assessment, these steps have been utilised when developing the methodology for this assessment:

- Evaluate early opportunities to reduce GHG emissions.
- Set the scope and boundaries of the GHG assessment.
- Data collection.
- Develop the baseline and Do-Minimum Scenario.
- Calculate/determine the GHG emissions from the Proposed Project.
- Identify mitigation measures.
- Assess Significance.
- Assess cumulative impacts.

The online TII Carbon tool (TII 2022g) has been commissioned by TII to assess GHG emissions associated with infrastructure projects using Ireland-specific emission factors and data. The goal of the tool is to assist project development as a decision-making tool that drives lower carbon infrastructure and to facilitate the integration of environmental issues into transport infrastructure planning, construction and operation.

Detailed project information including volumes of materials required for construction and generated during the construction phase were obtained from the designers. The proposed development is expected to have a construction phase of 9 months approximately and an operational lifespan of 60 years. The predicted embodied emissions can be averaged over the full construction phase and the lifespan of the proposed development to give the predicted annual emissions to allow for direct comparison with annual emissions and targets. Emissions have been compared against Ireland's non-ETS 2030 target of 33,381.3 Kt CO2eq (as set out in Commission Implementing Decision (EU) 2020/2126 of 16 December 2020 on setting out the annual emission allocations of the Member States for the period from 2021 to 2030 pursuant to Regulation (EU) 2018/842 of the European Parliament and of the Council).

The assessment commences with the preliminary design, through the pre-construction or site clearance period, followed by the assessment of the embodied carbon associated with all materials used in the construction of the proposed development, the emissions during the construction phase and additionally emissions related to waste generated during the construction phase. For public infrastructure such as the proposed development, it is generally assumed that end-of-life demolition is not relevant and thus there are no emissions associated with this stage.

The online TII Carbon tool (TII 2022g) uses emission factors from recognised sources including the Civil Engineering Standard Method of Measurement (CESSM) Carbon and Price Book database (CESSM, 2013), UK National Highways Carbon Tool v2.4 and UK Government 2021 Greenhouse Gas Reporting Conversion Factors. The carbon emissions are calculated by multiplying the emission factor by the quantity of the material that will be used over the entire construction. Early-stage design choices have already had a positive impact on sequestration of carbon.

TII Guidance PE-ENV-01104 (TII 2022d) states that: *"activities that account for less than 5% of the total energy usage and/or 5% of the mass balance can be excluded from the assessment scope. e.g., if electricity for operating signage is less than 5% of total electricity used of the project infrastructure, it can be excluded from the assessment scope."*

With respect to the requirement for a cumulative assessment PE-ENV-01104 (TII 2022d) states that:

> "*for GHG* Assessment *is the global climate and impacts on the receptor from a project are not geographically constrained, the normal approach for cumulative assessment in EIA is not considered applicable."*

However, by presenting the GHG impact of a project in the context of its alignment to Ireland's trajectory of net zero and any sectoral carbon budgets, this assessment will demonstrate the potential for the project to affect Ireland's ability to meet its national carbon reduction target. Therefore, the assessment approach is considered to be inherently cumulative.

Emissions related to the transportation of products/materials and construction equipment from point of production/storage to construction site are included within the online carbon tool as per PE-ENV-01104 (TII 2022g).

PE-ENV-01104 (TII 2022d) states that road traffic related emissions information should be obtained from an Air Quality Practitioner to show future user emissions during operation without the project in place. When scoped in, the Air Quality Practitioner calculated the traffic related emissions through the use of the TII REM tool (TII 2022h) which includes detailed fleet predictions for age, fuel technology, engine size and weight based on available national forecasts. However, Section 12.2.3.1 scoped out construction phase impacts due to traffic on the basis of no roads being classed as affected. Therefore, this element was not included within the GHGA.

Climate Change Risk Assessment (CCRA)

PE-ENV-01104 (TII 2022d) states that the CCRA is guided by the principles set out in the overarching best practice guidance documents:

- EU (2021) Technical guidance on the climate proofing of Infrastructure in the Period 2021-2027 (European Commission, 2021).
- The Institute of Environmental Management and Assessment, Environmental Impact Assessment Guide to: Climate Change Resilience and Adaptation (2nd Edition) (IEMA, 2020).

The baseline environment information provided in Section 12.3.3, future climate change modelling and input from other experts working on the Proposed Scheme (i.e. hydrologists) should be used in order to assess the likelihood of a climate hazard. A risk register is generated in order to document the risk assessment process (Appendix 12.2).

The initial stage of an assessment is to establish a scope and boundary for the assessment taking into account the following criteria:

- Spatial boundary: As per PE-ENV-01104 (TII 2022d), the study area with respect to the GHGA is Ireland's Climate budget. The study area with respect to the CCRA can be considered the project boundary and its assets. The study area will be influenced by current and future baselines (Section 0). This study area is influenced by the input of other experts within the Project team.
- Climate hazards: The outcomes of the climate screening i.e. vulnerability assessment and baseline assessment.
- Project receptors: TII state that the project receptors are the asset categories considered in the climate screening. In addition, any critical connecting infrastructure and significant parts of the surrounding environment e.g. water bodies that should be considered as a part of the indirect, cumulative and in combination impact assessment should also be considered project receptors.

Technical guidance on the climate proofing of infrastructure in the period 2021-2027 (European Commission 2021a) outlines an approach for undertaking a climate change risk assessment where there is a potentially significant impact on the Proposed Project due to climate change. The risk assessment assesses the likelihood and consequence of the impact occurring, leading to the evaluation of the significance of the impact. The role of the climate consultant in assessing the likelihood and impact is often to facilitate the climate change risk assessment process with input from the design team or specific specialists such as hydrologists.

Examples of climate hazards which are considered in the risk assessment include:

- Flooding (coastal) – including sea level rise and storm surge.
- Flooding (pluvial).
- Flooding (fluvial).
- Extreme heat – including extreme heat events and increasing temperatures overtime.
- Extreme cold – including frost and snow.
- Wildfire.
- Drought.
- Extreme wind.
- Lightning and hail.
- Landslides.
- Fog.

The climate screening risk assessment comprises of a sensitivity analysis which is intended to evaluate the project's vulnerability to climate change. This is completed by combining a sensitivity (Table 12-4) and exposure (Table 12-5) analysis. The sensitivity analysis identifies the climate hazards relevant to the specific project type irrespective of its location (example: Sea level rise will affect seaport projects regardless of location). Sensitivity ratings are classed as:

- High Sensitivity: the climate hazard may have a significant impact on assets and processes, inputs, outputs and transport links. This is a sensitivity score of 3.
- Medium Sensitivity: the climate hazard may have a slight impact on assets and processes, inputs, outputs and transport links. This is a sensitivity score of 2.
- Low Sensitivity: the climate hazard has no (or insignificant) impact. This is a sensitivity score of 1.

The European Commission assessment states that there are four themes to sensitivity analysis. Transport links may be outside the direct control of the project but still should be considered. TII (TII 2022d) set out the following as potential sensitive receptors: drainage, structures, earthworks, geotechnical, utilities, landscaping, signs, light posts and fences and buildings, these can be considered the on-site assets for road projects.

Table 12-4 Screening Assessment: Likelihood Categories

Sensitive Receptors	Sensitivity to Climate Hazards (No consideration of site location)								
	Flood (Fluvial /Pluvial)	Extreme Heat	Extreme Cold	Drought	Wind	Wildfire	Fog	Lightning & Hail	Landslides
Pavements									
Drainage									
Structures									
Earthworks									
Utilities									
Landscaping									

Sensitive Receptors	Sensitivity to Climate Hazards (No consideration of site location)								
	Flood (Fluvial /Pluvial)	Extreme Heat	Extreme Cold	Drought	Wind	Wildfire	Fog	Lightning & Hail	Landslides
Signs, Light Posts and Fences									
Buildings									

The exposure analysis identifies the climate hazards relevant to the proposed project location irrespective of the project type for example: flooding could be a risk if the project location is next to a river in a floodplain. Exposure may be classed as high, medium or low:

- High exposure: It is almost certain or likely this climate hazard will occur at the project location i.e. might arise once to several times per year. This is an exposure score of 3.
- Medium exposure: It is possible this climate hazard will occur at the project location i.e. might arise a number of times in a decade. This is an exposure score of 2.
- Low exposure: It is unlikely or rare this climate hazard will occur at the project location i.e. might arise a number of times in a generation or in a lifetime. This is an exposure score of 1.

Table 12-5 Screening Assessment: Exposure Assessment

Climate Exposure	Exposure Risk to Climate Variable (Consider the site location)								
	Flood Pluvial	Extreme Heat	Extreme Cold	Drought	Wind	Wildfire	Fog	Lightning & Hail	Landslides
Without Exposure at Project Location									

Once sensitivity and exposure are categorised, a vulnerability analysis is conducted using Table 12-6. If the project scores a high or medium vulnerability, the project should proceed to add further mitigation measures including management for vulnerabilities that cannot be fully mitigated.

Table 12-6 Screening Assessment: Vulnerability Analysis

		Exposure (current + future climate)		
		High (3)	Medium (2)	Low (1)
Sensitivity	High (3)	High (3 x 3 = 9)	High (2 x 3 = 6)	Medium (1 x 3 = 3)
	Medium (2)	High (3 x 2 = 6)	Medium (2 x 2 = 4)	Low (1 x 2 = 2)
	Low (1)	Medium (3 x 1 = 3)	Low (2 x 1 = 2)	Low (1 x 1 = 1)

Climate Significance Criteria

Significance Criteria for GHGA

PE-ENV-01104 (TII 2022d) outlines a recommended approach for determining the significance of both the Construction and Operational Phases. The approach is based on comparing the '*Do Something*' scenario and the net project GHG emissions (i.e. *Do Something – Do Minimum*) to the relevant carbon budgets (Department of the Taoiseach 2022). With the publication of the Climate Action Act in 2021, sectoral carbon budgets have been published for comparison with the Net CO_2 project GHG emissions from the Proposed Scheme. The waste sector emitted approximately 2 $MtCO_{2eq}$ in 2018 and has a ceiling of 1 $MtCO_{2eq}$ in 2030 which is a 50% reduction over this period. The comparison of impacts with the relevant budget has been completed in Section 12.6.1.2.

PE-ENV-01104 (TII 2022d) state that significance of GHG effects is based on IEMA guidance (IEMA, 2022) which is consistent with the terminology contained within Figure 3.4 of the EPA's (2022) 'Guidelines on the information to be contained in Environmental Impact Assessment Reports'.

The 2022 Guidance (IEMA 2022), a guidance which PE-ENV-01104 (TII 2022d) takes a lead from, sets out the following principles for significance:

- When evaluating significance, all new GHG emissions contribute to a negative environmental impact; however, some projects will replace existing development or baseline activity that has a higher GHG profile. The significance of a project's emissions should therefore be based on its net impact over its lifetime, which may be positive, negative or negligible.
- Where GHG emissions cannot be avoided, the goal of the EIA process should be to reduce the project's residual emissions at all stages.
- Where GHG emissions remain significant, but cannot be further reduced, approaches to compensate the project's remaining emissions should be considered.

TII (TII 2022d) states that professional judgement must be taken into account when contextualising and assessing the significance of a project's GHG impact. In line with IEMA Guidance (IEMA, 2022), TII state that the crux of assessing significance is "*not whether a project emits GHG emissions, nor even the magnitude of GHG emissions alone, but whether it contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero by 2050*".

Significance is determined using Table 12-7 (derived from Table 6.7 of PE-ENV-01104 (TII 2022d)) along with consideration of the following two factors:

- The extent to which the trajectory of GHG emissions from the project aligns with Ireland's GHG trajectory to net zero by 2050.
- The level of mitigation taking place.

Table 12-7 GHGA Significance Matrix

Effects	Significance Level Description	Description
Significant adverse	Major adverse	The project's GHG impacts are not mitigated.
		The project has not complied with do-minimum standards set through regulation, nor provided reductions required by local or

Effects	Significance Level Description	Description
		national policies; and
		No meaningful absolute contribution to Ireland's trajectory towards net zero.
	Moderate adverse	The project's GHG impacts are partially mitigated.
		The project has partially complied with do-minimum standards set through regulation, and have not fully complied with local or national policies; and
		Falls short of full contribution to Ireland's trajectory towards net zero.
Not significant	Minor adverse	The project's GHG impacts are mitigated through 'good practice' measures.
		The project has complied with existing and emerging policy requirements; and
		Fully in line to achieve Ireland's trajectory towards net zero.
	Negligible	The project's GHG impacts are mitigated beyond design standards.
		The project has gone well beyond existing and emerging policy requirements; and
		Well 'ahead of the curve' for Ireland's trajectory towards net zero.
Beneficial	Beneficial	The project's net GHG impacts are below zero and it causes a reduction in atmosphere GHG concentration.
		The project has gone well beyond existing and emerging policy requirements; and
		Well 'ahead of the curve' for Ireland's trajectory towards net zero, provides a positive climate impact.

Significance Criteria for CCRA

The significance rating for the CCRA in Table 12-8 is provided on the basis that all adaptation/mitigation measures have been implemented. Consultation with TII has been carried out regarding residual risk to confirm the consequence of the identified risk. Any risks that remain significant (i.e. a high or extreme risk) should be prioritised in the monitoring and reviews to the risk assessment.

Table 12-8 Risk profile comparison

Risk Rating	Number of Risks	
	Initial risk rating	Residual risk rating
Low Risk	No. of low risk	No. of low risk
Medium Risk	No. of medium risk	No. of medium risk
High Risk	No. of high risk	No. of high risk
Extreme Risk	No. of extreme risk	No. of extreme risk

12.2.4 Operational Phase Methodology

12.2.4.1 Air Quality

Impacts to air quality during the operational phase are typically as a result of vehicle exhaust emissions. The air quality assessment has been carried out following procedures described in the TII Guidance (TII 2022a). This is detailed in Section 12.2.3.1.

By definition of the traffic screening criteria detailed in Section 12.2.3.1, there are no road links impacted as a result of the proposed development. Therefore, no assessment using the REM model was required for the proposed development as there is no potential for significant impacts to air quality as a result of traffic emissions. There are no impacts within 200m of a sensitive receptor and the changes in traffic are below the scoping criteria. Therefore, traffic impacts have been scoped out from any further assessment as there is no potential for significant impacts to air quality.

No other likely operational phase impacts with respect to air quality are predicted.

12.2.4.2 Climate

Ireland has annual GHG targets which are set at an EU level and need to be complied with in order to reduce the impact of climate change. Impacts to climate as a result of GHG emissions are assessed against the targets set out by the EU under *Regulation (EU) 2018/842 on binding* annual *greenhouse gas emission reductions by Member States from 2021 to 2030 contributing to climate action to meet commitments under the Paris Agreement and amending Regulation (EU) No. 525/2013* which has set a target of a 30% reduction in non-ETS sector emissions by 2030 relative to 2005 levels.

The assessment set out in PE-ENV-01104 (TII 2022d) aims to quantify the difference in GHG emissions between the Proposed Scheme and the baseline scenario (the alternative project/solution in place of the Proposed Scheme).

PE-ENV-01104 (TII 2022d) states that road traffic related emissions information should be obtained from an Air Quality Practitioner to show future user emissions during operation without the project in place. The Air Quality Practitioner calculated the traffic related emissions through the use of the TII REM tool (TII 2022h) which includes detailed fleet predictions for age, fuel technology, engine size and weight based on available national forecasts. However, Section 12.2.4.1 scoped out operational phase impacts due to traffic on the basis of no roads being classed as affected.

Operational phase maintenance of materials is included within the embodied carbon assessment detailed in Section 12.2.3.2.

12.3 Description of Receiving Environment

12.3.1 Meteorological Data

A key factor in assessing temporal and spatial variations in air quality are the prevailing meteorological conditions. Depending on wind speed and direction, individual receptors may experience very significant variations in pollutant levels under the same source strength (i.e. traffic levels) (WHO, 2006). Wind is of key importance in dispersing air pollutants. The potential for dust dispersion and deposition depends on local meteorological factors such as rainfall, wind speed and wind direction.

The nearest representative weather station collating detailed weather records is Johnstown Castle, which is located approximately 35km southeast of the proposed development. Johnstown Castle met data has been examined to identify the prevailing wind direction and average wind speeds over a five-year period. For data collated during five representative years (2017 - 2021), the predominant wind direction is south-westerly with predominantly moderate wind speeds. In addition, dust generation is considered negligible on days where rainfall is greater than 0.2mm. A review of historical 30 year average data (1978 – 2007) for Kilkenny, the closest station with 30 year average data, indicates that on average 193 days per year have rainfall over 0.2mm (Met Eireann, 2023) and therefore it can be determined that over 50% of the time dust generation will be reduced.

12.3.2 Baseline Air Quality

Air quality monitoring programs have been undertaken in recent years by the EPA. The most recent annual report on air quality in Ireland is "Air Quality In Ireland 2021" (EPA 2022). The EPA website details the range and scope of monitoring undertaken throughout Ireland and provides both monitoring data and the results of previous air quality assessments (EPA 2022).

As part of the implementation of the Air Quality Standards Regulations 2022 (S.I. No. 739 of 2022), four air quality zones have been defined in Ireland for air quality management and assessment purposes (EPA 2022). Dublin is defined as Zone A and Cork as Zone B. Zone C is composed of 23 towns with a population of greater than 15,000. The remainder of the country, which represents rural Ireland but also includes all towns with a population of less than 15,000, is defined as Zone D.

In terms of air monitoring and assessment, the proposed development site is within Zone D (EPA 2023). The long-term monitoring data has been used to determine background concentrations for the key pollutants in the region of the proposed development. The background concentration accounts for all non-traffic derived emissions (e.g. natural sources, industry, home heating etc.).

Long-term NO_2 monitoring was carried out at the Zone D locations of Castlebar, Emo and Kilkitt for the period 2017 - 2021 (EPA 2022). Long term average concentrations are significantly below the annual average limit of 40 µg/m^3; average results range from 4 – 7 µg/m^3 (Table 12-9) over the five-year period, with a maximum monitored annual mean concentration of 8 µg/m^3. Based on the above information an estimate of the current background NO_2 concentration for the region of the proposed development is 8 µg/m^3.

Table 12-9 Trends In Zone D Air Quality - Nitrogen Dioxide (NO_2)

Station	Averaging Period [Notes 1,2]	Year				
		2019	2018	2019	2020	2021
Castlebar	Annual Mean NO_2 (µg/m^3)	7	8	8	6	6
	99.8th %ile 1-hr NO_2 (µg/m^3)	60	60	59	54	48
Kilkitt	Annual Mean NO_2 (µg/m^3)	2	3	5	2	2
	99.8th %ile 1-hr NO_2 (µg/m^3)	17	22	42	13	11
Emo	Annual Mean NO_2 (µg/m^3)	3	3	4	4	4
	99.8th %ile 1-hr NO_2 (µg/m^3)	28	42	28	23	28

Note 1 Annual average limit value - 40 µg/m^3 (EU Council Directive 2008/50/EC & S.I. No. 739 of 2022).

Note 2 1-hour limit value - 200 µg/m^3 as a 99.8th%ile, i.e. not to be exceeded >18 times per year (EU Council Directive 2008/50/EC & S.I. No. 739 of 2022).

Continuous PM_{10} monitoring was carried out at the Zone D locations of Castlebar, Claremorris and Kilkitt for 2017 - 2021. Levels range from 8 – 12 µg/m^3 over the five-year period (Table 12-10). In addition the 24-hour limit value of 50 µg/m^3 (as a 90.4th percentile) was complied with at all sites (EPA, 2022). Based on the EPA data, an estimate of the current background PM_{10} concentration in the region of the proposed development is 13 µg/m^3.

Table 12-10 Trends In Zone D Air Quality - PM_{10}

Station	Averaging Period Notes 1,2	Year				
		2015	2016	2017	2018	2019
Castlebar	Annual Mean PM_{10} (µg/m^3)	11	11	16	14	10
	90th %ile 24-hr PM_{10} (µg/m^3)	19	20	24	22	22
Killkitt	Annual Mean PM_{10} (µg/m^3)	8	9	7	8	8
	90th %ile 24-hr PM_{10} (µg/m^3)	14	15	13	14	13
Claremorris	Annual Mean PM_{10} (µg/m^3)	11	12	11	10	10
	90th %ile 24-hr PM_{10} (µg/m^3)	17	20	20	16	13

Note1 Annual average limit value - 40 µg/m^3 (EU Council Directive 2008/50/EC & S.I. No. 739 of 2022).

Note 2 24-hour limit value - 50 µg/m^3 as a 90.4th%ile, i.e. not to be exceeded >35 times per year (EU Council Directive 1999/30/EC & S.I. No. 739 of 2022).

Monitoring of both PM_{10} and $PM_{2.5}$ takes place at the station in Claremorris which allows for the $PM_{2.5}/PM_{10}$ ratio to be calculated. Average $PM_{2.5}$ levels in Claremorris over the period 2017 - 2021 ranged from 4 - 8 µg/m^3, with a $PM_{2.5}/PM_{10}$ ratio ranging from 0.36 – 0.86 (EPA, 2022). Based on this information, a ratio of 0.7 was used to generate an existing $PM_{2.5}$ concentration in the region of the development of 9.1 µg/m^3.

NO_x monitoring (EPA, 2022b) was conducted in the rural background stations of Emo and Kilkitt for the period 2015 - 2019 (EPA, 2022). Long term average concentrations are significantly below the annual average limit of 30 µg/m^3; average results range from 2.5 – 7.6 µg/m^3. Based on the above information an estimate of the current background NO_x concentration for the region of the proposed development is 8 µg/m^3.

12.3.3 Climate Baseline

PE-ENV-01104 (TII 2022d) states that a baseline climate scenario should identify, consistent with the study area for the project, GHG emissions without the project for both the current and future baseline (Do-Minimum scenarios).

Ireland declared a climate and biodiversity emergency in May 2019 and in November 2019 European Parliament approval of a resolution declaring a climate and environment emergency in Europe, in addition to Ireland's current failure to meet its EU binding targets under Regulation 2018/842 (European Union 2018). This results in changes in GHG emissions either beneficial or adverse being of more significance than previously considered prior to these declarations.

Data published in 2022 (EPA 2022b) predicts that Ireland exceeded (without the use of flexibilities) its 2021 annual limit set under EU's Effort Sharing Decision (ESD) (EU

2018/842) by 2.71million tonnes CO_2 equivalent (Mt CO_{2eq}) as shown in Table 12-11. The sector with the highest emissions in 2021 is agriculture at 35.3% of the total, followed by transport at 20.3%. Ireland's greenhouse gas emissions increased by 4.7% in 2021 compared to 2020. For 2021 (EPA 2022b), total national emissions were estimated to be 59.87 Mt CO_{2eq} as shown in Table 12-11. Waste accounted for 1.5% of Ireland's 2021 emissions, with 707 kt CO_2eq of the total 937 kt CO_2eq generated from landfills. Biological treatment of solid waste accounted for 50 kt CO_2eq.

The future baseline with respect to the GHGA can be considered in relation to the future climate targets which the assessment results will be compared against. In line with TII (TII 2022d) and IEMA Guidance (IEMA, 2022) the future baseline is a trajectory towards net zero by 2050 "*whether it* [the project] *contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero by 2050*".

The future baseline will be determined by Ireland meeting its targets set out in the CAP23, and future CAPs, alongside binding 2030 EU targets. In order to meet the commitments under the Paris Agreement, the European Union (EU) enacted 'Regulation (EU) 2018/842 on binding annual GHG emission reductions by Member States from 2021 to 2030 contributing to climate action to meet commitments under the Paris Agreement and amending Regulation (EU) No. 525/2013' (hereafter referred to as the Regulation) (European Union 2018). The Regulation aims to deliver, collectively by the EU in the most cost-effective manner possible, reductions in GHG emissions from the Emission Trading Scheme (ETS) and non-ETS sectors amounting to 43% and 30%, respectively, by 2030 compared to 2005. The ETS is an EU-wide scheme which regulates the GHG emissions of larger industrial emitters including electricity generation, cement manufacturing and heavy industry. The non-ETS sector includes all domestic GHG emitters which do not fall under the ETS scheme and thus includes GHG emissions from transport, residential and commercial buildings and agriculture.

Table 12-11 Total National GHG Emissions In 2021

Category	2021 Kilotonnes CO_{2eq}	% of Total GHG emissions
Waste	937	1.5%
Energy Industries	10,272	16.7%
Residential	7,040	11.4%
Manufacturing Combustion	4,593	7.5%
Commercial Services	817	1.3%
Public Services	663	1.1%
Transport	10,912	17.7%
Industrial Processes	2,460	4.0%
F-gases	738	1.2%
Agriculture	23,097	37.5%
Total	**61,528**	**100%**

Impacts as a result of climate change will evolve with a changing future baseline, changes have the potential to include increases in global temperatures and increases

in the number of rainfall days per year. Therefore, it is expected that the baseline climate will evolve over time and consideration is needed with respect to this within the detailed design of the Proposed Scheme as per the European Commission Technical guidance on the climate proofing of infrastructure in the period 2021-2027 (European Commission 2021a) and PE-ENV-01104 (TII 2022d) should the Proposed Scheme proceed.

Ireland has seen increases in the annual rainfall in the north and west of the country, with small increases or decreases in the south and east including in the region where the Proposed Scheme will be located (EPA 2021b). The EPA have compiled a list of potential adverse impacts (EPA 2021b) as a result of climate change including the following which may be of relevance to the Proposed Scheme:

- More intense storms and rainfall events.
- Increased likelihood and magnitude of river and coastal flooding.
- Water shortages in summer in the east.
- Adverse impacts on water quality.
- Changes in distribution of plant and animal species.

Wexford County Council (WCC 2019) discuss the Adaptation Baseline Assessment in Section 3 of the Climate Change Adaptation Strategy 2019-2024. Notable recent events that have occurred include:

- Storm Ophelia on October 16th 2017 with wind speeds of up to 115km/h recorded at Johnstown castle in Wexford.
- Storm Emma March 2018 led to widespread falls of heavy snow with snow depths of 27cm and 43cm recorded on 2nd and 3rd March respectively at Johnstown castle station.
- Heatwaves in summer 2018 with highest at Johnstown Castle, Co Wexford with 279.9 hours of sunshine which resulted in localised forest fires and gorse fires.

EPA's State of the Irish Environment Report (Chapter 2: Climate Change) (EPA 2020c) notes that projections show that full implementation of additional policies and measures, outlined in the 2019 Climate Action Plan, will result in a reduction in Ireland's total GHG emissions by up to 25 per cent by 2030 compared with 2020 levels. Climate change is not only a future issue in Ireland, as a warming of approximately 0.8°C since 1900 has already occurred. The EPA state that it is critically important for the public sector to show leadership and decarbonise all public transport across bus and rail networks to the lowest carbon alternatives. The report (EPA 2020c) underlines that the next decade needs to be one of major developments and advances in relation to Ireland's response to climate change in order to achieve these targets and that Ireland must accelerate the rate at which it implements GHG emission reductions. The report states that mid-century mean annual temperatures in Ireland are projected to increase by between 1.0°C and 1.6°C (subject to the emissions trajectory). In addition, heat events are expected to increase by mid-century (EPA 2020c). While individual storms are predicted to have more severe winds, the average wind speed has the potential to decrease (EPA 2020c).

TII's Guidance document PE-ENV-01104 (TII 2022d) states that for future climate change a moderate to high Representative Concentration Pathways (RCP) should be adopted. RPC4.5 is considered moderate while RPC8.5 is considered high. Representative Concentration Pathways (RCPs) describe different 21st century pathways of GHG emissions depending on the level of climate mitigation action undertaken.

Future climate predictions undertaken by the EPA have been published in 'Research 339: High-resolution Climate Projections for Ireland – A Multi-model Ensemble Approach' (EPA 2020d). The future climate was simulated under both Representative Concentration Pathway 4.5 (RCP4.5) (medium-low) and RCP8.5 (high) scenarios. Mid-century (2041–2060) mean annual temperatures are projected to increase by 1 to 1.2°C and 1.3 to 1.6°C for the RCP4.5 and RCP8.5 scenarios, respectively, with the largest increases in the east of Ireland. Warming will be enhanced at the extremes (i.e. hot days and cold nights), with summer daytime and winter night-time temperatures projected to increase by 1 to 2.4°C. There will be a substantial decrease, of approximately 50%, projected for a number of frost and ice days. Summer heatwave events are expected to occur more frequently, with the largest increases in the south. In addition, precipitation is expected to become more variable, with substantial projected increases in the occurrence of both dry periods and heavy precipitation events. Climate change also has the potential to impact future energy supply which will rely on renewables such as wind and hydroelectric. Wind turbines need a specific range of wind speeds to operate within and droughts or low ground water levels may impact hydroelectric energy generating sites. More frequent storms have the potential to damage the communication networks requiring additional investment to create resilience within the network.

The EPA's Critical Infrastructure Vulnerability to Climate Change report (EPA 2021b) assesses the future performance of Irelands critical infrastructure when climate is considered. With respect to road infrastructure, fluvial flooding and coastal inundation / coastal flooding are considered the key climate change risks with snowstorm and landslides being medium risks. Extreme winds and heatwaves/droughts are considered low risk to road infrastructure. One of the key outputs of the research was a framework that will provide quantitative risk-based decision support for climate change impacts and climate change adaptation analysis for infrastructure.

12.3.4 Sensitivity of the Receiving Environment

In line with the UK Institute of Air Quality Management (IAQM) guidance document '*Guidance on the Assessment of Dust from Demolition and Construction'* (2014) prior to assessing the impact of dust from a proposed development, the sensitivity of the area must first be assessed as outlined below.

Both receptor sensitivity and proximity to proposed works areas (between 0m and 350m from the proposed works as outlined in Table 12-12 below) are taken into consideration. For the purposes of this assessment, high sensitivity receptors are regarded as residential properties where people are likely to spend the majority of their time. Commercial properties and places of work are regarded as medium sensitivity, while low sensitivity receptors are places where people are present for short periods or do not expect a high level of amenity.

In terms of receptor sensitivity to dust soiling, there are greater than 10 but less than 100 high sensitivity residential receptors properties within 20m of the proposed site boundary as well as a number of commercial/residential units along R723 and R704 to the west of the River Barrow and along the Quays to the east (see Figure 12-1). Therefore, the overall sensitivity of the area to dust soiling impacts is considered **high** based on the IAQM criteria outlined in Table 12-12.

Table 12-12 Sensitivity of the Area to Dust Soiling Effects on People and Property

Receptor Sensitivity	Number Of Receptors	Distance from source (m)			
		<20	<50	<100	<350
High	>100	High	High	Medium	Low
	10-100	**High**	Medium	Low	Low
	1-10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

In addition to sensitivity to dust soiling, the IAQM guidelines also outline the assessment criteria for determining the sensitivity of the area to human health impacts from dust emissions. The criteria take into consideration the current annual mean PM_{10} concentration, receptor sensitivity based on type (residential receptors are classified as high sensitivity) and the number of receptors affected within various distance bands from the construction works. A conservative estimate of the current annual mean PM_{10} concentration in the vicinity of the proposed development is 13 $\mu g/m^3$ and there are greater than 10 but less than 100 residential properties within 20m of the proposed site boundary (see Figure 12.2). Based on the IAQM criteria outlined in **Table 12-13**, the worst-case sensitivity of the area to dust related human health impacts is considered to be **low**.

Table 12-13 Sensitivity of the Area to Dust Related Human Health Impacts

Receptor Sensitivity	Annual Mean PM_{10} Concentration	Number Of Receptors	Distance from source (m)				
			<20	<50	<100	<200	<350
High	< 24 $\mu g/m^3$	>100	Medium	Low	Low	Low	Low
		10-100	**Low**	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Medium	< 24 $\mu g/m^3$	>10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Low	< 24 $\mu g/m^3$	>1	Low	Low	Low	Low	Low

The IAQM guidance also outlines the criteria for determining the sensitivity of an ecological receptor to dust impacts. The sensitivity is determined based on the distance to the source, the designation of the site, (European, National or local designation) and the potential dust sensitivity of the ecologically important species present (see Table 12-14). Works will take place directly beside and within a section of the River Barrow and River Nore SAC (site code 002162) and Barrow River Estuary pNHA (site code 000698) (see Figure 12.1). The vegetation within the SAC is potentially dust sensitive. The River Barrow and River Nore SAC is considered a high sensitivity receptor to potential dust soiling impacts on vegetation due to its European designation. As the works will take place directly beside and within a section of the SAC the overall sensitivity of the area to dust related ecological impacts is considered **high** as per Table 12-14.

Table 12-14 Sensitivity of the Area to Dust Related Ecological Impacts

Receptor Sensitivity	Distance from the Source (m)	
	<20	<50
High	**High**	Medium
Medium	Medium	Low
Low	Low	Low

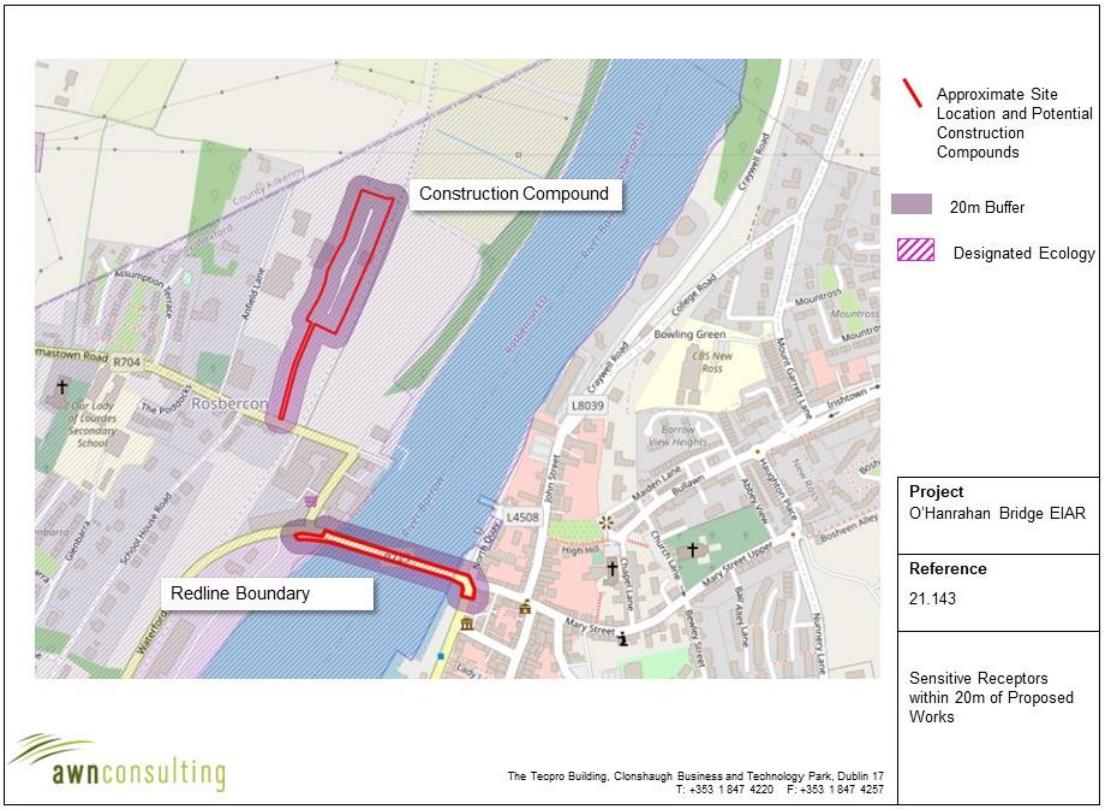


Figure 12-1 Sensitive Receptors within 20m of Proposed Works

12.4 Description of Potential Impacts

12.4.1 Construction Phase

12.4.1.1 Air Quality

The greatest potential impact on air quality during the construction phase of the proposed development is from construction dust emissions and the potential for nuisance dust. While construction dust tends to be deposited within 350m of a construction site, the majority of the deposition occurs within the first 50m. The extent of any dust generation depends on the nature of the dust (soils, peat, sands, gravels, silts etc.) and the nature of the construction activity. In addition, the potential for dust dispersion and deposition depends on local meteorological factors such as rainfall, wind speed and wind direction. As per Section 12.3.1, local meteorological conditions are favourable to dust suppression 50% of the time.

In order to determine the level of dust mitigation required during the proposed works, the potential dust emission magnitude for each dust generating activity needs to be taken into account, in conjunction with the previously established sensitivity of the area (see Section 12.3.4).

O'Hanrahan Bridge is a 9-span post-tensioned concrete beam and reinforced concrete slab bridge over the River Barrow in New Ross town, County Wexford. The overall length of the bridge is 175m, with an out-to-out width of 11.6m. The proposed works aim to widen the bridge deck by approx. 1m in order to accommodate an enhanced combined pedestrian and cycleway. The widening works are to take place on the southern side of the bridge through the replacement of the bridge deck. The existing surfacing and footways will be removed to allow the provision of bridge deck waterproofing and joint replacements before the widened footways are constructed and carriageway surfacing reinstated. The works will involve a number of service diversions and upgrades in both footways.

The primary activities involved in the proposed development which have the potential to generate dust include:

- Piling to construct a sheet pile flood defence wall on the south east and south west corner of the existing bridge.
- In fill of the gap between the new sheet pile wall and the existing quay wall.
- Demolition of existing concrete wall and the construction of a new concrete wall on top of the sheet pile wall.
- Some demolition of existing footpath will also likely be needed.
- Road works for the widening of footpaths on both sides of the carriageway.

The most significant works with dust generation potential are those that involve excavations, concrete repair and piling. Other works are likely to have very minor dust emissions due to their small scale. Worst-case assumptions have been used as part of this assessment. As such, the dust mitigation measures proposed are those associated with a worst-case assessment and actual levels of dust which may arise from the proposed construction activities may be lower than estimated. The major dust generating activites have been divided into four categories as detailed below to reflect their different potential impacts.

Piling and Demolition Activities

In order to determine the level of dust mitigation required during the proposed piling and minor demolition works, the potential dust emission magnitude needs to be taken into account, along with the already established sensitivity of the area. The dust emission magnitude of the IAQM assessment criteria for demolition activities can be classified as small, medium and large as described below, this criteria has been adopted for the piling activities associated with the proposed.

Large: Total Building Volume > 50,000m^3, potentially dusty construction material (e.g. concrete), on-site crushing and screening, demolition activities > 20m above ground level.

Medium: Total building volume 20,000m^3 – 50,000m^3, potentially dusty construction material, demolition activities 10-20m above ground level.

Small: Total building volume < 20,000m^3, construction material with low potential for dust release (e.g. metal cladding or timber), demolition activities <10m above ground, demolition during wetter months.

Sheet piling (approx. 85 lin.m) will be installed for the proposed flood defence walls. In addition, demoliton works on road/footpath surfacing and the bridge parapet edge are proposed to be in the region of 500m^3. Therefore, the dust emission magnitude for the proposed piling and minor demolition works can be considered small. Combining this with the previously established sensitivtiy of the area (see Section 12.3.4) results in an overall medium risk of temporary dust soiling, negligible risk of

temporary human health impacts and a medium risk of temporary ecological impacts as a result of the proposed activities (see Table 12-15).

Table 12-15 Risk of Dust Impacts – Piling & Demolition

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Medium Risk
Medium	High Risk	Medium Risk	Low Risk
Low	Medium Risk	Low Risk	Negligible

Earthworks

Earthworks primarily involve excavating material, loading and unloading of materials, tipping and stockpiling activities. Activities such as levelling the site and landscaping works are also considered under this category. The dust emission magnitude from earthworks can be classified as small, medium or large based on the definitions from the IAQM guidance as transcribed below:

Large: Total site area > 10,000m^2, potentially dusty soil type (e.g. clay which will be prone to suspension when dry due to small particle size), >10 heavy earth moving vehicles active at any one time, formation of bunds > 8m in height, total material moved >100,000 tonnes.

Medium: Total site area 2,500m^2 – 10,000m^2, moderately dusty soil type (e.g. silt), 5 - 10 heavy earth moving vehicles active at any one time, formation of bunds 4 – 8m in height, total material moved 20,000 – 100,000 tonnes.

Small: Total site area < 2,500m^2, soil type with large grain size (e.g. sand), < 5 heavy earth moving vehicles active at any one time, formation of bunds < 4 m in height, total material moved < 20,000 tonnes, earthworks during wetter months.

As part of the construction stage, there will a minor requirement for removal of some materials and the import of material for fill. This will be restricted to backfilling behind the new sheet piled wall (roughly 250m^3). Given the nature of the works the potential for earthworks related dust emissions can be classed as small. The sensitivity of the area, as determined in Section 12.3.4, is combined with the dust emission magnitude for each dust generating activity to define the risk of dust impacts in the absence of mitigation. As outlined in Table 12-16, this results in an overall low risk of temporary dust soiling impacts, a negligible risk of temporary dust related human health impacts and a low risk of dust related ecological impacts as a result of the proposed earthworks activities.

Table 12-16 Risk of Dust Impacts – Earthworks

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Construction

Dust emission magnitude from construction can be classified as small, medium or large based on the definitions from the IAQM guidance as transcribed below:

Large: Total building volume > 100,000 m^3, on-site concrete batching, sandblasting.

Medium: Total building volume 25,000 m^3 – 100,000 m^3, potentially dusty construction material (e.g. concrete), on-site concrete batching.

Small: Total building volume < 25,000 m^3, construction material with low potential for dust release (e.g. metal cladding or timber).

The dust emission magnitude from construction associated with the proposed development works can be classified as small due to the total building volume involved not exceeding 25,000m^3. Total volume of new materials including other miscellaneous items should be around 1,000m^3. Therefore, this results in an overall low risk of temporary dust soiling impacts, a negligible risk of temporary dust related human health impacts and a low risk of dust related ecological impacts as a result of the proposed construction activities prior to mitigation (Table 12-17).

Table 12-17 Risk of Dust Impacts – Construction

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Low Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Trackout

Factors which determine the dust emission magnitude are vehicle size, vehicle speed, number of vehicles, road surface material and duration of movement. Dust emission magnitude from trackout can be classified as small, medium or large based on the definitions from the IAQM guidance as transcribed below:

Large: > 50 HGV (> 3.5 t) outward movements in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length > 100m.

Medium: 10 - 50 HGV (> 3.5 t) outward movements in any one day, moderately dusty surface material (e.g. high clay content), unpaved road length 50 - 100m.

Small: < 10 HGV (> 3.5 t) outward movements in any one day, surface material with low potential for dust release, unpaved road length < 50m.

The dust emission magnitude for the proposed trackout can be classified as small as worst-case as on average there will less than 10 outward HGV movements per day during the construction works. In addition there will be no unpaved road length.

The sensitivity of the area is combined with the dust emission magnitude for each dust generating activity to define the risk of dust impacts in the absence of mitigation. As outlined in Table 12-18, this results in an overall low risk of temporary dust soiling impacts, a negligible risk of dust related human health impacts and a low risk of dust related ecological impacts as a result of the proposed trackout activities.

Table 12-18 Risk of Dust Impacts – Trackout

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Summary of Dust Emission Risk

The risk of dust impacts as a result of the proposed development are summarised in Table 12-19 for each activity. The magnitude of risk determined is used to prescribe the level of site specific mitigation required for each activity in order to prevent significant impacts occurring.

Overall, in order to ensure that no dust nuisance occurs during the construction activities for the proposed development, a range of dust mitigation measures associated with a **medium risk** of dust impacts must be implemented. In the absence of mitigation, there is the potential for *temporary, negative, slight* impacts to air quality.

Table 12-19 Summary of Dust Impact Risk used to Define Site-Specific Mitigation

Potential Impact	Dust Emission Risk			
	Piling & Demolition	Earthworks	Construction	Trackout
Dust Soiling	Medium Risk	Low Risk	Low Risk	Low Risk
Human Health Impacts	Negligible Risk	Negligible Risk	Negligible Risk	Negligible Risk
Ecological Impacts	Medium Risk	Low Risk	Low Risk	Low Risk

12.4.1.2 Climate GHGA

There is the potential for release of a number of greenhouse gas emissions to atmosphere during the construction of the proposed development.

The unmitigated embodied carbon within the construction materials has been calculated. This calculation was based on the updated online TII Carbon tool (TII 2022g), and the breakdown of the activities between the different phases of the proposed development has been assessed. As shown in Table 12.20, the assessment indicates that the key sources of GHG emissions are associated with the embodied carbon of the construction materials and construction waste.

The proposed development is estimated to result in total construction phase GHG emissions of 681.6 tonnes embodied CO_2eq for materials over the 36-week construction period, equivalent to an annualised total of 0.002% of Ireland's non-ETS 2030 target, 0.114% of the 2030 transport budget or 0.17% of the 2030 industry budget. Over the predicted 60-year lifespan the annualised emissions due to the initial construction phase of the proposed development is projected to reach, at most, 0.000035% of Ireland's non-ETS 2030 emissions target, 0.000189% of the 2030 transport budget or 0.000284% of the 2030 industry budget.

Table 12-20 Construction Stage Greenhouse Gas Emissions

Activity	Tonnes CO_2eq / Total	% Of Total
Pre-Construction	0.2	0.03%
Embodied Carbon	296.0	43.4%
Construction Activities	141.6	20.7%
Construction Waste	82.8	12.1%
Maintenance (Operational Phase)	161.0	23.6%
All	681.6	100%
Averaging Time	**% Of 2030 transport budget**	**% Of 2030 industry budget**
Over 1 years:	0.0114%	0.0170%
Over 60 years:	0.000189%	0.000284%

12.4.1.3 Climate CCRA

A risk assessment has been conducted for potentially significant impacts on the proposed development associated with climate change during the Operational Phase. The risk assessment assesses the likelihood and consequence of potential impacts occurring and then provides an evaluation of the significance of the impact using the framework set out in Section 12.2.4.2.

Potential impacts are considered in accordance with the likelihood categories set out in Section 12.2.4.2 (Table 12-21), which take account of designed in mitigation, in combination with the exposure analysis (Table 12-22) in order to assess the significance conclusion (Table 12-23).

Examples of potential climate impacts during operation are included in Annex D (Climate proofing and environmental impact assessment) of the technical guidance on the climate proofing of infrastructure (European Commission 2021a). Potential impacts of climate change of the proposed development include:

- Flood Risk due to increased precipitation, and intense periods of rainfall. This includes fluvial and pluvial flooding.
- Increased temperatures potentially causing drought, wildfires and prolonged periods of hot weather.
- Reduced temperatures resulting in ice or snow.
- Geotechnical impacts.
- Major Storm Damage – including wind damage.

Each of these potential risks are considered with respect to the operational phase of the proposed development as detailed in Section 12.4.2.1. During the construction phase no assessment is required however consideration will be given to the project's vulnerability to climate impacts. During construction, the Contractor will be required to mitigate against the effects of extreme rainfall / flooding through site risk assessments and method statements. The Contractor will also be required to mitigate against the effects of extreme wind / storms, temperature extremes through site risk assessments and method statements. All materials used during construction will be accompanied by certified datasheets which will set out the limiting operating temperatures. Temperatures can affect the performance of some materials, and this will require consideration during construction.

During construction, the Contractor will be required to mitigate against the effects of fog, lighting and hail through site risk assessments and method statements.

12.4.1.4 Human Health

Dust emissions from the construction phase of the proposed development have the potential to impact on human health through the release of PM_{10} and $PM_{2.5}$ emissions. As per Section 0, the surrounding area is of low sensitivity to potential human health impacts as a result of construction dust emissions. In addition, it was found that there is an overall negligible risk of human health impacts from dust emissions in the absence of mitigation. Therefore, in the absence of mitigation there is the potential for *imperceptible, negative, temporary* impacts to human health as a result of the proposed development.

12.4.2 Operational Phase

12.4.2.1 Air Quality

Due to the nature of the proposed development, there will be no emissions to atmosphere during the operational phase. The proposed works will enhance combined pedestrian and cycleways both of which are considered sustainable modes of transport from an air quality and climate point of view. Therefore, there is no potential for adverse impacts to air quality as a result of the proposed development. The operational phase is considered neutral in terms of air quality.

12.4.2.2 Climate GHGA

The construction phase GHGA includes operational phase maintenance of materials within the assessment. Maintenance is mainly associated with road surfacing repairs over the projects lifespan (161 tCO_2eq). This is set out in Section 12.4.1.2.

The proposed development provides active travel accessibility in the form of cycling and walking access on the bridge which is in line with CAP23.

12.4.2.3 Climate CCRA

A risk assessment has been conducted for potentially significant impacts on the proposed development associated with climate change during the Operational Phase. The risk assessment assesses the likelihood and consequence of potential impacts occurring and then provides an evaluation of the significance of the impact using the framework set out in Section 12.2.4.2. The assessment in Section 16 Major Accidents and Disasters (MADs) of the Planning Report, which takes into account the risk arising from climate change due to severe meteorological events. The MADs assessment found that the potential for risks during the Operational Phase to be low when identified mitigation measures are applied.

Potential impacts are considered in accordance with the likelihood categories set out in Section 12.2.4.2 (Table 12-21), which take account of mitigation by design, in combination with the exposure analysis (Table 12-22) in order to assess the significance conclusion (Table 12-23).

Examples of potential climate impacts during operation are included in Annex D (Climate proofing and environmental impact assessment) of the technical guidance on the climate proofing of infrastructure (European Commission 2021a). Potential impacts of climate change of the proposed development include:

- Flood Risk due to increased precipitation, and intense periods of rainfall. This includes fluvial and pluvial flooding.

- Increased temperatures potentially causing drought, wildfires and prolonged periods of hot weather.
- Reduced temperatures resulting in ice or snow.
- Geotechnical impacts.
- Major Storm Damage – including wind damage.

Each of these potential risks are considered with respect to the operational phase of the proposed development. An initial scoping of the risk assessments has been conducted, in line with technical guidance on the climate proofing of infrastructure in the period 2021-2027 (European Commission 2021a) and PE-ENV-01104 (TII 2022d).

Table 12-21 Sensitivity to Climate Hazards (with design mitigation in place)

Sensitive Receptors (Project Assets)	Sensitivity to Climate Hazards (No consideration of site location)								
	Flood (Coastal, Pluvial or Fluvial)	Extreme Heat	Extreme Cold	Drought	Wind	Wildfire	Fog	Lightning & Hail	Landslides
Pavements	2	1	1	1	1	1	1	1	1
Drainage	2	1	1	1	1	1	1	1	1
Structures	2	1	1	1	1	1	1	1	1
Earthworks	2	1	1	1	1	1	1	1	1
Utilities	2	1	1	1	1	1	1	1	1
Landscaping	2	1	1	1	1	1	1	1	1
Signs, Light Posts and Fences	2	1	1	1	1	1	1	1	1

Table 12-22 Exposure Risk to Climate Hazards

Climate Exposure	Exposure Risk to Climate Variable (Consider the site location)								
	Flood (Coastal, Pluvial or Fluvial)	Extreme Heat	Extreme Cold	Drought	Wind	Wildfire	Fog	Lightning & Hail	Landslides
Without exposure at project location	1	2	2	2	2	1	1	1	1

Table 12-23 Vulnerability Analysis to Climate Hazards

Assets	Vulnerability Analysis								
	Flood (Coastal, Pluvial or Fluvial)	Extreme Heat	Extreme Cold	Drought	Wind	Wildfire	Fog	Lightning & Hail	Landslides
	2 (Low Risk)	2 (Low Risk)	2 (Low Risk)	2 (Low Risk)	2 (Low Risk)	1 (Low Risk)	1 (Low Risk)	1 (Low Risk)	1 (Low Risk)

The most likely impact due to climate change on the proposed development is due to flooding. The proposed development is located approx. 29km upstream from the coastline, therefore coastal flood risk is scoped out. The proposed works are widening an existing bridge by approximately 1m. The proposed structure will be designed to withstand the hydraulic effects of sea level rise and storm surges. The heights of the proposed new flood walls at the southeast and west corners will be equal to or greater than the existing, adding additional protection. New combined kerb drainage is being constructed which will include for future rainfall intensity increases due to climate change. The Eastern Catchment Flood Risk Assessment and Management (CFRAM) study indicates that the bridge is not at risk from flooding, as detailed in the OPW Section 50 Application was submitted for the proposed development.

The structure will be designed the most onerous wind loads in accordance with IS-EN1991-1-4 (wind loading) and IS-EN1991-1-7 (Accidental actions).

Drought is not considered as it is predicted that drought will not have any direct or indirect effect on the proposed development.

The risk of wildfires is negligible due to the structure being located in an urban area. However, the proposed structure will be designed in accordance with IS-EN 1991-1-5 (temperature loads) and will include additional temperature due to climate change (2 degrees Celsius).

The proposed structure will include additional measures to increase its durability (including protecting against the effects of freeze / thaw action). These include bridge deck waterproofing, increased concrete cover to reinforcement in accordance with IS-EN1992-1-1, IS-EN206 and BS8500 and designing for temperature extremes as per IS-EN1991-1-5. All materials used during construction will be accompanied by certified datasheets which will set out the limiting operating temperatures.

The structure is located in the centre of an urban environment and the risk of landslides is negligible.

Lightning and hail are not deemed to pose an unusual risk to the structure.

Fog is unlikely to have an adverse effect on the structure. In terms of traffic visibility, no major changes are proposed to the road alignment that would negatively impact road user safety.

With the designed in mitigation in place the risk to climate is mitigated with only low vulnerability to climate risk remaining.

12.5 Mitigation & Monitoring Measures

12.5.1 Construction Phase

12.5.1.1 Air Quality

The proactive control of fugitive dust will ensure the prevention of significant emissions. The key aspects of controlling dust are listed below and in Appendix E of this Planning Report. These measures will be incorporated into the overall Construction Environmental Management Plan (CEMP) prepared in respect of the proposed development.

In summary, the measures which will be implemented will include:

- Hard surface roads will be swept to remove mud and aggregate materials from their surface while any un-surfaced roads will be restricted to essential site traffic.
- Any road that has the potential to give rise to fugitive dust will be regularly watered, as appropriate, during dry and/or windy conditions.
- Vehicles using site roads will have their speed restricted, and this speed restriction must be enforced rigidly. On any un-surfaced site road, this will be 20 kph, and on hard surfaced roads as site management dictates.
- Public roads outside the site will be regularly inspected for cleanliness and cleaned as necessary.
- Material handling systems and site stockpiling of materials will be designed and laid out to minimise exposure to wind. Water misting or sprays will be used as required if particularly dusty activities are necessary during dry or windy periods.
- During movement of materials both on and off-site, trucks will be stringently covered with tarpaulin at all times. Before entrance onto public roads, trucks will be adequately inspected to ensure no potential for dust emissions.
- During any demolition processes, water suppression should be used, preferably with a hand-held spray. Only the use of cutting, grinding or sawing equipment fitted or used in conjunction with a suitable dust suppression technique such as water sprays/local extraction should be used.
- Drop heights from conveyors, loading shovels, hoppers and other loading equipment should be minimised, if necessary fine water sprays should be employed.

At all times, these procedures will be strictly monitored and assessed. In the event of dust nuisance occurring outside the site boundary, movements of materials likely to raise dust would be curtailed and satisfactory procedures implemented to rectify the problem before the resumption of construction operations.

12.5.1.2 Climate GHGA

The Institute of Environmental Management and Assessment (IEMA) guidance note on *"Assessing Greenhouse Gas Emissions and Evaluating their Significance"* (IEMA 2022) states that the crux of significance regarding impact on climate is not whether a project emits GHG emissions, nor even the magnitude of GHG emissions alone, but whether it contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero by 2050. Mitigation has taken a leading role within the Guidance compared to the previous edition published in 2017. Early engagement is key and therefore mitigation should be considered from the outset of the project and continue throughout the project's lifetime in order to maximise GHG emissions savings. As well as stakeholders, key points of engagement include the design team and client who have a significant role to play in the reduction of GHG emissions.

The following guidance has been used when considering mitigation and resilience with respect to climate risk:

- IEMA EIA Guide to: Climate Change Resilience and Adaptation (IEMA 2020a).
- Technical guidance on the climate proofing of infrastructure in the period 2021-2027 (European Commission 2021a).
- Forging a climate-resilient Europe - the new EU Strategy on Adaptation to Climate Change (European Commission 2021b).

- PE-ENV-01104: Climate Guidance for National Rods, Light Rail and Rural Cycleways (Offline & Greenways) – Overarching Technical Document (TII 2022d).
- PE-ENV-01105: Climate Assessment of Proposed National Roads – Standard (TII 2022e).

Monitoring of the embodied carbon in the construction and operational phases will be conducted. The aim of the monitoring will be to seek further ways to minimise climate impacts. Monitoring will include; embodied carbon of construction materials, water usage, power and fuel usage and waste generation (including reuse and recycling rates). Where monitoring shows the proposed development is not meeting its targets, further mitigation will be put in place.

During the construction phase vehicles, generators etc., will give rise to some GHG emissions, however the proposed development's impact on climate due to traffic can be minimised through mitigation measures. The following mitigation measures will be put in place to minimise emissions:

- Implement a policy which prevents idling of vehicles both on and off-site including HGV holding sites.
- Construction Phase traffic shall be monitored to ensure construction vehicles are using the designated haul routes.
- All plant and machinery will be maintained and serviced regularly.
- Efficient scheduling of deliveries will be undertaken to minimise emissions.
- Construction vehicles shall conform to the latest EU emissions standards and where reasonably practicable, their emissions should meet upcoming standards prior to the legal requirement date for the new standard. This will ensure emissions on haul routes are minimised.

12.5.1.3 Climate CCRA

The purpose of the CCRA is to assess the impact of climate change and build in additional resilience to the proposed development where weaknesses to future climate change are identified. Mitigation measures with respect to CCRA fall into three main categories:

- Grey Actions: technical or engineering oriented responses to climate impacts (i.e. drainage design).
- Green Actions: nature-based solutions to develop the resilience of human and natural systems.
- Soft Actions: involve the alterations in behaviour, regulation, or systems of management (i.e. increased monitoring or management plans). Soft measures are considered the most flexible and inexpensive to implement.

A considerable part of the mitigation measures with respect to the CCRA are within the control by other experts (i.e. drainage design, a grey measure). A risk register (Appendix 12.2) was generated in order to document the risk assessment process and mitigation that was applied by specialists and members of the design team.

Where residual risk of future climate change remains, additional mitigation will be applied. These include management plans, monitoring or communication with TII on updated potential risks. Mitigation measures include time scales (i.e. annually, after a climate hazard event) and the responsible party. To ensure mitigation and adaptation measures to combat residual risks are binding, they will be included in the

appropriate project documentation (Phase 5 design reports onwards in CEMPs and OEMPs).

12.5.2 Operational Phase

Monitoring of carbon emissions will also include the ongoing management of adaptation and mitigation in order to measure their effectiveness, with consideration given to the vulnerabilities to extreme heat and cold. If monitoring of adaptation measures and mitigation measures indicates the measures are not effectively minimising embodied carbon or climate is impacting on the construction of the proposed development then they should be reviewed and updated.

12.6 Residual Impacts

12.6.1 Construction Phase

12.6.1.1 Air Quality

Once the dust minimisation measures outlined in Section 12.5.1 are implemented, the impact of the proposed development in terms of dust soiling will be *temporary, negative, localised* and *imperceptible* at nearby receptors.

12.6.1.2 Climate GHGA

PE-ENV-01104 TII (TII 2022a) states that professional judgement must be taken into account when contextualising and assessing the significance of a project's GHG impact. In line with IEMA Guidance (IEMA, 2022) TII state that the crux of assessing significance is "*not whether a project emits GHG emissions, nor even the magnitude of GHG emissions alone, but whether it contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero by 2050*".

Significance is determined using Table 12.7 (derived from Table 6.7 of PE-ENV-01104 (TII 2022a)) along with a with consideration of the following two factors:

- The extent to which the trajectory of GHG emissions from the project aligns with Ireland's GHG trajectory to net zero by 2050.
- The level of mitigation taking place.

The residual Construction Phase embodied carbon within the construction and maintenance materials and regional traffic impacts have been calculated in Table 12.20.

The proposed development with mitigation measures will result in total Construction Phase GHG emissions of 681.6 t CO_2eq over a 36 week construction period equivalent to an annualised total of 0.002% of Ireland's non-ETS 2030 emissions target, 0.0114% of the 2030 transport sector carbon budget or 0.017% of the 2030 industry sector carbon budget. This includes a value of 161 t CO_2eq for ongoing maintenance associated with the proposed development. Over the predicted 60-year lifespan the annualised emissions due to the initial Construction Phase and ongoing maintenance of the Proposed Scheme will reach at most of 0.000035% of Ireland's non-ETS 2030 emissions target, 0.000189% of the 2030 transport sector carbon budget or 0.000284% of the 2030 industry sector carbon budget. The significance criteria for impacts (IEMA 2022) states that the impact significance must be taken from the project as a whole over its lifecycle rather than individual phases.

12.6.1.3 Climate CCRA

Due to the nature of the proposed scheme the location is fixed. Low risks to climate change impacts remains as residual risk and will be monitored to ensure the risk does not increase.

12.6.1.4 Human Health

Best practice mitigation measures are proposed for the construction phase of the proposed development which will focus on the pro-active control of dust to minimise generation of emissions at source. The mitigation measures that will be put in place during construction of the proposed development will ensure that the impact of the development complies with all EU ambient air quality legislative limit values which are based on the protection of human health (see Table 12.1). Therefore, the impact of construction of the proposed development is likely to be *neutral, temporary, localised* and *imperceptible* with respect to human health.

12.6.2 Operational Phase

12.6.2.1 Air Quality

There are no predicted impacts to air quality as a result of the operational phase of the proposed development.

12.6.2.2 Climate GHGA

There are no predicted impacts to climate as a result of the operational phase of the proposed development. Some maintenance of the proposed development will be required.

The significance criteria for impacts (IEMA 2022) states that the impact significance must be taken from the project as a whole over its lifecycle rather than individual phases. With consideration the significance criteria set out in Section 0 which states that impact should consider the extent to which the trajectory of GHG emissions from the project aligns with Ireland's GHG trajectory to net zero by 2050 and the level of mitigation taking place.

Further mitigation of embodied carbon will be considered during detailed design.

12.6.2.3 Climate CCRA

The residual risk with respect to Climate Change is considered low due to designed in resilience. However, risks due to climate change will require monitoring to ensure the risk does not increase.

12.6.2.4 Overall Climate Significance

This proposed development helps promote active travel by improving walking and cycling facilities within the town. The impact is considered moderate adverse, national and long-term. The proposed development complied with the active travel policy set out in CAP23. Significant upgrades with respect to flood risk have not been included as part of the proposed development, however the heights of the proposed new flood walls at the southeast and west corners will be equal to or greater than the existing, adding additional protection. In addition, new combined kerb drainage is being constructed which will include for future rainfall intensity increases due to climate change.

Having regard to the significance criteria set out in Section 0, the proposed development is classed as moderate adverse as further mitigation is required to be shown with respect to the minimisation of the residual GHG emissions.

12.7 Difficulties Encountered

The updated Air Quality and Climate guidance was issued by TII in late December 2022. However at this stage the air quality and climate assessments were complete and had undergone a legal review. As per Section 1.9 of PE-ENV-01107 and Section of 1.5 of PE-ENV-01105 of the TII guidance, projects that have commenced planning and design and progressed assessments can treat the revised TII guidance as advice and guidance and it does not need to be implemented to the full extent. As the air quality and climate assessments for the proposed development had been completed at the time the revised TII guidance was published it was considered reasonably practicable to update the assessments where possible but the full extent of the revised guidance was not implemented.

The application was progressed to an extent that opportunities for minimisation of embodied carbon were constrained, however further work will be done in this area in detailed design.

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Appendix 12.1
Ambient Air Quality Standards

National standards for ambient air pollutants in Ireland have generally ensued from Council Directives enacted in the EU (& previously the EC & EEC). The initial interest in ambient air pollution legislation in the EU dates from the early 1980s and was in response to the most serious pollutant problems at that time which was the issue of acid rain. As a result of this sulphur dioxide, and later nitrogen dioxide, were both the focus of EU legislation. Linked to the acid rain problem was urban smog associated with fuel burning for space heating purposes. Also apparent at this time were the problems caused by leaded petrol and EU legislation was introduced to deal with this problem in the early 1980s.

In recent years the EU has focused on defining a basis strategy across the EU in relation to ambient air quality. In 1996, a Framework Directive, Council Directive 96/62/EC, on ambient air quality assessment and management was enacted. The aims of the Directive are fourfold. Firstly, the Directive's aim is to establish objectives for ambient air quality designed to avoid harmful effects to health. Secondly, the Directive aims to assess ambient air quality on the basis of common methods and criteria throughout the EU. Additionally, it is aimed to make information on air quality available to the public via alert thresholds and fourthly, it aims to maintain air quality where it is good and improve it in other cases.

As part of these measures to improve air quality, the European Commission has adopted proposals for daughter legislation under Directive 96/62/EC. The first of these directives to be enacted, Council Directive 1999/30/EC, has been passed into Irish Law as S.I. No 271 of 2002 (Air Quality Standards Regulations 2002), and has set limit values which came into operation on 17th June 2002. The Air Quality Standards Regulations 2002 detail margins of tolerance, which are trigger levels for certain types of action in the period leading to the attainment date. The margin of tolerance varies from 60% for lead, to 30% for 24-hour limit value for PM_{10}, 40% for the hourly and annual limit value for NO_2 and 26% for hourly SO_2 limit values. The margin of tolerance commenced from June 2002, and started to reduce from 1 January 2003 and every 12 months thereafter by equal annual percentages to reach 0% by the attainment date. A second daughter directive, EU Council Directive 2000/69/EC, has published limit values for both carbon monoxide and benzene in ambient air. This has also been passed into Irish Law under the Air Quality Standards Regulations 2002.

The most recent EU Council Directive on ambient air quality was published on the 11/06/08 which has been transposed into Irish Law as S.I. 180 of 2011. Council Directive 2008/50/EC combines the previous Air Quality Framework Directive and its subsequent daughter directives. Provisions were also made for the inclusion of new ambient limit values relating to $PM_{2.5}$. The margins of tolerance specific to each pollutant were also slightly adjusted from previous directives. In regard to existing ambient air quality standards, it is not proposed to modify the standards but to strengthen existing provisions to ensure that non-compliances are removed. In addition, new ambient standards for $PM_{2.5}$ are included in Directive 2008/50/EC. The approach for $PM_{2.5}$ was to establish a target value of 25 $\mu g/m^3$, as an annual average (to be attained everywhere by 2010) and a limit value of 25 $\mu g/m^3$, as an annual average (to be attained everywhere by 2015), coupled with a target to reduce human exposure generally to $PM_{2.5}$ between 2010 and 2020. This exposure reduction target will range from 0% (for $PM_{2.5}$ concentrations of less than 8.5 $\mu g/m^3$ to 20% of the average exposure indicator (AEI) for concentrations of between 18 - 22 $\mu g/m^3$). Where the AEI is currently greater than 22 $\mu g/m^3$ all appropriate measures should be employed to reduce this level to 18 $\mu g/m^3$ by 2020. The AEI is based on measurements taken in urban background locations averaged over a three year period from 2008 - 2010 and again from 2018 - 2020. Additionally, an exposure concentration obligation of 20 $\mu g/m^3$ was set to be complied with by 2015 again based on the AEI.

Although the EU Air Quality Limit Values are the basis of legislation, other thresholds outlined by the EU Directives are used which are triggers for particular actions. The Alert Threshold is defined in Council Directive 96/62/EC as "a level beyond which there is a risk to human health from brief exposure and at which immediate steps shall be taken as laid down in Directive 96/62/EC". These steps include undertaking to ensure that the necessary steps are taken to inform the public (e.g. by means of radio, television and the press).

The Margin of Tolerance is defined in Council Directive 96/62/EC as a concentration which is higher than the limit value when legislation comes into force. It decreases to meet the limit value by the attainment date. The Upper Assessment Threshold is defined in Council Directive 96/62/EC as a concentration above which high quality measurement is mandatory. Data from measurement may be supplemented by information from other sources, including air quality modelling.

An annual average limit for both NO_X (NO and NO_2) is applicable for the protection of vegetation in highly rural areas away from major sources of NO_X such as large conurbations, factories and high road vehicle activity such as a dual carriageway or motorway. Annex VI of EU Directive 1999/30/EC identifies that monitoring to demonstrate compliance with the NO_X limit for the protection of vegetation should be carried out distances greater than:

- 5 km from the nearest motorway or dual carriageway
- 5 km from the nearest major industrial installation
- 20 km from a major urban conurbation
- As a guideline, a monitoring station should be indicative of approximately 1000 km^2 of surrounding area.

Under the terms of EU Framework Directive on Ambient Air Quality (96/62/EC), geographical areas within member states have been classified in terms of zones. The zones have been defined in order to meet the criteria for air quality monitoring, assessment and management as described in the Framework Directive and Daughter Directives. Zone A is defined as Dublin and its environs, Zone B is defined as Cork City, Zone C is defined as 23 urban areas with a population greater than 15,000 and Zone D is defined as the remainder of the country. The Zones were defined based on among other things, population and existing ambient air quality.

EU Council Directive 96/62/EC on ambient air quality and assessment has been adopted into Irish Legislation (S.I. No. 33 of 1999). The act has designated the Environmental Protection Agency (EPA) as the competent authority responsible for the implementation of the Directive and for assessing ambient air quality in the State. Other commonly referenced ambient air quality standards include the World Health Organisation. The WHO guidelines differ from air quality standards in that they are primarily set to protect public health from the effects of air pollution. Air quality standards, however, are air quality guidelines recommended by governments, for which additional factors, such as socio-economic factors, may be considered.

Appendix 12.2
Climate Risk Register

Risk Identification					Planned Controls	Risk Assessment						Adaptation Measures								Significance
						Initial risk rating								Residual Risk Rating						
						RCP4.5 (2041-2060) Moderate Risk Scenario			RCP8.5 (2041-2060) High Risk Scenario					RCP4.5 (2041-2060)			RCP8.5 (2041-2060)			
Risk ID	Climate Variable	Risk Statement	Project Receptors	Impact Type		Likelihood	Consequence	Risk rating	Likelihood	Consequence	Risk rating	Adaptation Measures	Timing & Responsibility	Likelihood	Consequence	Risk rating	Likelihood	Consequence	Risk rating	
1	Flood pluvial	Potential risk to pluvial flooding on site	Access roads, landfill, buildings	Flooding	The proposed structure will be designed to withstand the hydraulic effects of storm surges. The heights of the proposed new flood walls at the southeast and west corners will be equal to or greater than the existing. Drainage includes additional 20% for climate change.	Rare	Minor	Low Risk	Unlikely	Low Risk	Low Risk	Design measures	Adaptation measures to be monitored and reviewed annually to ensure sufficient coverage of likely events.	Rare	Insignificant	Low Risk	Unlikely	Low Risk	Low Risk	Not significant
2	Extreme Heat	Extended heat events have the potential to impact structures	Structures and access roads	Damage road surfaces	Designed in resilience. Adaptation measures to be monitored and reviewed annually to ensure sufficient coverage of likely events.	Unlikely	Minor	Low Risk	Unlikely	Minor	Low Risk	Consideration of wetlands and composting management for extreme heat periods.	Designed in resilience. Adaptation measures to be monitored and reviewed annually to ensure sufficient coverage of likely events.	Unlikely	Minor	Low Risk	Unlikely	Minor	Low Risk	Not Significant
3	Extreme Cold	Extended cold events have the potential to impact structures	Structures and access roads	Ice/snow on roads impacting access and cold impacting road safety.	Designed in resilience. Gritting of roads when required, lighting to show if issue present.	Unlikely	Minor	Low Risk	Unlikely	Minor	Low Risk	Consideration of given with design for extreme cold.	Adaptation measures to be monitored and reviewed annually to ensure sufficient coverage of likely events.	Unlikely	Minor	Low Risk	Unlikely	Minor	Low Risk	Not Significant
4	Drought	Drought events will not impact the project	N/A	N/A	Adaptation measures to be monitored and reviewed annually to ensure sufficient coverage of likely events.	Rare	Insignificant	Low Risk	Rare	Insignificant	Low Risk	For any minor planting use drought resistant planting and rainwater harvesting to provide a backup supply of water.	Adaptation measures to be monitored and reviewed annually to ensure sufficient coverage of likely events.	Rare	Insignificant	Low Risk	Rare	Insignificant	Low Risk	Not significant

Risk Identification					Planned Controls	Risk Assessment						Adaptation Measures								Significance
						Initial risk rating								Residual Risk Rating						
						RCP4.5 (2041-2060) Moderate Risk Scenario			RCP8.5 (2041-2060) High Risk Scenario					RCP4.5 (2041-2060)			RCP8.5 (2041-2060)			
Risk ID	Climate Variable	Risk Statement	Project Receptors	Impact Type		Likelihood	Consequence	Risk rating	Likelihood	Consequence	Risk rating	Adaptation Measures	Timing & Responsibility	Likelihood	Consequence	Risk rating	Likelihood	Consequence	Risk rating	
5	Wind	Wind has the potential to damage some structures	Overhead lines and building	Damage to line or building cladding	Designed in resilience. Upkeep of buildings to ensure no weak points. Designed to Eurocodes which account for wind loadings.	Unlikely	Insignificant	Low Risk	Modera te	Insignificant	Low Risk	Designed and built to standards that should be resilient to increased wind loading.	Designed in resilience. Upkeep of buildings to ensure no weak points. Designed to Eurocodes which account for wind loadings.	Unlikely	Insignificant	Low Risk	Moderate	Insignificant	Low Risk	Not significant
6	Wildfire	Wildfire events are not likely due to project location	N/A	N/A	Adaptation measures to be monitored and reviewed annually to ensure sufficient coverage of likely events.	Rare	Insignificant	Low Risk	Unlikely	Insignificant	Low Risk	Design measures	Adaptation measures to be monitored and reviewed annually to ensure sufficient coverage of likely events.	Rare	Insignificant	Low Risk	Unlikely	Insignificant	Low Risk	Not significant
7	Fog	Risk to access roads during significant fog events	Access roads	Road accident	Speed restrictions and lighting to provide safer access conditions during fog events.	Rare	Insignificant	Low Risk	Rare	Insignificant	Low Risk	Speed restrictions and lighting to provide safer access conditions during fog events.	Regularly updated plan and review of potential risks.	Rare	Insignificant	Low Risk	Rare	Insignificant	Low Risk	Not significant
8	Lightning & Hail	Potential risk of hail or lighting on site.	Structures and access roads	Structural damage or H&S risk.	No history of issues on the site however will be reviewed for risk annually.	Rare	Insignificant	Low Risk	Rare	Insignificant	Low Risk	No history of issues on the site.	Reviewed for risk annually.	Rare	Insignificant	Low Risk	Rare	Insignificant	Low Risk	Not significant
9	Landslides	Potential risk of landslides	Structures and access roads	structural damage	No evidence of potential risk. Piles to prevent bridge embankment issues.	Rare	Insignificant	Low Risk	Rare	Insignificant	Low Risk	No evidence of potential risk. Piles to prevent bridge embankment issues.	Monitor any areas of concern.	Rare	Insignificant	Low Risk	Rare	Insignificant	Low Risk	Not significant

13. NOISE AND VIBRATION

13.1 Introduction

This section assesses the noise and vibration impacts associated with the construction phase of the proposed development. The upgrade works are intended for pedestrian and cyclist use only with no direct effects on vehicular traffic movements. It is therefore not required to assess the noise and vibration impact of the operational phase.

Development Description

O'Hanrahan Bridge is located in the centre of New Ross, Co. Wexford, where it carries the single carriageway R723 regional road over the River Barrow.

The bridge is located within an urban environment with the adjacent land use mainly comprising commercial and residential use with noise and vibration sensitive locations on both the east and west side of the bridge.

The primary function of the proposed development is to provide a shared pedestrian and cycleway from the New Ross quay front to Rosbercon Quay on the north-western side of the bridge, that is accommodated along the widened section of O'Hanrahan Bridge.

13.2 Guidance

This noise and vibration assessment has been prepared in accordance with the following guidance documents:

- EPA Guidelines on the Information to be contained in Environmental Impact Assessment Reports, (May, 2022).
- EPA Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4).
- BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites - Part 1 – Noise.
- BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites - Part 2 -Vibration.
- NRA/TII Good Practice Guidance for the Treatment of Noise during the Planning of National Road Schemes 2014.
- Design Manual for Roads and Bridges (UK): 2020 (DMRB).
- ISO 1996: 2017: Acoustics - Description, Measurement and Assessment of Environmental Noise.
- BS 6472-1 (2008) Guide to evaluation of Human Exposure to Vibration in Buildings - Vibration sources other than Blasting.
- BS 7385-2:1993 Guide for measurement of vibrations and evaluation of their effects on buildings.
- BS ISO 4866:2010 Mechanical vibration and shock — Vibration of fixed structures — Guidelines for the measurement of vibrations and evaluation of their effects on structures.

The noise and vibration assessment has been undertaken for the proposed development using the following methodology:

- A review of the proposed development to identify elements that would potentially effect noise and vibration levels at nearby sensitive locations.
- A review of the most applicable standards and guidelines to set a range of acceptable noise and vibration criteria for the construction phase of the proposed development.
- A baseline survey to assess the existing noise and vibration levels.
- Predictive calculations to estimate the noise and vibration emissions during the construction phase of the project at the nearest noise sensitive locations to the works.
- A schedule of mitigation measures, where relevant, to control the noise and vibration emissions associated with the construction phase of the proposed development.

13.3 Assessment Criteria

13.3.1 Construction Noise

13.3.1.1 Noise Sensitive Location – Definition

The assessment criteria will apply to Noise Sensitive Locations (NSLs), the definition of which is given in the EPA NG4 document as:

> *"any dwelling house, hotel or hostel, health building, educational establishment, place of worship or entertainment, or any other facility or other area of high amenity which for its proper enjoyment requires the absence of noise at nuisance levels."*

13.3.1.2 BS 5228

To set appropriate construction noise limits for the proposed development, reference has been made to *BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites - Noise*. This provides information on the prediction and measurement of noise from construction sites and operations such as mines and quarries. It also includes a large database of source noise levels for commonly used equipment and activities on construction sites.

The standard provides guidance on the 'threshold of significant effect' in respect of noise impact at dwellings. One suggested method for determining threshold noise levels is known as the 'ABC method'. This involves measuring existing ambient noise levels at noise sensitive locations and categorising them A, B or C accordingly, with the relevant threshold level derived from the category as set out in Table 13-1.

Table 13-1 BS 5228 - Example of significant effect at dwellings

Assessment category and threshold value period (L_{Aeq})	Threshold value, in decibels (dB)		
	Category A [A)]	Category B [B)]	Category C [C)]
Night-time (23.00−07.00)	45	50	55
Evenings and weekends [D)]	55	60	65
Daytime (07.00−19.00) and Saturdays (07.00−13.00)	65	70	75
NOTE 1 A significant effect has been deemed to occur if the total L_{Aeq} noise level, including construction, exceeds the threshold level for the Category appropriate to the ambient noise level. *NOTE 2 If the ambient noise level exceeds the threshold values given in the table (i.e. the ambient noise level is higher than the above values), then a significant effect is deemed to occur if the total*			

Assessment category and threshold value period (L_{Aeq})	Threshold value, in decibels (dB)		
	Category A A)	Category B B)	Category C C)
L_{Aeq} noise level for the period increases by more than 3 dB due to construction activity. *NOTE 3 Applied to residential receptors only.*			
A)	Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are less than these values.		
B)	Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are the same as category A values.		
C)	Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are higher than category A values.		
D)	19.00–23.00 weekdays, 13.00–23.00 Saturdays and 07.00 –23.00 Sundays.		

In general, the noise impact associated with the construction phase will be as a result of the specific items of plant used, the duration and phasing of the construction methods, the time of day that each plant will be used and their location.

Section 4.2 Overview of Construction Programme in this Planning Report provides the construction programme for the proposed development.

Table 13-2 Construction programme

Construction Element	Approx. Duration of each task
Mobilisation, compound set up	2 weeks
Works on southern side of bridge	Approx. 4 months
Works on northern side of bridge	Approx. 4 months
Works on southeast quay wall*	Approx. 2 months (incl. 4 weeks of pile-driving)
Works on southwest quay wall**	Approx. 2 to 2.5 months (incl. 4 to 6 weeks of pile driving)
Concrete repairs to underside of bridge*	4-6 weeks
Total Construction Phase	**Approx. 9 months**
* These works can be carried out in parallel with the main bridge works ** These works can be carried out following completion of the southeast corner and in parallel with the main bridge widening works	

13.3.1.3 NRA/TII Guidelines

The National Roads Authority (now TII) publication *Guidelines for the Treatment of Noise and Vibration in National Road Schemes* contains information on the permissible construction noise levels for various hours of operation. The noise level limits are outlined in Table 13-3.

Table 13-3 Maximum permissible noise levels at the façade of dwellings during construction.

Period	Noise Levels**	
	$L_{Aeq, 1hr}$	L_{ASmax}
Monday to Friday 07:00 to 19:00hrs	70	80
Monday to Friday 19:00 to 22:00hrs	60*	65*
Saturdays 08:00 to 16:30hrs	65	75

Period	Noise Levels**	
	$L_{Aeq, 1hr}$	L_{ASmax}
Sundays & Bank Holidays 08:00 to 16:30hrs	60	65*
** Construction activity at these times, other than that required for emergency works, will normally require the explicit permission of the relevant local authority.* *** Noise levels presented are in dB re. $2x10^{-5}$Pa*		

13.3.1.4 WHO – Noise Guidelines

The World Health Organisation (WHO) in their 2018 publication entitled Environmental Noise Guidelines for the European Region has proposed new guidelines for community noise. In this guidance, a Lden daytime noise limit of 53dB is suggested to protect against adverse health effects. Lnight Levels of 45dB or less are proposed at night-time to protect against adverse effects on sleep. It is noted that the WHO 2018 Noise Guidelines are directed to population level effects and should not be viewed as limit values for specific individual properties, unlike the NRA/TII and BS5228 guidelines which are used for this purpose.

13.3.1.5 Construction Traffic

The most appropriate criteria for assessing disturbance or annoyance from changes in traffic noise is related to the significance of perceived changes in noise levels.

The DMRB:2020 guidance sets out the magnitude of impact in relation to construction related traffic increases for roads within the construction traffic study area. A summary of this with subjective reactions and EPA Glossary of Effects is as follows:

Table 13-4 Summary of appropriate impact for changes in noise levels due to construction traffic

Change in Noise Level (dB)	DMRB Magnitude of Impact	Subjective Reaction	EPA Glossary of Effects[9]
< 1.0	No change	Negligible	Imperceptible
≥1.0 and < 3.0	Barely perceptible	Minor	Slight
≥3.0 and < 5.0	Noticeable	Moderate	Moderate
≥5.0	Significant	Major	Significant

13.3.2 Construction Vibration

13.3.2.1 Human Response to Vibration

BS 5228- 2:2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites provides guidance on vibration and its control and management on various site types. The standard also presents details on the human response to vibration and Table 13-5 below outlines these effects.

[9] EPA Guidelines on the Information to be contained in Environmental Impact Assessment Reports (EIAR), (May, 2022)

Table 13-5 Guidance on effects of vibration levels

Vibration Level	Effect
0.14 mm/s	Vibration might be just perceptible in the most sensitive situations for most vibration frequencies associated with construction. At lower frequencies, people are less sensitive to vibration.
0.3 mm/s	Vibration might be just perceptible in residential environments.
1.0 mm/s	It is likely that vibration of this level in residential environments will cause complaint but can be tolerated if prior warning and explanation has been given to residents.
10 mm/s	Vibration is likely to be intolerable for any more than a very brief exposure to this level.

13.3.2.2 Vibration induced Building Damage

The response of a building to ground-borne vibration is affected by the type of foundation, underlying ground conditions, the building construction, and the state of repair of the building. BS 7385-2 provides guide values to prevent building damage due to vibration transmitted through the ground. These limits for transient vibration as measured at the building/ground interface, above which cosmetic damage could occur, are given in Table 13-6.

Table 13-6 Transient vibration guide values for cosmetic damage.

Type of Building	Peak component particle velocity in frequency range of predominant pulse	
	4 Hz to 15 Hz	**15 Hz and above**
Reinforced or framed structures. Industrial and heavy commercial buildings	50 mm/s at 4Hz and above	50 mm/s at 4Hz and above
Unreinforced or light framed structures Residential or light commercial buildings	15 mm/s at 4Hz[1] increasing to 20 mm/s at 15Hz	20 mm/s at 15Hz increasing to 50 mm/s at 40Hz and above

NOTE 1 Values referred to are at the base of the building.

[1] At frequencies below 4 Hz, a maximum displacement of 0.6 mm (zero to peak) is not to be exceeded

Minor structural damage may occur at levels around twice the above limits and major damage can occur at levels around four times the above limits.

Buildings that are difficult to repair might require special consideration on a case-by-case basis, but buildings of historical importance should not (unless it is structurally unsound) be assumed to be more sensitive. If a building is in a very unstable state, then it will tend to be more vulnerable to the possibility of damage arising from vibration or any other ground borne disturbance.

It should be noted that there is a major difference between the sensitivity of people in feeling vibration and the onset of vibration which causes building damage. Vibration in relation to construction sites therefore may result in temporary disturbance but rarely cause even cosmetic damage. For some construction sites e.g., during piling or rock-braking and with dwellings nearby, vibration monitoring at these locations may be prudent.

13.3.2.3 NRA/TII Good Practice Guidance

The *NRA/TII Good Practice Guidance for the Treatment of Noise during the Planning of National Road Schemes 2014*, goes on to recommend that to prevent the potential for vibration induced damage to buildings during construction that vibration from road construction activities be limited to the values set out in Table 13-7.

Table 13-7 Summary of TII recommended construction vibration limits

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)**
8 mm/s	12.5 mm/s	20 mm/s

13.3.2.4 Recommended Criterion

In summary of the above standards, vibration levels measured as Peak Particle Velocity (PPV), should preferably be kept below 1.0 mm/s. By giving prior notice to the potentially affected residents, the vibration criterion can be relaxed to 8 mm/s. Vibration levels above 8 mm/s at occupied buildings should be avoided.

13.4 Vibration induced Bridge Damage

A bridge's reaction to excitation, including from external vibration sources, is dependent on its design and structure. It is believed that the bridge, when compared with a typical building, would be less susceptible to construction vibration damage. Hence, the adopted vibration limits for building damage set out above would be sufficient to protect the bridge from significant damage.

13.5 Baseline Environment

13.5.1 Background Noise & Vibration Survey

Study Area

The construction noise study area encompasses all Noise Sensitive Locations (NSLs) that are potentially affected by construction noise. A selection of representative NSLs were chosen closest to the proposed construction works to make a worse-case impact assessment. Noise and vibration surveys were made at these selected NSLs.

Survey Locations

A baseline survey was conducted to quantify the existing ambient noise and vibration levels within the study area. The survey was conducted in general accordance with the following standards and guidance:

- ISO 1996: 2017: Acoustics - Description, Measurement and Assessment of Environmental Noise.
- BS ISO 4866:2010 Mechanical vibration and shock. Vibration of fixed structures. Guidelines for the measurement of vibrations and evaluation of their effects on structures.
- TII Good Practice Guidance for the Treatment of Noise during the Planning of National Road Schemes 2014.

The noise and vibration survey locations are listed below and are presented in Figure 13-1.

Table 13-8 Summary of Survey Locations and Measurements

Location	Ref.	Type of Survey
West of the bridge, at The Moorings Apartments	ASL 1	Noise - Attended
	USL 2	Noise - Unattended
	VMT 2	Vibration - Attended
	NSL 3	Noise Sensitive Location – Check Point
West of bridge, at The Waterside Apartments	NSL 2	Noise Sensitive Location – Check Point
	ASL 2	Noise - Attended
East of the bridge, at small plaza area	USL 1	Noise - Unattended
	VMT 1	Vibration - Attended
	ASL 3	Noise - Attended
East of bridge, Dwellings above a retail unit, adjacent to Bank of Ireland	NSL 1	Noise Sensitive Location – Check Point
	ASL 4	Noise – Attended
Key:	*ASL – Attended Survey Location* *USL – Unattended Survey Location* *VMT – Vibration Monitoring Location* *NSL – Noise Sensitive Location – Check Point*	

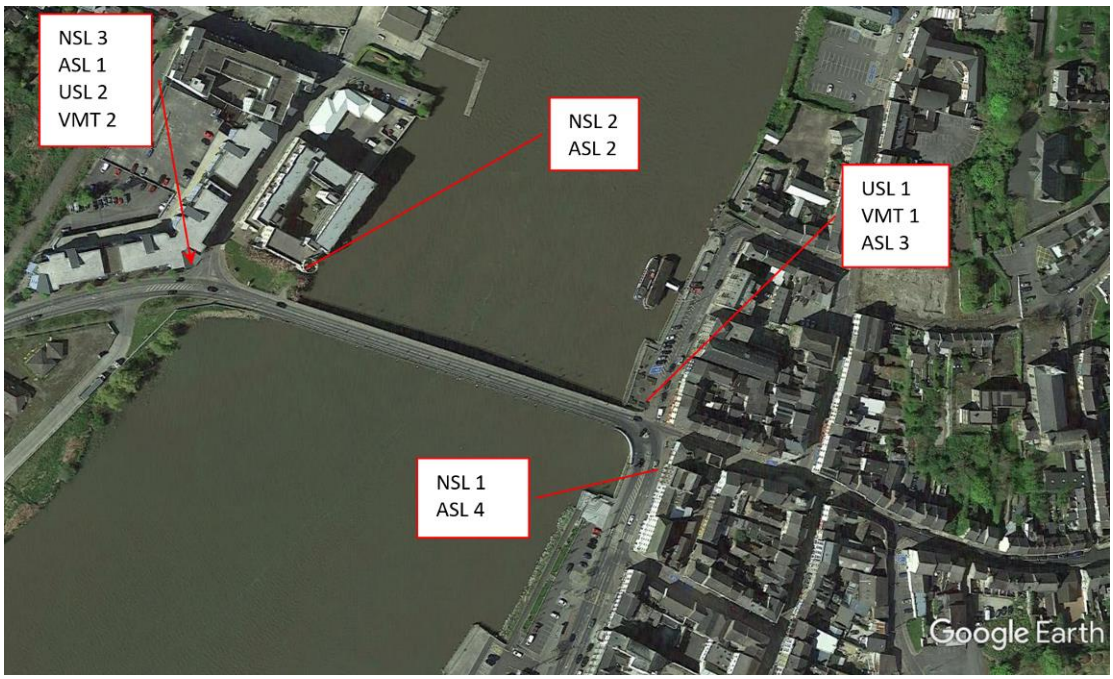

Figure 13-1 Map of Survey Locations

Attended noise and vibration measurements were taken on 19/01/2022. Unattended noise monitoring took place between 03/02/20222 and 04/02/2022. Weather conditions were dry and calm throughout the programme.

Instrumentation

The Sound Level Meters (SLMs) used were class 1 Bruel & Kjaer Type 2250s for the noise measurements and noise monitoring. Each SLM was calibrated prior to

measurements and the sensitivity checked afterwards for any significant drift; none was found.

For Vibration Measurements a Bruel and Kjaer Type 4450-A Vibration Monitoring Terminal was used. Sensor checks were conducted prior to measurements.

Measurement Parameters

The survey results are presented in terms of the following parameters:

A-weighting	Frequency weighting scale to account for non-linear response of the human ear. Used so that the measured noise corresponds roughly to the overall level of noise that is discerned by the average human. Denoted by suffix A in parameters such as L_{Aeq}, L_{AF90}, etc.
$L_{Aeq, T}$	Equivalent continuous A-weighted sound pressure level. The value of the sound pressure level in decibels of continuous steady sound that, within a specified time interval, T = t2 – t1, has the same mean-squared sound pressure as a sound that varies with time. Often described as the 'average' noise level.
L_{AF90}	The noise level exceeded for 90% of the measurement period, A-weighted and calculated by Statistical Analysis. Often used as a measure of background noise as it 'filters' the impact of individual noise events like passing vehicles.
L_{AFMax}	is the instantaneous maximum sound level measured during the sample period using the 'F' time weighting
PPV	Peak Particle Velocity. PPV is a vibration parameter. It is the measurement of maximum ground particle movement speed.

13.5.2 Survey Results

13.5.2.1 Noise Survey Results

Following the procedure outlined in the TII guidance, the average of a series of three non-consecutive 15min attended Daytime noise measurements were made at each Attended Survey Location.

The results are presented in Table 13-9 below.

Table 13-9 Summary of Daytime noise measurements.

ID	Start Time	Elapsed Time	L_{Aeq} (dB)	L_{A90} (dB)
ASL1	19/01/2022 14:25	15min	66	61
	19/01/2022 15:00		65	61
	19/01/2022 16:00		70	61
		Average:	**68**	**61**
ASL2	19/01/2022 14:12	15min	70	60
	19/01/2022 15:05		68	59
	19/01/2022 16:08		70	62
		Average:	**69**	**60**

ID	Start Time	Elapsed Time	L_{Aeq} (dB)	L_{A90} (dB)
ASL3	19/01/2022 14:28	15min	62	54
	19/01/2022 15:21		63	54
	19/01/2022 16:39		63	56
		Average:	**63**	**55**
ASL4	19/01/2022 14:41	15min	66	58
	19/01/2022 15:18		67	60
	19/01/2022 16:19		68	61
		Average:	**67**	**60**

The ambient noise levels for the Evening and Night-time periods were taken as the minimum of the averaged L_{Aeq} values from the unattended monitoring data and are presented below.

Table 13-10 Summary of Evening and Night-time noise levels.

	Evening (19:00-23:00)		Night-time (23:00-07:00)	
ID	L_{Aeq} (dB)	L_{A90} (dB)	L_{Aeq} (dB)	L_{A90} (dB)
USL 1	61	59	46	45
USL 2	59	58	44	43
Minimum Ambient Values	**59**	**58**	**44**	**43**

The noise environment at all measurement locations was dominated by Road Traffic Noise from the R723 Regional Road.

13.5.2.2 Vibration Survey Results

The vibration levels at the measurement locations are as a result of passing road traffic, in particular Heavy Goods Vehicles (HGVs). A representative measurement period between 2pm-3pm was chosen and numerous passing vehicles and HGVs were observed. The overall measured Peak Particle Velocity (PPV) results are given in Table 13-11 below.

Table 13-11 Summary of Baseline Vibration Survey Results

Location	ID	Measurement Period	PPV (mm/s)
East	VMT 1	14:18-14:57	0.41
West	VMT 2	14:07-15:00	0.75

13.6 Potential Impacts

The potential noise and vibration impacts associated with the construction phase of the proposed development are discussed in the following section.

13.6.1 Construction Noise Limits

The methodology set out in BS 5228 considers the existing ambient noise levels to set a category for suitable construction noise limits. The minimum measured ambient noise levels from Table 13-9 are used as a worse case assessment i.e. L_{Aeq} 63dB (Daytime) and L_{Aeq} 44dB (Night-time). These figures are rounded to the nearest 5dB to set the appropriate category for the respective periods. Category B noise limits are therefore applicable.

The NRA/TII guidelines recommend absolute limits regardless of the ambient conditions.

A summary of the noise limits and periods from both guidance relative to the works is given in Table 13-12 with the recommended limits.

Table 13-12 Summary of Construction Noise Limits

	Period					
Guidance	**Monday – Friday**		**Saturdays / Periods[1]**		**Sundays & Bank Hols. / Periods[1]**	
	Daytime 07:00 - 19:00	**Evening 19:00 - 23: 00**				
BS5228	70	60	70	07:00-13:00	60	07:00-23:00
			60	13:00-23:00		
TII	70[2]	60[3]	65[2]	08:00-16:30	60[3]	08:00-16:30
Recommended Limits	**70[2]**	**60[3]**	**65[2]**	**08:00-16:30**	**60[3]**	**08:00-16:30**

[1] Saturday and Sunday/Bank Hols. periods are defined differently in each guidance.
[2] L_{ASMax} limit +10dB also applies.
[3] L_{ASMax} limit +5dB also applies.

The permitted working hours fall within the respective time periods set out above.

13.6.2 Construction Noise Levels

Section 4 Construction & Operational Phase of the Planning Report sets out the general construction sequence however, specific information regarding the items of plant to be used cannot be fully quantified at this point. Therefore, as a working hypothesis the noise impact assessment will assume typical items of plant associated with each phase of the works.

BS 5228 provides details for items of plant that are used for various phases of typical construction works including road construction. The associated noise levels are generally given at a distance of 10m.

Noise levels attenuate over distance from a source to a receiver and will be further attenuated by barriers (such as a site hoarding), topography and other factors. In addition, it is not expected that items of plant will operate continuously or simultaneously for the 1 hour reference period and an activity correction therefore applies to the sources' noise level. It is possible using standard acoustic formula to calculate these effects.

Screening, distance and activity corrections where appropriate are applied to the total noise level of all items of plant to calculate the resultant at the nearest noise sensitive

location. The nearest noise sensitive location is NSL1 located approximately 20m east of the works and the impact assessment to here represents a worse case with other locations being further from the works and therefore the impact will be less.

The selected noisiest items of plant associated with the main phases of the works and the respective noise impact assessments are given in the following tables:

Table 13-13 Impact Assessment – Main Bridge Works

Phase:	**Main Bridge Works**		
Plant Type	**BS5228 Reference**	**Power Rating (kW)**	**L_{Aeq} (dB)**
Road breaker (hand-held pneumatic)	C5.3	-	82
Wheeled excavator	C5.11	112	73
		Sub Total	83
		Distance Attenuation (20m to nearest NSL)	-6
		Noise Barrier Attenuation	-10
		Activity Correction (33% duty cycle)	-5
		Total $L_{Aeq, 1hr}$	62
Construction Criteria:			
	Daytime (70dB)	**Evening (65dB)**	**Saturdays (65dB)**
Exceeded?	No	No	No
Impact Assessment:			
Existing Ambient	63dB	59dB	63dB
Difference	-1	-3	-1
EPA effect	Slight	Slight	Slight
Comments:	This is a worse case assessment when the works are closest to an NSL. As the works progress further from an NSL, the distance attenuation will increase. Works during night-time should be avoided where possible. There is capacity for up to seven addition sets of plant to operate within the Daytime criteria.		

Table 13-14 Impact Assessment – Southeast Quay Wall (Piling – Vibratory)

Phase:	**Southeast Quay Wall (Piling – Vibratory)**		
Plant Type	**BS5228 Reference**	**Power Rating (kW)**	**L_{Aeq} (dB)**
MOVAX SG60, vibratory pile driver	N/A	N/A	82
		Sub Total	82
		Distance Attenuation (20m to nearest NSL)	-6
		Noise Barrier Attenuation	-10
		Activity Correction (Piling up to 55min/hour)	0
		Total	66

Phase:	**Southeast Quay Wall (Piling – Vibratory)**		
Construction Criteria:			
	Daytime (70dB)	**Evening (65dB)**	**Saturdays (65dB)**
Exceeded?	No	N/A	N/A
Impact Assessment:			
Existing Ambient	63dB	N/A	N/A
Difference	-3	N/A	N/A
EPA effect	Slight	N/A	N/A
Comments:	Following every piling event, there shall be a quiet period of at least 30 minutes. An additional activity correction of -3dB shall therefore apply to the hour after a piling event. Piling works will take place intermittently during the daytime only for a total of 4 weeks. The impact is therefore Temporary.		

Table 13-15 Impact Assessment – Southeast Quay Wall (Piling – Impact)

Phase:	**Southeast Quay Wall (Piling – Impact)**		
Plant Type	**BS5228 Reference**	**Power Rating (kg.m)**	**L_{Aeq} (dB)**
Diesel Hammer	D4.3	5500	106
		Sub Total	106
		Distance Attenuation (20m to nearest NSL)	-6
		Noise Barrier Attenuation	-10
		Activity Correction (Piling up to 1min/hour)	-16
		Total	74
Construction Criteria:			
	Daytime (70dB)	**Evening (65dB)**	**Saturdays (65dB)**
Exceeded?	Yes	N/A	N/A
Impact Assessment:			
Existing Ambient	63dB	N/A	N/A
Difference	11	N/A	N/A
EPA effect	Significant	N/A	N/A
Comments:	Vibratory piling will be the primary method of piling for the proposed development. Impact piling will only be used when vibratory piling cannot fully imbed the sheet pile into bedrock. Piling works will take place intermittently during the daytime only for a total of 4 weeks. The impact is therefore Temporary.		

Table 13-16 Impact Assessment – Southwest Quay Wall (Piling – Vibratory)

Phase:	**Southwest Quay Wall (Piling – Vibratory)**			
Plant Type		**BS5228 Reference**	**Power Rating (kW)**	**L_{Aeq} (dB)**
MOVAX SG60, vibratory pile driver		N/A	N/A	82
			Sub Total	82
			Distance Attenuation (20m to nearest NSL)	-6
			Noise Barrier Attenuation	-10
			Activity Correction (Piling up to 55min/hour)	0
			Total	66
Construction Criteria:				
	Daytime (70dB)	**Evening (65dB)**	**Saturdays (65dB)**	
Exceeded?	No	N/A	N/A	
Impact Assessment:				
Existing Ambient	63dB	N/A	N/A	
Difference	3	N/A	N/A	
EPA effect	Slight	N/A	N/A	
Comments:	Following every piling event, there shall be a quiet period of at least 30 minutes. An additional activity correction of -3dB shall therefore apply to the hour after a piling event. Piling works will take place intermittently during the daytime only for a total of 4 weeks. The impact is therefore Temporary.			

Table 13-17 Impact Assessment – Southwest Quay Wall (Piling – Impact)

Phase:	**Southwest Quay Wall (Piling – Impact)**			
Plant Type	**BS5228 Reference**	**Power Rating (kg.m)**		**L_{Aeq} (dB)**
Diesel Hammer	D4.3	5500		106
			Sub Total	106
			Distance Attenuation (20m to nearest NSL)	-6
			Noise Barrier Attenuation	-10
			Activity Correction (Piling up to 1min/hour)	-16
			Total	74
Construction Criteria:				
	Daytime (70dB)	**Evening (65dB)**	**Saturdays (65dB)**	
Exceeded?	Yes	N/A	N/A	
Impact Assessment:				
Existing Ambient	63dB	N/A	N/A	
Difference	11	N/A	N/A	

Phase:	**Southwest Quay Wall (Piling – Impact)**		
EPA effect	Significant	N/A	N/A
Comments:	Vibratory piling will be the primary method of piling for the proposed development. Impact piling will only be used when vibratory piling cannot fully imbed the sheet pile into bedrock. Piling works will take place intermittently during the daytime only for a total of 4 weeks. The impact is therefore Temporary.		

Table 13-18 Impact Assessment – Resurfacing etc of bridge deck

Phase:	**Resurfacing and waterproofing of bridge deck**		
Plant Type	**BS5228 Reference**	**Power Rating (kW)**	**L_{Aeq} (dB)**
Wheeled excavator	C5.11	112	73
Vibratory roller	C5.20	98	75
Wacker plate (C2.41)	N/A	N/A	59
Asphalt paver (+ tipper lorry)	C5.33	78	75
		Sub Total	79
		Distance Attenuation (20m to nearest NSL)	-6
		Noise Barrier Attenuation	-10
		Activity Correction (33% duty cycle)	-5
		Total	58

Construction Criteria:			
	Daytime (70dB)	**Evening (65dB)**	**Saturdays (65dB)**
Exceeded?	No	No	No
Impact Assessment:			
Existing Ambient	63dB	59dB	63dB
Difference	-5	-1	-5
EPA effect	Imperceptible	Slight	Imperceptible
Comments:	This is a worse case assessment when the works are closest to an NSL. As the works progress further from an NSL, the distance attenuation will increase. Works during night-time should be avoided where possible. There is capacity for up to four addition sets of plant to operate within the Evening criteria.		

Table 13-19 Impact Assessment – Concrete repairs etc

Phase:	**Concrete repairs to Piers, Abutments and Deck Soffit**		
Plant Type	**BS5228 Reference**	**Power Rating (kW)**	**L_{Aeq} (dB)**
Road breaker (hand-held pneumatic)	C5.3	-	82
Wheeled excavator	C5.11	112	73
		Sub Total	83

Phase:	**Concrete repairs to Piers, Abutments and Deck Soffit**		
		Distance Attenuation (20m to nearest NSL)	-6
		Noise Barrier Attenuation	-10
		Activity Correction (33% duty cycle)	-5
		Total $L_{Aeq, 1hr}$	62
Construction Criteria:			
	Daytime (70dB)	**Evening (65dB)**	**Saturdays (65dB)**
Exceeded?	No	No	No
Impact Assessment:			
Existing Ambient	63dB	59dB	63dB
Difference	-1	-3	-1
EPA effect	Slight	Slight	Slight
Comments:	This is a worse case assessment when the works are closest to an NSL. As the works progress further from an NSL, the distance attenuation will increase. Works during night-time should be avoided where possible. There is capacity for up to seven addition sets of plant to operate within the Daytime criteria.		

Depending on construction phase, the noise impact effects are expected as follows:

- **Daytime**: Imperceptible – slight
- **Evening**: Slight – significant
- **Saturday**: Imperceptible – slight

The effects will be **temporary**.

In the unlikely event that construction works, with the exception of piling works, which will always be conducted during the daytime, will be carried out at night-time, it can potentially result in *significant, temporary* noise effects, however these will be avoided insofar as possible.

13.6.3 Construction Vibration Levels

It is prudent to assess the likely vibration levels at the NSLs from the sheet piling works and the associated MOVAX SG60 excavator-mounted, high frequency, vibratory-type pile driver as this will be the most significant source of vibration.

The prediction of vibration levels at a distance from piling works is complex and depends on many factors including the energy input to the piles, the pile/soil interface and the geotechnical conditions. However, empirical evidence from the manufacturer's data[10] estimates that the resultant vibration level at the closest NSLs will be approximately 1.5mm/s PPV for this machine.

This is considerably below the criteria of 8mm/s and therefore there is no risk of cosmetic or structural damage to buildings from the piling operations. However, it is recommended that a vibration test programme be established at the outset of the works to ensure compliance with the criteria.

[10] Movax, "Piling Handbook 8th Edition," 2008

The estimated magnitude of vibration as a result of the piling works is likely to be above the criteria of human perception given in Table 13-5. Therefore, advanced notice will be given to the potentially affected residents to minimise any adverse reaction.

The vibration impact effect is expected to be **negative**, **slight** and **temporary**.

13.6.4 Construction Traffic

It is appropriate to also consider additional construction traffic along the site access routes. Vehicular access to the construction site will be via the R704. R723 and R700. The ambient noise at the NSLs is dominated by traffic noise, the minimum average measured $L_{Aeq,\ 15mins}$ Daytime and Night-time noise level are 63dB and 44dB respectively.

It is possible to calculate the noise levels associated with passing HGVs using the following standard acoustic formula.

$L_{Aeq,T} = L_{AX} + 10\log_{10}(N) - 10\log_{10}(T) + 10\log_{10}(r1/\ r2)dB$

Where:

$L_{Aeq,T}$ is the equivalent continuous sound level over the time period T seconds.

L_{AX} is the "A-weighted" Sound Exposure Level of the event considered (dB).

N is the number of events over the course of time period T.

r1 is the distance at which L_{AX} is expressed.

R2 is the distance to the assessment location.

The mean value of L_{AX} for HGV moving at low to moderate speeds (i.e., 15 to 45km/hr) is of the order of 82dB at a distance of 5m from the vehicle. The distance from the façade of the nearest NSL in Quay St. is c.20m.

It has been calculated that a maximum of 20 HGVs per hour could operate without increasing the existing daytime noise levels. This represents more HGVs than required, therefore there will be no increase above the existing noise levels from construction traffic.

13.6.5 Construction Compound

A construction storage compound will be established adjacent to the R704 north of the site at the approximate location illustrated in Figure 13-2 below.

Figure 13-2 Location of the Site Compound

No noise generating assembly or other activities will take place at the compound. Construction related vehicles will access the site during construction periods but fewer vehicles than would be necessary to increase the existing ambient noise levels.

The construction traffic impact effect is expected to be **neutral** and **temporary**.

13.7 Mitigation Measures

As outlined in Section 13.6.1 to 13.6.4, the construction works are not expected to result in a significant impact during Daytime. Nevertheless, mitigation measures are necessary to reduce the noise from all activities to as low a level as feasible.

Appropriate general mitigation measures are set out as follows:

- A noise barrier shall be provided for the noisy activities. The noise barrier shall be located between the noise source and NSL and close to the noise source in order to provide maximum attenuation.
- In addition to this, a Construction Environmental Management Plan (CEMP) will be prepared prior to the construction phase outlining all measures undertaken to reduce construction noise levels emanating from the proposed site. This plan will detail a range of measures aimed at controlling construction activities at the boundary of the site adjacent to the nearest noise sensitive properties and additional general measures aimed at reducing noise levels from the proposed site.

- The contractor will implement proactive community relation and will notify the likely effected NSLs before the commencement of any works forecast to generate appreciable levels of noise or vibration, outlining the nature and duration of the works.
- With regard to mitigation for construction activities, best practice control measures from construction sites within *BS 5228 (2009 +A1 2014) Code of Practice for Noise and Vibration Control on Construction and Open Sites Parts 1 and 2* will be used to control noise and vibration impacts. The contractor will ensure that all best practice noise and vibration control methods will be used as necessary in order to ensure impacts to nearby residential noise sensitive locations are not significant. This will be particularly important during demolition, foundation constructions including piling works which are likely to be activities to have the highest potential noise and vibration impact.
- Construction activity will mostly take place during daytime hours Monday to Friday and Saturdays. It may be necessary to work outside these times at certain critical stages during the project to minimise public disturbance such as temporary road closures at night. Consideration will be given to the scheduling of activities in a manner that reflects the location and sensitivity of the site and the nature of neighbouring properties. Each potentially noisy event/activity will be considered on its individual merits and scheduled according to its noise level, proximity to sensitive receptors and possible options for noise control within the contractors' construction management plan. In situations where a particularly noisy activity is scheduled e.g. piling or other activities of similar noise level, the use of other on-site activities will be scheduled to ensure control of cumulative noise levels.

Other noise-related mitigation methods are described below and will be implemented for the project in accordance with best practice. These methods include:

- Select plant with low inherent potential for generation of noise and/or vibration.
- Situate any noisy plant as far away from sensitive properties as permitted by site constraints.
- Sequence activities to avoid using noisy plant simultaneously.
- Proper maintenance of plant will be employed to minimise the noise produced by on site operations.
- All vehicles and mechanical plant will be fitted with effective exhaust silencers and maintained in good working order for the duration of the contract.
- Use of less intrusive audible warnings such as broadband vehicle reversing alarms.
- Compressors will be attenuated model fitted with properly lined and sealed acoustic covers which will be kept closed whenever the machines are in use and all ancillary pneumatic tools shall be fitted with suitable silencers.
- Machinery that is used intermittently will be shut down or throttled back to a minimum during periods when not in use.
- During construction, the contractor will manage the works to comply with noise limits outlined above.
- Audible warning systems should be switched to the minimum setting required by the Health & Safety Executive or the Health & Safety Authority.

13.7.1 Noise & Vibration Monitoring

Where practicable it is recommended that noise and vibration from construction activities to off-site residences be limited to the values set out in Table 13-7 and Table 13-12. This may be achieved by undertaking noise and vibration monitoring at locations representative of the closest sensitive receptors.

Noise monitoring should be conducted in accordance with the International Standard ISO 1996: 2017: Acoustics – Description, measurement and assessment of environmental noise.

Vibration monitoring should be conducted in accordance with BS 6472 for human disturbance and BS ISO 4866:2010 for building damage.

13.7.2 Construction Working Hours

The permitted working hours are set out in section 4.5 in the Planning Report. In exceptional circumstances the Employer's Representative may allow the contractor to undertake night time works. Heavy or noisy construction activities will be avoided outside normal daytime hours and the amount of work outside normal daytime hours will be strictly controlled.

13.7.3 Piling Mitigation Measures

Piling is the activity which is most likely to cause disturbance. Specific guidance in relation to pilling is outlined below.

- Piling programmes should be arranged so as to control the amount of disturbance in noise and vibration sensitive areas at times that are considered of greatest sensitivity. If piling works are in progress on a site at the same time as other works of construction or demolition that themselves may generate significant noise and vibration, the working programme should be phased so as to prevent unacceptable disturbance at any time.
- Prior notice of the piling schedule should be given to the potentially affected residents.
- A vibration test programme will be established at the outset of the works to ensure compliance with the criteria.
- Vibratory piling will be the primary method of piling for the proposed development. Impact piling will only be used when vibratory piling cannot fully impede the sheet pile into bedrock.
- In certain types of piling works there will be ancillary mechanical plant and equipment that may be stationary, in which case, care should be taken in location, having due regard also for access routes. When appropriate, screens or enclosures should be provided for such equipment.

13.8 Residual Impacts

During the construction phase of the project there is potential for some *temporary, slight* effects on nearby residential and business properties as a result of the piling activities during the Evening and Saturday periods.

In the unlikely event that construction works will be carried out at night-time, it can potentially result in *moderate to significant, temporary* noise effects to NSL1, however these will be avoided insofar as possible.

The application of binding noise limits and hours of operation, along with implementation of appropriate noise control measures, will ensure that noise impact is kept to a minimum.

14. ARCHAEOLOGY, ARCHITECTURE AND CULTURAL HERITAGE

14.1 Introduction

This section assesses the archaeology, architecture and cultural heritage impacts associated with the construction and operation phase of the proposed development. The proposed works and a description of the site location are outlined in Chapters 3 and 4 of this report.

14.2 Methodology

The methodology used in the preparation of this assessment is broadly based on recommendations for assessing linear schemes provided in the National Roads Authority's[11] two guidance documents – *Guidelines for the Assessment of Archaeological Heritage Impacts of National Road Schemes* (NRA 2005a) and *Guidelines for the Assessment of Architectural Heritage Impacts of National Road Schemes* (NRA 2005b). The methodology is also consistent with other guidance including the Environmental Protection Agency's Guidelines on the information to be contained in Environmental Impact Assessment Reports (EPA 2022), *Draft Guidelines on the Information to be contained in Environmental Impact Assessment Reports* (EPA 2017) and *Advice Notes on Current Practice* (EPA 2003). The study was divided into two main components: the collation of baseline data (comprising desk and field-based assessments); and the analysis of this data to determine any likely impacts resulting from the scheme.

The type of effect predicted to result from the proposed development was considered in terms of being direct or indirect, as described in Table 14-1, below.

Table 14-1 Type of effects

Direct	Where the cultural heritage receptor is physically located within the footprint of the proposed development so that the design will entail the removal of all or part of the feature.
Indirect	Effects that are not a direct result of the project, but are caused by the interaction of effects, or by associated off-site developments.

Direct effects occur where construction will cause direct physical damage to the cultural heritage receptor, or where the cultural heritage receptor could be affected by a range of factors, including visual intrusion on its setting, noise, vibration, changes in groundwater levels, chemistry or air pollution.

Archaeological sites are considered to have a 'setting', which can contribute significantly to our understanding of them. Setting may be defined as t*he surroundings in which a place is experienced, while embracing an understanding of the perceptible evidence of the past in the present landscape* (Highways Agency 2007). Effects upon setting can therefore affect the overall archaeological and historical interest of a site.

The quality of effects was assessed against the criteria in Table 14.2, which derive from those set out in Table 3.4 of the EPA Guidelines (2022, 50–52) and Table 3.3 of the EPA draft Guidelines (2017, 50).

[11] Now TII.

Table 14-2 Quality of effects

Positive Effect	A change that improves the quality of the environment.
Neutral Effect	No effects or effects that are imperceptible.
Negative/Adverse Effect	A change that reduces the quality of the environment.

The significance of effects was assessed on a scale of 'Imperceptible, Not Significant, Slight, Moderate, Significant, Very Significant and Profound', as defined in Table 3.4 of the EPA Guidelines (2022, 50–52) and Table 3.3 of the EPA draft Guidelines (2017, 50–51), and shown in Table 14.3 below.

Table 14-3 Criteria for the assessment of the significance of effects

Imperceptible	An effect capable of measurement, but without significant consequences.
Not Significant	An effect that causes noticeable changes in the character of the environment, but without significant consequences.
Slight	An effect that causes noticeable changes in the character of the environment without affecting its sensitivities.
Moderate	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
Significant	An effect which, by its character, magnitude, duration, or intensity alters a sensitive aspect of the environment.
Very Significant	An effect which, by its character, magnitude, duration, or intensity, significantly alters most of a sensitive aspect of the environment.
Profound	An effect that obliterates sensitive characteristics.

The significance of impacts was quantified using professional judgement and experience, and was guided by the matrix outlined in Figure 3.4 of the EPA Guidelines (2022, 53). This matrix compares the magnitude (or level) of impact with the importance of the receptor to arrive at a significance of impact or effect.

14.2.1 Study Area

The study area was defined in consultation with the TII-assigned Project Archaeologist. It measures 150.03m (NE–SW) by 288.2m (ESE–WNW) by 167.13m (NNE–SSW) by 340.52m (WNW–SSE) and encompasses an area of 48,889.172m^2. It includes the River Barrow, a section of the townland of New Ross to the southeast and a part of the townland of Rosbercon to the northwest of the study area, see Figure 14-1 and Figure 14-2.

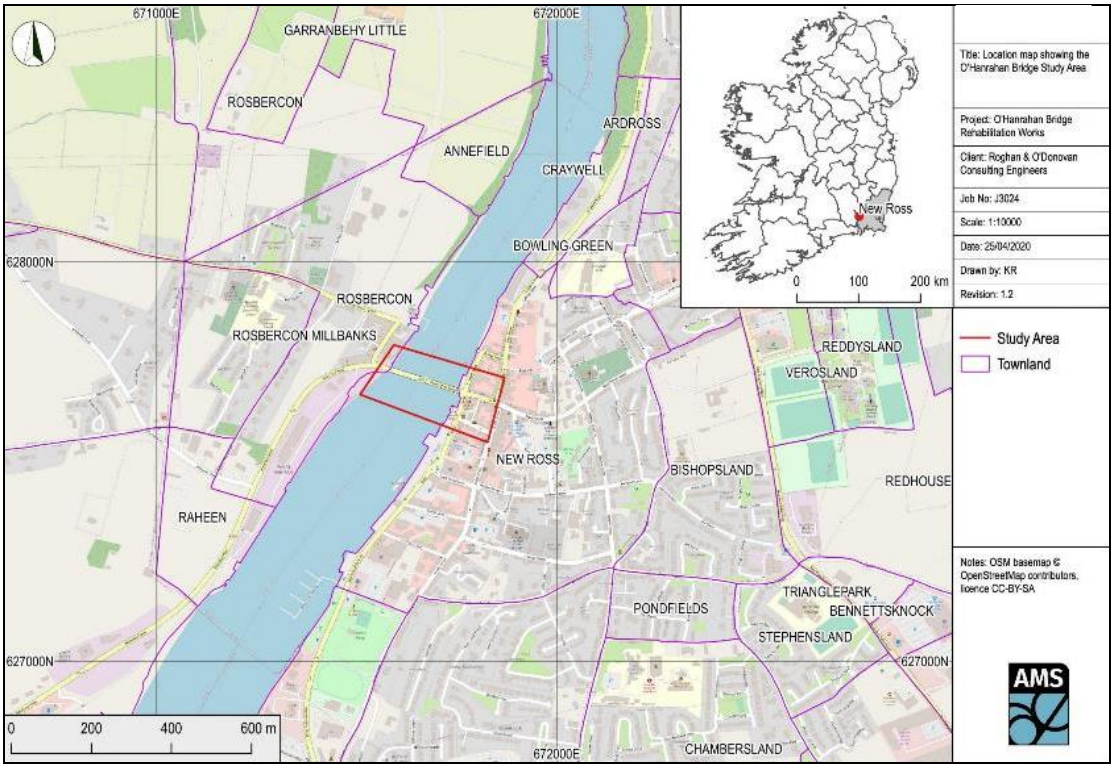

Figure 14-1 Location map showing the study area.

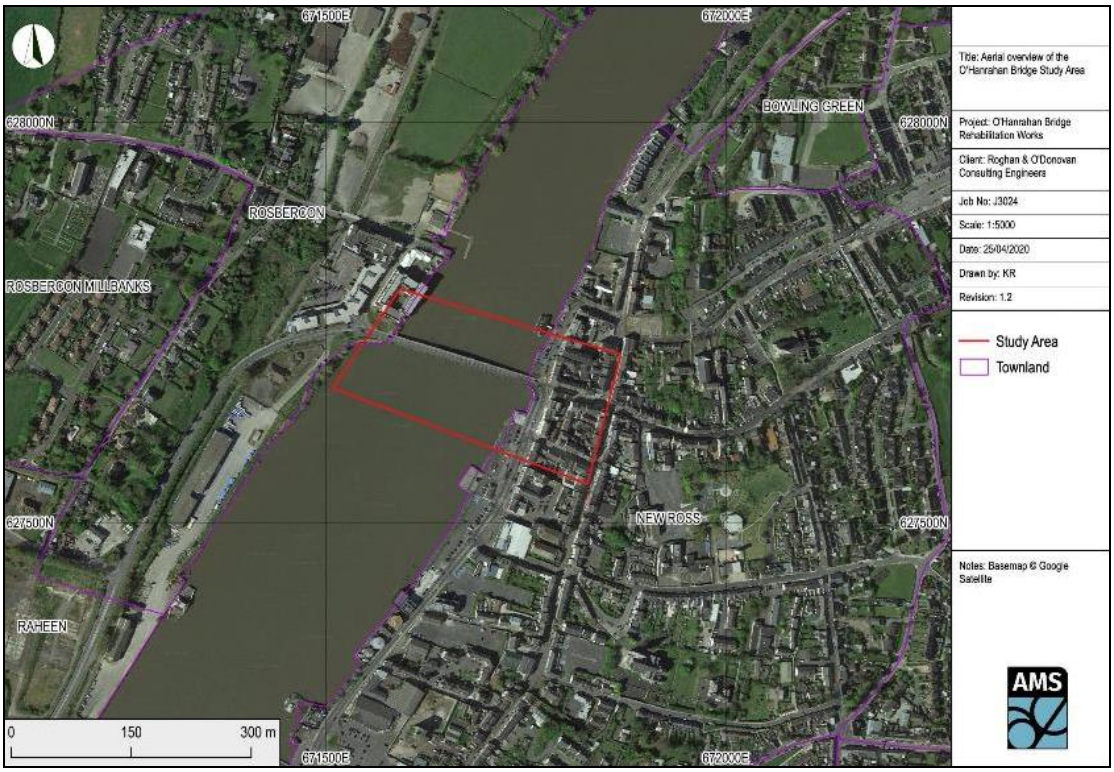

Figure 14-2 Aerial overview of the study area.

14.2.2 Desktop Assessment

The methodology for the first component comprised a desk-based survey to identify all recorded archaeological and architectural heritage sites within the study area, this included archaeological sites listed in the Record of Monuments and Places (RMP) and the Sites and Monuments Record (SMR), as well as recorded/listed architectural

heritage sites, including Architectural Conservation Areas (ACAs), Protected Structures, and buildings/monuments listed in the National Inventory of Architectural Heritage (NIAH). Furthermore, archaeological and architectural heritage sites that occurred within the foreshore to be impacted by the sheet piling, as well as a 50m buffer zone around O'Hanrahan Bridge and the quay walls to the southeast (i.e. 25m either side of the works areas), were assessed for potential impacts. The refined study areas correspond to recommendations set out in guidelines for linear projects (NRA 2005a, 35).

This component also included a desktop review of other readily available information to ascertain the archaeological potential of the O'Hanrahan Bridge study area. The survey and review involved consultation of the sources listed in Table 14-4 (below), as well as a survey of published and unpublished sources relating to the town of New Ross (see References). The archaeological and architectural assets identified during the desktop survey were mapped using open-source GIS software QGIS (version 3.16).

Table 14-4 Sources consulted for the desk-based assessment

Data	Source
Background Information	• *Wexford County Development Plan 2013–2019*.[12] • *Draft Wexford County Development Plan 2022–2028*.[13] • *New Ross Town and Environs Development Plan 2011–2017 (as extended)*.[14] • *A Topographical Dictionary of Ireland* (Lewis 1837). • Placenames Database of Ireland: *Logainm.ie;*[15] and Irish Townlands: *Townlands.ie*.[16] • Cartography: First edition 6-inch and 25-inch Ordnance Survey (OS) maps via the Ordnance Survey of Ireland's (OSI) MapViewer.[17] The Down Survey Maps via The Down Survey of Ireland Project.[18] • Aerial and satellite imagery: Google Earth via Google Earth Pro; Digital Globe and orthophotographs via OSI's MapViewer; Bing Satellite and Google Satellite via QGIS (version 3.16) XYZ Tiles. • Previous Archaeological Investigations: Database of Irish Excavation Reports (DIER)[19] and the TII Digital Heritage Collection.[20] • Archaeological objects: National Museum of Ireland's (NMI) Topographical Files and Finds Database available in the Antiquities Division, Kildare Street, Dublin 2. The NMI online Finds Database (2010) was also consulted via the 'Museum's, Archives and Collections' dataset on the Heritage Council's 'Dublin County Heritage' map viewer. • The Irish Folklore Commission (IFC) Schools' Collection,[21] made available online as part of the Dúchas Project, was consulted for

[12] Available at: https://www.wexfordcoco.ie/planning/development-plans-and-local-area-plans/current-plans/wexford-county-development-plan-2013 [Accessed: 29.03.22].
[13] Available at: https://www.wexfordcoco.ie/planning/development-plans-and-local-area-plans/current-plans/draft-wexford-county-development-plan [Accessed: 29.03.22].
[14] Available at: https://www.wexfordcoco.ie/planning/development-plans-and-local-area-plans/current-plans/new-ross-town-and-environs-development [Accessed: 30.03.22]. *NOTE: Pursuant to the provisions of Part 8 of the Electoral, Local Government and Planning and Development Act 2013, the lifetime of the New Ross Town and Environs Development Plan was extended to 2019, until the Wexford Development Plan was made.
[15] Available at: https://www.logainm.ie/en/ [Accessed: 31.03.22].
[16] Available at: https://www.townlands.ie/dublin/ [Accessed: 31.03.22].
[17] Available at: http://map.geohive.ie/ [Accessed: 01.04.22].
[18] Available at: http://downsurvey.tcd.ie/index.html [Accessed: 01.04.22].
[19] Available at: www.excavations.ie [Accessed: 30.03.22].
[20] Available at: https://repository.dri.ie/catalog/v6936m966 [Accessed: 30.03.22].

Data	Source
	folklore and local history associated with the River Barrow and the nautical tradition of the study area. A selection of extracts from the Schools' Collection are given in Appendix 14.4.
Recorded Archaeological Sites	• Record of Monuments and Places (RMP): Statutory list of protected places and monuments, with accompanying constraints maps, published for County Wexford in 1998.[22] • The NMS Historic Environment Viewer (HEV): Database of information on sites and monuments based on the Record of Monuments and Places (RMP) and the Sites and Monuments Record (SMR).[23] The HEV provides information not only on those archaeological monuments included in the statutory RMP, but also in regard to many more which have been identified since the RMP was issued (DHLGH 2022). • List of national monuments in State Care: Ownership and Guardianship for Wexford, published in 2009.[24] • List of Preservation Orders held by the NMS, published in 2019.[25] • The NMS Wreck Viewer,[26] which displays data regarding known wreck locations contained within the Wreck Inventory of Ireland Database (WIID).
Recorded / Listed Architectural Heritage Sites	• Wexford County Record of Protected Structures (RPS).[27] • NIAH Building Survey and Survey of Historic Gardens and Designed Landscapes.[28] • New Ross ACA.[29]

14.2.3 Wade and Metal Detection Survey

A licensed Wade and Metal Detection Survey[30] was undertaken by AMS on 25 March 2022, in compliance with recommendations from the National Monuments Service (NMS) and the Development Applications Unit (DAU) (Figure 14-3 and Plate 14.1). The key aim of the survey was to inform any further mitigatory works that should be carried out in advance of the commencement of the proposed development works, and to describe the nature of the sediments present within the riverine element of the study area.

The foreshore and mudflats to the southeast of O'Hanrahan Bridge and west of the quay walls where works are proposed were surveyed; the survey area measured 37m (NNE–SSW) by 22.5m (WNW–ESE). The surveys included a walk-over visual

[21] Available at: https://www.duchas.ie/en/cbes [Accessed: 06.04.22].
[22] Available at: https://archaeology.ie/sites/default/files/media/pdf/Archaeology-RMP-Wexford-Manual-(1995)-0054.pdf and https://archaeology.ie/sites/default/files/media/pdf/Archaeology-RMP-Wexford-Map-(1995)-0055.pdf [Accessed: 29.03.22].
[23] Available at: https://maps.archaeology.ie/HistoricEnvironment/ [Accessed: 29.03.22].
[24] Available at: https://www.archaeology.ie/sites/default/files/media/pdf/monuments-in-state-care-wexford.pdf [Accessed: 18.05.22].
[25] Available at: https://www.archaeology.ie/sites/default/files/media/publications/po19v1-all-counties.pdf [Accessed: 18.05.22].
[26] Available at: https://dahg.maps.arcgis.com/apps/webappviewer/index.html?id=89e50518e5f4437abfa6284ff39fd640 [Accessed: 01.04.22].
[27] Available at: https://consult.wexfordcoco.ie/sites/default/files/Volume%205%20Record%20of%20Protected%20Structures.pdf. The RPS in Appendix III of the New Ross Town and Environs Development Plan 2011–2017 (as extended) is available at: https://www.wexfordcoco.ie/sites/default/files/content/Planning/NewRossPlan11-17/Appendix3RecordOfProtectedStructures.pdf [Accessed: 31.03.22].
[28] Available at: https://www.buildingsofireland.ie/ [Accessed: 31.03.22].
[29] Available at: https://www.wexfordcoco.ie/sites/default/files/content/Planning/NewRossPlan11-17/Map7-ArchitecturalConservationAreas.pdf and https://consult.wexfordcoco.ie/sites/default/files/Volume%206%20Architectural%20Conservation%20Areas.pdf [Accessed: 01.04.22].
[30] Wade Survey Licence No. 22D0032; Metal Detection Device Licence No. 22R0097

and metal detection survey, coupled with a detailed topographical survey using a survey grade GPS. In addition, a high-resolution hand-held laser scanner was used to produce highly accurate 3D models. LiDAR functions on the iPhone 13 Pro were used to carry out photogrammetry and produce smaller 3D models.

The key objectives of the Wade and Metal Detection Survey were to:

- Ascertain the location, nature, character, extent, date and significance of potential archaeological features and/or deposits that occur in proximity to O'Hanrahan Bridge and the quay walls, and thus may be impacted by the proposed works.
- Describe the nature of the sediments present on the foreshore, as well as identify and locate any features or objects, of archaeological and/or historic significance within the Barrow foreshore.
- Describe the quay walls and their fabric, establish its date/phases of construction and history of use, and identify elements within its fabric of particular note.
- Inspect and assess the condition of the full extents of the proposed O'Hanrahan Rehabilitation works.

Consultation with NMS was undertaken in September 2022 on the proposed works area at the southwestern side of the bridge, and the potential requirement for further wade and metal detection survey. It was agreed that no additional wade or metal detection survey would be undertaken to inform this assessment at this side of the bridge, but that this assessment would include recommendations for mitigation during the construction phase of works, and include for archaeological monitoring of all works on the river bank and within the channel.

Figure 14-3 Aerial overview of the Wade and Metal Detection Survey Area

14.3 Receiving Environment

14.3.1 Historical Background

Introduction

The inland port of New Ross is located at an important crossing point on the tidal estuary of the River Barrow (Figure 14-1 and Figure 14-2), between its confluence with the River Suir and the sea, c.40km to the south, and the point where the River Nore joins the Barrow to the north. The River Barrow has been spanned by at least five bridges at New Ross since the thirteenth century (e.g. WX029-013071), from which it derived its name, Ros Pontis Villa Nova, meaning The New Town of the Bridge of Ros (see Table 14-5). The urban area occupies a steep escarpment that overlooks the river (e.g. Plate 14.2); the ground rises at a gradient of 2m OD at the river, to 60m OD at the western limit of the town (Ó Drisceoil 2017, 269).

Early Medieval Period (*c*.AD500–1100)

The earliest record of settlement in the area dates to the sixth century when St Abban, or *Abán*, a nephew and disciple of St Ibar, or *Iobhar of Bergerin*, is reputed to have founded a monastery at *Ros Mhic Treoin* (WX029-013012), one of several foundations attributed to him (Ó Riain 2011, 51–52). It has been suggested that St Abban's church was situated inside the medieval North Gate of New Ross (e.g. Hore 1900, vol. 1, 46–48).

Alternatively, St Stephen's Chapel and graveyard (WX029-13017, WX029-013069), which occur within a subcircular enclosure (WX029-013006) in the townland of Morrissyland to the east-northeast of the town, have been suggested as an alternative site for the Early Christian monastery of St Abban (e.g. Ó Drisceoil 2017, 271–73; Doran 2007a, 15).

Medieval Period (*c*.AD1100–1600)

In the mid-twelfth century, New Ross was in the territory of Dermot McMurrough, but came to prominence when the Anglo-Normans conquered the region. The Norman knight William Marshal, son-in-law of Richard de Clare, and his bride Isabella de Clare arrived sometime before *c*.1200, when the first of many bridges were built and the town was planned. The bridge was seminal in the topography of the town and provided an element of one of the most commonly used medieval names for the town. In 1210, King John and his 7,000-strong army descended on the town; a subsequent entry in the royal military accounts refers to the town as *Pons Novus, villa Williemi Marescalli* (Ó Drisceoil 2017, 268). The bridge also facilitated a link between Wexford and Marshal's caput of Kilkenny (Colfer 2019, 140). A medieval borough rapidly developed around this strategic point along the Barrow, largely populated by Anglo-Norman and Cambro-Norman settlers, and the town became the port for the Marshal lands in south Leinster.

The arrival of Isabella and William is described in the Chronicles of Ross, which record that in 1189 Isabella set about building a city on the Barrow. The town's fortunes further increased in 1189 when King John made William the Earl of Pembroke at his coronation. A year later, the Earl Marshal transferred the Norman capital of Leinster to Kilkenny and New Ross became the main port.

The town of New Ross was granted a Royal Charter in 1207. The port gained concessions from King John in 1215 and again in 1227, but these were later revoked by Henry III and Edward I to protect the port of Waterford. New Ross was still one of Ireland's busiest ports in the thirteenth century, as shown from the customs returns of

1277–80 and was a commercial rival of the Royal City of Waterford (Orpen 1911, 10). The port of New Ross traded principally with Britain, Normandy, Brittany, Gascony and Flanders (Doran 2007a, 1).

The building of the walls *c*.1265 is described in a poem of 200 lines known as *The Walling of New Ross* (Hore 1900, 58–60); however, essentially it concerns not the construction of a stone wall, but the digging of the fosse. At the beginning of the verses we are told that *They [the whole commons assembled] made a resolution thus: that a wall of stone and mortar they would build around the town*, but later the poet says *The fosse is twenty feet deep and extends a full league* (Sinclair 1994, 227–28). According to a charter of 1374, the town was still unwalled (Hore 1900. vol. 1, 202–04). Murage was collected down to 1830, but the most intense period was 1374–1420 (Thomas 1992, vol. 2, 176).

The walls (WX029-013005) ran from the river at the north, up Goat Lane to the Maiden Gate, along the back of properties to the west of Haughton Place, along Nunnery Lane to a mural tower, and on to the junction with Neville Street (Figure 14-4). It changed direction here and ran west down the northern side of William Street, where there is a portion of surviving wall . It crossed the junction with Priory Street and continued towards the river where another tower has been identified. There were gates at North Street; the Maiden's Gate to Irishtown, which still partly survives, Three Bullet Gate at Neville Street and William Street and the Priory or South Gate. Bunnion Gate, at the top of Mary Street, is probably a late addition. A wall was provided on the riverside in the sixteenth or seventeenth century, with gates onto the quays. Rosbercon was an independent borough on the Kilkenny side of the River Barrow and was probably unwalled.

In 1247, Gilbert de Clare came into the possession of the Rosbercon following the partition of the Marshal lands. He subsequently received a royal grant in 1286 to hold a weekly market and fair four times a year at his manor of *Rosbergon*. De Clare's charter of 1289–95 confirmed the rights granted to the burgesses of Rosbercon; the presence of a bridge from *c*.1207, linking New Ross to Rosbercon, may have attracted a community to the western banks of the Barrow (Doran 2007a, 12–13).

Within the town five church sites are known: the thirteenth century parish church of St Mary's (WX029-013002) with considerable remains, St Michael's (WX029-013010), St Saviour's Chapel (WX029-013011), and the Franciscan (WX029-013008) and Augustinian (WX029-013009) friaries. In Rosbercon there was the Dominican friary (WX029-013007), founded in 1267, and the parish church (WX029-013001). Outside the town is the site of St Stephen's Church (WX029-013006) and the site of a monastery, possibly a leper hospital (WX029-015), while in the Maudlins, Trinity hospital (WX029-013074) was established in the sixteenth century (Bradley and King 1990, 99–146; Hore 1900, vol. 1, 42 & 396).

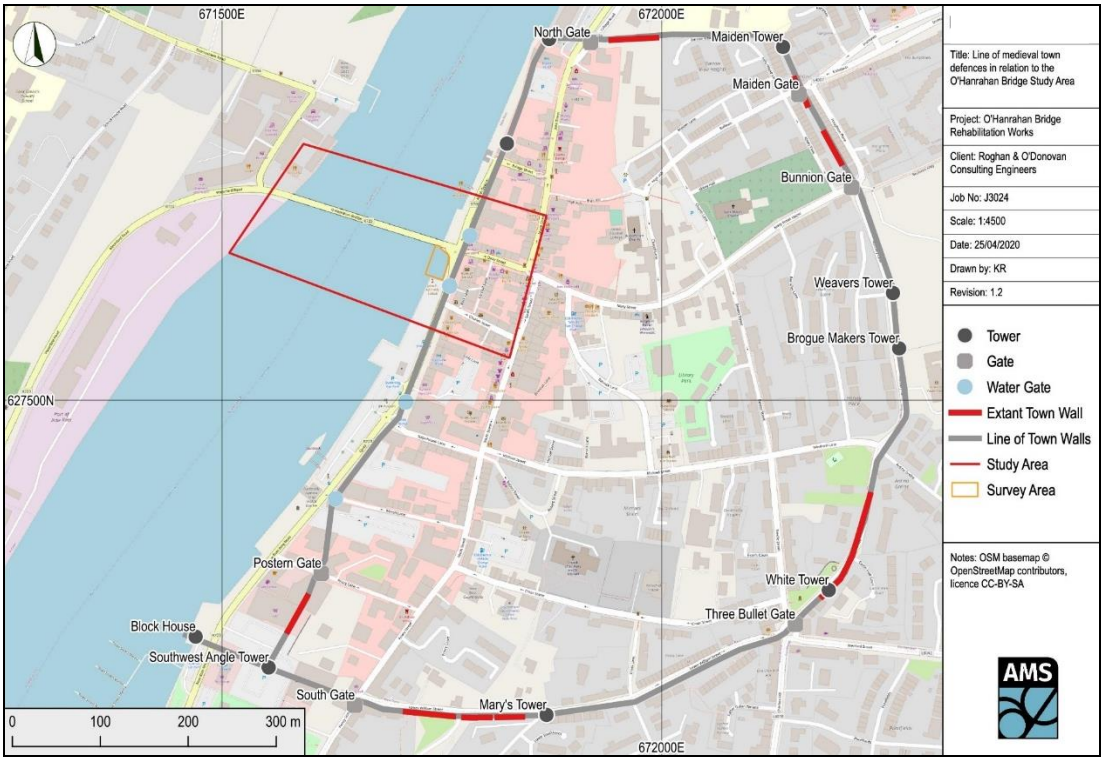

Figure 14-4 Line of medieval town defences in relation to the study area.

Post-Medieval Period (*c*.1600–1900)

The town was fought over in the Irish Confederate Wars of the 1640s. On 2 March 1643, the Marquess of Ormond left Dublin with an army of 3,700 and advanced to New Ross with the intention of destroying the Confederate Army of Leinster under Thomas Preston.[31] Ormond reached the town on 11 March, but his attempt to storm the town was driven back by defenders (Griffiths 1890, 92). Confederate reinforcements subsequently arrived in New Ross from Munster via the River Barrow and Ormond abandoned the siege on 16 March. Preston, who had marshalled the Leinster militia 8km to the east in Old Ross, attempted to block Ormond's withdrawal (*ibid*., 92–93). However, Ormond routed the Leinster Confederates at the Battle of New Ross on 18 March; the battle occurred in nearby Ballinvegga to the north (*ibid*., 94–95). Preston and his army fled west across the River Barrow and they destroyed the New Ross bridge behind them.

Oliver Cromwell and his New Model Army laid siege to New Ross on 19 October 1649, following the Sack of Wexford. Anxious to avoid the fate of Wexford and Drogheda the New Ross garrison, under Sir Lucas Taaffe, surrendered following a three-shot barrage on the Bewley Gate (Three Bullet Gate). With New Ross secured, Cromwell ordered his pioneers to build a bridge of boats over the Barrow to enable the Parliamentarian army to advance into Munster.[32]

The Battle of New Ross (1798)

New Ross was the location of one of the bloodiest battles of the 1798 rebellion.[33] The Battle of New Ross was fought between the United Irishmen, comprising a force

[31] Available at: http://bcw-project.org/military/confederate-war/campaigns-of-1643-4 [Accessed: 07.04.22].
[32] Available at: http://bcw-project.org/military/third-civil-war/cromwell-in-ireland/waterford [Accessed: 07.04.22].
[33] The battlefield was included on the SMR (No. WX029-013077), following its inclusion in the Irish Battlefields Project, which aimed to identify the appropriate statutory protection that should be extended to battlefield sites. WCC recognises the importance and value of battlefield sites in the *DRAFT Wexford County Development Plan 2021–2027* (WCC 2021, 513–15).

of 10,000 rebels, and the British Crown forces, who were composed of regular soldiers, militia and yeomanry. The key objective of the attack on New Ross was to cross the River Barrow and spread the rebellion into Kilkenny and the outlying province of Munster (Wheeler & Broadley 1910, 129).

The United Irishmen attacked the Crown garrison on 5 June 1798. However, the British garrison had anticipated the attack and had prepared defences inside and outside the town (Alexander 1800, 30). Trenches were manned and cannon were stationed on approaches to the town to counter the rebels, who were mainly armed with pikes. Bagenal Harvey, the leader of the United Irishmen, attempted to negotiate surrender of New Ross, but the rebel emissary Matt Furlong was shot by the Crown outposts while bearing the flag of truce (Cloney 1832, 34–35). This provoked a charge by an advance guard of insurgents, who drove a herd of cattle through Three Bullet Gate to aid their attack (Gahan 1998, 12). A second column attacked the Priory Gate; however, a third intimidated by strong defences pulled back from the Market Gate. Seizing the opportunity, the garrison sent a force of cavalry out the Market Gate to attack the remaining two hostile columns from the flanks, but the rebels rallied and broke the cavalry charge with massed pikes (Cloney 1832, 37).

The rebels subsequently seized the Three Bullet Gate and broke into the town. Street fighting ensued with the British Crown forces, but they managed to seize two-thirds of the town. However, the rebels limited supplies of gunpowder and ammunition forced them to reply on pikes, which blunted their offensive. The military managed to hold on until reinforcements arrived and drove the rebels from the town (Gahan 1998, 11–12).

Nineteenth to Twentieth Century New Ross

The nineteenth century saw New Ross merchants establish strong links with ports on the North American east coast. Savannah, Boston and Quebec, as well as Newfoundland, had links with the Graves, Howlett and Kough shipping dynasties in the town (see Appendix 14.4). Timber, tobacco, cotton and other commodities dominated the west to east trade; however, the outbound cargo from New Ross was mainly emigrants to the USA and Canada. The port's shipping trade was impacted by the arrival of the Dublin, Wicklow and Wexford Railway (DW&WR) to Rosbercon in 1887, which was extended from New Ross to Waterford in 1904 (Sheperd 2000–01, 64). The railway closed for passenger traffic in 1964 and for goods traffic in 1995.

A number of new churches were also built in the town in the nineteenth and early twentieth century, which included St Mary's Abbey (Church of Ireland), built in 1811. The Roman Catholic Augustinian Church opened in 1835, while the Church of Saints Michael and Mary was completed in 1902.

Bridges over the River Barrow in New Ross

The TII Project Archaeologist provided the following detail regarding the history of the bridging of the Barrow in New Ross:[34]

> *The crossing of the River Barrow at New Ross has always been of commercial, cultural and social importance. Long before the foundation of the town and the erection of any bridge there was a ford at this location, this was the lowest point along the course of the Barrow at which anyone travelling by land could cross*

Objective AH07 includes: *To protect historic and archaeological landscapes, including battlefields, and promote access to such sites provided that this does not threaten the feature* (*ibid*., 516).

[34] Included in an original briefing note for a TII Board Meeting and site visit to the N25 New Ross Bypass Project on 22 May 2018 [updated: 14.03.22].

the mighty river. Following the Anglo-Norman invasion of 1169, the Lordship of Leinster, which included much of the lands drained by the Rivers Barrow and Nore in Counties Carlow, Kildare, Kilkenny and Wexford, was granted to Richard de Clare, better known as Strongbow. Richard's daughter, Isabel, inherited his estates as a five-year old. In 1189, the then seventeen year old Isabel de Clare, countess of Leinster, married 43 year old William Marshal. Marshal was known as the greatest knight of his time and was a loyal and trusted member of the royal household. Following marriage Marshal became one of the wealthiest men in the kingdom. In due course he acquired Strongbow's title of the Earl of Pembroke to go with his wealth. Marshal and Isabel might be considered a medieval power-couple controlling large properties in Ireland, Wales, England and France, prospering from trade, and enjoying privileges at court.

Around 1200, William and Isabel visited their Irish estates and it seems likely chose the site for their new town and port. It was strategically located to facilitate trade to and from their extensive lands in the Lordship of Leinster and the construction of the bridge linked the road networks in the Marshal-controlled lands on both sides of the Barrow. Construction of the bridge was a substantial and costly undertaking, its significance is reflected in the first name applied to the town – Pons Novus, villa Willelmi Marescalli (the new bridge of William Marshal's town). Marshal's bridge stood for more than a century. In 1313, it was replaced by the second bridge, which was built by Aylmer de Valence who had inherited New Ross and other portions of Marshal's Irish estates. That bridge also stood for approximately a century before it too had to be rebuilt in the reign of King Henry IV in the early fifteenth century. We do not have any contemporary descriptions of the medieval bridges at New Ross; however, they would have been built of timber and tolls were charged on all users.

The third bridge at New Ross stood until 1643, when in the course of the Nine Years War it was burned by the retreating Catholic Confederate forces following their defeat at the Battle of Ballinvegga, a townland between New Ross and Clonroche. Six years later when the Parliamentarian forces led by Oliver Cromwell laid siege to New Ross they built a pontoon bridge so their forces could easily cross the Barrow. However, the Cromwellian bridge was dismantled after a short time and for almost 150 years the only way to cross the Barrow at New Ross was by ferry. In 1794 an American engineer, Lemeul Cox, was commissioned to build the fourth permanent bridge at New Ross. Cox's bridge was 508 feet long and 40 feet wide and was constructed from Quebec Oak, it had an opening span on the New Ross side to allow ships pass through (see *Figure 14-5). It's construction cost £8,000. Extremely cold weather in the winter of 1867 caused ice to form on the Barrow and Nore, ice built up around the New Ross bridge piers which led to the collapse of the bridge.*

It was the last wooden bridge to span the Barrow at New Ross. Its replacement was built of wrought iron (e.g. Plate 14.3, Plate 14.4 and Plate 14.6)*. This bridge was designed by Waterford-born engineer Samuel U. Roberts, with construction overseen by James B. Farrell and Peter Burtchaell, county surveyors for Wexford and Kilkenny. Construction by Dublin-based contractors Kennard Bros commenced in April 1868 and the fifth New Ross bridge opened to traffic in July 1869. It had an opening central span which could pivot to allow ships through. Its construction cost £37,000. The abutments for this bridge can still be seen beside the boatclub on the Rosbercon side and at the end of Bridge Street on the New Ross side* (e.g. Plate 14.2)*. A portion of the bridge parapet, bearing the crest of New Ross and the dedication of the bridge, was salvaged and installed in a landscaped area close to the western end of O'Hanrahan Bridge.[35] The sixth*

[35] The portion of the bridge parapet is located just outside the boundary of the Study Area.

bridge built across the Barrow at New Ross broke with almost 800 years of tradition by being located downstream from its predecessors. This reinforced concrete bridge was designed by Cork-based engineers O'Connell Harley O'Dwyer, with McCarthy/Hyder. It was opened to traffic in February 1967 and its construction cost £380,000. It was named in honour of New Ross-born writer Michael O'Hanrahan who participated in the Easter Rising as a member of the Jacob's Factory garrison and was executed at Kilmainham Gaol on 4 May 1916.

Table 14-5 Summary of the Timeline of the bridging of the River Barrow at New Ross

Date	Event/Structure	Commissioner/Architect	Location
Pre-1200	Ford	N/A	Unknown
c.1200–1210	Bridge construction	William Marshal and Isabella de Clare	Unknown*[36]
c.1310–1330	Bridge construction	Aylmer de Valence	Unknown*
Early 1400s	Bridge construction	Unknown	Unknown*
1643	Bridge destruction	Confederate forces	N/A
1649	Construction of pontoon bridge	Cromwellian army	Unknown*
c.1650–1794	Ferry	N/A	N/A
1795	Bridge construction	New Ross Bridge Commissioners; Lemuel Cox	Bridge Street to Rosbercon
1867	Bridge destruction	N/A	N/A
1869	Bridge construction	Grand Jury of the County of Wexford; Samuel U. Roberts	Bridge Street to Rosbercon
1967	Construction of O'Hanrahan Bridge	Wexford County Council; O'Connell Harley O'Dwyer with McCarthy Hyder	Quay Street to Waterford Road (R273)
2020	Construction of the Rose Fitzgerald Kennedy Bridge as part of the N25 New Ross Bypass	TII; ARUP and Carlos Fernandez Casado	Stokestown to Ballyverneen

[36] *Bridges marked with an asterisk are assumed to have been located on the Bridge Street to Rosbercon alignment.

Figure 14-5 'New Ross, Ireland' (c.1830), by W.H. Bartlett (artist) and H. Winkles (engraver) showing late eighteenth-century bridge, facing southwest.[37]

[37] Victoria and Albert Museum, Department of Engraving, Illustration and Design and Department of Paintings, Accessions 1945, London: HMSO, 1956. Available at: https://collections.vam.ac.uk/item/O723444/new-ross-ireland-print-william-henry-bartlett/ [Accessed: 22.04.02].

14.3.2 Cartographical Analysis

Design for the Recovery of Town of Ross (*c*.1649)

A number of general representations of Ireland dating to the late sixteenth and seventeenth century include Ross, Rosbercon and the River Barrow, which demonstrate the medieval significance of the town (e.g. Doran 2007a & 2007b). However, the earliest known plan of New Ross (Figure 14-6), which dates from 1649 and was reproduced by Hore (1900, 329), was drawn to facilitate a planned assault on New Ross by the forces of the Marquess of Ormond following the capture of the town by the Confederate troops.

The map depicts the town's strategic infrastructure, as it was sketched for military purposes (Doran 2007a, 3–4; Ó Drisceoil 1996, 20). It shows the River Barrow bounding the D-Shaped town defences that enclose a grid-pattern of streets (Figure 14-6). Stretches of the town walls and their associated gates and towers are marked, while some are also named. These include three water gates on the quay with a block house at the southern end and a parallel tower to the north (Doran 2007a, 4–5). The map also notes a ferry quay along the river opposite Quay Street, which would have been important in the absence of a permanent bridge, as well as the town hall, *the greate church* (St Mary's) and St Michaels Church (*ibid*., 5). The medieval Religious house of the Dominican friars (WX029-013007-) in Rosbercon townland is not depicted on this map, and no suggestion of riverside infrastructure on the western side of the river is provided.

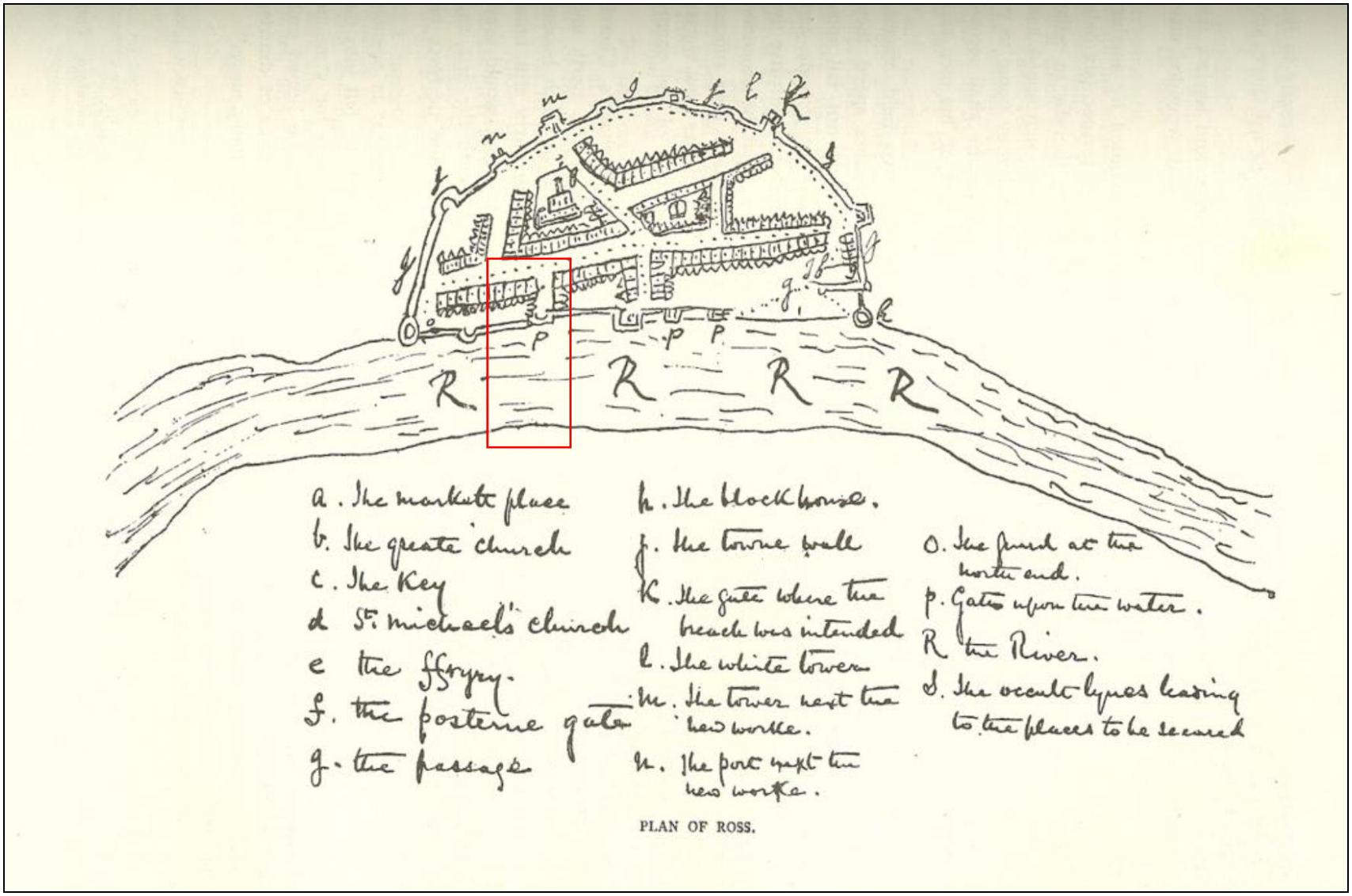

Figure 14-6 **Design for Recovery of Town of Ross c.1649 (reproduced in Hore 1900, 329); the approximate location of the study area is delineated in red.**

The Down Survey maps (c.1656–58)

The Down Survey maps (*c*.1656–58), were drawn up in the aftermath of the 1641 rebellion. The map of *The Barony of Bantrie in the County of Wexford*[38] shows *New Rosse Parish* with the distinctive D-shaped enclosure of the town defences to the east of the River Barrow (Figure 14-7). However, it does not include a detailed depiction of the town. The accompanying map for *The Liberties of Rosse*[39] shows the same detail, in addition to a church in Rosbercon, possibly the Religious house of the Dominican friars (WX029-013007-). No indication of curtilage for the medieval abbey or riverside infrastructure is provided on this map.

[38] Available at: http://downsurvey.tcd.ie/down-survey-maps.php#bm=Bantry&c=Wexford [Accessed: 06.04.22].
[39] Available at: http://downsurvey.tcd.ie/down-survey-maps.php#bm=Bantry&c=Wexford&p=Newrosse [Accessed: 06.04.22].

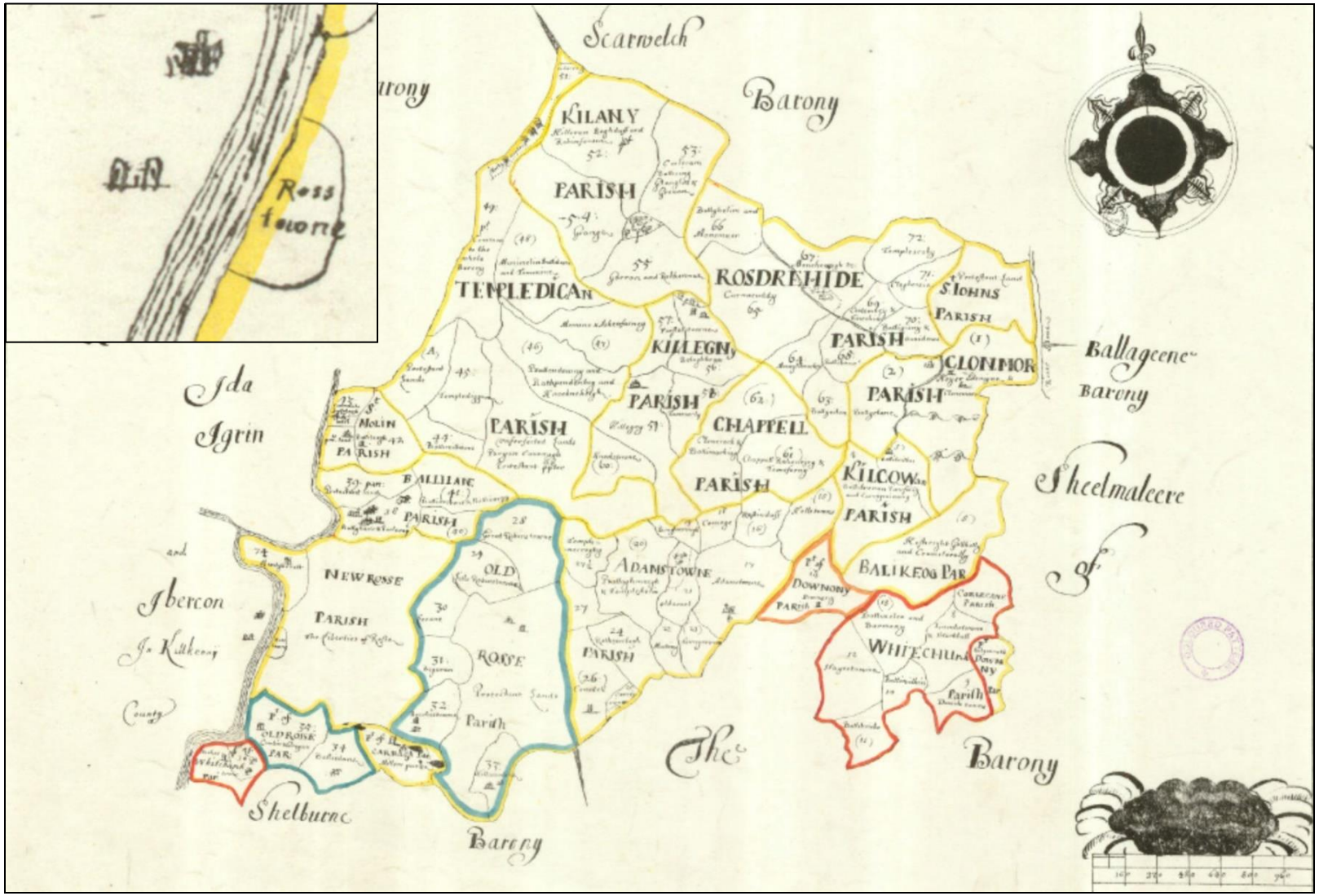

Figure 14-7 Down Survey map of the Barony of Bantry showing New Ross (c.1656–58); the inset shows an enlarged detail of New Ross.[40]

[40] Available at: http://downsurvey.tcd.ie/down-survey-maps.php#bm=Bantry&c=Wexford [Accessed: 06.04.22].

Anglesey Estate Map (c.1699)

The Earl of Anglesey obtained New Ross as part of a substantial land grant in 1666 and subsequently commissioned a map of the town that he presented to the citizens (Figure 14-8), which is dated 1699 (Doran 2007a, 4). The location of the original map is unknown and its dating is problematical (Ó Drisceoil 1996, 21), reproductions of the map are included in a number of histories of the town (e.g. Carroll 1875; Hore 1900, 51; Butler 1975, 88–89). At the base of the reproduction by Carroll it is stated the map is a nineteenth-century copy of the original that *is believed to represent New Ross as it stood 200 years ago*, i.e. 1675 (1875, map). This suggests it was prepared sometime between 1666, when the earl was granted New Ross, and 1699, when it was presented to the town (Ó Drisceoil 1996, 20). These copies of the Anglesey Map include nineteenth-century additions, such as information regarding events that took place in the town in the 1798 Rebellion (*ibid*.), as well as the depiction of a bridge crossing the River Barrow from Bridge Street to Rosbercon, which was not constructed until after 1795 (see Table 14-5). A possible explanation for these later elements is that the nineteenth-century copyists either added details from the Anglesey map to a nineteenth-century basemap, or added features from the nineteenth-century landscape so that contemporary viewers could orientate themselves.

The fortifications as shown on the *c*.1699 map are broadly comparable to the 1649 sketch map, and include the D-shaped walls with five gates and five towers (Figure 14-8). It depicts the street pattern in detail and names Maiden Lane, Market Street, Bridge Street, North Street, South Street, Main Guard, Church Lane, Chapel Lane, Mary Street, Quay Street, Nevin Street, Michaels Lane, Michaels Street, Crofs (Cross) Lane, Friary Street, Coals Lane, Condons Lane, Barrack Lane and Nevilles Lane, in addition to Custom House Quay and Block House Quay. The map denotes the ferry crossing to the northwest of North Street, with a New Pier Head off the Custom House Quay.

The Anglesey Estate Map also notes some places of commercial and civic interest such as the Custom House on the corner of Block House Quay, a jail on Mary Street, two market places, in addition to St Mary's Church, The Folly House, St Augustine's Abbey Schoolhouse, and the Barracks. Roads leaving the town are also depicted that include the Road to Wexford to the southeast, the Road to Fethard to the south-southeast and the Road to Ballinlan Ferry and Waterford to the southwest.

No cartographic detail for the western side of the river is provided in the Anglesey Estate Map.

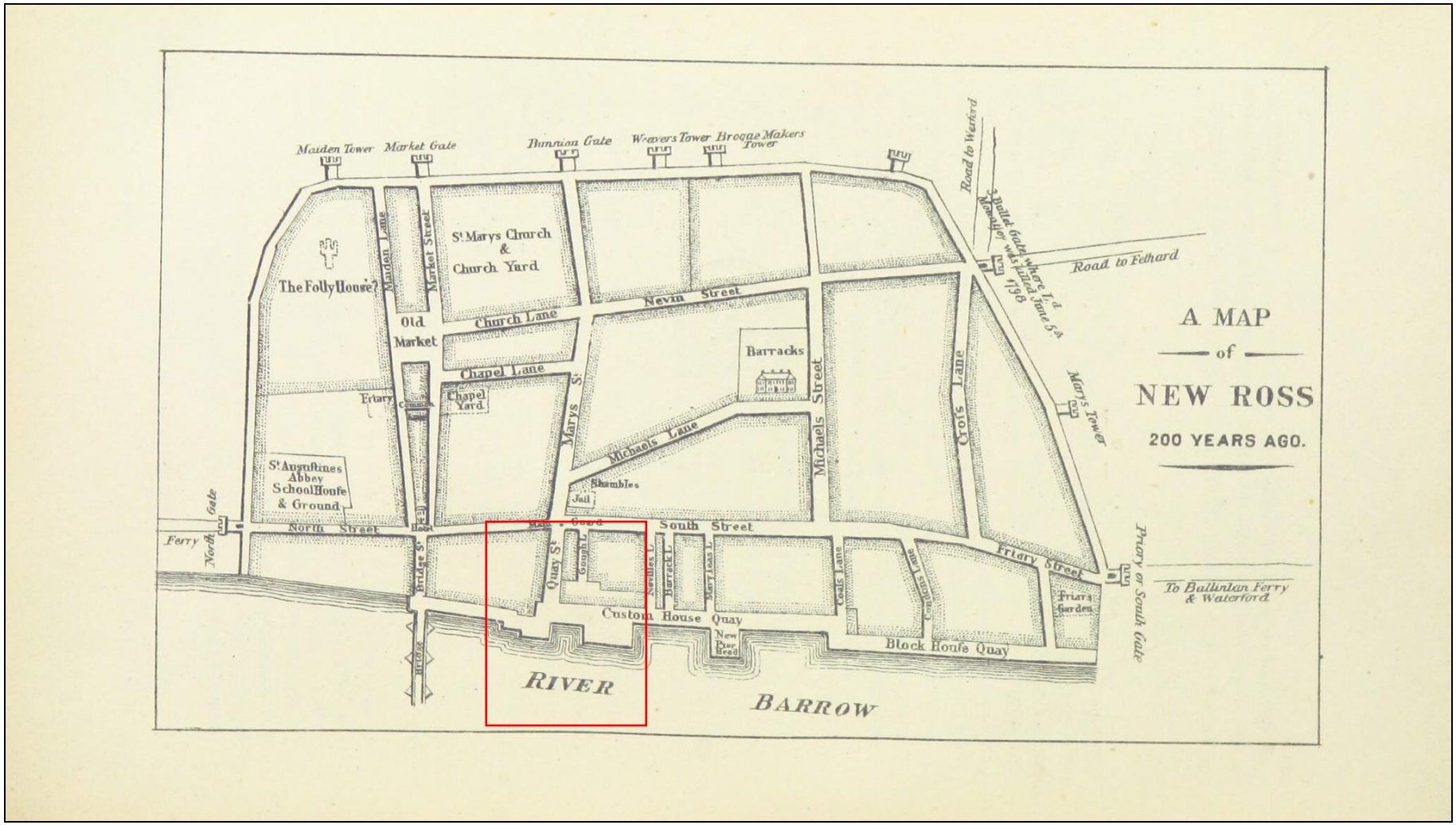

Figure 14-8 Anglesey Estate Map c.1699 (reproduced in Butler 1975, 88); the approximate location of the study area is delineated in red

Ordnance Survey First-Edition Six-Inch Map (1839–41)

The first-edition OS six-inch map, which was surveyed in 1839 and published in 1841, provides a comprehensive overview of the character of the town of New Ross in the years preceding the Great Famine (Figure 14-9). At a general level, the distinctive D-shaped pattern of the medieval enclosure is still evident, with Three Bullet Gate, Maiden Gate and the Site of North Gate all annotated. Religious buildings in New Ross include the Monastery of St Saviour (in ruins), a Roman Catholic Chapel and Church north of Main Street and a Methodist Meeting House, while the civic buildings include the town hall, a police station, Trinity Hospital, the Bridewell, Market Place and an Endowed School.

The north-eastern part of the town is the most densely occupied part of the town. Numerous burgage plots are still evident, particularly off Maiden Lane and Maiden Street (Figure 14-9), demonstrating that elements of the street pattern were still largely medieval in origin (Ó Drisceoil 2017, 286–88; Bradley 1985, 449–50). Frequent burgage plots are also evident extending to the north and south from Fair Green and Irish Town in the suburb of Irishtown to the northeast.

To the west of the Barrow, the suburb of Rosbercon is also illustrated in detail, with settlement on either side of the main street. The site of Rosbercon Abbey is shown, as well as the police station, Rosbercon Castle, a church and graveyard, a dispensary, hospital, Roman Catholic Chapel and the Glebe House.

In the context of the study area, the wooden bridge that collapsed during the snowfall of 1867 is shown to the north of the site of the present O'Hanrahan Bridge (Figure 14-5 and Figure 14-9). The bridge leads from Bridge Street in New Ross across to the Thomastown Road in Rosbercon and includes a draw bridge section. A *New Quay* is shown on the Rosbercon side of the Barrow, with piers also extending from the New Ross riverside. There is a density of buildings fronting onto the quay and along North Street and South Street. In addition, the Barrow sloblands to the southeast and southwest of the study area, in Rosbercon and New Ross, have not yet been reclaimed.

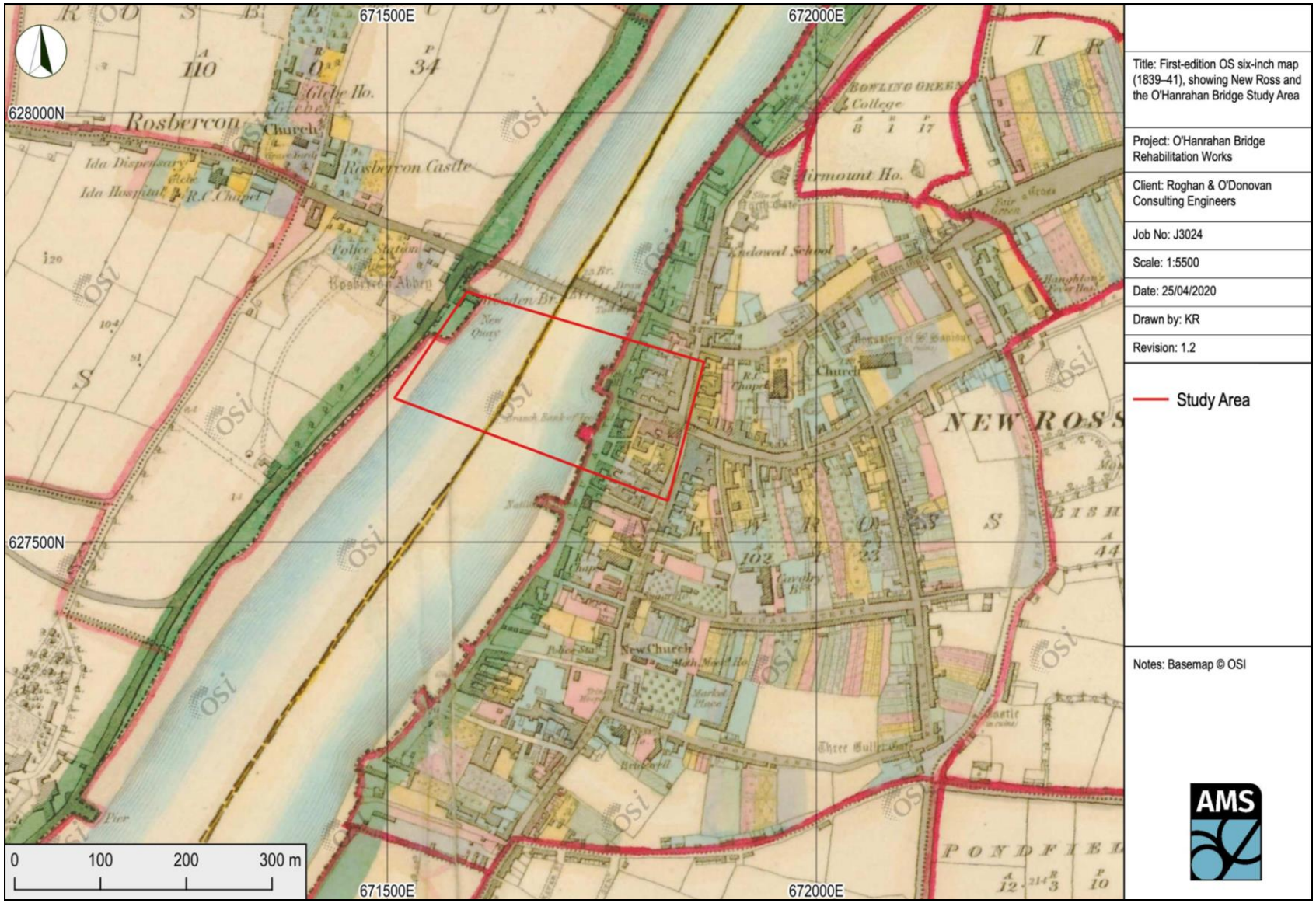

Figure 14-9 First-edition OS six-inch map (1839–41), showing New Ross and the study area.

Ordnance Survey 25-Inch Map (1902–04)

The Ordnance Survey 25-inch map, which was surveyed in 1902 and published in 1904, illustrates the development of Rosbercon during the nineteenth century (Figure 14-10), in addition to the coming of the railway to the town, which arrived in Rosbercon in 1887 (Sheperd 2000–01, 64). Coal yards and corn stores are shown to the south of the bridge that was constructed by the Grand Jury of the County of Wexford in 1869; the bridge follows the same line as the wooden bridge that collapsed in 1867 (see also Plate 14.3 and Plate 14.4). To the north of the bridge a boat house and slip are shown.

A series of buoys are depicted in the River Barrow, while on the New Ross side of the river, corn stores, a fish house, mooring points and boat piers occur along the quay (Figure 14-10). The streets within the study area, including North Street, South Street, Charles Street and Quay Street, as well as the Quays, Back Lane and Conduit Lane, are all densely settled, illustrating the nineteenth century growth of the area.

With reference to the wider urban area of New Ross, sections of the town wall are detailed at William Street and the castle (in ruins) off Town Wall, while Three Bullet Gate (site of), Maiden Gate and North Gate (site of), also shown (Figure 14-10). The map also denotes several limekilns and disused quarries on the perimeter of the town, with warehouses, coal yards, slate and timber yards, malt stores, saw mills, gas works and cranes along the quays of the Barrow (e.g. Plate 14.5).

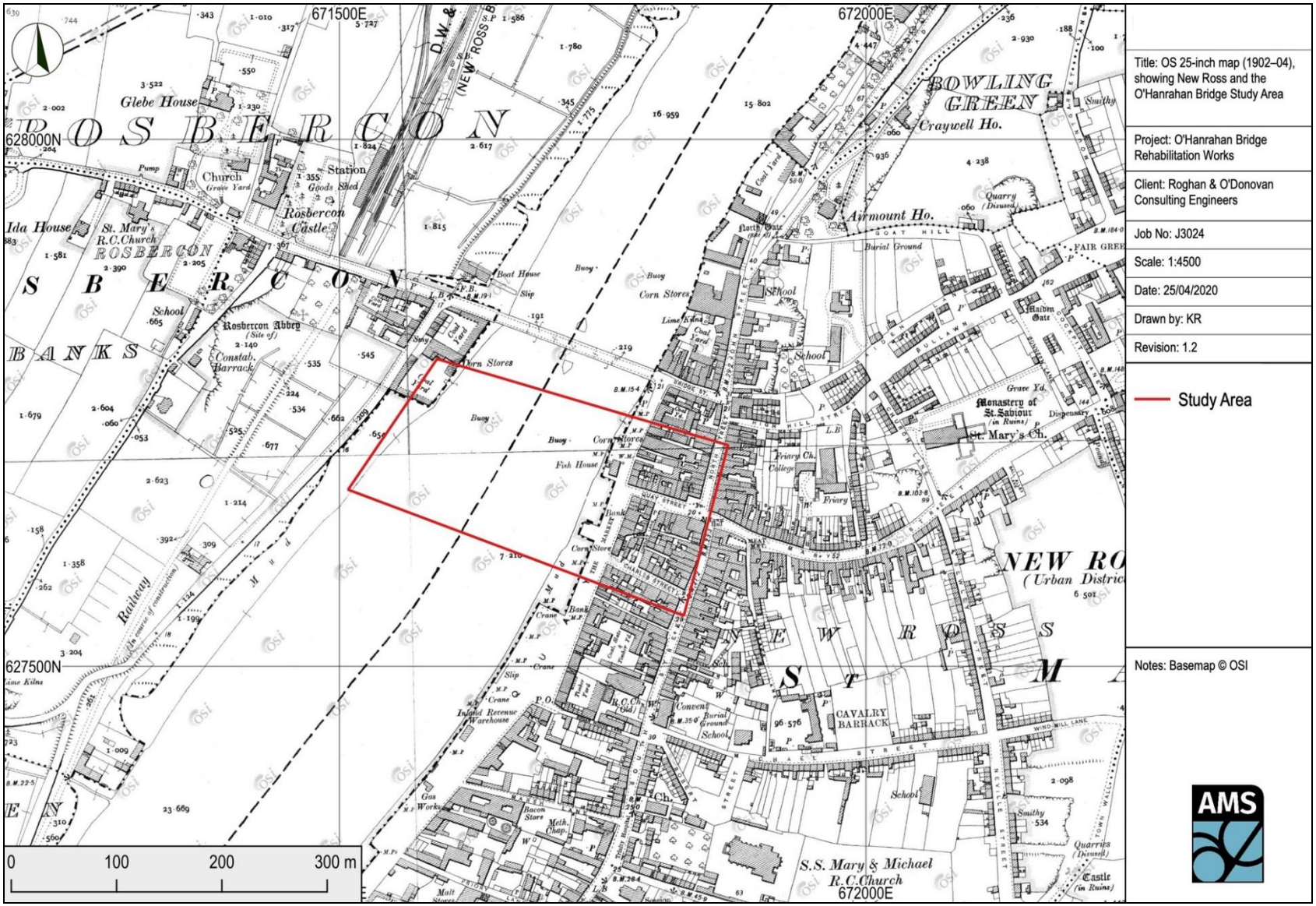

Figure 14-10 OS 25-inch map (1902–04), showing New Ross and the study area.

14.3.3 Recorded Archaeological Sites

There are five (no. 5) archaeological sites that are recorded in the RMP and/or SMR from the study area (Table 14-6 and Figure 14-11). Details of these previously recorded archaeological sites, based on information from the Historic Environment Viewer (HEV), are given in Appendix 14.1.

Table 14-6 Recorded archaeological sites in the study area

SMR / RMP No.	Site Type	Designation	Significance	Townland	ITM	Distance[41]
WX029-013	Historic town	RMP	High	Rosbercon, Irishtown, New Ross	671939, 627541	0m
WX029-013005	Town defences	National monument	High	New Ross	672144, 627854	13m
WX029-013014	Excavation – miscellaneous	SMR	Medium	New Ross	671800, 627710	45m
WX029-013071	Bridge	RMP	High	Rosbercon, New Ross	671626, 627639[42]	68m
WX029-013007-	Religious house – Dominican friars	RMP	High	Rosbercon	671509 627802	96m

The study area is within the Zone of Archaeological Potential (ZAP) for the Historic Town of New Ross (RMP No. WX029-013), which encompasses the townlands of New Ross, Irishtown and Rosbercon (Figure 14-11). The medieval town defences (RMP No. WX029-013005) are a national monument under the National Policy on Town Defences, by reason of the historical, architectural and archaeological interest attached to them (DEHLG 2008, 8). The town wall circuit enclosed a D-shaped area with a gridiron street pattern of 39ha (e.g. Figure 14-4, Figure 14-6 and Figure 14-8). The defence perimeter was 1.57km to the curved section and 750m along the straight river frontage (Doran 2014, 10–11; Alastair Coey Architects 2008, 9).

The town walls ran from the River Barrow at the north, up Goat Lane to the Maiden Gate, the only survivor of the four original gates (Figure 14-4). From there, the wall ran along the back of properties to the west of Haughton Place and along Nunnery Lane to a mural tower. From this tower the wall continued southwest to the junction of Neville Street. Here it turned west and proceeded down William Street, where there is a standing section of wall. The wall then crossed the junction with Priory Street and continued towards the river and another tower. There was a gate at North Street, while the Maiden's Gate led to Irishtown. The Bunnion Gate was at the top of Mary Street and the Three Bullet Gate was at the junction of Neville Street and William Street. The Priory, or South Gate, was at the junction of Lower William Street and Priory Street. The independent borough of Rosbercon on the Kilkenny side of the river was probably unwalled.

[41] Distances measurements are from the edge of the site/structure to the edge of O'Hanrahan Bridge or the area of the proposed works at the quay, depending on which is closer.
[42] *NOTE: These grid coordinates correspond to the centroid for WX029-013071 as shown on the HEV. However, the medieval bridges were probably sited to the north of O'Hanrahan Bridge on the Bridge Street–Rosbercon alignment [Centroid: 671716, 627802].

A centroid for the site of the Dominican abbey (WX029-013007-) in Rosbercon is annotated on the first-edition OS six-inch map (Figure 14-9) and presented on the HEV; however, it is unclear as to which (if any) of the buildings depicted on this map edition might relate to the religious house. An enclosing wall suggesting possible line of curtilage or elements associated with the foundation is also shown and a number of buildings fronting onto the roughly north-south orientated Waterford road are similarly depicted. Little cartographic evidence in general for this religious house survives, however, archaeological monitoring of the laying of a drainage pipe (Licence No. 95E0086) identified a wall and burials associated with the abbey. This site is included in the assessment owing to the potential for previously unrecorded archaeological features/finds/deposits associated with it and associated activities along the river bank during the medieval period.

The HEV places the centroid for the medieval wooden bridge(s) (RMP No. WX029-013071), *c*.68m to the south-southwest of O'Hanrahan Bridge (Figure 14-11). However, it appears from the available historical evidence that the thirteenth, fourteenth and fifteenth century bridges spanned the Barrow on the Bridge Street to Rosbercon axis (e.g. Table 14-5). This would place the site of the medieval bridges *c*.111m to the north-northeast, which is outside the study area. Nonetheless, RMP No. WX029-013071 is included in the assessment owing to the potential for previously unrecorded archaeological remains associated with medieval and post-medieval bridge and fording sites in this part of the River Barrow.

The first bridge over the River Barrow comprised a wooden structure that was erected shortly before 1210, while a bridge was also recorded at this location in 1586 (Hore 1900–11, 52). Hore also records that a bridge built in 1313 to connect the boroughs of Rosbercon and New Ross was destroyed during the siege of 1643, but was rebuilt in 1796 (*ibid*., 112). An entry in the IFC Schools' Collection from St Leonards National School, in the village of Ballycullane to the southeast of New Ross, records that part of the wooden bridge collapsed following a large snowfall in 1867 (Appendix 14.4).[43]

The final site, which is recorded in the SMR (WX029-013014), comprises the site of an archaeological investigation (Licence No. 03E0489),[44] within a late nineteenth-century malthouse on the North Quay (NIAH Reg. 15605004). Four trenches were investigated, which uncovered post-medieval structural foundations, reclamation deposits and a seventeenth-century stone-lined drain. A medieval layer was also exposed at a depth of 1m below ground level (BGL), which produced sherds of Bristol Redcliffe, French Saintonge and local Waterford-type medieval wares, suggesting a mid- to late thirteenth century date for the ceramic assemblage (see also Table 14-7 and Appendix 14.2).

[43] Available at: https://www.duchas.ie/en/cbes/5009220/4999202 [Accessed: 06.04.22].
[44] Available at: https://excavations.ie/report/2003/Wexford/0011057/ [Accessed: 05.04.22].

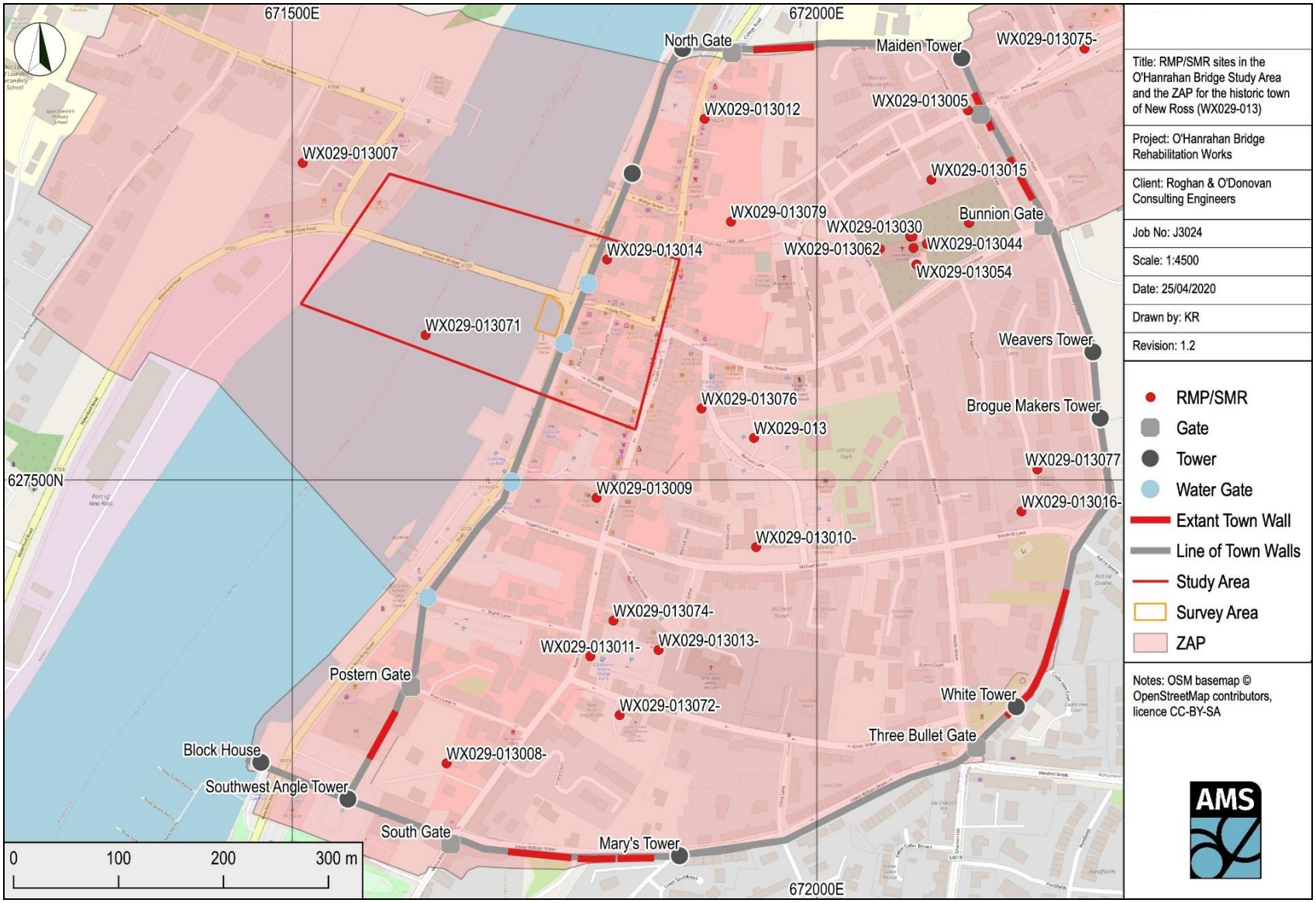

Figure 14-11 RMP/SMR sites in the study area and the ZAP for the Historic Town of New Ross (WX029-103)

14.3.4 Previous Archaeological Investigations

Three (no. 3) archaeological investigations have been carried out within the study area (Figure 14-12). Details of these investigations, based on information from the Database of Irish Excavation Reports (DIER),[45] are given in Appendix 14.2, while summaries of the findings are detailed in Table 14-7, below. It should be noted that the location of excavation 95E0086 as shown on the DIER is based on point data (a centroid – see Figure 14-12), but the works associated with this licence concerned a linear scheme which extended into Rosbercon townland also.

Table 14-7 Archaeological investigations undertaken within the study area

Licence No.	DIER Ref.	Archaeological Consultant	Site Name	ITM	Findings
95E0086	1995:277, 1997:601	Sarah McCutcheon, ADS Ltd	New Ross Main Drainage Scheme, The Quay, South St, Conduit Lane, Back Lane, New Ross	671796, 627627	Medieval town walls and town ditch, as well as medieval burials in Rosbercon. Reclamation layers and brick-built conduit. Post-medieval and medieval ceramics recovered.
03E0489	2003:2025	Daniel Noonan, The Archaeology Company	North Quay, New Ross	671777, 627706	Foundations of post-medieval corn store, a seventeenth-century stone-lined drain, as well as medieval deposits that produced ceramics.
03E0541	2003:2032	Emmet Stafford, Stafford McLoughlin Archaeology	48 The Quay, New Ross	671789, 627701	Post-medieval reclamation layers and structural remains, including a well and wall foundations.

Archaeological monitoring of the New Ross Main Drainage Scheme was undertaken in New Ross, Irishtown and Rosbercon on dates from 1995 to 1997 (Licence No. 95E0086). With reference to the study area, monitoring of pipe laying was carried out along The Quay, South Street, Conduit Lane and Back Lane. However, the key discoveries occurred outside the study area and included portions of the medieval town ditch along Town Wall, to the southeast. In addition, burials and structural remains associated with the Dominican friary that was founded in Rosbercon in 1267 were archaeologically excavated.

Medieval deposits were also uncovered during the aforementioned programme of archaeological testing at the late nineteenth-century malthouse on North Quay (Licence No. 03E0489; SMR No. WX029-013014), located *c*.45m to the northeast of O'Hanrahan Bridge. Post-medieval reclamation deposits and nineteenth-century structural remains were also exposed in the test trenches. Post-medieval structural remains were uncovered during testing at No. 48 The Quay (Licence No. 03E0541), located *c*.35m to the northeast of O'Hanrahan Bridge (Figure 14-12). These included a possible well and several wall foundations; post-medieval reclamation deposits were also noted.

[45] Available at: https://excavations.ie/ [Accessed: 18.05.22].

Figure 14-12 Locations of archaeological investigations in the study area.

Archaeological Investigations in Proximity to the Study Area

Archaeological monitoring of geotechnical investigations in advance of main drainage insertion along the quays (Licence No. 03E0786),[46] *c*.105m to the north–northeast of O'Hanrahan Bridge, uncovered archaeological material in two boreholes. One of these was situated at the western end of Bridge Street close to the site of the old bridgehead. At a depth of 10.5m BGL an obstruction was encountered that could not be breached, and a piece of timber plank was recovered from the casing. The overlying deposit of silty gravel contained 35 sherds of medieval pottery. The excavator suggested the bore may have encountered the site of a medieval bridge (Doran 2014, 37).

Archaeological testing in advance of the construction of the Dunbrody Famine Ship Visitor Centre (Licence No. 01E0006),[47] *c*.300m to the south-southeast of O'Hanrahan Bridge, uncovered reclamation deposits that produced a sherd of nineteenth-century chinaware. Post-medieval reclamation deposits were also uncovered along The Quay in proximity to Marsh Lane (Licence No. 00E0151),[48] *c*.325m to the south-southeast of O'Hanrahan Bridge. The testing also uncovered a section of the town wall, in addition to the remains of a round turret or wall tower, dating to the mid-seventeenth century (Doran 2014, 35–36). A test excavation to the rear of No. 19 The Quay (Licence No. 04E0240),[49] *c*.115m south of O'Hanrahan Bridge between Charles Street and Lady Lane, also revealed successive dump or fill layers that were suggestive of reclamation deposits.

Underwater surveys have also been carried out of the Barrow riverbed. These include marine archaeological monitoring of a river-dredging scheme of the Barrow in 1999. As well as monitoring the dredger at its point of impact, all discharged materials were examined with a metal detector and a portion of the discharged materials were sieved for organic content and small finds. Finds recovered included three stone anchors, boat timbers, net weights, small gaming pieces, nails, bone, leather and small wooden tools (Kieran 1999, 21). A non-disturbance survey of a 190m by 25m area beside the site of a nineteenth-century brewery complex at Craywell Road was carried out in 2006 and 2007 (Licence Nos. 06R232 and 07D056), prior to the construction of a floating marina. Systematic visual inspection of the subtidal riverbed and intertidal foreshore did not reveal any material of archaeological significance. However, material of historic interest was noted that included early twentieth-century glass bottles, a large hardwood timber and rough-cut masonry from the adjacent brewery/quayside structures (Doran 2014, 42–43).

14.3.5 Topographical Files

A search of the Topographical Files and the NMI Finds Database for the townlands of New Ross and Rosbercon was undertaken in the NMI Antiquities Division, Kildare Street, Dublin 2 on 7 April 2022. One find is recorded in the Topographical Files, comprising an unspecified quantity of human remains of unknown date from an unspecified location in New Ross (Table 14-8). No archaeological objects are recorded from the study area in the NMI Finds Database.

[46] Available at: https://excavations.ie/report/2003/Wexford/0011062/ [Accessed: 06.04.22].
[47] Available at: https://excavations.ie/report/2001/Wexford/0007242/ [Accessed: 06.04.22].
[48] Available at: https://excavations.ie/report/2000/Wexford/0005906/ [Accessed: 06.04.22].
[49] Available at: https://excavations.ie/report/2004/Wexford/0012938/ [Accessed: 06.04.22].

Table 14-8 Archaeological objects from the study area recorded in the NMI Topographical Files

Townland	NMI Reg.	Simple Name	Material	Find Circumstances
New Ross	2013:90	Human remains	Bone	Found in New Ross area. Paper files include one internal letter and one letter to the Gardaí on the find.

14.3.6 Shipwreck Inventory

The WIID, accessed via the NMS Wreck Viewer, was consulted to assess if any wrecks are recorded from the study area. The Wreck Viewer displays data regarding the known wreck locations contained within the WIID. No wrecks occur within the study area; however, eleven (no. 11) wrecks are recorded downstream of O'Hanrahan Bridge (Table 14-9), to the confluence of the River Barrow and the River Suir.

Table 14-9 Wrecks recorded from the River Barrow in New Ross in the Wreck Inventory of Ireland Database

Wreck No.	Wreck Name	DD Latitude[50]	DD Longitude	Date of Loss	Place of Loss
W11302	Unknown	52.36634	-6.99049	Unknown	Lucy Rock, River Barrow, County Kilkenny.
W11304	Unknown	52.31904	-6.98639	Unknown	River Barrow, 45m northwest of Pilton Quay, Pilton.
W11305	Unknown	52.29478	-7.01645	Unknown	Ferry Point, River Barrow. 90m west of Great Island, County Wexford.
W11335	Unknown	52.27943	-7.00578	Unknown	Mouth of River Barrow, County Waterford.
W11639	Unknown	52.30019	-7.01901	Unknown	Gabbard from Ringville Pill, River Barrow. 1km west of Ballinlaw, County Waterford.
W14107	Norval	Unknown	Unknown	1843	River Barrow, near New Ross.
W14456	John Bull	Unknown	Unknown	1911	Mead's Quay, New Ross, 3m down the River Barrow.
W18541	Unknown	52.36660	-6.99017	N/A	Lucy Rock, River Barrow, County Kilkenny.
W18542	Unknown	52.35885	-6.99583	Unknown	Wooden wreck identified during geophysical survey of River Barrow. Wreck lies 200m north of Pink Point on west side of channel.
W18544	Unknown	52.31728	-6.99300	Unknown	River Barrow, County Kilkenny, 175m southwest of Rochestown Spit and 440m northeast of Dollar Point Quay.
W18545	Unknown	52.31873	-6.98550	Unknown	River Barrow, County Wexford, near Pilton Quay.

[50] Decimal Degrees (DD)

14.3.7 Recorded/Listed Architectural Heritage

Forty (no. 40) recorded/listed architectural heritage sites are recorded from the study area, 27 of which are Protected Structures (Table 14-10 and Figure 14-13). No direct impacts are predicted for any recorded/listed architectural heritage sites in the study area. Details for all recorded/listed architectural heritage sites in the study area, based on information from the NIAH Building Survey and the Wexford County RPS, are given in Appendix 14.3.

Table 14-10 Recorded architectural heritage sites within the study area

NIAH Reg.	RPS Ref.	Original Use (Date)	Townland/ Street	Rating	ITM	Distance[51]
15605001	NR0084	House (1840–1860)	North Quay, New Ross	Regional	271850, 127635	20m
15605002	NR0083	House (1815–1835)	P.J. Roche, North Quay, New Ross	Regional	271852, 127641	23m
15605003	NR0082	House (1815–1835)	T. Bradley, North Quay, New Ross	Regional	271854, 127647	28m
15605004	N/A	Malthouse (1842–1881)	North Quay, New Ross	Regional	271874, 127658	53m
15605005	N/A	Granary (1895–1900)	North Quay, New Ross	Regional	271866, 127673	56m
15605033	N/A	Store/warehouse (1875–1880)	25–27 North St, New Ross	Regional	271915, 127664	97m
15605034	N/A	House (1865–1885)	18 North St, New Ross	Regional	271913, 127632	86m
15605035	NR0186	House (1700–1840)	17 North St, New Ross	Regional	271911, 127626	82m
15605036	NR0187	Shop/retail outlet (1815–1835)	16 North St, New Ross	Regional	271910, 127621	80m
15605037	NR0188	Shop/retail outlet (1815–1835)	15 North St, New Ross	Regional	271909, 127616	80m
15605038	NR0095	Monument (1905–1910)	1798 Monument, Quay St/North St, New Ross	Regional	271906, 127606	82m
15605039	NR0089	House (1840–1860)	10 Quay St, New Ross	Regional	271897, 127616	72m
15605040	NR0094	House (1840–1860)	P. Nolan, 8 Quay St, New Ross	Regional	271886, 127620	60m
15605041	N/A	House (1840–1860)	7 Quay St, New Ross	Regional	271880, 127621	55m
15605042	N/A	House (1840–1860)	4 Quay St, New Ross	Regional	271864, 127626	38m
15605043	N/A	House (1840–1860)	3 Quay St, New Ross	Regional	271858, 127624	33m

[51] Distance measurements were taken from the edge of the site/structure to the edge of O'Hanrahan Bridge or the proposed works areas at the quay, depending on which is closer.

NIAH Reg.	RPS Ref.	Original Use (Date)	Townland/ Street	Rating	ITM	Distance[51]
15605044	NR0191	House (1815–1835)	The Quay/Quay St, New Ross	Regional	271850, 127611	29m
15605045	NR0012	Shop/retail outlet (1840–1850)	The Half Door, Conduit Lane, New Ross	Regional	271863, 127600	46m
15605046	N/A	Store/warehouse (1865–1885)	Conduit Lane, New Ross	Regional	271873, 127585	58m
15605047	N/A	House (1815–1835)	15 Quay St/Conduit Lane, New Ross	Regional	271876, 127595	56m
15605048	NR0091	House (1840–1860)	James Byrne, 13 Quay St, New Ross	Regional	271887, 127593	75m
15605049	NR0096	Market house (1745–1750)	New Ross Town Hall, Quay St/South St, New Ross	Regional	271908, 127587	96m
15605050	NR0123	House (1815–1835)	J. Hogan, 69 South St, New Ross	Regional	271908, 127576	93m
15605051	NR0121	House (1890–1910)	The Bakehouse, 67 South St, New Ross	Regional	271908, 127565	98m
15605052	N/A	House (1890–1910)	64 South St, New Ross	Regional	271903, 127550	107m
15605053	NR0163	House (1870–1880)	The Cloth Hall, 61 South St, Charles St, New Ross	Regional	271895, 127531	115m
15605054	NR0120	Shop/retail outlet (1840–1860)	Jack & Jill, 60 South St/Charles St, New Ross	Regional	271887, 127515	123m
15605055	NR0119	House (1840–1860)	J. Bailey, 59 South St, New Ross	Regional	271885, 127508	129m
15605230	NR0205	House (1840–1860)	Hanrahan, 2 Charles St, New Ross	Regional	271877, 127519	116m
15605231	NR0008	House (1890–1910)	Brook, 7 Charles St, New Ross	Regional	271887, 127534	104m
15605232	NR0142	Shop/retail outlet (1790–1810)	4 Charles St, New Ross	Regional	271871, 127543	93m
15605233	NR0206	House (1790–1810)	6 Charles St, New Ross	Regional	271865, 127546	87m
15605235	NR0009	Post office (1900–1905)	New Ross Post Office, Charles St/Conduit Lane, New Ross	Regional	271845, 127557	66m
15605237	NR0207	House (1890–1910)	The Dunbrody Inn, The Quay, New Ross	Regional	271821, 127531	65m
15605238	NR0085	Store/warehouse (1840–1860)	Sherry Fitzgerald, 14 The Quay/Charles St, New Ross	Regional	271834, 127566	35m

NIAH Reg.	RPS Ref.	Original Use (Date)	Townland/ Street	Rating	ITM	Distance[51]
15605239	NR0081	Bank/financial institution (1855–1865)	Bank of Ireland, 12 The Quay, New Ross	Regional	271846, 127597	17m
15605268	NR0211	House (1840–1860)	6 Quay St, New Ross	Regional	271875, 127626	54m
15605270	N/A	Shop/retail outlet (1790–1810)	12 Quay St, New Ross	Regional	271891, 127592	81m
15605271	N/A	House (1790–1810)	11 Quay St, New Ross	Regional	271897, 127590	83m
15605272	N/A	Shop/retail outlet (1815–1835)	62 South St, New Ross	Regional	271899, 127539	110m

The earliest structures in the study area include an eighteenth-century house at No. 17 North Street (WCC RPS Ref. NR0186; NIAH Reg. 15605035) and the former market house (WCC RPS Ref. NR0096; NIAH Reg. 15605049), now New Ross Town Hall on Quay Street and South Street (Figure 14-13). The market house was erected by Charles Tottenham in 1749 and rebuilt in 1806. Late eighteenth-century to early nineteenth-century buildings include a former shop at No. 4 Charles Street (WCC RPS Ref. NR0142; NIAH Reg. 15605232), and No. 12 Quay Street (NIAH Reg. 15605270), in addition to houses at No. 6 Charles Street (WCC RPS Ref. NR0206; NIAH Reg. 15605233) and No. 11 Quay Street (NIAH Reg. 15605271).

The North Quay includes three (no. 3) early to mid-nineteenth-century residential dwellings (NIAH Regs. 15605001, 15605002 and 15605003) that are also Protected Structures (WCC. RPS Refs. NR0082, NR0083 and NR0084). A late nineteenth-century malthouse (NIAH Reg. 15605004) and granary (NIAH Reg. 15605005). Recorded/listed structures on The Quay comprise an early nineteenth-century house on The Quay/Quay Street (WCC RPS Ref. NR0191; NIAH Reg. 15605044), a mid-nineteenth century former warehouse (WCC RPS Ref. NR0085; NIAH Reg. 15605238) and bank (WCC RPS Ref. NR0081; NIAH Reg. 15605239), as well as a late nineteenth century house (WCC RPS Ref. NR0207; NIAH Reg. 15605237), now the Dunbrody Inn.

A series of mid-nineteenth century residential dwellings are located on Quay Street that include No. 3 (NIAH Reg. 15605043), No. 4 (NIAH Reg. 15605042), No. 6 (WCC RPS Ref. NR0211; NIAH Reg. 15605268), No. 7 (NIAH Reg. 15605041), No. 8 (WCC RPS Ref. NR0094; NIAH Reg. 15605040), No. 10 (WCC RPS Ref. NR0089; NIAH Reg. 15605039), No. 13 (WCC RPS Ref. NR0091; NIAH Reg. 15605048) and No. 15 (NIAH Reg. 15605047).

Built heritage sites on North Street include two early nineteenth-century shops at No. 15 (WCC RPS Ref. NR0188; NIAH Reg. 15605037) and No. 16 (WCC RPS Ref. NR0187; NIAH Reg. 15605036), while mid-to late nineteenth century structures include a house at 18 North Street (NIAH Reg. 15605034) and a warehouse at Nos. 25–27 North Street (NIAH Reg. 15605033). The 1798 Monument (WCC RPS Ref. NR0095; NIAH Reg. 15605038) is also located at the junction of North Street and Quay Street.

The recorded/listed structures on South Street consist of an early nineteenth century house at and No. 62 (NIAH Reg. 15605272) and No. 69 (WCC RPS Ref. NR0123), as well as a mid-nineteenth-century house (WCC RPS Ref. NR0119; NIAH Reg. 15605055) and shop WCC RPS Ref. NR0120; NIAH Reg. 15605054), at Nos. 59 and

60 respectively. Three late nineteenth-century houses are also recorded/listed on the street at No. 61 (WCC RPS Ref. NR0163; NIAH Reg. 15605053), No. 64 (NIAH Reg. 15605052) and No. 67 South Street (WCC RPS Ref. NR0121; NIAH Reg. 15605051).

The remaining architectural heritage sites in the study area consist of a mid-nineteenth-century house at No. 2 Charles Street (WCC RPS Ref. NR0205; NIAH Reg. 15605230), and a shop on Conduit Lane, now The Half Door (WCC RPS Ref. NR0012; NIAH Reg. 15605045). A late nineteenth-century warehouse is located on Conduit Lane (NIAH Reg. 15605046), while early twentieth-century buildings include a house at No. 7 Charles Street (WCC RPS Ref. NR0008; NIAH Reg. 15605231) and New Ross Post Office on Charles Street and Conduit Lane (WCC RPS Ref. NR0009; NIAH Reg. 15605235).

14.3.8 New Ross Architectural Conservation Area

The eastern end of the study area also includes part of the New Ross ACA[52] (Figure 14-13). An ACA is a place, area, group of structures or townscape, taking account of building lines and heights, that is of special architectural, historical, archaeological, artistic, cultural, scientific, social or technical interest or that contributes to the appreciation of a Protected Structure, and whose character it is an objective of a development plan to preserve (DAHG 2011).[53]

[52] ACA 4 (Nos. 1 and 2) in Vol. 6 of the DRAFT Wexford County Development Plan 2021–2027. Available at: https://consult.wexfordcoco.ie/sites/default/files/Volume%206%20Architectural%20Conservation%20Areas.pdf [Accessed: 26.04.22].
[53] Section 81 of the Planning and Development Act 2000, as amended. Available at: https://www.irishstatutebook.ie/eli/2000/act/30/section/81/enacted/en/html#sec81 [Accessed: 26.04.22].

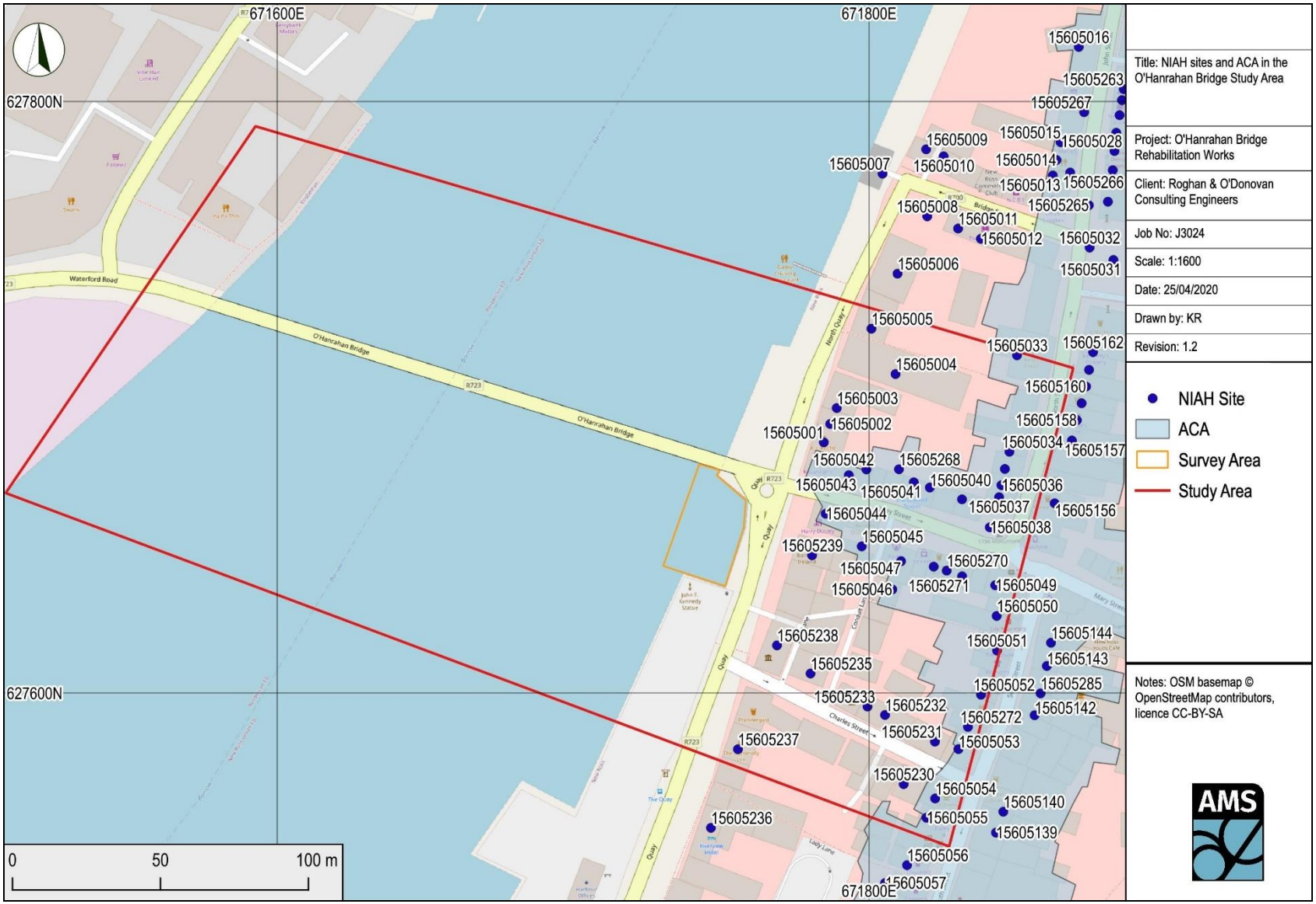

Figure 14-13 NIAH sites in the study area.

14.3.9 Undesignated Architectural Heritage

The existing masonry quay wall is of cultural heritage significance, due to its location and setting, condition fabric, dimensions and visible evidence for its history in the development of the port of New Ross. The modern quayside is the product of a long history of reclamation and it has been suggested that the land on the river side of the Priory Street to North Street axis was reclaimed (Ó Drisceoil 2017, Figure 9.12; Doran 2014, 41). The Quay was laid out in *c*.1850, which included further reclamation works (*ibid*., 36).

A visual inspection of the portions of extant masonry quay wall in the study area during the Wade and Metal Detection survey suggest these appear to date to the mid-nineteenth century (Figure 14-14). The section to the north-northeast, beside O'Hanrahan Bridge, was altered in the twentieth century, with visible sheet piling and rock armour (Plate 14.1). The extant section of wall is capped with a twentieth-century concrete parapet wall, or concrete and glass flood panel (Plate 14.8). Steps down from the top of the quay wall remain intact (Plate 14.7 and Plate 14.11), but access has been cut off from the quayside by a flood wall (Plate 14.13). A modern outfall protrudes through the stone wall.

However, while it is probable that the majority of the extant quay wall dates to the mid-nineteenth century, elements of earlier phases, possibly dating to the seventeenth century or earlier, may be incorporated within the existing structure. One of the earliest references to a quay in New Ross was in 1338 when *the quay of the pill of St Saviour's* in *Rosponte* was mentioned (Curtis 1932, 303–04). During the medieval period the hub of the town of New Ross was at the waterfront, meaning a functioning quayside was a necessity for the deep-water port afforded by the tidal River Barrow (Ó Drisceoil 2017, 289).

Unfortunately, there is no direct documentary or archaeological evidence for the medieval quays and very little can be said with certainty regarding their exact location or form (*ibid*., 292). Seventeenth-century maps depict a river wall as part of the river defences, as well as jetties and gates (e.g. Figure 14-6 and Figure 14-8). This demonstrates considerable masonry construction capability and suggests the mid-nineteenth century quay walls may have been constructed upon medieval and/or post-medieval masonry.

At the southwestern side of O'Hanrahan bridge, similar to the eastern end of the bridge, little can be said about the layout or extent of the town during the medieval period. Seventeenth-century maps do not provide good evidence for infrastructure, or indeed buildings, at this side of the river, and archaeological investigations have provided piecemeal evidence for same. The western abutments of the extant bridge are founded on sheet-piles which also act as wing walls to interface with the quay on the western end of the bridge. On the approaches to the wingwalls on the southwest corner, a reinforced concrete restraining slab acts as a flood wall as part of the New Ross Flood Alleviation Scheme. The restraining slab, constructed in the last decade, includes a masonry clad wall and guardrail. As part of the proposed widening works to O'Hanrahan Bridge, it is proposed to widen the southwestern end of the bridge by approximately 1m in order to continue the shared pedestrian and cycleway from the bridge to the South East Greenway (incorporating the Kilkenny Greenway).

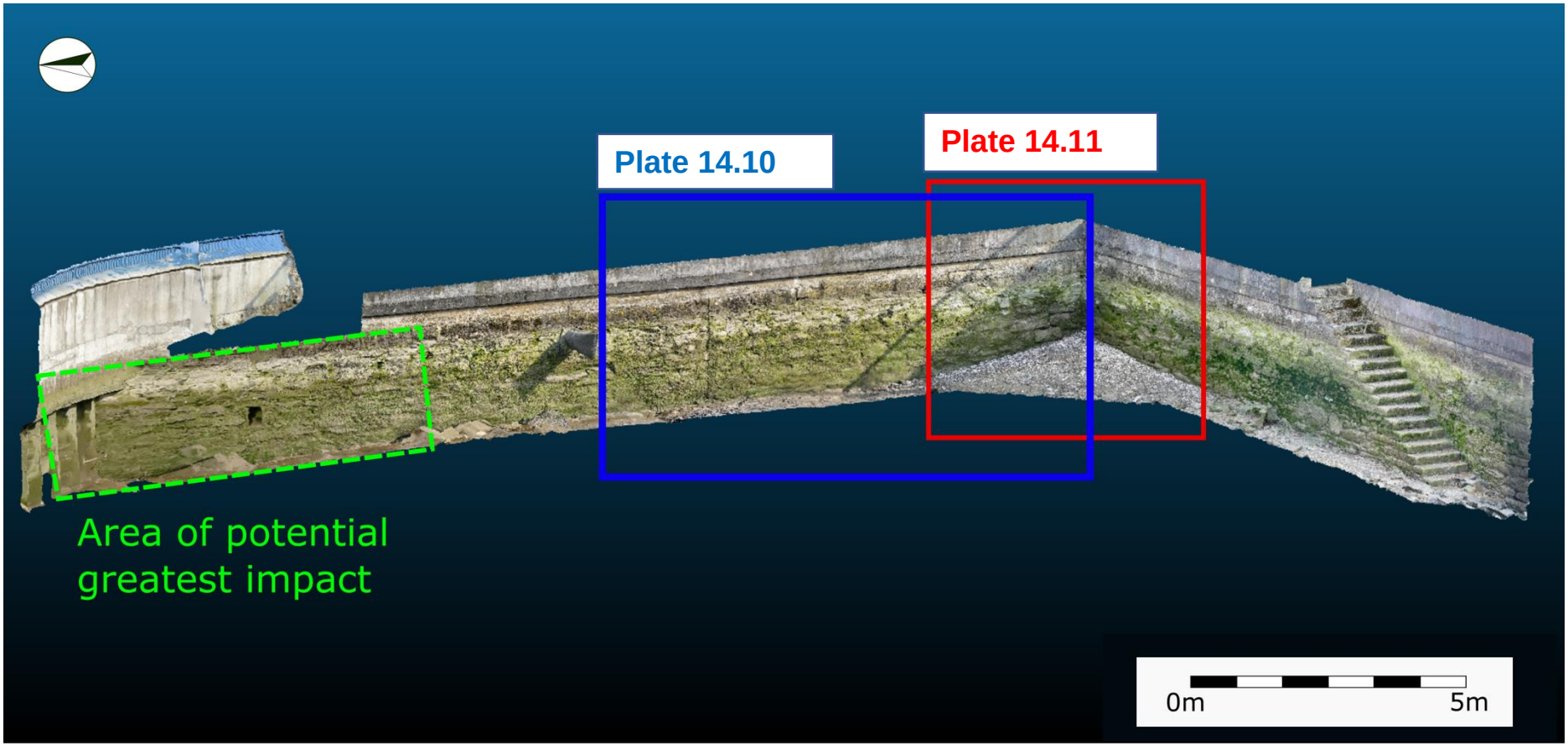

Figure 14-14 **3D-elevation model of masonry quay wall, steps and flood relief wall generated from the photogrammetry survey, facing east-southeast.**

14.4 Wade and Metal Detection Survey

The Wade and Metal Detection Survey was carried out during one of the lowest tides for March 2022, when there was a 2.5m height difference between low and high tide. The survey area, at the south-eastern side of the bridge which measured 37m (NNE–SSW) by 22.5m (WNE–ENE), was bounded to the east by the masonry quay wall, to the northeast by the flood relief wall, by O'Hanrahan Bridge to the north and by the masonry quay wall and steps to the south (Figure 14-14, Plate 14.1 and Plate 14.12). No survey was undertaken at the southwestern side of the bridge as the proposal to undertake works in this area was made subsequent to the above works being concluded. In consultation with NMS, it was agreed that during construction, any requisite wade and/or dive and metal detection and/or archaeological monitoring of in-channel works at this side of the bridge would be undertaken at that stage of the programme.

The Wade and Metal Detection Survey at the eastern side of the bridge consisted of a walk-over visual and metal detection survey, coupled with a detailed topographical survey that utilised a survey grade GPS system (Figure 14-14, Plate 14.15 and Plate 14.16). In addition, a high-resolution hand-held laser scanner was used to produce highly accurate 3D models (Plate 14.9, Plate 14.10 and Plate 14.11). This was augmented by photogrammetry and smaller 3D models by using the new LiDAR function on iPhone 13 Pro (Plate 14.12, Plate 14.13 and Plate 14.14).

The sediments in the survey area included a deep deposit of alluvial silty clay that was mid-yellowish brown in colour and ranged in depth from 1–1.5m BGL (e.g. Plate 14.1). The alluvial clay was overlain by a raised shingle beach in the southern half of the survey area, which has formed naturally as a result of tidal deposition (e.g. Plate 14.8 and Plate 14.9). The shingle beach was evident to the north of the steps and at the south-eastern corner of the nineteenth-century quay walls.

The depth of the alluvial clays in the vicinity of O'Hanrahan Bridge in the north-western end of the survey area presented health and safety concerns. Consequently, the metal detection survey focused on the area shown in Figure 14-13, which included the area to the southwest of the flood relief wall, to the west of the nineteenth-century quay wall and to the north and west of the steps. The metal detection and visual survey noted several modern metal objects, ranging from an electrical insulator to a car key, nails and wire (e.g. Plate 14.17 and Plate 14.18). A number of modern non-metallic objects were also recovered, such as brick fragments and roof tiles (Plate 14.19 and Plate 14.20). Nothing of archaeological significance was noted during the survey. However, one interesting find was recorded, which consisted of a rectangular stone trough that was located at the base of the steps, with a second broken trough beside it (Plate 14.21). This may represent a two-part water trough for horses.

14.5 Predicted Impacts

14.5.1 Construction Phase

Impacts resulting from the proposed development have been identified for 2 no. cultural heritage receptors, which are listed in Table 14-11. No impacts on any of the other sites identified within the baseline study are predicted. Unless otherwise stated, all impacts are assessed to be negative.

Table 14-11 Predicted construction impacts on cultural heritage receptors

Site Ref.	Site Type	Significance	Magnitude of construction impact	Significance of construction impact
WX029-013	ZAP for historic town of New Ross	High	Low	Moderate
WX029-013007-	Religious house – Dominican friars	High	Potential Negligible	Potential Not Significant
Undesignated	Masonry quay walls	Medium	Medium	Slight

The proposed O'Hanrahan Bridge Widening project will impact the ZAP for the Historic Town of New Ross (WX029-013), which is a Recorded Monument (Table 14-6 and Figure 14-12). This impact will occur at both the southeastern and southwestern sides of the extant O'Hanrahan bridge. Impacts are not anticipated for the town defences (WX029-013014), as they are located to the east of the proposed works (e.g. Figure 14-5), or to the remains of the historic bridges (WX029-013071), which were located to the north-northeast of the present O'Hanrahan Bridge (e.g. Table 14-5). The excavation site represented by WX029-013014 will not be impacted (e.g. Figure 14-13); the site is occupied by a standing nineteenth-century building on the North Quay, *c*.45m to the northeast of the proposed works area.

In the context of the ZAP for the Historic Town of New Ross (WX029-013), there is a possibility that previously unrecorded features, deposits and/or objects associated with the medieval and post-medieval town may be impacted by the proposed works. This includes works that could impact on the former lands of or within the curtilage of the medieval Religious house – Dominican friars (WX029-013007-) for which the original extents are not fully known. It is considered that the potential for any such remains to survive within the former mudflats and along the in-channel side of the river is very low to potentially negligible. Any impacts that could occur during construction on previously unrecorded archaeology or built heritage associated with the Recorded Monument in this area is therefore also potentially negligible and Not Significant. However, this does not preclude the potential for subsurface archaeological remains and/or archaeological objects located on the Quays and in the River Barrow. Therefore, the significance of the construction impact at the southeastern side of the bridge is rated Moderate, as the proposed development will alter the character of the environment in a manner that is consistent with emerging and baseline trends and it is unlikely that the archaeological integrity of the ZAP will be greatly compromised.

No direct impacts are predicted for any recorded/listed architectural heritage sites in the study area (Table 14-10 and Figure 14-13). However, the undesignated nineteenth-century masonry quay walls, which might incorporate earlier fabric, may be impacted by the sheet piling. The significance of the construction impact is rated as Slight as the proposals will cause minor change in the character of a small section of the quay walls but will not affect the integrity of the walls.

14.5.2 Operation Phase

No negative impacts are predicted to occur on any cultural heritage receptors during the operational phase.

Moderate impacts of a positive quality are predicted for the masonry quay walls during the operation phase as the proposed cycleway and footpath will enhance the character and setting of the architectural heritage receptor.

14.6 Mitigation Measures

14.6.1 Construction Phase

Architectural Heritage and Topographical Survey

An Architectural Heritage and Topographical Survey of the section of the masonry quay wall in proximity to the proposed development at the southeastern side of the bridge shall be carried out in advance of construction. The survey shall comprise a measured survey, a detailed written description, reporting (incorporating the results of the Wade and Metal Detection Survey), and the preparation of an archive.

All elements of the survey shall be carried out in accordance with a written method statement. The method statement will, if necessary, be submitted in support of an application for a licence to the DHLGH. The Architectural Heritage and Topographical Survey should include:

- A description of the masonry quay wall that references its location and setting, condition, fabric, dimensions and any visible evidence for its use and history.
- Customised building recording sheets shall be used to record the fabric, dimensions and location of features identified within the quay wall. Terminology should follow the criteria in the NIAH Handbook (2021).[54]
- A photographic survey, with photographs displaying, at a minimum, the main elevation, the setting of the quay walls and any related features, showing features of special interest, as well as detailed photographs of these features with scales, as appropriate.
- A topographic site plan showing the relevant structure and any nearby structures. The site area shall be recorded as an annotated and contoured site plan showing boundaries and representative ground profiles. Control points should be established with a 3D survey grid referenced to OD and ITM.
- Detailed annotated ground plan and representative profiles.
- Detailed annotated elevation drawings of the main external elevation, key internal elevation and any significant features.

The Architectural Heritage and Topographical Survey shall be carried out in accordance with best professional practice and conducted by qualified competent and authorised professionals. The significance of the masonry quay wall shall be recorded using the rating criteria outlined in the *NIAH Handbook* (2021).

While it is probable that the majority of the extant quay wall at the southeastern side of the extant O'Hanrahan bridge dates to the mid-nineteenth century, it is possible that elements of earlier phases, possibly dating to the medieval and/or post-medieval period may be incorporated within the existing structure. A simple and inexpensive means to determine the date of the masonry is through mortar analysis of the lower and higher areas on the masonry. This could be carried out at the junction of the steps and the vertical quay wall and include a closer examination of the form of the masonry of the extant section to the southeast of the flood relief wall.

At the proposed works area at the southwestern side of O'Hanrahan bridge there is potential for previously unrecorded built heritage elements associated with former

[54] Available at: https://www.buildingsofireland.ie/app/uploads/2021/03/NIAH-Handbook-Edition-March-2021.pdf

quaysides and/or riverbank activities to survive within the mud and estuarine deposits at this side of the river. Therefore, it is recommended that in advance of any construction works taking place a wade and/or dive survey with metal-detection survey should be undertaken in consultation with NMS and TII Project Archaeologist. The surveys should be undertaken under licence, by a suitably competent and qualified archaeologist with the experience necessary to undertake work in this type of environment. Particular care should be taken to assess the potential for any medieval or post-medieval quayside structures surviving within the works area, and the report on the survey should identify where additional archaeological works (if any) are required in advance of construction. The significance of any built heritage elements identified during the course of this work should be recorded using the rating criteria outlined in the *NIAH Handbook* (2021). The archaeologist should also undertake archaeological monitoring of all piling or in-channel works which have the potential to disturb or uncover archaeological features, finds or deposits in the river.

The proposed archaeological mitigation for all sheet-piling works is discussed in Archaeological Monitoring below.

Archaeological Monitoring

The services of a suitably qualified and experienced archaeologist, with experience in underwater archaeology, shall be engaged to carry out archaeological monitoring for the construction works programme; to include archaeological monitoring of dryland, foreshore and in-stream works. The aim of the licensed archaeological monitoring is to ascertain the location, nature, date, character, extent and significance of any archaeological features/deposits/objects that may be uncovered during site investigations and/or construction works and to undertake the necessary amount of archaeological investigation on all such features/deposits/objects so as to determine their horizontal and vertical extents and to produce the necessary report(s) on the findings.

The archaeological monitoring shall be licensed by the National Monuments Service of the Department of Housing, Local Government and Heritage and a detailed method statement should accompany the licence application. The method statement, which shall lay out the monitoring strategy for each location where works are proposed, shall be prepared in consultation with the TII Project Archaeologist. The archaeological monitoring shall be carried out in two separate phases:

1. Site investigations will involve the investigation of two boreholes on the foreshore area and a test pit/slit trench on land at the eastern side of the bridge, and one borehole is proposed at the southwestern side of the bridge. The test pit/ slit trench should be archaeologically monitored. Borehole logs should be made available to the monitoring archaeologist as the detail included should be presented in the archaeological monitoring report for the proposed works.
2. During construction, to include the sheet piling works at both sides of the bridge, and construction of footings for the new wall at the western side of the bridge.

In addition to the licence eligible archaeologists, the archaeological team shall include a topographical surveyor to attend onsite as required. A communication strategy shall form part of the monitoring strategy to ensure full communication is in place between the monitoring archaeologist and the plant operators at all times during works. The archaeological personnel undertaking the monitoring will be in a position to directly monitor all elements of the works, to ensure they have unobstructed views of the excavations/other works, and the plant and machinery

operators should be prepared to facilitate the archaeological personnel in the undertaking of their monitoring work.

As part of the Finds Retrieval Strategy in the methodology, all excavated material removed shall be spread and searched for archaeological objects and metal detected (under licence) to assess the artefact-bearing potential of the deposits. Sufficient archaeological personnel shall be in place to cover all aspects of the monitoring works.

Should potential archaeology be identified during the works, then the construction works shall be suspended in that location and the NMS, the TII-assigned Project Archaeologist, Project Engineer and Contractor shall be notified. Minor or isolated features/deposits shall be fully excavated and recorded by the archaeological team during the course of their archaeological monitoring, subject to the agreement of the NMS, TII-assigned Project Archaeologist and Project Engineer. Further archaeological works may also be required, that depending on recommendations from NMS may include further archaeological assessment, test-excavations, avoidance / preservation *in situ*, or full excavation. In order to establish the date nature and significance of archaeological features/deposits, bulk samples of soil/sediment/mortar should be obtained, as appropriate.

Following the completion of works, reports detailing the outcome of the monitoring shall be forwarded to the NMS and other statutory authorities, as per the conditions of the archaeological licences.

Communication and Awareness Strategy

All on-site personnel shall be made aware of the significance of the masonry quay walls during works. Signage and barriers/fencing shall be erected for the duration of the construction phase to protect the quay walls from damage.

14.6.2 Operation Phase

No mitigation measures are required for cultural heritage during the operational phase of the proposed development.

14.7 Residual Impacts

14.7.1 Construction Phase

In the context of the ZAP for the Historic Town of New Ross (RMP No. WX029-013) all proposed works will be archaeologically monitored and any exposed remains will be archaeologically excavated. It is acknowledged that preservation *in situ* is the preferable option. However, in this instance and within such localised works areas, preservation by record is an acceptable form of archaeological mitigation. The excavation will ensure that the removal of any uncovered remains is systematically and accurately recorded, and a paper and digital archive of the site will be generated.

Following the full and successful implementation of the mitigation measures there will be no predicted residual impacts during construction phase to the cultural heritage resource.

14.7.2 Operation Phase

No residual impacts are anticipated during the operational phase of the proposed development.

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Plate 14.1 **Overview of Wade and Metal Detection Survey area, facing southeast**

Plate 14.2 **View at the site of the former bridge, from Rosbercon east-southeast to Bridge Street**

Plate 14.3 **View west from Bridge Street towards the former nineteenth-century bridge, photographed by William Cavanagh in 1899; W. Cavanagh, W. Cavanagh/J. FitzGibbon Collection (WCC 2011, 7)**

Plate 14.4 **View east-southeast from the former nineteenth-century bridge towards Bridge Street, taken by William Cavanagh in 1899; W. Cavanagh, W. Cavanagh/J. FitzGibbon Collection (WCC 2011, 6)**

Plate 14.5 **The Quays, photographed by William Cavanagh in 1895 after flooding, W. Cavanagh, W. Cavanagh/J. FitzGibbon Collection (WCC 2011, 9)**

Plate 14.6 **Aerial overview of the River Barrow and New Ross from the 1950s showing the nineteenth-century bridge, facing southwest (WCC 2011, 10)**

Plate 14.7 Detail of steps and masonry quay walls, facing east-northeast

Plate 14.8 Detail of masonry quay wall, facing east-southeast

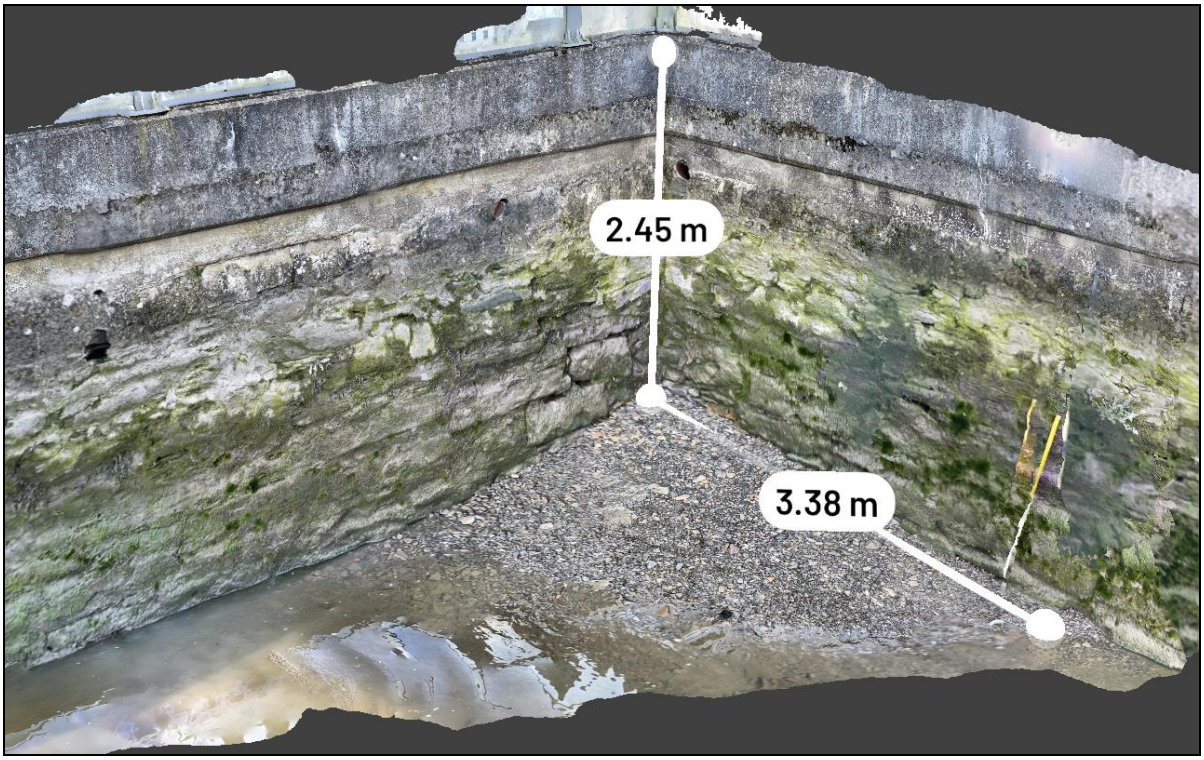


Plate 14.9 **3D-elevation model of masonry quay wall with raised shingle beach, facing east-southeast**

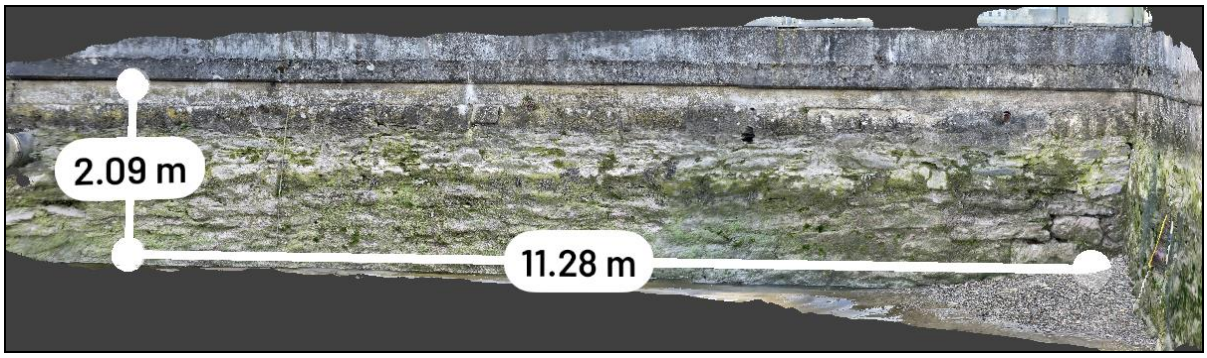


Plate 14.10 **3D-elevation model of masonry quay wall, facing east**

Plate 14.11 **3D-elevation model of masonry quay wall and steps, facing southeast**

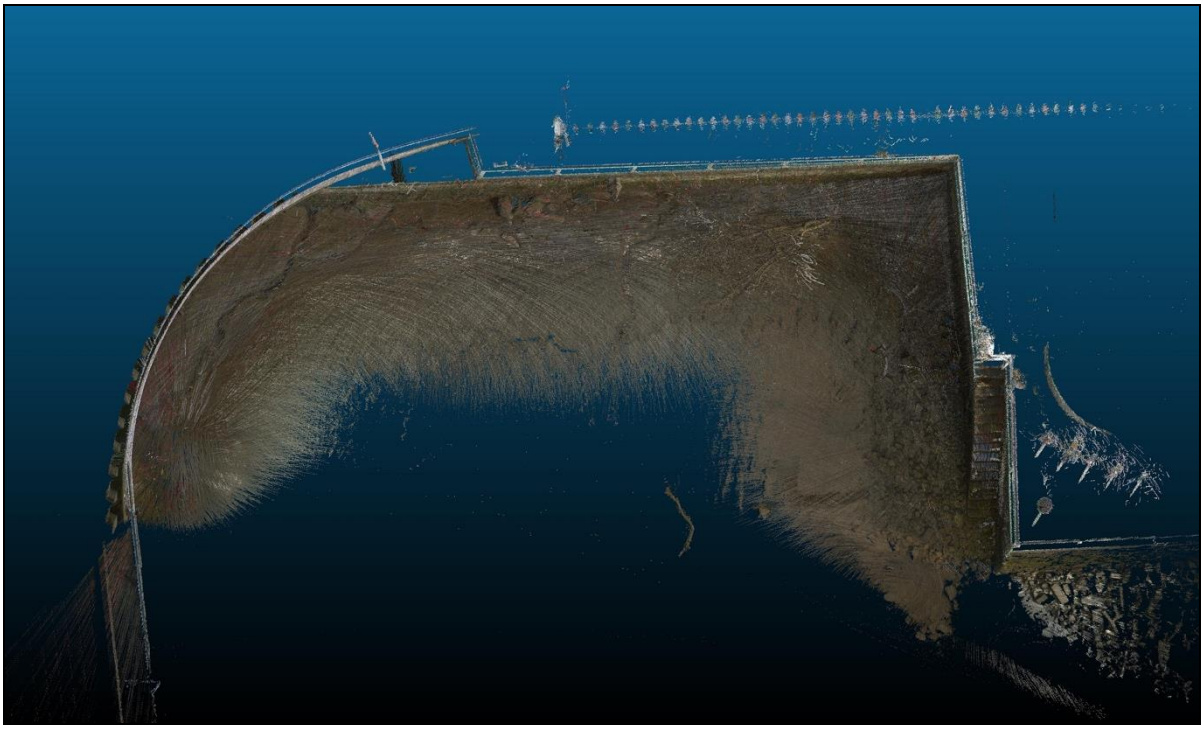


Plate 14.12 LiDAR scan overview, facing east

Plate 14.13 LiDAR scan elevation of masonry quay wall, flood relief wall and steps, facing east

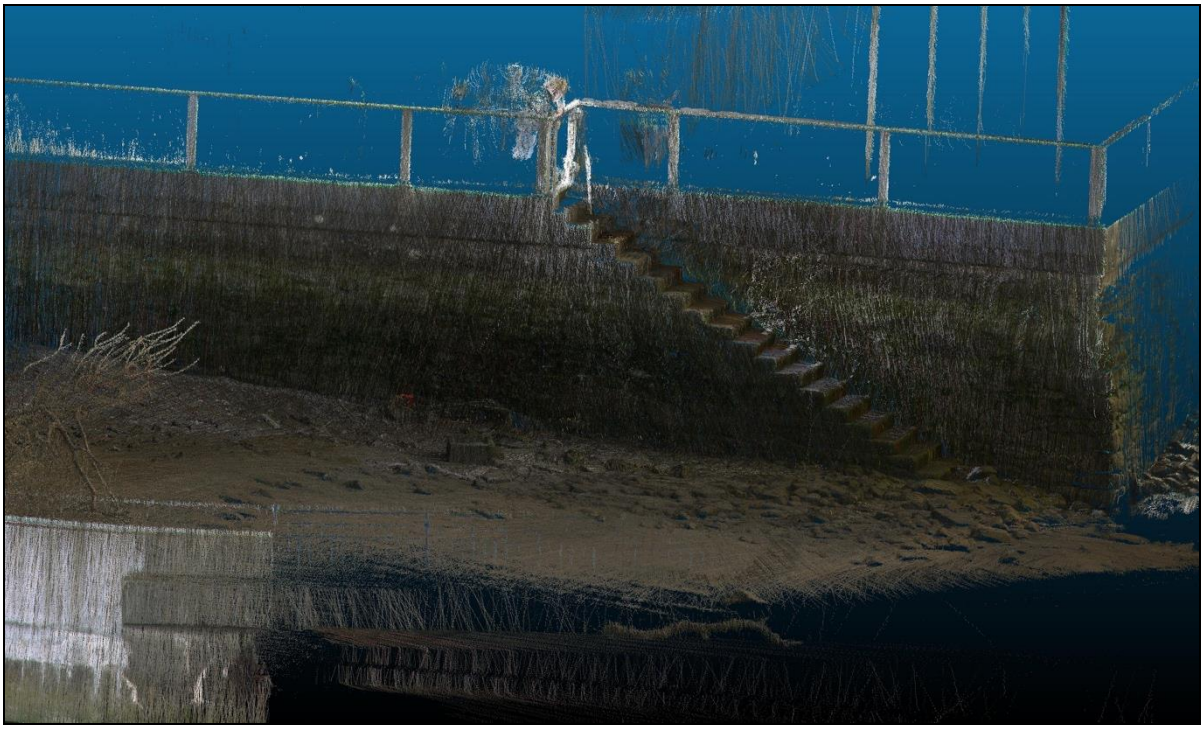


Plate 14.14 LiDAR scan elevation of masonry quay wall and steps, facing southeast

Plate 14.15 **Survey team member undertaking Wade and Metal Detection Survey with O'Hanrahan Bridge in background, facing west**

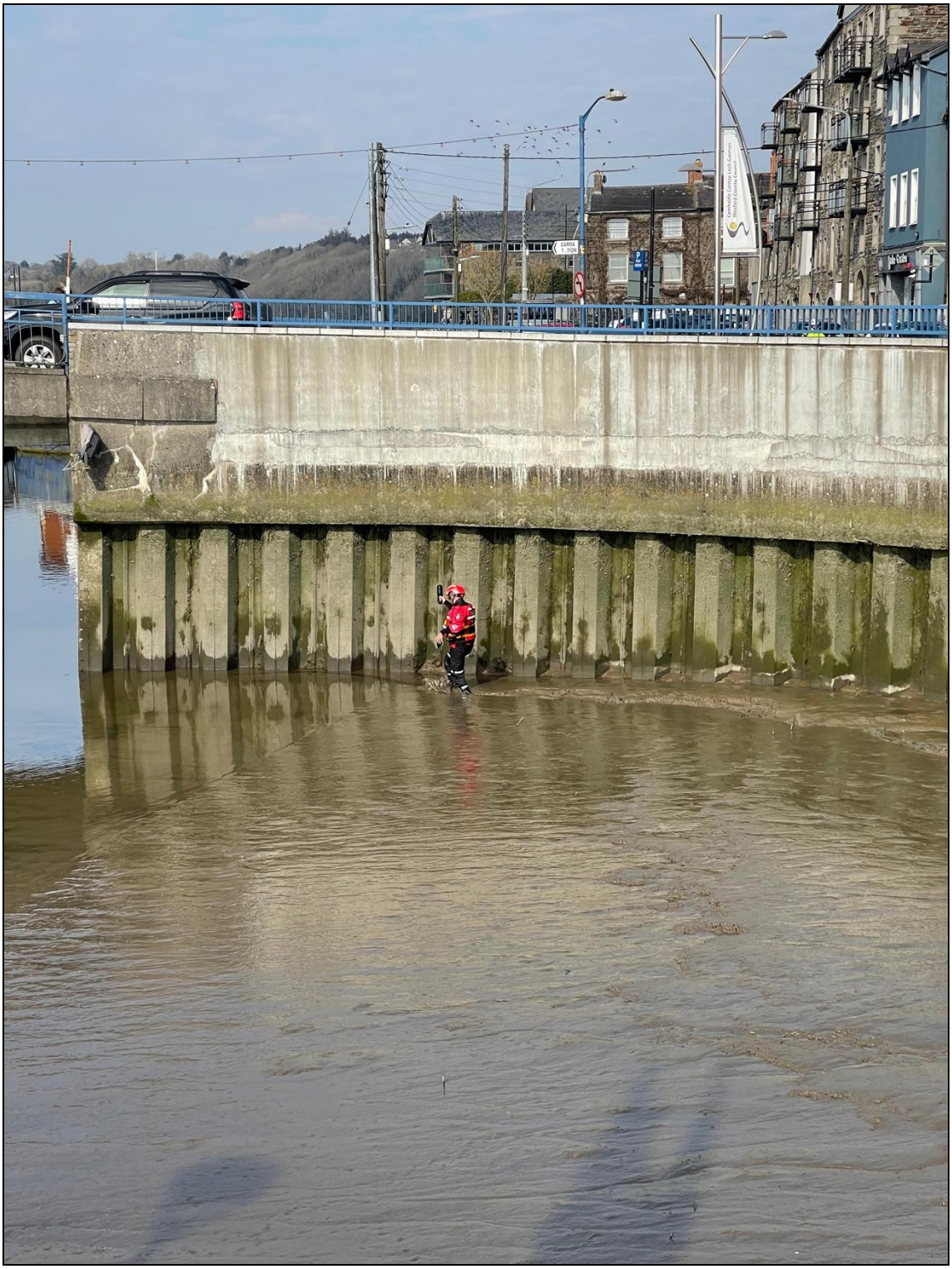


Plate 14.16 **Survey team member undertaking Wade and Metal Detection Survey in area of flood relief wall, facing north-northeast**

Plate 14.17 **Electrical insulator found with metal detection device, the scalebar is 20cm in length**

Plate 14.18 **Car keys found with metal detection device, the scalebar is 20cm in length**

Plate 14.19 **Modern brick fragment, the scalebar is 20cm in length**

Plate 14.20 **Modern roof tile, the scalebar is 20cm in length**

Plate 14.21 **Stone trough noted during Wade and Metal Detection Survey, facing east-southeast**

APPENDIX 14.1
Archaeological Heritage Inventory

SMR/RMP No.	WX029-013
Site Type	Historic town
Legal Status	Recorded monument
Townland	Rosbercon, Irishtown, New Ross
Civil Parish	Saint Mary's
Barony	Bantry
Coordinates (ITM)	671939, 627541
Description	**Scheduled for inclusion in the next revision of the RMP**: Yes St Abban is said to have founded an early church at *Ros Mhic Treoin* (WX029-013012), but the town was founded by William Marshall [*sic*] sometime before *c*.1200, when the first of many bridges was built. The town grew rapidly and became the port for the Marshall [*sic*] lands in south Leinster, which consisted of most of the counties of Wexford and Kilkenny with large portions of neighbouring territories. The building of the walls *c*.1265 is described in a poem (Hore 1900, 58–60), but this probably just involved the digging of the fosse. According to a charter of 1374, the town was still unwalled (Hore 1900. vol. 1, 202–4). Murage was collected down to 1830, but the most intense period was 1374–1420 (Thomas 1992, vol. 2, 176). New Ross was a commercial rival of the Royal City of Waterford and the customs returns of 1277–80 shows it was the busiest port in Ireland (Orpen 1911, 10). However, by the middle of the fifteenth-century had declined to such an extent that it was sacked by the Kavanaghs in 1469. The town was held by the Confederate Catholics in 1642, who destroyed the bridge, but the town was subsequently captured by the Earl of Ormond for the King. However, the town surrendered without a fight to Cromwell in 1649, who dismantled the fortifications. The town is situated on a steep slope which runs down to the River Barrow on its west side. The walls (WX029-013005) enclosed *c*.105 acres running from the river at the north, up Goat Lane to the Maiden Gate, along the back of properties to the west of Haughton Place, along Nunnery Lane to a mural tower, and on to the junction with Neville Street. It changed direction here and ran west down the northern side of William Street, where there is a portion of surviving wall. It crossed the junction with Priory Street and continued towards the river where another tower has been identified. Rosbercon was an independent borough on the Kilkenny side of the River Barrow and was probably unwalled. There were gates at North Street; the Maiden's Gate to the Irishtown, which still partly survives, Three Bullet Gate at Neville Street and William Street and the Priory or South Gate. Bunnion Gate, at the top of Mary Street, is probably a late addition. A wall was provided on the riverside in the sixteenth or seventeenth century, with may gates onto the quays. The river has been spanned by at least five bridges (WX029-013071) since the thirteenth century, from which it derived its name, *Ros Pontis Villa Nova* (The New Town of the Bridge of Ros). There have also been lengthy periods when reliance was placed in ferries. Within the town five church sites are known: St Mary's (WX029-013002) with considerable remains, St Michael's (WX029-013010), St Saviour's Chapel (WX029-013011), and the Franciscan (WX029-013008) and Augustinian (WX029-013009) friaries. In Rosbercon there was the Dominican friary (WX029-013007) and the parish church (WX029-013001). Outside the town is the site of St Stephen's Church (WX029-013006) and the site of a monastery,

SMR/RMP No.	WX029-013
	possibly a leper hospital (WX029-015) in the Maudlins. Trinity hospital (WX029-013074) was established in the sixteenth century (Bradley and King 1990, 99–146; Hore 1900, vol. 1, 42 & 396).
Source	Historic Environment Viewer [online]. Available at: https://maps.archaeology.ie/HistoricEnvironment/

SMR/RMP No.	WX029-013005
Site Type	Town defences
Legal Status	National monument
Townland	New Ross
Civil Parish	Saint Mary's
Barony	Bantry
Coordinates (ITM)	672144, 627854
Description	**Scheduled for inclusion in the next revision of the RMP**: Yes The town of New Ross is situated on a steep west-facing slope that runs down to the River Barrow. The walls enclosed *c*.105 acres and they were commenced *c*.1265 according to a poem, which describes the different trades working in digging the fosse on different days, with ladies working on Sunday (Hore 1900-10, vol. 1, 58–60). However, according to a charter of 1374, New Ross was still unwalled (*ibid*. 202–4). Murage was collected down to 1830, but the most intense period was 1374–1420 (Thomas 1992, vol. 2, 176). The town walls ran from the river at the north, up Goat Lane to the Maiden Gate; the only survivor of four original gates. Only one side of the entrance passage with a portcullis niche and evidence of groin vaulting survives. The gate was conserved in 2012, when extraneous fabric was removed and the original structure secured with a lime mortar. The work was archaeologically monitored (Licence No. E004449), but no medieval material was encountered in any ground works (DIER Ref. 2012:631). From there, the wall ran along the back of properties to the west of Haughton Place and along Nunnery Lane to a mural tower. This is a semicircular tower of mortared shale surviving to two storeys (H *c*.5m). Each storey had three windows and the first storey had four smaller slot windows while the ground floor has one. Archaeological testing (Licence No. 95E00086) connected with a drainage scheme identified part of the fosse outside the town wall close to the tower (McCutcheon 1996). From this tower the wall continued southwest to the junction of Neville Street. Here it turned west and proceeded down William Street, where there is a preserved section of town wall (L 8.5m; H *c*.5m) on Jones' Hill/Lower William Street, which may extend in either direction under modern walls. Archaeological testing (Licence No. E004572) in 2014 of an earthen bank (Wth *c*.2m; H 0.8m), on top of the wall and west of the high preserved section, demonstrated that the bank was nineteenth century in date and overlying a section (L 29m) the town wall (Wth *c*.2.5m; H up to 2.8m), which was conserved (DIER Ref. 2014:450). Archaeological testing (Licence No. 03E0764) along Priory Street, from the junction with Cross Lane to the junction with William Street, produced evidence of structures or features. These included a lengthy deposit of compact stony brown clay with charcoal and slate inclusions that may represent a street surface, as well as a large pit and a possible wall section (L 3m; H 0.3m) of the South Gate, at the junction of Priory Street/William Street (McLoughlin 2003). The wall then crossed the junction with Priory Street and continued towards the river, where another tower has been identified (Scully 2010). Archaeological testing (Licence No. E004572) and reconstruction of a section

SMR/RMP No.	WX029-013005
	of wall at Goat's Lane in 2015 demonstrated the wall was of nineteenth century date, but it was built on a medieval wall (Wth 0.75m) (DIER Ref. 215:329). According to a map of 1649 a wall was built on the quay with three to seven gates (Thomas 1992, vol. 2, 177). Rosbercon was an independent borough on the Kilkenny side of the River Barrow that was probably unwalled. There was a gate at North Street, while the Maiden's Gate led to the Irishtown. The Bunnion Gate was at the top of Mary Street, while the Three Bullet Gate, also known as the Bewley or Aldgate, was at the junction of Neville Street and William Street. The Priory, or South Gate, was at the junction of Lower William Street and Priory Street.
Source	Historic Environment Viewer [online]. Available at: https://maps.archaeology.ie/HistoricEnvironment/

SMR/RMP No.	WX029-013014
Site Type	Excavation – miscellaneous
Legal Status	Listed on the SMR
Townland	New Ross
Civil Parish	Saint Mary's
Barony	Bantry
Coordinates (ITM)	671800, 627710
Description	**Scheduled for inclusion in the next revision of the RMP**: Yes Archaeological testing (Licence No. 03E0489) on the probable line of the quay walls uncovered redeposited natural soils over a dark brown silty riverine clay.[55] An assembly of medieval pottery was recovered that included Saintonge, Bristol Redcliffe and local wares. A seventeenth-century stone-lined drain was also recorded.
Source	Historic Environment Viewer [online]. Available at: https://maps.archaeology.ie/HistoricEnvironment/

SMR/RMP No.	WX029-013071
Site Type	Bridge
Legal Status	Listed on the SMR
Townland	Rosbercon, New Ross
Civil Parish	Saint Mary's
Barony	Bantry
Coordinates (ITM)	671626, 627639
Description	**Scheduled for inclusion in the next revision of the RMP**: Yes The first bridge over the River Barrow was a wooden structure that was built shortly before 1210. In 1586, Stanihurst stated that *diverse of the poales, logs and stakes with which the bridge was underpropt, sticke to this daie in the water* (Hore 1900–11, vol. 1, 52). In 1313, the town received a grant of pontage to build a new bridge between Ross and Rosbercon (*ibid*. 178). The bridge was destroyed during the siege of the town in 1643 and was not rebuilt until 1796 (*ibid*. 112; Bradley & King 1990, 106).

[55] Available at: https://excavations.ie/report/2003/Wexford/0011057/ [Accessed: 04.04.22].

SMR/RMP No.	WX029-013071
Source	Historic Environment Viewer [online]. Available at: https://maps.archaeology.ie/HistoricEnvironment/

APPENDIX 14.2
Inventory of Previous Archaeological Investigations

Licence No.	95E0086
Site Name	New Ross Main Drainage Scheme, The Quay, South St, Conduit Lane and Back Lane
Townland	New Ross
RMP/SMR Ref.	WX029-013
DIER Ref.	1995:277 and 1997:601
Coordinates (ITM)	671796, 627627
Consultant	Sarah McCutcheon, ADS Ltd
Summary of Findings	Archaeological monitoring of the New Ross Main Drainage Scheme was undertaken on dates from 1995 to 1997. The pipes were laid on a line that follows the south and west exterior circuits of the medieval town wall, as well as the medieval suburbs of Irishtown and Rosbercon. The pipes either replaced existing sewers and were laid in previously cut trenches, or were placed in trenches cut through the natural rock. However, traces of the town ditch were recorded at the southeast of the town on the street known as Town Wall. Archaeological remains were also recorded on the Thomastown Road, in the suburb of Rosbercon. A pumping station in Rosbercon revealed archaeological layers, substantial stone walls and burials, which were archaeologically excavated. The site represented the remains the Dominican friary founded in 1267.
Source	Database of Irish Excavation Reports [online]. Available at: https://excavations.ie/report/1995/Wexford/0002119/

Licence No.	03E0489
Site Name	North Quay
Townland	New Ross
RMP/SMR Ref.	WX029-013
DIER Ref.	2003:2025
Coordinates (ITM)	671777, 627706
Consultant	Daniel Noonan, The Archaeology Company
Summary of Findings	Archaeological testing was carried out in advance of the conversion of a warehouse on the North Quay, New Ross. The site is contiguous with the line of the riverward run of the town wall of New Ross. Two warehouse buildings were to be converted to accommodate fifteen apartments and five townhouses. The conversion was to be an internal fit-out, with new works supported by the existing walls of the structures. Testing was confined to the proposed line of the service trenches and an eastward extension to the street-front warehouse (Building 1) to accommodate a stairwell, a lift shaft and create extra apartment space. Four trenches were mechanically excavated. Trenches 1 and 2 investigated the proposed line of the service trenches, while Trenches 3 and 4 examined the new build to Building 1. Trench 1 uncovered the subsurface remains of a mortar-bonded stone wall, 0.8m wide, that appears from cartographic evidence to be part of the structures associated with the former corn-storage activities onsite. A mixed fill of silty clays and clay abutted the wall and appears to have been make-up layers for the present ground level. Excavation of this trench ceased at a

Licence No.	03E0489
	depth of 1m BGL, well below the depth of the service trenches. No features or finds of archaeological significance were uncovered. Trench 2 contained a similar profile of modern make-up layers to Trench 1, all of which were on top of a distinct layer of redeposited orange/brown shaley clay natural. The redeposited natural sealed a dark-brown silty clay beneath, which started 1m deep (1.645m OD). A brief examination of this sealed layer produced fifteen sherds of medieval pottery, including Saintonge, Bristol Redcliffe and possible Waterford-type pottery, suggesting a mid- to late thirteenth-century date for the assemblage. It was interpreted that the upper layers in this trench represent reclamation layers and it is possible that the medieval layer was similar. Excavation of this trench ceased when the medieval layer was revealed. Trench 3 was positioned to investigate the potential impact of the lift shaft and stairwell. Once the modern and eighteenth/nineteenth-century overburden was removed, a probable seventeenth-century stone-lined drain was uncovered running throughout the long axis of the trench. The drain (0.8m deep, 1.481m OD) appeared to cut an earlier greyish-brown silty clay, from which a single sherd of medieval pottery was recovered. Excavation ceased once the drain was revealed. Trench 4 was excavated parallel to Trench 3 and, when the overburden was removed the greyish-brown silty clay was present at a depth of 1.1m (1.074m OD). Its findings corresponded with those of Trench 3. Excavation ceased at this stage. It was possible to raise the formation levels of the proposed works and preserve the archaeological material *in situ*.
Source	Database of Irish Excavation Reports [online]. Available at: https://excavations.ie/report/2003/Wexford/0011057/

Licence No.	03E0541
Site Name	48 The Quay
Townland	New Ross
RMP/SMR Ref.	WX029-013
DIER Ref.	2003:2032
Coordinates (ITM)	671789, 627701
Consultant	Emmet Stafford, Stafford McLoughlin Archaeology
Summary of Findings	Two test-trenches, totalling 12.6m^2 were excavated at the site of a demolished structure at 48 The Quays, New Ross in 2003, within the footprint of the proposed development. A well and several walls were uncovered below the existing concrete floor, suggesting they represented late post-medieval structural remains that predated the construction of the demolished building. Probable reclamation layers uncovered in both trenches suggested the building represented by the walls was constructed following a phase of intentional post-medieval reclamation in this part of New Ross. The necessity for this reclamation was evidenced by the presence of tidally affected groundwater at a depth of 1.5m BGL in the trench closest to the River Barrow on the date of the excavation.
Source	Database of Irish Excavation Reports [online]. Available at: https://excavations.ie/report/2003/Wexford/0011064/

APPENDIX 14.3
Architectural Heritage Inventory

Reference No.	WCC RPS Ref. NR0084; NIAH Reg. 15605001
Legal Status	Protected Structure; listed in the NIAH
Rating	Regional
Street	North Quay
Townland	New Ross
Civil Parish	Saint Mary's
Barony	Bantry
Original Use	House
Date	1840–1860
Coordinates (ITM)	671785, 627683
Description	Terraced two-bay, four-storey house (*c*.1850), possibly incorporating fabric of earlier house (pre-1840), on site with shopfront to ground floor. Reroofed (*c*.1950). Refenestrated (2002–04). One of a group of eight. Pitched (shared) roof with replacement fibre-cement slate (*c*.1950), clay ridge tiles, no chimney stacks, rendered coping, and replacement uPVC rainwater goods on rendered eaves having iron ties retaining cast-iron downpipe. Rendered, ruled and lined walls. Square-headed window openings with cut-stone sills, and replacement timber casement windows (2002–04). These replaced two-over-two (first floor), six-over-six (second floor) and three-over-three (top floor) timber sash windows. Timber shopfront to ground floor on a symmetrical plan with cut-stone pad-stones supporting engaged fluted Ionic columns, fixed-pane (four-light) display window, timber panelled double doors having overlight on panelled entablature, timber panelled door to house having overlight on panelled entablature, and box fascia having lined coping. Street fronted with concrete brick cobbled footpath to front. A well composed house of the middle size built as one of a group of eight units (including NIAH Regs. 15605040–41 and 15605268) representing an element of the redevelopment of the centre of New Ross in the mid-nineteenth century. Exhibiting a pleasing, if understated, design aesthetic. The architectural value of the house is established by attributes including the slender vertical emphasis of the massing, the slight diminishing in scale of the openings in the Classical manner, producing a graduated or tiered effect, the sparse surface detailing, and so on. Although some of the character has been compromised following a number of renovation projects undertaken over the course of the twentieth century, the house retains a particularly fine Classically-detailed shopfront of artistic interest, displaying expert craftsmanship, thereby making a beneficial impact on the streetscape value of North Quay at street level.
Source	NIAH Building Survey [online]. Available at: https://www.buildingsofireland.ie/buildings-search/building/15605001/north-quay-new-ross-new-ross-wexford

Reference No.	WCC RPS Ref. NR0083; NIAH Reg. 15605002
Legal Status	Protected Structure; listed in the NIAH
Rating	Regional
Street	P.J. Roche, North Quay
Townland	New Ross

Reference No.	WCC RPS Ref. NR0083; NIAH Reg. 15605002
Civil Parish	Saint Mary's
Barony	Bantry
Original Use	House
Date	1815–1835
Coordinates (ITM)	671786, 627690
Description	Terraced three-bay, four-storey house (*c*.1825). Renovated (*c*.1900), with pub-front inserted to ground floor. Reroofed (*c*.1950). Part refenestrated. Pitched roof with replacement fibre-cement slate (*c*.1950), clay ridge tiles, redbrick (shared) chimney stack (bond not discerned), having stepped capping supporting terracotta pots, rendered coping, and cast-iron rainwater goods on rendered eaves having iron brackets. Rendered, ruled and lined walls. Square-headed window openings with cut-stone sills, and replacement two-over-two timber sash windows (*c*.1900), having replacement casement windows to top floor. Timber pub-front (*c*.1900), to ground floor with pilasters, fixed-pane (four-light) window, timber panelled double doors having overlight, fascia on consoles, and slate-lined moulded cornice. Street fronted with concrete brick cobbled footpath to front. An amiable house of the middle size retaining the simple architectural composition attributes together with substantial quantities of the historic fabric, including a traditional Irish pub front of artistic design interest displaying good quality carpentry. However, the continued introduction of replacement fittings to the openings threatens to undermine the status of the house in the streetscape of North Quay.
Source	NIAH Building Survey [online]. Available at: https://www.buildingsofireland.ie/buildings-search/building/15605002/p-j-roche-north-quay-new-ross-new-ross-wexford

Reference No.	WCC RPS Ref. NR0082; NIAH Reg. 15605003
Legal Status	Protected Structure; listed in the NIAH
Rating	Regional
Street	T. Bradley, North Quay
Townland	New Ross
Civil Parish	Saint Mary's
Barony	Bantry
Original Use	House
Date	1815–1835
Coordinates (ITM)	671792, 627698
Description	Terraced two-bay, three-storey house (*c*.1825), with square-headed carriageway to left ground floor. Renovated (*c*.1925), with pub-front inserted to ground floor. Renovated and refenestrated (2002–04). Pitched slate roof with clay ridge tiles, redbrick (shared) chimney stack (bond not discerned) having stepped capping supporting terracotta pots, and rainwater goods on rendered eaves having iron ties. Rendered walls probably replacement (2002–04). Square-headed window openings with cut-stone sills, and replacement uPVC casement windows (2002–04). These replaced two-over-two timber sash windows. Square-headed carriageway to left ground floor with replacement iron doors (2002–04). Timber pub-front (*c*.1925), to ground floor with pilasters on pad-stones, fixed-pane (two-light) window, timber panelled double doors on

Reference No.	WCC RPS Ref. NR0082; NIAH Reg. 15605003
	cut-granite threshold having overlight, and fascia having lined moulded cornice. Street fronted with concrete brick cobbled footpath to front. An attractive house of modest size retaining the elementary composition attributes together with important features, including a pretty pub front of artistic interest displaying good quality craftsmanship. However, the character or external expression of the house on North Quay has not benefited from the introduction of replacement fittings to the openings.
Source	NIAH Building Survey [online]. Available at: https://www.buildingsofireland.ie/buildings-search/building/15605003/t-bradley-north-quay-new-ross-new-ross-wexford

Reference No.	NIAH Reg. 15605004
Legal Status	Listed in the NIAH
Rating	Regional
Street	North Quay
Townland	New Ross
Civil Parish	Saint Mary's
Barony	Bantry
Original Use	Malt house
Date	1842–1881
Coordinates (ITM)	671809, 627706
Description	Attached four-bay, five-storey hipped gable-fronted malthouse, extant 1881, on a rectangular plan. Undergoing "restoration" (2005-06), to accommodate proposed alternative use. Replacement hipped gable-fronted slate roof. Part repointed coursed rubble stone walls with cut-granite quoins to corners centred on cut-limestone date stone ("1899"). Round-headed door opening with cut-granite block-and-start surround framing replacement corrugated-iron fitting. Square-headed window openings (upper floors) with redbrick block-and-start surrounds framing fixed-pane timber fittings. Quay fronted with concrete footpath to front. A malthouse 'PURCHASED BY P.J. [Patrick James] ROCHE [1818–1905]' representing an important component of the mid-nineteenth-century industrial heritage of New Ross with the architectural value of the composition confirmed by such attributes as the elongated rectilinear plan form; the construction in unrefined local fieldstone with granite or redbrick dressings producing a pleasing palette; and the uniform or near-uniform proportions of the openings on each floor. Having been reasonably well maintained, the elementary form and massing survive intact together with substantial quantities of the original fabric. However, an unfinished "restoration" may determine the ongoing architectural heritage status of the malthouse forming part of a self-contained group alongside an adjoining grain store or warehouse (NIAH Reg. 15605005) with the resulting ensemble making a pleasing visual statement on the North Quay. NOTE: Recent archaeological testing (2003) uncovered 'an assembly of medieval pottery [and] a stone-lined drain probably seventeenth-century in date' (SMR No. WX029-013014).
Source	NIAH Building Survey [online]. Available at: https://www.buildingsofireland.ie/buildings-search/building/15605004/north-quay-originally-the-quay-new-ross-new-ross-wexford

Reference No.	NIAH Reg. 15605005
Legal Status	Listed in the NIAH
Rating	Regional
Street	North Quay
Townland	New Ross
Civil Parish	Saint Mary's
Barony	Bantry
Original Use	Granary
Date	1895–1900
Coordinates (ITM)	671800, 627722
Description	Attached two-bay four- or five-storey grain store or warehouse, dated 1899, on a rectangular plan. Now disused. Hipped corrugated-iron roof with pressed iron ridges, and cast-iron rainwater goods on redbrick header bond eaves retaining cast-iron hopper and downpipe. Part repointed coursed rubble stone walls retaining sections of lime rendered surface finish with red brick flush quoins to corners centred on cut-limestone date stone ("1899"). Square-headed window openings in camber-headed recesses (upper floors) with red brick block-and-start surrounds framing timber panelled fittings behind wrought iron bars. Quay fronted with concrete footpath to front. A grain store or warehouse erected by Patrick James Roche (1818–1905) of Woodville House (NIAH Reg. 15702908), which represents an integral component of the industrial heritage of New Ross. A prolonged period of neglect notwithstanding, the elementary form and massing survive intact together with substantial quantities of the original fabric. Thereby upholding the character or integrity of a grain store or warehouse forming part of a self-contained group alongside an adjoining malthouse (NIAH Reg. 15605004) with the resulting ensemble making a pleasing, if increasingly forlorn visual statement in North Quay. NOTE: A masonry break illustrates the origins of the grain store or warehouse as a three-bay three-storey gable-fronted composition.
Source	NIAH Building Survey [online]. Available at: https://www.buildingsofireland.ie/buildings-search/building/15605005/north-quay-originally-the-quay-new-ross-new-ross-wexford

Reference No.	NIAH Reg. 15605033
Legal Status	Listed in the NIAH
Rating	Regional
Street	25–27 North Street
Townland	New Ross
Civil Parish	Saint Mary's
Barony	Bantry
Original Use	Store/warehouse
Date	1875–1880
Coordinates (ITM)	671852, 627709
Description	Detached five-bay (seven-bay deep), five-storey commercial warehouse, dated 1877, on a rectangular plan. Possibly originally three-bay (seven-bay deep),

Reference No.	NIAH Reg. 15605033
	five-storey with shopfront to ground floor. Renovated to accommodate continued alternative use. Hipped slate roof not visible behind parapet. Rendered wall to front (east) elevation with rendered pilasters supporting moulded rendered cornice on blind frieze below parapet; rendered surface finish (remainder). Rendered shopfront to ground floor with series of camber- or segmental-headed openings. Paired camber- or segmental-headed window openings in square-headed recesses (upper floors) with concrete or rendered sills, and concealed dressings framing replacement fittings. Street fronted with concrete brick cobbled footpath to front. A commercial warehouse erected by James B. Cullen, 'Wholesale and Family Grocer and Wine Merchant', representing an important component of the later nineteenth-century built heritage of New Ross. The architectural value of the composition is confirmed by such attributes as the rectilinear plan form, the arcaded shopfront, the slight diminishing in scale of the coupled openings on each floor producing a graduated visual impression, and the parapeted roofline. However, the introduction of replacement fittings to the openings has not had a beneficial impact on the external expression or integrity of a commercial warehouse making an imposing visual statement in North Street.
Source	NIAH Building Survey [online]. Available at: https://www.buildingsofireland.ie/buildings-search/building/15605033/25-27-north-street-new-ross-new-ross-wexford

Reference No.	NIAH Reg. 15605034
Legal Status	Listed in the NIAH
Rating	Regional
Street	18 North Street
Townland	New Ross
Civil Parish	Saint Mary's
Barony	Bantry
Original Use	House
Date	1865–1885
Coordinates (ITM)	671849, 627682
Description	Terraced single-bay, three-storey house (*c*.1875), possibly incorporating fabric of earlier house (pre-1840), on site with shopfront to ground floor. Disused (2002). Extensively renovated (2002–04). Pitched roof with replacement artificial slate (2002–04), clay ridge tiles, rendered (shared) chimney stack, and replacement uPVC rainwater goods (2002–04), on rendered eaves having ties retaining cast-iron hopper and downpipe. Rendered, ruled and lined walls with rendered quoins to ends. Square-headed window openings originally in tripartite arrangement with cut-stone sills, lugged surrounds, and replacement uPVC casement windows, (2002–04). These are placed four-over-four timber sash windows with two-over-two sidelights. Timber shopfront to ground floor with bull nose-profiled pilasters on panelled (hollow) bases, fixed-pane (three-light) display window having cast-iron supporting column behind, glazed timber panelled door having overlight, and fascia having lined moulded cornice. Street fronted with concrete brick cobbled footpath to front. A picturesque modest-scale house making a pleasing contribution to the diverse streetscape quality in North Street, with particular emphasis at street level on account of the survival of a traditional Irish shopfront of artistic interest displaying high quality carpentry or craftsmanship. However, while some of the supplementary detailing prevails elsewhere, including rendered accents

Reference No.	NIAH Reg. 15605034
	producing a refined Classical theme, the character or external expression of the house has not benefited from a comprehensive renovation programme including the elimination of the original Wyatt-inspired tripartite glazing patterns.
Source	NIAH Building Survey [online]. Available at: https://www.buildingsofireland.ie/buildings-search/building/15605034/18-north-street-new-ross-new-ross-wexford

Reference No.	WCC RPS Ref. NR0186; NIAH Reg. 15605035
Legal Status	Protected Structure; listed in the NIAH
Rating	Regional
Street	17 North Street
Townland	New Ross
Civil Parish	Saint Mary's
Barony	Bantry
Original Use	House
Date	1700–1840
Coordinates (ITM)	671846, 627675
Description	Terraced three-bay four-storey house, extant 1840, on a rectangular plan. Renovated 1974, with replacement shopfront inserted to ground floor. Pitched slate roof with replacement uPVC rainwater goods on rendered stepped eaves retaining cast-iron octagonal or ogee hopper and downpipe. Rendered, ruled and lined wall to front (east) elevation with rusticated rendered quoins to ends; fine roughcast surface finish (remainder). Square-headed window openings (first floor) with concealed sills, and moulded rendered surrounds centred on keystones framing one-over-one timber sash windows. Square-headed window openings (second floor) with cut-granite sills, and moulded rendered surrounds centred on keystones framing six-over-six timber sash windows without horns. Square-headed window openings (top floor) with cut-granite sills, and moulded rendered surrounds framing three-over-three timber sash windows without horns. Street fronted with concrete brick cobbled footpath to front. A house representing an integral component of the domestic built heritage of New Ross The architectural value of the composition is suggested by such attributes as the compact rectilinear plan form, the diminishing in scale of the openings on each floor producing a graduated visual impression with those openings showing sleek "stucco" refinements, and the high-pitched roofline. Although much modified at street level in the later twentieth century, losing in the process a traditional Irish shopfront photographed by A.H. Poole (1884–1954) of Waterford. The elementary form and massing survive intact overhead together with substantial quantities of the original fabric, including crown or cylinder glazing panels in hornless sash frames, thus upholding much of the character or integrity of a house making a pleasing visual statement in North Street. NOTE: Occupied (1901; 1911) by John J. Browne, 'Baker [and] Rate Collector'.
Source	NIAH Building Survey [online]. Available at: https://www.buildingsofireland.ie/buildings-search/building/15605035/17-north-street-new-ross-new-ross-wexford

Reference No.	WCC RPS Ref. NR0187; NIAH Reg. 15605036
Legal Status	Protected Structure; listed in the NIAH
Rating	Regional
Street	16 North Street
Townland	New Ross
Civil Parish	Saint Mary's
Barony	Bantry
Original Use	Shop/retail outlet
Date	1815–1835
Coordinates (ITM)	671844, 627670
Description	Terraced two-bay three-storey house (*c*.1825). Renovated with replacement shopfront inserted to ground floor incorporating fabric of earlier shopfront (*c*.1900). Now in use as offices to ground floor. One of a group of three. Pitched (shared) slate roof with clay ridge tiles, redbrick running bond (shared), chimney stack having stepped capping, and iron rainwater goods on rendered eaves having iron ties. Rendered, ruled and lined walls. Square-headed window openings with cut-stone sills, nine-over-six (first floor) and six-over-six (top floor) timber sash windows. Replacement timber shopfront to ground floor incorporating fabric of earlier shopfront (*c*.1900), with panelled pilasters retaining chamfered inner pilaster on pad-stone, display window, glazed timber panelled door having overlight, fascia having fluted consoles, and lined moulded cornice. Interior with timber panelled shutters to window openings. Street fronted with concrete brick cobbled footpath to front. A pleasantly appointed modest-scale house built as one of a group of three houses (including NIAH Reg. 15605037), making a dignified contribution to the streetscape aesthetic of North Street. Attributes including the diminishing in scale of the openings on each floor in the Classical manner producing an elegant tiered visual effect, the understated surface detailing, and so on, all identifying the architectural design value of the composition. Having been well maintained, the house continues to present an early aspect with most of the historic fabric surviving in place, both to the exterior and to the interior, thereby maintaining some of the character or integrity of the collective ensemble in the street scene.
Source	NIAH Building Survey [online]. Available at: https://www.buildingsofireland.ie/buildings-search/building/15605036/16-north-street-new-ross-new-ross-wexford

Reference No.	WCC RPS Ref. NR0188; NIAH Reg. 15605037
Legal Status	Protected Structure; listed in the NIAH
Rating	Regional
Street	15 North Street
Townland	New Ross
Civil Parish	Saint Mary's
Barony	Bantry
Original Use	Shop/retail outlet
Date	1815–1835
Coordinates (ITM)	671843, 627666

Reference No.	WCC RPS Ref. NR0188; NIAH Reg. 15605037
Description	Terraced two-bay three-storey house (*c*.1825). Renovated (*c*.1900), with shopfront inserted to ground floor. Refenestrated. Now disused. One of a group of three. Pitched (shared) slate roof with clay ridge tiles, redbrick running bond, (shared) chimney stacks having stepped capping, and iron rainwater goods on rendered eaves having iron ties. Rendered, ruled and lined walls. Square-headed window openings with cut-stone sills, and replacement uPVC casement windows. Timber shopfront (*c*.1900), to ground floor with pilasters on cut-stone pad-stones. Replacement display window, replacement glazed timber panelled door, and fascia having slate-lined moulded cornice. Interior with timber panelled shutters to some window openings. Street fronted with concrete brick cobbled footpath to front. A pleasantly appointed modest-scale house built as one of a group of three houses (including NIAH Reg. 15605036) making a dignified contribution to the streetscape aesthetic of North Street. Attributes include the diminishing in scale of the openings on each floor in the Classical manner, producing an elegant tiered visual effect, the understated surface detailing, and so on, all identifying the architectural design value of the composition. Although some of the character or external expression of the composition has been compromised following the introduction of replacement fittings to the openings, the elementary attributes prevail together with an appealing traditional Irish shopfront of artistic design interest, thereby maintaining some of the integrity of the collective ensemble in the street scene.
Source	NIAH Building Survey [online]. Available at: https://www.buildingsofireland.ie/buildings-search/building/15605037/north-street-new-ross-new-ross-wexford

Reference No.	WCC RPS Ref. NR0095; NIAH Reg. 15605038
Legal Status	Protected Structure; listed in the NIAH
Rating	Regional
Street	1798 Monument, Quay St/North St
Townland	New Ross
Civil Parish	Saint Mary's
Barony	Bantry
Original Use	Monument
Date	1905–1910
Coordinates (ITM)	671843, 627654
Description	Freestanding monument, unveiled 1907, on a square plan. Pillared pedestal on drag edged rusticated limestone ashlar base, on drag edged cut-limestone plinth. Street fronted on a corner site on concrete brick cobbled footpath. A monument erected to the memory of 'OUR HEROIC ANCESTORS Who Fought And Fell In The BATTLE Of ROSS [5th June 1798]' with a figure designed by Reverend Edward A. Foran OSA (1866–1938), given variously as Captain John Kelly (1776–98) of Killann, or Matthew Furlong (d. 1798) of Raheen, who was shot while carrying the flag of truce. NOTE: The pedestal by Patrick Molloy of Callan and Dungarvan was assembled by Andrew Carty of Irishtown to much fanfare by The New Ross Standard (November 17, 1906), which reported that 'it looks splendid [and] gives a good foretaste of what the memorial will be like'. However, the unveiling of the memorial in preparation for its installation on the pedestal descended into chaos with The Cardiff Times (2 March, 1907), reporting 'there

Reference No.	WCC RPS Ref. NR0095; NIAH Reg. 15605038
	was a turbulent meeting in preparation for the unveiling. O'Brienites and Redmondites hurled recriminations at each other, and the chairman and a number of O'Brienites left the room and employed two coal porters, who, amidst cheers, jeers, and denunciations, unveiled the memorial'. By comparison, the subsequent unveiling of the monument was carefully choreographed with The New Ross Standard (28 June, 1907) reporting, 'The beautiful memorial [was] guarded by a guard of Enniscorthy Foresters, in splendid costume, and holding drawn swords. At a given signal the big band of St James's, Dublin, struck up "The Memory of the Dead", which having concluded, the Reverend Chairman of the meeting [Reverend Thomas Quigley] pulled the pendant cord, and, amidst a scene of magnificent enthusiasm, the figure of the defiant pikeman burst fully into view [to] the strains of "A Nation Once Again"'.
Source	NIAH Building Survey [online]. Available at: https://www.buildingsofireland.ie/buildings-search/building/15605038/1798-monument-quay-street-north-street-new-ross-new-ross-wexford

Reference No.	WCC RPS Ref. NR0089; NIAH Reg. 15605039
Legal Status	Protected Structure; listed in the NIAH
Rating	Regional
Street	10 Quay Street
Townland	New Ross
Civil Parish	Saint Mary's
Barony	Bantry
Original Use	House
Date	1840–1860
Coordinates (ITM)	671832, 627662
Description	Terraced two-bay four-storey house (*c*.1850), possibly incorporating fabric of earlier house (pre-1840), on site with single-bay four-storey side elevation. Renovated (*c*.1900), with wrap-around shopfront inserted to ground floor. Now in use as offices to upper floors. Hipped slate roof with clay ridge tiles, rendered chimney stack over redbrick running bond construction, having stepped capping, and cast-iron rainwater goods on rendered eaves over redbrick construction having iron ties. Rendered, ruled and lined walls with rendered quoins to corners. Square-headed window openings with cut-stone sills, six-over-six and three-over-three (top floor) timber sash windows. Wrap-around timber shopfront (*c*.1900), to ground floor with pilasters on panelled pad-stones. Fixed-pane display windows, glazed timber panelled double doors having overlight, timber panelled door to house having overpanel, and fascia having slate-lined moulded cornice. Interior with timber panelled shutters to window openings. Street fronted with concrete brick cobbled footpath to front. A well composed house of the middle size possibly originally intended as the end piece of an ensemble of contemporary (*c*.1850) houses (see NIAH Regs. 15605001, 15605040–43 and 15605268), which represents an element of the redevelopment of the centre of New Ross in the mid-nineteenth century. Exhibiting a pleasing, if understated design aesthetic. The architectural value of the house is established by attributes including the slender vertical emphasis of the massing rising slightly above the flanking ranges in the street, the slight diminishing in scale of the openings in the Classical manner producing a graduated or tiered visual effect in the composition, the sparse surface detailing, and so on. Having been well maintained, the house

Reference No.	WCC RPS Ref. NR0089; NIAH Reg. 15605039
	continues to present an early aspect with most of the historic or original fabric surviving in place, both to the exterior and to the interior including a traditional Irish shopfront of artistic potential displaying good craftsmanship. Thereby making a positive impact in a prominent position in Quay Street at the opening out into the town 'square'.
Source	NIAH Building Survey [online]. Available at: https://www.buildingsofireland.ie/buildings-search/building/15605039/10-quay-street-new-ross-new-ross-wexford

Reference No.	WCC RPS Ref. NR0094; NIAH Reg. 15605040
Legal Status	Protected Structure; listed in the NIAH
Rating	Regional
Street	P. Nolan, 8 Quay Street
Townland	New Ross
Civil Parish	Saint Mary's
Barony	Bantry
Original Use	House
Date	1840–1860
Coordinates (ITM)	671825, 627665
Description	Terraced two-bay four-storey over basement house (*c*.1850), possibly incorporating fabric of earlier house (pre-1840), on site. Renovated (post-1900), with replacement pub-front inserted to ground floor. Refenestrated. One of a group of eight. Pitched (shared) slate roof with clay ridge tiles, rendered and redbrick running bond (shared) chimney stacks having stepped capping supporting terracotta or yellow terracotta pots, and cast-iron rainwater goods on rendered eaves having iron ties. Rendered, ruled and lined walls. Square-headed window openings with cut-stone sills, and replacement uPVC casement windows. Replacement timber pub-front (post-1900), to ground floor with pilasters on cut-granite pad-stones, replacement window, glazed timber panelled double doors having overlight, fascia on decorative (Acanthus) consoles having raised lettering, and moulded cornice incorporating awning box on iron arms. Interior retaining some timber shelving (post-1900). Street fronted with concrete footpath to front. A well composed house of the middle size built as one of group of eight units (including NIAH Regs. 15605001, 15605041 and 15605268), which represent an element of the redevelopment of the centre of New Ross in the mid-nineteenth century. Exhibiting a pleasing, if understated design aesthetic. The architectural value of the house is established by attributes including the slender vertical emphasis of the massing, the slight diminishing in scale of the openings in the Classical manner producing a graduated or tiered visual effect, the sparse surface detailing, and so on. Although some of the character has been compromised following the introduction of replacement fittings to most of the openings, the house retains some of the historic or original fabric, both to the exterior and to the interior including a fine pub-front of artistic design merit displaying expert carpentry with particular emphasis on the enriched consoles, thereby continuing to make a beneficial impact on the streetscape value of Quay Street.
Source	NIAH Building Survey [online]. Available at: https://www.buildingsofireland.ie/buildings-search/building/15605040/p-nolan-8-quay-street-new-ross-new-ross-wexford

Reference No.	NIAH Reg. 15605041
Legal Status	Listed in the NIAH
Rating	Regional
Street	7 Quay Street
Townland	New Ross
Civil Parish	Saint Mary's
Barony	Bantry
Original Use	House
Date	1840–1860
Coordinates (ITM)	671815, 627667
Description	Terraced two-bay four-storey house (*c*.1850), possibly over basement incorporating fabric of earlier house (pre-1840), on site. Refenestrated (*c*.1925). Renovated and part refenestrated with replacement shopfront inserted to ground floor. Now in use as offices. One of a group of eight. Pitched (shared) slate roof with redbrick Running bond and rendered (shared) chimney stacks having stepped capping supporting terracotta or yellow terracotta pots, and cast-iron rainwater goods on rendered eaves having iron ties. Rendered walls with steel tie plates. Square-headed window openings with cut-stone sills, and replacement one-over-one timber sash windows (*c*.1925), having replacement uPVC casement windows to top floor. Replacement timber shopfront to ground floor with panelled pilasters, fixed-pane (three-light) timber window having casement overlights, timber panelled doors having overlight, fascia having consoles, and dentilated moulded cornice. Street fronted with concrete footpath to front. A well composed house of the middle size built as one of group of eight units (including NIAH Regs. 15605001, 15605040 and 15605268) representing an element of the redevelopment of the centre of New Ross in the mid-nineteenth century. Exhibiting a pleasing, if understated design aesthetic. The architectural value of the house is established by attributes including the slender vertical emphasis of the massing, the slight diminishing in scale of the openings in the Classical manner producing a graduated or tiered visual effect, the sparse surface detailing, and so on. Although some of the character of the house has been compromised following a comprehensive renovation programme undertaken at the end of the twentieth century, the elementary composition characteristics prevail together with some of the historic fabric, thereby continuing to make a beneficial impact on the streetscape value of Quay Street.
Source	NIAH Building Survey [online]. Available at: https://www.buildingsofireland.ie/buildings-search/building/15605041/7-quay-street-new-ross-new-ross-wexford

Reference No.	NIAH Reg. 15605042
Legal Status	Listed in the NIAH
Rating	Regional
Street	4 Quay Street
Townland	New Ross
Civil Parish	Saint Mary's
Barony	Bantry

Reference No.	NIAH Reg. 15605042
Original Use	House
Date	1840–1860
Coordinates (ITM)	671797, 627672
Description	Terraced two-bay four-storey house (*c*.1850), possibly over basement incorporating fabric of earlier house (pre-1840), on site. Mostly refenestrated (*c*.1925). Renovated with replacement shopfront inserted to ground floor. One of a pair. Pitched (shared) slate roof with clay ridge tiles, rendered (shared) chimney stacks having capping, and cast-iron rainwater goods on rendered eaves having iron ties. Rendered walls. Square-headed window openings with cut-stone sills, and replacement one-over-one timber sash windows (*c*.1925), retaining three-over-three timber sash windows to top floor. Replacement timber shopfront to ground floor with fluted pilasters on plinths, fixed-pane timber display windows, glazed timber door having overlight, fascia having gabled fluted consoles, and cornice incorporating awning. Interior with timber panelled reveals or shutters to window openings. Street fronted with concrete brick cobbled footpath to front. A well composed house of the middle size built as one of a pair (with NIAH Reg. 15605043), representing an element of the redevelopment of the centre of New Ross in the mid-nineteenth century. Exhibiting a pleasing, if understated design aesthetic. The architectural value of the house is established by attributes including the slender vertical emphasis of the massing, the slight diminishing in scale of the openings in the Classical manner producing a graduated or tiered visual effect, the sparse surface detailing, and so on, all producing a scheme identical to a contemporary (*c*.1850) house nearby (see NIAH Reg. 15605039), thereby suggesting a shared provenance. Having been well maintained, the house continues to present an early aspect with the elementary characteristics surviving in place together with substantial quantities of the historic or original fabric, both to the exterior and to the interior: meanwhile, a replacement shopfront featuring minimal superfluous detailing upholds the pleasing street scene aesthetic at street level.
Source	NIAH Building Survey [online]. Available at: https://www.buildingsofireland.ie/buildings-search/building/15605042/4-quay-street-new-ross-new-ross-wexford

Reference No.	NIAH Reg. 15605043
Legal Status	Listed in the NIAH
Rating	Regional
Street	3 Quay Street
Townland	New Ross
Civil Parish	Saint Mary's
Barony	Bantry
Original Use	House
Date	1840–1860
Coordinates (ITM)	671792, 627673
Description	Terraced two-bay four-storey house (*c*.1850), possibly over basement, incorporating fabric of earlier house (pre-1840), on site. Renovated and refenestrated (post-1900), with replacement shopfront inserted to ground floor. Refenestrated (2005). One of a pair. Pitched (shared) slate roof with clay ridge

Reference No.	NIAH Reg. 15605043
	tiles, rendered (shared) chimney stacks having capping, and cast-iron rainwater goods on rendered eaves having iron ties. Rendered walls. Square-headed window openings with cut-stone sills, and replacement uPVC casement windows (2005). These superseded the replacement one-over-one timber sash windows (post-1900). Replacement shopfront (post-1900), to ground floor with pilasters on pad-stones, fixed-pane display window, glazed timber panelled door, and fascia having moulded cornice. Street fronted with concrete brick cobbled footpath to front. A well composed house of the middle size built as one of a pair (with NIAH Reg. 15605042), which represent an important element of the redevelopment of the centre of New Ross in the mid-nineteenth century. Exhibiting a pleasing, if understated design aesthetic. The architectural value of the house is established by attributes including the slender vertical emphasis of the massing, the slight diminishing in scale of the openings in the Classical manner producing a graduated or tiered visual effect, the sparse surface detailing, and so on, all producing a scheme identical to a contemporary (*c*.1850) house nearby (see NIAH Reg. 15605039), thereby suggesting a shared provenance. However, while the elementary characteristics prevail together with some of the historic fabric, including a simple traditional Irish shopfront making a pleasing visual impression at street level, the character or external expression of the house has been undermined by the recent (2005) introduction of replacement fittings to the openings.
Source	NIAH Building Survey [online]. Available at: https://www.buildingsofireland.ie/buildings-search/building/15605043/3-quay-street-new-ross-new-ross-wexford

Reference No.	WCC RPS Ref. NR0191; NIAH Reg. 15605044
Legal Status	Protected Structure; listed in the NIAH
Rating	Regional
Street	The Quay/Quay Street
Townland	New Ross
Civil Parish	Saint Mary's
Barony	Bantry
Original Use	House
Date	1815–1835
Coordinates (ITM)	671786, 627659
Description	Terraced single-bay three-storey house (*c*.1825), on a corner site, with three-bay three-storey side (north) elevation. Refenestrated (*c*.1900). Renovated with replacement shopfronts inserted to ground floor. Now in use as offices. Hipped slate roof with clay ridge tiles, rendered (shared) chimney stack over redbrick construction having stepped capping supporting pots, and replacement uPVC rainwater goods on rendered eaves having iron ties retaining sections of cast-iron rainwater goods. Rendered walls with chamfer to corner to ground floor. Square-headed window openings with cut-stone sills, and replacement two-over-two timber sash windows (*c*.1900). Replacement timber shopfronts to ground floor with fluted pilasters, fixed-pane (single- and three-light) display windows on brick Running bond risers, timber panelled doors, glazed fascia's having fluted consoles, and lined moulded cornices. Street fronted on a corner site with concrete brick cobbled footpath to front. A modest-scale house exhibiting unpretentious architectural design aspirations, thereby making a pleasing, if unassuming visual impression in a

Reference No.	WCC RPS Ref. NR0191; NIAH Reg. 15605044
	prominent corner position at the junction of The Quay with Quay Street. Although replacement shopfronts are of little outstanding design distinction elsewhere, the elementary composition attributes survive in place together with most of the historic fabric, thus upholding the positive contribution made to the character of the local setting.
Source	NIAH Building Survey [online]. Available at: https://www.buildingsofireland.ie/buildings-search/building/15605044/the-quay-quay-street-new-ross-new-ross-wexford

Reference No.	WCC RPS Ref. NR0012; NIAH Reg. 15605045
Legal Status	Protected Structure; listed in the NIAH
Rating	Regional
Street	The Half Door, Conduit Lane
Townland	New Ross
Civil Parish	Saint Mary's
Barony	Bantry
Original Use	Shop/retail outlet
Date	1840–1850
Coordinates (ITM)	671798, 627645
Description	Terraced three-bay, three-storey house (*c*.1850), possibly originally with carriageway to left ground floor. Renovated and refenestrated (*c*.1925), with shopfront inserted to right ground floor. Reroofed (*c*.1950). Renovated. Now disused. Pitched roof replacement fibre-cement slate (*c*.1950), clay ridge tiles, rendered chimney stack having capping supporting yellow terracotta pots, and replacement uPVC rainwater goods on timber eaves. Replacement rendered walls with cast-iron tie plates and rendered course to eaves. Square-headed window openings with cut-stone shallow sills and replacement one-over-one timber sash windows (*c*.1925), retaining two-over-two timber sash windows to top floor. Square-headed door opening with timber boarded door. Shopfront (*c*.1925), to right ground floor with pilasters, fixed-pane window, timber boarded door having overlight or overpanel, and replacement fascia. Interior with timber panelled shutters to window openings. Street fronted with concrete brick cobbled pedestrianised street to front. A pleasant modest-scale house making an unassuming visual impression of almost urban vernacular quality in the streetscape. Although apparently no longer in use, the house has historically been well maintained to present an early aspect with the elementary attributes surviving in place together with much of the historic fabric, both to the exterior and to the interior including the remains of a simple traditional Irish shopfront, thus upholding the positive contribution made to the character of the immediate setting.
Source	NIAH Building Survey [online]. Available at: https://www.buildingsofireland.ie/buildings-search/building/15605045/conduit-lane-new-ross-new-ross-wexford

Reference No.	NIAH Reg. 15605046
Legal Status	Listed in the NIAH
Rating	Regional
Street	Conduit Lane

Reference No.	NIAH Reg. 15605046
Townland	New Ross
Civil Parish	Saint Mary's
Barony	Bantry
Original Use	Store/warehouse
Date	1865–1885
Coordinates (ITM)	671805, 627633
Description	Terraced four-bay three-storey warehouse (*c*.1875), with round-headed carriageway to right ground floor. Reroofed (*c*.1950). Renovated or repaired. Now disused. Pitched roof incorporating gable over loading door, opening to top floor with replacement corrugated-asbestos (*c*.1950), rolled ridges, and cast-iron rainwater goods on redbrick or squared rubble stone eaves. Random rubble stone walls on rendered plinth with cement ribbon repointing, and redbrick quoins to ends. Square-headed window openings with cut-granite sills, red brick block-and-start surrounds, and timber casement windows having iron bars to ground floor. Square-headed door openings including loading doors to upper floors with redbrick block-and-start surrounds, cut-granite sills to upper floors, and tongue-and-groove timber panelled doors with replacement timber panelled door to ground floor, having tongue-and-groove timber panelled overpanel. Round-headed carriageway to right ground floor with redbrick block-and-start surround rising into red brick header voussoirs, and no fittings. Street fronted with concrete brick cobbled pedestrianised street to front. An amiable modest-scale warehouse representing an important element of the mid- to late nineteenth-century commercial or industrial legacy of New Ross, having historic connections with the activities traditionally centred on the nearby quays. Although having fallen into some disrepair following decommissioning by the late twentieth century, the elementary composition characteristics prevail, including the distinctive construction in local fieldstone with redbrick accents, together with substantial quantities of the historic fabric, thereby upholding the positive contribution made to the streetscape character of Conduit Lane.
Source	NIAH Building Survey [online]. Available at: https://www.buildingsofireland.ie/buildings-search/building/15605046/conduit-lane-new-ross-new-ross-wexford

Reference No.	NIAH Reg. 15605047
Legal Status	Listed in the NIAH
Rating	Regional
Street	15 Quay Street/Conduit Lane
Townland	New Ross
Civil Parish	Saint Mary's
Barony	Bantry
Original Use	House
Date	1815–1835
Coordinates (ITM)	671810, 627843
Description	End-of-terrace two-bay three-storey house with dormer attic (*c*.1825), on a corner site. Renovated (post-1900), with shopfront inserted to ground floor.

Reference No.	NIAH Reg. 15605047
	Refenestrated (*c*.1950). Now disused. Pitched (shared) slate roof with clay ridge tiles, redbrick Running bond (shared) chimney stack having stepped capping, slightly swept eaves, and iron rainwater goods on rendered eaves over redbrick header bond construction having iron brackets retaining cast-iron ogee hopper and downpipe. Rendered walls with chamfer to corner to ground floor, rendered channelled piers to ends, and rendered 'fascia' to top floor. Square-headed window openings with cut-stone sills, and replacement one-over-one timber sash windows (*c*.1950), retaining six-over-six and three-over-three (top floor) timber sash windows to side (west) elevation. Timber shopfront (post-1900), to ground floor with panelled (diamond-pointed hollow) pilasters, fixed-pane (two-light) display window having supporting pillar behind, glazed timber double doors having overlight, fascia having panelled (diamond-pointed hollow) consoles, and lined moulded cornice. Interior with timber panelled shutters or splayed reveals to window openings. Street fronted on a corner site with concrete footpath to front. A well composed house of modest to middle size retaining the simple architectural design attributes together with substantial quantities of the historic fabric, both to the exterior and to the interior. This includes an early twentieth-century shopfront of artistic design interest displaying good quality traditional craftsmanship, thereby making a positive contribution to the streetscape aesthetic of Quay Street.
Source	NIAH Building Survey [online]. Available at: https://www.buildingsofireland.ie/buildings-search/building/15605047/15-quay-street-conduit-lane-new-ross-new-ross-wexford

Reference No.	WCC RPS Ref. NR0091; NIAH Reg. 15605048
Legal Status	Protected Structure; listed in the NIAH
Rating	Regional
Street	James Byrne, 13 Quay Street
Townland	New Ross
Civil Parish	Saint Mary's
Barony	Bantry
Original Use	House
Date	1840–1860
Coordinates (ITM)	671822, 627642
Description	Terraced two-bay three-storey house (*c*.1850), possibly over basement incorporating fabric of earlier house (pre-1840), on site with pub-front to ground floor. Pitched (shared) slate roof with clay ridge tiles, rendered (shared) chimney stack over red brick Running bond construction having stepped capping, and replacement uPVC rainwater goods on rendered eaves having iron brackets retaining cast-iron ogee hopper and downpipe. Rendered, ruled and lined walls. Square-headed window openings with cut-stone sills, and six-over-six timber sash windows. Timber pub-front to ground floor with engaged colonettes on cut-granite pad-stones, fixed-pane (three-light) window on carved timber sill, timber panelled double doors on cut-limestone threshold having overlight, and fascia having moulded cornice. Interior with timber panelled shutters to window openings. Street fronted with concrete footpath to front. A pleasantly composed Classically-proportioned modest-scale house representing an important element of the mid-nineteenth-century architectural legacy of New Ross having been purpose-built accommodating commercial

Reference No.	WCC RPS Ref. NR0091; NIAH Reg. 15605048
	and residential spaces in a wholly-integrated scheme adhering to a traditional Irish arrangement. Having been particularly well maintained, the house presents an early aspect with most of the original fabric surviving in place, both to the exterior and to the interior including a picturesque pub-front of artistic design interest displaying good quality carpentry or craftsmanship, thereby upholding the character of an historic street scene.
Source	NIAH Building Survey [online]. Available at: https://www.buildingsofireland.ie/buildings-search/building/15605048/james-byrne-13-quay-street-new-ross-new-ross-wexford

Reference No.	WCC RPS Ref. NR0096; NIAH Reg. 15605049
Legal Status	Protected Structure; listed in the NIAH
Rating	Regional
Street	New Ross Town Hall, Quay Street/South Street
Townland	New Ross
Civil Parish	Saint Mary's
Barony	Bantry
Original Use	Market house
Date	1745–1750
Coordinates (ITM)	671846, 627635
Description	Attached five-bay (three-bay deep) two-storey market house, or tholsel, dated 1749, on a rectangular plan. Rebuilt 1806. Hipped slate roof on a quadrangular plan behind parapet with pressed or rolled iron ridges centred on granite ashlar "cupola" on an octagonal plan on rusticated granite ashlar base, and concealed rainwater goods. Part repointed granite ashlar walls (ground floor) on cut-granite chamfered cushion course on cut-granite plinth with benchmark-inscribed rusticated cut-granite quoins to corners centred on segmental-headed arcade on rusticated granite ashlar piers; part repointed granite ashlar walls (first floor) with rusticated cut-granite quoins to corners supporting "Cyma Recta"- or "Cyma Reversa"-detailed cornice on blind frieze below urn-topped parapet. Square-headed central door opening in segmental-headed recess with moulded rendered lugged surround centred on keystone framing timber panelled double doors. Square-headed flanking window openings in segmental-headed recesses with cut-granite sills, and moulded rendered lugged surrounds framing nine-over-six timber sash windows behind spear head-detailed wrought iron railings. Square-headed window openings (first floor) with cut-granite sill course, and cut-granite lugged surrounds centred on double keystones framing nine-over-six timber sash windows without horns. Interior including (ground floor): central vestibule retaining granite flagged floor, carved timber dado rails centred on carved timber surround to door opening framing glazed timber panelled double doors, and moulded plasterwork cornice to ceiling. Hall retaining carved timber surrounds to door openings framing timber panelled doors, and moulded plasterwork cornice to ceiling; room (east), retaining carved timber surround to door opening framing timber panelled door with carved timber surrounds to window openings framing timber panelled shutters on panelled risers, timber chimneypiece, and picture railing below reinforced compartmentalised ceiling with bull nose-detailed timber beams. Subdivided room (west) retaining carved timber surround to door opening framing timber panelled door with carved timber surrounds to window openings framing timber panelled shutters on panelled risers. Carved timber surrounds to door openings to remainder framing timber panelled doors with

Reference No.	WCC RPS Ref. NR0096; NIAH Reg. 15605049
	carved timber surrounds to window openings framing timber panelled shutters on panelled risers. Street fronted on a corner site with concrete brick cobbled footpath to front. A market house or tholsel 'erected [by] Charles Tottenham Jnr Esqr Sovergn' representing an important component of the built heritage of County Wexford with the architectural value of the composition. One where the laying of the foundation stone marked 'the Anniversary of ye Glorious BATTLE of the BOYNE [1690]'. Confirmed by such attributes as the compact rectilinear plan form, the construction in a honey-coloured granite demonstrating good quality workmanship, the diminishing in scale of the openings on each floor producing a graduated visual impression, and the polygonal "cupola" embellishing the urn-topped parapeted roofline. Meanwhile, a date stone (1806) records the near-total reconstruction of the market house or tholsel 'by John Robinson Carpenter & Architect'. Having been well maintained, the elementary form and massing survive intact together with substantial quantities of the original fabric, both to the exterior and to the interior, including some crown or cylinder glazing panels in hornless sash frames, thus upholding the character or integrity of a market house or tholsel making a pleasing visual statement in an urban street scene. Meanwhile, a benchmark remains of additional interest for the connections with cartography and the preparation of maps by the Ordnance Survey (established 1824). NOTE: The market house or tholsel has known a variety of uses over the course of the nineteenth and twentieth centuries: Samuel Lewis (1837) notes that the 'corn-market being found to be too confined for the trade of the town has been used as a place for the sale of leather' (Lewis 1837, 531); Thomas Lacy (1863) notes that 'the under portion has recently been enclosed and reading-rooms established within it [while] the upper storey is appropriated to a town-hall [where] commissioners under the Towns' Improvement Act hold their meetings' (Lacy 1863, 509).
Source	NIAH Building Survey [online]. Available at: https://www.buildingsofireland.ie/buildings-search/building/15605049/new-ross-town-hall-quay-street-south-street-new-ross-new-ross-wexford

Reference No.	WCC RPS Ref. NR0123; NIAH Reg. 15605050
Legal Status	Protected Structure; listed in the NIAH
Rating	Regional
Street	J. Hogan, 69 South Street
Townland	New Ross
Civil Parish	Saint Mary's
Barony	Bantry
Original Use	House
Date	1815–1835
Coordinates (ITM)	671843, 627623
Description	Terraced two-bay four-storey house (*c*.1825). Renovated (pre-1880), with shopfront inserted to ground floor. Refenestrated. One of a pair. Pitched (shared) slate roof with clay ridge tiles, red brick Running bond (shared) chimney stacks having stringcourses, stepped capping supporting yellow terracotta tapered pots, and replacement uPVC rainwater goods on rendered eaves over red brick construction having iron ties retaining (shared) cast-iron hopper and downpipe. Rendered, ruled and lined walls with cast-iron tie plates to top floor. Square-headed window openings with cut-stone sills, and

Reference No.	WCC RPS Ref. NR0123; NIAH Reg. 15605050
	replacement uPVC casement windows. Timber shopfront, pre-1880, to ground floor with pilasters on replacement plinths, fixed-pane (two- and three-light) display windows having cast-iron supporting pillars behind, timber panelled double doors having overlight, timber panelled door to house on threshold having overlight, fascia having applied marbleised lettering, and moulded cornice. Street fronted with concrete brick cobbled footpath to front. A well-appointed Classically-proportioned house of the middle size built as one of an identical pair (second in pair not included in survey), making a dignified visual impression in the streetscape. Attributes include the vertical emphasis of the massing rising above the flanking ranges in the street, the diminishing in scale of the openings on each floor producing a tiered effect, and so on, all identifying the refined architectural design aesthetic of the composition. Although some of the character of the house has been compromised following the introduction of replacement fittings to most of the openings, a particularly fine shopfront of artistic design merit displaying good quality traditional craftsmanship continues to make a beneficial impact in the street scene at street level.
Source	NIAH Building Survey [online]. Available at: https://www.buildingsofireland.ie/buildings-search/building/15605050/j-hogan-69-south-street-new-ross-new-ross-wexford

Reference No.	WCC RPS Ref. NR0121; NIAH Reg. 15605051
Legal Status	Protected Structure; listed in the NIAH
Rating	Regional
Street	The Bakehouse, 67 South Street
Townland	New Ross
Civil Parish	Saint Mary's
Barony	Bantry
Original Use	House
Date	1890–1910
Coordinates (ITM)	671841, 627615
Description	Terraced two-bay three-storey house (*c.*1900), probably incorporating fabric of earlier house (pre-1840), on site with shopfront to ground floor. Refenestrated, between 2002–05. Now disused. One of a pair. Pitched slate roof with clay ridge tiles, rendered chimney stack having stepped capping, rendered coping, and cast-iron rainwater goods on rendered eaves having paired iron ties. Rendered, ruled and lined walls with rendered channelled pier to end. Square-headed window openings with cut-stone sills, and replacement uPVC casement windows, between 2002–05 (replacing one-over-one timber sash windows). Timber shopfront to ground floor on a symmetrical plan on a moulded plinth with pilasters having decorative Acanthus consoles, fixed-pane timber windows on carved timber sills, glazed timber panelled double doors having overlight, and fascia having slate-lined dentilated moulded cornice. Street fronted with concrete brick cobbled footpath to front. A pleasant house of modest size built as one of a pair (second in pair not included in survey), making a positive contribution to the diverse streetscape quality of North Street, with particular emphasis at street level on account of the survival of a richly-detailed traditional Irish shopfront of artistic interest displaying high quality carpentry or craftsmanship. However, while the elementary attributes survive in place elsewhere, the character or external expression of the house has not benefited from a comprehensive renovation

Reference No.	WCC RPS Ref. NR0121; NIAH Reg. 15605051
	programme including the elimination of the original glazing patterns.
Source	NIAH Building Survey [online]. Available at: https://www.buildingsofireland.ie/buildings-search/building/15605051/67-south-street-new-ross-new-ross-wexford

Reference No.	NIAH Reg. 15605052
Legal Status	Listed in the NIAH
Rating	Regional
Street	64 South Street
Townland	New Ross
Civil Parish	Saint Mary's
Barony	Bantry
Original Use	House
Date	1890–1910
Coordinates (ITM)	671837, 627599
Description	Terraced two-bay three-storey house (*c*.1900), probably incorporating fabric of earlier house (pre-1840), on site. Renovated with replacement shopfront inserted to ground floor. One of a pair. Pitched (shared) slate roof with clay ridge tiles, redbrick Running bond chimney stack having stepped capping, and iron rainwater goods on rendered eaves having iron brackets. Rendered, ruled and lined walls. Square-headed window openings with cut-stone sills, and one-over-one timber sash windows. Replacement timber shopfront to ground floor with fluted pilasters, fixed-pane display windows, glazed timber door, glazed timber panelled door to house having overlight, and fascia incorporating dentilated cornice. Street fronted with concrete brick cobbled footpath to front. A modest-scale house built as one of a pair (second in pair not included in survey), making a positive, if understated visual impression in South Street. Notwithstanding the introduction of a generic replacement shopfront of little outstanding design interest, the house continues to present an early aspect with most of the historic or original fabric surviving in place, thereby upholding the character of an historic setting.
Source	NIAH Building Survey [online]. Available at: https://www.buildingsofireland.ie/buildings-search/building/15605052/64-south-street-new-ross-new-ross-wexford

Reference No.	NIAH Reg. 15605052
Legal Status	Listed in the NIAH
Rating	Regional
Street	64 South Street
Townland	New Ross
Civil Parish	Saint Mary's
Barony	Bantry
Original Use	House
Date	1890–1910

Reference No.	NIAH Reg. 15605052
Coordinates (ITM)	671837, 627599
Description	Terraced two-bay three-storey house (*c*.1900), probably incorporating fabric of earlier house (pre-1840), on site. Renovated with replacement shopfront inserted to ground floor. One of a pair. Pitched (shared) slate roof with clay ridge tiles, redbrick Running bond chimney stack having stepped capping, and iron rainwater goods on rendered eaves having iron brackets. Rendered, ruled and lined walls. Square-headed window openings with cut-stone sills, and one-over-one timber sash windows. Replacement timber shopfront to ground floor with fluted pilasters, fixed-pane display windows, glazed timber door, glazed timber panelled door to house having overlight, and fascia incorporating dentilated cornice. Street fronted with concrete brick cobbled footpath to front. A modest-scale house built as one of a pair (second in pair not included in survey), making a positive, if understated visual impression in South Street. Notwithstanding the introduction of a generic replacement shopfront of little outstanding design interest, the house continues to present an early aspect with most of the historic or original fabric surviving in place, thereby upholding the character of an historic setting.
Source	NIAH Building Survey [online]. Available at: https://www.buildingsofireland.ie/buildings-search/building/15605052/64-south-street-new-ross-new-ross-wexford

Reference No.	WCC RPS Ref. NR0120; NIAH Reg. 15605054
Legal Status	Protected Structure; listed in the NIAH
Rating	Regional
Street	Jack & Jill, 60 South Street/Charles Street
Townland	New Ross
Civil Parish	Saint Mary's
Barony	Bantry
Original Use	Shop/retail outlet
Date	1840–1860
Coordinates (ITM)	671825, 627563
Description	Terraced two-bay four-storey over basement house (*c*.1850), on a corner site possibly incorporating fabric of earlier range (pre-1840), on site with three-bay three-storey side (north) elevation, and shopfronts to ground floor. Renovated (post-1900), with rendered façade enrichments added. One of a group of three. Pitched (shared) slate roof forming hip to corner with clay ridge tiles, red or yellow brick Running bond (shared) chimney stacks having stepped capping, and cast-iron rainwater goods on rendered eaves having consoles (post-1900), on moulded stringcourse. Replacement pebble-encrusted rendered walls (post-1900), with rusticated cut-granite quoins to corners (one incorporating raised lettering), moulded stringcourse to first floor, and moulded stringcourse to second floor. Square-headed window openings with cut-stone sills forming part of sill courses, rendered dressings (post-1900), including panelled (hollow) pilaster surrounds to first floor having fluted consoles supporting triangular pediments, moulded surrounds to second floor having friezes supporting entablatures, moulded surrounds to top floor on aprons, and replacement one-over-one timber sash windows (post-1900), retaining three-over-three timber sash windows to top floor. Shopfronts to ground floor with engaged fluted Ionic columns on pad-stones, replacement fixed-pane timber windows having casement overlights, timber panelled double doors having

Reference No.	WCC RPS Ref. NR0120; NIAH Reg. 15605054
	overlights, and fascia's having moulded cornices. Interior with timber panelled shutters to window openings. Street fronted on a corner site with concrete brick cobbled footpath to front. A pleasantly composed house of the middle size built as one of a group of three identical units (with NIAH Regs. 15605055 and 15605230), making a pleasing impression in the streetscapes of South Street and Charles Street. Attributes including the vertical emphasis of the massing, the diminishing in scale of the openings on each floor producing a tiered visual effect, and so on, all identifying a refined architectural design aesthetic. Having undergone a comprehensive renovation programme at the turn of the twentieth century, the external expression of the house is further enlivened by rendered accents producing a robust Classical theme: meanwhile, original shopfronts of artistic design interest displaying good quality craftsmanship continue the Classical theme at street level. Having been well maintained, the house continues to present an early aspect with substantial quantities of the historic or original fabric surviving in place, both to the exterior and to the interior, thereby upholding the character of the collective ensemble in the immediate setting: meanwhile, a discreet benchmark remains of additional importance for the connections with cartography and the preparation of maps by the Ordnance Survey.
Source	NIAH Building Survey [online]. Available at: https://www.buildingsofireland.ie/buildings-search/building/15605054/60-south-street-charles-street-new-ross-new-ross-wexford

Reference No.	WCC RPS Ref. NR0119; NIAH Reg. 15605055
Legal Status	Protected Structure; listed in the NIAH
Rating	Regional
Street	J. Bailey, 59 South Street
Townland	New Ross
Civil Parish	Saint Mary's
Barony	Bantry
Original Use	House
Date	1840–1860
Coordinates (ITM)	671821, 627557
Description	Terraced two-bay four-storey over basement house (*c*.1850), possibly incorporating fabric of earlier range (pre-1840), on site with shopfront to ground floor. One of a group of three. Pitched (shared) slate roof with clay ridge tiles, red brick Running bond (shared) chimney stack having stepped capping, and cast-iron rainwater goods on rendered eaves having iron ties. Rendered walls. Square-headed window openings with cut-stone sills, nine-over-six (first floor), six-over-six (second floor) and three-over-three (top floor) timber sash windows. Shopfront to ground floor on a symmetrical plan with engaged fluted Ionic columns on cut-granite pad-stones, fixed-pane (three-light) timber display window on carved timber sill on panelled riser, glazed timber panelled double doors having overlight, timber panelled door to house having overlight, and fascia having slate-lined moulded cornice. Interior with timber panelled shutters to window openings. Street fronted with concrete brick cobbled footpath to front incorporating cast-iron grill to basement in cut-granite surround. A pleasantly composed house of the middle size built as one of a group of three identical units (with NIAH Regs. 15605054 and 15605230), making a

Reference No.	WCC RPS Ref. NR0119; NIAH Reg. 15605055
	pleasing impression in the streetscapes of South Street. Attributes including the vertical emphasis of the massing, the diminishing in scale of the openings on each floor producing a tiered visual effect, and so on, all identifying a refined architectural design aesthetic. Having been particularly well maintained, the house continues to present an early aspect with most of the historic or original fabric surviving in place, both to the exterior and to the interior including an original shopfront of artistic design interest displaying good quality craftsmanship producing a Classical theme at street level.
Source	NIAH Building Survey [online]. Available at: https://www.buildingsofireland.ie/buildings-search/building/15605055/j-bailey-59-south-street-new-ross-new-ross-wexford

Reference No.	WCC RPS Ref. NR0205; NIAH Reg. 15605230
Legal Status	Protected Structure; listed in the NIAH
Rating	Regional
Street	Hanrahan, 2 Charles Street
Townland	New Ross
Civil Parish	Saint Mary's
Barony	Bantry
Original Use	House
Date	1840–1860
Coordinates (ITM)	671813, 627568
Description	Terraced two-bay four-storey over basement house (*c*.1850), possibly incorporating fabric of earlier range (pre-1840), on site. Renovated with replacement shopfront inserted to ground floor. One of a group of three. Pitched (shared) roof with materials not visible, chimney stack(s) not visible, and cast-iron rainwater goods on rendered eaves having iron ties. Rendered walls. Square-headed window openings with cut-stone sills, nine-over-six (first floor), six-over-six (second floor) and three-over-three (top floor) timber sash windows. Replacement timber shopfront to ground floor on a symmetrical plan with panelled pilasters, fixed-pane display windows, glazed double doors having overlight, and fascia having dentilated cornice. Interior with timber panelled shutters to window openings, and moulded plasterwork cornices to some ceilings. Street fronted with concrete brick cobbled footpath to front. A pleasantly composed house of the middle size built as one of a group of three identical units (with NIAH Regs. 15605054–55) making a pleasing impression in the streetscape of Charles Street with attributes including the vertical emphasis of the massing, the diminishing in scale of the openings on each floor producing a tiered visual effect, and so on, all identifying a refined architectural design aesthetic. With the exception of a replacement shopfront of little inherent design distinction or individuality, having been well maintained, the house continues to present an early aspect with substantial quantities of the historic or original fabric surviving in place, both to the exterior and to the interior, thereby upholding the character of the collective ensemble in the immediate setting.
Source	NIAH Building Survey [online]. Available at: https://www.buildingsofireland.ie/buildings-search/building/15605230/2-charles-street-new-ross-new-ross-wexford

Reference No.	WCC RPS Ref. NR0008; NIAH Reg. 15605231
Legal Status	Protected Structure; listed in the NIAH
Rating	Regional
Street	Brook, 7 Charles Street
Townland	New Ross
Civil Parish	Saint Mary's
Barony	Bantry
Original Use	House
Date	1890–1910
Coordinates (ITM)	671822, 627583
Description	Terraced four-bay three-storey house (*c*.1900), originally two separate two-bay three-storey houses possibly incorporating fabric of earlier range (pre-1840), on site. Renovated (*c*.1975), with replacement shopfront inserted to ground floor. Pitched slate roof with clay ridge tiles, red brick Running bond chimney stacks having red brick saw tooth-profiled stringcourses under capping, and replacement uPVC rainwater goods on rendered eaves. Rendered walls with rendered quoins to ends. Square-headed window openings with cut-stone sills, moulded rendered surrounds, and two-over-two timber sash windows. Replacement shopfront (*c*.1975), to ground floor with reeded pilasters, fixed-pane iron display windows, glazed iron doors, and projecting box fascia having cornice. Interior with timber panelled shutters to window openings. Street fronted with concrete brick cobbled footpath to front. An attractive house of the middle size originally intended as two separate units representing an element of the late nineteenth- or early twentieth-century redevelopment of ranges indicated on archival editions of the Ordnance Survey. Although a somewhat dated generic replacement shopfront makes an unimpressive contribution to the streetscape aesthetic at street level, elsewhere the original composition attributes prevail, including the moulded accents producing an understated Classical theme, together with most of the original fabric, both to the exterior and to the interior, thereby making a beneficial impression on the streetscape character of Charles Street.
Source	NIAH Building Survey [online]. Available at: https://www.buildingsofireland.ie/buildings-search/building/15605231/charles-street-new-ross-new-ross-wexford

Reference No.	WCC RPS Ref. NR0142; NIAH Reg. 15605232
Legal Status	Protected Structure; listed in the NIAH
Rating	Regional
Street	4 Charles Street
Townland	New Ross
Civil Parish	Saint Mary's
Barony	Bantry
Original Use	Shop/retail outlet
Date	1790–1810
Coordinates (ITM)	671805, 627592
Description	Terraced two-bay four-storey house (*c*.1800), possibly over basement. Renovated (*c*.1850), with shopfront inserted to ground floor. Part refenestrated

Reference No.	WCC RPS Ref. NR0142; NIAH Reg. 15605232
	(*c*.1925). Part refenestrated. Now in use as offices. One of a pair. Pitched (shared) slate roof with clay ridge tiles, red brick Running bond chimney stack, rendered coping, slightly sprocketed eaves, and cast-iron rainwater goods on rendered eaves having iron ties. Rendered, ruled and lined walls with channelled pier to end. Square-headed window openings with cut-stone sills, and replacement four-over-four (first floor) timber sash windows (*c*.1925), having replacement timber casement windows to second floor retaining three-over-three timber sash windows to top floor. Timber shopfront (*c*.1850), to ground floor (incorporating elliptical-headed door opening with two cut-granite steps, and timber panelled double doors having overpanel), with half-fluted engaged Corinthian columns on reeded risers on cut-stone pad-stones, fixed-pane timber window having fluted tapered flanking pilasters on panelled pedestals, entablature incorporating awning box on iron arms, fascia having dosserets, and dentilated moulded cornice. Interior with timber staircase having turned balustrade supporting carved timber handrail. Street fronted with concrete brick cobbled footpath to front. A pleasantly composed house of the middle size built as one of a pair (with NIAH Reg. 15605233) making a pleasing impression in the streetscape of Charles Street with attributes including the vertical emphasis of the massing, the diminishing in scale of the openings on each floor producing a tiered visual effect, and so on, all identifying a refined architectural design aesthetic. Although modified over the course of the twentieth century with the systematic introduction of replacement fittings to the openings gradually impacting on the external expression of the composition, the house nevertheless continues to present an early aspect with substantial quantities of the historic or original fabric surviving in place, both to the exterior and to the interior including a particularly fine Classically-detailed shopfront of artistic design interest displaying expert carpentry or craftsmanship.
Source	NIAH Building Survey [online]. Available at: https://www.buildingsofireland.ie/buildings-search/building/15605232/4-charles-street-new-ross-new-ross-wexford

Reference No.	WCC RPS Ref. NR0206; NIAH Reg. 15605233
Legal Status	Protected Structure; listed in the NIAH
Rating	Regional
Street	6 Charles Street
Townland	New Ross
Civil Parish	Saint Mary's
Barony	Bantry
Original Use	House
Date	1790–1810
Coordinates (ITM)	671799, 627595
Description	Terraced two-bay four-storey house (*c*.1800), possibly over basement. Refenestrated. Now in use as offices. One of a pair. Pitched (shared) slate roof with clay ridge tiles, rendered and redbrick Running bond chimney stacks, rendered coping, slightly sprocketed eaves, and cast-iron rainwater goods on rendered eaves having iron ties. Rendered, ruled and lined walls with channelled pier to end. Square-headed window openings with cut-stone sills, and replacement uPVC casement windows. Elliptical-headed door opening with four carved cut-granite steps, carved timber surround, and timber panelled door having overlight. Interior with lobby having timber panelled wainscoting

Reference No.	WCC RPS Ref. NR0206; NIAH Reg. 15605233
	supporting carved timber dado rail, and timber panelled reveals or shutters to some window openings. Street fronted with concrete brick cobbled footpath to front. A pleasantly composed house of the middle size built as one of a pair (with NIAH Reg. 15605232) making a pleasing impression in the streetscape of Charles Street with attributes including the vertical emphasis of the massing, the diminishing in scale of the openings on each floor producing a tiered visual effect, and so on, all identifying a refined architectural design aesthetic. However, although the elementary composition attributes prevail together with some of the historic or original fabric, both to the exterior and to the interior, the character or external expression of the house has not benefited from the introduction of replacement fittings to most of the openings.
Source	NIAH Building Survey [online]. Available at: https://www.buildingsofireland.ie/buildings-search/building/15605233/6-charles-street-new-ross-new-ross-wexford

Reference No.	WCC RPS Ref. NR0009; NIAH Reg. 15605235
Legal Status	Protected Structure; listed in the NIAH
Rating	Regional
Street	New Ross Post Office, Charles Street/Conduit Lane
Townland	New Ross
Civil Parish	Saint Mary's
Barony	Bantry
Original Use	Post office
Date	1900–1905
Coordinates (ITM)	671780, 627606
Description	Detached two-bay single-storey post office, designed 1904; dated 1904; opened 1905, on a rectangular plan with single-bay single-storey side elevations; three-bay single-storey return block (north). Pitched (west) or hipped (east) slate roofs behind parapets; pitched double-pile (M-profile) slate roof (north), ridge tiles, redbrick chimney stack having cut-limestone "Cyma Recta"- or "Cyma Reversa"-detailed cornice capping supporting ribbed terracotta tapered pots, and concealed rainwater goods retaining cast-iron hoppers and square profile downpipes. Redbrick Flemish bond walls on drag edged dragged limestone ashlar base on moulded cushion course on drag edged dragged cut-limestone plinth with cut-limestone "Cyma Recta"- or "Cyma Reversa"-detailed cornice on frieze below parapet having cut-limestone "Cyma Recta"- or "Cyma Reversa"-detailed coping; red brick English bond walls (north) on chamfered plinth. Square-headed window openings in tripartite arrangement (west) with drag edged cut-limestone sill course, cut-limestone mullions, and cut-limestone block-and-start surround supporting cut-limestone lintels framing timber casement windows. Pair of square-headed window openings (east) with drag edged cut-limestone sill course, and cut-limestone lintels framing timber casement windows. Camber- or segmental-headed window openings (north) with cut-limestone chamfered flush sills, and red brick voussoirs framing mild steel panels over steel casement windows having square glazing bars. Street fronted with concrete brick cobbled footpath to front. A post office erected to a design examined (1904) by Thomas John Mellon (d. 1922), Principal Surveyor to the Board of Public Works (appointed 1893), representing an important component of the early twentieth-century built

Reference No.	WCC RPS Ref. NR0009; NIAH Reg. 15605235
	heritage of New Ross with the architectural value of the composition, one evoking comparisons with the contemporary Skibbereen Post Office (1902–05) in County Cork, confirmed by such attributes as the compact rectilinear plan form; the construction in a vibrant Ruabon red brick offset by "blue" limestone dressings not only demonstrating good quality workmanship, but also producing an eye-catching two-tone palette; the multipartite glazing patterns; and the curvilinear parapet embellishing the roofline. Having been well maintained, the elementary form and massing survive intact together with substantial quantities of the original fabric, both to the exterior and to the restrained interior, thus upholding the character or integrity of a post office making a pleasing visual statement in Charles Street. NOTE: A "chiselled-off" cartouche and a surviving King Edward VII (1841–1910; r. 1901–10) royal cipher are of additional significance as a remainder of the period when Ireland formed part of the British Empire.
Source	NIAH Building Survey [online]. Available at: https://www.buildingsofireland.ie/buildings-search/building/15605235/new-ross-post-office-charles-street-back-lane-conduit-lane-new-ross-new-ross-wexford

Reference No.	WCC RPS Ref. NR0207; NIAH Reg. 15605237
Legal Status	Protected Structure; listed in the NIAH
Rating	Regional
Street	The Dunbrody Inn, The Quay
Townland	New Ross
Civil Parish	Saint Mary's
Barony	Bantry
Original Use	House
Date	1890–1910
Coordinates (ITM)	671755, 627580
Description	Terraced five-bay three-storey house (*c*.1900), possibly incorporating fabric of earlier range(s) (pre-1840), on site. Reroofed and renovated with replacement pub-front inserted to ground floor. Pitched roof with replacement artificial slate, clay ridge tiles, rendered chimney stack, and replacement uPVC rainwater goods on overhanging timber eaves having consoles/modillions retaining cast-iron ogee hopper and downpipe. Rendered, ruled and lined walls with cast-iron tie plates to upper floors. Square-headed window openings with cut-stone sills, and one-over-one timber sash windows. Replacement timber pub-front to ground floor with carved pilasters having decorative consoles, fixed-pane windows, glazed tongue-and-groove timber panelled double doors, box fascia having panelled (hollow) consoles, and lined dentilated cornice. Street fronted with concrete brick cobbled footpath to front undergoing construction (2005). A well-proportioned house of the middle size possibly having origins in earlier ranges indicated on archival editions of the Ordnance Survey. Having been reasonably well maintained, the house continues to present an early aspect with the understated architectural attributes prevailing together with substantial quantities of the historic or original fabric, thereby making a pleasing impression on the aesthetic appeal of a diverse street scene.
Source	NIAH Building Survey [online]. Available at: https://www.buildingsofireland.ie/buildings-search/building/15605237/the-quay-new-ross-new-ross-wexford

Reference No.	WCC RPS Ref. NR0085; NIAH Reg. 15605238
Legal Status	Protected Structure; listed in the NIAH
Rating	Regional
Street	Sherry Fitzgerald, 14 The Quay/Charles Street
Townland	New Ross
Civil Parish	Saint Mary's
Barony	Bantry
Original Use	Store/warehouse
Date	1840–1860
Coordinates (ITM)	671768, 627616
Description	Attached seven-bay six-storey warehouse (*c*.1850), on a corner site originally seven-bay five-storey with elliptical-headed carriageway to left ground floor, and two-bay six-storey side (south) elevation originally two-bay five-storey. Renovated (pre-1880), with top floor added. Extensively renovated (1983–84), with some openings to ground floor remodelled to accommodate commercial or office use. Hipped roof originally pitched with replacement fibre-cement slate (1983–84), clay ridge tiles, slightly sprocketed or swept eaves, and iron rainwater goods on rendered eaves retaining cast-iron downpipes. Replacement rendered wall (1983–84), to front (west) elevation with exposed random rubble stone construction to remainder having red brick or squared rubble stone quoins to corners, iron tie plates to upper floors, and stringcourse to top floor rear (east) elevation originally coping supporting red brick construction (bond not discernible). Square-headed window openings with concealed dressings to front (west) elevation, no sills to remainder having red brick block-and-start surrounds, and replacement fixed-pane timber windows (1983–84) (outline of square-headed openings throughout including loading doors to upper floors to rear (east) elevation with red brick block-and-start surrounds, and red brick irregular bond infill). Square-headed openings to ground floor remodelled (1983–84), with fixed-pane fittings, and glazed doors. Elliptical-headed carriageway to left ground floor with concealed dressings, and no fittings (corresponding in rear (east) elevation as elliptical-headed carriageway with squared rubble granite block-and-start surround supporting red brick voussoirs, and no fittings). Street fronted on a corner site with concrete brick cobbled footpath to front. An impressive large-scale warehouse representing an integral component of the mid nineteenth-century built heritage of New Ross having historically supported some of the commercial or industrial activities centred on the quays. Although modified to accommodate an alternative purpose, the elementary attributes of the composition prevail including the vertical thrust of the massing rising above the flanking ranges in the street, the traditional construction in unrefined local fieldstone with red brick or squared stone accents, the regular, almost monotonous arrangement of small-scale openings on each floor, and so on, thereby maintaining the status as an important landmark enhancing the aesthetic appeal of a diverse streetscape.
Source	NIAH Building Survey [online]. Available at: https://www.buildingsofireland.ie/buildings-search/building/15605238/14-the-quay-charles-street-new-ross-new-ross-wexford

Reference No.	WCC RPS Ref. NR0081; NIAH Reg. 15605239
Legal Status	Protected Structure; listed in the NIAH
Rating	Regional

Reference No.	WCC RPS Ref. NR0081; NIAH Reg. 15605239
Street	Bank of Ireland, 12 The Quay
Townland	New Ross
Civil Parish	Saint Mary's
Barony	Bantry
Original Use	Bank/financial institution
Date	1855–1865
Coordinates (ITM)	671779, 627646
Description	Attached four-bay three-storey double-pile split-level bank, designed 1860, on a square plan; three-bay four-storey rear (east) elevation. Occupied, 1901; 1911. Pitched double-pile slate roof behind parapet with clay ridge tiles, cut-granite coping to gables (west) with granite ashlar panelled chimney stacks to apexes having cut-granite cornice capping supporting terracotta or yellow terracotta octagonal or tapered pots, coping to gables (east) with rendered chimney stacks to apexes having capping supporting terracotta or yellow terracotta octagonal or tapered pots, and concealed rainwater goods retaining cast-iron octagonal or ogee hoppers and downpipes with cast-iron rainwater goods (east) on rendered eaves retaining cast-iron downpipes. Granite ashlar wall (ground floor) on cut-granite stepped plinth with dentilated "Cyma Recta"- or "Cyma Reversa"-detailed cornice on consoles; granite ashlar surface finish (upper floors) with dentilated "Cyma Recta"- or "Cyma Reversa"-detailed cornice on consoles below copper-covered parapet; rendered surface finish (remainder). Camber-headed window openings in camber-headed recesses (ground floor) with cut-granite sills on vermiculated panelled risers, and cut-granite archivolts framing one-over-one timber sash windows. Square-headed window openings (first floor) with cut-granite sill course on panelled risers, and cut-granite surrounds with panelled pilasters supporting segmental pediments on "Acanthus"-detailed consoles framing one-over-one timber sash windows. Camber-headed window openings (top floor) with cut-granite sill course, and cut-granite lugged surrounds centred on diamond pointed panelled keystones framing one-over-one timber sash windows. Square-headed window openings to rear (east) elevation with cut-granite sills, and concealed dressings framing six-over-six or three-over-six (top floor) timber sash windows behind wrought iron bars. Interior including (ground floor): banking hall; (upper floors): carved timber surrounds to door openings framing timber panelled doors with carved timber surrounds to window openings framing timber panelled shutters. Quay fronted with concrete brick cobbled footpath to front. A bank erected to a design signed (1860) by Sandham Symes (1807–94), Architect to the Bank of Ireland (appointed 1854; retired 1879), representing an important component of the mid nineteenth-century built heritage of New Ross with the architectural value of the composition, a Venetian "palazzo" recalling the Symes-designed branch in Waterford City (1875), confirmed by such attributes as the compact square plan form; the construction in a silver-grey granite demonstrating good quality workmanship; the diminishing in scale of the openings on each floor producing a graduated visual impression; and the parapeted roofline. Having been well maintained, the elementary form and massing survive intact together with substantial quantities of the original fabric, both to the exterior and to the interior where contemporary joinery; chimneypieces; and plasterwork refinements, all highlight the artistic potential of a bank making a pleasing visual statement in The Quay (cf. NIAH Reg. 15605236). NOTE: Occupied (1901) by Richard Walsh, 'Bank Manager' (NA 1901); and (1911) by John Anderson Exshaw (1853–1931), 'Bank Manager' (NA 1911).
Source	NIAH Building Survey [online]. Available at:

Reference No.	WCC RPS Ref. NR0081; NIAH Reg. 15605239
	https://www.buildingsofireland.ie/buildings-search/building/15605239/bank-of-ireland-12-the-quay-new-ross-new-ross-wexford

Reference No.	WCC RPS Ref. NR0211; NIAH Reg. 15605268
Legal Status	Protected Structure; listed in the NIAH
Rating	Regional
Street	6 Quay Street
Townland	New Ross
Civil Parish	Saint Mary's
Barony	Bantry
Original Use	House
Date	1840–1860
Coordinates (ITM)	671807, 627669
Description	Terraced two-bay four-storey house (*c*.1850), possibly over basement incorporating fabric of earlier house (pre-1840), on site. Renovated and refenestrated with replacement shopfront inserted to ground floor. One of a group of eight. Pitched (shared) slate roof with redbrick Running bond (shared) chimney stacks, and cast-iron rainwater goods on rendered eaves having iron ties. Rendered walls. Square-headed window openings with cut-stone sills, and replacement timber casement windows. Replacement timber shopfront to ground floor with pilasters, fixed-pane display window, glazed timber panelled door, timber panelled door to house, fascia having gabled fluted consoles, and dentilated cornice. Interior with timber panelled shutters to window openings. Street fronted with concrete brick cobbled footpath to front. A well composed house of the middle size built as one of group of eight units (including NIAH Regs. 15605001, 15605040 and 15605041) representing an element of the redevelopment of the centre of New Ross in the mid-nineteenth century. Exhibiting a pleasing, if understated design aesthetic, the architectural value of the house is established by attributes including the slender vertical emphasis of the massing, the slight diminishing in scale of the openings in the Classical manner producing a graduated or tiered visual effect, the sparse surface detailing, and so on. Although the subject of a comprehensive renovation programme in the late twentieth century, the elementary composition nevertheless prevails together with a quantity of the historic or original fabric, both to the exterior and to the interior, thereby continuing to make a beneficial impact on the streetscape value of Quay Street.
Source	NIAH Building Survey [online]. Available at: https://www.buildingsofireland.ie/buildings-search/building/15605268/6-quay-street-new-ross-new-ross-wexford

Reference No.	NIAH Reg. 15605270
Legal Status	Listed in the NIAH
Rating	Regional
Street	12 Quay Street
Townland	New Ross
Civil Parish	Saint Mary's

Reference No.	NIAH Reg. 15605270
Barony	Bantry
Original Use	Shop/retail outlet
Date	1790–1810
Coordinates (ITM)	671828, 627640
Description	Terraced three-bay five-storey house with dormer attic (*c*.1800). Renovated and refenestrated with replacement shopfront inserted to ground floor. Now disused to ground floor. One of a group of two. Pitched (shared) slate roof with clay ridge tiles, redbrick Running bond chimney stacks having stepped capping supporting terracotta or yellow terracotta pots, rendered coping, and cast-iron rainwater goods on rendered eaves over redbrick construction having iron brackets. Rendered walls. Square-headed window openings with cut-stone sills, and replacement aluminium or uPVC casement windows. Replacement timber shopfront to ground floor with pilasters, fixed-pane windows, timber panelled door, fascia having gabled consoles, and box cornice. Street fronted with concrete brick cobbled footpath to front. A well composed house of substantial size built as one of a group of two related houses (with NIAH Reg. 15605271) making a strong visual statement in Quay Street on account of attributes including the vertical thrust of the massing rising over the flanking ranges in the street, the diminishing in scale of the openings on each floor in the Classical manner producing a graduated or tiered visual effect, the sparse surface articulation, and so on. However, while the elementary composition prevails, the character of external expression of the house has not benefited from the introduction of replacement fittings to the openings.
Source	NIAH Building Survey [online]. Available at: https://www.buildingsofireland.ie/buildings-search/building/15605270/12-quay-street-new-ross-new-ross-wexford

Reference No.	NIAH Reg. 15605271
Legal Status	Listed in the NIAH
Rating	Regional
Street	11 Quay Street
Townland	New Ross
Civil Parish	Saint Mary's
Barony	Bantry
Original Use	House
Date	1790–1810
Coordinates (ITM)	671835, 627637
Description	Terraced two-bay five-storey house with dormer attic (*c*.1800). Renovated and refenestrated with replacement shopfront inserted to ground floor. One of a group of two. Pitched (shared) slate roof with clay ridge tiles, red brick Running bond chimney stacks having stepped capping supporting terracotta or yellow terracotta pots, rendered coping, and cast-iron rainwater goods on rendered eaves over red brick construction having iron brackets. Rendered walls. Square-headed window openings with cut-stone sills, and replacement aluminium or uPVC casement windows. Replacement timber shopfront to ground floor on a symmetrical plan with pilasters rising into archivolts producing camber-headed lights, fixed-pane window, glazed timber double

Reference No.	NIAH Reg. 15605271
	doors, fascia having consoles, and lined moulded cornice. Street fronted with concrete brick cobbled footpath to front. A well composed house of substantial size built as one of a group of two related houses (with NIAH Reg. 15605270) making a strong visual statement in Quay Street on account of attributes including the vertical thrust of the massing rising over the flanking ranges in the street, the diminishing in scale of the openings on each floor in the Classical manner producing a graduated or tiered visual effect, the sparse surface articulation, and so on. However, while the elementary composition prevails, the character of external expression of the house has not benefited from the introduction of replacement fittings to the openings.
Source	NIAH Building Survey [online]. Available at: https://www.buildingsofireland.ie/buildings-search/building/15605271/11-quay-street-new-ross-new-ross-wexford

Reference No.	NIAH Reg. 15605272
Legal Status	Listed in the NIAH
Rating	Regional
Street	62 South Street
Townland	New Ross
Civil Parish	Saint Mary's
Barony	Bantry
Original Use	Shop/retail outlet
Date	1815–1835
Coordinates (ITM)	671831, 627588
Description	Terraced two-bay four-storey house (*c*.1825). Extensively renovated with replacement shopfront inserted to ground floor to accommodate use as offices. Pitched slate roof with clay ridge tiles, rendered chimney stack over red brick Running bond construction having stringcourse, and rainwater goods on rendered eaves having iron ties retaining cast-iron hopper and downpipe. Rendered walls. Square-headed window openings with cut-stone sills, and replacement six-over-six timber sash windows. Replacement timber shopfront to ground floor with pilasters, fixed-pane window, glazed timber panelled door having overlight, glazed timber panelled door to upper floors having overlight, fascia having 'consoles', and lined cornice. Street fronted with concrete brick cobbled footpath to front. An amiable house of the middle size making an elegant statement in South Street on account of attributes including the vertical emphasis of the massing, the diminishing in scale of the openings on each floor in the Classical manner producing a graduated or tiered visual impression, the understated surface articulation, and so on, all identifying a refined architectural design aesthetic. Having been reasonably well maintained or restored with replacement fittings replicating the appearance or form of the original counterparts, the house continues to make a beneficial impact on the historic character of the street scene.
Source	NIAH Building Survey [online]. Available at: https://www.buildingsofireland.ie/buildings-search/building/15605272/62-south-street-new-ross-new-ross-wexford

APPENDIX 14.4
Extracts from the Irish Folklore Commission Schools' Collection

Townland	New Ross
School	Saint Leonards National School, Ballycullane
Collector / Informant	Miss A. O'Neill
Extract Detail	**Cross of Irishtown** In the writer's mother's childhood days i.e. about 90 years ago there was no Cross structure as we see it now. It was a tall upright stone called locally The Long Stone standing upright as a cromlech stone and believed to be the marking place of the grave of a chieftain. The structure, surmounted by the Celtic cross, was part of the public works undertaken after the ravages of the Famine. **Old Boatmen's' names on the Barrow, New Ross** Above the Bridge on the North side 1. Linn Beag 2. Tomhaistín Below the Bridge on the South side 1. Linn Mór 2. The Dollard 3. Lady's wretch (phonetic) ('reach') 4. Carrigcloney 'wretch'* 5. White horse wretch *'Phonetic' as pronounced by old boatman who gave me the information **The John Bell** This was the name of one of the largest sailing boats that traded from New Ross to St John's Newfoundland and thence to Boston about 80 years ago. It also sailed to Savannah. The writer's father emigrated to America on the John Bell. It took many weeks to do the journey. The passengers suffered much hardship. Old hard sea biscuits were their chief food going. Scurvy, owing to lack of proper food, was very prevalent amongst the passengers
Reference	The Schools' Collection, Vol. 0871, pages 124–25
Source	Dúchas Archive [online]. Available at: https://www.duchas.ie/en/cbes/5009220/4999231

Townland	New Ross
School	Saint Leonards National School, Ballycullane
Collector / Informant	Miss A. O'Neill
Extract Detail	**The Night of the Big Snow in New Ross** For some days previous to the night of the Big Snow of 1867 there had been a heavy frost. The river, though tidal was one mass of ice. The bridge, a wooden structure of great antiquity, was ill able to bear extra weight or pressure. Part of the bridge fell in the early part of the evening. This is how the story was told by an onlooker who had reason to remember it: This girl Miss Furlong was a maid in the hotel which overlooks the bridge. She was standing on the hotel steps in the evening when the bridge crashed, and simultaneously her nose was swept from her face. She said 'twas a blast. Ever

Townland	New Ross
	afterwards the poor thing always wore a cloth over her nose, or over the vacant place in her face. During the night what remained of the bridge was swept into the river. Anyhow, in the morning the town was 'snowed under' and the bridge missing. Mr Potsy Dooley, Garranbehy, and a Mr Lee, a smith from Rosbercon walked across into town from Kilkenny on the ice
Reference	The Schools' Collection, Vol. 0871, page 97
Source	Dúchas Archive [online]. Available at: https://www.duchas.ie/en/cbes/5009220/4999202

Townland	New Ross
School	Saint Leonards National School, Ballycullane
Collector / Informant	Mary B. Dunphy
Extract Detail	**New Ross as a Great Port** New Ross today is but a sickly ghost of its former self, according to the old people. Shipping abounded in the river. Sailors speaking many foreign languages paraded the quays and streets. The writer's father often described these foreigners to her. Some wore earrings, some pigtails, some big baggy coloured trousers. These latter were called Petticoat Men. There was life everywhere. The bustle and noise of business was the music of the town. Horses and carts carried grain into the large stores on The Quay from all over the countryside. Nothing is left to tell of its former greatness but the huge seven storey stores along the quayside. Alas, these are now empty and rotting floors, doors, etc., only greet the eye. The walls are substantially built, however, and show no sign of decay yet. In those good old days great wages were paid for loading and unloading a ship as it would be a hurry to avail of a propitious wind or tide. A man (Mr J. Power Maudlins) told me to-day that 21s/= per day was refused on the Quay of Ross on one occasion. New Ross made many sailors and emigrants in those days, some going to South America even. Many New Ross people have friends in Buenos Aires since these old times. St John's, Newfoundland, was a great Mecca for New Ross folk also.
Reference	The Schools' Collection, Vol. 0871, page 104
Source	Dúchas Archive [online]. Available at: https://www.duchas.ie/en/cbes/5009220/4999209

Townland	New Ross
School	Saint Leonards National School, Ballycullane
Collector / Informant	Mary B. Dunphy
Extract Detail	**The Benjamin Franklin** 40 years ago, the hull and riggings of this ship were bought by Mr Patsy Dooley Rosbercon and for bravo he steered it himself across the river from New Ross quay to the County Kilkenny side. There it stuck in the mud and remained till it rotted away. There is no trace of it now. It was a coal vessel trading to the coal ports on the Bristol Channel and commanded by the late Captain Kearns, a native of Arklow but married in Mary Street, New Ross.

Townland	New Ross
	The Dunbrody sailed from New Ross to America to various ports including Savanah in 1850–60. Its steering wheel is in the possession of the Williams family, New Ross, whose grandfather was its last commander.
Reference	The Schools' Collection, Vol. 0871, page 113
Source	Dúchas Archive [online]. Available at: https://www.duchas.ie/en/cbes/5009220/4999219

Townland	New Ross
School	Saint Leonards National School, Ballycullane
Collector / Informant	Mary B. Dunphy
Extract Detail	**Captain Williams – Master of the Lady Bagot, which traded from the Port of New Ross in the 1840s** The Log Book of the Lady Bagot The Williams family, New Ross, grandchildren of Captain Williams lent the writer the Log Book of the Lady Bagot, for the Collection of Folklore. From it can be inferred: 1. The Lady Bagot was trading from New Ross to Savannah in 1847. 2. It took eight weeks to cover the journey. 3. It stayed about seven weeks in the port of Savannah 4. One of the crew, Martin Moran was put in jail in Savannah for fighting a coloured man. 5. Members of the crew gave way to drunkenness in port. 6. The Captain had to go on shore to get them out of their 'scrapes'. 7. That the John Bell from New Ross passed up the river to Savannah as the "Lady Bagot" lay in the same harbour loading at 9 a.m. on January 24th 1848. 8. Martin Moran was the name of the sailor from the Lady Bagot who fought the coloured man in Savannah. 9. The cargo taken in at Savannah for New Ross seems to consist of timber, apples, molasses, sugar and rice. 10. The Lady Bagot left New Ross on the outward journey on Thursday 21st October, 1847. 11. Arrived at the Ballast Wharf, Savannah on Saturday 18th December, 1847. 12. Remained there until she left Savannah on the homeward journey, 14th of February 1848. Never did New Ross that fair ship see again. Terrific storms, seas and hurricanes set in her path. The crew seems to have had an awful time at the pumps – in the words of the log itself: "Lat. 46-2, Long. 22 – 2pm, awful squalls spilt the foresail…3pm a complete hurricane – sea making a fair sweep over the ship, washing water cocks, spars and ropes overboard. Shipped a sea in the larboard gangway and washed the cabin door in and filled the house so that the chairs and tables were all afloat. Shipped a sea in the starboard gangway and took the Master fore and aft and going out over the rail, when one of the men caught him by the hair of the head. Likewise, washed a dog overboard."
Reference	The Schools' Collection, Vol. 0871, pages 106–07
Source	Dúchas Archive [online]. Available at: https://www.duchas.ie/en/cbes/5009220/4999211

Townland	New Ross
School	Saint Leonards National School, Ballycullane
Collector / Informant	Mary B. Dunphy
Extract Detail	**Captains who Lived and Sailed from New Ross in the Olden Times** 1. Captain Williams & Captain Tidy. Both lived in Quay Street and had two daughters who married captains – Williams and Molley. 2. Captain Curran – lived in Irishtown. He built the house at present occupied by Whelan's. It is a public house. 3. Captain Savage – lived where Schelby Jeweller is now, on the Quay. He got a better ship and went to live in Liverpool from which port he traded. 4. Captain Culleton – lived in The Mangers after retiring. 5. Captain Black – who married Miss Molloy, Organist to the Augustinian Church. He sailed foreign from a foreign port.
Reference	The Schools' Collection, Vol. 0871, page 105
Source	Dúchas Archive [online]. Available at: https://www.duchas.ie/en/cbes/5009220/4999210

Townland	New Ross
School	Saint Leonards National School, Ballycullane
Collector / Informant	Mary B. Dunphy
Extract Detail	**The Little Steamship Ida** Before the railway extension from New Ross to Waterford the Ida formed the connecting link between the two towns. It was a tidy-sized little S.S. I do not know the tonnage. A comfortable quarter-deck and a cosy cabin were at the disposal of the passengers who took cabin tickets. There were also steerage rates for steerage passengers. The Ida left New Ross every morning for Waterford at 9.15 a.m. and generally arrived at the latter port at 11.15 a.m. There were two intermediate ports on the way: Piltown and the ferry of Ballinlaw.
Reference	The Schools' Collection, Vol. 0871, page 122
Source	Dúchas Archive [online]. Available at: https://www.duchas.ie/en/cbes/5009220/4999228

15. MATERIAL ASSETS AND LAND

15.1 Introduction

This section of the Planning Report assesses the potential impacts of the proposed development on material assets which include infrastructure and utilities such as rail, road, water supply, electricity, gas network, telecommunications, wastewater treatment facilities and surface water drainage infrastructure. Material assets also include economic assets, properties and land.

15.2 Methodology

This section will describe the receiving environment and determine the significance of the impact of the proposed development on:

- Land use and ownership – an examination of impacts on housing, severance, loss or rights of way or amenities, conflicts, or other changes likely to ultimately alter the character and use of the surroundings.
- Existing services and utilities.
- Transport infrastructure.

To complete this assessment, a baseline study of the existing material assets has been undertaken using desktop research. The Corine Land Cover map, Wexford County Development Plan 2022-2028 and New Ross Town and Environs Development Plan (as extended) were consulted during the desktop study. Additionally, Google Maps and a site layout plan of the existing area within and surrounding the proposed development have been consulted.

15.3 Baseline Environment

15.3.1 Land Use and Ownership

The proposed development encompasses the existing O'Hanrahan Bridge which carries traffic over the River Barrow in New Ross town. Corine 2018 Land Cover data was consulted to categorise the land use within, and in vicinity of, the proposed development. Aligning with the urban location of the proposed development, Corine land cover classifies the land use as 'artificial surfaces' with a 'discontinuous urban fabric' on the western banks of the River Barrow, and 'continuous urban fabric' on the eastern banks of the river.

The surrounding land uses are mainly industrial, commercial and low-density residential properties. The eastern side predominantly comprises a mix of historic buildings, commercial properties, and tourism sites. The western side comprises commercial, residential, and industrial properties.

The public roads on approach to O'Hanrahan Bridge are in the ownership of Wexford County Council. Sections of the in-stream permanent and temporary works areas for the proposed development are located within the foreshore.

Sites for the proposed temporary compound areas are in Wexford County Council's ownership, see Drawing No. WBRC-ROD-ENV-S101-DR-CB-30025 in Appendix A.

15.3.2 Transport Infrastructure

Road Infrastructure

Transport infrastructure and services are an important part of community infrastructure. New Ross Town is connected to surrounding regions through the

existing road network and bus services. The N25 National Road previously travelled through New Ross Town across O'Hanrahan Bridge acting as the main connection between Wexford and Waterford until the opening of the New Ross Bypass approximately 6.4km downstream of New Ross. Following the opening of the bypass, the N25 travelling through New Ross was reclassified to R723 Regional Road.

Public Transport

There are a number of bus stops in vicinity of the proposed development. The New Ross (The Quay) and New Ross (Supervalu) bus stops are located along the R723 Regional Road which runs in parallel to the River Barrow, approximately 110m and 167m south east of the proposed development respectively. Nine bus routes utilise these bus stops which serve the population regionally and locally. The Irishtown Northbound and Southbound bus stops are located approximately 725m east of the proposed development and are served by two bus routes at regional and local level. All of the bus stops are located on the east bank of the River Barrow in New Ross Town, however buses travelling from the western bank are routed through the O'Hanrahan Bridge to these bus stops.

There are no operational train stations in New Ross town. The existing out of service Waterford to New Ross railway line will be converted to the Kilkenny (South East) Greenway, the construction of which has commenced.

Active Travel

There are no dedicated cyclist facilities along O'Hanrahan Bridge, or on the approach Roads. The future Kilkenny (South East) Greenway will develop dedicated cyclist facilities on the approach to New Ross on the western banks of the River Barrow.

River Navigation

New Ross town has a long history as a busy inland port. New Ross has been part of some of Ireland's most historic events and had been at the centre of some of Ireland's bloodiest battles. Throughout the early part of the 13th century, New Ross was Ireland's main port and continued to be the busiest port for the duration of the century, even after the rights granted by Royal Charter were taken away in the late 13th century.

The use of the port gradually declined as ships got larger, since the river is too shallow to accommodate the passage of such ships. Throughout the decrease in the usage of the port, the town continued to be a popular market town, however, it suffered from recession during the 1970s until the 1990s. The port's shipping trade was also impacted in the late 19th century by the now decommissioned railway line. The railway is currently being transformed into a new Kilkenny (South East) Greenway that will serve as a link between the town of New Ross and Waterford City.

15.3.3 Existing Drainage

The current drainage system consists of gullies adjacent to the existing footway kerbs that discharge water directly into the River Barrow through outlet pipes cast into the soffit of the bridge deck.

15.3.4 Utilities

A significant number of utilities and services are present underneath the existing footpaths of O'Hanrahan Bridge which continue through the abutments and into the quays. These services were identified as part of a previous Ground investigation

contract undertaken in 2020. The following service providers were also consulted as part of the assessment:

- Open Eir.
- ESB.
- Wexford County Council Public Lighting.
- Irish Water.
- Aurora Telecom.
- Virgin Media.

The following utilities were identified within the proposed development boundary and are shown on Drawing no. WBRC-ROD-ENV-S101-DR-CB-30024 in Appendix A.

Electricity

The ESB distribution network comprises medium voltage (MV) (10kV / 20kV) and low voltage (LV) electricity lines which are managed by ESB networks area offices. These include:

- Existing MV underground lines along both sides of O'Hanrahan Bridge.
- Existing MV and public lighting underground lines along the quays at both Rosbercon and New Ross sides.

Gas Network

There are no gas distribution pipes identified within the vicinity of the proposed development.

Telecommunications

Eircom records indicate that there is existing underground infrastructure in the vicinity of the proposed development. The underground lines are located along both sides of the O'Hanrahan Bridge as well as at the quays on both sides of the River Barrow.

Virgin Media records indicate that there is existing overhead and underground Virgin Media (VM) infrastructure located in the vicinity of the proposed development. The underground VM cables are located western and eastern banks of the River Barrow. There are overhead VM cables and VM aerial cables located on the eastern side of the River Barrow, and VM fibre optics cables located along the western side of the river.

Water Supply

Records from surveys present that there is existing watermain infrastructure located within the vicinity of the proposed development. These include:

- 3 No. 150mm dia. water mains along the southern side of the bridge (not in use).
- 2 No. 150mm dia. water mains on the northern side of the bridge (in use).
- Existing watermain infrastructure on both sides of the River Barrow.

Foul Sewage / Wastewater

The Ground investigation contract 2020 identified that there is foul and combined drainage infrastructure within the vicinity of the proposed development, which include:

- An existing foul sewer suspended from the underside of the northern deck cantilever.
- A stormwater sewer along the northern side of the bridge that continues through the abutments and into the quays.

Other

At the southern (downstream) end where works for the proposed development are taking place, the following services have been identified:

- 3 No. 150mm dia. existing duct (1no. unknown function, 1no.street lighting duct and 1no. Aurora duct).

The following services have been identified on the northern (upstream) side of the bridge:

- 5 No. 80mm dia. existing ducts (unknown function).
- 3 No. 150mm dia. existing ducts (unknown function).
- 1 No. 200mm dia. pipe (unknown function).

15.4 Potential Impacts

15.4.1 Land Use and Ownership

The temporary and permanent footprint of the proposed development is located within areas of the foreshore. Wexford County Council hold a foreshore license for the current extents of O'Hanrahan Bridge. An application for Foreshore Lease consent will be made by Kildare County Council on behalf of of Wexford County Council to the Marine Planning and Foreshore Section of the Department of Housing, Local Government and Heritage for the temporary and permanent works area not included in the current foreshore license.

The proposed construction compound is located on lands within the ownership of Wexford County Council ownership.

Access will be maintained for all properties during the construction and operation phase of the proposed development. The existing private side entrance to the Riverside Apartment complex will be permanently removed. Currently, this entrance poses a risk for road users as it exits onto the main R723 Regional Road just before the main bridge itself. Residents of the apartment complex will continue to avail of the main entrance to the apartments and therefore, no significant effects on access is envisaged.

15.4.2 Transport Infrastructure

Construction Phase

The traffic impacts are assessed in detail in Section 6 Traffic and Transport in this Report. As discussed in Section 6, the delivery of construction materials will generate HGV movements along the haul route identified in Section 4 'Construction & Operation Phase' of the report. The delivery of construction material will generate some increase in average daily traffic, which will amount to an increase of less than 0.1% on the traffic flows on O'Hanrahan Bridge, and less than 0.5% of the baseline HGV traffic flows. Therefore, the potential effects on existing traffic flows from the proposed development are considered to be *temporary and imperceptible*.

The construction phase of the development will be broken up into at least four phases to facilitate movement of existing traffic. Each phase will require a lane

closure of approximately 100m in length. The remaining traffic lane in each phase will be used to maintain existing traffic under a one-way shuttle flow arrangement. The results of the traffic survey indicate that the proposed stop/go shuttle arrangement on straight sections of O'Hanrahan Bridge will operate well within capacity, and will not result in any significant negative impacts on the traffic flow.

The construction phase to widen the quay wall and bridge abutments at the eastern end of the bridge will involve temporarily signalling for the O'Hanrahan Bridge, The Quay, Quay Street and North Quay Junction. These works will take approximately 2 months to complete. A junction capacity analysis was undertaken to assess the predicted impacts of the signalised junction. Following the assessment, it is predicted that the Construction Traffic Management Plan at the eastern end of O'Hanrahan Bridge will have a *negative, moderate, temporary* effect on the capacity of the O'Hanrahan Bridge at construction phase.

Furthermore, the proposed main works traffic management plan was implemented during site investigation works undertaken in September/ October 2022. The temporary signalised traffic management system was found to work well and did not cause significant disruption to traffic flow approaching and passing the works area.

Operational Phase

The proposed development will provide a safe, comfortable, and attractive pedestrian and cycle link along O'Hanrahan Bridge which will connect New Ross to the future Kilkenny (South East) Greenway (under construction) along the western banks of the River Barrow. Hence, the proposed development is considered to have *significant positive* effects on active travel and on achieving the vision set out in the National Cycle Policy Framework. The proposed development will have no impact on vehicular traffic flows or congestion in the operational phase of the development.

15.4.3 Drainage

Construction Phase

The existing drainage system will be replaced as part of the proposed development. There is potential for *temporary negative* effects on the existing drainage system during the construction phase. However, any potential disruptions of these services will be kept to the minimum required and best practices will be implemented during construction works.

Operational Phase

It is proposed to replace the existing drainage system with a surface water drainage system of the bridge, that will follow the existing longitudinal profile of the deck. Transverse falls in the carriageway and footpaths/cycle paths will be provided to facilitate surface water drainage. Any runoff from the bridge will flow into an approved combined kerb/drainage unit which is provided at the interface of the carriageway and footpaths/cycleways and water from the drainage system will flow into gullies at the ends of the bridge. The proposed new drainage system will then tie into Wexford County Council's drainage network. There will be a p*ositive, slight and long-term* effect as a result of upgrade works to the drainage system.

15.4.4 Utilities

Impacts to utilities as a result of the construction and operation of the proposed development are discussed in sections below.

Electricity

Construction Phase

On the southern (downstream) end, the existing lighting duct shall remain in place and be protected throughout the works. The existing ESB cables along the bridge will be diverted to the opposite side during the construction phase and will be protected. There is potential for *brief, negative* effects on electricity infrastructure during the construction stage particularly during the localised diversion works. No significant temporary effects are predicted.

It is proposed to replace the existing lighting columns on the bridge. The proposed columns will be installed on reinforced concrete corbels which will protrude out from the new parapet edge beams. The lighting columns will be of a similar height and spacing to the existing, will utilise the existing lighting duct in the footpath and will provide a lighting intensity similar to what is already in place.

Operational Phase

No significant negative effects are predicted for ESB or public lighting for the operation phase of the proposed development.

Telecommunications

Construction Phase

On the southern (downstream) end, the existing Aurora duct shall remain in place and be protected throughout the works. There will be no impact on the existing Virgin Media infrastructure on the eastern and western banks. The VM fibre optic cable along the northern side of the bridge will be diverted to the southern end during the construction on that side.

Disruption to utilities may occur during the construction phase, however outages to facilitate diversion of these utilities will be kept to the minimum required and advance notice given to affected properties prior to any loss of service.

Operational Phase

No significant negative effects are predicted for telecommunications for the operation phase of the proposed development.

Water Supply

Construction Phase

On the northern (upstream) end, it is proposed to temporarily divert the 2 no. existing 150 mm diameter (dia.) watermains in use to the southern end whilst works are taking place on this end. The 3 no. existing 150mm dia. water mains on the southern side will be protected during the construction works. Disruption to utilities may occur during the construction phase, but outages to facilitate diversion of these utilities will be kept to the minimum, with advance notice given to affected properties prior to any loss of service. It is proposed to provide 2 no. new 100mm dia. HDPE watermains.

Operational Phase

No significant negative effects are predicted to water supply for the operation phase of the proposed development.

Foul Sewage / Wastewater

Construction Phase

The foul sewer suspended from the underside of the deck cantilever shall be unaffected during the edge beam reconstruction, and will be protected during the construction phase.

Operational Phase

No significant negative effects are predicted to foul sewage for the operation phase of the proposed development.

Other

Construction Phase

The remaining ducts (150mm dia. spare duct, 5 No. 80 mm dia. existing ducts and 1 No. 200mm dia. pipe) shall be protected throughout the works. Refer to the existing utilities Drawing no. WBRC-ROD-ENV-S101-DR-CB-30024 in Appendix A for further details.

Operational Phase

No significant negative effects are predicted to the existing ducts and services for the operation phase of the proposed development.

15.5 Mitigation Measures

15.5.1 Construction Stage

During construction, it will be ensured that all utilities will be repaired or replaced without unreasonable delay. Mitigation measures have been proposed for the construction of the proposed development as outlined below.

Prior to commencing construction works, the Contractor will be required to:

- Prepare a Construction and Environmental Management Plan (CEMP) and Construction Traffic Management Plan (CTMP) of which the contents of which must be approved in advance by Kildare County Council.
- Traffic Management will be put in place to ensure access to residential and commercial property is maintained during construction.
- Prepare an Incident Response Plan detailing the procedures to be undertaken in the event of a spill of chemical, fuel or other hazardous wastes, a fire, or non-compliance incident with any permit of license issues.
- Prepare a site plan showing the location of all surface water drainage lines and proposed discharge points to surface water. This will also include the location of all existing and proposed surface water protection measures, including best practice measures such as monitoring points, sediment traps, settling basins, interceptors etc.
- Existing roads to be kept open to facilitate access as far as practicable, with temporary diversions implemented where necessary to ensure access is maintained.
- Residents will be notified in advance of any disruption to utilities.

15.5.2 Operation Stage

During operation, there is no predicted impacts to material assets and therefore, no mitigation measures are necessary.

15.6 Residual Impacts

There are no significant residual impacts predicted.

16. MAJOR ACCIDENTS AND DISASTERS

16.1 Introduction

This section presents the information required to allow the Competent Authority (An Bord Pleanála) to complete an assessment of the proposed O'Hanrahan Bridge Widening works (the 'proposed development' hereafter) in terms of its potential to cause major accidents and disasters ('MADs' hereafter), and its vulnerability to the negative effects of same.

16.2 Methodology

Scope

In accordance with the Institute of Environmental Management and Assessment (IEMA) guidelines (IEMA, 2020), the MADs assessment considers whether the associated risks are mitigated to a level that is 'low as reasonably practicable'.

As recommended by IEMA (2018a), minor accident risks of relatively low consequence, e.g. localised flooding, have been scoped out of the assessment. Such events are addressed where appropriate, in the relevant specialist sections of this Part VIII Planning Report.

This section does not deal with the impacts of gradual trends associated with climate change, e.g. sea level rise or increasing annual rainfall volumes. It does, however, address sudden events whose frequency may be increased as a result of climate change related trends, e.g. extreme weather events.

The geographic scope of the assessment shall take in all external features which may present a hazard to the development, even if these are beyond the development boundary.

Definitions

This assessment is based on the following definitions of key concepts, which have been informed by the IEMA (2020), IPCC (2012) and UN/ISDR (2004) definitions, as well as the relevant sections of the EIA Directive.

Hazard

A potentially harmful, sudden event of natural, semi-natural or anthropogenic origin, including latent conditions which may pose future threats; and single, sequential or combined events.

Receptors

Annex IV, Point 5 (d) of the EIA Directive states that "*the risk to human health, cultural heritage or the environment*" [as a result of major accidents and disasters] should be considered. As such, humans, cultural heritage assets and the environment are considered potential receptors herein.

Vulnerability

The propensity of a receptor to be adversely affected by a hazard.

Major Accident/Disaster (MAD)

A hazard to which vulnerable receptors (i.e. humans, cultural heritage and / or the environment) are exposed, resulting in major negative impacts on one or more of

these, which requires the use of resources beyond those of the Applicant or its appointed representatives (i.e. Contractors) to manage.

Note: Some sources differentiate between 'accidents' and 'disasters' as different classes of hazards, e.g. anthropogenic versus natural in origin. This is not necessary for the purposes of this assessment and is not carried out herein.

Risk

Risk = *Hazards* x Vulnerability. It is the probability of negative impacts on human health and/or cultural heritage and/or the environment as a result of the interaction between a hazard and receptors.

Significant Environmental Effect

Effect which could include the loss of life, permanent injury and temporary or permanent destruction of an environmental receptor which cannot be restored through minor clean up or restoration.

As Low As Reasonably Practicable (ALARP)

ALARP describes the level of which we expect risks to be controlled, i.e. a tolerable level. Whether a risk is ALARP comes down qualitative, professional judgement.

General Methodology

According to IEMA guidelines (IEMA, 2020), this assessment will follow a three-stage methodology:

Stage 1 – Screening

The IEMA (2020) guidelines state that "*During screening it should be sufficient to identify if a development has a vulnerability to major accidents and/or disasters and to consider whether a development could lead to a significant effect"* (p.10). Questions to consider at this stage include the following (adapted from IEMA, 2020):

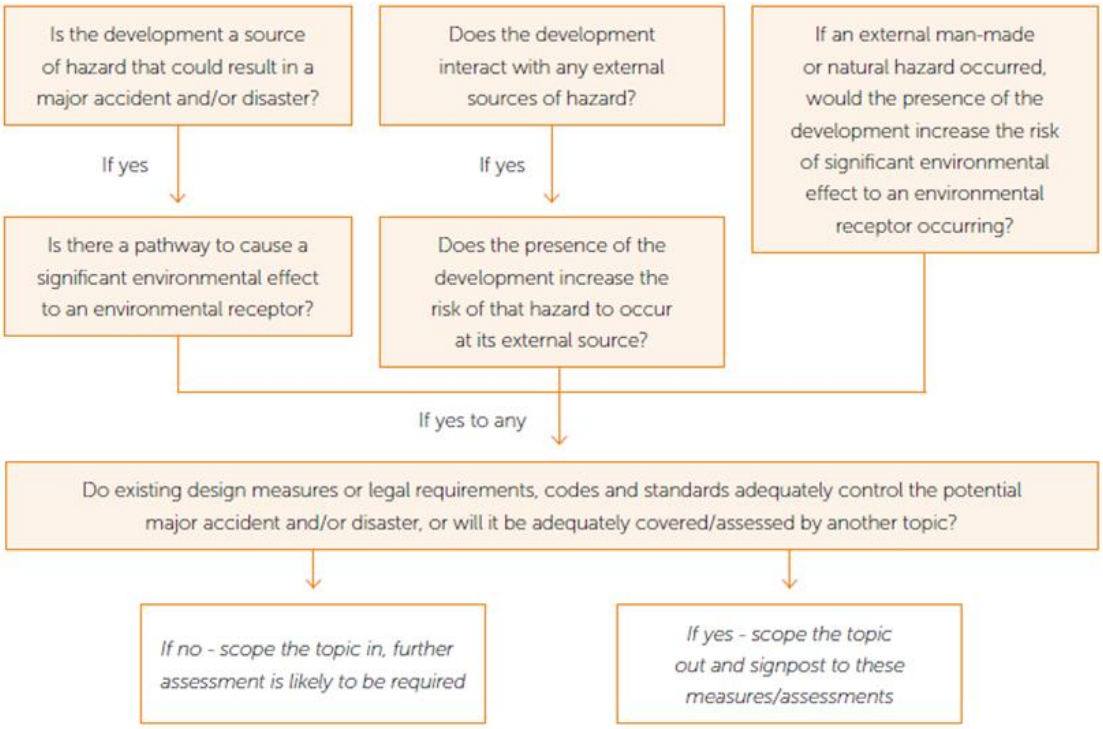
- Is the proposed development a source of hazard itself that could conceivably result in a major accident and/or disaster occurring?
- Does the proposed development interact with any sources of external hazards that may conceivably make it vulnerable to a major accident and/or disaster?
- If an external major accident and/or disaster occurred, would the existence of the proposed development conceivably increase the risk of a significant effect to an environmental receptor occurring?

Stage 2 – Scoping

If the proposed development is screened in for the assessment of impacts in relation to MADs at Stage 1, the scoping stage aims to determine i*n more detail* whether there is potential for significant effects as a result of MADs in relation to the proposed development.

At this stage, various hazard classes are considered in relation to the proposed development. The UK National Risk Register of Civil Emergencies (2017 Edition) has been used as a primary source to identify hazard classes herein. The baseline (i.e. receiving) environment is described insofar as is relevant to the hazard class in question.

IEMA provide a useful infographic illustrating the scoping decision process to aid at this stage.



It is stated that the assessment of impacts in relation to MADs can be scoped out if it can be demonstrated that:

- "*There is no source-pathway-receptor linkage of a hazard hat could trigger a major accident and/or disaster or potential for the scheme to lead to a significant environmental effect; or*
- *All possible major accidents and/or disasters are adequately covered elsewhere in the assessment of covered by existing design measures or compliance with legislation and best practice."* (IEMA, 2020; p. 12)

It is pointed out in the IEMA (2020) guidelines that 'A major accidents and/or disasters assessment will be relevant to some developments more than others, and for many developments it is likely to be scoped out of the assessment" (p.11)

Stage 3 – Assessment

If hazard class(es) are screened in at Stage 2, they are brought forward to Stage 3 for a detailed consideration of the potential for significant impacts to arise. At this stage, the following exercises are carried out (as per IEMA, 2020):

- The potentially affected receptors are identified with as much speciality as practicable. If no receptors can be identified, the hazard class in question is excluded from further consideration, since there is no valid source-pathway-receptor linkage.
- The reasonable worst-case impacts on the receptors are identified insofar as possible. This exercise is based on a qualitative, professional judgement. Uncertainty at this stage is to be acknowledged. Hazard classes which are not predicted to result in significant impacts under this reasonable worst-case scenario are excluded from further consideration.

16.3 Stage 1 - Screening

It is considered that the proposed development should screen in for the impact assessment in relation to MADs since, on the basis of a preliminary consideration of

the proposed development and receiving environment, it is *conceivable* (although highly unlikely) that:

- The proposed development could result in a MAD.
- The proposed development could interact with external sources of hazards that could conceivably make it vulnerable to a MAD.
- If an external MAD occurred, the proposed development could conceivably exacerbate the associated risk of significant impacts.

16.4 Stage 2 – Scoping

The scoping exercise is documented in Table 16-1.

Table 16-1 Major Accidents and Disasters Scoping

Class of Hazard	Reason(s) for Scoping Out	Scoped In/Out?
Flooding	The proposed development does not have the potential to cause such an event. The proposed development will replace the existing flood defence wall, providing the same level of flood protection, to prevent flooding on the R723 and the quays adjacent to the River Barrow. An OPW Section 50 report *"O'Hanrahan Bridge Office of Public Works Section 50 Application Report"*, prepared by Roughan and O'Donovan Consulting Engineers, dated January 2023, has been prepared for the proposed development based on the design characteristics presented in the drawings in Appendix A. The conclusions of that report state: - *"The proposed upgraded crossing will not have negative effect on flood levels locally and will not increase flood risk within the wider catchment comparing to existing crossing"*.	Out
Storm Surges	The proposed development does not have the potential to cause such an event. The proposed development is located approx. 29km upstream from the coastline.	Out
Gale force winds / tornado/ cyclone / hurricane / typhoon	The proposed development does not have the potential to cause such an event.	Out
Lightning strikes	The proposed development does not have the potential to cause such an event, nor is it likely to exacerbate such an event.	Out
Heatwaves	The proposed development does not have the potential to cause such an event, nor is it likely to exacerbate such an event.	Out
Drought	The proposed development does not have the potential to cause such an event, nor is it likely to exacerbate such an event.	Out
Extreme cold weather	The proposed development does not have the potential to cause such an event, nor is it likely to exacerbate such an event.	Out
Volcanic eruption	There is no volcanic activity in Ireland. Indirect impacts (i.e. tsunamis and disruption to air travel) are considered separately below. Subject discounted from further consideration herein. **Likelihood of significant impacts ALARP.**	Out
Earthquake	The proposed development does not have the potential to cause such an event. Seismic activity in and around Ireland is typically of low magnitude – although moderately damaging events of higher magnitude do occasionally occur. As stated by Blake (2006; p. 79), *"The most recent damaging earthquake in Ireland recorded by the DIAS network*	Out

Class of Hazard	Reason(s) for Scoping Out	Scoped In/Out?
	was on July 19th 1984. This was a deep crustal event of magnitude 5.4Ml whose epicentre was off the Lleyn Peninsula of NW Wales. This was felt widely in Britain and on the east coast of Ireland and caused some structural damage to houses on the east coast of Ireland." No account could be found of any damage of transport infrastructure as a result of a seismic event. The detailed design of the proposed development will be in accordance with the relevant design codes and standards in order to ensure structural integrity such that the level of risk associated with such an event will be mitigated to a tolerable level. **Likelihood of significant impacts ALARP.**	
Mass wasting	The proposed development does not have the potential to cause such an event. No significant volumes or soil / rock / debris on slopes in vicinity. Discounted from consideration herein. **Likelihood of significant impacts ALARP**.	Out
Sinkhole	The proposed development does not have the potential to cause such an event, nor is it likely to exacerbate such an event.	Out
Limnic eruption/venting	The proposed development does not have the potential to cause such an event, nor is it likely to exacerbate such an event.	Out
Tsunami	The proposed development does not have potential to cause such an event. Extreme wave events do occur in Ireland's marine and coastal waters, Accordingly, this class of hazard is discounted from further consideration herein. **Likelihood of significant impacts ALARP.**	Out
Major system / utilities / infrastructure failure	Construction works have the potential to result in damage to existing utilities infrastructure (e.g., watermains and electricity lines along the bridge) if improperly planned and managed for. For the proposed development, this risk has been addressed in Section 15 Material Assets and Land, and is not considered further herein. **Likelihood of significant impacts ALARP.**	Out
Major nuclear radiation event	The proposed development does not have the potential to cause such an event. It is not especially vulnerable to negative impacts as a result of elevated levels of background radiation. Nor is it likely to exacerbate such an event. **Discounted from further consideration herein. Likelihood of significant impacts ALARP.**	Out
Major disruption of air travel	The proposed development does not have the potential to cause such an event. It would not be affected negatively by a major disruption of air travel. Nor is it likely to exacerbate such an event. Discounted from further consideration herein.	Out
Major air pollution event	The proposed development does not have the potential to cause such an event. Emissions to Air during the construction and operation phases have been assessed in Section 12 Air Quality and Climate, and is not considered further herein.	Out
Major water pollution event	The risk to water quality has been assessed in Section 9 Hydrology and standard mitigation measures to be implemented during the construction phase have also been outlined in Section 9 Hydrology of this Planning Report. A CEMP is provided in Appendix B which includes measures for works in the vicinity of watercourses and sets out measures to be undertaken in response to any incidents. The **likelihood of significant impacts ALARP,** therefore, this is not considered further herein.	Out
Major explosion / fire	The proposed development does not have the potential to cause such an event, nor is it likely to exacerbate such an event.	Out

Class of Hazard	Reason(s) for Scoping Out	Scoped In/Out?
Wildfire	The proposed development does not have the potential to cause such an event, nor is it likely to exacerbate such an event.	Out
Infectious disease pandemic	The proposed development does not have the potential to cause such an event. It would not be affected negatively by such an event. Nor is it likely to exacerbate such an event. Discontinued from further consideration herein. Likelihood of significant impacts ALARP.	Out
Major traffic accident	The proposed development is designed in accordance with current TII Publication Standards. Therefore, the l**ikelihood of significant impacts ALARP,** and this is not considered further therein.	Out
Major industrial accident	The closest Seveso site, Green Biofuels Ireland Ltd, is located 1.6km south of the proposed development. Green Biofuels Ireland Ltd has been granted an Industrial Emissions Licence (P0829-01) by the Environmental Protection Agency. Condition 9 of this IEL requires that a documented Emergency Response Procedure is in place to address any emergency situations or accidents that may arise, therefore the **likelihood of significant impacts ALARP**.	Out
Building collapse	The proposed development does not include the provision of any buildings. The impact of vibration on nearby buildings during the construction phase have been assessed as part of Section 13 Noise and Vibration and are discounted herein.	Out
Major construction works-related accident	The CEMP included in Appendix B requires the contractor to ensure that construction workers are trained and sufficiently experienced. A suitability experienced and qualified contractor will be selected through the procurement process, with experience of undertaking works of a similar nature. Therefore, the l**ikelihood of significant impacts ALARP,** and this is not considered further therein.	Out
Major public disorder	The proposed development does not have the potential to cause such an event. It is not especially vulnerable to such an event or likely to exacerbate such an event. Discounted from further consideration herein. **Likelihood of significant impacts ALARP.**	Out
Physical attack	The proposed development does not have the potential to cause such an event. It is not especially vulnerable to such an event or likely to exacerbate such an event. Discounted from further consideration herein. **Likelihood of significant impacts ALARP.**	Out
Cyber attack	The proposed development does not have the potential to cause such an event. Nor is it likely to exacerbate such an event. **Likelihood of significant impacts ALARP.**	Out

16.5 Conclusion

As per the scoping exercise undertaken in Table 16-1, all MADs have scoped out and therefore there are no items brought forward to Stage 3. It is therefore concluded that as a result of the design of the proposed development and the mitigation measures outlined in this Planning Report, that the likelihood of significant impacts as a result of major accidents and disasters are as low as reasonably practicable.

16.6 References

Blake T (2006) Measuring Ireland's Earthquakes, The Dublin Institute for Advanced Studies Regional Seismic Network. *Extractive Industry Ireland*. P.79.

17. CUMULATIVE EFFECTS

17.1 Introduction

This section presents a preliminary consideration of likely significant impacts which may be expected to arise as a result of the combined effects of the proposed development and other, proposed or existing developments and plans. This assessment considered plans and developments within a 1km radius of the proposed development to determine whether cumulative effects are anticipated as a result the proposed development in combination with all reasonably foreseeable development. This cumulative assessment has considered cumulative impacts that are:

- Likely;
- Significant; and
- Relating to an event which has either occurred or is reasonably foreseeable together with the impacts from this development.

The following sources were consulted to inform this assessment:

- Proposed developments and developments that have been granted planning permission within the preceding five years in the immediate vicinity of the proposed development, as recorded in the Wexford County Council Planning Portal (checked on 22nd of March 2022).
- An Bord Pleanála Website.
- Wexford County Council Planning Search.
- Kilkenny County Council Planning Search.
- Projects listed on the EIA Portal.
- Wexford County Development Plan 2022-2028.
- New Ross Town and Environs Development Plan 2011-2017 (extended).

17.2 Cumulative Assessment of Plans and Projects

The cumulative assessment of the plans and projects with the proposed development is presented in Table 17.1.

Table 17.1 Cumulative Effects Assessment of the plans and projects with the proposed development

Existing Project/ Plan	Description of project/ plan	Cumulative Assessment
National Planning Framework to 2040 (NPF) & the National Development Plan 2021-2030	The NPF sets out a strategic plan to accommodate future growth and development of Ireland to the year 2040. The NPF is a framework to provide guidance to investors from public and private sectors in relation to development, to promote opportunities for the residents, as well as protecting and conserving the national environment. The NPF incorporates the policies and objectives of the National Development Plan 2018 – 2027 and has adapted from the pitfalls of the National Spatial Strategy 2002 – 2020. The ambition of the NPF is to create a single vision and a shared set of goals for every community across the country. These goals are expressed in the NPF as National Strategic Outcomes (NSOs), through the Strategic Investment Priorities (SIPs), and are supported by a range of National Policy Objectives (NPOs) within the NPF. By providing improved pedestrian and cycling infrastructure on O'Hanrahan Bridge, the proposed development is aligned with the principles and objectives of the National Planning Framework to 2040 namely NSO 1 Compact Growth, NSO 4 Sustainable Mobility, and NSO 7 Enhanced Amenity and Heritage.	Significant positive direct, indirect, cumulative effects are predicted to arise from the combination of this plan with the proposed development.
National Investment Framework for Transport in Ireland (NIFTI)	The Department of Transport in December 2021 adopted the National Investment Framework for Transport in Ireland (NIFTI), which seeks to prioritise future investment in the land transport network to support the delivery of the National Strategic Outcomes of the National Planning Framework (NPF). NIFTI contains a Modal Hierarchy and an Intervention Hierarchy. As per the Modal Hierarchy, developments which seeks to promote active travel are prioritised over public transport and private vehicles, while maintenance of existing assets is prioritised over optimising, improving or new construction in accordance with the Intervention Hierarchy. The proposed development will provide infrastructure for active modes of travel and is therefore at the top tier of the NIFTI Modal Hierarchy. The proposed development also had regard to the NIFTI Intervention Hierarchy and will improve the existing asset, O'Hanrahan Bridge by optimising and improving the existing structure.	Significant positive direct, indirect, cumulative effects are predicted to arise from the combination of this plan with the proposed development.
National Sustainable Mobility Policy	The National Sustainable Mobility Policy (NSMP) was published in April 2022 as a replacement to the Smarter Travel – A Sustainable Transport Future, considering the significant changes in legislation during the intervening period. The NSMP aligns with current policy, such as the NPF, NDP, Climate Action Plan, Road Safety Strategy 2021-2030 and National Investment Framework for Transport in Ireland (NIFTI) and its vision is *"to connect people and places with sustainable mobility that is safe, green, accessible and efficient"*. The O'Hanrahan Bridge Widening project supports a number of goals 1of the NSMP by providing enhanced pedestrian and cyclist infrastructure over O'Hanrahan Bridge. The proposed works are likely to promote active travel in New Ross, whilst also providing a connection to the future Kilkenny (the South East) Greenway.	Significant positive direct, indirect, cumulative effects are predicted to arise from the combination of this plan with the proposed development.

Existing Project/ Plan	Description of project/ plan	Cumulative Assessment
Climate Action Plan 2023	The Climate Action Plan 2023 (CAP23) sets out a roadmap of specific actions in various sectors including road transport. This plan is the first to be prepared under the Climate Action and Low Carbon Development (Amendment) Act 2021, which commits Ireland to a legally binding target of net-zero greenhouse gas emissions no later than 2050 and a reduction of 51 percent by 2030 (compared to 2018 levels) and is required to be reviewed and updated annually to ensure it is responsive. Under the Climate Act 2021, Ireland's national climate objective requires the State to pursue and achieve, by no later than the end of the year 2050, the transition to a climate-resilient, biodiversity rich, environmentally sustainable and climate-neutral economy. By providing enhanced pedestrian and cycling infrastructure along O'Hanrahan Bridge, the proposed development will contribute to increasing the daily sustainable travel journeys set out in the Climate Action Plan,	Significant positive direct, indirect, cumulative effects are predicted to arise from the combination of this plan with the proposed development.
Southern Region Regional Spatial and Economic Strategy (S-RSES)	The Regional Spatial and Economic Strategy for the Southern Region of Ireland (S-RSES) outlines how the policies and objectives from the National Planning Framework (NPF) and any other relevant Government policies and objectives will be implemented in the Southern Region. The S-RSES intends to implement these policies and objectives through economic and spatial strategies targeted specifically at the Southern Region. The provision of walking and cycling routes within urban centres and rural areas is targeted as they endorse a healthy lifestyle for the population and create an opportunity for attracting tourism to the area. Regional Policy Objectives (RPOs) within the S-RSES has been identified to promote the development of walking and cycling routes as well as Blueways, Greenways and Peatways in the region. The construction of the proposed development will support the listed RPOs by promoting walking and cycling activities in the area. It will also provide better connectivity between the future South East Greenway and New Ross which will further support the tourism sector.	Significant positive direct, indirect, cumulative effects are predicted to arise from the combination of this plan with the proposed development.

Existing Project/ Plan	Description of project/ plan	Cumulative Assessment
Wexford County Development Plan (2022-2028)	The Wexford County Development Plan 2022-2028 will be adopted by Wexford County Council which outlines the intentions for the future development of land, including measures for the improvement of the natural and physical environment and the provision of infrastructure. The Plan builds on the strategies, policies and objectives of the previous County Development Plan 2013-2019. The core strategies of the plan include: • To support and develop our town and villages and rural heritage sites for tourism purposes through the facilitation of links by public transport. • To plan for the appropriate development of all aspects of the transport network for all modes and to ensure that the design and investment decisions prioritise sustainable transport modes. • To encourage walking and cycling by all sections of the community through: o Promoting walking and cycling as sustainable transport modes and healthy recreation activities throughout the County; o Promoting cycling and pedestrian friendly development layouts, provide facilities at public transport nodes, towns and villages, plan for and make provision for the integration of cyclist and pedestrian needs when considering new development proposals; o Promoting cycling and walking facilities as integral to the provision of vehicular traffic facilities; o Supporting the installation of infrastructure measures (for example new/wider pavements, road crossings and cycle parking facilities), retrofitted if necessary, which facilitates and encourages safe walking and cycling; • To promote sustainable outdoor recreation in the form of walking and cycling and exploit the recreational and tourist potential of walking and cycling routes in the County whilst ensuring the protection of the environment.	Significant positive direct, indirect, cumulative effects are predicted to arise from the combination of this plan with the proposed development.

Existing Project/ Plan	Description of project/ plan	Cumulative Assessment
New Ross Town and Environs Development Plan 2011-2017 (as extended)	The New Ross Town and Environs Development Plan 2011-2017 (as extended) was adopted by New Ross Town Council in order to develop and improve in a sustainable manner the social, economic, cultural and environmental assets of the town and environs. The plan's objectives are as follows: • Develop a pedestrian and cycle friendly environment which will achieve a reduction in CO2 emissions. • Encourage a modal shift from private modes of transport to cycling and walking. • To provide for and encourage high levels of access and good quality pedestrian facilities to connect neighbourhood centres to their surrounding neighbourshoods. Facilities for cycling shall also be provided. • To improve cycling facilities in the town to enable New Ross to be linked to the National Cycle Network. • To improve the attractiveness of the riverside area in accordance with the New Ross Urban Design Waterfront Study 2006 and to carry out other environmental improvements to the town centre The New Ross Urban Design Waterfront Study 2006 seeks to develop a woodland walk in this area which would be connected to the town centre by a linear walkway/boardwalk along the riverfront. • To facilitate the continued enhancement of the quayside and riverfront areas in accordance with the New Ross Urban Design Waterfront Study 2006 adopted by New Ross Town Council, subject to the findings of an Appropriate Assessment in compliance with Article 6 of the Habitats Directive, where appropriate.	Significant positive direct, indirect, cumulative effects are predicted to arise from the combination of this plan with the proposed development.
South East Greenway, New Ross to Waterford (Planning Refs: 19928 **Distance: 0m from the proposed development**	The South East Greenway is being jointly developed by Kilkenny County Council, Wexford County Council and Waterford City and County Council. The greenway will run for 24km from the Quays in Waterford to the banks of River Barrow in New Ross, ending in Rosbercon. The development is currently under construction and is projected to be completed in Autumn 2023. The proposed development proposes widening of O'Hanrahsn Bridge to provide pedestrian and cyclist connection to and from the South East Greenway across the River Barrow. A Part 8 report, Environmental Impact Assessment Screening report, Appropriate Assessment Screening report, and a Ecological Impact Assessment (EcIA) have been developed for this project. The EIA Screening Report concluded that '*Under Section 50 (1) (c) of the Roads Act, 1993 Kilkenny County Council considers that the proposed Greenway development does not have potential to have significant effects on the environment for those reasons listed in the previous sections and, as such, it is not recommended that an EIS is required*.' The construction phase for the South East Greenway has commenced. The site for the construction compound for the South East Greenway project and the proposed development is at the same location. If the construction phases of both projects overlap, arrangements will be made to ensure both projects can effectively use this construction compound.	Should the construction phases of these developments overlap or occur sequentially, there is potential for impacts on traffic due to the increase of HGVs on the road network. Due to the scale and nature of both projects, and the implementation of the Construction Traffic Management Plan (CTMP), it is not likely that there will be any significant cumulative effects in combination with the proposed development during construction. Both projects will provide sustainable travel facilities in New Ross town. Positive direct, indirect, cumulative effects are predicted to arise from the combination of this project with the proposed development during operation phase.

Existing Project/ Plan	Description of project/ plan	Cumulative Assessment
Shielbaggan OETC, Ramsgrange, New Ross **(WCC Planning Ref: 20191427)** **Distance: 160m north west of the proposed development**	Planning permission was granted for the project on 29/11/2019 with 4 no. conditions. The development will involve demolition of the existing boat club and construction of a new 2 storey boat club (70 sq. m.). The boat club will comprise boat storage, changing rooms, plant room, kitchen and ancillary accommodation. Additionally, the development includes parking and alterations to existing road junction, as well as a 28m diameter roundabout adjacent to the building. The Planner Report identified that an Appropriate Assessment Screening accompanied the Planning Application. The screening exersise concluded that '*the development would not have a significant effect either individually or in combination with other plans or projects on the conservation objectives of the River Barrow and River Nore SAC.'*	No significant negative effects predicted to arise from the combination of this project with the proposed development.
Five-storey development (WCC Planning Ref: 20190473) **Distance: 35m west from the proposed development**	Planning permission was granted on 23/05/2019 for a development comprising the erection of a five-storey development comprising 97 apartments and ancillary accommodation in 4 blocks, shop units, takeaway restaurant, an office and a 125-space car park. The floor area of the new development is 28 sq. m. This development is located on the Rosbercon side of the River Barrow by the Rosbercon Quay.	No significant negative effects predicted to arise from the combination of this project with the proposed development.
Mountelliot Greenway (WCC Planning Ref: LAC1611) **Distance: adjacent to the proposed development**	The development of the disused railway line, railway bridge and railway tunnel extending from Rosbercon, New Ross to Mountelliot as a cycle and pedestrian route. The route will form part of the planned National Greenway network link, connecting Waterford, Wexford, Kilkenny and Carlow to Dublin and beyond. This section also forms part of the looped walk returning to New Ross along the Craywell road/footpath. O'Hanrahan Bridge forms part of the greenway route across the River Barrow. The works will include the following: the clearance of vegetation on the rail line corridor, retaining boundary hedgerows and boundary vegetation; the laying of a 3 metre wide bituminous surface on a crushed stone base to form the cycle and footpath track; repair and upgrade of existing drains; the upgrade and repair of existing bridges so as to accommodate the cycle/pedestrian route; the installation of barriers for the safety of greenway users; stock proof fencing where required; provision of agricultural crossings and security fencing; screen fencing and/or screen planting. An Appropriate Assessment Screening Report accompanied the Planning Application. The report specified a number of conditions following the screening. It was concluded that '*subject to the set out conditions, the project is is not likely to have a significant effect on any of the qualifying interests, structure, function, integrity, conservation objectives or long-term survival of the Natura 2000 site'.* The report also determined that subject to the set out conditions, '*no part of the Natura 2000 site will be fundamentally and irreversibly compromised as a result of the advancement of the project*.'	Direct, long-term positive effects are predicted to arise from the combination of this plan and the proposed development.

Existing Project/ Plan	Description of project/ plan	Cumulative Assessment
Eddie Mernagh and Pierce Handrick T/A Hanmer Properties (WCC Planning Ref: 20191332) **Distance: 780m east of the Proposed Development**	The development comprises construction of seven ground floor mixed use commercial units, three facing Bosheen road, one large three sided pizza restaurant and take away end unit and three units facing the rear parking area, along with eight terraced dwellings above, along side two number, two storey office/mixed use commercial units. This is, overall, a three storey proposal, all with a landscaped open space terrace between same. Includes all associated site works, external tables and chairs, awnings, waste yards and parking at Verosland, Bosheen Road, New Ross, Co. Wexford.	No significant negative effects predicted to arise from the combination of this project with the proposed development.
Renewal works to 38kV overhead line, New Ross (KCC Planning Ref: 15825) **Distance: 520m north of the Proposed Development**	Conditional permission was granted on 31/03/2016 for renewal works to the existing 38kV overhead line spanning the River Barrow to the north of O'Hanrahan Bridge in New Ross, County Wexford. The overhead line runs through the townlands of Rosbercon and Annefield on the west bank of the river and the townlands of Craywell, Ardross and Castlemoyle on the east bank of the river. On the west bank it is proposed to replace two steel towers with one steel tower and one double wooden poleset both of lower height than the existing structures and to replace an existing double wooden poleset with a new double wooden poleset of the same dimensions. On the east bank of the river, it is proposed to replace the existing steel tower with a smaller steel tower and to replace an existing double wooden poleset with a new triple wooden poleset of similar dimensions. It is also proposed to underground the existing overhead line between these two structures by drilling under Mountgarrett Road and running a cable underground between these structures. In total five structures will be replaced as part of the proposed works. The overhead line falls within the administrative areas of County Kilkenny and County Wexford. An Appropriate Assessment Screening Report has been submitted as part of the application. The report concluded that *'no significant impacts on any Natura 2000 site will occur in respect of the development and that a Stage 2 Appropriate Assessment is not required in this instance.'*	No significant negative effects predicted to arise from the combination of this project with the proposed development.
Albatross Limited, New Ross (KCC Planning Ref: 17788) **Distance: 860m south west of the Proposed Development**	Conditional permission was granted on 26/03/2018 to demolish all buildings on the Albatross factory site. Building materials will be segregated and steel frames will be removed from site and recycled. Concrete materials will be crushed and retained on site. The Planners Report identified that a Screening excersise was completed for this project and it was concluded that '*no significant environmental impact is likely having regard to the distance of the subject site from any Natura 2000 site*.'	No significant negative effects predicted to arise from the combination of this project with the proposed development.

Existing Project/ Plan	Description of project/ plan	Cumulative Assessment
Pallas Foods Unlimited Company (KCC Planning Ref: 21357) **Distance: 935m south west of the Proposed Development**	Conditional permission was granted on 18/10/2021 for (i) proposed change of use of part of the existing site from truck parking (which was granted permission under Planning reg no 94311) to form a Cold Storage Depot, Hard Standing and yard area together with all associated site works and ancillary services, (ii) the proposed installlation of a ESB Substation with Switch Room on site, (iii) the propsed demolition of an existing building on site and (iv) the proposed relocation of the existing Truck Wash Bay area on site. The Planners Report identified that a Screening excersise was completed as part of the planning application, which concluded that '*no significant environmental impact is likely having regard to the development proposed and distance of the subject site from any Natura 2000 site*.' It was concluded that a Natura Impact Statement is not required for the project.	No significant negative effects predicted to arise from the combination of this project with the proposed development.
St Joseph's Athletics Club, New Ross, Co. Kilkenny (KCC Planning Ref: 21123) **Distance: 1km south west of the Proposed Development**	Conditional permission was granted on 14/12/2021 for development to construct a walking track to perimeter of the grounds with associated street lighting and floodlighting to existing pitches. The project also comprises retention of existing floodlighting with replacement to LED light fittings, and 3 no. storage containers, as well as retention of roadside signpost and placing of new advertisement.	No significant negative effects predicted to arise from the combination of this project with the proposed development.

17.3 Conclusion

Plans and projects within a 1km radius of the proposed development have been assessed to determine whether cumulative effects are anticipated as a result the proposed development in combination with all reasonably foreseeable development.

It is not anticipated that the above plans and projects will result in significant cumulative effects during the construction or operation phases. It is anticipated that once built, the proposed development will have positive impacts on developments planned within the New Ross Town, through improved access and connectivity.

No further mitigation measures are therefore proposed as a result of this assessment.

18. CONCLUSION

This Planning Report and supporting drawings provides a description of the nature and extent of the proposed O'Hanrahan Bridge Widening Project. It has considered and assessed the likely significant environmental effects of the proposed development.

The environmental considerations have included assessing likely impacts on a range of environmental topics including traffic and transport; population and human health; biodiversity; soils, geology and hydrogeology; hydrology; landscape and visual; noise and vibration; air quality and climate; cultural heritage; and material assets and land. The likely environmental effects and recommended mitigation measures are detailed at the end of each environmental factor addressed in Sections 6 to 17 of this Report.

The Contractor will be required to demonstrate how they address the likely environmental effects and will be required to include mitigation measures herein, and within the Construction Environmental Management Plan, which will be agreed with Kildare County Council prior to the works commencing.

This assessment found that there are no likely significant adverse environmental effects as a result of the proposed development.

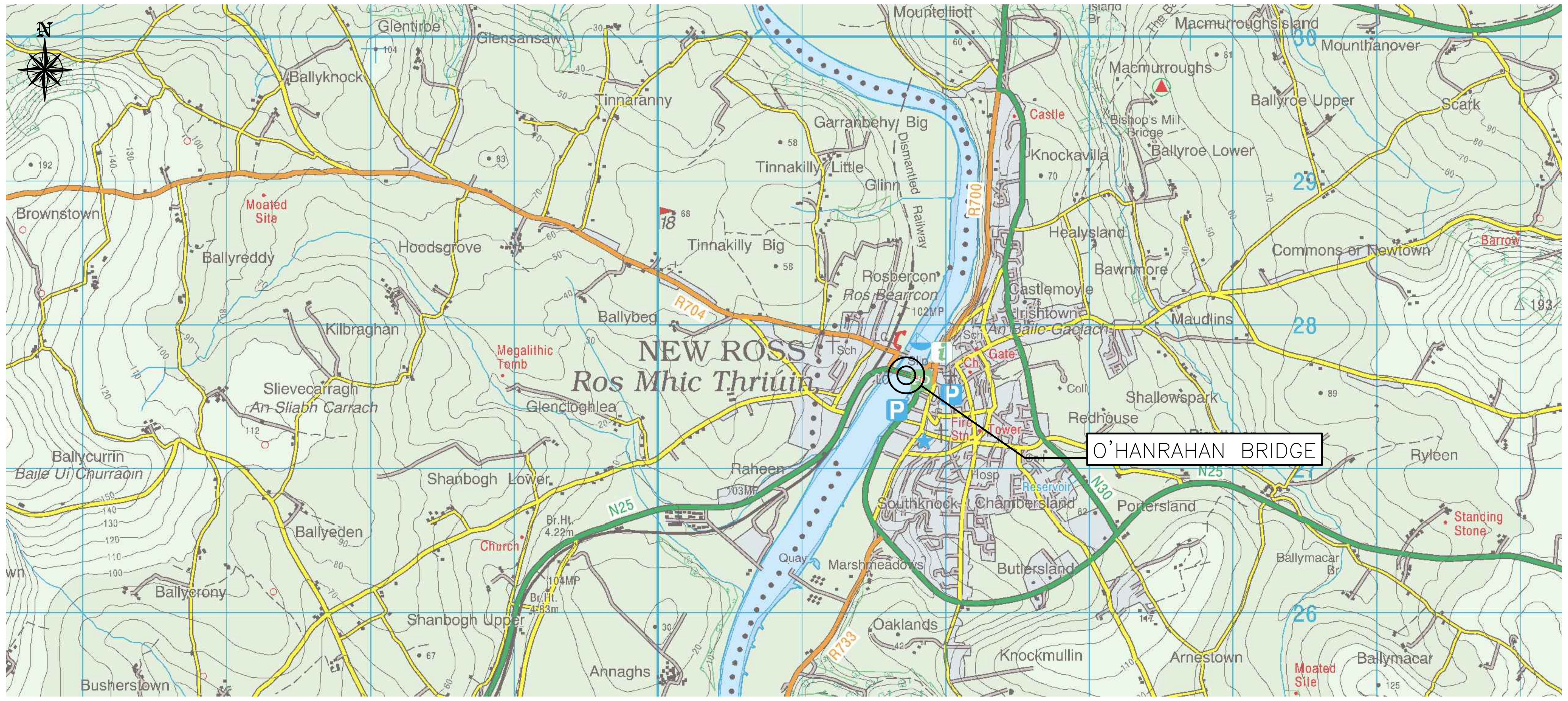
Appendix A
Development Drawings

Appendix A

O'Hanrahan Bridge Widening
Planning Report – Appendix A

Drawing Index

Drawing Number	Drawing Title
WBRC-ROD-ENV-S101-DR-CB-30001	Location Plan of Proposed Development
WBRC-ROD-ENV-S101-DR-CB-30002	O'Hanrahan Bridge Southeast Corner - Option 1 Plan and Cross Section
WBRC-ROD-ENV-S101-DR-CB-30003	O'Hanrahan Bridge Southeast Corner - Option 2 Plan and Cross Section
WBRC-ROD-ENV-S101-DR-CB-30004	O'Hanrahan Bridge Southeast Corner - Option 3 Plan and Cross Section
WBRC-ROD-ENV-S101-DR-CB-30005	O'Hanrahan Bridge Widening Southwest Corner - Option 1 Plan and Cross Section
WBRC-ROD-ENV-S101-DR-CB-30006	O'Hanrahan Bridge Widening Southwest Corner - Option 2 Plan and Cross Section
WBRC-ROD-ENV-S101-DR-CB-30007	Proposed O'Hanrahan Bridge Plan & Elevation Sheet 01 of 02
WBRC-ROD-ENV-S101-DR-CB-30008	Proposed O'Hanrahan Bridge Plan & Elevation Sheet 02 of 02
WBRC-ROD-ENV-S101-DR-CB-30009	Proposed O'Hanrahan Bridge Road Cross Sections
WBRC-ROD-ENV-S101-DR-CB-30010	Proposed O'Hanrahan Bridge Deck Cross Sections
WBRC-ROD-ENV-S101-DR-CB-30011	Proposed Lighting Corbel Design
WBRC-ROD-ENV-S101-DR-CB-30012	Geotechnical Investigation Locations
WBRC-ROD-ENV-S101-DR-CB-30013	Remedial Works to Eastern Approach Quay Wall
WBRC-ROD-ENV-S101-DR-CB-30014	Remedial Works to Western Approach Quay Wall
WBRC-ROD-ENV-S101-DR-CB-30015	Proposed Bridge Parapets
WBRC-ROD-ENV-S101-DR-CB-30016	Location of Temporary Construction Compound Area
WBRC-ROD-ENV-S101-DR-CB-30017	Temporary Traffic Management Plan Stage 1 of 5
WBRC-ROD-ENV-S101-DR-CB-30018	Temporary Traffic Management Plan Stage 2 of 5
WBRC-ROD-ENV-S101-DR-CB-30019	Temporary Traffic Management Plan Stage 3 of 5
WBRC-ROD-ENV-S101-DR-CB-30020	Temporary Traffic Management Plan Stage 4 of 5
WBRC-ROD-ENV-S101-DR-CB-30021	Temporary Traffic Management Plan Stage 5 of 5
WBRC-ROD-ENV-S101-DR-CB-30022	Zone of Influence
WBRC-ROD-ENV-S101-DR-CB-30023	Habitat Mapping
WBRC-ROD-ENV-S101-DR-CB-30024	Existing Utilities
WBRC-ROD-ENV-S101-DR-CB-30025	Landownership



SITE LOCATION PLAN

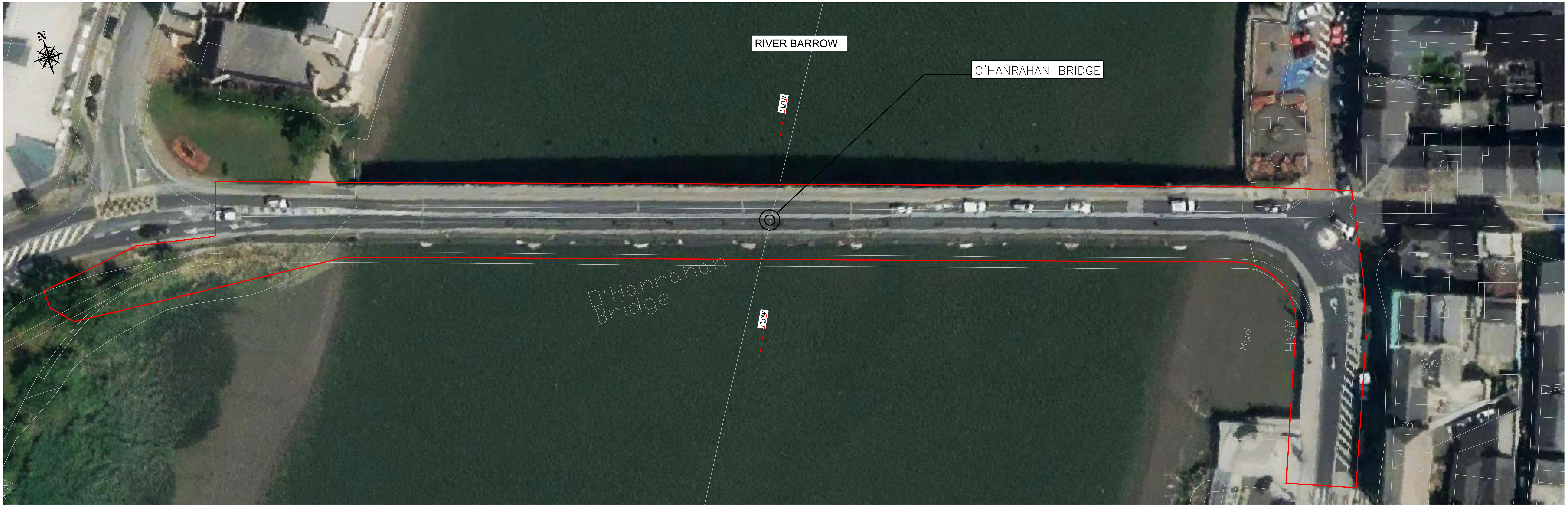
A1 SCALE 1:25,000
A3 SCALE 1:50,000

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
2. ALL LEVELS ARE IN METRES ABOVE ORDNANCE DATUM AT MALIN HEAD.
3. ALL CO-ORDINATES ARE TO IRISH TRANSVERSE MERCATOR.
4. EXTENT OF SITE AREA PROVIDED BY THE EMPLOYER EXCLUDES AREA WHICH MAY BE TEMPORARY OCCUPIED SUBJECT TO TRAFFIC SAFETY AND MANAGEMENT AND DIVERSIONS.
5. THE CONTRACTOR IS REQUIRED TO PROVIDE ACCESS THROUGH THE EXTENT OF SITE AND AREA PROVIDED BY THE EMPLOYER IN ACCORDANCE WITH THE SPECIFICATION.
6. THE EXISTING POSITION AND LEVEL OF SERVICES SHOWN TO BE DETERMINED BY THE CONTRACTOR. THE CONTRACTOR SHALL PROVIDE PROTECTION TO EXISTING SERVICES

LEGEND:

DEVELOPMENT BOUNDARY



SITE LAYOUT

A1 SCALE 1:400
A3 SCALE 1:800

Comhairle Contae Loch Garman
Wexford County Council

KILDARE nro NATIONAL ROADS OFFICE

No.	Revision	Date	By	Chk'd	App'd

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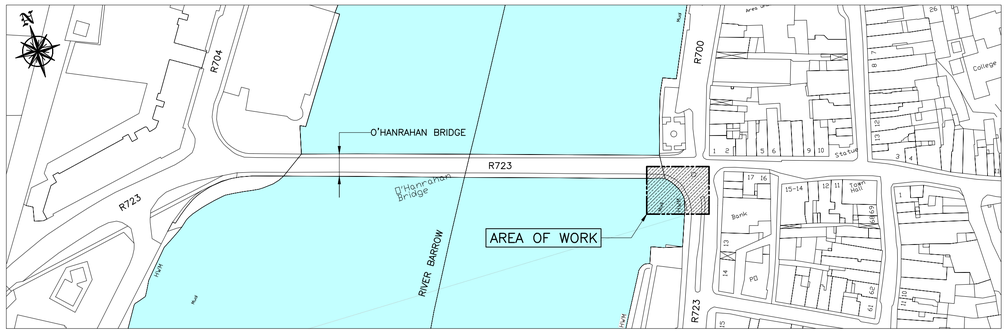
Drawn	Designed	Checked	Approved	Suitability Code - Description
ZZX	CH	MR	JK	S4 - Stage Approval

Project Stage	Preliminary
Project Title	O'Hanrahan Bridge Widening Project
Drawing Title	Location Plan of Proposed Development
Drawing Number	Project WBRC - Originator ROD - Volume ENV - Location S101 - Type DR - Role CB - Number 30001
Scale (A1)	As Shown
Date:	MAY 2022
Job No:	21.143
Rev:	P0

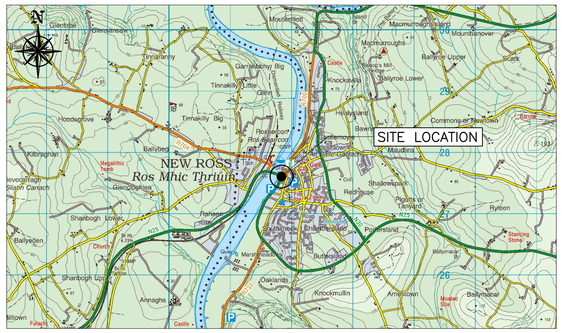
DO NOT SCALE USE FIGURED DIMENSIONS ONLY

24 October 2022 15:50:50 J:\2021\21143\21143-02_WIP\08 MODELS\01 CAD\01 DWG\01 STG 1 - PRELIMINARY\ENVIORNMENTAL DRAWINGS\WBRC-ROD-ENV-S101-DR-CB-30001.DWG



KEYPLAN

A1 SCALE 1:1500
A3 SCALE 1:3000

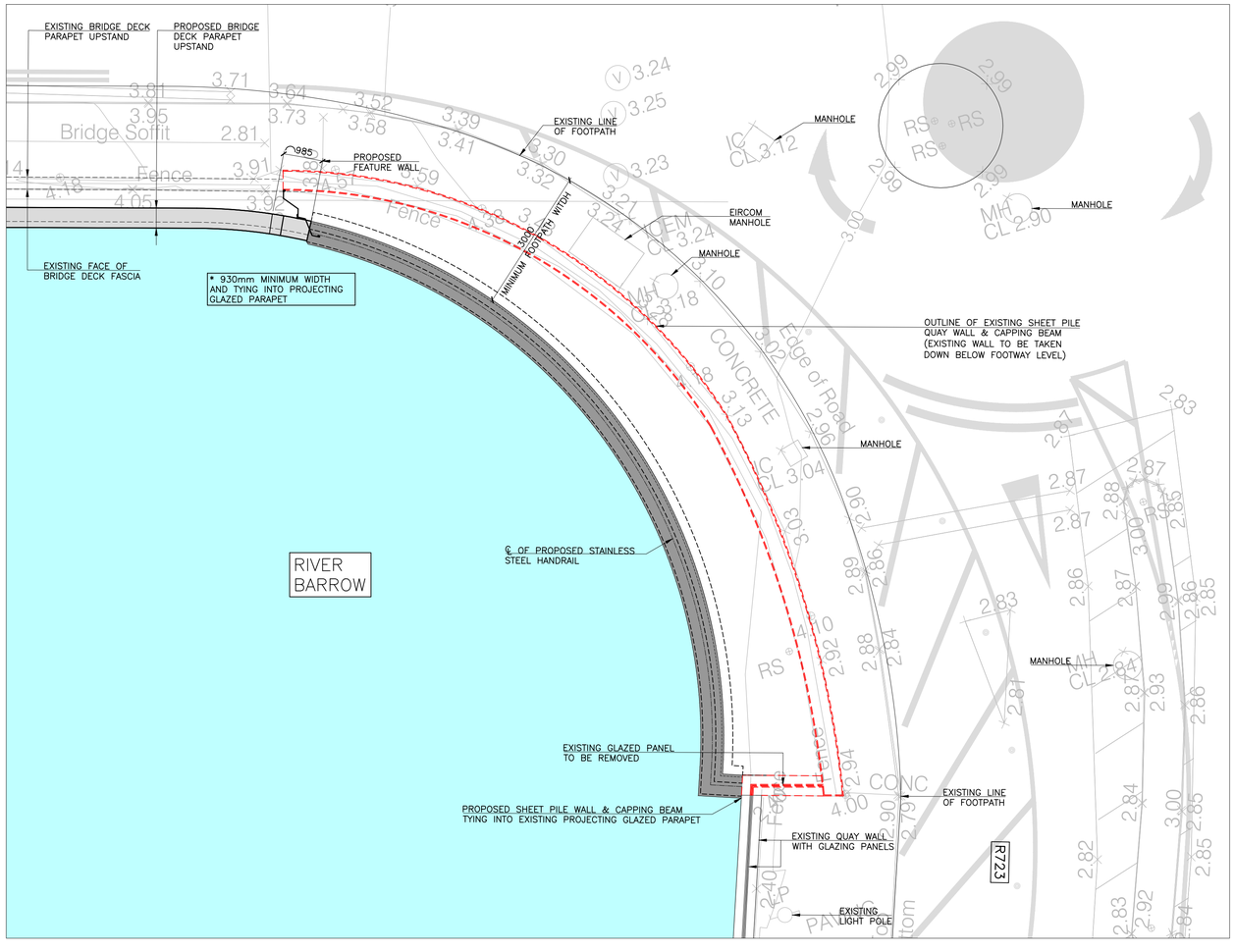


SITE LOCATION

A1 SCALE 1:50000
A3 SCALE 1:100000

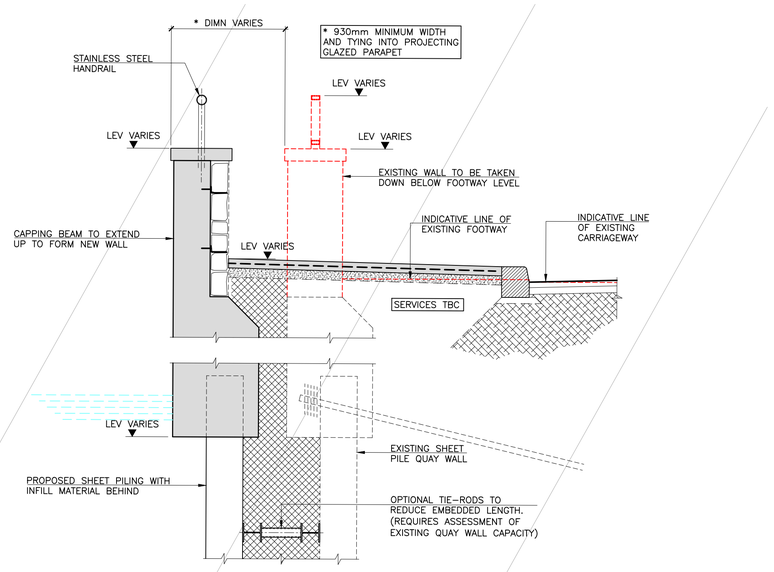
NOTES:

1. ALL DIMENSIONS IN MILLIMETERS, UNLESS OTHERWISE NOTED.
2. ALL LEVELS ARE IN METRES TO ORDNANCE DATUM MALIN HEAD.
3. ALL CO-ORDINATES ARE IN METRES TO IRISH TRANSVERSE MERCATOR (ITM).



(OPTION 1) PART PLAN – BRIDGE WIDENING & REMEDIAL WORKS TO QUAY WALL

A1 SCALE 1:75
A3 SCALE 1:150



TYPICAL SOUTHEAST QUAY WALL CROSS SECTION

A1 SCALE 1:25
A3 SCALE 1:50

Comhairle Contae Loch Garman
Wexford County Council

Mianna agus Misneach

KILDARE nro NATIONAL ROADS OFFICE

No.	Revision	Date	By	Chk'd	App'd

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Arena House, Arena Road, Sandyford, Dublin 18, Ireland
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www.rod.ie

Drawn	Designed	Checked	Approved	Suitability Code - Description
OB	CH	MR	JK	S4 - Stage Approval

Project Stage	PRELIMINARY
Project Title	O'Hanrahan Bridge Widening Project
Drawing Title	O'Hanrahan Bridge Southeast Corner - Option 1 Plan and Cross Section
Drawing Number	Project | Originator | Volume | Location | Type | Role | Number: WBRC - ROD - ENV - S101 - DR - CB - 30002
Scale (A1)	as shown
Date:	MAY 2022
Job No:	19.145
Rev:	P0

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DO NOT SCALE USE FIGURED DIMENSIONS ONLY

NOTES:

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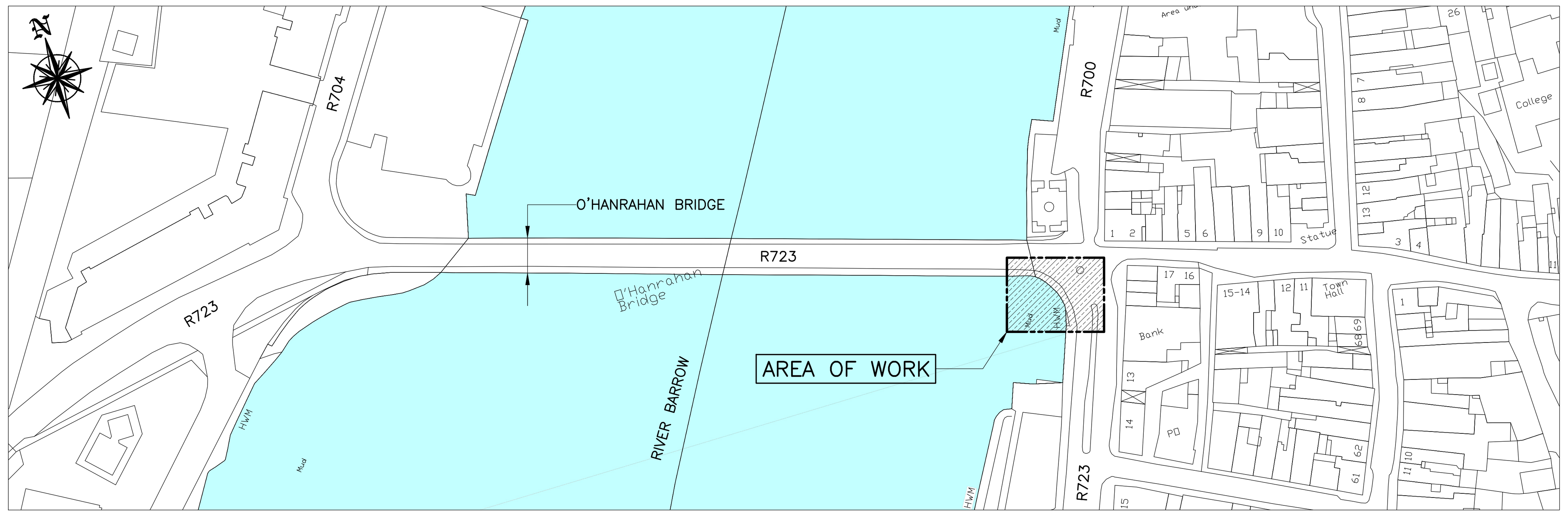
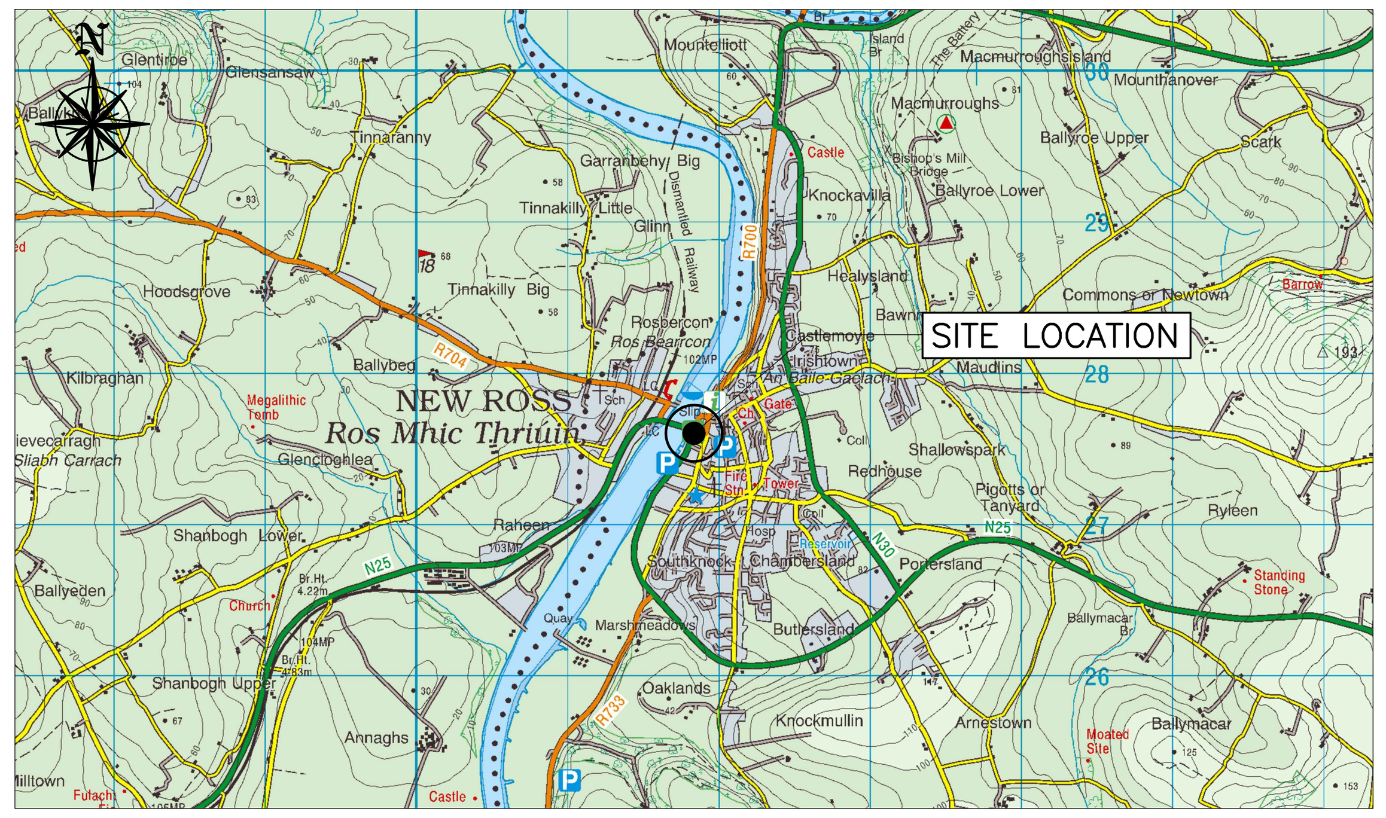


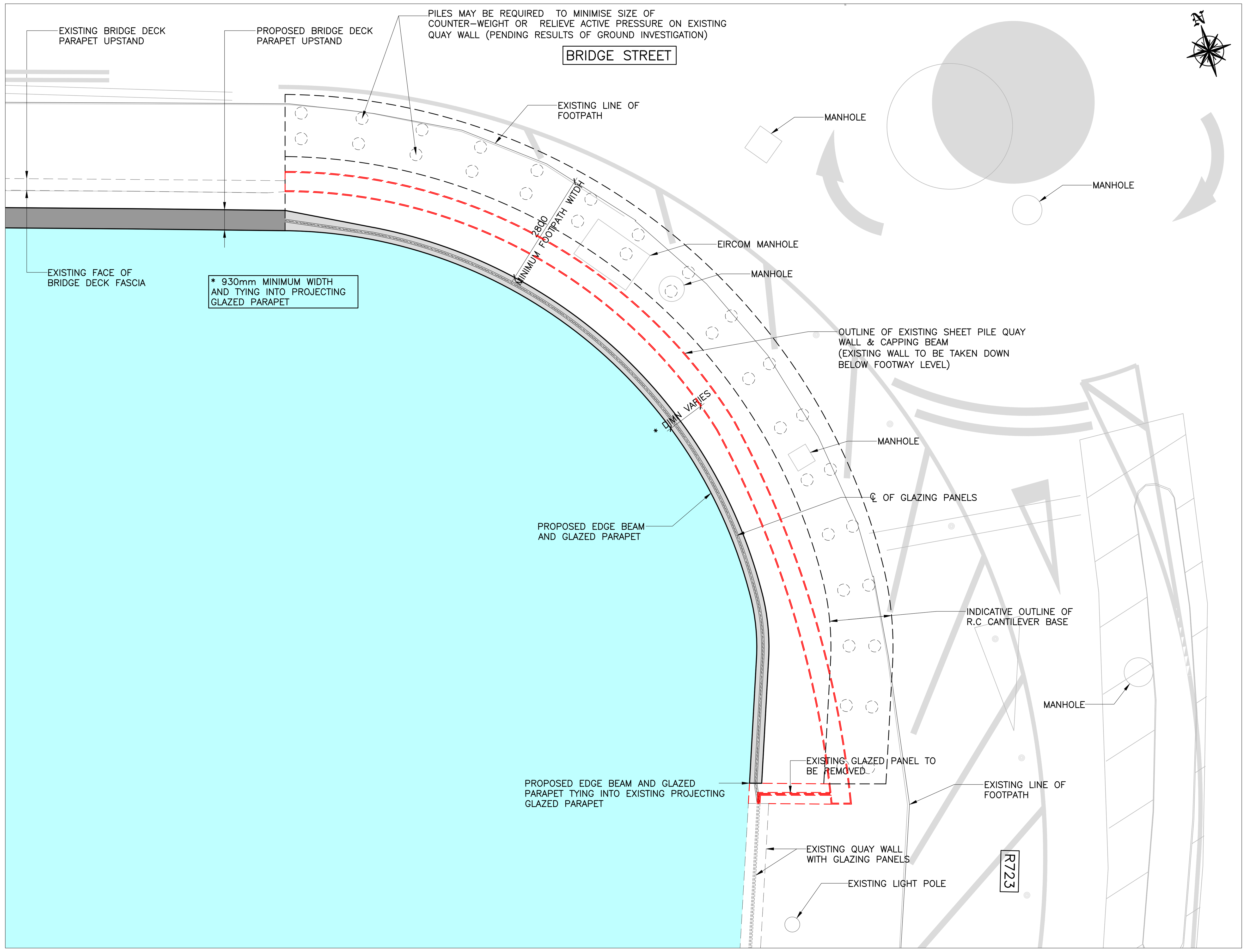
KEYPLAN

A1 SCALE 1:1500
A3 SCALE 1:3000



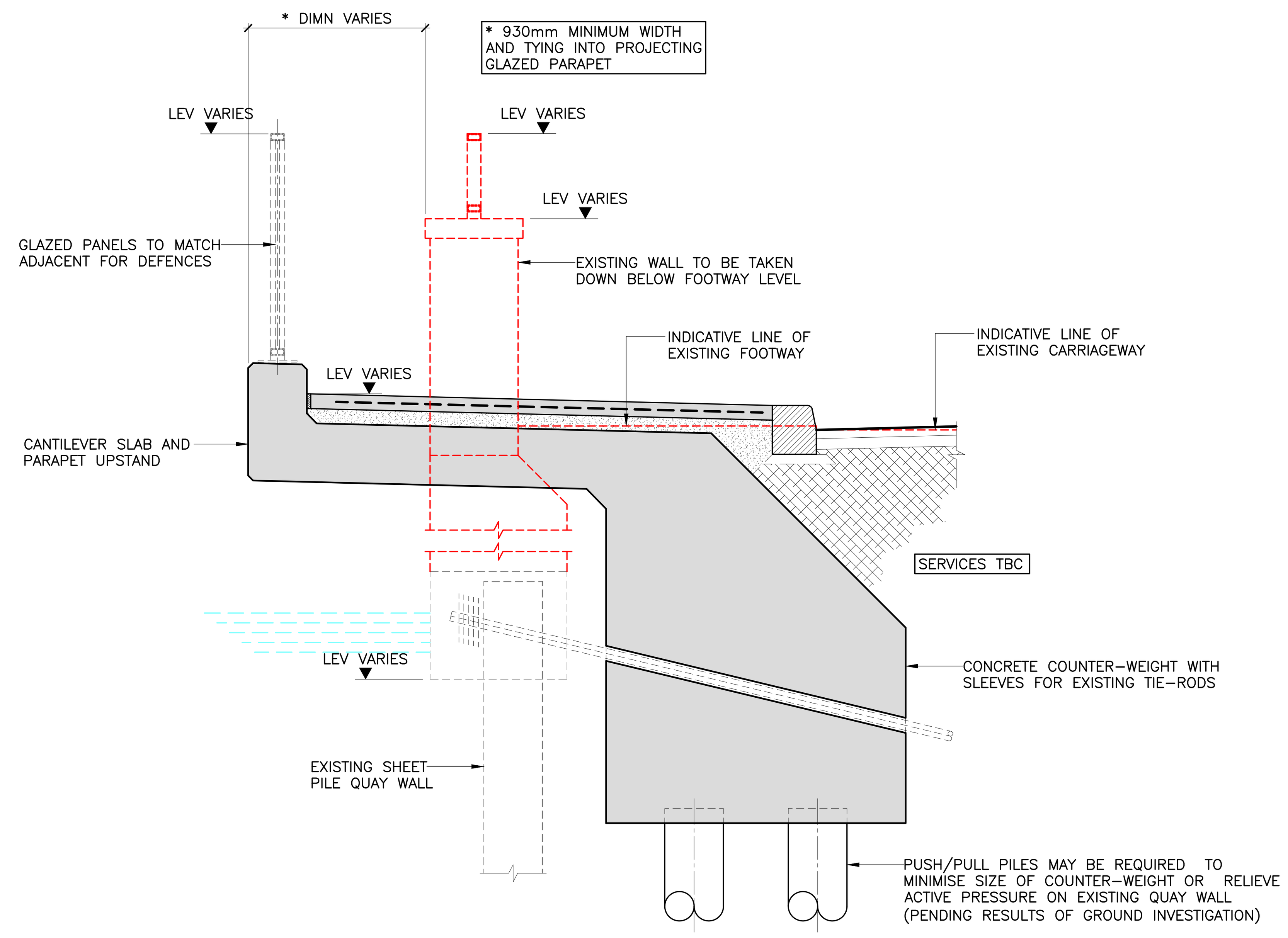
SITE LOCATION

A1 SCALE 1:50000
A3 SCALE 1:100000



(OPTION 2) PART PLAN – BRIDGE WIDENING & REMEDIAL WORKS TO QUAY WALL

A1 SCALE 1:75
A3 SCALE 1:150



TYPICAL QUAY WALL CROSS SECTION

A1 SCALE 1:25
A3 SCALE 1:50

No.	Revision	Date	By	Chk'd	App'd

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Drawn	Designed	Checked	Approved	Suitability Code - Description
OB	CH	MR	JK	S4 - Stage Approval

Project Stage	PRELIMINARY
Project Title	O'Hanrahan Bridge Widening Project
Drawing Title	O'Hanrahan Bridge Southeast Corner - Option 2 Plan and Cross Section
Drawing Number	Project WBRC - Originator ROD - Volume ENV - Location S101 - Type DR - Role CB - Number 30003
Scale (A1)	as shown
Date:	MAY 2022
Job No:	19.145
Rev:	P0

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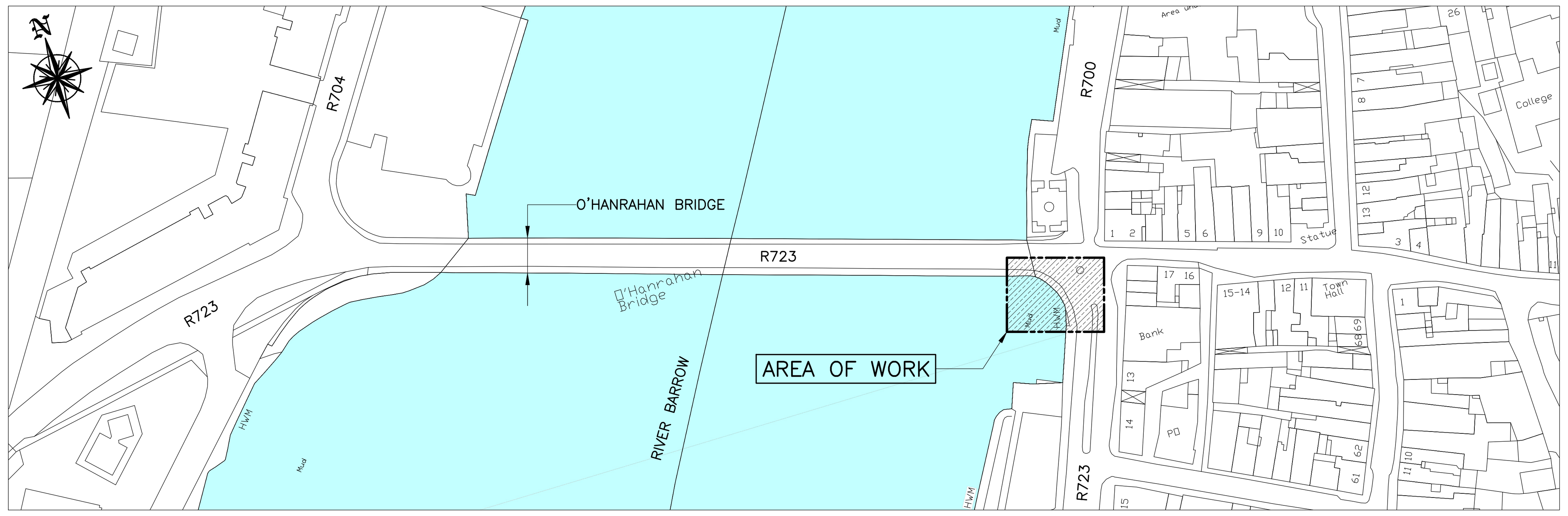
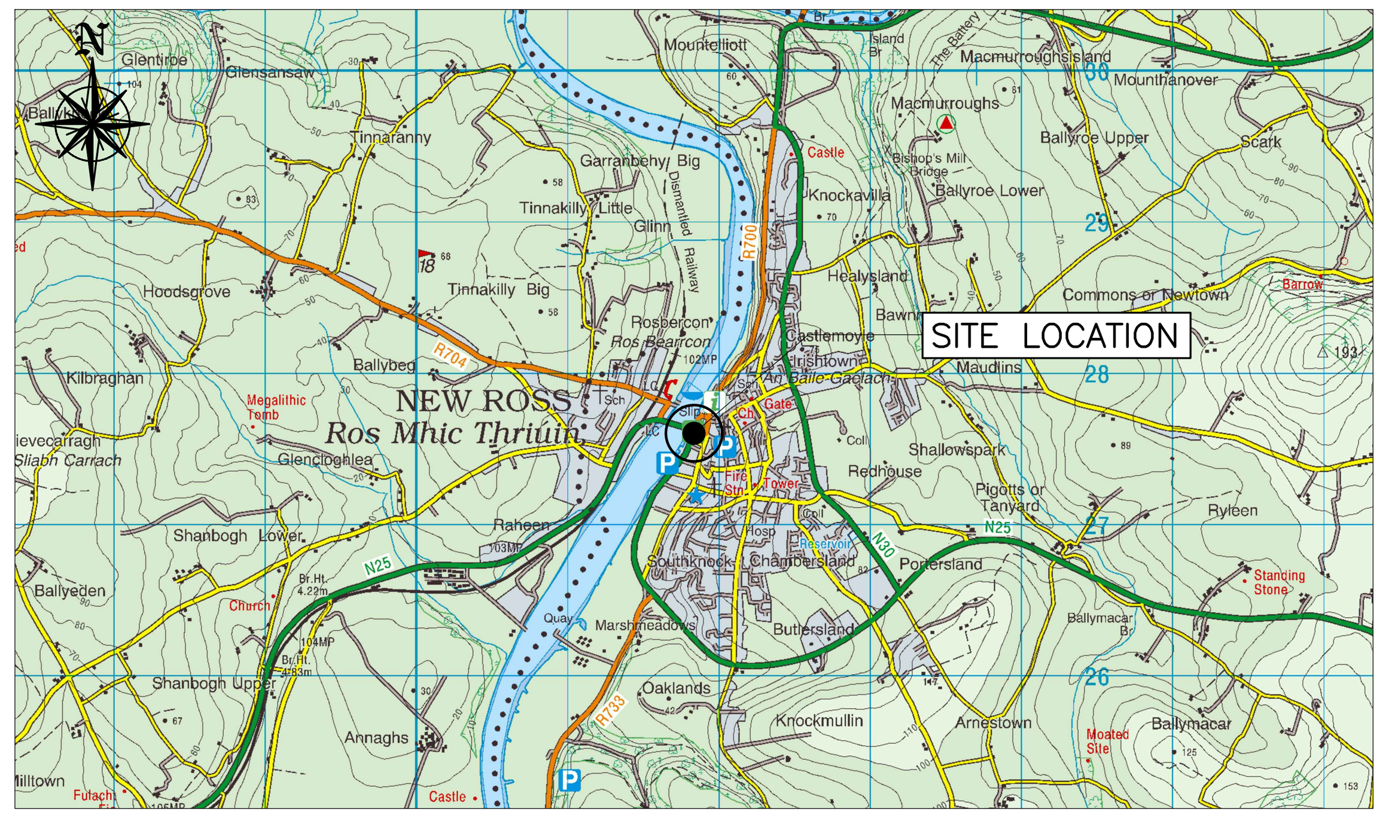


KEYPLAN

A1 SCALE 1:1500
A3 SCALE 1:3000



SITE LOCATION

A1 SCALE 1:50000
A3 SCALE 1:100000

NOTES:

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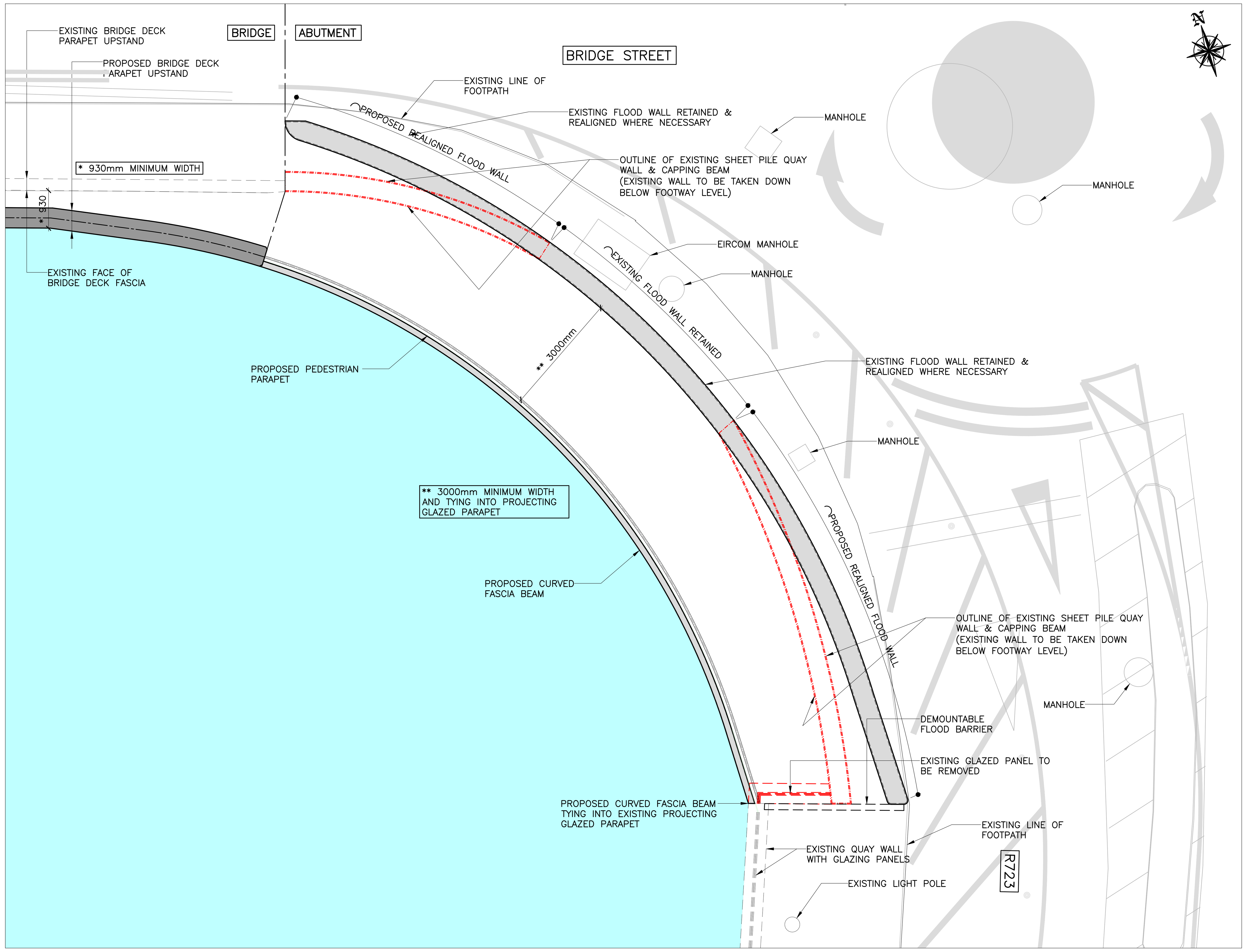
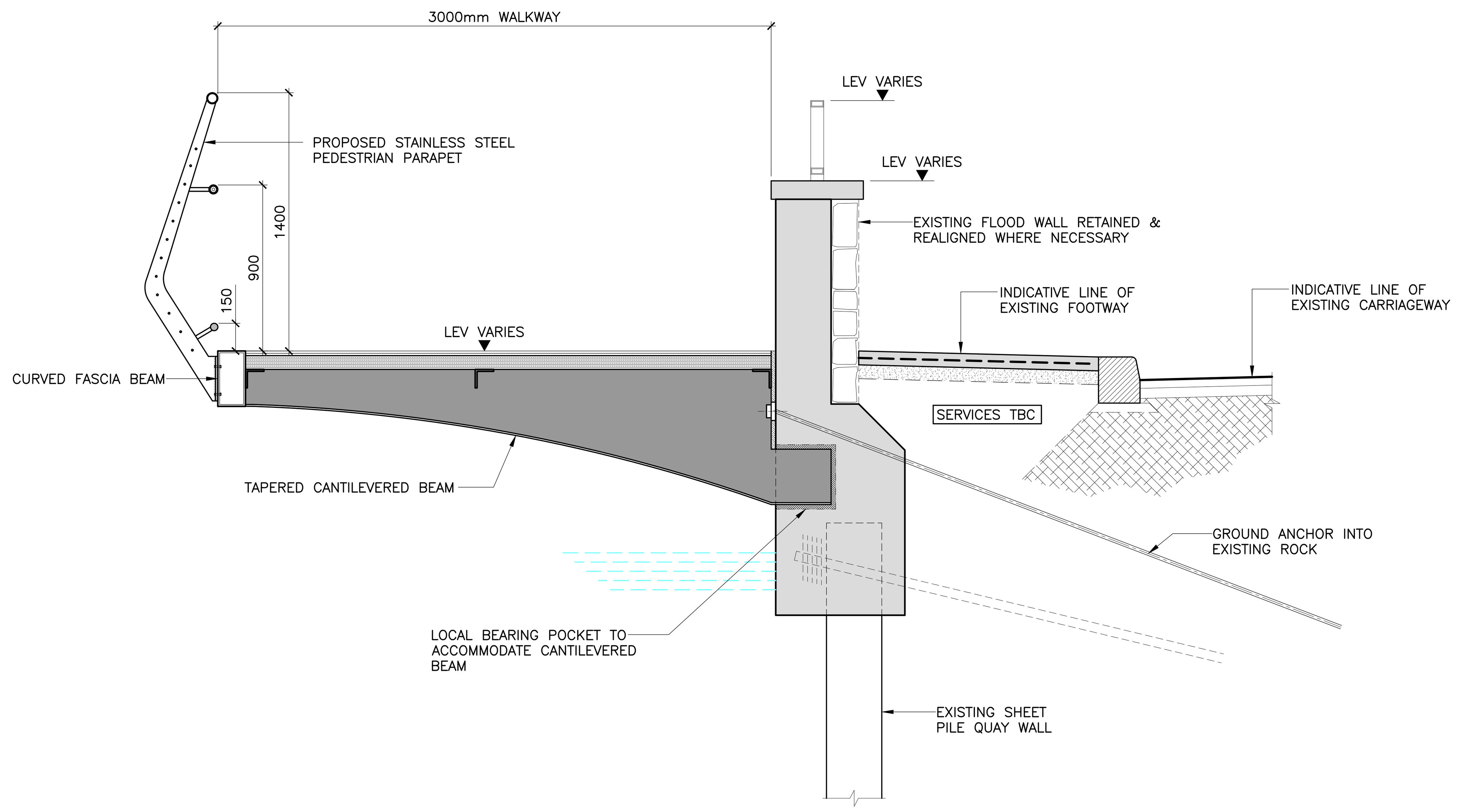


(OPTION 3) PART PLAN – BRIDGE WIDENING & REMEDIAL WORKS TO QUAY WALL

A1 SCALE 1:75
A3 SCALE 1:150



TYPICAL QUAY WALL CROSS SECTION

A1 SCALE 1:25
A3 SCALE 1:50

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Wexford County Council

Meanma agus Misneach

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Drawn	Designed	Checked	Approved	Suitability Code - Description
OB	CH	MR	JK	S4 - Stage Approval

Project Stage	PRELIMINARY
Project Title	O'Hanrahan Bridge Widening Project
Drawing Title	O'Hanrahan Bridge Southeast Corner - Option 3 Plan and Cross Section
Drawing Number	Project WBRC - Originator ROD - Volume ENV - Location S101 - Type DR - Role CB - Number 30004
Scale (A1)	as shown
Date:	MAY 2022
Job No:	19.145
Rev:	P0

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NOTES:

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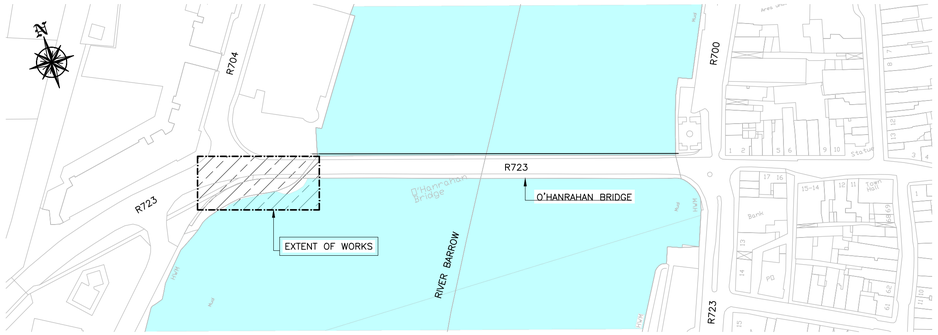
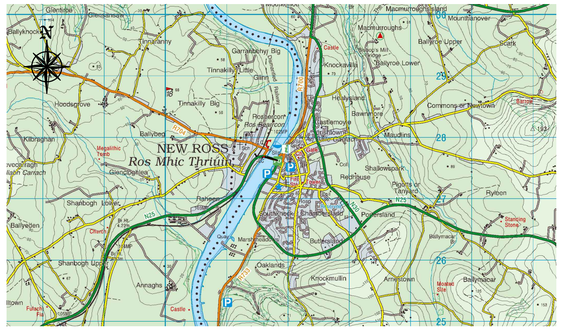
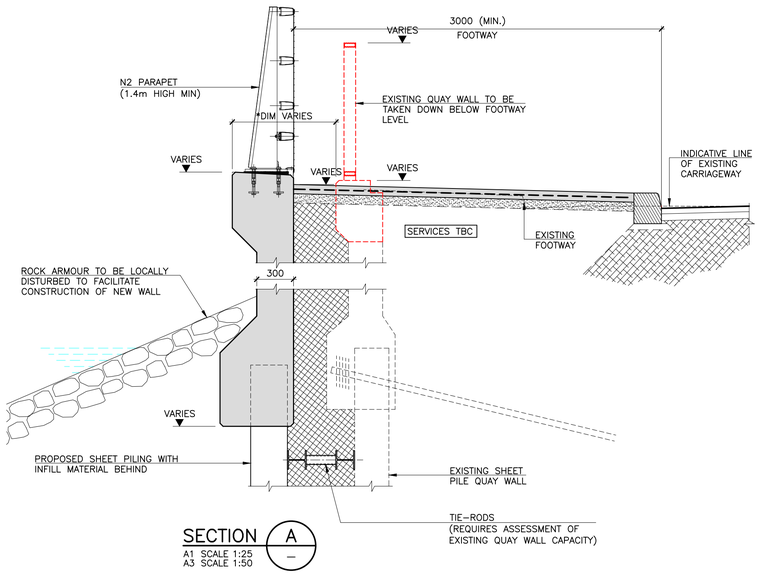


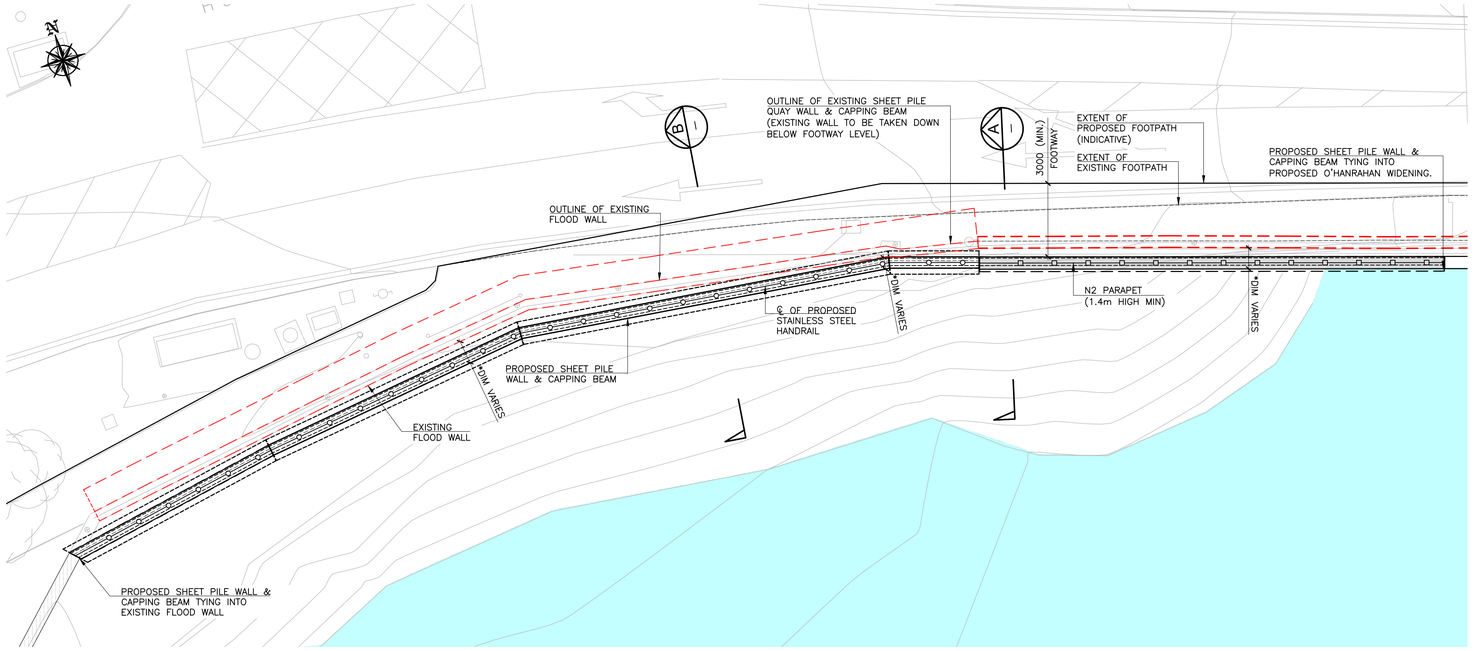
KEY PLAN
A1 SCALE 1:1500
A3 SCALE 1:3000



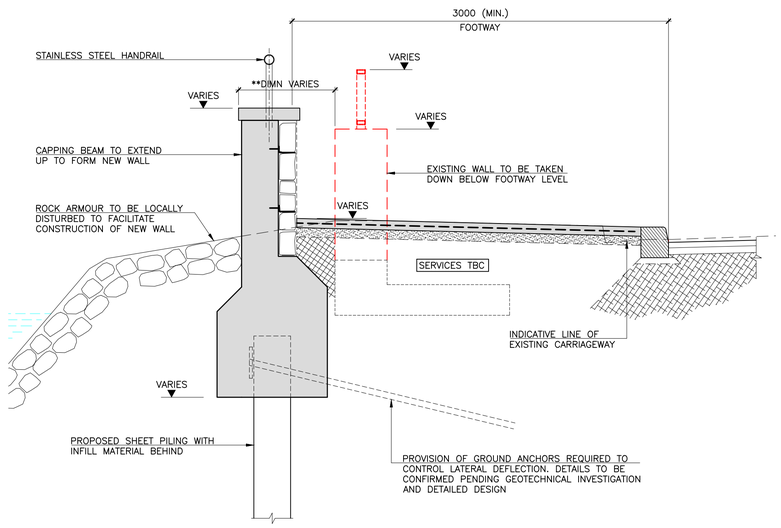
SITE LOCATION
A1 SCALE 1:50000
A3 SCALE 1:100000



SECTION A
A1 SCALE 1:25
A3 SCALE 1:50



PLAN ON SOUTHWEST CORNER OPTION 1 – BRIDGE WIDENING & REMEDIAL WORKS TO QUAY WALL
A1 SCALE 1:125
A3 SCALE 1:250



SECTION B
A1 SCALE 1:25
A3 SCALE 1:50

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Wexford County Council

Ikanna agus Misneach

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No.	Revision	Date	By	Chk'd	App'd

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Drawn	Designed	Checked	Approved	Suitability Code - Description
DS	CH	MR	JK	S4 - Stage Approval

Project Stage	Preliminary
Project Title	O'Hanrahan Bridge Widening Project
Drawing Title	O'Hanrahan Bridge Widening Southwest Corner - Option 1 Plan and Cross Section
Drawing Number	Project | Originator | Volume | Location | Type | Role | Number WBRC - ROD - ENV - S101 - DR - CB - 30005
Scale (A1)	As Shown
Date:	Aug' 2022
Job No:	21.143
Rev:	P0

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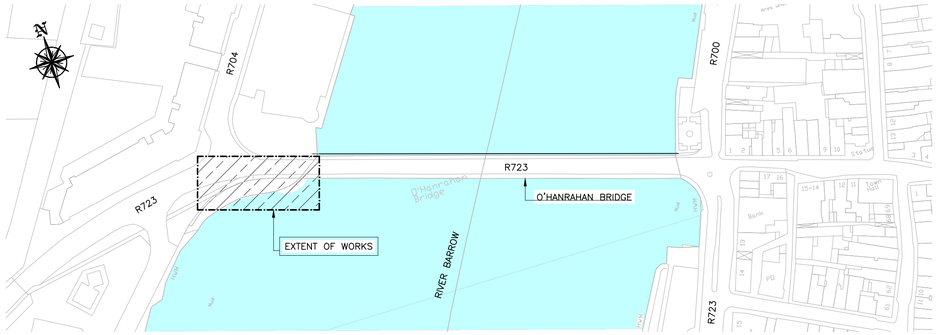
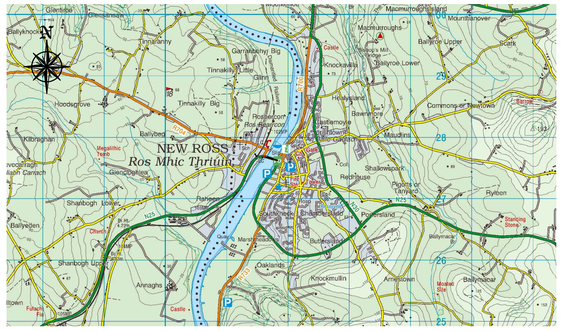
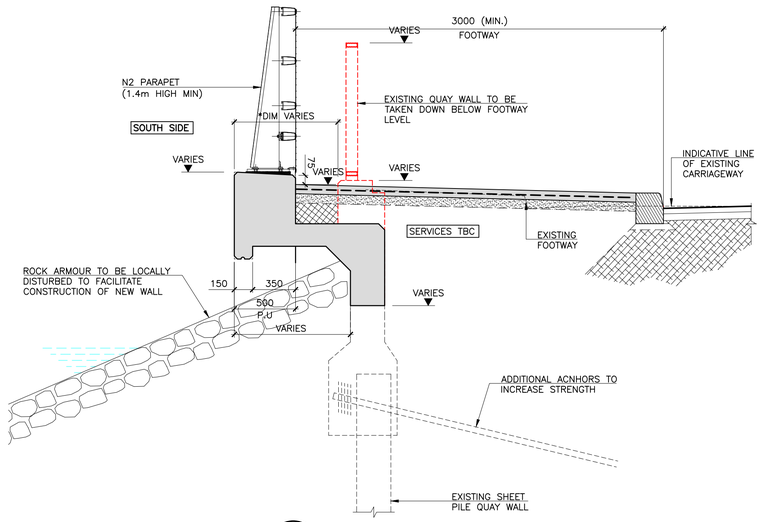


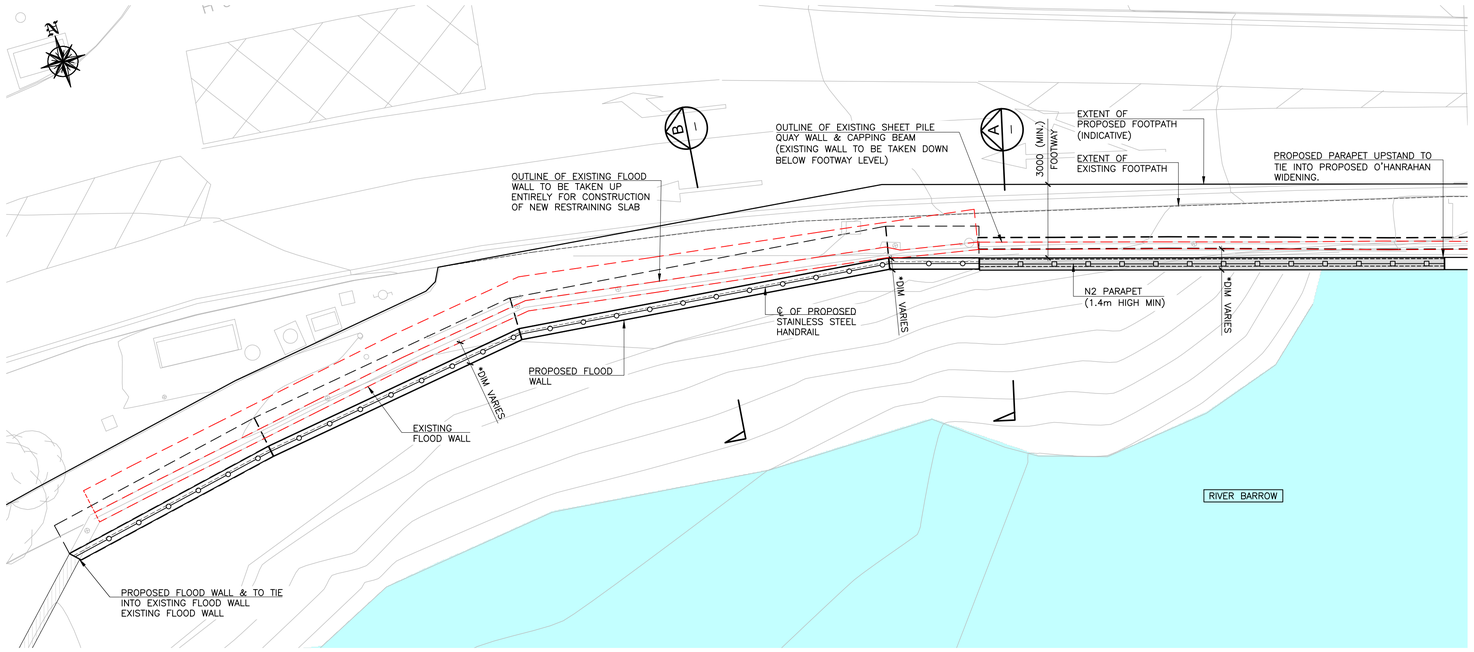
KEY PLAN
A1 SCALE 1:1500
A3 SCALE 1:3000



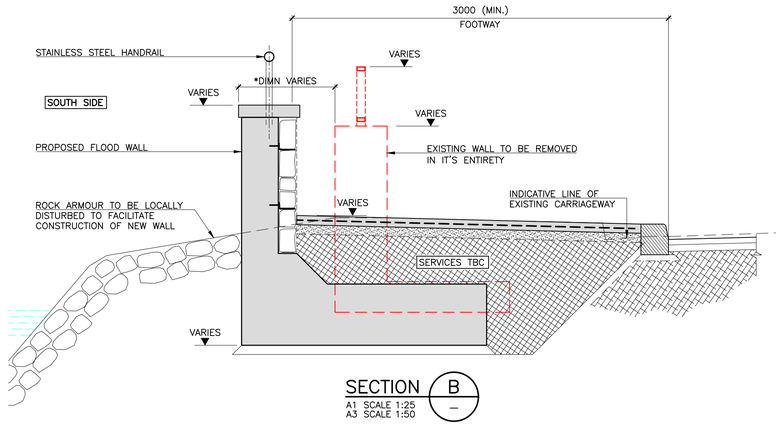
SITE LOCATION
A1 SCALE 1:50000
A3 SCALE 1:100000



SECTION A
A1 SCALE 1:25
A3 SCALE 1:50



PLAN ON SOUTHWEST CORNER OPTION 2 – BRIDGE WIDENING & REMEDIAL WORKS TO QUAY WALL
A1 SCALE 1:125
A3 SCALE 1:250



SECTION B
A1 SCALE 1:25
A3 SCALE 1:50

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Wexford County Council

Mianna agus Mianach

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Drawn	Designed	Checked	Approved	Suitability Code - Description
DS	CH	MR	JK	S4 - Stage Approval

Project Stage	Preliminary
Project Title	O'Hanrahan Bridge Widening Project
Drawing Title	O'Hanrahan Bridge Widening Southwest Corner - Option 2 Plan and Cross Section
Drawing Number	Project | Originator | Volume | Location | Type | Role | Number WBRC - ROD - ENV - S101 - DR - CB - 30006
Scale (A1)	As Shown
Date:	Aug' 2022
Job No:	21.143
Rev:	P0

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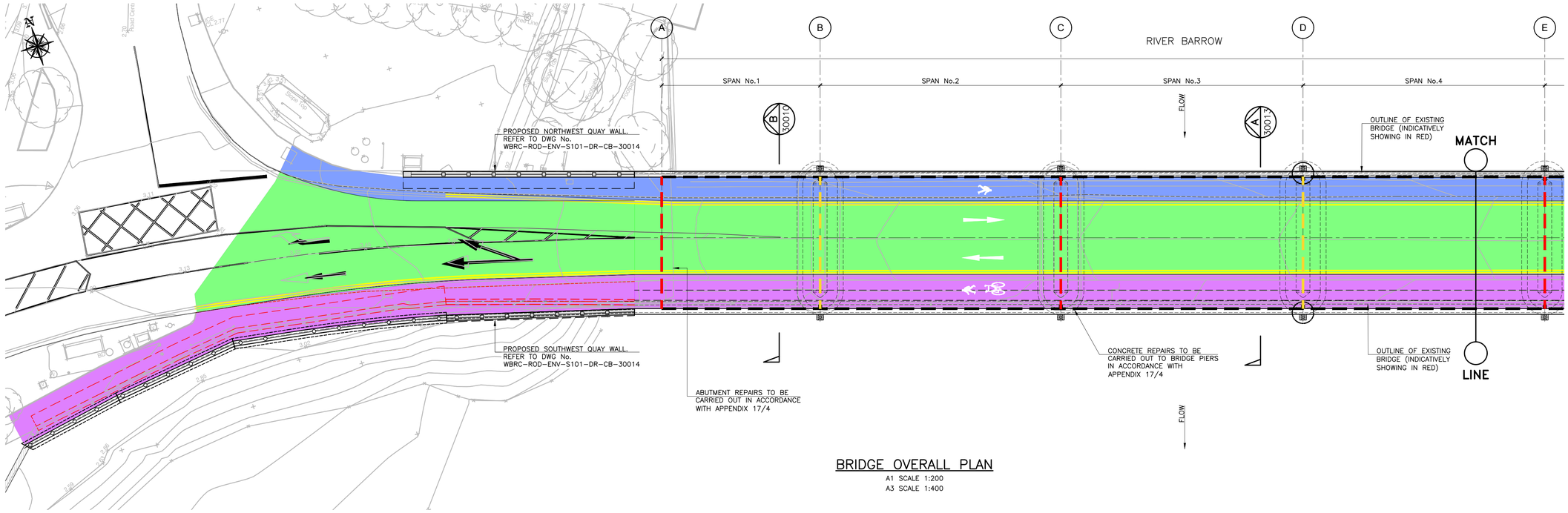


BRIDGE OVERALL PLAN

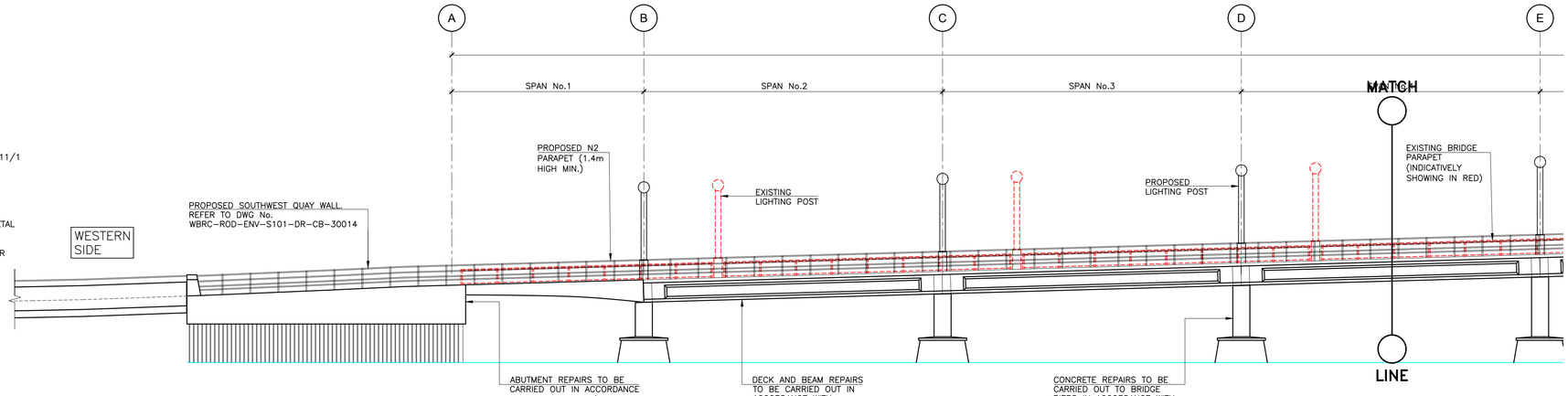
A1 SCALE 1:200
A3 SCALE 1:400

NOTES:

1. ALL DIMENSIONS IN MILLIMETERS, UNLESS OTHERWISE NOTED.
2. ALL LEVELS ARE IN METRES TO ORDNANCE DATUM MALIN HEAD.
3. ALL CO-ORDINATES ARE IN METRES TO IRISH TRANSVERSE MERCATOR (ITM).
4. WHERE EXISTING BOUNDARY WALLS AND FENCES ARE TO BE TAKEN DOWN TO ALLOW CONSTRUCTION OF PERMANENT WORKS TEMPORARY FENCING TO BE PROVIDED TO PREVENT UNAUTHORIZED ACCESS TO SITE AREA AND PRIVATE LANDS.
5. THE CONTRACTOR IS REQUIRED TO PROVIDE ACCESS THROUGH THE EXTENT OF SITE IN ACCORDANCE WITH THE SPECIFICATION.
6. THE CONTRACTOR SHALL LIAISE WITH THE RELEVANT SERVICE PROVIDERS TO AGREE AND IMPLEMENT PROTECTION MEASURES AND DIVERSIONS.
7. WHERE EXISTING LIGHTING AND SIGNAGE IS TO BE TAKEN DOWN TO ALLOW CONSTRUCTION OF THE PERMANENT WORKS EQUIVALENT TEMPORARY LIGHTING AND SIGNAGE TO BE PROVIDED FOR THE DURATION OF THE WORKS UNTIL PERMANENT LIGHTING AND SIGNAGE IS REINSTATED OR IN PLACE.
8. GAPS IN PARAPET EDGE BEAMS EITHER SIDE OF MOVEMENT JOINTS TO BE REFILLED AND RESEALED IN ACCORDANCE WITH APPENDIX 23/2.
9. ALL FINISHES ON DRAWINGS ARE AS PER TII CORE SPECIFICATION.
10. ALL BURIED SURFACES NOT RECEIVING BRIDGEDECK WATERPROOFING TO BE WATERPROOFED WITH 2 LAYERS OF EPOXY RESIN WATERPROOFING.
11. ALL EXPOSED ARRISES OF STRUCTURAL CONCRETE SHALL BE FINISHED WITH A 25 x 25mm CHAMFER UNLESS NOTED OTHERWISE.
12. REFER TO APPENDIX 17/1 FOR CONCRETE MIXES.
13. EXPOSED CONCRETE TO BE IMPREGNATED WITH HYDROPHOBIC PORELINER IN ACCORDANCE WITH THE SPECIFICATION.
14. CONCRETE CLASS TO BE C40/50 (MIX I).
15. CONCRETE BLINDING TO BE MIX. ST1.
16. COLD MILLING TO BE PROVIDED OVER EXTENT OF NEW PAVEMENT WORKS.
17. ALL SURFACES OF THE PRECAST CONCRETE UNITS THAT INTERFACE WITH IN-SITU CONCRETE SHALL BE PREPARED IN ACCORDANCE WITH CLAUSE 1710.8 (iv) (a) OF THE TII SPW TO ENSURE THAT THE SURFACE FINISH IS CONSIDERED "ROUGH".

LEGEND:

- PROPOSED SURFACING. REFER TO APPENDIX 7/1
- PROPOSED FOOTPATH. REFER TO APPENDIX 11/1
- PROPOSED FOOTPATH/CYCLEWAY. REFER TO APPENDIX 11/1
- EXISTING STRUCTURE
- DENOTES PROPOSED TYPE 1 BURIED JOINT UNDER CONTINUOUS SURFACING. REFER TO APPENDIX 23/1
- DENOTES PROPOSED TYPE 6 ELASTOMERIC JOINT IN METAL RUNNERS. REFER TO APPENDIX 23/1
- DENOTES EXTENT OF PROPOSED WATERPROOFING. REFER TO APPENDIX 20/1
- F- – DENOTES CLASS OF FORMED CONCRETE FINISH
- U- – DENOTES CLASS OF UNFORMED CONCRETE FINISH



BRIDGE ELEVATION

A1 SCALE 1:200
A3 SCALE 1:400

Comhairle Contae Loch Garman Wexford County Council

Mumma agus Mianach

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Drawn	Designed	Checked	Approved	Suitability Code - Description
ZZX	CH	MR	JK	S4 - Stage Approval

Project Stage	Preliminary
Project Title	O'Hanrahan Bridge Widening Project
Drawing Title	Proposed O'Hanrahan Bridge Plan & Elevation Sheet 01 of 02

Drawing Number	Project	Originator	Volume	Location	Type	Role	Number
	WBRC	ROD	ENV	S101	DR	CB	30007

Scale (A1)	Date	Job No:	Rev:
As Shown	MAY 2022	21.143	P0

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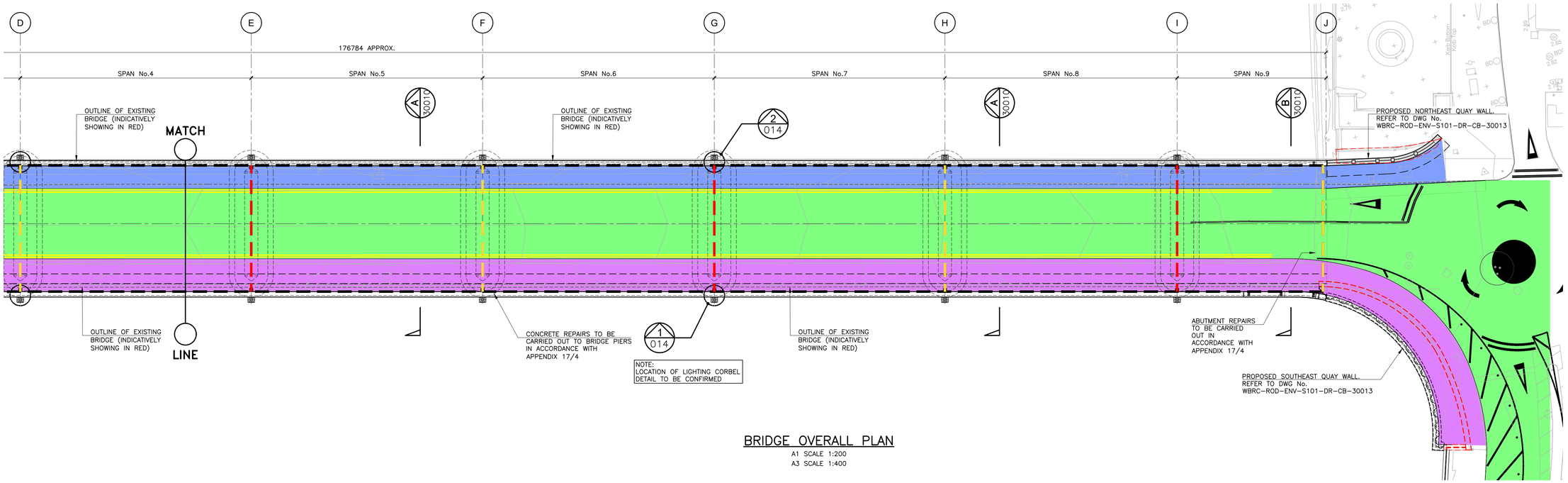
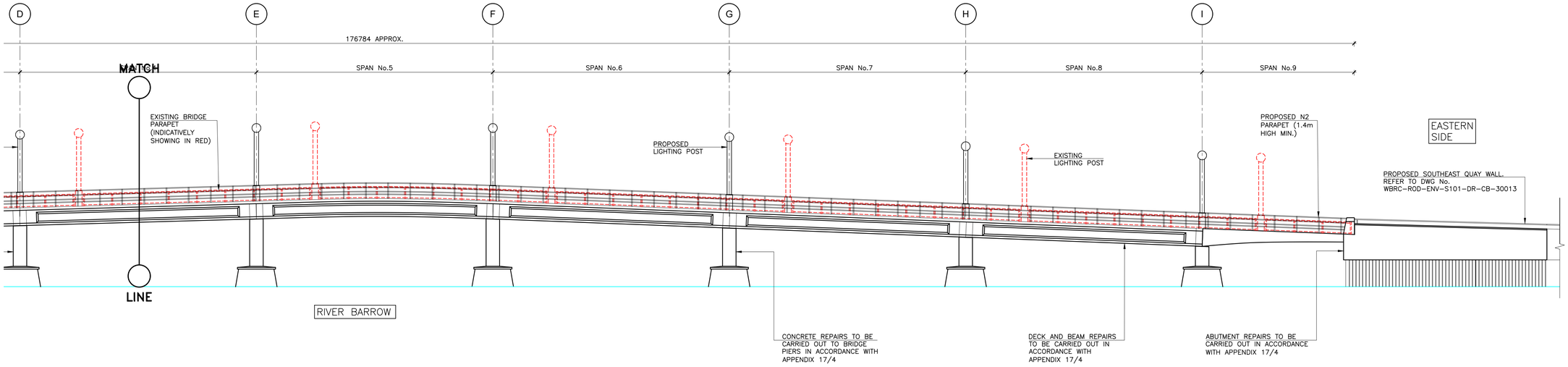


BRIDGE OVERALL PLAN

A1 SCALE 1:200
A3 SCALE 1:400



BRIDGE ELEVATION

A1 SCALE 1:200
A3 SCALE 1:400

NOTES:

1. REFER TO DRAWING WBRC-ROD-SBR-S101-DR-CB-30011 FOR GENERAL NOTES.

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Drawn	Designed	Checked	Approved	Suitability Code - Description
ZZX	CH	MR	JK	S4 - Stage Approval

Project Stage	Preliminary
Project Title	O'Hanrahan Bridge Widening Project
Drawing Title	Proposed O'Hanrahan Bridge Plan & Elevation Sheet 02 of 02
Drawing Number	Project | Originator | Volume | Location | Type | Role | Number: WBRC - ROD - ENV - S101 - DR - CB - 30008
Scale (A1)	As Shown
Date:	MAY 2022
Job No:	21.143
Rev:	P0

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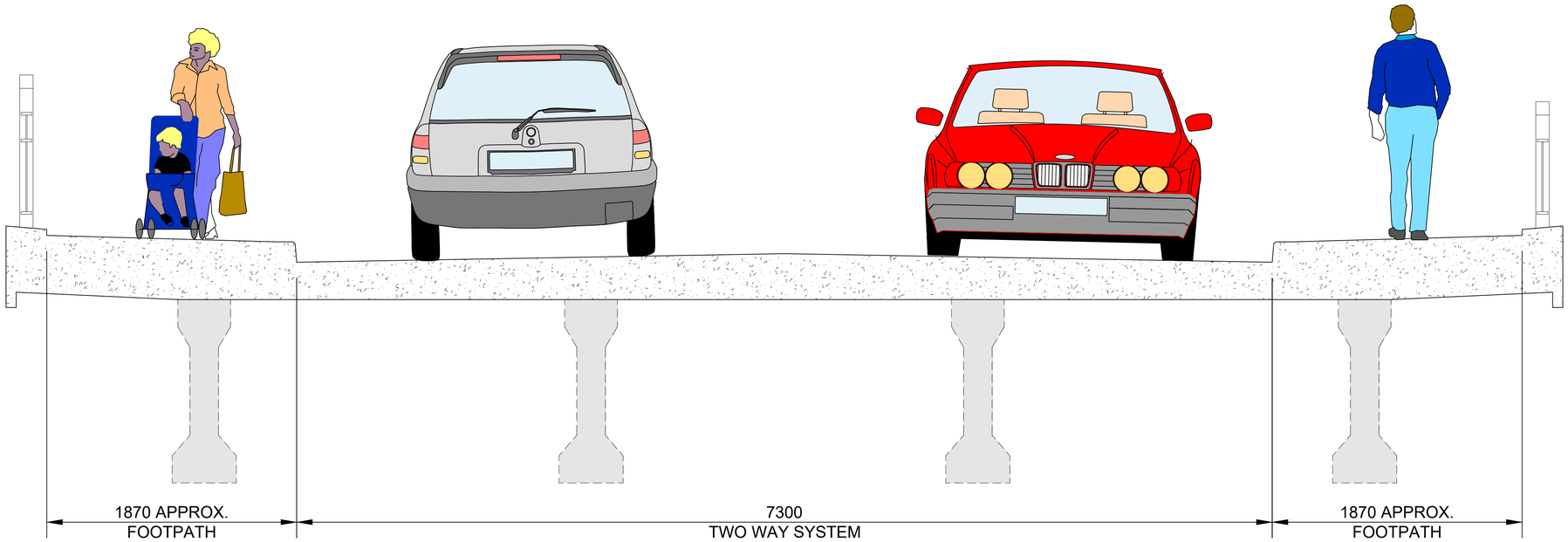
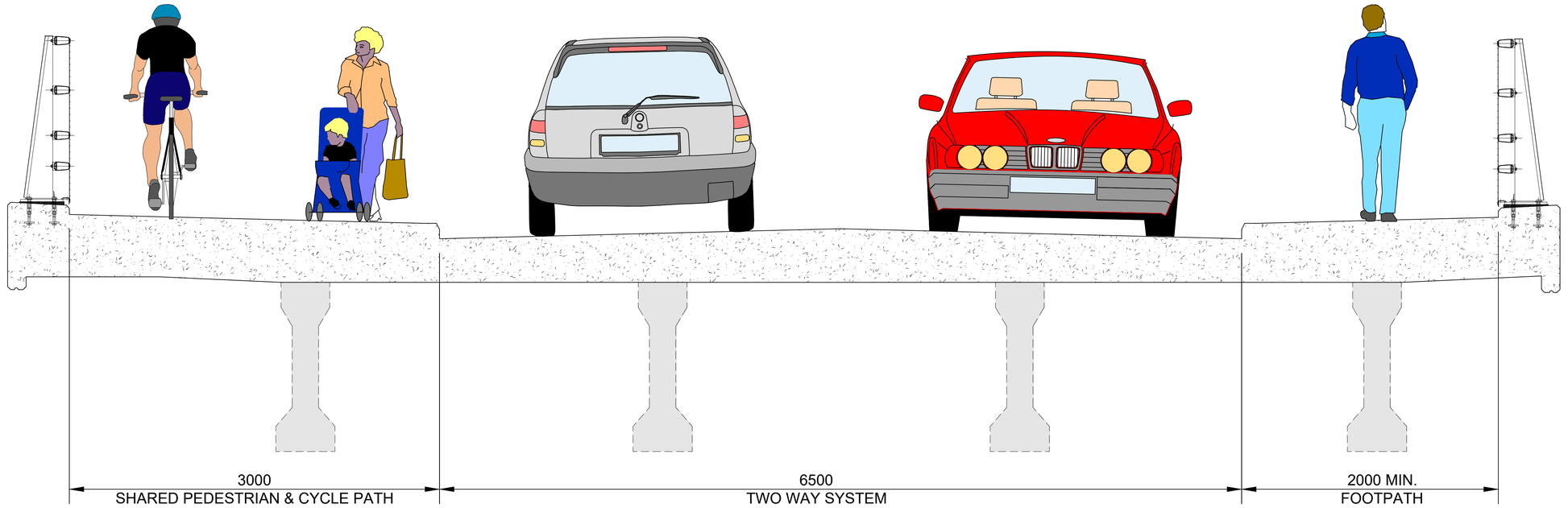


TYPICAL EXISTING O'HANRAHAN BRIDGE DECK CROSS SECTION



TYPICAL PROPOSED O'HANRAHAN BRIDGE DECK CROSS SECTION

NOTES:

1. ALL DIMENSIONS IN MILLIMETERS, UNLESS OTHERWISE NOTED.

Comhairle Contae Loch Garman
Wexford County Council

Fleanna agus Mineach

KILDARE nro NATIONAL ROADS OFFICE

No.	Revision	Date	By	Chk'd	App'd

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Consulting Engineers
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www.rod.ie

Drawn	Designed	Checked	Approved	Suitability Code - Description
ZZX	YB	MR	JK	S4 - Stage Approval

Project Stage	Preliminary
Project Title	O'Hanrahan Bridge Widening Project
Drawing Title	Proposed O'Hanrahan Bridge Road Cross Sections
Drawing Number	Project | Originator | Volume | Location | Type | Role | Number: WBRC - ROD - ENV - S101 - DR - CB - 30009
Scale (A1)	As Shown
Date:	MAY 2022
Job No:	21.143
Rev:	P0

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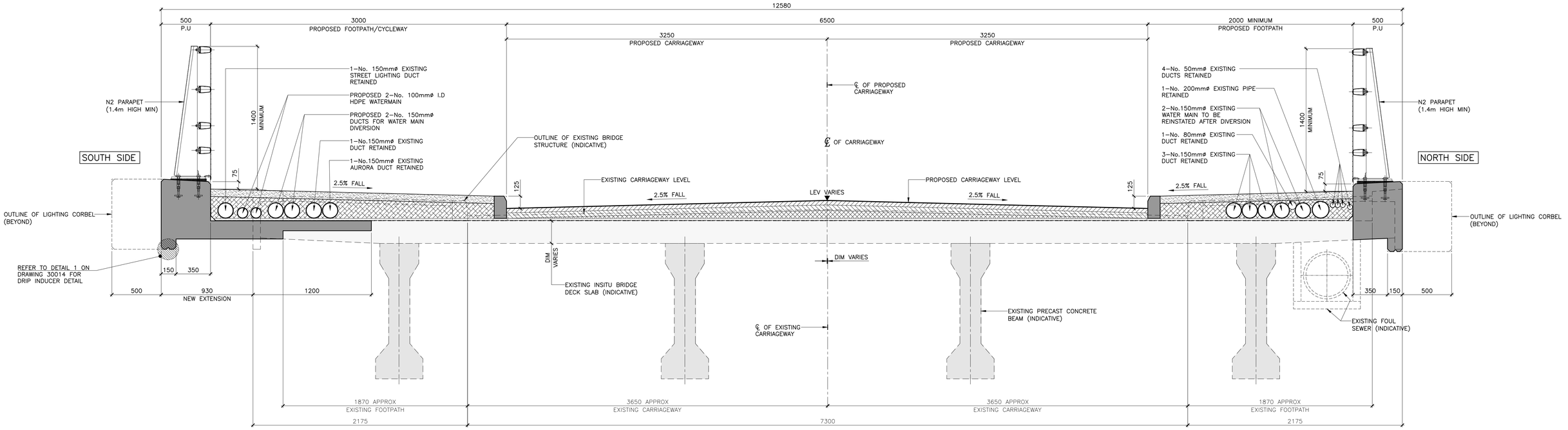
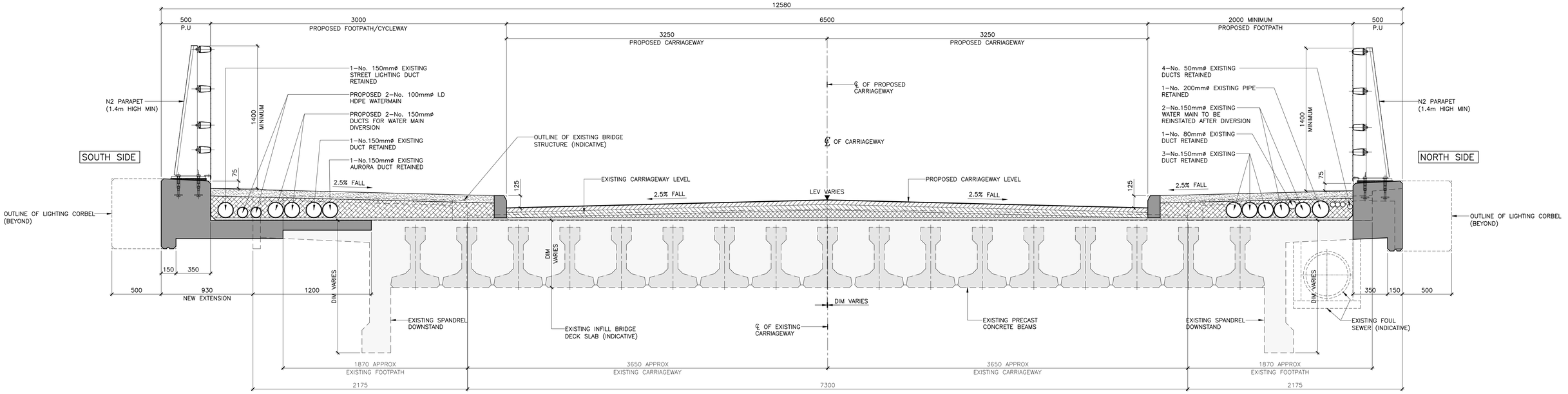
DO NOT SCALE USE FIGURED DIMENSIONS ONLY



SECTION A

A1 SCALE 1:20
A3 SCALE 1:40

30012



SECTION B

A1 SCALE 1:20
A3 SCALE 1:40

30012

NOTES:

1. ALL DIMENSIONS IN MILLIMETERS, UNLESS OTHERWISE NOTED.
2. ALL LEVELS ARE IN METRES TO ORDNANCE DATUM MALIN HEAD.
3. ALL CO-ORDINATES ARE IN METRES TO IRISH TRANSVERSE MERCATOR (ITM).

Comhairle Contae Loch Garman Wexford County Council

Muirinn agus Misneach

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Drawn	Designed	Checked	Approved	Suitability Code - Description
OB	CH	MR	JK	S4 - Stage Approval

Project Stage	Preliminary
Project Title	O'Hanrahan Bridge Widening Project
Drawing Title	Proposed O'Hanrahan Bridge Deck Cross Sections
Drawing Number	Project | Originator | Volume | Location | Type | Role | Number: WBRC - ROD - ENV - S101 - DR - CB - 30010
Scale (A1)	As Shown
Date:	MAY 2022
Job No:	21.143
Rev:	P0

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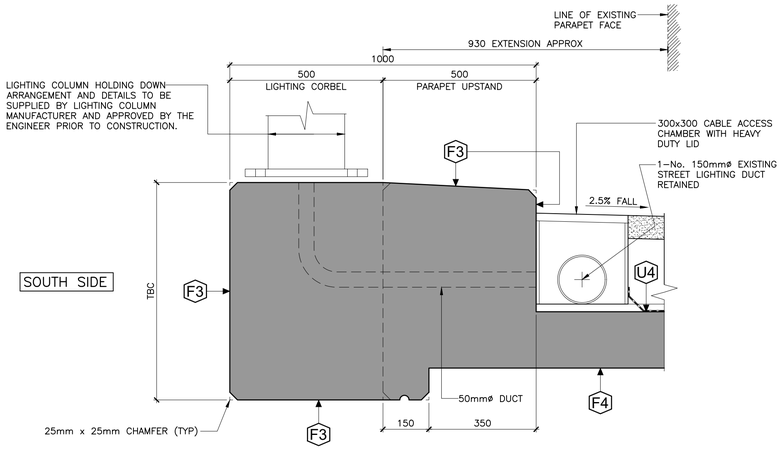
DO NOT SCALE USE FIGURED DIMENSIONS ONLY

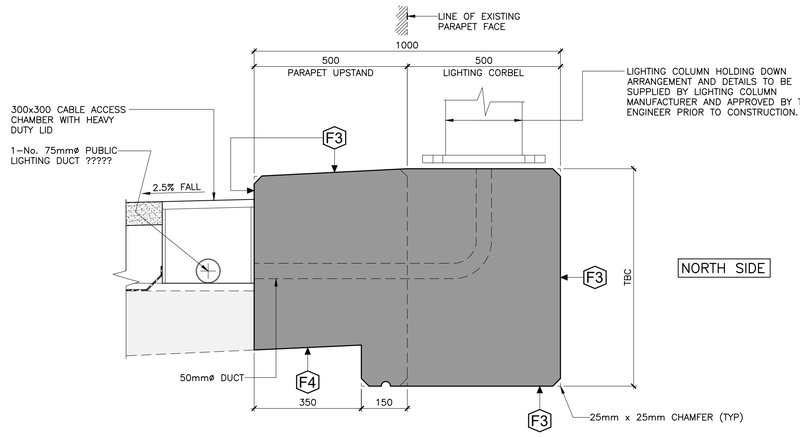
NOTES:

1. ALL DIMENSIONS IN MILLIMETERS, UNLESS OTHERWISE NOTED.
2. ALL LEVELS ARE IN METRES TO ORDNANCE DATUM MALIN HEAD.
3. ALL CO-ORDINATES ARE IN METRES TO IRISH TRANSVERSE MERCATOR (ITM).



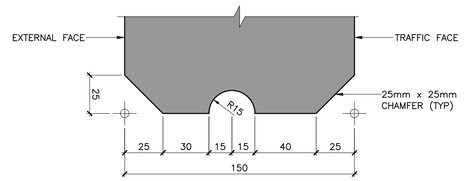
TYP LIGHTING CORBEL CROSS SECTION (SOUTH SIDE)

A1 SCALE 1:10
A3 SCALE 1:20



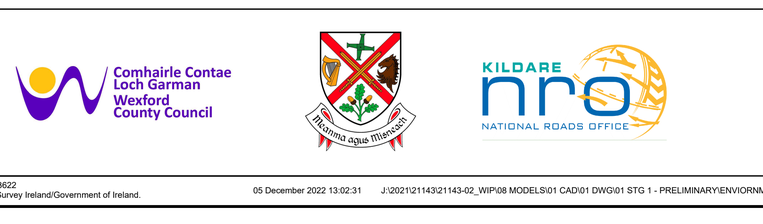
TYP LIGHTING CORBEL CROSS SECTION (NORTH SIDE)

A1 SCALE 1:10
A3 SCALE 1:20



DETAIL 1

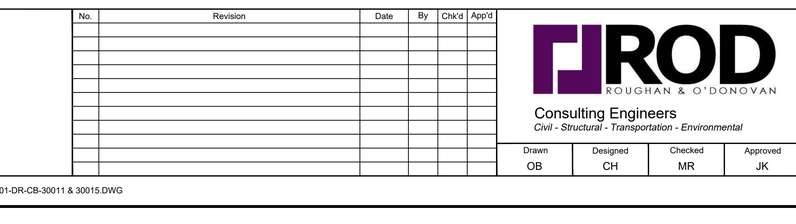
A1 SCALE 1:2
A3 SCALE 1:4
30013



PLAN ON LIGHTING CORBEL (SOUTH SIDE)

DETAIL 1

A1 SCALE 1:10
A3 SCALE 1:20
30012



PLAN ON LIGHTING CORBEL (NORTH SIDE)

DETAIL 2

A1 SCALE 1:10
A3 SCALE 1:20
30012

Comhairle Contae Loch Garman
Wexford County Council

Misneamh agus Mianaigh

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Drawn	Designed	Checked	Approved	Suitability Code - Description
OB	CH	MR	JK	S4 - Stage Approval

Project Stage	Preliminary
Project Title	O'Hanrahan Bridge Widening Project
Drawing Title	Proposed Lighting Corbel Design
Drawing Number	Project | Originator | Volume | Location | Type | Role | Number: WBRC - ROD - ENV - S101 - DR - CB - 30011
Scale (A1)	As Shown
Date:	MAY 2022
Job No:	21.143
Rev:	P0

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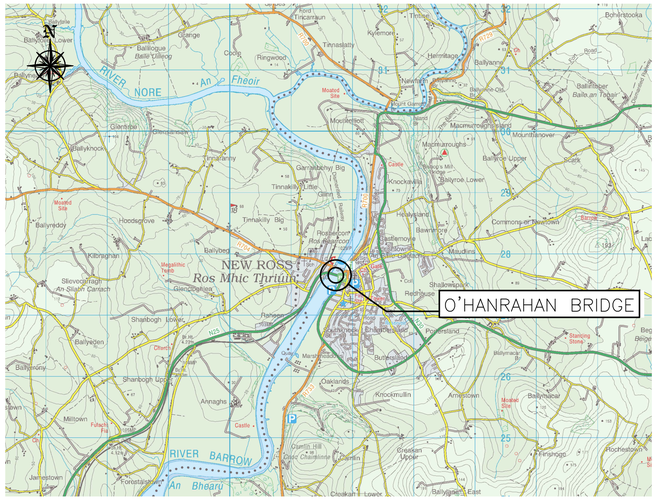
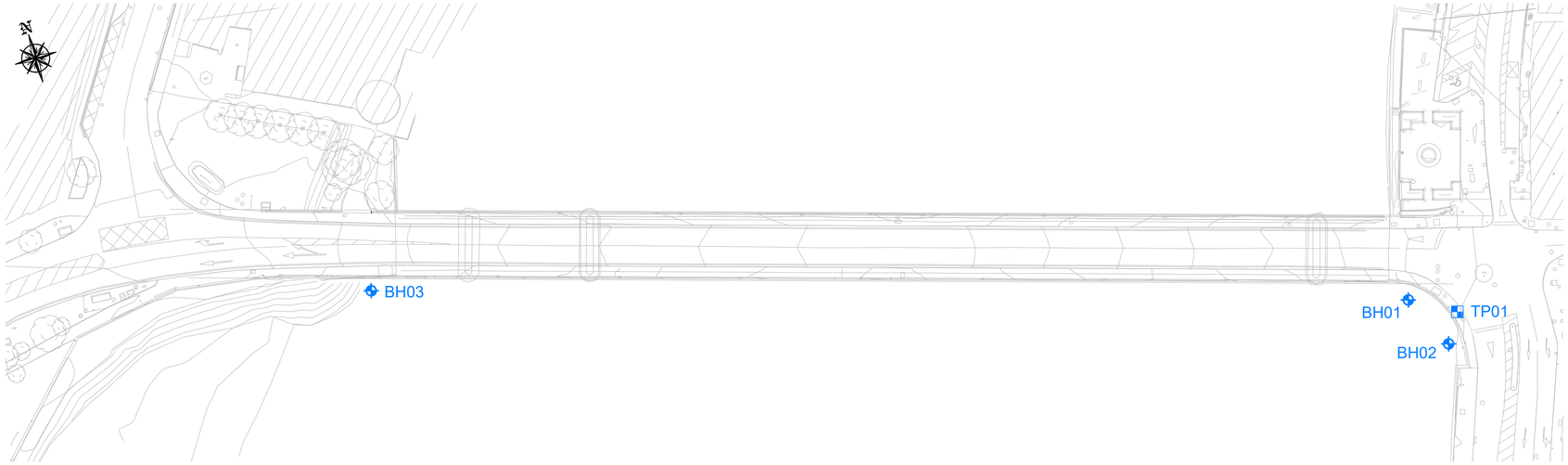
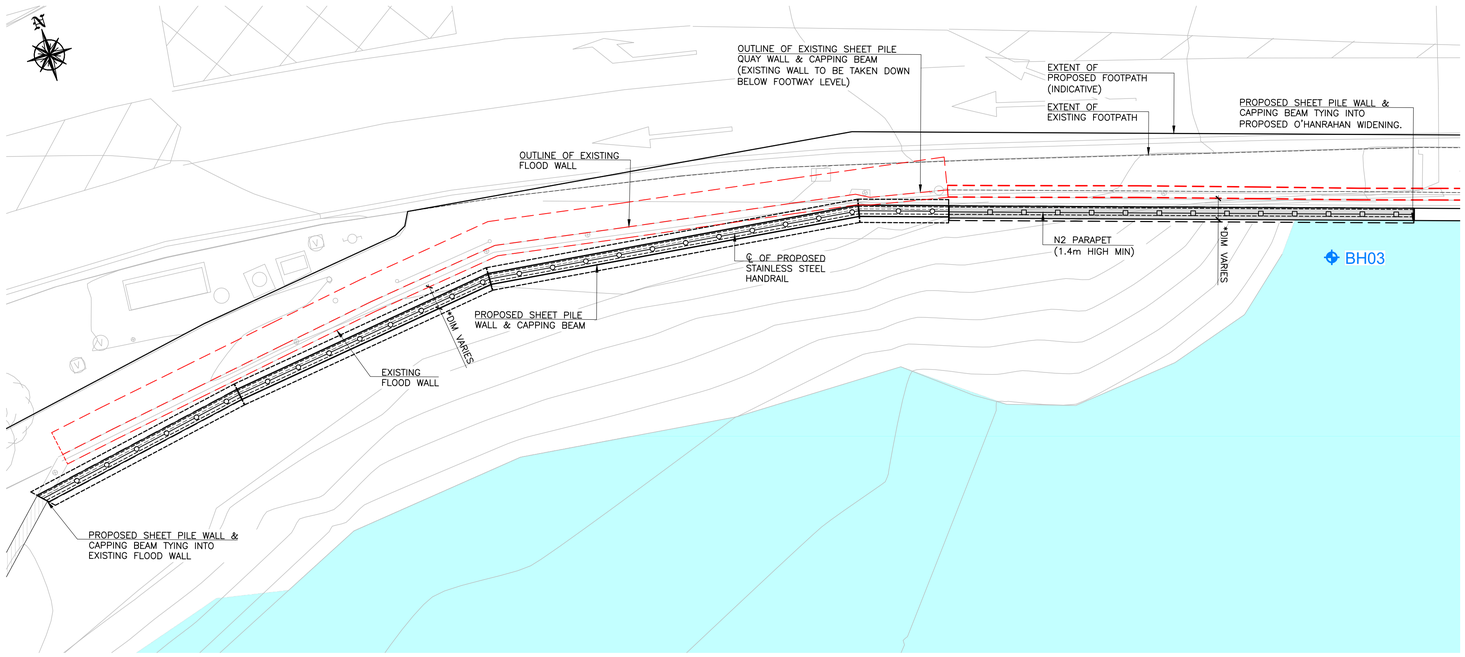


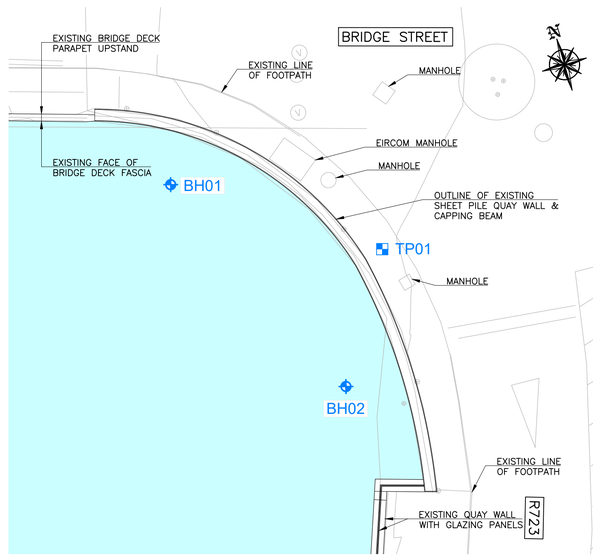
SITE LOCATION PLAN
A1 SCALE 1:50,000
A3 SCALE 1:100,000



SITE LAYOUT
A1 SCALE 1:500
A3 SCALE 1:1000



GI LOCATION PLAN ON SOUTHWEST CORNER
A1 SCALE 1:125
A3 SCALE 1:250



GI LOCATION PLAN ON SOUTHEAST CORNER
A1 SCALE 1:125
A3 SCALE 1:250

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
2. ALL LEVELS ARE IN METRES ABOVE ORDNANCE DATUM AT MALIN HEAD.
3. ALL CO–ORDINATES ARE TO IRISH TRANSVERSE MERCATOR.
4. EXTENT OF SITE AREA PROVIDED BY THE EMPLOYER EXCLUDES AREA WHICH MAY BE TEMPORARY OCCUPIED SUBJECT TO TRAFFIC SAFETY AND MANAGEMENT AND DIVERSIONS.
5. THE CONTRACTOR IS REQUIRED TO PROVIDE ACCESS THROUGH THE EXTENT OF SITE AND AREA PROVIDED BY THE EMPLOYER IN ACCORDANCE WITH THE SPECIFICATION.
6. THE EXISTING POSITION AND LEVEL OF SERVICES SHOWN TO BE DETERMINED BY THE CONTRACTOR. THE CONTRACTOR SHALL PROVIDE PROTECTION TO EXISTING SERVICES

LEGEND:

DEVELOPMENT BOUNDARY

Comhairle Contae Loch Garman
Wexford County Council

Kildare nro National Roads Office

No.	Revision	Date	By	Chk'd	App'd

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Drawn	Designed	Checked	Approved	Suitability Code - Description
ZZX	CH	MR	JK	S4 - Stage Approval

Project Stage	Preliminary
Project Title	O'Hanrahan Bridge Widening Project
Drawing Title	Geotechnical Investigation Locations
Drawing Number	Project | Originator | Volume | Location | Type | Role | Number: WBRC - ROD - ENV - S101 - DR - CB - 30012
Scale (A1)	As Shown
Date:	MAY 2022
Job No:	21.143
Rev:	P0

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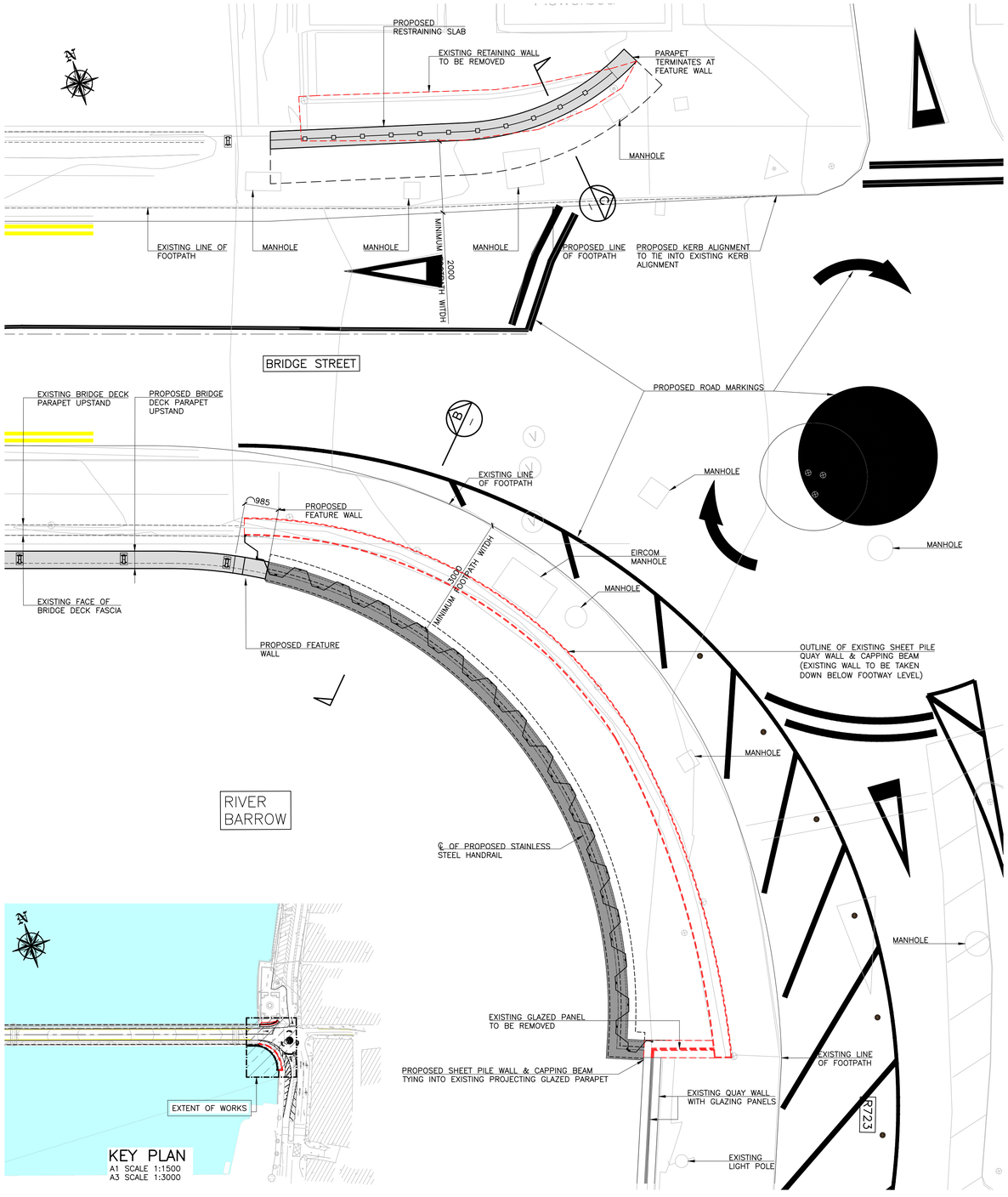
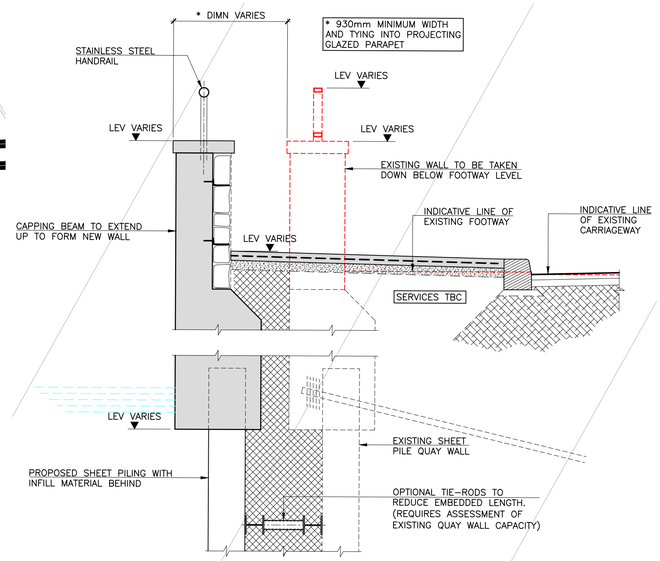


PART PLAN – BRIDGE WIDENING & REMEDIAL WORKS TO EASTERN QUAY WALLS

A1 SCALE 1:75

A3 SCALE 1:150

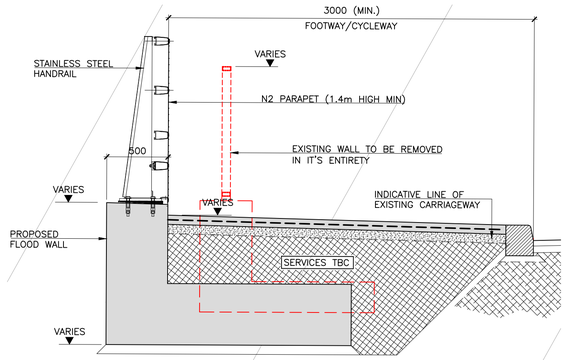


SECTION B

(TYPICAL SOUTHEAST QUAY WALL CROSS SECTION)

A1 SCALE 1:25

A3 SCALE 1:50



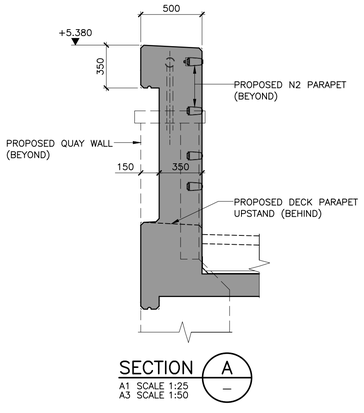
SECTION C

(TYPICAL NORTHEAST QUAY WALL CROSS SECTION)

(NORTHWEST WALL SIMILAR)

A1 SCALE 1:25

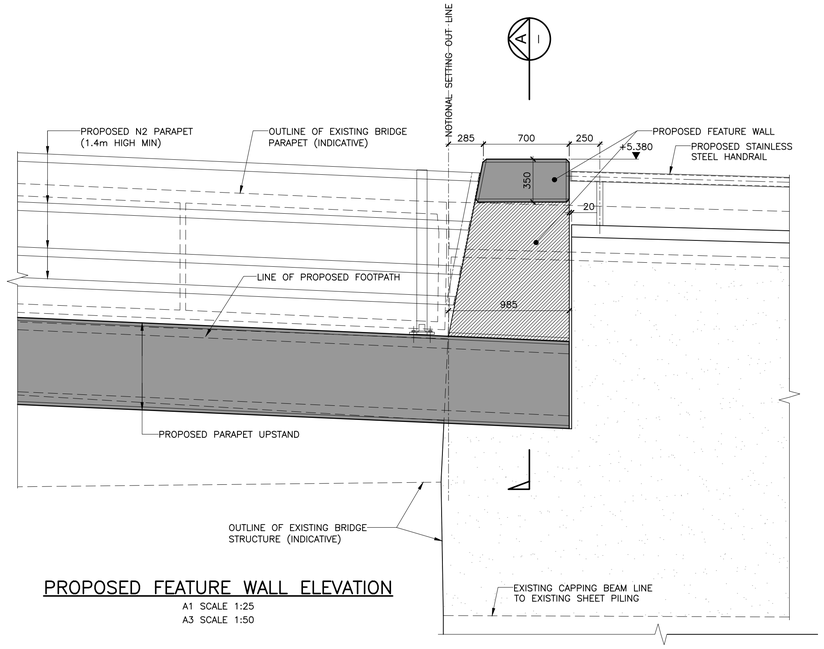
A3 SCALE 1:50



SECTION A

A1 SCALE 1:25

A3 SCALE 1:50



PROPOSED FEATURE WALL ELEVATION

A1 SCALE 1:25

A3 SCALE 1:50

NOTES:

1. REFER TO DRAWING WBRC-ROD-SBR-S101-DR-CB-30007 FOR GENERAL NOTES.

No.	Revision	Date	By	Chk'd	App'd

Comhairle Contae Loch Garman Wexford County Council

Kildare nro National Roads Office

ROD Roughan & O'Donovan

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Drawn	Designed	Checked	Approved	Suitability Code - Description
OB	CH	MR	JK	S4 - Stage Approval

Project Stage	Preliminary
Project Title	O'Hanrahan Bridge Widening Project
Drawing Title	Remedial Works to Eastern Approach Quay Wall
Drawing Number	Project | Originator | Volume | Location | Type | Role | Number: WBRC - ROD - SBR - S101 - DR - CB - 30013
Scale (A1)	As Shown
Date:	Oct' 2021
Job No:	21.143
Rev:	P0

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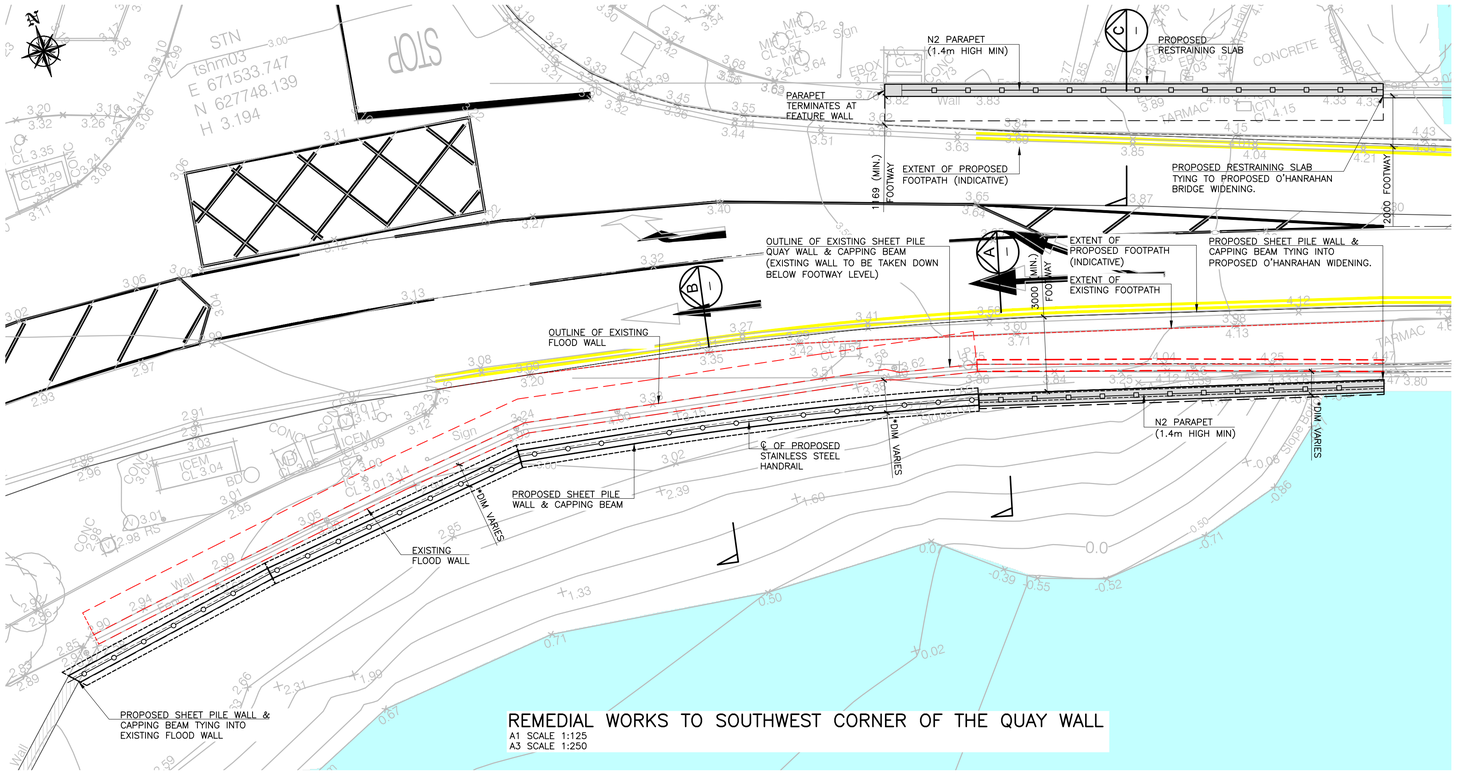
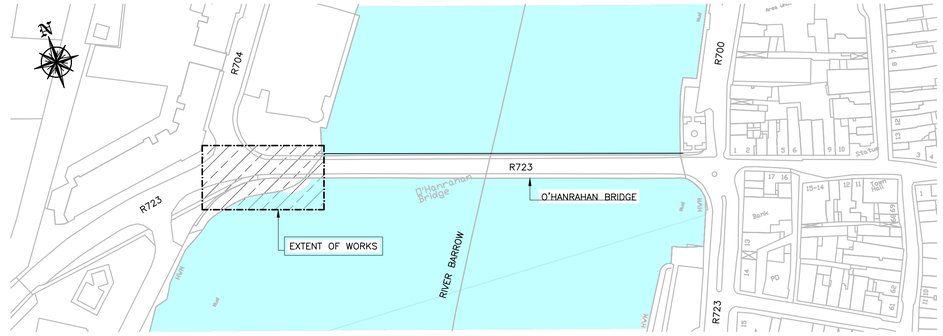
DO NOT SCALE USE FIGURED DIMENSIONS ONLY



REMEDIAL WORKS TO SOUTHWEST CORNER OF THE QUAY WALL

A1 SCALE 1:125
A3 SCALE 1:250

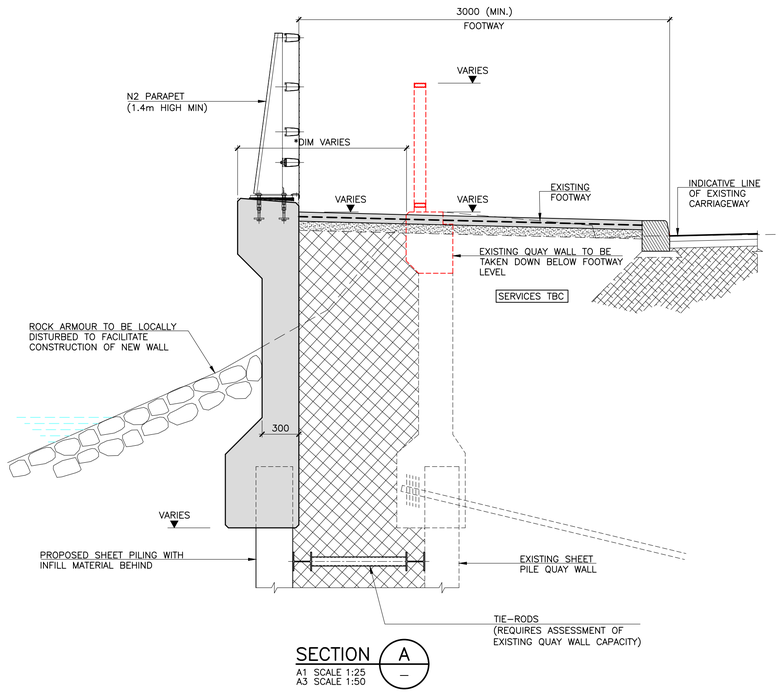


KEY PLAN

A1 SCALE 1:1500
A3 SCALE 1:3000

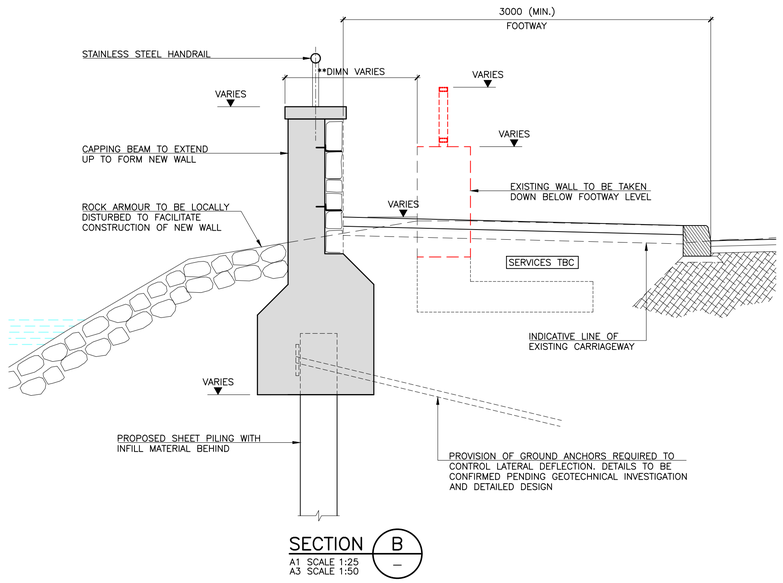
SITE LOCATION

A1 SCALE 1:50000
A3 SCALE 1:100000



SECTION A

A1 SCALE 1:25
A3 SCALE 1:50

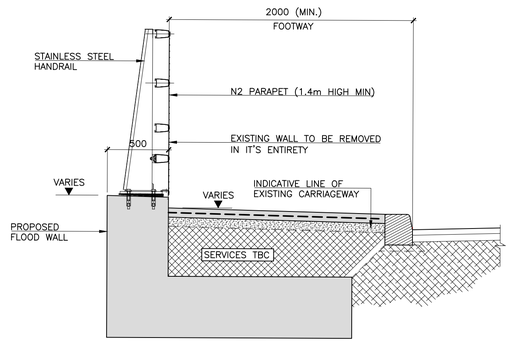


SECTION B

A1 SCALE 1:25
A3 SCALE 1:50

NOTES:

1. ALL DIMENSIONS IN MILLIMETRES, UNLESS OTHERWISE NOTED.
2. ALL LEVELS ARE IN METRES TO ORDNANCE DATUM MALIN HEAD.
3. ALL CO–ORDINATES ARE IN METRES TO IRISH TRANSVERSE MERCATOR (ITM).



SECTION C
(TYPICAL NORTHWEST QUAY WALL CROSS SECTION)

(NORTHWEST WALL SIMILAR)
A1 SCALE 1:25
A3 SCALE 1:50

Comhairle Contae Loch Garman
Wexford County Council

Mheanma agus Misneach

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No.	Revision	Date	By	Chk'd	App'd

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www.rod.ie

Drawn	Designed	Checked	Approved	Suitability Code - Description
DS	CH	MR	JK	S4 - Stage Approval

Project Stage	Preliminary
Project Title	O'Hanrahan Bridge Widening Project
Drawing Title	Remedial Works to Southwest Corner of the Quay Wall
Drawing Number	Project | Originator | Volume | Location | Type | Role | Number: WBRS - ROD - ENV - S101 - DR - CB - 30014
Scale (A1)	As Shown
Date:	June 2022
Job No:	21.143
Rev:	P0

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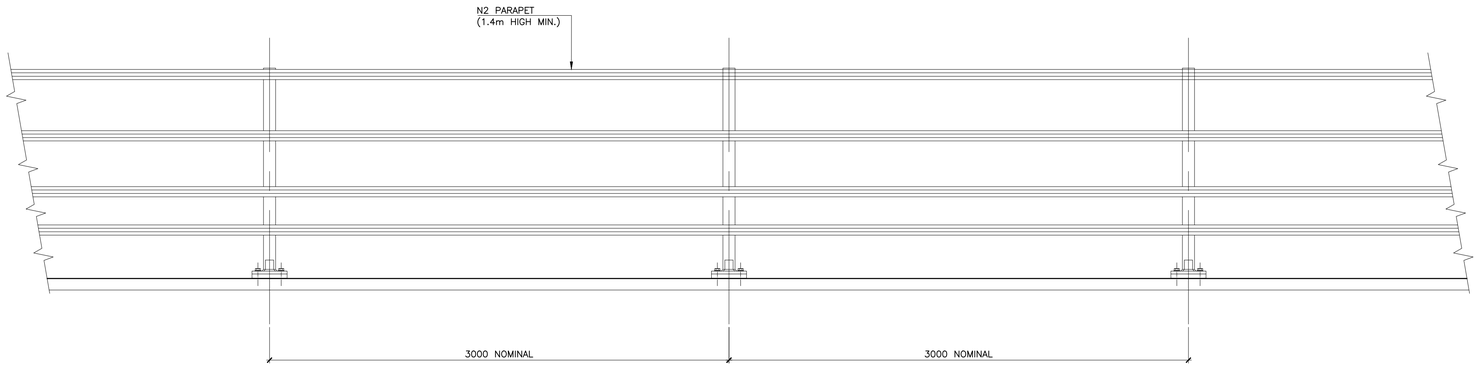
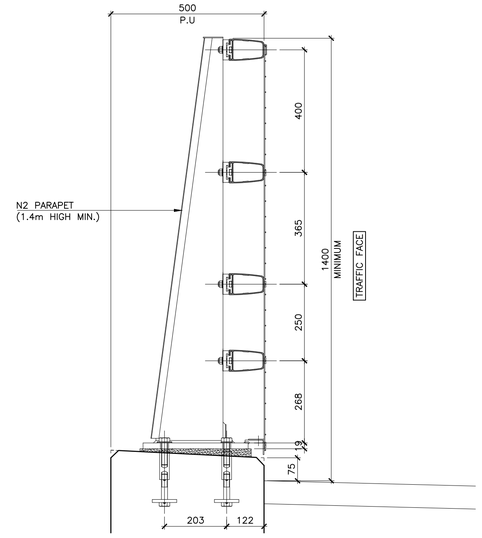
DO NOT SCALE USE FIGURED DIMENSIONS ONLY



TYPICAL PROPOSED PARAPET ELEVATION

A1 SCALE 1:20
A3 SCALE 1:40



TYPICAL PROPOSED PARAPET SECTION

A1 SCALE 1:10
A3 SCALE 1:20

EXISTING PARAPET SAMPLE

PROPOSED PARAPET SAMPLE

NOTES:

1. ALL DIMENSIONS IN MILLIMETERS, UNLESS OTHERWISE NOTED.
2. ALL LEVELS ARE IN METRES TO ORDNANCE DATUM MALIN HEAD.
3. ALL CO-ORDINATES ARE IN METRES TO IRISH TRANSVERSE MERCATOR (ITM).

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Wexford County Council

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Drawn	Designed	Checked	Approved	Suitability Code - Description
ZZX	CH	MR	JK	S4 - Stage Approval

Project Stage	Preliminary
Project Title	O'Hanrahan Bridge Widening Project
Drawing Title	Proposed Bridge Parapets

Drawing Number	Project	Originator	Volume	Location	Type	Role	Number
	WBRC	ROD	ENV	S101	DR	CB	30015

Scale (A1)	Date:	Job No:	Rev:
As Shown	Mar. 2022	21.143	P0

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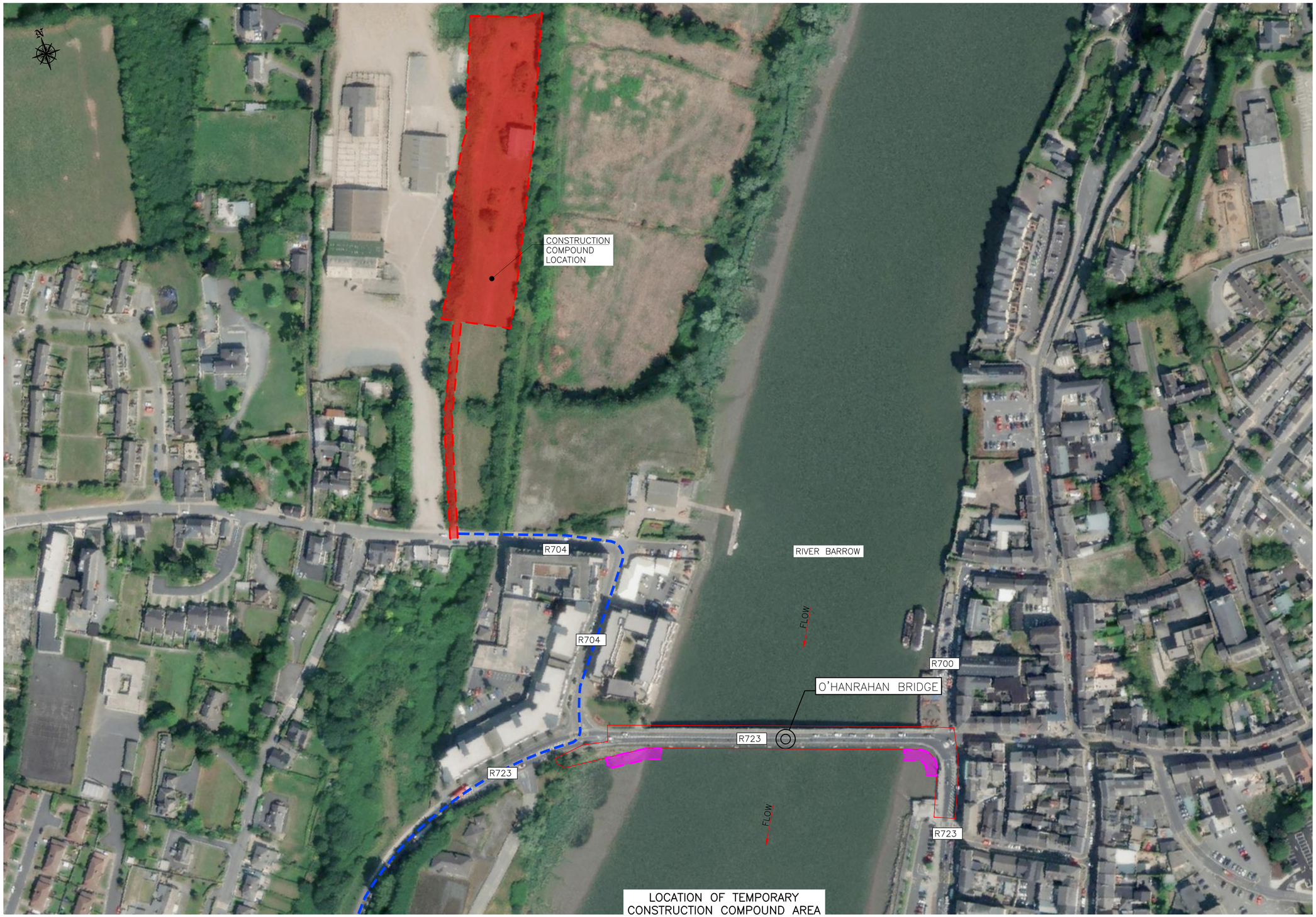
DO NOT SCALE USE FIGURED DIMENSIONS ONLY



LEGEND:

- DEVELOPMENT BOUNDARY
- HAULAGE ROUTE
- POTENTIAL TEMPORARY CONSTRUCTION COMPOUND AREAS
- TEMPORARY WORK AREAS

LOCATION OF TEMPORARY CONSTRUCTION COMPOUND AREA

A1 SCALE 1:1250
A3 SCALE 1:2500

Comhairle Contae Loch Garman
Wexford County Council

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Drawn	Designed	Checked	Approved	Suitability Code - Description
ZZX	CH	MR	JK	S4 - Stage Approval

Project Stage	Preliminary
Project Title	O'Hanrahan Bridge Widening Project
Drawing Title	Location of Temporary Construction Compound Area

Drawing Number	Project	Originator	Volume	Location	Type	Role	Number
	WBRC	ROD	ENV	S101	DR	CB	30016

Scale (A1)	Date:	Job No:	Rev:
As Shown	MAY 2022	21.143	P0

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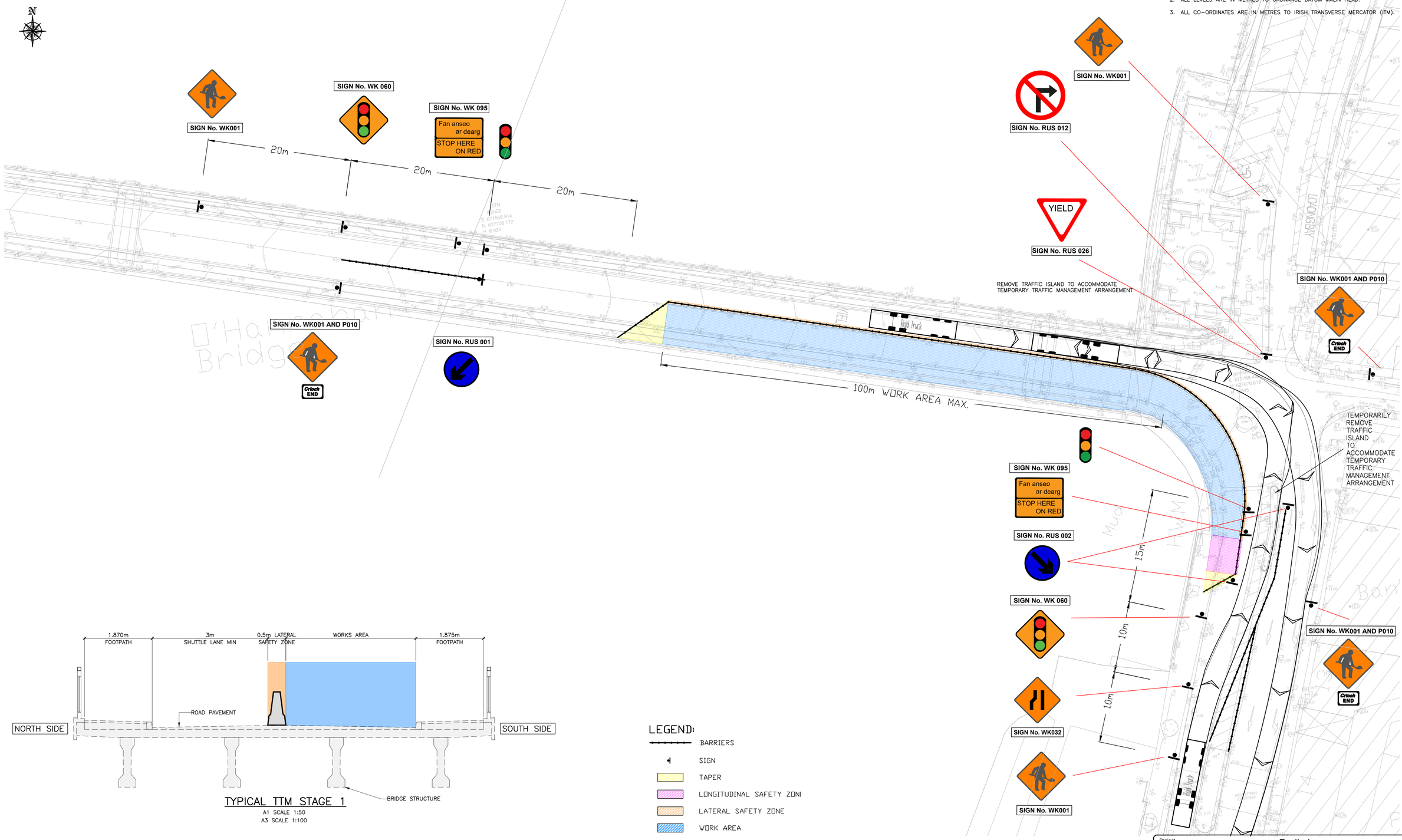

TYPICAL TTM STAGE 1

A1 SCALE 1:50
A3 SCALE 1:100

LEGEND:

- BARRIERS
- SIGN
- TAPER
- LONGITUDINAL SAFETY ZONE
- LATERAL SAFETY ZONE
- WORK AREA

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Wexford County Council

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Drawn	Designed	Checked	Approved	Suitability Code - Description
OB	CH	MR	JK	S4 - Stage Approval

Project Stage	Preliminary
Project Title	O'Hanrahan Bridge Widening Project
Drawing Title	Temporary Traffic Management Plan Stage 1 of 5
Drawing Number	Project | Originator | Volume | Location | Type | Role | Number: WBRC - ROD - ENV - S101 - DR - CB - 30017
Scale (A1)	1:250
Date:	Sept 2021
Job No:	21.143
Rev:	P0

DO NOT SCALE USE FIGURED DIMENSIONS ONLY

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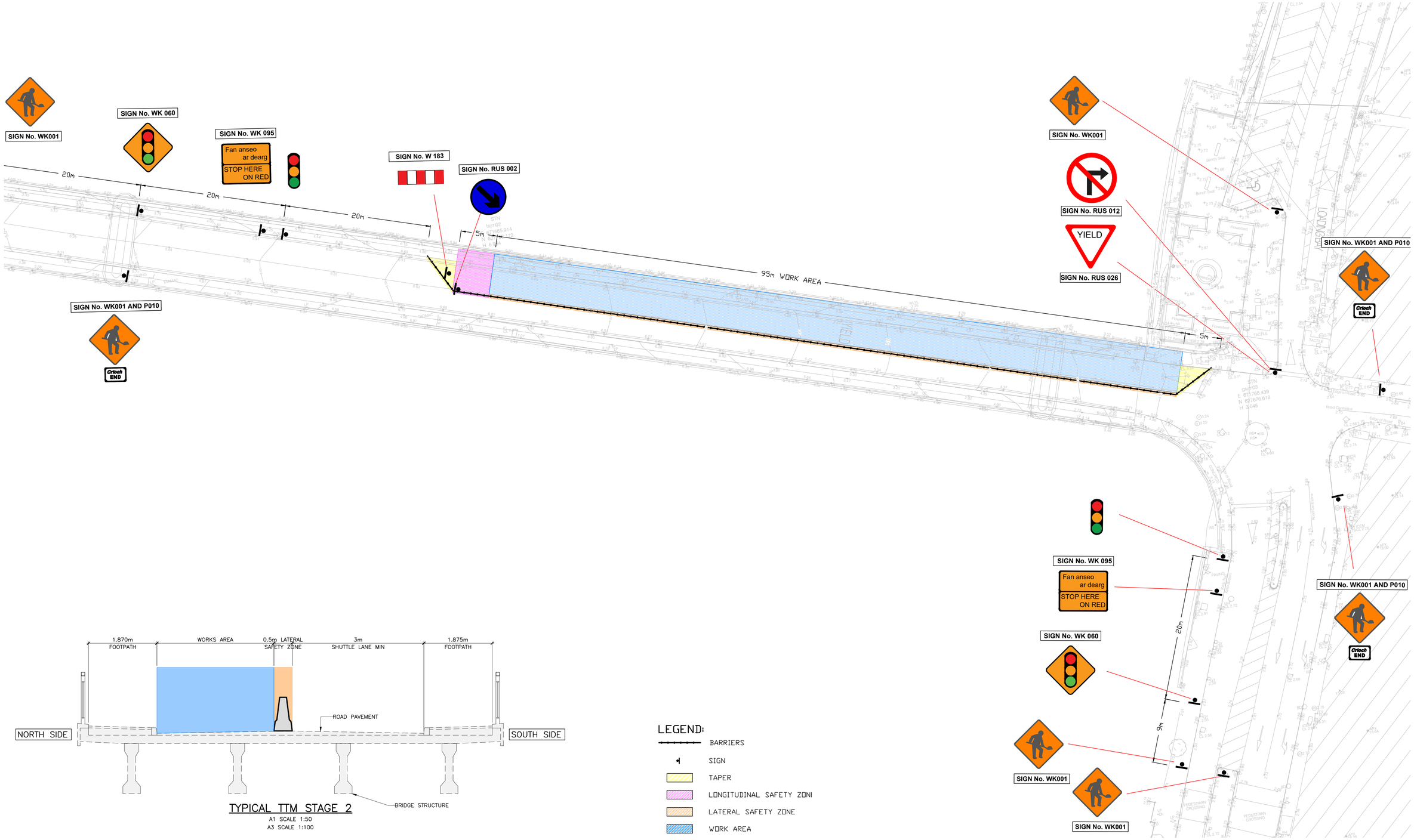

TYPICAL TTM STAGE 2

A1 SCALE 1:50

A3 SCALE 1:100

LEGEND:

- BARRIERS
- SIGN
- TAPER
- LONGITUDINAL SAFETY ZONE
- LATERAL SAFETY ZONE
- WORK AREA

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OB	CH	MR	JK	S4 - Stage Approval

Project Stage	Preliminary
Project Title	O'Hanrahan Bridge Widening Project
Drawing Title	Temporary Traffic Management Plan Stage 2 of 5

Drawing Number	Project	Originator	Volume	Location	Type	Role	Number
	WBRC	ROD	ENV	S101	DR	CB	30018

Scale (A1)	1:250	Date:	Sept 2021	Job No:	21.143	Rev:	P0

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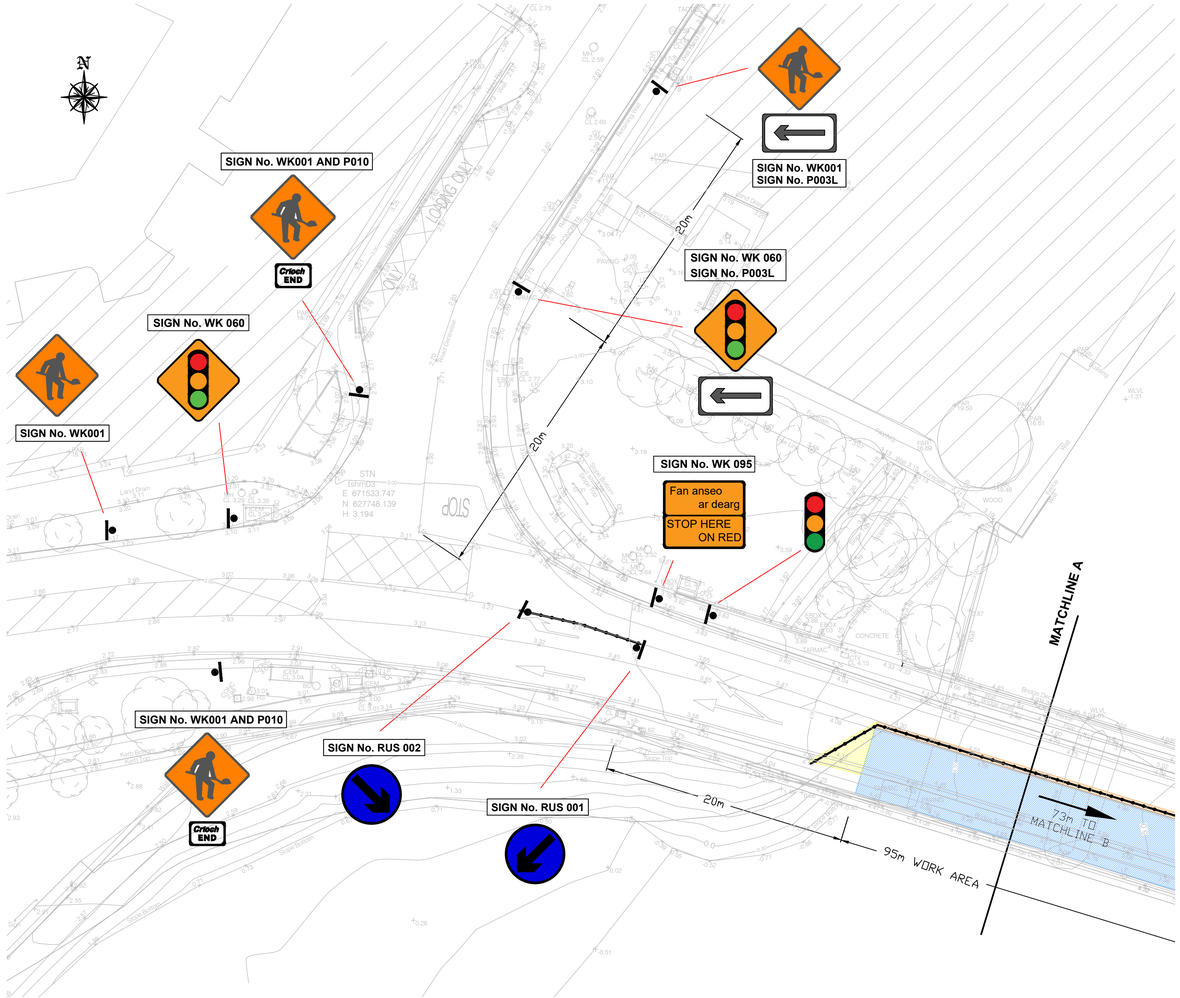

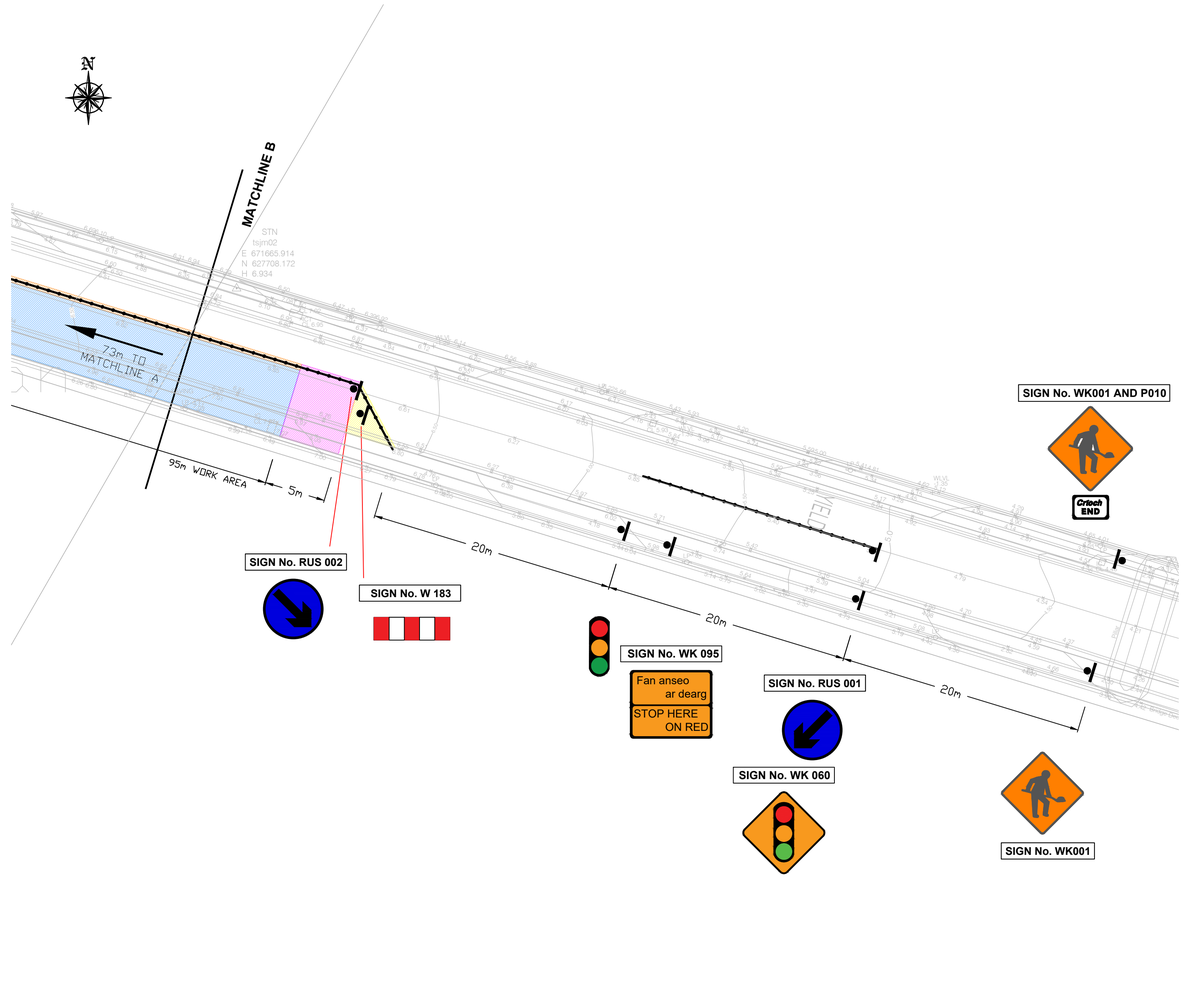

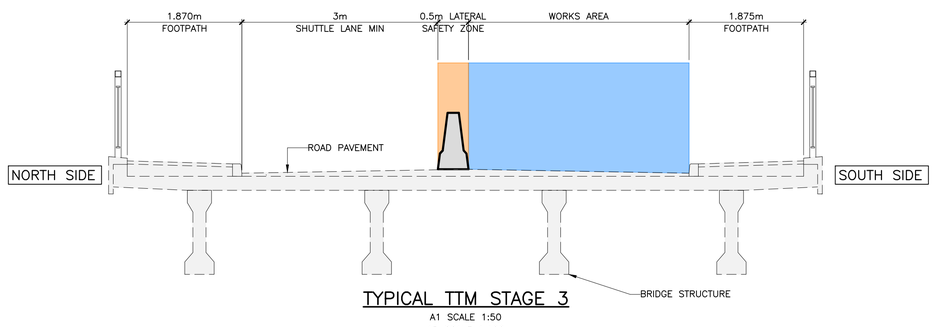

TYPICAL TTM STAGE 3

A1 SCALE 1:50
A3 SCALE 1:100

LEGEND:

- BARRIERS
- SIGN
- TAPER
- LONGITUDINAL SAFETY ZONE
- LATERAL SAFETY ZONE
- WORK AREA

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Drawn	Designed	Checked	Approved	Suitability Code - Description
OB	CH	MR	JK	S4 - Stage Approval

Project Stage	Preliminary
Project Title	O'Hanrahan Bridge Widening Project
Drawing Title	Temporary Traffic Management Plan Stage 3 of 5
Drawing Number	Project | Originator | Volume | Location | Type | Role | Number: WBRC - ROD - ENV - S101 - DR - CB - 30019
Scale (A1)	1:250
Date:	Sept 2021
Job No:	21.143
Rev:	P0

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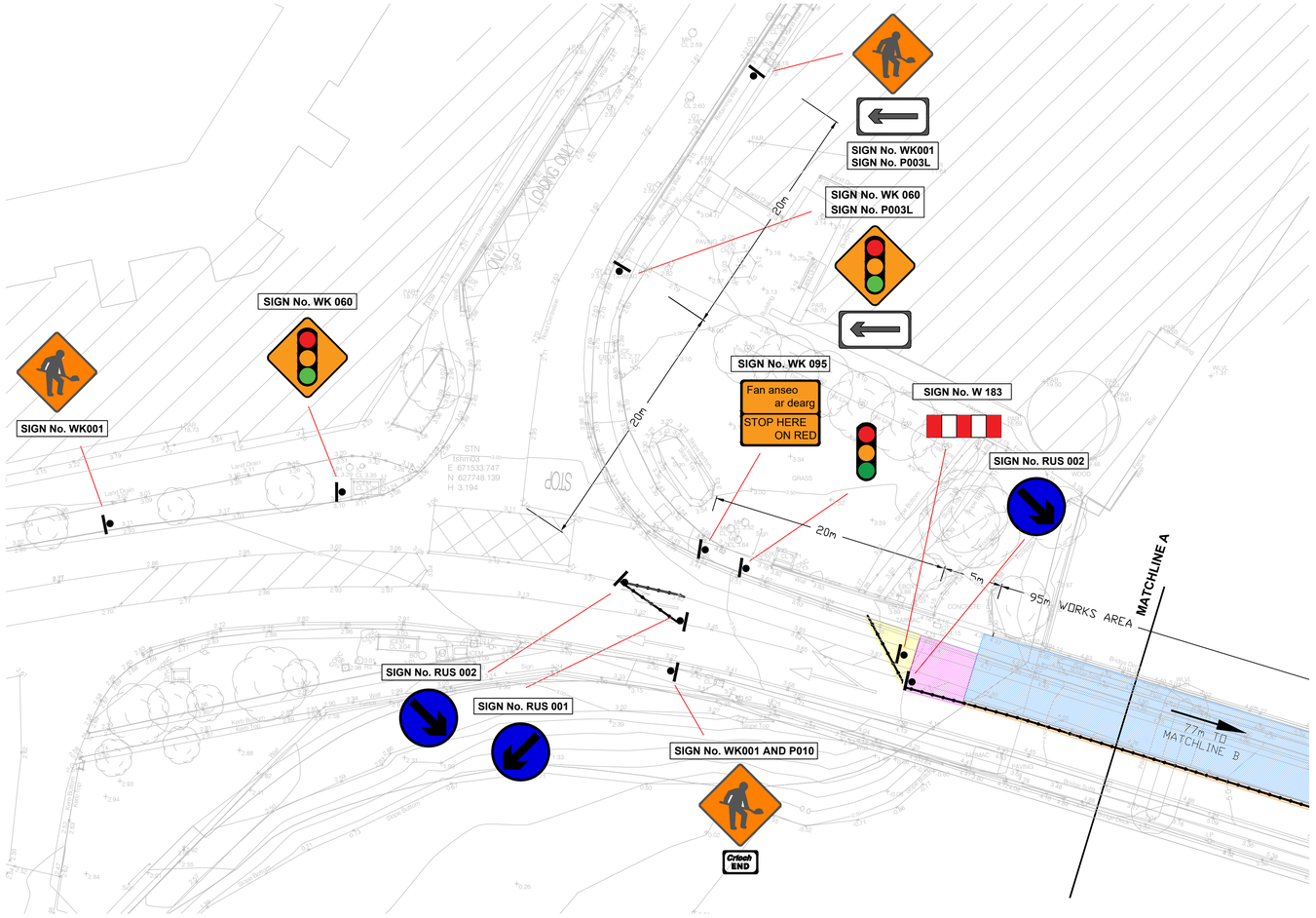

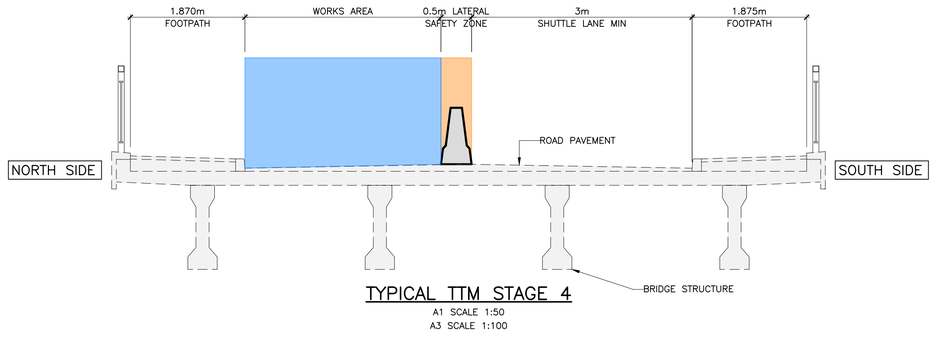

TYPICAL TTM STAGE 4

A1 SCALE 1:50
A3 SCALE 1:100

LEGEND:

- BARRIERS
- SIGN
- TAPER
- LONGITUDINAL SAFETY ZONE
- LATERAL SAFETY ZONE
- WORK AREA

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Drawn	Designed	Checked	Approved	Suitability Code - Description
OB	CH	MR	JK	S4 - Stage Approval

Project Stage	Preliminary
Project Title	O'Hanrahan Bridge Widening Project
Drawing Title	Temporary Traffic Management Plan Stage 4 of 5

Drawing Number	Project	Originator	Volume	Location	Type	Role	Number
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Scale (A1)	1:250	Date:	Sept 2021	Job No:	21.143	Rev:	P0

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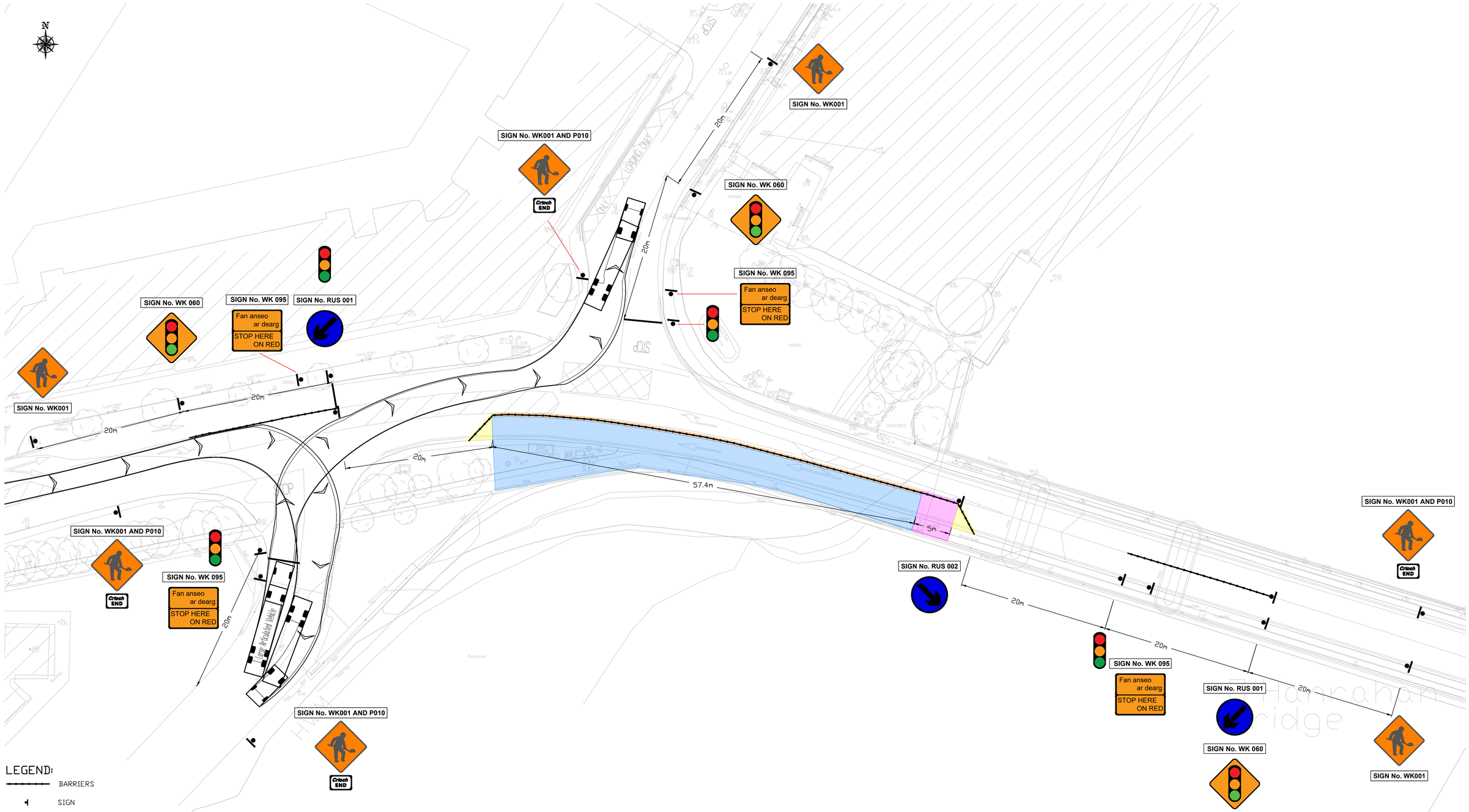

NOTES:

1. ALL DIMENSIONS IN MILLIMETERS, UNLESS OTHERWISE NOTED.
2. ALL LEVELS ARE IN METRES TO ORDNANCE DATUM MALIN HEAD.
3. ALL CO-ORDINATES ARE IN METERS TO IRISH TRANSVERSE MERCATOR (ITM).

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Drawn	Designed	Checked	Approved	Suitability Code - Description
AC	CH	MR	JK	S4 - Stage Approval

Project Stage	Preliminary
Project Title	O'Hanrahan Bridge Widening Project
Drawing Title	Temporary Traffic Management Plan Stage 5 of 5
Drawing Number	Project | Originator | Volume | Location | Type | Role | Number: WBRC - ROD - ENV - S101 - DR - CB - 30021
Scale (A1)	1:250
Date:	August 2022
Job No:	21.143
Rev:	P0

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Thomastown pNHA
River Nore SPA
Inistioge pNHA
Ice House, Near Inistioge, Co. Kilkenny pNHA
Blackstairs Mountains SAC
Slaney River Valley SAC
Murphy's Of The River pNHA
Rathsnagadan Wood pNHA
Pollmounty River Valley pNHA
River Barrow And River Nore SAC
Kilkeasy Bog pNHA
Kylecorragh Wood pNHA
Brownstown Wood pNHA
Proposed Development
Oaklands Wood pNHA
River Barrow And River Nore SAC
Ballykelly Marsh pNHA
Barrow River Estuary pNHA
Lough Cullin pNHA
Boley Fen pNHA
Granferry pNHA
Lower River Suir SAC
King's Channel pNHA
Ballyhack pNHA
Bannow Bay SAC
Bannow Bay pNHA
Tintern Abbey pNHA
Kilbarry Bog pNHA
Duncannon Sandhills pNHA
Waterford Harbour pNHA
Belle Lake pNHA
Bannow Bay SPA
Hook Head SAC
Hook Head pNHA
Tramore Back Strand SPA
Tramore Dunes and Backstrand SAC

N

0 3.75 7.5 15 Kilometers

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Legend

- Proposed Development Boundary
- Zone of Influence
- Special Area of Conservation (SAC)
- Special Protection Area (SPA)
- Proposed Natural Heritage Area (pNHA)

Project Stage: Preliminary

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e-mail : info@rod.ie
Website : www.rod.ie
www.aecom.com

Drawn	Designed	Checked	Approved	Suitability Code - Description
RoH	KTS	POS	JK	S4 - Stage Approval

Project Title: O'Hanrahan Bridge Widening Project

Drawing Title: Zone of Influence

Drawing Number	Project	Originator	Volume	Location	Type	Role	Number
	WBRC	ROD	ENV	S101	DR	CB	30022

Scale (A1): 1:50,000@A1 | Date: October 2022 | Job No: 21.143 | Rev: P0

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Legend

- Site Boundary
- Study Area
- BL3 - Buildings and artificial surfaces
- CC1 - Sea walls, piers and jetties
- FW4 - Drainage ditches
- WL1 - Hedgerows
- WL2 - Treelines
- BL3 - Buildings and artificial surfaces
- CC1 - Sea walls, piers and jetties
- CW2 - Tidal rivers
- FS1 - Reed and large sedge swamps
- ED3 - Recolonising bare ground
- WD5 - Scattered trees and parkland
- GA2 - Amenity grassland (improved)
- GA1 - Improved agricultural grassland
- WS2 - Immature woodland
- GS2 - Dry meadows and grassy verges
- LS4 - Mud shores
- WS1 - Scrub
- WD1 - (Mixed) broadleaved woodland

N

0 50 100 200 Meters

Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

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Wexford County Council

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RoH	KTS	POS	JK	S4 - Stage Approval

Project Stage	Preliminary
Project Title	O'Hanrahan Bridge Widening Project
Drawing Title	Habitat Mapping

Drawing Number	Project	Originator	Volume	Location	Type	Role	Number
	WBRC	ROD	ENV	S101	DR	CB	30023

Scale (A1)	Date:	Job No:	Rev:
1:1,000@A1	October 2022	21.143	P0

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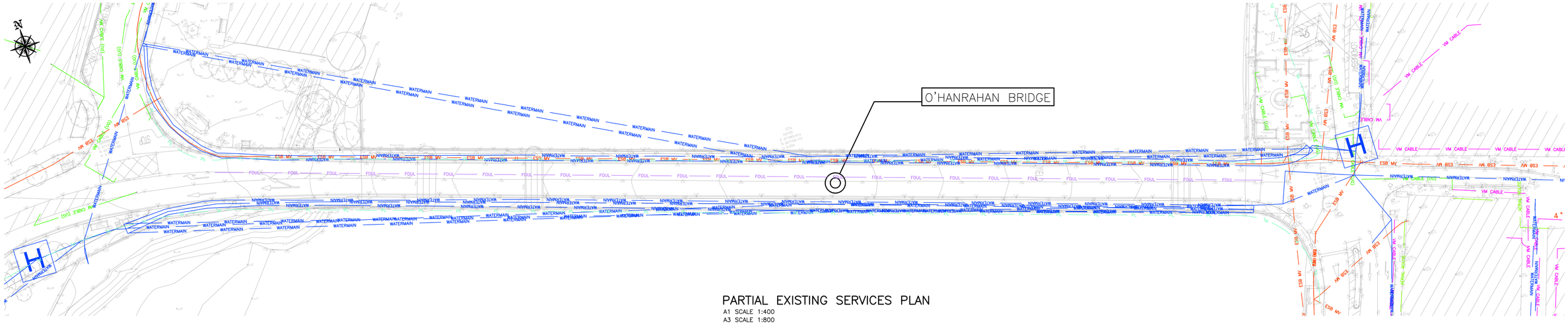
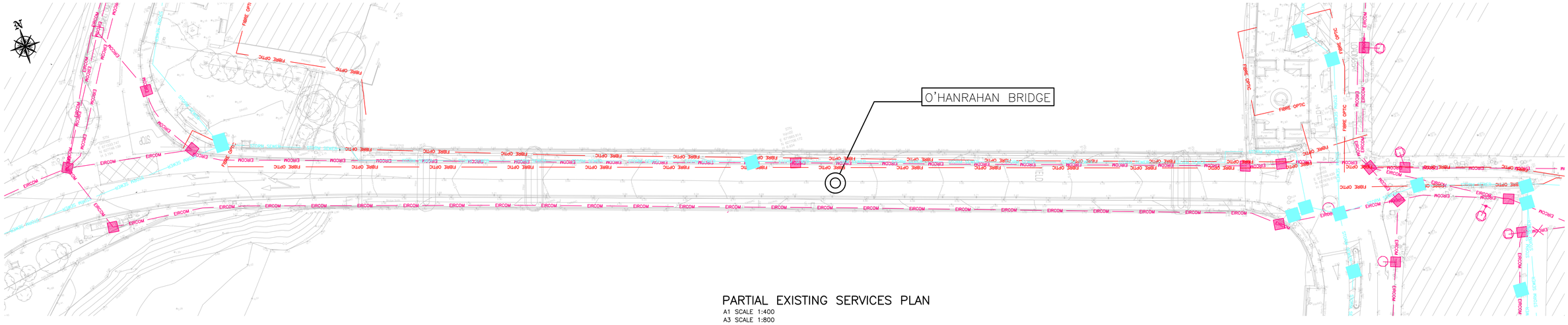
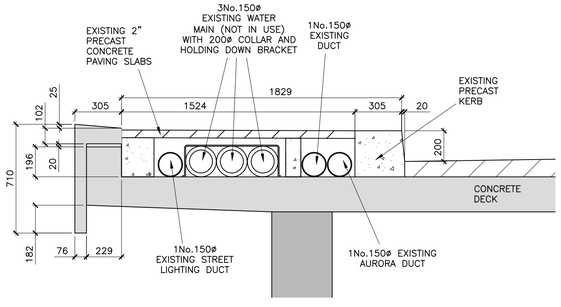


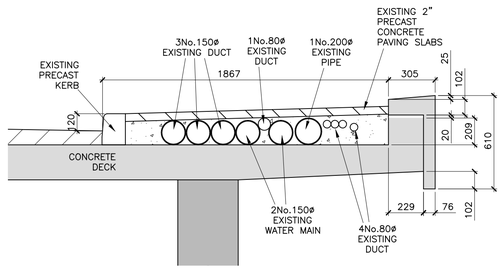
PARTIAL EXISTING SERVICES PLAN
A1 SCALE 1:400
A3 SCALE 1:800



PARTIAL EXISTING SERVICES PLAN
A1 SCALE 1:400
A3 SCALE 1:800



DOWNSTREAM FOOTPATH
'EXISTING' SERVICES
A1 SCALE 1:20
A3 SCALE 1:40



UPSTREAM FOOTPATH
'EXISTING' SERVICES
A1 SCALE 1:20
A3 SCALE 1:40

NOTES:

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2. ALL LEVELS ARE IN METRES ABOVE ORDNANCE DATUM AT MALIN HEAD.
3. ALL CO-ORDINATES ARE TO IRISH TRANSVERSE MERCATOR.

LEGEND:

- FIBRE OPTIC — VIRGIN MEDIA FIBRE OPTIC
- PL — PUBLIC LIGHTING
- ESB MV — ESB UTILITIES
- VM CABLE (UG) — VRIGIN MEDIA CABLE (UG)
- VM CABLE — VRIGIN MEDIA CABLE
- AERIAL ROUTE — VRIGIN MEDIA AERIAL ROUTE
- STORM SEWER — STORM WATER SEWER
- FOUL — LIVE FOUL SEWER
- EIRCOM — EIRCOM
- WATERMAIN — PUBLIC WATER MAIN

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Wexford County Council

Ilkenna agus Mionvan

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ZZX	CH	MR	JK	S4 - Stage Approval

Project Stage	Preliminary
Project Title	O'Hanrahan Bridge Widening Project
Drawing Title	Existing Utilities
Drawing Number	Project | Originator | Volume | Location | Type | Role | Number: WBRC - ROD - ENV - S101 - DR - CB - 30024
Scale (A1)	As Shown
Date:	MAY 2022
Job No:	21.143
Rev:	P0

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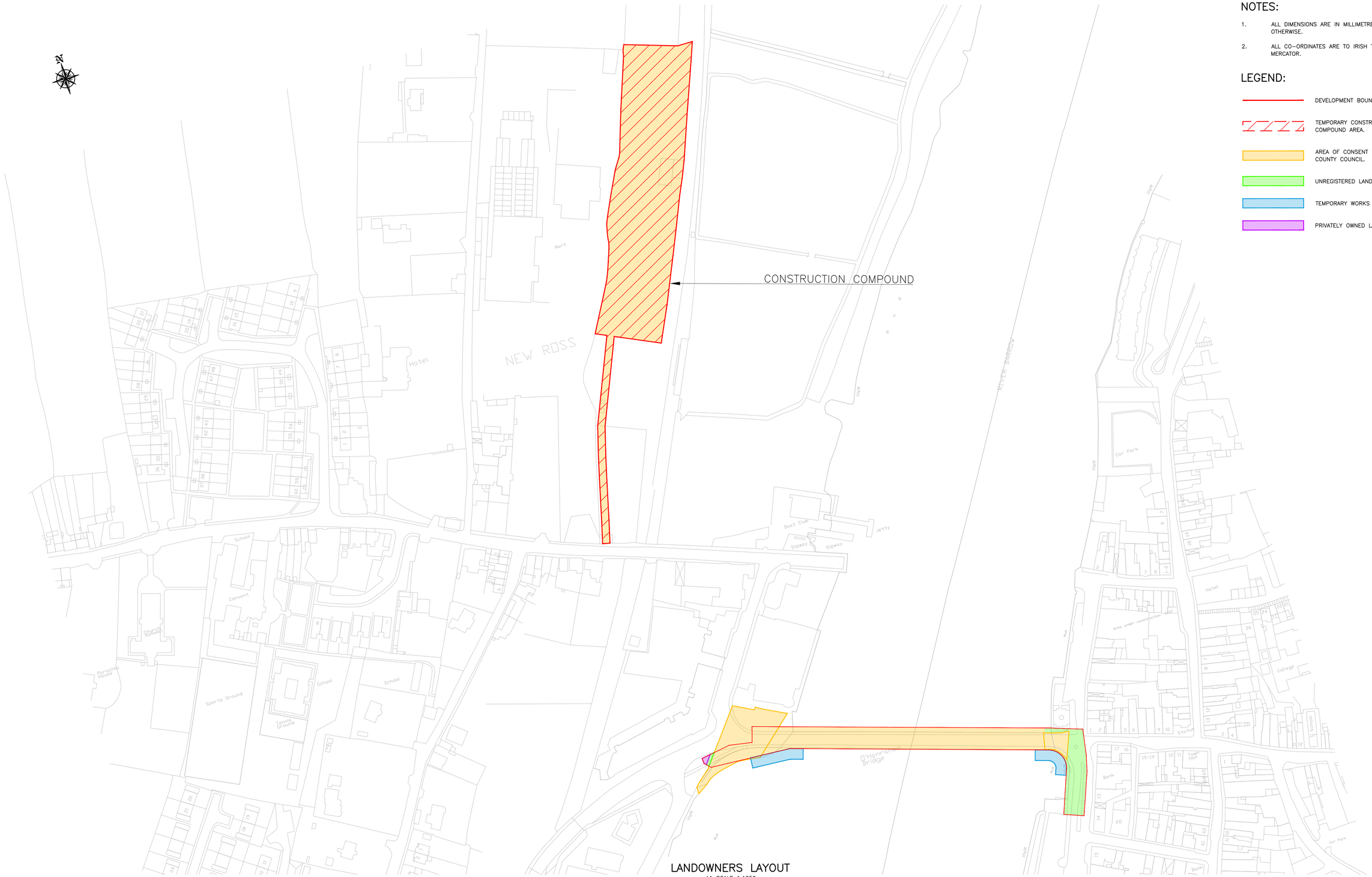
LEGEND:

- DEVELOPMENT BOUNDARY.
- TEMPORARY CONSTRUCTION COMPOUND AREA.
- AREA OF CONSENT FROM WEXFORD COUNTY COUNCIL.
- UNREGISTERED LAND.
- TEMPORARY WORKS AREA.
- PRIVATELY OWNED LAND.



LANDOWNERS LAYOUT

A1 SCALE 1:1250
A3 SCALE 1:2500

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Drawn	Designed	Checked	Approved	Suitability Code - Description
LW	CH	MR	JK	S4 - Stage Approval

Project Stage	Preliminary
Project Title	O'Hanrahan Bridge Widening Project
Drawing Title	Land Ownership
Drawing Number	Project | Originator | Volume | Location | Type | Role | Number: WBRC - ROD - ENV - S101 - DR - CB - 30025
Scale (A1)	As Shown
Date:	JUNE 2022
Job No:	21.143
Rev:	P0

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Appendix B
Construction Environmental Management Plan

Appendix B

Prepared by
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Email: info@rod.ie www.rod.ie

O'Hanrahan Bridge Widening

Construction Environmental Management Plan

March 2023

Client:
Kildare County Council

ROD
ROUGHAN & O'DONOVAN

O'Hanrahan Bridge Widening

Construction Environmental Management Plan

TABLE OF CONTENTS

1. INTRODUCTION

This Construction Environmental Management Plan (CEMP) is prepared for the proposed O'Hanrahan Bridge Widening ("the proposed development") on behalf of Kildare County Council.

1.1 Purpose of the CEMP

This CEMP applies to all works associated with the proposed development.

As a contractor has not yet been appointed, this Construction Environmental Management Plan (CEMP) has not been formally adopted and further development and commitment to the CEMP will be undertaken following selection of Contractors and before commencement of site works.

It presents the approach and application of environmental management and mitigation for the construction of the proposed development. It aims to ensure that adverse effects from the construction phase of the proposed development, on the environment and the local communities, are avoided or minimised. It does not describe mitigation measures relating to the operation and decommissioning of the proposed development. These are provided in the Planning Report. The CEMP provides the environmental management framework for the appointed Contractors and sub-contractors as they incorporate the mitigating principles to ensure that the work is carried to reduce adverse effects on the environment. The construction management staff as well as contractors and sub-contractors' staff must comply with the requirements and constraints set forth in the CEMP in developing the finalised CEMPs. The key environmental aspects associated with the construction of the 'O'Hanrahan Bridge Widening' project, the appropriate mitigation and monitoring controls, are identified in this CEMP and its supporting documentation.

The implementation of the requirements of the CEMP will ensure that the construction phase of the project is carried out in accordance with the commitments made by Kildare County Council for the proposed development, and as required under the planning application. Once commenced, the CEMP is considered a living document that will be updated according to changing circumstances on the project and to reflect current construction activities. The CEMP will be reviewed on an ongoing basis during the construction process and will include information on the review procedures.

CEMP contains the following supporting environmental documents:

Appendix A	Natura Impact Statement – Mitigation Measures
Appendix B	Statutory Planning Consent including any additional Environmental commitments
Appendix C	Environmental Operating Plan
Appendix D	Incident Response Plan

2. DESCRIPTION OF THE PROPOSED DEVELOPMENT

2.1 Project Description

O'Hanrahan Bridge is located in the urban centre of New Ross, in Co. Wexford, where it carries the single carriageway R723 Regional Road over the River Barrow. The river forms the boundary between County Wexford and County Kilkenny for the most part. The catchment includes a considerable amount of arable land, as well as pasture, woodland and large towns such as New Ross.

The primary function of the proposed development is to provide a shared pedestrian and cycleway from the New Ross quay front to Rosbercon Quay on the north-western side of the bridge, that is accommodated along the widened section of O'Hanrahan Bridge.

O'Hanrahan Bridge is a 9-span post-tensioned concrete beam and reinforced concrete slab bridge over the River Barrow in New Ross town, Co. Wexford. The overall length of the bridge is 175m with an out-to-out width of 11.6m. The proposed works aim to widen the bridge deck by approx. 1m in order to accommodate an enhanced combined pedestrian and cycleway. The widening works are to take place on the southern side of the bridge through the replacement of the existing bridge deck cantilever and parapet edge beam. As a result, the instream piers will not be affected. However, in order to tie the new widened section into the quays at the eastern end and ensure continuity of the new cycleway, the scheme requires for an approx. 20m long section of the existing quay wall on the south-east corner of the bridge to be reconstructed up to 2m out from the existing quay wall. This section will require working instream. Similarly, approx. 60m section of the south-west corner of the bridge will require widening works by approximately 1m out from the existing wall. The length of new sheet piles in front of the wingwalls will be approximately 19m, of which 5m will be located directly in the river. The remaining 41m of new wall will be constructed in front of the existing flood wall, all driven at the top of the embankment above the water level.

In addition, the edge beam on the northern side of the bridge will be strengthened to accommodate upgrading of the existing parapet. The existing surfacing and footways will be removed to allow the provision of bridge deck waterproofing and joint replacements before the widened footways are constructed and carriageway surfacing reinstated. The works will involve a number of service diversions and upgrades in both footways. Finally, it is also proposed to replace the existing bridge lighting.

Furthermore, concrete repair works will be undertaken on the existing bridge in areas where minor concrete defects are identified.

2.1.1 Overview of the activities on site

The construction programme for the proposed development is approximately 36 weeks (9 months).

- Site setup and establishment of construction compound;
- Ground Investigations (GI);
    - GI works will be undertaken in the area of the southeast and southwest quay wall to inform the design of the proposed sheet pile wall. The works will consist of a trial pit (TP01) and three river boreholes (BH01, BH02 and BH03).

- Widening of the bridge deck (southern side);
    - The widening of the southern side of the bridge will consist of approx. 1m wide reinforced concrete cantilever slab that will be made integral with the existing deck slab. The cantilever slab will include an upstand edge beam to support the proposed new N2 parapet.
- Widening of the quay/wing walls (south-east corner);
    - The quay wall will be extended by up to 2m on the south-east corner to facilitate the transition from the widened southern part of the bridge to the existing quay wall on the eastern side of the bridge. A sheet pile wall will be installed up to 2m from the face of the existing quay wall. Installation of the sheet piles will be completed via a piling rig from a river barge. The existing flood defence wall will be taken down below footway level and the space between the sheet pile wall and the front face of the existing quay wall will be filled with compacted fill material.
- Widening of the quay/wing walls (south-west corner);
    - The quay wall will be extended by approximately 1m on the south-west corner to facilitate the transition from the widened southern part of the bridge to the existing quay wall on the western side of the bridge. A sheet pile wall will be installed 1m from the face of the existing southern wingwall. Installation of the sheet piles will be completed via a piling rig either from the landside or from a river barge. The existing flood defence wall will be taken down below footway level and replaced by a matching flood defence wall along the line of the widened quay wall. These will be supported by a new reinforced concrete capping beam on the sheet piles. The new sheet piled wing wall will be tied back to the existing quay wall and backfilled with compacted fill material.
- Replacement of northern parapet;
    - The existing parapets are approximately 1m high and will be replaced with 1.4m high N2 containment level parapets in accordance with DN-REQ-03034. The parapet edge beam on the northern side of the bridge will be reconstructed to facilitate the higher containment parapet.
- Resurfacing and waterproofing of bridge deck;
    - To facilitate the waterproofing of the bridge deck, the existing road surface will be excavated to expose the top of the bridge deck. The deck surface will be prepared, and multiple layers of waterproofing membrane will be applied to the surface. New road surfacing material will be laid, and footpaths will be reconstructed.
- Installation of expansion joints;
- Concrete repairs to underside of the bridge;
- Relocation of underground utilities, where required;
- All ancillary works.

2.2 Construction Programme Sequence

The construction methodology is preliminary and subject to change following the detailed design and preparation of the CEMP by the appointed Contractor. Access to and across O'Hanrahan Bridge will be maintained throughout the construction phase. However, there will be unavoidable restrictions to single lane traffic which KCC will endeavour to keep to a minimum to avoid significant impacts. These will be detailed as part of the CEMP which will be developed by the Contractor and agreed with Kildare County Council at contract award stage.

The works are expected, subject to An Bord Pleanála approval, to commence in late 2023, with construction likely to be approximately 9 months in duration.

2.2.1 Construction sequence and methodology

The works will consist of the widening and upgrade of the main bridge itself, and the construction of the southeast and southwest quay wall. Due to the length of the bridge, and the need to keep traffic open with at least one lane open at all times, it is likely that the work will consist of at least four phases on the bridge itself and a possible fifth phase for the quay walls. The proposed works will be undertaken on a live carriageway and will necessitate the use of lane closures and potential night works to complete the construction. Refer to traffic management drawings for details of traffic management phasing.

Ground Investigations

A separate GI contract will be carried out prior to the commencement of the main works. GI river works will be undertaken in the following sequence (river borehole):

- Drilling equipment and personnel to be loaded onto jack-up barge at access point as agreed with the Client;
- The drilling rig will be positioned and secured over the moon pool (an opening inside the barge);
- Geotextile membrane will be placed on the working area;
- Absorbing padding and drip tray will be positioned beside/below rig engine;
- Positioning of barge and securing of jack-up legs once GPS location has been confirmed;
- Drilling will be carried out at low tide only using geobor-s rotary drilling and sample recovery of rock and soil;
- Once the scheduled depth is reached and upon approval from the Engineer, the drilling will stop, the barge will be positioned and secured at the next location and the process will be repeated.

GI road works will be undertaken in the following sequence (road trial pit):

- Appropriate Road Opening License (ROL) will be applied and received before commencing of the works;
- Traffic management will be implemented;
- The engineer will CAT scan the location of the works and marking the trace of any services;
- The excavator will locate into position and excavating to the required depth;
- If services are encountered impeding or preventing the full excavation of the trial pit relocation may be required;
- Excavated material will be logged and sampled for laboratory testing;
- Backfilling will be carried out immediately after the completion of the excavation.

Main bridge work sequencing

(1) Implement traffic management measures and lane closures for south-eastern side of bridge;

(2) Implement protective measures to prevent debris entering the river;

(3) Remove existing footpaths, road surfacing, waterproofing, expansion joints whilst protecting / diverting existing services and expose concrete deck;

(4) Remove existing lighting columns, parapets and breakout parapet edge beam and deck cantilever;

(5) Construct new widened cantilever slab, edge beams and lighting column corbels. Scaffolding to construct this slab will be propped/cantilevered off the existing bridge structure;

(6) Carry out concrete deck repairs where necessary;

(7) Install new parapets and lighting columns;

(8) Install new waterproofing;

(9) Construct new footpath/cycleway and drainage system;

(10) Install new carriageway surfacing and expansion joints;

(11) Switch traffic management to south-western end of bridge and repeat steps 2 to 11;

(12) Switch traffic management to north-eastern end of bridge;

(13) Implement protective measures to prevent debris entering the river, such as the use of silt-screens to trap and arrest any falling debris;

(14) Remove existing footpaths, road surfacing, waterproofing, expansion joints whilst protecting / diverting existing services and expose concrete deck;

(15) Divert existing watermain on northern side of bridge to southern side;

(16) Remove existing lighting columns, parapets and breakout parapet edge beam;

(17) Construct new edge beams and lighting column corbels;

(18) Carry out concrete deck repairs where necessary;

(19) Install new parapets and lighting columns;

(20) Install new waterproofing;

(21) Construct new footpath and drainage system;

(22) Install new carriageway surfacing and expansion joints;

(23) Switch traffic management to north-western end of bridge and repeat steps 14 to 24;

(24) Redivert watermain to northern side of bridge;

(25) Remove traffic management;

(26) Undertake concrete repairs to bridge abutments, piers and underside of deck as necessary;

(27) Remove protective measures in river.

Construction sequence of southeast quay wall

(1) Procurement of sheet piles and traffic management set up;

(2) Mobilisation of piling rig;

(3) Transportation of structural steelwork to lay down area;

(4) Installation of sheet piles to required embedded depth (approx. 22 linear m in length);

(5) Back-filling behind newly installed sheet piles with compacted granular 6N/P fill (approx. 150m^3), monitoring for movement;

(6) Following the installation of the sheet piled wall, scaffolding will be erected to facilitate the construction of the reinforced concrete capping beam (new flood

wall). The scaffolding will be cantilevered off of the sheet pile in order to avoid further instream work and also to prevent any concrete spillage or debris from entering the river;

(7) Erect formwork for reinforced concrete capping beam and tie reinforcement steel;

(8) Pour in-situ concrete for new capping beam and upstand wall to match existing flood defence wall (approx. 40m^3 of concrete);

(9) Take down existing flood defence wall to below footpath level (reuse existing stonework where possible);

(10) Completion of footway pavement and erection of stone cladding to new flood defence wall (approx. 10m^3 of stonework);

(11) Removal of traffic management.

Construction sequence of southwest quay wall

(1) Temporary removal of existing rock armour using an excavator;

(2) Procurement of sheet piles and traffic management set up;

(3) Mobilisation of piling rig;

(4) Transportation of structural steelwork to lay down area;

(5) Installation of sheet piles to required embedded depth (60 linear m);

(6) Back-filling behind newly installed sheet piles with compacted granular 6N/P fill (approx. 100m^3) and reinstatement of rock armour, monitoring for movement;

(7) Erect formwork for reinforced concrete capping beam and tie reinforcement steel;

(8) Following the installation of the sheet piled wall, scaffolding will be erected to facilitate the construction of the reinforced concrete capping beam (for new flood wall and parapet). The scaffolding will be cantilevered off of the sheet pile in order to avoid further instream work and also to prevent any concrete spillage or debris from entering the river;

(9) Pour in-situ concrete for new capping beam and upstand wall to match existing flood defence wall (approx. 60m x 1.5m^2 = 90m^3 of concrete);

(10) Install new N2 parapet;

(11) Take down existing flood defence wall and existing parapet to below footpath level (reuse existing stonework where possible);

(12) Completion of footway pavement and erection of stone cladding to new flood defence wall (approx. 10m^3 of stonework);

(13) Removal of traffic management.

Piling Methodology

- Piling is anticipated to be carried out from a jack-up barge positioned in the River Barrow to avoid disruptions to traffic and costly traffic management. The barge will carry a crane and/or long reach excavator equipped with a vibratory hammer that drives piles into the ground by vibration. In case of reaching a lower pile toe level than specified, impact driving may be required. The stack of sheet piles will be placed on an additional pontoon placed next to the barge, from a loading / unloading point on the west side of the River Barrow either at the marina, or on lands south of the bridge.

- Piling works will start from the southern end and progress towards the south-eastern abutment. It is proposed to complete the closing sheet pile at low tide so as to reduce impacts on aquatic species (i.e., avoid trapping fish).
- The work process involves the barge anchoring and stabilising itself, for which the barge shall be repositioned during high tide. Similarly, all the necessary material and personnel shall be transported during high tide.
- The pile is lowered to a position and the vibrating clamp is attached to the head of the pile. The vibrations generated by the vibratory hammer drive the pile into the ground. The vibration and noise generated by this process are continuous during the driving time but are less than those induced by impact driving. With the extent of piling works limited to approximately 20-25m in length, barge relocations are anticipated to be minor, or not required.
- The sheet pile alignment is set so that the back side of the sheet piles is at a distance of approximately 1m from the front face of the existing quay wall. Localised obstacles such as dislodged blocks in the mudflats will be removed by an excavator bucket prior to piling works.
- It is envisaged that piles will be embedded into the upper layer of weathered rock or dense gravels anticipated at ca. 15-20m below ground level (to be confirmed by the ground investigation). Sheet piles will meet the required top of wall level matching the existing quay wall level.
- The construction is assumed to be carried out during normal working hours (daytime), 6 days a week. The estimated timeframe for 20-25m sheet pile driving is approximately 4 weeks. This excludes set up and other activities on site, either prior to, or after pile driving. The piling will occur intermittently throughout the day, with the remainder of the time spent on ancillary processes such as setting up the barge, positioning the piles, checking tolerances, delivering material and personnel, and similar.

Piling durations to satisfy environmental requirements

The following general procedure will be followed for any pilling activities ("piling event" means any period of continuous piling; "quiet period" means any period in which there is no piling by any rig):

- Piling works shall not be undertaken between the 1st of April and the 31st May;
- There shall be no night-time piling;
- Vibratory piling shall be the standard method for the installation of all piles. Impact piling shall only be employed where the required pile toe level cannot be achieved by vibratory piling
- The duration of any vibratory piling event shall not exceed 180 piling minutes,
- The length of any impact piling event shall not exceed 200 strikes;
- Following every piling event, there shall be a quiet period of at least 30 minutes. Only following 30 minutes of no piling whatsoever can the cumulation of piling minutes be re-zeroed.

The above limitations apply to all piling activity for the proposed widening of the quay wall.

Based on the time expected to be required for the installation of each pile (including ancillary processes), the limits prescribed above will not prolong the proposed programme for riverside or landside piling.

Resurfacing and waterproofing of bridge deck

- To facilitate the waterproofing of the bridge deck, the existing road surface will be excavated to expose the top of the bridge deck;
- The deck surface will be prepared, cleaned and primed;
- Multiple layers of a waterproofing membrane will be applied to the surface;
- An adhesive coating will be applied to ensure the new material will stick;
- New (narrower) road surfacing material will be laid and rolled and footpaths will be reconstructed; and
- Road markings will be reapplied.

Concrete repairs to Piers, Abutments and Deck Soffit

- Concrete repairs will be carried out where minor areas of defective concrete are identified;
- Defective concrete will be broken out by handheld drill/impact hammer or other specified method; and
- The exposed surfaces will be suitably primed, and an approved proprietary prebagged repair mortar/concrete will be placed by hand and allowed to dry.
- Protective measures will be in place at all times during construction to prevent debris from falling into the river.

Table 2-2 Construction Programme

Construction Element	Approx. Duration of each task
Mobilisation, compound set up	2 weeks
Works on southern side of bridge	Approx. 4 months
Works on northern side of bridge	Approx. 4 months
Works on southeast quay wall*	Approx. 2 months (incl. 4 weeks of pile-driving)
Works on southwest quay wall**	Approx. 2 to 2.5 months (incl. 4 to 6 weeks of pile driving)
Concrete repairs to underside of bridge*	4-6 weeks
Total Construction Phase	**Approx. 9 months**
***** These works can be carried out in parallel with the main bridge works ****** these works can be carried out following completion of the southeast corner and in parallel with the main bridge widening works	

2.2.2 Working Hours

The permitted working hours arising from construction works is as shown in the following table. The Contractor may propose night-time works outside of these hours provided it is agreed with Kildare County Council. On O'Hanrahan bridge, night works will likely be confined to the eastern half and underside of the structure only due to the close proximity of residential apartments on the western side.

Table 2-3 Working Hours

Period	Hours
Mon to Thurs	08:00 - 19:00

Period	Hours
Mon to Thurs (where evening working is approved by KCC)	19:00 - 22:00
Fri	08:00 - 17:00
Sat	08:00 - 16:00
Sun and Bank Holiday	not permitted

2.2.3 Sourcing of Materials

All imported material will be sourced from the nearest possible locations. Concrete, backfill and surfacing materials can be found from a number of manufacturers / quarries locally.

Only those quarries that conform to all necessary statutory consents will be used in the construction phase.

It is assumed that the Contractor will source the sheet piles directly from the manufacturer/supplier. While Irish-based sheet pile suppliers exist, there is a greater range of sheet piles from the manufacturers/suppliers that exist in the UK.

2.2.4 Temporary Construction Compound

The temporary construction compound will be set up and maintained by the successful Contractor. The construction compound and the associated temporary access road will be located within lands on the west side of the River Barrow, with access onto the R704 Regional Road as shown in Figure 2-1 below, and in Drawing No. WBRC-ROD-ENV-S101-DR-CB-30016 in Appendix A. The lands are in the ownership of Wexford County Council.

At the time of writing, these lands are used as a construction compound for the separately proposed South East Greenway project which will be completed prior to the commencement of the construction phase for the proposed development.

Figure 2-1 Location of the Construction Compound

2.2.5 Construction Traffic Management

Temporary traffic management arrangements are to be implemented to facilitate ongoing access to construction access points throughout the works.

The following restrictions will be adhered to unless agreed otherwise with Kildare County Council:

- The Contractor shall provide and maintain temporary traffic management in accordance with the Department of Transport Traffic Signs Manual.
- Access to local properties shall be maintained at all times. Works to any accesses shall be planned in consultation with the property owners to minimise disruption.
- Existing footways and cycle tracks shall be maintained at all times except where such footways and cycle tracks are at the point of being removed for the completion of the works. In such circumstances, the Contractor shall provide temporary footpath or cycle track diversions, with sufficient advance signage informing people of the diversions.
- Fuel for vehicles will be stored in a mobile double skinned tank.
- The contractor will be required to submit a Construction and Demolition (C&D) Waste Management Plan to Kildare County Council for approval which should address all types of material to be disposed of.
- Roads used by construction traffic will be monitored visually and a road sweeper used to remove debris from construction activities when required.

- Loads of materials leaving site shall be assessed and covered where necessary to reduce dust impacts.
- Development of a detailed construction programme that gives consideration to traffic flows and aims to avoid coincidentally high volumes of traffic using the same roads where possible.
- The Contractor shall allow for variable message signs (VMS) in accordance with Chapter 8 paragraph 8.2.4 of the Traffic Signs Manual on approach routes affected by traffic management measures, restrictions or road closures.
- The Contractor shall liaise with the Roads Authority in respect of any temporary road closures, lane closures, and other traffic management controls required to be carried out to ensure the safety of the workforce and the general public during the duration of the works.
- Where floodlighting of the works area is required in poor daylight conditions, the positioning of the lighting units must not be such as to cause glare to drivers.

Visual inspections will also be undertaken and recorded at regular, frequent intervals, to ensure that the existing road infrastructure remains in an acceptable condition throughout the duration of construction activities or should evidence of any defects arise during the construction period, remedial actions and/or works can be put in hand forthwith. Wheel washes for construction vehicles will be provided (if necessary) at the development site to prevent mud and dust being brought onto the public road. The site entrance and the immediate approach roads will be monitored and swept clean when necessary.

Construction vehicles and site personnel will be required to adhere to the approved access routes and timing restrictions. Construction plant, equipment and vehicles will be parked onsite. No vehicles associated with the proposed development will be parked on the public roads.

3. CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN (CEMP)

This CEMP will be used to develop the CEMP by the Contractor to meet the requirements of ISO 14001 and all site works will be undertaken in compliance with the CEMP. The CEMP will include details of the topics listed below:

- Environmental Policy;
- Environmental Aspects Register;
- Project Organisation and Responsibilities;
- Project Communication and Co-ordination;
- Training;
- Operational Control;
- Checking and Corrective Action;
- Environmental Control Measures; and
- Complaints Procedure.

The CEMP will detail all the environmental aspects and impacts associated with this contract such as waste management, pollution prevention and protection of flora and fauna with particular emphasis on the nearby Special Area of Conservation (SAC), Special Protection Area (SPA), proposed Natural Heritage Area (pNHA) and water quality in the watercourses. The Register of Impacts provides the framework for identifying the potential environmental impacts generated by construction and the associated works. The Environmental Operational Control Procedures and activity-specific method statements will detail the working methods necessary for managing and mitigating these impacts, whether it is by prevention or mitigation. Prior to the commencement of construction activities, the Environmental Operational Control Procedures and activity-specific method statements will be completed so as to conform to precise site-specific requirements at the location of the proposed O'Hanrahan Bridge Widening.

3.1 Environmental Policy

The Contractor will complete an Environmental Policy with consideration for impacts on the natural and built environment. All project personnel will be accountable for the environmental performance of the Project and will be made aware of the Environmental Policy at induction. The Environmental Policy will consider and make commitments with regard to the protection of Natura 2000 sites, and any pNHA and/or Natural Heritage Area (NHA) sites, emissions to the atmosphere, maintenance of water quality, resource usage, energy consumption and waste management.

3.2 Environmental Aspect Register

Once appointed, the Contractor will prepare a register of all sensitive environmental features which have the potential to be affected by the construction works, together with details of commitments and agreements made during the preparation of the Planning Report and Natura Impact Statement (i.e., any conditions that may be imposed by An Bord Pleanála) and the contract documentation, with regards mitigation of potential environmental impacts.

The Environmental Aspects Register provides the relevant information for the preparation of construction method statements and will be regularly updated during the works.

The Environmental Aspects Register will consider sensitive environmental features as listed below (please note this list is not exhaustive and will be amended and expanded upon as required by the Contractor):

- Identification of all waterways and drainage outlets for the protection against ingress of suspended solids or any pollutant;
- Air emissions;
- Noise emissions
- Vibration emissions;
- Light emissions;
- Waste generation;
- Treatment of contaminated materials;
- Treatment of invasive species;
- Use of hazardous materials;
- Energy usage;
- Water usage;
- Discharge of wastewater;
- Traffic generation;
- Biodiversity (terrestrial and aquatic ecology);
- Landscape and Visual impacts;
- Soils, Geology and Hydrogeology;
- Hydrology; and
- Archaeology, Architectural and Cultural Heritage.

3.3 Project Organisation and Responsibilities

The Contractor's CEMP will define the roles and responsibilities of the project team. The Contractor is responsible to ensure that all members of the Project Team, including sub-contractors, comply with the procedures set out in the CEMP. The Contractor will ensure that all persons working on site are provided with sufficient training, supervision and instruction to fulfil this requirement.

Key staff will be notified of their appointment and confirm that their responsibilities are clearly understood.

The principal environmental responsibilities for key staff can be identified in the following sections.

3.3.1 Project Manager

The Project Managers main duties and responsibilities in relation to the CEMP include liaising with the Project Team in assigning duties and responsibilities in relation to the CEMP to individual members of the main contractor's project staff.
It is the responsibility of the Project Manager to approve key personnel required for employment on the project. He/She will liaise with the site Environmental Manager.

The Project Manager will lead the works on site. He/She will be responsible for the management and control of the activities and will have overall responsibility for the implementation of the CEMP. He/She will be assisted by the site Environmental Manager who will act as his/her deputy.

3.3.2 Site Manager

The Site Manager's environmental management responsibilities include, but are not limited to:

- Liaise with the site Environmental Manager and the Project Team in assigning duties and responsibilities in relation to the CEMP, to individual members of the main contractor's project staff;
- Liaising with Site Manager in preparing, reviewing and updating all site-specific method statements for activities where there is a risk of pollution or adverse effects on the environment;
- Liaising with the site Environmental Manager in agreeing site specific Method Statements with Third Parties;
- Ensuring that all relevant information on project programming, timing, construction methodology, etc., is communicated from the contractor's Project Team, including the Project Manager, to the site Environmental Manager in a timely and efficient manner in order to allow pre-emptive actions relating to the environment to be taken where required;
- Ensuring that the risk assessments for control of noise and environmental risk are prepared and effectively monitored, reviewed and communicated on site;
- Close liaison with the site Environmental Manager to ensure adequate resources are made available for implementation of the CEMP; and
- Ensuring that the site Environmental Manager reviews all method statements, performs regular and frequent environmental site inspections and that relevant environmental protocols are incorporated and appended.

3.3.3 Environmental Manager

In order to ensure the successful development, implementation and maintenance of the Environmental Operating Plan (EOP), the Contractor will be required to appoint an independent site Environmental Manager to provide independently verifiable audit reports.

The site Environmental Manager must possess sufficient training, experience and knowledge appropriate to the nature of the task to be undertaken, a Level Eight qualification recognised by the Higher Education and Training Awards Council (HETAC), or a university equivalent, or other qualification acceptable to the Employer, in Environmental Science or Environmental Management, Environmental Hydrology, Engineering or other relevant qualification acceptable to the Employer.

Separate from the on-going and detailed monitoring carried out by the contractor as part of the EOP, the EM shall carry out the inspection/ monitoring regime described below, and report to the Contractor. The results will be stored in the site Environmental Manager's monitoring file and will be available for inspection/ audit by the Client, National Parks and Wildlife Service (NPWS) or Inland Fisheries Ireland (IFI) staff. All inspections/ monitoring/ results will be recorded on standard forms.

The responsibilities of the site Environmental Manager include, but are not limited to:

- Ensuring that the CEMP is finalised, implemented and maintained;

- Liaising with Site Manager in preparing, reviewing and updating all site-specific method statements for activities where there is a risk of pollution or adverse effects on the environment;
- Liaising with Site Manager in agreeing site specific Method Statements with Third Parties;
- Being familiar with the information in the pre-construction surveys, construction requirements, An Bord Pleanála and Planning Service decisions and all relevant Method Statements;
- Being familiar with the contents, environmental commitments and requirements contained within the reference documentation listed in the CEMP;
- Being familiar with the baseline data collated during the compilation of the EIAR and the NIS;
- Assisting Management in liaising with the Engineers and Kildare County Council and the provision of information on environmental management during the construction of the project;
- Liaising with the Site Manager and the Project Team in assigning duties and responsibilities in relation to the EOP, to individual members of the main Contractor's project staff;
- Overseeing, ensuring coordination and playing a lead role in third party consultations required statutorily, contractually and in order to fulfil best practice requirements;
- Ensuring that all relevant works are undertaken in accordance with the relevant legislation in the Republic of Ireland;
- Liaising with the designated licence holders and specific agent defined in the licence with respect to licences granted pursuant to the Wildlife Acts 1976 (as amended) and the European Communities (Birds and Natural Habitats) Regulations 2011;
- Bring any legal constraints that may occur during certain tasks to the attention of management;
- Hold copies of all permits and licenses provided by waste contractors;
- Ensuring that any operations or activities that require certificates of registration, waste collection permits, waste permits, waste licences, etc have appropriate authorisation;
- Gathering and holding documentation with respect to waste disposal;
- Keeping up to date with changes in environmental practices and legislation and advising staff of such changes and incorporating them into the CEMP;
- Liaising with contactors and consultants prior to works;
- Procuring the services of specialist environmental contactors when required;
- Ensuring that all specialist environmental contactors are legally accredited and proven to be competent;
- Coordinating all the activities of the specialist environmental contractors;
- Ensuring that environmental induction training is carried out on all personnel on site and ensuring that toolbox talks include aspects of environmental awareness and training;
- Respond to all environmental incidents in accordance with legislation, the CEMP and company policy/procedures;

- Responsible for notifying the relevant statutory authority when environmental incidents occur and producing the relevant reports as required;
- Ensuring that all relevant works have (and are being carried out in accordance with) the required permits, licenses, certificates and planning permissions;
- Carrying out regular documented inspections of the site to ensure that work is being carried out in accordance with the Environmental Control Measures and relevant site-specific Method Statements;
- Preparing and being ready to implement at all times the Emergency Incident Response Plan; and
- Responsible for reviewing all environmental monitoring data and ensuring that they all comply with stated guidelines and requirements.
- For more detailed list of duties refer to the EOP contained in Appendix C to this CEMP.

3.3.4 Design Manager

The main duties and responsibilities of the Design Manger include:

- Be familiar with the CEMP and relevant documentation referred to within;
- Be familiar with the contents, commitments and requirements contained within the reference documents; and
- Participate in Third Party Consultations and liaising with third Parties through the site Environmental Manager.

3.3.5 Site Agents

The Site Agents are responsible for the following:

- Ensuring Forepersons under his/her control adhere to the relevant Environmental Control measures and relevant site-specific Method Statements, etc.
- Ensuring that the procedures agreed during third party consultations are followed;
- Reporting immediately to the site Environmental Manager any incidents where there has been a breach of agreed environmental management procedures, where there has been a spillage of a potentially environmentally harmful substance, where there has been an unauthorised discharge to ground, water or air, damage to habitat, etc.
- Attending environmental review meetings and preparing any relevant documentation as required by Management.

3.3.6 Forepersons

The Forepersons on site are responsible for the following:

- Ensuring personnel under his/her control adhere to the relevant environmental control measures and relevant site-specific Method Statements;
- Reporting immediately to the site agents and site Environmental Manager any incidents where there has been a breach of agreed procedures e.g. spillages and discharges.

3.3.7 Employer's Representative

Name: [To be inserted by successful contractor]

Duties and Responsibilities

The Employer's Representative (ER) acts on behalf of the Employer during the course of a construction project. The EOP will be audited by the Employer's Representative to ensure that the Contractor is compliant with the environmental provisions of the Contract Documents.

3.3.8 Project Supervisor Construction Stage

The role of the Project Supervisor Construction Stage (PSCS) is to manage and co-ordinate health and safety matters during the construction stage. The PSCS will be appointed before the construction work begins and will remain in that position until all construction work on the project is completed.
It is the responsibility of the PSCS to ensure that the project:

- is designed and is capable of being constructed to be safe and without risk to health;
- is constructed to be safe and without risk to health;
- can be maintained safely and without risk to health during subsequent use; and
- complies in all respects, as appropriate, with the relevant statutory provisions.

The PSCS will maintain contact with the Project Supervisor Design Process (PSDP) throughout the construction phase to communicate any health and safety related issues. The PSDP will prepare a written safety file appropriate to the characteristics of the project, containing relevant health and safety information, to be taken into account during any subsequent construction work following completion of the project.

3.3.9 All Project Personnel

All project personnel have the following responsibilities:

- Reporting any operations and conditions that deviate from the CEMP to the Site Agent and site Environmental Manager. Depending on circumstances it may be appropriate for general operatives and machinery operators to report directly to their Foreperson who will then report to the site Environmental Manager and Site Agent;
- Taking an active part in site safety and environmental meetings;
- Ensuring awareness of the contents of method statements, plans, supervisors' meetings or any other meetings that concern the environmental management of the site; and
- Attend environmental training as required.

3.3.10 Ecological Clerk of Works (ECoW)

In order to ensure the successful development and implementation of the CEMP, the Contractor will appoint an independent Ecological Clerk of Works (ECoW). The ECoW must possess training, experience and knowledge appropriate to the role, including:

- An NFQ Level 8 qualification or equivalent or other acceptable qualification in ecology or environmental biology; and,
- Demonstrable experience in the protection of European sites.

The principal functions of the ECoW are:

- To provide ecological supervision of the construction of the proposed development and thereby ensure the full and proper implementation of all the mitigation measures relating to biodiversity prescribed in the EIAR and NIS;

- To regularly review the outcome of the specialist hydroacoustic monitoring if being undertaken and, on that basis, make any necessary adjustments to the mitigation; and
- To carry out weekly inspections and reporting on the implementation of the Contractor's Biosecurity Protocol.

During the preparation of the Contractor's CEMP, the site Environmental Manager may, as appropriate, assign other duties and responsibilities to the ECoW.

In exercising his/her functions, the ECoW will be required to keep a monitoring file and this will be made available for inspection or audit by Kildare County Council, the NPWS or IFI at any time.

3.3.11 Project Archaeologist

The Project Archaeologist on site is responsible for the following:

- Relevant licences to the Department of Housing, Local Government and Heritage required for the project in advance of any construction work taking place and throughout the project as required;
- To supervise works in vicinity of known archaeological sites'; and
- To supervise any pre-construction archaeological survey works.

Section 26 of the National Monuments Act 1930 (as amended) requires that excavations for archaeological purposes must be carried out by suitably qualified and experienced archaeologists acting under an excavation licence. Inappropriate excavation of a heritage site could result in damage to, or destruction of, the integrity, setting or historical context of the site, contrary to the public interest.

3.3.12 Other

Subject to the environmental commitments / requirements, other environmental specialists will be employed as required during the construction works.

3.4 Training and Induction

3.4.1 Site induction

All employees and subcontractors involved on site will be given a comprehensive induction prior to commencement of the works. The environmental training and awareness procedure will ensure that staff are familiar with the principles of the CEMP, the environmental aspects and impacts associated with their activities, the procedures in place to control these impacts and the consequences of departure from these procedures.

This environmental training can be run concurrently with safety awareness training. Training will include:

- Overview of the Environmental Policy and Construction Environmental Management Plan, goals and objectives;
- Awareness in relation to risk, consequence and methods of avoiding environmental risks as identified within the Register of Aspects and with the planning conditions;
- Awareness of roles and individual environmental responsibilities and environmental constrains to specific jobs;

- Location of and sensitivity of Special Area of Conservations, Special Protection Areas, protected monuments, structures etc.
- Location of habitats and species to be protected during construction, how activities may affect them and methods necessary to avoid impacts.
- A record will be kept of a signed register on the project files of all attendees of the environmental induction.
- Toolbox talks based on specific activities being carried out will be given to personnel by the nominated project representative. These will be based on specific activities being carried out and will include environmental issues particular to the project, including the impact on bird populations and water quality namely:
- Oil/Diesel spill prevention and safe refuelling practice;
- Storage of materials including oil/diesels and cement;
- Emergency response processes used to deal with spills;
- Minimising disturbance to wildlife;
- Emergency response to include water pollution hotline to the EPA/Irish Rail for regulator response. Identification of registered / accredited spill cleanup company for oil etc.; and
- Consideration of importance of containment of vehicle washing, containments of concrete / cement / grout washout etc, bank protection using hessian to prevent excessive scour and mobilisation of suspended solids, maintenance of vegetation corridors etc.

3.4.2 Specific training and awareness

A project specific training plan that identifies the competency requirements for all personnel allocated with environmental responsibilities will be produced by the Contractor. Training will be provided by the Contractor to ensure that all persons working on site have a practical understanding of environmental issues and management requirements prior to commencing activities. A register of completed training is to be kept by the SEM. The Site Manager will ensure that environmental emergency plans are drawn up and the SEM will conduct the necessary training/inductions.

3.5 Project communication and co-ordination

Environmental issues and performance aspects will be communicated to the workforce on a regular basis. Weekly project meetings, which follow a set agenda incorporating the environment, will be held alongside overall management meetings.

All staff and sub-contractors involved in all phases of the project will be encouraged to report environmental issues.

3.6 Operational control

Site works will be checked against the CEMP requirements. Any mitigation measures that have been agreed with the Statutory Authorities, or are part of planning conditions, will be put into place prior to the undertaking of the works for which they are required, and all relevant staff will be briefed accordingly.

Method statements that are prepared for the works will be reviewed / approved by the Client Project Manager and where necessary, the relevant Environmental

Specialist. All method statements for works in, near or liable to impact on a waterway must have prior agreement with IFI and NPWS.

A Quality Management System (QMS) will also be put into operation for the project. Document control will be in accordance with this QMS and copies of all audits, consents, licences, etc will be finalised by the Site Environmental Manager and their team and kept on site for review at any time.

3.7 Checking and corrective action

Daily inspections of the site and the works will be undertaken to minimise the risk of environmental damage and to ensure compliance with the CEMP. Any environmental incidents are to be reported immediately to the Site Foreman. The Site Environmental Manager will undertake periodic inspections and complete an assessment of the project's environmental performance with regard to the relevant standards/legislation and the contents of the CEMP. Following these inspections, the Site Environmental Manager will produce a report detailing the findings which will be provided to the Client Project Manager and reviewed at the monthly project meeting.

3.8 Environmental control measures

Licensing requirements will be in place and specific procedures to manage the key environmental aspects of the project will be developed by the contractor prior to work commencing.

3.9 Complaints procedure

A liaison officer will be available to allow for member of the pubic or interested parties to make complaints about the construction works. The CEMP will contain details of the complaints procedures and a monitoring system will be implemented to ensure that any complaints are addressed, and satisfactory outcome is achieved for all parties.

4. ENVIRONMENTAL COMMITMENTS

Project environmental mitigation has been set out in the application documentation, in the Planning Report and Natura Impact Statement in particular, and will be detailed in the final CEMP, in accordance with this CEMP. The final CEMP will provide a framework for compliance auditing and inspection to ensure that these construction practices and mitigation measures, as set out in the Planning Report and the conditions in the planning approval, are adhered to. It should be noted that Section 4.1 of this CEMP details the key mitigation measures which are detailed in the Planning Report.

4.1 Mitigation Measures – Planning Report

The mitigation measures detailed in the following sections have been derived from the Planning Report. Mitigation measures for each environmental factor are divided into either the construction or operational phase of the proposed development.

4.1.1 Traffic and Transport

4.1.1.1 Construction Phase

As with any construction project, the contractors shall carry out a comprehensive Construction Traffic Management Plan (CTMP) in consultation with the local authority, Wexford Co. Co., before the commencement of the construction phase. The purpose of such a plan is to outline the measures to manage the expected construction traffic during the construction period and will be revised accordingly as works progress. The CTMP will also detail how facilities for existing road users will be maintained whilst construction operations are proceeding. The CTMP will ensure at least one footpath on O'Hanrahan Bridge always remains open and appropriate infrastructure and signage is provided to ensure the safe passage of pedestrian across the bridge, including people with mobility impairments.

4.1.2 Population and Human Health

4.1.2.1 Construction Phase

The mitigation and monitoring measures to be implemented for population and human health during the construction phase are as follows:

- A Construction Environmental Management Plan (CEMP) will be implemented as part of the construction stages to account for all works associated with the construction of the proposed development, including pre-construction site clearance works. This plan will ensure construction practices and measures are put in place to minimise any effects on road users.
- A Construction Traffic Management Plan (CTMP) will be submitted for approval to Kildare County Council by the appointed Contractor prior to the commencement of any construction works as part of the Environmental Management Plan. This plan will ensure that required diversions are put in place during temporary road closures and that temporary traffic works and road safety measures will be in place during the duration of the construction phase to minimise the impact on local road users. The CTMP will be required to minimise disruption to economic and residential amenities. The plan will ensure access is maintained along O'Hanrahan Bridge for vehicles, pedestrians, cyclists and economic operators at all times.
- An Environmental Operating Plan (EOP) will be implemented prior to construction works. This plan will outline procedures for the delivery of environmental mitigation measures and for addressing day-to-day

environmental issues that can arise from construction. The EOP will ensure that appropriate measures relating to working at heights and near water are implemented during the construction stages.

- In order to minimise air quality impacts, a Dust Management Plan will be implemented as outlined in Section 12 of the Planning Report.
- Noise and vibration mitigation measures are detailed in Section 13 of the Planning Report. A comprehensive Construction Environmental Management Plan, which includes adopting appropriate mitigation measures, will manage the risk of noise impacting the local community. The plan will outline stringent construction limits and guidelines to protect residential and commercial amenities, including the application of binding noise limits and hours of operation. These measures will ensure that noise and vibration impacts will be reduced to the greatest possible extent.
- All construction areas, including the proposed temporary construction compound, will be suitably fenced and screened, and access to the site will be limited to authorised personnel in the interest of public health and safety.
- Safe working practices, in accordance with the relevant legislation, will be in place during the construction phase to protect the workers and visitors to the construction sites.

With the application of the mitigation measures identified in this section, along with those specific mitigation measures related to Population and Human Health described in other sections of this report, no likely significant impacts are predicted during construction stage.

4.1.2.2 Operational Phase

There are no operational stage mitigation measures required for population and human health. The proposed development is aimed at pedestrians and cyclists use only.

4.1.3 Biodiversity

4.1.3.1 General Mitigation Measures

Mitigation by Avoidance

The proposed development minimises land-take from ecologically sensitive areas and has been constraints-led from the initial phase, through an iterative design process, and into the final proposed development. The design has followed the basic principles outlined below to eliminate the potential for impacts on Key Ecological Receptors where possible, and to minimise such impacts where total elimination is not possible. The proposed development has been designed to minimise direct or indirect impacts on any habitats or species or other ecological features that were classified as being of Local Importance (Higher Value) or above. The widening of the bridge deck and quay wall has been designed to avoid, as far as possible, direct, indirect or secondary adverse effects on European sites and other designated sites for nature conservation. All piling works within the river will avoid the periods between the 1st April and the 31st May as advised by IFI, in order to avoid impacts on European Eel, which migrate along banks during this time along with other fish species including Sea Lamprey, River Lamprey, Twaite Shad and Atlantic Salmon.

Mitigation by Design

The proposed development has been designed having regard to European and national legislation and all relevant guidelines in relation to ecology and engineering best practice for the planning and construction of developments. These guidelines

and best practice provide practical measures that can be incorporated into the design to minimise the impact and protect the receiving environment. The following is an overview of the design measures that will be employed to minimise and avoid significant impacts on the ecological receptors within the zone of influence.

- A Construction and Environmental Management Plan (CEMP), Environmental Operating Plan (EOP) and Incidence Response Plan (IRP) have been produced to ensure that the construction does not lead to any unanticipated negative impacts on the environment.
- Vibratory driven sheet piles forming the new quay wall have been selected as their installation is generally quieter than impact piling and minimises disturbance and land take from benthic habitats and mudflats. Noise levels from vibratory piling rise slowly, and for this reason vibratory piling is frequently employed as a mitigation measure where impact piling was originally proposed. In this case, while almost all piling is expected to be vibratory piling, impact piling shall only be employed where the required pile toe level cannot be achieved by vibratory piling. The length of any impact piling event shall not exceed 200 strikes.
- The proposed lighting columns will be of a similar height and spacing to the existing, will utilise the existing lighting duct in the footpath and will provide a lighting intensity similar to what is already in place. The lighting plan will be designed in accordance with *Bats and artificial lighting in the UK* (BCT, 2018). There will be ongoing disturbance impacts, although there will be no net-deterioration in terms of light spill onto the River Barrow as a result of the proposed development.
- The Contractor will appoint a Site Environmental Manager to carry out environmental monitoring and to ensure that the mitigation measures proposed in this planning report is followed.

Construction Phase

Artificial Lighting

As discussed in the assessment of impacts above, artificial lighting associated with the construction of the proposed development poses a risk of potential negative impacts on habitats and species within and adjacent to the River Barrow. Therefore, the following limits on construction lighting is proposed:

- Subject to any Health & Safety and/or navigational requirements, construction lighting over the river channel shall be turned off outside of working hours.
- Construction lighting shall be limited to the minimum area required to be lit and minimise light spill to areas not required for construction.

Given the implementation of the above measures, these works are unlikely to give rise to significant impacts beyond the duration of the works and, therefore, no additional mitigation is proposed in relation to these works.

Water Quality

As is normal practice with infrastructure projects, a Construction Environmental Management Plan (CEMP) has been prepared for the proposed development and are included in Appendix B of this Planning Report. These will be updated and finalised by the selected contractor to suit the detailed construction methodology and allocate responsibilities to individuals in the construction team. In doing so, the measures detailed in the appended reports will be considered minimum requirements to be considered and improved upon. The level of detail provided within the Plans is

sufficient to allow an assessment of the anticipated impacts including residual impacts.

The following will be implemented as part of this plan:

- An Environmental Operating Plan (EOP) (Appendix C of the CEMP) outlines procedures for the delivery of environmental mitigation measures and for addressing general day-to-day environmental issues that can arise during the construction phase of developments.
- An Incident Response Plan (see Appendix D of the CEMP) detailing the procedures to be undertaken in the event of spillage of chemical, fuel or other hazardous wastes, non-compliance with any permit or license, or other such risks that could lead to a pollution incident, including flood risks.
- All necessary permits and licenses for in-stream construction work for provision of the proposed development will be obtained prior to the commencement of construction.
- Inform and consult with the National Parks and Wildlife Service and Inland Fisheries Ireland.

During construction, cognisance will have to be taken of the following guidance documents for construction work on, over or near water.

- *Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters* (IFI, 2016).
- *C532 Control of water pollution from construction sites: guidance for consultants and contractors* (CIRIA, 2001).
- *CIRIA C648 Control of water pollution from linear construction projects: technical guidance* (CIRIA, 2006).
- *Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes* (NRA, 2006).

Based on the above guidance documents, the following principal mitigation measures will be adhered to for the construction phase:

Sedimentation and surface water run-off

- Sheet piling for the new quay wall shall be installed prior to any excavation on the landward side and demolition of the existing quay wall boundary. This will form an effective barrier to run-off from the site during construction.
- Any material stockpiled shall be located a minimum of 30 m from the edge of the river and shall also be covered and remain stockpiled for as short a time as possible.
- The Contractors shall provide method statements for weather and tide/storm surge forecasting and continuous monitoring of water levels in Waterford Harbour and the removal of site materials, fuels, tools, vehicles and persons from flood zones in order to minimise the risk of input of sediment or construction materials into the river during flood events.
- The works area (including the site compound) will be limited to the minimum required to undertake the necessary elements of the project.
- Surface water flowing onto the construction area will be minimised through the provision of berms, diversion channels or cut-off ditches.
- Protection of waterbodies from silt load will be carried out through the use of gully silt/sediment filters and shallow berms in hardstanding areas to provide adequate treatment of runoff to watercourses.

- Settlement tanks/ponds, silt traps/bags and bunds will be used. Where pumping of water is to be carried out, filters will be used at intake points and discharge will be through a sediment trap.
- The anticipated site compound/storage facility will be fenced off at a minimum distance of 5 m from the top of the edge of the watercourse bank. Any works within the 10 m buffer zone will require measures to be implemented to ensure that silt laden or contaminated surface water runoff from the compound does not discharge directly to the watercourse. CEMP has been drafted and will need to be finalised by the appointed Contactor.
- Protection measures will be put in place to ensure that all hydrocarbons used during the construction phase are appropriately handled, stored and disposed of in accordance with the TII document "*Guidelines for the crossing of watercourses during the construction of National Road Schemes*". All chemical and fuel filling locations will be contained within bunded areas and set back a minimum of 50 m from watercourses.
- Foul drainage from all site offices and construction facilities will be contained and disposed of in an appropriate manner, off site, to prevent pollution.
- The construction discharge will be treated such that it will not reduce the environmental quality standard of the receiving watercourses.
- Water quality monitoring will be undertaken in the River Barrow, with weekly samples being taken from at least 2 months prior to commencement of construction until at least 4 months post-completion. Water samples will be taken from at least two locations. The final number and location of sampling points will be determined by the Site Environmental Manager. The results of the water quality monitoring programme will be reviewed by the Site Environmental Manager on an ongoing basis during construction. In the event of any non-compliance with regulatory limits for any of the water quality parameters monitored, an investigation will be undertaken to identify the source of this non-compliance and corrective action will be taken where the this is deemed to be associated with the proposed development.

Concrete Works

The use and management of concrete in or close to watercourses must be carefully controlled to avoid spillage which has a deleterious effect on water chemistry and aquatic habitats and species. As the use of concrete cannot be avoided, the following control measures will be employed:

- Hydrophilic grout and quick-setting mixes or rapid hardener additives shall be used to promote the early set of concrete surfaces exposed to water.
- When working in or near the surface water and the application of in-situ materials cannot be avoided, the use of alternative materials such as biodegradable shutter oils shall be used.
- Any plant operating close to the water will require special consideration on the transport of concrete from the point of discharge from the mixer to final discharge into the delivery pipe (tremie). Care will be exercised when slewing concrete skips or mobile concrete pumps over or near surface waters.
- The weather forecast will be consulted prior to commencing concrete pours. No such works will be undertaken if inclement weather is forecast such that precipitation may make it difficult to maintain a dry working area.
- There will be no spills of concrete, cement, grout or similar materials hosed into surface water drains. Such spills shall be contained immediately and runoff prevented from entering the watercourse.

- Concrete waste and wash-down water will be contained and managed on site to prevent pollution of all surface watercourses.
- On-site concrete batching and mixing activities will only be allowed at the identified construction compound areas.
- Washout from concrete lorries, with the exception of the chute, will not be permitted on site and will only take place at the construction compound (or other appropriate facility designated by the manufacturer).
- Chute washout will be carried out at designated locations only. These locations will be signposted. The Concrete Plant and all Delivery Drivers will be informed of their location with the order information and on arrival to site.
- Chute washout locations will be provided with an appropriate designated, contained impermeable area and treatment facilities including adequately sized settlement tanks. The clear water from the settlement tanks shall be pH corrected prior to discharge (which shall be by means of one of the construction stage settlement facilities) or alternatively disposed of as waste in accordance with the Contractor's Waste Management Plan.

Hydrocarbons and other chemicals (See also Section 9 of the Planning Report)

- Land-based vehicles and plant shall be refuelled off-site, where possible.
- All land-based fuelling of machinery shall be undertaken on an impermeable base in bunded areas at least 50 m from the edge of the river.
- Marine based fuelling will only be undertaken using specifically designed nozzles to prevent spillages and spill kits will be available.
- All fuelling equipment shall be regularly inspected and serviced.
- Any petrol- or diesel-fuelled pumps or other machinery shall be located within temporary bunded units.
- All fuel, oils, chemicals, hydraulic fluids, on-site toilets etc. shall be stored in the construction site compound, on an impermeable base which shall be bunded to 110% capacity and appropriately secured.
- All plant and construction vehicles shall be inspected daily for oil leaks and a full service record shall be kept for all plant and machinery.
- Spill kits shall be available on site during construction, including on the jack-up barge during pile driving.
- All waste oils, empty oil containers and hazardous wastes shall be disposed of in accordance with the Waste Management Act, 1996 (as amended).
- Owing to the presence of contaminants within the construction site, excavation shall be limited to the absolute minimum necessary.

Operational Phase

Artificial Lighting

During the operation of the proposed development, lighting columns will be of a similar height and spacing to the existing and will utilise the existing lighting duct in the footpath. The following mitigation measures will be integrated into the lighting design:

- Lighting outside the intended area of illumination will be minimised. Where light spill cannot be avoided, louvres, cowls or shields will be fitted to the columns.
- Lighting will be LED and have no upward light spill (apart from intentional up-lighting) and a sharp horizontal cut off.

- Lighting will be a warm-white colour of 2700K or less.

4.1.3.2 Specific Mitigation Measures

KER 1 River Barrow and River Suir, including Annex I 'Estuaries'

In addition to the mitigation measures described under construction and operational phase mitigation measures, the following measures will apply to KER 1.

KER 2 Intertidal Habitats, including Annex I 'Mudflats and sandflats not covered by seawater at low tide'

In addition to the mitigation measures described under construction and operational phase mitigation measures, the following measures will apply to KER 2.

KER 3 Migratory Fish and Marine Mammals

In addition to the mitigation measures described under construction and operational phase mitigation measures, the following measures will apply to KER 3.

The rationale for this mitigation is fully detailed in the NIS for the proposed development (included as part of this Planning Application).

Hydroacoustic Impacts

The mitigation for hydroacoustic impacts is as follows ("piling event" means any period of continuous piling by one or two rigs; "quiet period" means any period in which there is no piling by any rig):

- Piling works shall not be undertaken between the 1st April and the 31st May as advised by IFI during consultation.
- There shall be no piling between sunset and sunrise.
- Vibratory piling shall be the standard method for the installation of all piles. Impact piling shall only be employed where the required pile toe level cannot be achieved by vibratory piling.
- The duration of any vibratory piling event shall not exceed 180 piling minutes.
- The length of any impact piling event shall not exceed 200 strikes.
- An appropriate soft-start/ramp-up procedure shall be used for all impact piling events. Where it is possible according to the operational parameters of the equipment and materials concerned, the underwater acoustic energy output shall commence from a lower energy start-up (i.e., a peak sound pressure level not exceeding 170 dB re: 1µPa @1m) and, thereafter, be allowed to gradually build up to the necessary maximum output over a period of 20 – 40 mins.
- Following every piling event, there shall be a quiet period of at least 30 minutes. Only following 30 minutes of no piling whatsoever can the cumulation of piling minutes be re-zeroed.
- Rotary drilling will be the method used to drill the boreholes over other methods such as percussion drilling which give rise to higher levels of noise. Furthermore, these works will take place at low tide to allow for greater attenuation of noise within the mud in the absence of water. This mitigation will ensure that any hydroacoustic impacts will not give rise to a significant barrier to the movements of Twaite Shad or other species, or other significant effects on such species, in the Barrow Estuary as a result of the ground investigations.

KER 4 Otter

The mitigation measures outlined under general mitigation measures are sufficient to reduce any potential negative effects on Otter to slight, not significant or imperceptible levels. Therefore, no further specific mitigation is required for KER 4.

KER 5 Bat Species

The mitigation measures outlined under general mitigation measures are sufficient to reduce any potential negative effects on Bat species to slight or imperceptible levels. Therefore, no further specific mitigation is required for KER 5.

KER 6 Invasive Alien Species

In addition to the mitigation measures described under construction and operational phase mitigation measures, the following measures will apply to KER 6.

Terrestrial Plant Species

In order to minimise the risk of the introduction or spread of invasive alien plant species (IAPS) during construction, all land-based works shall be executed in accordance with best practice for biosecurity in construction. In particular, prior to commencement, the Contractor shall prepare a detailed Biosecurity Protocol describing his/her proposed approach to ensuring that IAPS are not imported or spread during the construction of the proposed development. The Biosecurity Protocol shall include, as a minimum, the following measures to prevent the spread of invasive species:

- Good construction site hygiene will be employed to prevent the introduction and spread of problematic IAPS by thoroughly washing vehicles prior to leaving any site.
- All plant and equipment employed on the construction site (e.g. excavators, piling equipment etc.) will be thoroughly cleaned down using a power washer unit prior to arrival on site to prevent the spread of IAPS.
- All washing must be undertaken in areas with no potential to result in the spread of IAPS, as detailed in the Construction Environmental Management Plan.
- Any soil and topsoil required on the site will be sourced from a stock that has been screened for the presence of any IAPS and where it is confirmed that none are present.
- All site staff shall be made aware of the Contractor's Biosecurity Protocol and receive training in the importance of good site biosecurity.

Aquatic Species

The use of barges during the construction of the proposed development poses the risk of introducing invasive alien species to the aquatic environment both in the vicinity of the works and in the wider Suir-Barrow-Nore Estuary. This has the potential to significantly affect the integrity of aquatic and intertidal habitats in the zone of influence.

In order to minimise the risk of either the introduction or spread of aquatic invasive alien species and thereby avoid negative impacts on these habitats, the owner or operator of the barge or barges shall provide documentary evidence (in the form of a completed and signed Marine Institute "*Cleaning and Disinfection Declaration Form*") that the vessel was fully de-fouled within the 6 months immediately preceding its engagement in the construction of the proposed development.

In relation to other construction activities the principles and appropriate measures in the IFI guidance document *Biosecurity Protocol for Field Survey Work* (IFI, 2010) shall be followed and shall form part of the Contractor's Biosecurity protocol.

4.1.3.3 Implementation

In order to give effect to the mitigation prescribed in the EcIA contained within Section 8 of the Planning Report, it should be a condition of any consent granted in respect of the proposed development that all of the mitigation, including monitoring and enforcement, prescribed in the EcIA be binding, during the construction phase, on the Contractor and, during operational phase, on Wexford County Council. Accordingly, all of the mitigation prescribed in the EcIA shall be transposed into the Contract Documents for the construction of the proposed development.

During construction, all works must comply with relevant legislation and guidelines in order to reduce and minimise environmental impacts and to protect all ecological receptors. In particular, there must be full compliance with the following:

- The CEMP.
- The Schedule of Commitments.
- The mitigation prescribed in the EcIA and in the NIS.
- Any conditions which might be attached to the proposed development's planning consent.
- Any requirements of stakeholders and statutory bodies, e.g. the NPWS and IFI, including:
    - *Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters* (IFI, 2016).
- All applicable legislative requirements in relation to environmental protection.
- All relevant construction industry guidelines, including:
    - *C532 Control of water pollution from construction sites: guidance for consultants and contractors* (CIRIA, 2001).
- Any biosecurity requirements arising from the preceding points.
- The Transport Infrastructure Ireland (TII) and National Roads Authority (NRA) Environmental Assessment and Construction Guidelines, specifically:
    - *Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes.*
    - *Guidelines for the Testing and Mitigation of the Wetland Archaeological Heritage for National Road Schemes.*
    - *Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes.*
    - *The Management of Invasive Alien Plant Species on National Roads – Technical Guidance.*
    - *Guidelines for the Treatment of Noise and Vibration in National Road Schemes.*
    - *Guidelines for the Treatment of Otters Prior to the Construction of National Road Schemes.*
    - *Management of Waste from National Road Construction Projects.*
    - *Guidelines for the Creation, Implementation and Maintenance of an Environmental Operating Plan.*

This list is non-exhaustive. All environmental commitments/requirements and relevant legislation and guidelines which are current at the time of construction will be followed.

4.1.4 Hydrology

4.1.4.1 Construction Phase

As is normal practice with infrastructure projects, an Environmental Operating Plan (EOP) and Construction Environmental Management Plan (CEMP) will be prepared for the scheme. These will be developed by the selected contractor to suit the detailed construction methodology and allocate responsibilities to individuals in the construction team. In doing so, the measures detailed in the appended reports will be considered minimum requirements to be considered and improved upon. The level of detail provided within the current drafts of the Plans is sufficient to allow an assessment of the anticipated impacts including residual impacts.

The following will be implemented as part of this plan:

- An Incident Response Plan (see requirements outlined in the CEMP) will be finalised by the contractor detailing the procedures to be undertaken in the event of spillage of chemical, fuel or other hazardous wastes, non-compliance with any permit or license, or other such risks that could lead to a pollution incident, including flood risks.
- All necessary permits and licenses for in stream construction work for provision of the flood defences will be obtained prior to the commencement of construction.
- During construction, cognisance will have to be taken of the following guidance documents for construction work on, over or near water.
- *Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites* (Eastern Regional Fisheries Board).
- *Central Fisheries Board Channels and Challenges – The enhancement of Salmonid Rivers.*
- *CIRIA C532 Control of Water Pollution from Construction Sites Guidance for Consultants and Contractors.*
- *CIRIA C648 Control of Water Pollution from Constructional Sites.*
- *Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes (TII, 2006).*

Based on the above guidance documents concerning the control of construction impacts on the water environment, the following outlines the standard mitigation measures that will be adhered to for the construction phase, in order to protect all catchments and watercourses from direct and indirect impacts.

Standard Mitigation Measures

- The works area (including the site compound) will be limited to the minimum required to undertake the necessary elements of the project.
- Surface water flowing onto the construction area will be minimised through the provision of berms, diversion channels or cut-off ditches.
- Protection of waterbodies from silt load will be carried out through the use of gully silt/sediment filters and shallow berms in hardstanding areas to provide adequate treatment of runoff to watercourses.

- Settlement tanks/ponds, silt traps/bags and bunds will be used. Where pumping of water is to be carried out, filters will be used at intake points and discharge will be through a sediment trap.
- The anticipated site compound/storage facility will be fenced off at a minimum distance of 5m from the top of the edge of the watercourse bank. Any works within the 10m buffer zone will require measures to be implemented to ensure that silt laden or contaminated surface water runoff from the compound does not discharge directly to the watercourse. This CEMP has been drafted and will need to be finalised by the appointed Contactor.
- Protection measures will be put in place to ensure that all hydrocarbons used during the construction phase are appropriately handled, stored and disposed of in accordance with the TII document "*Guidelines for the crossing of watercourses during the construction of National Road Schemes*". All chemical and fuel filling locations will be contained within bunded areas.
- Foul drainage from all site offices and construction facilities will be contained and disposed of in an appropriate manner, off site, to prevent pollution.
- The construction discharge will be treated such that it will not reduce the environmental quality standard of the receiving watercourses.
- Water quality monitoring will be undertaken in the River Barrow, with weekly samples being taken from at least 2 months prior to commencement of construction until at least 4 months post-completion. Water samples will be taken from at least two locations. The final number and location of sampling points will be determined by the Site Environmental Manager. The results of the water quality monitoring programme will be reviewed by the Site Environmental Manager and Ecological Clerk of Works on an ongoing basis during construction. In the event of any non-compliance with regulatory limits for any of the water quality parameters monitored, an investigation will be undertaken to identify the source of this non-compliance and corrective action will be taken where this is deemed to be associated with the proposed development.

Specific Mitigation Measures - Concrete Works

The use and management of concrete in or close to watercourses must be carefully controlled to avoid spillage which has a deleterious effect on water chemistry and aquatic habitats and species. As the use of concrete cannot be avoided, the following control measures will be employed:

- Hydrophilic grout and quick-setting mixes or rapid hardener additives shall be used to promote the early set of concrete surfaces exposed to water.
- When working in or near the surface water and the application of in-situ materials cannot be avoided, the use of alternative materials such as biodegradable shutter oils shall be used.
- Any plant operating close to the water will require special consideration on the transport of concrete from the point of discharge from the mixer to final discharge into the delivery pipe (tremie). Care will be exercised when slewing concrete skips or mobile concrete pumps over or near surface waters.
- Placing of concrete in or near watercourses will be carried out only under the supervision of the Ecological Clerk of Works (ECoW).
- The weather forecast will be consulted prior to commencing concrete pours. No such works will be undertaken if inclement weather is forecast such that precipitation may make it difficult to maintain a dry working area.

- There will be no spills of concrete, cement, grout or similar materials hosed into surface water drains. Such spills shall be contained immediately and runoff prevented from entering the watercourse.
- Concrete waste and wash-down water will be contained and managed on site to prevent pollution of all surface watercourses.
- On-site concrete batching and mixing activities will only be allowed at the identified construction compound areas.
- Washout from concrete lorries, with the exception of the chute, will not be permitted on site and will only take place at the construction compound (or other appropriate facility designated by the manufacturer).
- Chute washout will be carried out at designated locations only. These locations will be signposted. The Concrete Plant and all Delivery Drivers will be informed of their location with the order information and on arrival to site.
- Chute washout locations will be provided with an appropriate designated, contained impermeable area and treatment facilities including adequately sized settlement tanks. The clear water from the settlement tanks shall be pH corrected prior to discharge (which shall be by means of one of the construction stage settlement facilities) or alternatively disposed of as waste in accordance with the Contractor's Waste Management Plan.

Flooding

The Contractor will provide method statements for weather forecasting and continuous monitoring of water levels in the River Barrow. The Contractor will also provide method statements for the removal of site materials, fuels, tools, vehicles and persons from flood zones in order to minimise the risk to persons working on the site as well as potential input of sediment or construction materials into the river during flood events.

4.1.4.2 Operational Phase

There are no mitigation measures proposed for the operational phase of the proposed development.

4.1.5 Soils, Geology and Hydrogeology

4.1.5.1 Mitigation by Design

The construction works will be carried out with the least feasible disturbance of soils to avoid any requirement for excavation of in-situ ground and creation of waste.

The quantity of imported backfill for the gap between the sheet piles and the existing quay wall, is minimised by design, as the alignment of the sheet pile wall was carefully selected as close as possible to the existing wall without compromising wall stability or the proposed alignment.

4.1.5.2 Specific Mitigation Measures

Approximately 330m^3 of construction and demolition waste will be generated during the demolition of existing paving, pavement, parapets and footpaths which will be exported from site. The quantity is very small given the scale of the project, and will be disposed of by the contractor who will ensure that all subsurface materials excavated during the construction phase of the proposed development are managed in accordance with the relevant waste management legislation. The successful contractor will ensure that all subsurface materials are removed from the site and sent to authorised waste management facilities (i.e. which hold all relevant, valid permits / licences) which accept the corresponding types of waste. The contractor

will be required to submit a Construction and Demolition Waste Management Plan (CDWMP) to the local authority for approval, which will address all types of material to be disposed of. The contractor will undertake the environmental testing of the material to be disposed of in order to determine the waste acceptability characteristics.

All imported material will be sourced from the nearest possible locations. A number of suitable active quarries with all necessary statutory consents exist across County Wexford and southwest County Wexford, such as Oaklands Quarry in Ballykelly, New Ross. The mentioned quarry is accessible through R733 which links to the proposed development via R723. There may be other suitable quarries, in addition to the quarry identified above, that the Contractor may select as the source for construction materials. Only those quarries that conform to all necessary statutory consents may be used in the construction phase by the appointed Contractor.

A project-specific Construction Environmental Management Plan (CEMP) will be prepared for the development by the contractor. It will be maintained by the contractor for the duration of the construction phase. The CEMP will cover all potentially polluting activities and include an emergency response procedure. All personnel working on the site will be trained in the implementation of the procedures. As a minimum, the CEMP for the proposed development will be formulated in consideration of the standard best practice. The CEMP will include a range of site-specific measures which include:

- Safety measures for working from barges in-river, including but not limited to risk of pollutants from the machinery stationed on the barge and operating with bulk materials such as backfill gravel on the barge.
- Runoff will be controlled and treated to minimise impacts to groundwater and the River Barrow.
- Temporary storage of any contaminated material on-site shall be carefully managed so as to limit any risk of contaminated surface water runoff leaving the site or infiltrating to groundwater. Runoff from the material shall be directed to a lined pond or temporary sewer/tank and the water shall be disposed of off-site for treatment at an appropriate licenced facility in accordance with the relevant waste management legislation. Alternatively, the material shall be covered while stored to remove the risk of surface water contamination.
- All hazardous materials will be stored within secondary containment, designed to retain at least 110% of the storage contents. Temporary bunds for oil/diesel storage tanks will be used on the site during the construction phase.
- The successful contractor will ensure that spill kits and hydrocarbon absorbent packs are stored in the site compound, and that operators will be fully trained in the use of this equipment.
- The successful contractor will ensure that silt and sediment barriers are installed (and maintained in proper working order) at the perimeter of earthworks areas to limit transport of erodible soils to watercourses.
- Where soils are being excavated and removed from site, the successful contractor will ensure that dust generation will be avoided, by damping down material during excavation and loading onto trucks for off-site removal, if necessary.
- Safe materials handling of all potentially hazardous materials will be emphasised to all construction personnel employed during construction, including the usage of appropriate PPE.

- The successful contractor will prepare an Incident Response Plan (IRP) which outlines measures to be implemented to prevent and address spillages of hazardous substances.

4.1.6 Landscape and Visual

4.1.6.1 Construction Phase

No specific landscape and visual mitigation measures are deemed necessary for the temporary construction stage works because these will be minor and short-lived.

4.1.6.2 Operational Phase

Mitigation measures are "embedded" into the scale, setting, design, tone, material and finish of the proposed development, in order to avoid any adverse landscape or visual impact. Thus, no specific mitigation measures are required, in this instance.

4.1.7 Air Quality and Climate

4.1.7.1 Construction Phase

Air Quality

The proactive control of fugitive dust will ensure the prevention of significant emissions. The key aspects of controlling dust are listed below and in Appendix E of the Planning Report. These measures will be incorporated into the overall Construction Environmental Management Plan (CEMP) prepared in respect of the proposed development.

In summary, the measures which will be implemented will include:

- Hard surface roads will be swept to remove mud and aggregate materials from their surface while any un-surfaced roads will be restricted to essential site traffic.
- Any road that has the potential to give rise to fugitive dust will be regularly watered, as appropriate, during dry and/or windy conditions.
- Vehicles using site roads will have their speed restricted, and this speed restriction must be enforced rigidly. On any un-surfaced site road, this will be 20 kph, and on hard surfaced roads as site management dictates.
- Public roads outside the site will be regularly inspected for cleanliness and cleaned as necessary.
- Material handling systems and site stockpiling of materials will be designed and laid out to minimise exposure to wind. Water misting or sprays will be used as required if particularly dusty activities are necessary during dry or windy periods.
- During movement of materials both on and off-site, trucks will be stringently covered with tarpaulin at all times. Before entrance onto public roads, trucks will be adequately inspected to ensure no potential for dust emissions.
- During any demolition processes, water suppression should be used, preferably with a hand-held spray. Only the use of cutting, grinding or sawing equipment fitted or used in conjunction with a suitable dust suppression technique such as water sprays/local extraction should be used.
- Drop heights from conveyors, loading shovels, hoppers and other loading equipment should be minimised, if necessary fine water sprays should be employed.

At all times, these procedures will be strictly monitored and assessed by competent experts. In the event of dust nuisance occurring outside the site boundary, movements of materials likely to raise dust would be curtailed and satisfactory procedures implemented to rectify the problem before the resumption of construction operations.

Climate GHGA

The Institute of Environmental Management and Assessment (IEMA) guidance note on "Assessing Greenhouse Gas Emissions and Evaluating their Significance" (IEMA 2022) states that the crux of significance regarding impact on climate is not whether a project emits GHG emissions, nor even the magnitude of GHG emissions alone, but whether it contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero by 2050. Mitigation has taken a leading role within the Guidance compared to the previous edition published in 2017. Early engagement is key and therefore mitigation should be considered from the outset of the project and continue throughout the project's lifetime in order to maximise GHG emissions savings. As well as stakeholders, key points of engagement include the design team and client who have a significant role to play in the reduction of GHG emissions.
The following guidance has been used when considering mitigation and resilience with respect to climate risk:

- IEMA EIA Guide to: Climate Change Resilience and Adaptation (IEMA 2020a).
- Technical guidance on the climate proofing of infrastructure in the period 2021-2027 (European Commission 2021a).
- Forging a climate-resilient Europe - the new EU Strategy on Adaptation to Climate Change (European Commission 2021b).
- PE-ENV-01104: Climate Guidance for National Rods, Light Rail and Rural Cycleways (Offline & Greenways) – Overarching Technical Document (TII 2022d).
- PE-ENV-01105: Climate Assessment of Proposed National Roads – Standard (TII 2022e).

Monitoring of the embodied carbon in the construction and operational phases will be conducted. The aim of the monitoring will be to seek further ways to minimise climate impacts. Monitoring will include; embodied carbon of construction materials, water usage, power and fuel usage and waste generation (including reuse and recycling rates). Where monitoring shows the proposed development is not meeting its targets, further mitigation will be put in place.

During the construction phase vehicles, generators etc., will give rise to some GHG emissions, however the proposed development's impact on climate due to traffic can be minimised through mitigation measures. The following mitigation measures will be put in place to minimise emissions:

- Implement a policy which prevents idling of vehicles both on and off-site including HGV holding sites.
- Construction Phase traffic shall be monitored to ensure construction vehicles are using the designated haul routes.
- All plant and machinery will be maintained and serviced regularly.
- Efficient scheduling of deliveries will be undertaken to minimise emissions.
- Construction vehicles shall conform to the latest EU emissions standards and where reasonably practicable, their emissions should meet upcoming standards

prior to the legal requirement date for the new standard. This will ensure emissions on haul routes are minimised.

Climate CCRA

The purpose of the CCRA is to assess the impact of climate change and build in additional resilience to the proposed development where weaknesses to future climate change are identified. Mitigation measures with respect to CCRA fall into three main categories:

- Grey Actions: technical or engineering oriented responses to climate impacts (i.e. drainage design).
- Green Actions: nature-based solutions to develop the resilience of human and natural systems.
- Soft Actions: involve the alterations in behaviour, regulation, or systems of management (i.e. increased monitoring or management plans). Soft measures are considered the most flexible and inexpensive to implement.

A considerable part of the mitigation measures with respect to the CCRA are within the control by other experts (i.e. drainage design, a grey measure). A risk register (Appendix 12.3) was generated in order to document the risk assessment process and mitigation that was applied by specialists and members of the design team.

Where residual risk of future climate change remains, additional mitigation will be applied. These include management plans, monitoring or communication with TII on updated potential risks. Mitigation measures include time scales (i.e. annually, after a climate hazard event) and the responsible party. To ensure mitigation and adaptation measures to combat residual risks are binding, they will be included in the appropriate project documentation (Phase 5 design reports onwards in CEMPs and OEMPs).

4.1.7.2 Operation Phase

Monitoring of carbon emissions will also include the ongoing management of adaptation and mitigation in order to measure their effectiveness, with consideration given to the vulnerabilities to extreme heat and cold. If monitoring of adaptation measures and mitigation measures indicates the measures are not effectively minimising embodied carbon or climate is impacting on the construction of the proposed development then they should be reviewed and updated.

4.1.8 Noise and Vibration

4.1.8.1 Construction Phase

As outlined in Section 13.6.1 to 13.6.4 of the Planning Report, the construction works are not expected to result in a significant impact during Daytime. Nevertheless, mitigation measures are necessary to reduce the noise from all activities to as low a level as feasible.

Appropriate general mitigation measures are set out as follows:

- A noise barrier shall be provided for the noisy activities which are defined in the Noise and Vibration section of the Planning Report. The noise barrier shall be located between the noise source and NSL and close to the noise source in order to provide maximum attenuation.
- In addition to this, a Construction Environmental Management Plan (CEMP) will be prepared prior to the construction phase outlining all measures undertaken to reduce construction noise levels emanating from the proposed site. This

plan will detail a range of measures aimed at controlling construction activities at the boundary of the site adjacent to the nearest noise sensitive properties and additional general measures aimed at reducing noise levels from the proposed site.

- The contractor will implement proactive community relations and will notify the likely effected noise sensitive locations before the commencement of any works forecast to generate appreciable levels of noise or vibration, outlining the nature and duration of the works.
- With regard to mitigation for construction activities, best practice control measures from construction sites within *BS 5228 (2009 +A1 2014) Code of Practice for Noise and Vibration Control on Construction and Open Sites Parts 1 and 2* will be used to control noise and vibration impacts. The contractor will ensure that all best practice noise and vibration control methods will be used as necessary in order to ensure impacts to nearby residential noise sensitive locations are not significant. This will be particularly important during demolition, and foundation constructions, including piling works, which are likely to be activities to have the highest potential noise and vibration impact.
- Construction activity will mostly take place during daytime hours Monday to Friday and Saturdays. It may be necessary to work outside these times at certain critical stages during the project to minimise public disturbance such as temporary road closures at night. Consideration will be given to the scheduling of activities in a manner that reflects the location and sensitivity of the site and the nature of neighbouring properties. Each potentially noisy event/activity will be considered on its individual merits and scheduled according to its noise level, proximity to sensitive receptors and possible options for noise control within the contractors' construction management plan. In situations where a particularly noisy activity is scheduled e.g. piling or other activities of similar noise level, the use of other on-site activities will be scheduled to ensure control of cumulative noise levels.

Other noise-related mitigation methods are described below and will be implemented for the project in accordance with best practice. These methods include:

- Select plant with low inherent potential for generation of noise and/or vibration.
- Situate any noisy plant as far away from sensitive properties as permitted by site constraints.
- Sequence activities to avoid using noisy plant simultaneously.
- Proper maintenance of plant will be employed to minimise the noise produced by on site operations.
- All vehicles and mechanical plant will be fitted with effective exhaust silencers and maintained in good working order for the duration of the contract.
- Use of less intrusive audible warnings such as broadband vehicle reversing alarms.
- Compressors will be attenuated model fitted with properly lined and sealed acoustic covers which will be kept closed whenever the machines are in use and all ancillary pneumatic tools shall be fitted with suitable silencers.
- Machinery that is used intermittently will be shut down or throttled back to a minimum during periods when not in use.
- During construction, the contractor will manage the works to comply with noise limits outlined above.

- Audible warning systems should be switched to the minimum setting required by the Health & Safety Executive or the Health & Safety Authority.

Noise & Vibration Monitoring

Where practicable it is recommended that noise and vibration from construction activities to off-site residences be limited to the values set out in Table 13-7 and Table 13-12 in the Planning Report. This may be achieved by undertaking noise and vibration monitoring at locations representative of the closest sensitive receptors.

Noise monitoring should be conducted in accordance with the International Standard ISO 1996: 2017: Acoustics – Description, measurement and assessment of environmental noise.

Vibration monitoring should be conducted in accordance with BS 6472 for human disturbance and BS ISO 4866:2010 for building damage.

Construction Working Hours

The permitted working hours are set out in section 4.5 in the Planning Report. In exceptional circumstances the Employer's Representative may allow the contractor to undertake night time works. Heavy or noisy construction activities will be avoided outside normal daytime hours and the amount of work outside normal daytime hours will be strictly controlled.

Piling Mitigation Measures

Piling is the activity which is most likely to cause disturbance. Specific guidance in relation to pilling is outlined below.

- Piling programmes should be arranged so as to control the amount of disturbance in noise and vibration sensitive areas at times that are considered of greatest sensitivity. If piling works are in progress on a site at the same time as other works of construction or demolition that themselves may generate significant noise and vibration, the working programme should be phased so as to prevent unacceptable disturbance at any time.
- Prior notice of the piling schedule should be given to the potentially affected residents.
- A vibration test programme will be established at the outset of the works to ensure compliance with the criteria.
- Vibratory piling will be the primary method of piling for the proposed development. Impact piling will only be used when vibratory piling cannot fully impede the sheet pile into bedrock.
- In certain types of piling works there will be ancillary mechanical plant and equipment that may be stationary, in which case, care should be taken in location selection, having due regard also for access routes. When appropriate, screens or enclosures should be provided for such equipment.

4.1.9 Archaeology, Architecture and Cultural Heritage

4.1.9.1 Construction Phase

Architectural Heritage and Topographical Survey

An Architectural Heritage and Topographical Survey of the section of the masonry quay wall in proximity to the proposed development at the southeastern side of the bridge shall be carried out in advance of construction. The survey shall comprise a

measured survey, a detailed written description, reporting (incorporating the results of the Wade and Metal Detection Survey), and the preparation of an archive.

All elements of the survey shall be carried out in accordance with a written method statement. The method statement will, if necessary, be submitted in support of an application for a licence to the DHLGH. The Architectural Heritage and Topographical Survey should include:

- A description of the masonry quay wall that references its location and setting, condition, fabric, dimensions and any visible evidence for its use and history.
- Customised building recording sheets shall be used to record the fabric, dimensions and location of features identified within the quay wall. Terminology should follow the criteria in the NIAH Handbook (2021).[1]
- A photographic survey, with photographs displaying, at a minimum, the main elevation, the setting of the quay walls and any related features, showing features of special interest, as well as detailed photographs of these features with scales, as appropriate.
- A topographic site plan showing the relevant structure and any nearby structures. The site area shall be recorded as an annotated and contoured site plan showing boundaries and representative ground profiles. Control points should be established with a 3D survey grid referenced to OD and ITM.
- Detailed annotated ground plan and representative profiles.
- Detailed annotated elevation drawings of the main external elevation, key internal elevation and any significant features.

The Architectural Heritage and Topographical Survey shall be carried out in accordance with best professional practice and conducted by qualified competent and authorised professionals. The significance of the masonry quay wall shall be recorded using the rating criteria outlined in the *NIAH Handbook* (2021).

While it is probable that the majority of the extant quay wall at the southeastern side of the extant O'Hanrahan bridge dates to the mid-nineteenth century, it is possible that elements of earlier phases, possibly dating to the medieval and/or post-medieval period may be incorporated within the existing structure. A simple and inexpensive means to determine the date of the masonry is through mortar analysis of the lower and higher areas on the masonry. This could be carried out at the junction of the steps and the vertical quay wall and include a closer examination of the form of the masonry of the extant section to the southeast of the flood relief wall.

At the proposed works area at the southwestern side of O'Hanrahan bridge there is potential for previously unrecorded built heritage elements associated with former quaysides and/or riverbank activities to survive within the mud and estuarine deposits at this side of the river. Therefore, it is recommended that in advance of any construction works taking place a wade and/or dive survey with metal-detection survey should be undertaken in consultation with NMS and TII Project Archaeologist. The surveys should be undertaken under licence, by a suitably competent and qualified archaeologist with the experience necessary to undertake work in this type of environment. Particular care should be taken to assess the potential for any medieval or post-medieval quayside structures surviving within the works area, and the report on the survey should identify where additional archaeological works (if any) are required in advance of construction. The significance of any built heritage elements identified during the course of this work should be recorded using the rating

[1] Available at: https://www.buildingsofireland.ie/app/uploads/2021/03/NIAH-Handbook-Edition-March-2021.pdf

criteria outlined in the *NIAH Handbook* (2021). The archaeologist should also undertake archaeological monitoring of all piling or in-channel works which have the potential to disturb or uncover archaeological features, finds or deposits in the river.

The proposed archaeological mitigation for all sheet-piling works is discussed in Archaeological Monitoring below.

Archaeological Monitoring

The services of a suitably qualified and experienced archaeologist, with experience in underwater archaeology, shall be engaged to carry out archaeological monitoring for the construction works programme; to include archaeological monitoring of dryland, foreshore and in-stream works. The aim of the licensed archaeological monitoring is to ascertain the location, nature, date, character, extent and significance of any archaeological features/deposits/objects that may be uncovered during site investigations and/or construction works and to undertake the necessary amount of archaeological investigation on all such features/deposits/objects so as to determine their horizontal and vertical extents and to produce the necessary report(s) on the findings.

The archaeological monitoring shall be licensed by the National Monuments Service of the Department of Housing, Local Government and Heritage and a detailed method statement should accompany the licence application. The method statement, which shall lay out the monitoring strategy for each location where works are proposed, shall be prepared in consultation with the TII Project Archaeologist. The archaeological monitoring shall be carried out in two separate phases:

1. Site investigations will involve the investigation of two boreholes on the foreshore area and a test pit/slit trench on land at the eastern side of the bridge, and one borehole is proposed at the southwestern side of the bridge. The test pit/ slit trench should be archaeologically monitored. Borehole logs should be made available to the monitoring archaeologist as the detail included should be presented in the archaeological monitoring report for the proposed works.
2. During construction, to include the sheet piling works at both sides of the bridge, and construction of footings for the new wall at the western side of the bridge.

In addition to the licence eligible archaeologists, the archaeological team shall include a topographical surveyor to attend onsite as required. A communication strategy shall form part of the monitoring strategy to ensure full communication is in place between the monitoring archaeologist and the plant operators at all times during works. The archaeological personnel undertaking the monitoring will be in a position to monitor directly all elements of the works, to ensure they have unobstructed views of the excavations/other works, and the plant and machinery operators should be prepared to facilitate the archaeological personnel in the undertaking of their monitoring work.

As part of the Finds Retrieval Strategy in the methodology, all excavated material removed shall be spread and searched for archaeological objects and metal detected (under licence) to assess the artefact-bearing potential of the deposits. Sufficient archaeological personnel shall be in place to cover all aspects of the monitoring works.

Should potential archaeology be identified during the works, then the construction works shall be suspended in that location and the NMS, the TII-assigned Project

Archaeologist, Project Engineer and Contractor shall be notified. Minor or isolated features/deposits shall be fully excavated and recorded by the archaeological team during the course of their archaeological monitoring, subject to the agreement of the NMS, TII-assigned Project Archaeologist and Project Engineer. Further archaeological works may also be required, that depending on recommendations from NMS may include further archaeological assessment, test-excavations, avoidance/preservation *in situ*, or full excavation. In order to establish the date, nature and significance of archaeological features/deposits, bulk samples of soil/sediment/mortar should be obtained, as appropriate.

Following the completion of works, reports detailing the outcome of the monitoring shall be forwarded to the NMS and other statutory authorities, as per the conditions of the archaeological licences.

Communication and Awareness Strategy

All on-site personnel shall be made aware of the significance of the masonry quay walls during works. Signage and barriers/fencing shall be erected for the duration of the construction phase to protect the quay walls from damage.

4.1.9.2 Operation Phase

No mitigation measures are required for cultural heritage during the operational phase of the proposed development.

4.1.10 Material Assets and Land

4.1.10.1 Construction Phase

During construction, it will be ensured that all utilities will be repaired or replaced without unreasonable delay. The following mitigation measures have been proposed for the construction of the proposed development:

Prior to commencing construction works, the Contractor will be required to:

- Prepare a Construction and Environmental Management Plan (CEMP) and Construction Traffic Management Plan (CTMP) of which the contents of which must be approved in advance by Kildare County Council.
- Traffic Management will be put in place to ensure access to residential and commercial property is maintained during construction.
- Prepare an Incident Response Plan detailing the procedures to be undertaken in the event of a spill of chemical, fuel or other hazardous wastes, a fire, or non-compliance incident with any permit of license issues.
- Prepare a site plan showing the location of all surface water drainage lines and proposed discharge points to surface water. This will also include the location of all existing and proposed surface water protection measures, including best practice measures such as monitoring points, sediment traps, settling basins, interceptors etc.
- Existing roads to be kept open to facilitate access as far as practicable, with temporary diversions implemented where necessary to ensure access is maintained.
- Residents will be notified in advance of any disruption to utilities.

4.1.10.2 Operational Phase

During operation, there are no predicted impacts to material assets and therefore, no mitigation measures are necessary.

5. STATUTORY PLANNING CONSENT

When the planning application is approved by An Bord Pleanála for the proposed development the entire contents of the statutory approval and any conditions will be complied with as part of the CEMP. The Statutory Planning consent will be inserted as an Appendix (Appendix B) into the final CEMP once statutory planning approval is received and will be carried forward into the Contractors CEMP.

6. ENVIRONMENTAL OPERATING PLAN

An Environmental Operating Plan (EOP) is prepared to outline procedures for delivery of environmental mitigation measures for addressing general day-to-day environmental issues that can arise during the construction phase of the proposed development. The EOP is a live document and will be further developed and updated by the Contractor during the project construction stage. The EOP is contained in Appendix C to this CEMP.

7. INCIDENT RESPONSE PLAN

The Incident Response Plan (IRP) describes the procedures, lines of authority and processes that will be followed to ensure that incident response efforts are prompt, efficient, and appropriate to particular circumstances. The IRP is contained within Appendix D to this CEMP.

APPENDIX A

Natura Impact Statement - Mitigation Measures

1. NATURA IMPACT STATEMENT – MITIGATION MEASURES

1.1 Principles and Approach

Section 4 of the Natura Impact Statement (NIS) assessed the adverse effects likely to arise from the proposed development on the specific Attributes and Targets which define the Conservation Objectives for a number of Qualifying Interests of the River Barrow and River Nore SAC, Lower River Suir SAC and the River Nore SPA. This section prescribes mitigation measures to ensure their full and proper implementation aimed at mitigating these adverse effects, thereby protecting the integrity of these European sites during the construction and operation of the proposed development.

The mitigation measures prescribed in the NIS have been designed according to the principle of a mitigation hierarchy, as outlined in the European Commission's guidance document *Assessment of plans and projects in relation to Natura 2000 Sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC* (EC, 2021). According to this hierarchy, mitigation measures first suggest *avoidance* (i.e. preventing significant impacts from happening in the first place) and then *reduction* of impact (i.e. reducing the magnitude and/or likelihood of an impact).

As mitigation measures are related directly to impacts and only indirectly to receptors and as, in this case, all of the affected receptors have been identified as being affected the same set of impacts, to describe mitigation measures under the headings of the relevant receptors would lead to undue repetition. Therefore, the measures prescribed in this NIS are described under the headings of the types of impacts which they are intended to mitigate.

1.2 Mitigation Measures

1.2.1 Water Quality

As is normal practice with infrastructure projects, a Construction Environmental Management Plan (CEMP) has been prepared for the proposed development and is included in Appendix D of this NIS. This will be updated and finalised by the selected contractor to suit the detailed construction methodology and allocate responsibilities to individuals in the construction team. In doing so, the measures detailed in the appended reports will be considered minimum requirements to be considered and improved upon. The level of detail provided within the Plans is sufficient to allow an assessment of the anticipated impacts including residual impacts.

The following will be implemented as part of this plan:

- An Environmental Operating Plan (EOP) (Appendix C of Appendix D) outlines procedures for the delivery of environmental mitigation measures and for addressing general day-to-day environmental issues that can arise during the construction phase of developments.
- An Incident Response Plan (Appendix D of Appendix D) detailing the procedures to be undertaken in the event of spillage of chemical, fuel or other hazardous wastes, non-compliance with any permit or license, or other such risks that could lead to a pollution incident, including flood risks.
- All necessary permits and licenses for in-stream construction work for provision of the proposed development will be obtained prior to the commencement of construction.
- Inform and consult with the National Parks and Wildlife Service and Inland Fisheries Ireland.

During construction, cognisance will have to be taken of the following guidance documents for construction work on, over or near water.

- *Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters (IFI, 2016)*
- *Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites (Eastern Regional Fisheries Board)*
- *Central Fisheries Board Channels and Challenges – The enhancement of Salmonid Rivers.*
- *C532 Control of water pollution from construction sites: guidance for consultants and contractors (CIRIA, 2001)*
- *CIRIA C648 Control of water pollution from linear construction projects: technical guidance (CIRIA, 2006)*
- *Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes (TII, 2006)*

Based on the above guidance documents, the following principal mitigation measures will be adhered to for the construction phase:

Sedimentation and surface water run-off

- Sheet piling for the new site boundary shall be installed prior to any excavation on the landward side and demolition of the existing quay wall boundary. This will form an effective barrier to run-off from the site during construction.
- Any material stockpiled shall be located a minimum of 30 m from the edge of the river and shall also be covered and remain stockpiled for as short a time as possible.
- The Contractors shall provide method statements for weather and tide/storm surge forecasting and continuous monitoring of water levels in Waterford Harbour and the removal of site materials, fuels, tools, vehicles and persons from flood zones in order to minimise the risk of input of sediment or construction materials into the river during flood events.
- The works area (including site compounds) will be limited to the minimum required to undertake the necessary elements of the project.
- Surface water flowing onto the construction area will be minimised through the provision of berms, diversion channels or cut-off ditches.
- Protection of waterbodies from silt load will be carried out through the use of gully silt/sediment filters and shallow berms in hardstanding areas to provide adequate treatment of runoff to watercourses.
- Settlement tanks/ponds, silt traps/bags and bunds will be used. Where pumping of water is to be carried out, filters will be used at intake points and discharge will be through a sediment trap.
- The anticipated site compound/storage facility will be fenced off at a minimum distance of 5 m from the top of the edge of the watercourse bank. Any works within the 10 m buffer zone will require measures to be implemented to ensure that silt laden or contaminated surface water runoff from the compound does not discharge directly to the watercourse. CEMP has been drafted and will need to be finalised by the appointed Contactor. See the CEMP in Appendix D for further detail.

- Protection measures will be put in place to ensure that all hydrocarbons used during the construction phase are appropriately handled, stored and disposed of in accordance with the TII document "*Guidelines for the crossing of watercourses during the construction of National Road Schemes*". All chemical and fuel filling locations will be contained within bunded areas.
- Foul drainage from all site offices and construction facilities will be contained and disposed of in an appropriate manner, off site, to prevent pollution.
- The construction discharge will be treated such that it will not reduce the environmental quality standard of the receiving watercourses.
- Water quality monitoring will be undertaken in the River Barrow, with weekly samples being taken from at least 2 months prior to commencement of construction until at least 4 months post-completion. Water samples will be taken from at least two locations. The final number and location of sampling points will be determined by the Site Environmental Manager. The results of the water quality monitoring programme will be reviewed by the Site Environmental Manager on an ongoing basis during construction. In the event of any non-compliance with regulatory limits for any of the water quality parameters monitored, an investigation will be undertaken to identify the source of this non-compliance and corrective action will be taken where the this is deemed to be associated with the proposed development.

Concrete Works

The use and management of concrete in or close to watercourses must be carefully controlled to avoid spillage which has a deleterious effect on water chemistry and aquatic habitats and species. As the use of concrete cannot be avoided, the following control measures will be employed:

- Hydrophilic grout and quick-setting mixes or rapid hardener additives shall be used to promote the early set of concrete surfaces exposed to water;
- When working in or near the surface water and the application of in-situ materials cannot be avoided, the use of alternative materials such as biodegradable shutter oils shall be used;
- Any plant operating close to the water will require special consideration on the transport of concrete from the point of discharge from the mixer to final discharge into the delivery pipe (tremie). Care will be exercised when slewing concrete skips or mobile concrete pumps over or near surface waters;
- Placing of concrete in or near watercourses will be carried out only under the supervision of the Ecological Clerk of Works (ECoW);
- The weather forecast will be consulted prior to commencing concrete pours. No such works will be undertaken if inclement weather is forecast such that precipitation may make it difficult to maintain a dry working area.
- There will be no spills of concrete, cement, grout or similar materials hosed into surface water drains. Such spills shall be contained immediately, and runoff prevented from entering the watercourse;
- Concrete waste and wash-down water will be contained and managed on site to prevent pollution of all surface watercourses;
- On-site concrete batching and mixing activities will only be allowed at the identified construction compound areas;
- Washout from concrete lorries, with the exception of the chute, will not be permitted on site and will only take place at the construction compound (or other appropriate facility designated by the manufacturer);

- Chute washout will be carried out at designated locations only. These locations will be signposted. The Concrete Plant and all Delivery Drivers will be informed of their location with the order information and on arrival to site; and
- Chute washout locations will be provided with an appropriate designated, contained impermeable area and treatment facilities including adequately sized settlement tanks. The clear water from the settlement tanks shall be pH corrected prior to discharge (which shall be by means of one of the construction stage settlement facilities) or alternatively disposed of as waste in accordance with the Contractor's Waste Management Plan.

Hydrocarbons and other chemicals

- Land-based vehicles and plant shall be refuelled off-site, where possible.
- All land-based fuelling of machinery shall be undertaken on an impermeable base in bunded areas at least 50 m from the edge of the river.
- Marine based fuelling will only be undertaken using specifically designed nozzles to prevent spillages and spill kits will be available.
- All fuelling equipment shall be regularly inspected and serviced.
- Any petrol- or diesel-fuelled pumps or other machinery shall be located within temporary bunded units.
- All fuel, oils, chemicals, hydraulic fluids, on-site toilets etc. shall be stored in the construction site compound, on an impermeable base which shall be bunded to 110% capacity and appropriately secured.
- All plant and construction vehicles shall be inspected daily for oil leaks and a full-service record shall be kept for all plant and machinery.
- Spill kits shall be available on-site during construction, including on the jack-up barge during pile driving.
- All waste oils, empty oil containers and hazardous wastes shall be disposed of in accordance with the Waste Management Act, 1996 (as amended).
- Owing to the presence of contaminants within the construction site, excavation shall be limited to the absolute minimum necessary.

Flooding

The Contractor will provide method statements for weather forecasting and continuous monitoring of water levels in the River Barrow. The Contractor will also provide method statements for the removal of site materials, fuels, tools, vehicles and persons from flood zones in order to minimise the risk to persons working on the site as well as potential input of sediment or construction materials into the river during flood events.

Operational Phase

No water quality impacts are predicted to arise during the operation of the proposed development.

1.2.2 Hydroacoustic Impacts

Hydroacoustic Impacts

The mitigation for hydroacoustic impacts is as follows ("piling event" means any period of continuous piling by one or two rigs; "quiet period" means any period in which there is no piling by any rig):

- Piling works shall not be undertaken between the 1st April and the 31st May as advised by IFI during consultation.
- There shall be no piling between sunset and sunrise.
- Vibratory piling shall be the standard method for the installation of all piles. Impact piling shall only be employed where the required pile toe level cannot be achieved by vibratory piling.
- The duration of any vibratory piling event shall not exceed 180 piling minutes.
- The length of any impact piling event shall not exceed 200 strikes.
- An appropriate soft-start/ramp-up procedure shall be used for all impact piling events. Where it is possible according to the operational parameters of the equipment and materials concerned, the underwater acoustic energy output shall commence from a lower energy start-up (i.e., a peak sound pressure level not exceeding 170 dB re: 1µPa @1m) and, thereafter, be allowed to gradually build up to the necessary maximum output over a period of 20 – 40 mins.
- Following every piling event, there shall be a quiet period of at least 30 minutes. Only following 30 minutes of no piling whatsoever can the cumulation of piling minutes be re-zeroed.
- Rotary drilling will be the method used to drill the boreholes over other methods such as percussion drilling which give rise to higher levels of noise. Furthermore, these works will take place at low tide to allow for greater attenuation of noise within the mud in the absence of water. This mitigation will ensure that any hydroacoustic impacts will not give rise to a significant barrier to the movements of Twaite Shad or other species, or other significant effects on such species, in the Barrow Estuary as a result of the ground investigations.

1.2.3 Lighting

In summary, light spill onto the river channel during hours of darkness has the potential to form a barrier to the migration of nocturnal species and to encourage night-time activity of diurnal species, causing them to become more vulnerable to nocturnal predators.

Therefore, the following limits on construction lighting is proposed:

- Subject to any Health & Safety and/or navigational requirements, construction lighting over the river channel shall be turned off outside of working hours.
- Construction lighting shall be limited to the minimum area required to be lit and minimise light spill to areas not required for construction.
- In order to further limit any light spill, solid hoarding shall be erected around areas which will be subject to night-time construction activities.

Given the implementation of the above measures and the short duration of night-time construction activities, these works are unlikely to give rise to any impacts beyond the duration of the works and, therefore, no additional mitigation is proposed in relation to these works.

During the operation of the proposed development, lighting columns will be of a similar height and spacing to the existing and will utilise the existing lighting duct in the footpath. The following mitigation measures will be integrated into the lighting design:

- Lighting outside the intended area of illumination will be minimised. Where light spill cannot be avoided, louvres, cowls or shields will be fitted to the columns.
- Lighting will be LED and have no upward light spill (apart from intentional up-lighting) and a sharp horizontal cut off.
- Lighting will be a warm-white colour of 2700K or less.

1.2.4 Invasive Alien Species

In order to minimise the risk of the introduction or spread of invasive species during construction, all land-based works shall be executed in accordance with best practice for biosecurity in construction. In particular, prior to commencement, the Contractor shall prepare a detailed Biosecurity Protocol describing his/her proposed approach to ensuring that invasive species are not imported or spread during the construction of the proposed development.

Terrestrial Plant Species

In order to minimise the risk of the introduction or spread of invasive alien plant species (IAPS) during construction, all land-based works shall be executed in accordance with best practice for biosecurity in construction. In particular, prior to commencement, the Contractor shall prepare a detailed Biosecurity Protocol describing his/her proposed approach to ensuring that IAPS are not imported or spread during the construction of the proposed development. The Contractor's Biosecurity Protocol shall be in accordance with *The Management of Invasive Alien Plant Species on National Roads – Standard* (TII, 2020a) and *The Management of Invasive Alien Plant Species on National Roads – Technical Guidance* (TII, 2020b). The Biosecurity Protocol shall include, as a minimum, the following measures to prevent the spread of invasive species:

- Good construction site hygiene will be employed to prevent the introduction and spread of problematic IAPS (i.e., Himalayan Balsam and Common Cord-grass) by thoroughly washing vehicles prior to leaving any site.
- All plant and equipment employed on the construction site (e.g., excavators, piling equipment etc.) will be thoroughly cleaned down using a power washer unit prior to arrival on site to prevent the spread of IAPS.
- All washing must be undertaken in areas with no potential to result in the spread of IAPS, as detailed in the Construction Environmental Management Plan.
- Any soil and topsoil required on the site will be sourced from a stock that has been screened for the presence of any IAPS and where it is confirmed that none are present.

Aquatic Species

The use of barges during the construction of the proposed development poses the risk of the introduction of invasive alien species to the aquatic environment both in the vicinity of the works and in the wider Barrow-Nore-Suir Estuary. This has the potential to significantly affect the integrity of aquatic and intertidal habitats in the zone of influence. In order to minimise the risk of either the introduction or spread of aquatic invasive alien species and thereby avoid negative impacts on these habitats, the owner or operator of the barge shall provide documentary evidence (in the form of a

completed and signed Marine Institute "*Cleaning and Disinfection Declaration Form*") that the vessel was fully de-fouled within the 6 months immediately preceding its engagement in the construction of the proposed development.

In relation to other construction activities, including pre-construction surveys and any other site inspections, the principles and appropriate measures in the IFI guidance document *Biosecurity Protocol for Field Survey Work* (IFI, 2010a) shall be followed and shall form part of the Contractor's Biosecurity protocol.

1.2.5 Fish Rescue

As the sheet piling will be installed at high tide, there is a risk that fish could become trapped once the wall is closed off. In order to avoid this, the final sheet pile will be installed at low tide so that any fish that might have become trapped behind sheet piling will be able to escape with the receding tide before the area behind the new quay wall is closed off and filled in.

1.2.6 Monitoring

Water Quality

Monitoring of water quality shall be undertaken in the River Barrow, with samples taken, weekly for at least 2 months prior to commencement of construction, for the entire duration of construction and for at least 4 months post-completion. The parameters which shall be monitored include, but are not limited to:

- Suspended solids and turbidity;
- Total hydrocarbons;
- Ammonia, nitrates, nitrites and total nitrogen;
- Phosphates and total phosphorus;
- Dissolved oxygen and biological oxygen demand; and,
- Temperature and salinity.

Samples shall be taken from at least two different locations, including at least one location at an appropriate distance upstream of the proposed development and at least one other at an appropriate distance downstream of the proposed development. The final number and location of sampling points will be determined by the Site Environmental Manager. Given the strong tidal influence at the location of the proposed development, the date and exact time at which each sample is taken, as well as the water level and direction of flow, must be recorded in order to ensure that comparative analysis of samples can control for tidal influence, as well as other variables, e.g., fluvial conditions.

The results of the water quality monitoring programme will be reviewed by the Site Environmental Manager on an ongoing basis during construction. In the event of any non-compliance with regulatory limits for any of the water quality parameters monitored, an investigation shall be undertaken to identify the source of this non-compliance and corrective action will be taken where this is deemed to be associated with the proposed development.

Record of Habitats

In order to maintain an accurate and precise record of changes to intertidal and fringing habitats, particularly mudflats, a photographic record shall be made of these habitats. This record shall cover both sides of the river from 50m upstream of the sheet pile wall

to 50m downstream. All photographs shall be taken at low tide, every 2 months, beginning 6 months prior to commencement of construction and finishing 12 months after completion.
In addition, in order to accurately and precisely record any change in the structure and composition of biological communities of hard and soft intertidal substrates, sampling and analysis of these habitats shall be carried out at 6 months, 1 year, 2 years and 5 years post-construction. To facilitate meaningful comparative analysis and evaluation of the impacts of the proposed development, the sampling and analysis should follow the methodology employed by UCC Aquatic Services Unit in carrying out the pre-planning benthic surveys on 14th January and 21st September 2022 (in Appendix C).

Hydroacoustic Impacts

In order to allow for greater accuracy in the assessment of future plans and projects, it is recommended that hydroacoustic monitoring be undertaken for the duration of the proposed development's construction during which piling activities will take place. This monitoring shall establish the ambient underwater noise levels in the estuary (and the rate of sound attenuation) prior to and after construction and more accurately characterise the sound outputs in terms of SPL_{peak}, SPL_{RMS} and *SEL* at different frequencies arising from the different methods of pile driving and different types and sizes of piles. This monitoring shall be carried out by specialist underwater noise surveyors.

1.3 Implementation

In order to give effect to the mitigation prescribed in this NIS, it should be a condition of any consent granted in respect of the proposed development that all of the mitigation, including monitoring and enforcement, prescribed in this NIS be binding, during the construction phase, on the Contractor and, during operational phase, on Wexford County Council. Accordingly, all of the mitigation prescribed herein shall be transposed into the Contract Documents for the construction of the proposed development.

During construction, all works must comply with relevant legislation and guidelines in order to reduce and minimise environmental impacts and to protect all ecological receptors. In particular, there must be full compliance with the following:

- The CEMP
- The Schedule of Commitments.
- The mitigation prescribed in the Ecological Impact Assessment (EcIA) (submitted as part of the Planning Report) and in this NIS.
- Any conditions which might be attached to the proposed development's planning consent.
- Any requirements of stakeholders and statutory bodies, e.g., the NPWS and IFI, including:
    - *Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters* (IFI, 2016).
    - *Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters* (NPWS, 2014).
    - *Bats and artificial lighting in the UK* (BCT, 2018).
- All applicable legislative requirements in relation to environmental protection.
- All relevant construction industry guidelines, including:

- *C532 Control of water pollution from construction sites: guidance for consultants and contractors* (CIRIA, 2001).

- Any biosecurity requirements arising from the preceding points.
- The Transport Infrastructure Ireland (TII) Environmental Assessment and Construction Guidelines, specifically:
  - *Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes.*
  - *Guidelines for the Testing and Mitigation of the Wetland Archaeological Heritage for National Road Schemes.*
  - *Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes*
  - *The Management of Invasive Alien Plant Species on National Roads – Standard.*
  - *The Management of Invasive Alien Plant Species on National Roads – Technical Guidance.*
  - *Guidelines for the Treatment of Noise and Vibration in National Road Schemes.*
  - *Guidelines for the Treatment of Otters Prior to the Construction of National Road Schemes.*
  - *Management of Waste from National Road Construction Projects.*
  - *Guidelines for the Creation, Implementation and Maintenance of an Environmental Operating Plan.*

This list is non-exhaustive. All environmental commitments/requirements and relevant legislation and guidelines which are current at the time of construction will be followed.

1.3.1 Construction Environmental Management Plan

Appendix E of the NIS contains the Construction and Environmental Management Plan (CEMP) which shall be finalised by the Contractor, in agreement with Kildare County Council, prior to the commencement of the construction phase.

A CEMP deals with the Contractor's overall management and administration of a construction project in addition to any environmental control measures required during construction. A CEMP is prepared by the Contractor during the pre-construction phase, to ensure that the project is completed on-time and within budget. The CEMP will include a detailed programme of works. The CEMP is also developed to ensure that all construction activities are undertaken in a satisfactory and safe manner, to a delivery program meeting the Clients requirements. The Contractor will be required to include details under the following headings;

- Details of working hours and days;
- Details of emergency plan - in the event of fire, chemical spillage, cement spillage, collapse of structures or failure of equipment or road traffic incident within an area of traffic management. The plan must include contact names and telephone numbers for: Local Authority (all sections/departments); Ambulance; Gardaí and Fire Services;
- Details of chemical/fuel storage areas, (including location and bunding to contain runoff of spillages and leakages);
- Details regarding refuelling areas for machinery and vehicles.

- Details of construction plant storage, temporary offices;
- Traffic management plan (to be developed in conjunction with the Local Authority – Roads Section) including details of routing of network traffic; temporary road closures; temporary signal strategy; routing of construction traffic; programme of vehicular arrivals; on-site parking for vehicles and workers; road cleaning; other traffic management requirements such as traffic calming where necessary;
- Truck wheel wash details (including measures to reduce and treat runoff);
- Dust management to prevent nuisance and harmful effects (demolition & construction);
- Site run-off and drainage management plan;
- Noise and vibration management to prevent nuisance (demolition & construction);
- Landscape management;
- Soil management plan
- Management of contaminated land and assessment of risk for same by suitably qualified, trained and licenced personnel;
- Management of demolition of all structures and assessment of risks for same;
- Stockpiles;
- Project procedures & method statements for:
    - Site clearance, site investigations, excavations and working with asbestos containing materials (ACMS);
    - Management and removal of ACMs;
    - Demolition & removal of buildings, services, pipelines (including risk assessment and disposal);
    - Diversion of services;
    - Excavation;
    - Piling;
    - Construction of pipelines;
    - Temporary hoarding & lighting;
    - Disposal of surplus geological material (peat, soils, rock etc.);
    - Protection of watercourses from contamination and silting during construction;
- Site Compounds.
    - Temporary car parks for staff and site workers
    - Material processing areas / Material storage areas / plant storage

The production of the CEMP will also detail areas of concern with regard to Health and Safety and any environmental issues that require attention during the construction phase. Adoption of good management practices on site during the construction and operation phases will also contribute to reducing environmental impacts.

The CEMP has been appended (Appendix E). This is a preliminary document, which will be updated and finalised by the successful Contractor. Appended to the CEMP are the following constituent plans, also to be finalised by the Contractor:

- **Appendix C:** Environmental Operating Plan (EOP)
- **Appendix D:** Incident Response Plan (IRP)

Each of these plans is discussed in the following sections. The obligation to develop, maintain and implement the CEMP and all of the above-listed plans will form part of the contract documents for the construction phase.

Environmental Operating Plan

The EOP is a document that outlines procedures for the delivery of environmental mitigation measures and for addressing general day-to-day environmental issues that can arise during the construction phase of developments. Essentially the EOP is a project management tool. It is prepared, developed and updated by the Contractor during the construction stage and will be limited to setting out the detailed procedures by which the mitigation measures proposed as part of this NIS and the Planning Report and NIS and arising out of Wexford County Council's decision (if approving the proposed development) will be achieved. The EOP will not give rise to any reduction of mitigation measures or measures to protect the environment.

Before any works commence on site, the Contractor will be required to prepare an Environmental Operating Plan (EOP) in accordance with the TII *Guidelines for the Creation and Maintenance of an Environmental Operating Plan*. The EOP will set out the Contractors approach to managing environmental issues associated with the construction of the road and provide a documented account to the implementation of the environmental commitments set out in the EIAR and measures stipulated in the planning conditions. Details within the plan will include, as a minimum:

- All environmental commitments and mitigation stipulated in the planning documentation in respect of the proposed development, including sediment controls and other measures to ensure that water quality in the River Barrow is not degraded.
- Any requirements of statutory bodies such as the NPWS and IFI, including adherence to *Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters* (IFI, 2016).
- A detailed Biosecurity Protocol.
- A list of all applicable legislative requirements in relation to environmental protection and a method of documenting compliance with these requirements.
- Outline methods by which construction activities will be managed in such a manner as to avoid, reduce or remedy potential negative impacts on the environment.

To oversee the implementation of the EOP, the Contractors will be required to appoint a person to ensure that the mitigation measures included in this NIS and the Planning Report, the EOP and the statutory approvals are executed in the construction of the works and to monitor that those mitigation measures employed are functioning properly.

Incident Response Plan

The Incident Response Plan (IRP) describes the procedures, lines of authority and processes that will be followed to ensure that incident response efforts during the construction stage of the proposed development are prompt, efficient, and appropriate to particular circumstances.

The Contractor will finalise the IRP prior to the commencement of the proposed works to include the following information, at a minimum:

- Contact names and telephone numbers for the local authority, i.e., Wexford County Council (all sections and departments), An Garda Síochána and ambulance and fire services; and,
- Method statements for weather forecasting and continuous monitoring of water levels in the River Barrow. The plan must outline how the Contractor will respond to forecasted flood events, including but not limited to, details of removal of site materials, fuels, tools, vehicles and persons from flood zones.
- The measures to be taken to avoid or reduce the incident risk potential;
- Reference to the method statement and management plans for construction activities, insofar as they are relevant for the purposes of mitigating against health and safety and pollution incidents;
- Procedures to be adopted to contain, limit and mitigate any adverse effects, as far as reasonably practicable, in the event of a health and safety or pollution incident;
- Persons responsible for dealing with incidents and their contact details;
- Procedures for alerting key staff, appropriate emergency services, authorities, the Employer's Representative and clean-up companies, where required, and contact details of same;
- Procedures for notifying relevant statutory bodies, environmental regulatory bodies, local authorities and local water and sewer providers of pollution incidents, where required, and contact details of same;
- Standby / rota systems; and
- The types and location of emergency response equipment available and appropriate personal protective equipment to be worn.

An IRP has been appended to the CEMP (i.e., Appendix D of Appendix D). The document in its current form will be finalised by the successful Contractor prior to the commencement of the construction phase of the proposed development.

Implementation of the EOP

It will be a condition of the Contract for the construction of the proposed development that the successful Contractor fully implement the EOP throughout the works. To oversee the implementation of the EOP, the Contractor will be required to appoint a responsible Site Environmental Manager (SEM) to ensure that the environmental commitments (as described above) and the EOP are fully executed for the duration of works, and to monitor whether the mitigation measures employed are functioning properly (i.e., are effectively addressing the environmental impact(s) which they were prescribed for).

1.3.2 Site Environmental Manager

To ensure the successful development, implementation and maintenance of the EOP, the Contractor will appoint an independent Site Environmental Manager (SEM). He/she must possess training, experience and knowledge appropriate to the role, including a National Framework of Qualifications (NFQ) Level 8 qualification (or equivalent) or other acceptable qualification in environmental science, environmental management, hydrology or engineering. The principal functions of the SEM will be to ensure that the mitigation prescribed in this NIS, the Planning Report, the EOP and the CEMP, is fully and properly implemented and to monitor the construction stage from an environmental perspective. The SEM will also provide independently verifiable audit reports.

Separate from the on-going and detailed monitoring carried out by the Contractor as part of the EOP, the SEM will carry out the inspection and monitoring described below on behalf of NRDO. The results will be stored in the SEM's monitoring file and will be available for inspection or audit by NRDO, the NPWS or IFI.

- Daily reporting on weather and flood forecasting and daily reporting on the monitoring of peak water levels in the River Barrow.
- Weekly inspections of the principal control measures described in the CEMP and reporting of findings to the Contractor.
- Daily inspections of surface water treatment measures.
- Daily inspections of all outfalls to watercourses.
- Daily visual inspections of watercourse to which there are discharges from the works and those in the vicinity of construction works.
- Weekly inspections of wheel-wash facilities.
- Daily monitoring of any stockpiles.
- Auditing at least six times per quarter of the Contractor's EOP monitoring results.

APPENDIX B

Statutory Planning Consent

[The Statutory Planning consent will be inserted into the final CEMP once statutory planning approval is received and will be carried forward into the Contractors CEMP]

APPENDIX C

Environmental Operating Plan

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O'Hanrahan Bridge Widening

Environmental Operating Plan

March 2023

Client:
Kildare County Council

ROD
ROUGHAN & O'DONOVAN

O'Hanrahan Bridge Widening

Environmental Operating Plan

TABLE OF CONTENTS

1. INTRODUCTION

This document is the project-specific preliminary Environmental Operating Plan (EOP) for the O'Hanrahan Bridge Widening project. It is prepared to inform and provide a template for the successful contractor to develop and maintain an EOP for the construction of the O'Hanrahan Bridge Widening project.

1.1 Purpose and Scope

The preliminary EOP is designed to assist the main contractor in preventing, managing and/or minimising significant environmental impacts during the construction phase. The preliminary EOP sets out the mechanism by which environmental protection is to be achieved for the O'Hanrahan Bridge Widening project. The preliminary EOP describes the Environmental Management System (EMS) of the proposed development, which will be devised according to the criteria of ISO 14001:2015 – Environmental Management Systems and developed having regard to the National Road Authority (now known for operating purposes as Transport Infrastructure Ireland (TII)) *"Guidelines for the Creation, Implementation and Maintenance of an Environmental Operating Plan".* This preliminary EOP will be complemented by General Procedures, Work Procedures and Operations Instructions of the contractor. These documents will be in place within the site administration offices and appropriate site locations during the works.

This preliminary EOP covers the activities of the [*Successful Contractor Name*] and that of its sub-contractors. It outlines the environmental commitments in relation to the construction works and how these commitments are to be managed, including details of the monitoring systems and mitigation measures to be employed by the successful contractor. It also assigns responsibilities for ensuring the effective implementation of the EOP.

To achieve this objective, the finalised EOP should contain all Environmental Commitments and Requirements set out in:

- the Contract documents (in particular, the Works Requirements (WR));
- the Planning Report
- the Natura Impact Statement (NIS);
- any conditions and/or modifications imposed by An Bord Pleanála (ABP);
- the Schedule of Commitments, and provide a method of documenting compliance with these Environmental Commitments and conditions / modifications; (refer to the CEMP)
- List all relevant environmental legislative requirements and provide a method of documenting compliance with these requirements, and
- Outline methods by which construction work will be managed to prevent, reduce or compensate for potential adverse impacts on the environment. (refer to the CEMP – Schedule of Environmental Commitments)

The EOP of the contractor should address the following key requirements:

- Clearly identify the roles and responsibilities of the main contractor's staff having regard to the main contractor's organisational structure;
- Incorporate procedures for communicating with the public;
- Incorporate procedures for communicating with relevant site-personnel;

- Incorporate procedures for Environmental Awareness Training for the main contractor's staff;
- Incorporate monitoring procedures and responses to monitoring results, where contractually required, and
- Provide for a system of audit with regard to the effectiveness of the EOP during the construction life cycle of the project.

This preliminary EOP should be read in conjunction with the Construction Environmental Management Plan (**CEMP)** and serves as an indicative template for the main contractor to ensure that they are fully aware and plan for all Environmental Commitments and Requirements relevant to the proposed the development.

1.2 EOP Structure

The contents of this preliminary EOP are presented as follows:

Chapter 2 General Project Details
Chapter 3 Contract Sheets
Chapter 4 Reference Documents
Chapter 5 Organisational Structure / Duties and Responsibilities
Chapter 6 Environmental Commitments
Chapter 7 Environmental Control Measures
Chapter 8 Site-Specific Method Statements
Chapter 9 Environmental Awareness Training
Chapter 10 Communication
Chapter 11 Inspections, Auditing and Monitoring Compliance
Chapter 12 Handover of the Final EOP

1.3 Contractor's Environmental Policy Statement

Environmental management is fundamental to the successful operation of construction activities. Therefore, the Environmental Policy must, as a priority, be understood by all parties involved in the contract and adhered to throughout the course of the works to allow for legal compliance and environmental management.

The preliminary EOP shall be prepared having regard to the O'Hanrahan Bridge Widening Planning Report

[*Successful Contractor Name*] Environmental Policy Statement is detailed below.
[*Insert policy statement*]

2. GENERAL PROJECT DETAILS

2.1 Project description

This section will be completed by the successful contractor once appointed:

- Brief overview;
- Location of the project;
- Location of the compound;
- Contact Sheets for site, employer and third-party contacts;
- Register of all applicable legislation, including relevant standards, Codes of Practice and Guidelines;
- Organisational chart; and,
- Duties and responsibilities.

Project details which have been identified prior to appointment of the contractor are described in the subsequent subsections.

2.2 Project overview and location

2.2.1 Project location

O'Hanrahan Bridge is located in the urban centre of New Ross, in Co. Wexford, where it carries the single carriageway R723 Regional Road over the River Barrow.

The bridge is located within the urban environment of New Ross town, with the adjacent land use mainly consisting of commercial and residential use. The setting is urban with the bridge site surrounded by a mix of historic buildings and structures, tourism sites and commercial properties on the eastern side; and residential, commercial, and industrial properties on the western side.

The N25 previously travelled over O'Hanrahan Bridge as the main link between County Wexford and County Waterford until January 2020 when the New Ross Bypass was officially opened.

The primary function of the proposed development is to provide a shared pedestrian and cycleway from the New Ross quay front to Rosbercon Quay on the southern side of the bridge, that is accommodated along the widened section of O'Hanrahan Bridge.

2.2.2 Project description

O'Hanrahan Bridge is a 9-span post-tensioned concrete beam and reinforced concrete slab bridge over the River Barrow in New Ross town, Co. Wexford. The overall length of the bridge is 175m with an width of 11.6m. The proposed works aim to widen the bridge deck by approx. 1m in order to accommodate an enhanced combined pedestrian and cycleway which will connect to the future 'South East' Greenway. In order to tie the new widened section into the quays at the eastern end and ensure continuity of the new cycleway, the proposed development requires for a 20m long section of the existing quay wall on the south-east corner of the bridge to be reconstructed up to 2m out from the existing quay wall. This section will require working instream. Similarly, approx. 60m section of the south-west corner of the bridge will require widening works by approximately 1m out from the existing wall; The length of new sheet piles in front of the wingwalls will be approximately 19m, of which 5m will be located directly in the river. The remaining 41m of new wall will be constructed in

front of the existing flood wall, all driven at the top of the embankment above the water level.

In addition, the edge beam on the northern side of the bridge will be strengthened to accommodate upgrading of the existing parapet. The existing surfacing and footways will be removed to allow the provision of bridge deck waterproofing and joint replacements before the widened footways are constructed and carriageway surfacing reinstated. The works will involve a number of service diversions and upgrades in both footways. Finally, it is also proposed to replace the existing bridge lighting.

Furthermore, concrete repair works will be undertaken on the existing bridge in areas where minor concrete defects are identified.

Detailed description of the proposed development is provided in Section 3 Description of the Proposed Development of the O'Hanrahan Bridge Widening Planning Report.

2.2.3 Location of all works sites, compounds etc.

Detailed description of the proposed O'Hanrahan Bridge Widening project is provided in Section 3 Description of the Proposed Development and Section 4 Construction & Operational Phase of the Planning Report. Extents of the proposed development including construction sites, compounds etc., are shown in development drawings in Appendix A of the Planning Report.

2.2.4 Duration of the Project

It is anticipated that the construction of the proposed development will be phased and will last approximately 9 months.

The approximate duration of the main activities are shown in Table 2-1.

Table 2-1 Construction Sequence and Duration

Construction Element	Approx. Duration of each task
Mobilisation, compound set up	2 weeks
Works on southern side of bridge	Approx. 4 months
Works on northern side of bridge	Approx. 4 months
Works on southeast quay wall*	Approx. 2 months (incl. 4 weeks of pile-driving)
Works on southwest quay wall**	Approx. 2 to 2.5 months (incl. 4 to 6 weeks of pile driving)
Concrete repairs to underside of bridge*	4-6 weeks
Total Construction Phase	**Approx. 9 months**
* These works can be carried out in parallel with the main bridge works ** These works can be carried out following completion of the southeast corner and in parallel with the main bridge widening works	

3. CONTACT SHEETS

Contact details of relevant personnel employed during the construction phase of the proposed development are required to ensure that environmental incidents are competently reported. The contact details should be frequently reviewed to ensure that they are up to date.

Table 3-1, Table 3-2 and Table 3-3 provide examples of how to document the contact details of all relevant main contractor, employer and third-party consultation personnel respectively.

Table 3-1 Main Contractor Contacts (Example)

Position Title	Name	Phone Number	Email Address
Project Manager			
Site Manager*			
Environmental Manager*			
Site Agents			
Forepersons			
Safety Officers*			
Site Emergency Number*			
Other, as appropriate			

***** 24hr contact details are required for persons with this position.

Table 3-2 Employer Contacts (Example)

Organisation	Position Title	Name	Phone Number	Email Address
Project Resident Engineer's Office	Project Resident Engineer			
Other, as appropriate				

Table 3-3 Third-Party Contacts (Example)

Organisation	Position Title	Name	Phone Number	Email Address
Wexford County Council				
Inland Fisheries Ireland				
Waterways Ireland				
National Parks and Wildlife Service				
Office of Public Works				
Environmental Protection Agency				

Organisation	Position Title	Name	Phone Number	Email Address
Local Authority				
Health and Safety Authority				
Emergency Services				
Other, as appropriate				

4. REFERENCE DOCUMENTS

4.1 Scheme Specific Documentation

Scheme specific documentation to be referred to when determining the Environmental Commitments and Requirements for the proposed development include:

- The Contract Documents;
- The Environmental Impact Assessment Report (EIAR);
- The Natura Impact Statement (NIS);
- Schedule of Commitments (Refer to the CEMP);
- Statutory Planning Consent including any additional Environmental commitments (Refer to the CEMP);
- Contractor's Construction Phase Safety and Health Plan.

4.2 General Reference and Guidance Documentation

TII's "Guidelines for the Creation, Implementation and Maintenance of an Environmental Operating Plan" should be referred to when developing the contractors EOP.

The contractor should have regard to guidance and standards set out in the relevant TII/NRA guidelines at https://www.tii.ie/technical-services/environment/construction/ and at https://www.tii.ie/technical-services/environment/planning/ shall be followed.

5. ORGANISATIONAL STRUCTURE/DUTIES AND RESPONSIBILITIES

5.1 Organisational Structure

The successful contractor will provide an organogram in the EOP to assign the duties and responsibilities of their personnel under the EOP.

5.2 Duties and Responsibilities

5.2.1 Project Manager

Name: [To be inserted by successful contractor]

Duties and Responsibilities

The Project Managers main duties and responsibilities in relation to the EOP include liaising with the Project Team in assigning duties and responsibilities in relation to the EOP to individual members of the main contractor's project staff.

It is the responsibility of the Project Manager to approve key personnel required for employment on the project. He/She will liaise with the site Environmental Manager.

The Project Manager will lead the works on site. He/She will be responsible for the management and control of the activities and will have overall responsibility for the implementation of the EOP. He/She will be assisted by the site Environmental Manager who will act as his/her deputy.

5.2.2 Site manager

Name: [To be inserted by successful contractor]

Duties and Responsibilities

The Site Manager's environmental management responsibilities include, but are not limited to:

- Liaise with the site Environmental Manager and the Project Team in assigning duties and responsibilities in relation to the EOP, to individual members of the main contractor's project staff;
- Liaising with Site Manager in preparing, reviewing and updating all site-specific method statements for activities where there is a risk of pollution or adverse effects on the environment;
- Liaising with the site Environmental Manager in agreeing site specific Method Statements with Third Parties;
- Ensuring that all relevant information on project programming, timing, construction methodology, etc., is communicated from the contractor's Project Team, including the Project Manager, to the site Environmental Manager in a timely and efficient manner in order to allow pre-emptive actions relating to the environment to be taken where required;
- ensuring that the risk assessments for control of noise and environmental risk are prepared and effectively monitored, reviewed and communicated on site;
- close liaison with the site Environmental Manager to ensure adequate resources are made available for implementation of the EOP; and

- ensuring that the site Environmental Manager reviews all method statements, performs regular and frequent environmental site inspections and that relevant environmental protocols are incorporated and appended.

5.2.3 Environmental Manager

Name: [To be inserted by successful contractor]

Duties and Responsibilities

In order to ensure the successful development, implementation and maintenance of the EOP, the Contractor will be required to appoint an independent site Environmental Manager to provide independently verifiable audit reports.

The site Environmental Manager must possess sufficient training, experience and knowledge appropriate to the nature of the task to be undertaken, a Level Eight qualification recognised by the Higher Education and Training Awards Council (HETAC), or a university equivalent, or other qualification acceptable to the Employer, in Environmental Science or Environmental Management, Environmental Hydrology, Engineering or other relevant qualification acceptable to the Employer.

Separate from the on-going and detailed monitoring carried out by the contractor as part of the EOP, the EM shall carry out the inspection/ monitoring regime described below, and report to the Contractor. The results will be stored in the site Environmental Manager's monitoring file and will be available for inspection/ audit by the Client, National Parks and Wildlife Service (NPWS) or Inland Fisheries Ireland (IFI) staff. All inspections/ monitoring/ results will be recorded on standard forms.

The responsibilities of the site Environmental Manager include:

Site-Specific Method Statements

- Liaising with the Construction Manager in preparing site-specific Method Statements for all Works activities where there is a risk of environmental damage. These site-specific Method Statements should incorporate relevant Environmental Control Measures and take account of relevant Environmental Control Measure Sheets;
- Liaising with the Construction Manager in reviewing and updating site-specific Method Statements for all Works activities where Environmental Control Measures and Environmental Control Measure Sheets have been altered, and
- Liaising with the Construction Manager where third party agreement is required in relation to site-specific Method Statements, Environmental Control Measures and/or Environmental Control Measure Sheets.

General

- Being familiar with the contents, environmental commitments and requirements contained within the Reference Documents
- Being familiar with baseline data gathered during Environmental Impact Assessment and NIS and during pre-construction surveys;
- Listing all Environmental Commitments and Requirements in an Environmental Commitments Summary Table;
- Assisting the Construction Manager in liaising with the PSDP/Engineer and the provision of information on environmental management to the Engineer during the course of the construction phase, and

- Liaising with the Project Team in assigning duties and responsibilities in relation to the EOP to individual members of the main contractor's project staff.

Third Party Consultations

- Overseeing, ensuring coordination and playing a lead role in third party consultations required statutorily, contractually and in order to fulfil best practice requirements;
- Ensuring that the minutes of meetings, action lists, formal communications, etc., are well documented and that consultation certificates are issued to the Engineer as required;
- Liaising with all prescribed bodies during site visits, inspections and consultations;
- Where new Environmental Control Measures are agreed as a result of third party consultation, ensuring that the EOP is amended accordingly;
- Where new Environmental Control Measures are agreed as a result of third party consultation, the Environmental Manager should liaise with the Construction Manager in updating relevant site-specific Method Statements, and
- Where required, liaising with the Construction Manager in agreeing site-specific Method Statements with third parties.

Licensing

- Ensuring that all relevant works have (and are being carried out in accordance with) the required permits, licences, certificates, planning permissions, etc.;
- Liaising with the designated licence holders with respect to licences granted pursuant to the Wildlife Act, 1976, as amended;
- Liaising with the designated licence holders and "scientific agent" (generally defined in the licence as "the contractor engaged to carry out the scientific direction and monitoring of mitigation measures") with respect to licences granted pursuant to the European Communities (Natural Habitats) Regulations 1997, as amended, and
- Bringing to the attention of the Project, Design and Construction Team any timing and legal constraints that may be imposed on the carrying out of certain tasks.

Waste Management Documentation

- Holding copies of all permits and licences provided by waste contractors;
- Ensuring that any operations or activities that require certificates of registration, waste collection permits, waste permits, waste licences, etc., have appropriate authorisation, and
- Gathering and holding documentation with respect to waste disposal.

Legislation

- Keeping up to date with changes in environmental legislation that may affect environmental management during the construction phase;
- Advising the Construction Manager of these changes, and
- Reviewing and amending the EOP in light of these changes and bringing the changes to the attention of the main contractor's senior management and subcontractors.

Site environmental inspections

- Carrying out regular documented inspections of the site to ensure that work is being carried out in accordance with the Environmental Control Measures and relevant site-specific Method Statements, etc, and
- Appending copies of the inspection reports to the EOP.

Specialist environmental contractors

- Identifying requirements for specialist environmental contractors (including ecologists, waste contractors and spill clean-up specialists) before commencement of the project;
- Procuring the services of specialist environmental contractors and liaising with them with respect to site access and report production;
- Ensuring that specialist environmental contractors are competent and have sufficient expertise to co-ordinate and manage environmental issues, and
- Co-ordinating the activities of all specialist environmental contractors on environmental matters arising out of the contract.

Environmental Induction Training and Environmental Tool Box Talks

- Ensuring that Environmental Induction Training is carried out for all the main contractor's site personnel. The induction training may be carried out in conjunction with Safety Induction Training, and
- Providing toolbox talks on Environmental Control Measures associated with site specific Method Statements to those who will undertake the work.

Environmental Incidents/Spillages

- The Environmental Manager should be notified of all incidents where there has been a breach of agreed environmental management procedures: where there has been a spillage of a potentially environmentally harmful substance; where there has been an unauthorised discharge to ground, water or air; where there has been damage to a protected habitat, etc.;
- The Environmental Manager should prepare and be in readiness to implement at all times an Emergency Response Plan.
- The Environmental Manager is responsible for notifying the relevant statutory authority of environmental incidents, and
- Carrying out an investigation and producing a report regarding environmental incidents. The report of the incident and details of remedial actions taken should be made available to the relevant authority, the Engineer and the Construction Manager.

5.2.4 Design Manager

Name: [To be inserted by successful contractor]

Duties and Responsibilities

The main duties and responsibilities of the Design Manger include:

- Be familiar with the EOP and relevant documentation referred to within;
- Be familiar with the contents, commitments and requirements contained within the reference documents; and

- Participate in Third Party Consultations and liaising with third Parties through the site Environmental Manager.

5.2.5 Site Agents

Name: [To be inserted by successful contractor]

Duties and Responsibilities

The Site Agents are responsible for the following:

- Ensuring Forepersons under his/her control adhere to the relevant Environmental Control measures and relevant site-specific Method Statements, etc.
- Ensuring that the procedures agreed during third party consultations are followed;
- Reporting immediately to the site Environmental Manager any incidents where there has been a breach of agreed environmental management procedures, where there has been a spillage of a potentially environmentally harmful substance, where there has been an unauthorised discharge to ground, water or air, damage to habitat, etc.
- Attending environmental review meeting and preparing any relevant documentation as required by Management.

5.2.6 Forepersons

Name: [To be inserted by successful contractor]

Duties and Responsibilities

The forepersons on site are responsible for the following:

- Ensuring personnel under his/her control adhere to the relevant environmental control measures and relevant site-specific Method Statements;
- Reporting immediately to the site agents and site Environmental Manager any incidents where there has been a breach of agreed procedures e.g. spillages and discharges.

5.2.7 Employer's Representative

Name: [To be inserted by successful contractor]

Duties and Responsibilities

The Employer's Representative (ER) acts on behalf of the Employer in the course of a construction project. The EOP will be audited by the Employer's Representative to ensure that the Contractor is compliant with the environmental provisions of the Contract Documents.

5.2.8 Project Supervisor Construction Stage

The role of the Project Supervisor Construction Stage (PSCS) is to manage and co-ordinate health and safety matters during the construction stage. The PSCS will be appointed before the construction work begins and will remain in that position until all construction work on the project is completed.

It is the responsibility of the PSCS to ensure that the project:

- is designed and is capable of being constructed to be safe and without risk to health;
- is constructed to be safe and without risk to health;
- can be maintained safely and without risk to health during subsequent use; and
- complies in all respects, as appropriate, with the relevant statutory provisions

The PSCS will prepare the Construction Phase Safety and Health Plan in accordance with the Safety, Health and Welfare at Work (Construction) Regulations 2013 (as amended) prior to the commencement of construction work for the project. The Plan should provide the blueprint for managing and co-ordinating safety and health during construction and should explain how the key safety and health issues will be managed.

The PSCS will maintain contact with the Project Supervisor Design Process (PSDP) throughout the construction phase to communicate any health and safety related issues. The PSDP will prepare a written safety file appropriate to the characteristics of the project, containing relevant health and safety information, to be taken into account during any subsequent construction work following completion of the project.

5.2.9 All Project Personnel

Name: [To be inserted by successful contractor]

Duties and Responsibilities

All project personnel have the following responsibilities:

- Reporting any operations and conditions that deviate from the EOP to the Site Agent and site Environmental Manager. Depending on circumstances it may be appropriate for general operatives and machinery operators to report directly to their Foreperson who will then report to the site Environmental Manager and Site Agent;
- taking an active part in site safety and environmental meetings;
- ensuring awareness of the contents of method statements, plans, supervisors' meetings or any other meetings that concern the environmental management of the site; and
- Attend environmental training as required.

5.2.10 Ecological Clerk of Works (ECoW)

Name: [To be inserted by successful contractor]

Duties and Responsibilities

In order to ensure the successful development and implementation of the EOP, the Contractor will appoint an independent Ecological Clerk of Works (ECoW). The ECoW must possess training, experience and knowledge appropriate to the role, including:

- An NFQ Level 8 qualification or equivalent or other acceptable qualification in ecology or environmental biology; and,
- Demonstrable experience in the protection of European sites.

The principal functions of the ECoW are:

- To provide ecological supervision of the construction of the proposed development and thereby ensure the full and proper implementation of all the mitigation measures relating to biodiversity prescribed in the EIAR and NIS;

- To regularly review the outcome of the specialist hydroacoustic monitoring if being undertaken and, on that basis, make any necessary adjustments to the mitigation; and,
- To carry out weekly inspections and reporting on the implementation of the Contractor's Biosecurity Protocol.

During the preparation of the Contractor's EOP, the site Environmental Manager may, as appropriate, assign other duties and responsibilities to the ECoW.

In exercising his/her functions, the ECoW will be required to keep a monitoring file and this will be made available for inspection or audit by the NPWS or IFI at any time.

5.2.11 Project Archaeologist

Name: [To be inserted by successful contractor]

Duties and Responsibilities

A suitably qualitied Project Archaeologist on site is responsible for the following:

- Relevant licences to the Department of Housing, Local Government and Heritage required for the project in advance of any construction work taking place and throughout the project as required
- To supervise works in vicinity of known archaeological sites' and
- To supervise any pre-construction archaeological survey works.

Section 26 of the National Monuments Act 1930 (as amended) requires that excavations for archaeological purposes must be carried out by suitably qualified and experienced archaeologists acting under an excavation licence. Inappropriate excavation of a heritage site could result in damage to, or destruction of, the integrity, setting or historical context of the site, contrary to the public interest.

5.2.12 Other

Subject to the environmental commitments / requirements, other environmental specialists will be employed as required during the construction works.

6. ENVIRONMENTAL COMMITMENTS

The Schedule of Environmental Commitments comprises the mitigation measures as outlined in the Planning Report and Natura Impact Statement and any additional commitments arising up to and including the Oral Hearing and is included in the CEMP, Appendix A contains the Natura Impact Statement mitigation measures and Appendix B contains the Statutory Planning Consent including any additional Environmental commitments.

Relevant environmental legislation prescribes environmental performance criteria. Therefore, in addition to: the Contract documents, the conditions imposed by An Bord Pleanála, the Schedule of Commitments, and relevant environmental legislation all prescribe environmental performance criteria.

The following table lists the complete suite of Environmental Commitments together with the relative specification and evidence of how each commitment will be met. An example of the layout of this table and potential entries is given below.

Table 6-1 Environmental Commitments (Example)

Environmental Commitment	Legislation / Specific Ref.	Action Owner	Evidence	Target Date	Close Date
Biodiversity (Flora and Fauna)	Planning Report: Section 8 Biodiversity	Env. Manager/ Specialist Ecologist/ Env. Designer / Site Agent / Foreman	Method Statement / Ecological Walkover / Pre-surveys / agreement from IFI & NPWS / Site Inspections	Ongoing	End of Contract
Hydrology and Hydrogeology	Planning Report: Section 8 Biodiversity Section 9 Hydrology Section 10 Soils, Geology and Hydrogeology	Env. Manager/ Specialist Ecologist/ Env. Designer / Site Agent / Foreman	Method Statement / Site Inspections / Monitoring Data	Ongoing	End of Contract
Air Quality	Planning Report: Section 12 Air Quality	Env. Manager/ Site Agent / Foreman	Method Statement / Site Inspections / Monitoring Data	Ongoing	End of Contract
Noise and Vibration	Planning Report: Section 13 Noise and Vibration	Env. Manager / Noise Specialist / Env. Designer / Site Agent / Foreman	Method Statement / Site Inspections / Monitoring Data / Environmental Control Measure Sheet	Ongoing	End of Contract
Landscape and Visual	Planning Report: Section 8 Biodiversity Section 11 Landscape and Visual	Env. Manager/ Specialist Ecologist/ Env. Designer / Site Agent / Foreman	Method Statement / Site Inspections /	Ongoing	End of Contract

7. ENVIRONMENTAL CONTROL MEASURES

Environmental Control Measures to meet the Environmental Commitments / Requirements will be identified and implemented by the Contractor, refer to the CEMP for the list of Environmental Commitments / Requirements.

The Contractor will follow the procedure outlined in Figure 7-1 to identify the environmental control measures.

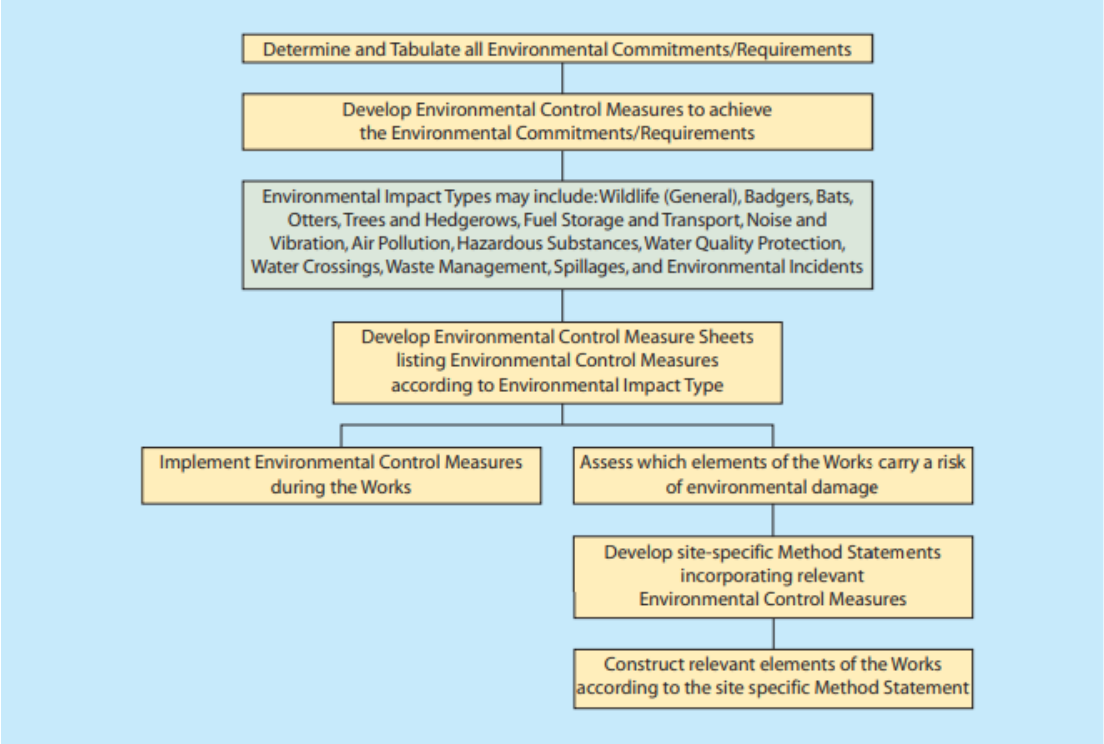


Figure 7-1 Example of Main Steps in Developing and Implementing Environmental Control Measures. Source: *TII's Guidelines for the Creation, Implementation and Maintenance of an Environmental Operating Plan*

As outlined in Figure 7.1, some environmental control measures are generally implemented across all works. However, some construction works may present a risk of environmental damage for which, relevant environmental control measures are required to be incorporated into site-specific method statements.

Environmental Control Sheets will be prepared by the Contractor which will contain the prescribed environmental control measures according to the environmental impact (e.g., impacts on watercourses, bats, badger etc.). It will be the responsibility of the site Environmental Manager to ensure that the identified environmental control measures are sufficient to meet the environmental commitments and that they are brought to the attention of the relevant key personnel.

An example of an Environmental Control Sheet is shown in Figures 7.2 and 7.3 below. For more examples, see Section 7.3 of the TII's *"Guidelines for the Creation, Implementation and Maintenance of an Environmental Operating Plan"*.

Example Environmental Control Measure Sheet – Noise and Vibration (contd.)

Environmental Control Measures – Communication with the Public

- A Public Communications Strategy should be established to promote awareness of measures being taken to restrict noise and vibration to acceptable levels. See Chapter 10.

Environmental Control Measures – Piling and Blasting

- A publicity campaign should be undertaken prior to the commencement of piling and blasting, explaining the work being carried out and the reasons for the work.
- An on-site documented complaints procedure should be implemented.
- Blasting should be carried out at similar times each day to reduce the 'startle' effect.
- Trial blasts should be carried out in less sensitive areas to assist in blast designs and identify potential zones of influence.

Environmental Control Measures – Control of Noise and Vibration (General)

Environmental Control Measures in relation to Noise and Vibration may be split into two categories:

- Control of noise and vibration at source, and
- Controlling the spread of noise and vibration.

Environmental Control Measures – Control of Noise and Vibration at Source

- Where reasonably practicable, noisy plant or processes should be replaced by less noisy alternatives.
- Plant should be properly and regularly maintained.
- Compressors should be 'sound reduced' models fitted with properly lined and sealed acoustic covers which should be kept closed whenever machines are in use and all ancillary pneumatic tools should be fitted with suitable silencers.
- Machinery, which is used intermittently, should be shut down or throttled back to a minimum during those periods when not in use.
- All vehicles and mechanical plant should be fitted with effective exhaust silencers.
- Noise from existing plant and equipment can be reduced by modification or by the application of improved sound reduction methods, but this should only be carried out after consultation with the manufacturer.
- Depending on the nature of the machine and on their ventilation requirements the use of enclosures and acoustic sheds should be considered where their use is reasonably practicable.
- Where deemed reasonably practicable, plant and site equipment should be located away from noise sensitive receptors.
- Plant known to emit noise strongly in one direction should, when possible, be orientated so that the noise is directed away from noise sensitive receptors.

Environmental Control Measures – Controlling the Spread of Noise and Vibration

At certain times during construction and at particular locations the use of temporary noise attenuating devices should be considered:

- The erection of temporary noise attenuating screens may be required in order to reduce noise levels below the maximum permissible noise levels. Noise-attenuating screens can be made up of formwork panels or constructed from at least 12 mm thick plywood and battens. Plywood may need to be stiffened with additional battens to prevent drumming. The lower edge of the panels should rest on the ground with any gap plugged by spoil, sandbags, etc.
- The use of temporary or the advance construction of permanent berms may be appropriate.
- Site buildings or material stockpiles may be located so as to shield sensitive receptors.

Environmental Control Measures – Construction of Permanent Noise Reducing Measures

Permanent noise mitigating measures installed on national road schemes should achieve the noise design commitments specified in the Contract documents, the EIS, any conditions and/or modifications imposed by ABP and the Schedule of Commitments. It will generally be required that such noise mitigation measures achieve the noise design goal '*performance standard*' of 60 L_{den} as specified in the *Guidelines for the Treatment of Noise and Vibration in National Road Schemes* (Revision 1, National Roads Authority, October 2004). In order to demonstrate that these noise design commitments are being achieved, the following Environmental Control Measures should be implemented:

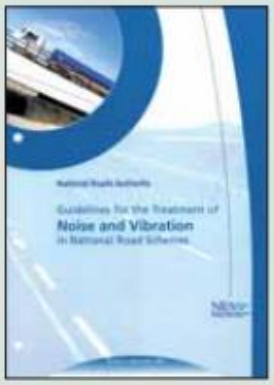
- Documented evidence demonstrating that all noise mitigation measures will achieve the noise design commitments should be attached to the EOP. The Contractor's Designer, as advised by an acoustic specialist, should produce this report. This Environmental Control Measure should be in addition to any contractual requirements for the provision of documented evidence demonstrating that all noise mitigation measures meet the noise design commitments.
- Documented evidence demonstrating that all noise barriers have achieved the performance specified in the Contract in accordance with I.S. EN 1793 – 1:1998, I.S. EN 1793 – 2:1998, I.S. EN 1793 – 3:1998, I.S. EN 1794 – 1:2003 and I.S. EN 1794 – 2:2003 following the specifications outlined in I.S. EN 14388:2005 should be attached to the EOP. This documented evidence should demonstrate how the barriers meet the specified standards and should clearly indicate the absorptive performance (where such barrier is used) and airborne sound insulation categories of the constructed barriers as outlined in I.S. EN 1793 – 1:1998 and I.S. EN 1793 – 2:1998. This Environmental Control Measure should be in addition to any contractual requirements for the provision of such documented evidence.

Responsibility

- The Site Agent should be familiar with the noise sensitive receptors and alert the Environmental Manager in good time prior to work commencing in these areas.
- The Environmental Manager should develop site-specific Method Statements in conjunction with the Construction Manager.

References

Guidelines for the Treatment of Noise and Vibration in National Road Schemes (Revision 1, National Roads Authority, October 2004).



BS 5228: *Noise and vibration control on construction and open sites*.

ISO1996-1 1982 *Acoustics – Description and measurement of environmental noise – Part 1: Basic quantities and procedures*.

Figure 7-2 **Example of an Environmental Control Sheet for Noise and Vibration. Source Box 19 *TII's Guidelines for the Creation, Implementation and Maintenance of an Environmental Operating Plan***

Example Environmental Control Measure Sheet – Otters

Environmental Control Measures – Pre-Construction Ecological Walkover

- The Environmental Manager should ensure that signs of otter activity are assessed during the Pre-Construction Ecological Walkover.

Environmental Control Measures – Consultation

Prior to their commencement, all works impacting on otters and their breeding or resting places should be agreed and documented in consultation with the relevant statutory authority:

- National Parks and Wildlife Service (NPWS) of the Department of the Environment, Heritage and Local Government.

Such consultation should take place at the earliest opportunity in order to avoid any delay in obtaining licences or disruption to the works programme.

Environmental Control Measures – Compliance with relevant Licences, Approvals and Legislation

All works impacting on otters and their breeding or resting places should be carried out in accordance with relevant licences, approvals and legislation.

- Otters, along with their breeding and resting places, are protected under the provisions of the Wildlife Act, 1976, as amended by the Wildlife (Amendment) Act, 2000. Otters have additional protection because of their inclusion in Annex II and Annex IV of the Habitats Directive, which is transposed into Irish law in the European Communities (Natural Habitats) Regulations, 1997 (S.I. No. 94 of 1997), as amended.

- The removal of otters from affected holts, and the subsequent destruction of these holts, must be conducted under a Regulation 25 derogation under the 1997 Habitats Regulations. The National Parks and Wildlife Service (NPWS), of the Department of the Environment, Heritage and Local Government, is responsible for processing these licences. An application for a Regulation 25 derogation should be submitted to the NPWS along with the relevant ecological information from otter surveys. At least three weeks is normally required to process a derogation application. Conditions will usually be attached to each derogation granted in respect of otters and operations at holts or in their vicinity. Closure of holts requires a monitoring period to ensure that there is no current otter activity at the holt. Derogations may not be provided by the NPWS for the closure of holts containing a breeding female or young otters. Derogations may also be required for any works likely to cause disturbance (e.g. piling and blasting) to active breeding holts (when present within c.150m of a scheme).

Environmental Control Measures – Otter Holt Protection

- A map (at an appropriate scale) should be attached to the Environmental Operation Plan showing the general locations of otter holts and otter crossing-points, where applicable. The map should be available to Site Agents, Forepersons and Monitoring Staff.

Site-specific Method Statements – Otters

Site-specific Method Statements should be drawn up for the following Works:

- The exclusion of otters from holts;
- The destruction of holts;
- The construction of otter ledges on culverts and bridges;
- The construction of otter underpasses;
- The construction of mammal resistant fencing;
- The construction of culverts and bridges known to contain otters, and
- Site works in the vicinity of otter holts.

Environmental Control Measures – Post-Construction Monitoring and Mitigation

- Quarterly monitoring of mitigation measures should take place after completion of construction. Monitoring should be continued for at least one year after construction work ceases.

Responsibility

The Environmental Manager is responsible for ensuring:

- That third party consultations take place;
- Liaison with the Designated Licence Holders and ensuring that the removal of otters from affected holts and subsequent destruction of these holts is conducted under licence;
- That a pre-construction survey is carried out;
- Environmental Control Measures are drawn up;
- Site Agents and Forepersons are made aware of requirements, and
- Post-mitigation monitoring takes place.

References

Guidelines for the Treatment of Otters Prior to the Construction of National Road Schemes (National Roads Authority, 2006).

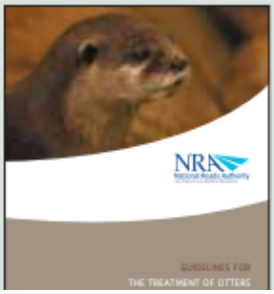


Figure 7-3 **Example of an Environmental Control Sheet for Otters. Source Box 19 *TII's Guidelines for the Creation, Implementation and Maintenance of an Environmental Operating Plan***

8. SITE SPECIFIC METHOD STATEMENTS

A Method Statement may be defined as a statement of the construction methods and resources to be employed in executing construction work. Method Statements can cover numerous works activities, however where there is a risk of environmental damage, site- specific method statements must be prepared for the construction works. The Method Statement should be prepared by the Contractor with assistance from the site Environmental Manager who will identify which elements of the works have the potential to significantly impact the environment.

The Method Statement should refer to relevant Environmental Control Measure Sheets and incorporate relevant Environmental Control Measures. The Method Statement should include:

- The proposed method of construction and how impacts shall be mitigated;
- Contingency plans and emergency plans to limit damage caused by accidents, spills or other unforeseen events: and
- Notification procedures to the relevant Authorities, Utilities and Service Providers.

There may be a requirement for method statements to be reviewed and / or approved by third party consultees (where applicable) prior to their finalisation.

A template of the site-specific method statements is provided in Figure 8.1 below.

Site-Specific Method Statement: Demolition of the Building at Chainage 13+00 LHS	
A. Resource Required	
Labour	
1	Site Agent
2	Forepersons
3	Machine Operators (as necessary)
4	General Operatives
5	Safety Officer
6	Environmental Manager
Plant & Equipment	
1	Teleporter with cradle.
2	20/30 tonne excavators.
3	Dumptruck (as necessary).
B. Material & Supplies	
Not Applicable.	

2.	Main contractor's Engineer to survey and inspect the building to ensure that no hazardous materials are present and that all services are disconnected.	Site Engineer	Site Engineer	01/06/06	No hazardous materials were present. All services have been disconnected. See survey report attached.
3.	Ensure that Scientific Agent (listed in the Licence) examines building prior to demolition.	Environmental Manager	Environmental Manager	02/06/06	Building contained roosting bats as indicated in the EIS. Bats are inaccessible and the exclusion procedure must be followed. Scientific Agent
4.	Install one-way valves over suitable access points as per the advice of the Scientific Agent.	Environmental Manager	Environmental Manager	02/06/06	One-way valves installed in accordance with best practice. Scientific Agent
5.	Allow a sufficient period for bats to be excluded from the building as per the advice of the Scientific Agent.	Environmental Manager	Environmental Manager	06/06/06	Four day exclusion period required in accordance with best practice. Scientific Agent

C. Staff Responsibilities	
Position Title	Responsibility
Environmental Manager	
Site Agent	
Foreperson	
Safety Officer	Ensure compliance with the Health and Safety Plan.

D. Environmental Control Measure Sheets
Environmental Control Measure Sheet – Wildlife (General)
Environmental Control Measure Sheet – Bats
Environmental Control Measure Sheet – Trees and Hedgerows

E. Health and Safety Risk Assessment

F. Method					
	Operation	**Person Responsible**	**Signature**	**Date**	**Comment**
1.	Obtain copy of Licence issued by NPWS.	Environmental Manager	Environmental Manager	01/06/06	Copy of licence received from the Engineer. See attached licence.

Figure 8-1 **Example of a Site-Specific Method Statement for Demolition Works. Source: *TII's Guidelines for the Creation, Implementation and Maintenance of an Environmental Operating Plan***

9. ENVIRONMENTAL AWARENESS TRAINING

9.1 EOP, Planning Report, NIS and Contractual Requirement Briefing

The site Environmental Manager will brief the Contractor's senior personnel, namely the Project Manager, Site Manager, Design Engineers, Site Agents, PSCS and any other key personnel on the EOP and the Environmental Commitments/ Requirements that must be met during the construction phase.

9.2 Site induction

All employees and subcontractors involved on site will be given a comprehensive induction prior to commencement of the works. The environmental training and awareness procedure will ensure that staff are familiar with the principles of the CEMP, the environmental aspects and impacts associated with their activities, the procedures in place to control these impacts and the consequences of departure from these procedures.

This environmental training can be run concurrently with safety awareness training. Training will include:

- Overview of the Environmental Policy and Construction Environmental Management Plan, goals and objectives;
- Awareness in relation to risk, consequence and methods of avoiding environmental risks as identified within the Register of Aspects and with the planning conditions;
- Awareness of roles and individual environmental responsibilities and environmental constrains to specific jobs;
- Location of and sensitivity of Special Area of Conservations, Special Protection Areas, protected monuments, structures etc.
- Location of habitats and species to be protected during construction, how activities may affect them and methods necessary to avoid impacts.

A record will be kept of a signed register on the project files of all attendees of the environmental induction.

Toolbox talks based on specific activities being carried out will be given to personnel by the nominated project representative. These will be based on specific activities being carried out and will include environmental issues particular to the project, including the impact on bird populations and water quality namely:

- Oil/Diesel spill prevention and safe refuelling practice;
- Storage of materials including oil/diesels and cement;
- Emergency response processes used to deal with spills;
- Minimising disturbance to wildlife;
- Emergency response to include water pollution hotline to the EPA for regulator response. Identification of registered / accredited spill cleanup company for oil etc.; and
- Consideration of importance of containment of vehicle washing, containments of concrete /cement / grout washout etc, bank protection using hessian to prevent excessive scour and mobilisation of suspended solids, maintenance of vegetation corridors etc.

9.3 Specific training and awareness

A project specific training plan that identifies the competency requirements for all personnel allocated with environmental responsibilities will be produced by the Contractor. Training will be provided by the Contractor to ensure that all persons working on site have a practical understanding of environmental issues and management requirements prior to commencing activities. A register of completed training is to be kept by the site Environmental Manager. The Site Manager will ensure that environmental emergency plans are drawn up and the site Environmental Manager will conduct the necessary training/inductions.

10. COMMUNICATION

10.1 External Communication

A Stakeholder Management and Communication Plan (SMCP) will be prepared by the contractor. The Employer will appoint a Public Liaison Officer, or equivalent, who will be consulted in the preparation of the Plan as well as its maintenance and implementation. The SMCP will provide the means of the stakeholder and members of the public to communicate with the project team, and for the project team to communicate relevant information of the scheme.

- The principal component of a Stakeholder Management and Communication Plan will include:
- Details of general construction process / phasing will be communicated to the relevant stakeholders and members of the public prior to implementation to ensure local residents and businesses are fully informed of the nature and duration of construction works.
- Details of a contact name and number for any complaints that may arise during such works.

A complaints register will be developed as part of the Plan to efficiently record any complaints made. Environmental related complaints will be initially directed to the site Environmental Manager. A template for an environmental complaints register is provided in Figure 10.1 below as an example.

Environmental Complaints Register

Form 4

Title:	Environmental Complaints Register				
Page:	Page 1 of 1	Ref. No.:		Issue No.:	
Issued by:		Approved by:		Date:	

Date	__/__/__
Complaint received by:	
Complaint recorded by:	
Complaint made by:	
Name:	
Address:	
Telephone:	
Email Address:	
Nature of the complaint:	
Weather conditions at time of complaint:	
Complaint reported to:	
Action taken:	
Was there a follow up call to complainant?	YES/NO
Use additional sheets if required	

Figure 10-1 Template of an Environmental Complaints Register. Source: Form 4 in *TII's Guidelines for the Creation, Implementation and Maintenance of an Environmental Operating Plan*

10.2 Internal Communication

Environmental issues and performance aspects will be communicated to the workforce on a regular basis. Weekly project meetings, which follow a set agenda incorporating Environment, will be held alongside overall management meetings.

All staff and sub-contractors involved in all phases of the project will be encouraged to report environmental issues.

The PSCS will maintain contact with the PSDP throughout the works to communicate any health and safety related issues. The PSDP will prepare a written safety file appropriate to the characteristics of the project, containing relevant health and safety information, to be taken into account during any subsequent construction work following completion of the project.

11. INSPECTIONS, AUDITING AND MONITORING COMPLIANCE

11.1 Inspections

The appointed site Environmental Manager will carry out environmental inspections at appropriate intervals. The site Environmental Manager will be accompanied by a qualified and accredited environmental specialists (ecologists, landscape architects and noise specialists etc.) when appropriate and where required during inspections.

The site Environmental Manager will append the reports from environmental inspections to this EOP.

11.2 Monitoring

The Planning Report may require the execution of certain types of monitoring e.g., related to noise and vibration, water quality air quality, etc.

The appointed site Environmental Manager will prepare a schedule of monitoring required, detailing the type of report to be prepared and to whom it should be send to. All of the monitoring is to be carried out by competent experts. A template of a monitoring schedule is provided in Figure 11.1 below as an example.

Monitoring Schedule

Form 5

Title:	Monitoring Schedule				
Page:	Page 1 of 1	Ref. No.:		Issue No.:	
Issued by:		Approved by:		Date:	

Location	Parameters	Frequency	By whom	Report type	Distribution to

Figure 11-1 Template of Monitoring Schedule. Source: Form 5 in *TII's Guidelines for the Creation, Implementation and Maintenance of an Environmental Operating Plan*

11.3 Audits

11.3.1 Audit by the Environmental Manager

The EOP will be audited by the site Environmental Manager in conjunction with the Site Manager annually or as agreed at the start of the contract to ensure that the appointed Contractor is in compliance with all environmental commitments / requirements. Should there be a need to revise the EOP, the site Environmental Manager will make all the necessary changes to the EOP and inform the key personnel of such changes. The EOP should only be revised by the site Environmental Manager and approved by the Site Manager.

A template containing an auditing format is provided in Figure 11.2 below as an example.

Audit Format

Form 6

Title:	Audit Format				
Page:	Page 1 of 1	Ref. No.:		Issue No.:	
Issued by:		Approved:		Date:	

No.	Query	Outcome	Action required	Date for completion
1	Has the EOP been created, maintained and implemented?			
2	Has the EOP being submitted to the Engineer at appropriate intervals?			
3	Has an Environmental Manager, having sufficient training, experience and knowledge appropriate to the nature of the task to be undertaken, been appointed by the main contractor?			
4	Have General Project Details been included within the EOP?			
5	Have Contact Details of relevant persons and bodies been incorporated and updated within the EOP?			
6	Has an up-to-date and appropriate Reference Document Section been included within the EOP?			
7	Has the main contractor's organisational structure been illustrated within the EOP?			
8	Have duties and responsibilities been satisfactorily assigned under the EOP?			
9	Have all the Environmental Commitments and Requirements been identified and documented?			
10	Have all Environmental Control Measures necessary to comply with the Environmental Commitments and Requirements been developed and documented?			
11	Have all site-specific Method Statements been developed for Works activity where a risk of environmental damage is present?			
12	Has Environmental Awareness Training been adequately carried out? Are records of training available and attached to the EOP?			
13 14	Is the complaints register being filled in? Do minutes of meetings show environmental issues on the agenda?			
15	Has the Environmental Manager carried out regular environmental inspections? Have the reports of the inspections been appended to the EOP?			
16	Has an appropriate schedule of monitoring been drawn up? Where monitoring falls outside of the range contractually required, has the Environmental Manager initiated and reported on corrective action?			
17	Have the Environmental Manager and Construction Manager audited the EOP on an annual basis?			

Figure 11-2 Template of an Audit Format. Source: Form 6 in *TII's Guidelines for the Creation, Implementation and Maintenance of an Environmental Operating Plan*

11.3.2 Audit by the Employer's Representative

The EOP will be audited by the Employer's Representative to ensure that the Contractor is compliant with the environmental provisions of the Contract Documents.

12. HANDOVER OF THE FINAL EOP

Two copies of the final and complete EOP should be supplied to the Employer's Representative / PSDP immediately following the end of the defect's notification period.

APPENDIX D

Incident Response Plan

Prepared by
Roughan & O'Donovan
Arena House, Arena Road, Sandyford, Dublin 18
Tel: +353 1 2940800 Fax: +353 1 2940820
Email: info@rod.ie www.rod.ie

O'Hanrahan Bridge Widening

Incident Response Plan

March 2023

Client:
Kildare County Council

ROD
ROUGHAN & O'DONOVAN

O'Hanrahan Bridge Widening

Incident Response Plan

TABLE OF CONTENTS

1.0 INTRODUCTION

This Incident Response Plan (IRP) describes the procedures, lines of authority and processes that will be followed to ensure that incident response efforts are prompt, efficient, and appropriate to particular circumstances. It has been developed to provide the information that each employee may need in order to respond to an emergency and to handle it effectively.

2.0 OBJECTIVE OF PLAN

The primary objective of this document is to:

- Ensure the health and safety of workers and visitors at and in proximity to the site.
- Minimise any impacts to the environment and to ensure protection of the water quality and the aquatic species dependant on it.
- Protect property and operations at the proposed site and to minimise the impact on the continuity of business.
- Establish procedures that enable personnel to respond to incidents with an integrated multi-departmental effort and in a manner that minimises the possibility of loss and reduces the potential.

3.0 RESPONSIBILITY

It is the responsibility of the Site Environmental Manager to maintain and update this IRP as required.

This IRP will be reviewed on an ongoing basis and amended, as necessary, when one or more of the following occur:

- Applicable regulations are revised.
- The Plan fails in an emergency.
- The project changes in its design, construction, operation, maintenance, or other circumstance in a way that materially increases the potential for impacts on the environment, workers or visitors to the site; and/or.
- Amendments are required by a regulatory authority.

4.0 OTHER PLANS

In 2019, Health Service Executive (HSE) prepared an Emergency Plan for the South East Region in accordance with the Government's Major Emergency Management Framework which include counties of Carlow, Kilkenny, Tipperary, Wexford and Waterford. This plan is available ONLINE at:

https://www.hse.ie/eng/services/list/3/emergencymanangement/area-mep/hse-emergency-management-area-5-emergency-plan.pdf

It details the initial contact that should be made in case of an emergency incident as well as those responsible for following up once an emergency event is declared. This plan may be referred to during both the construction and operation phases.

5.0 RESPONSE PLANNING

5.1 Incident Response Plan

The Contractor's Environmental Operating Plan (EOP) will include an Incident Response Plan, which will detail the controls to be adopted to manage the risk of pollution incidents and procedures to be followed in the event of any pollution incidents.

The Incident Response Plan will include the following, as appropriate:

- Reference to the Method Statements and Management Plans for other construction activities, insofar as they are relevant for the purposes of mitigating against health and safety and pollution incidents.
- Procedures to be adopted to contain, limit and mitigate any adverse effects, as far as reasonably practicable, in the event of a health and safety or pollution incident.
- Details of spill clean-up companies appropriate to deal with pollution incidents associated with the materials being used or stored on site.
- Procedures to be followed and appropriate information to be provided in the event of any incident, such as a spillage or release of a potentially hazardous material.
- Procedures for notifying appropriate emergency services, authorities, the Employer's Representative and personnel on the construction site.
- Procedures for notifying relevant statutory bodies, environmental regulatory bodies, local authorities and local water and sewer providers of pollution incidents, where required.
- Maps showing the locations, together with address and contact details, of local emergency services facilities such as police stations, fire authorities, medical facilities and other relevant authorities.
- Contact details for the persons responsible on the construction site and within the Contractor's organisation for pollution incident response.

5.2 Monitoring

The Contractor will investigate and provide reports on any health and safety or pollution incidents to the Employer's Representative, including, as appropriate:

- A description of the incident;
- Contributory causes;
- Adverse effects;
- Measures implemented to mitigate adverse effects; and,
- Effectiveness of measures implemented to prevent pollution.

The Contractor will undertake appropriate monitoring of the procedures and measures set out in the management plans for construction activities required to prevent health and safety or pollution incidents to ensure they are being adequately implemented.

The Contractor will monitor the effectiveness of the procedures and measures implemented in the event of an incident and the effectiveness of the response procedures set out in the Incident Response Plan to identify any areas where improvement is required.

6.0 OUTLINE INCIDENT RESPONSE PLAN

Name and address of the Client:

Kildare County Council

National Roads Office

Maudlins, Naas

Co. Kildare

The contact within the Client organisation: _____ tel no:_____

Site Location:

Overview of the activities on site:

The construction programme for the proposed development is approximately 36 weeks (9 months).

- Site Setup and establishment of construction compound;
- Ground Investigations (GI);
    - GI works will be undertaken in the area of the southeast and southwest quay wall to inform the design of the proposed sheet pile wall. The works will consist of a trial pit (TP01) and three river boreholes (BH01, BH02 and BH03).
- Widening of the bridge deck (southern side);
    - The widening of the southern side of the bridge will consist of approx. 1m wide reinforced concrete cantilever slab that will be made integral with the existing deck slab. The cantilever slab will include an upstand edge beam to support the proposed new N2 parapet.
- Widening of the quay/wing walls (south-east corner);
    - The quay wall will be extended by up to 2m on the south-east corner to facilitate the transition from the widened southern part of the bridge to the existing quay wall on the eastern side of the bridge. A sheet pile wall will be installed up to 2m from the face of the existing quay wall. Installation of the sheet piles will be completed via a piling rig from a river barge. The existing flood defence wall will be taken down below footway level and the space between the sheet pile wall and the front face of the existing quay wall will be filled with compacted fill material.
- Widening of the quay/wing walls (south-west corner);
    - The quay wall will be extended by approximately 1m on the south-west corner to facilitate the transition from the widened southern part of the bridge to the existing quay wall on the western side of the bridge. A sheet pile wall will be installed 1m from the face of the existing southern wingwall. Installation of the sheet piles will be completed via a piling rig either from the landside or from a river barge. The existing flood defence wall will be taken down below footway level and replaced by a matching flood defence wall along the line of the widened quay wall. These will be supported by a new reinforced concrete capping beam on the sheet piles. The new sheet piled wing wall will be tied back to the existing and backfilled with compacted fill material.
- Replacement of northern parapet;
    - The existing parapets are approximately 1m high and will be replaced with 1.4m high N2 containment level parapets in accordance with DN-REQ-03034. The parapet edge beam on the northern side of the bridge will be reconstructed to facilitate the higher containment parapet.
- Resurfacing and waterproofing of bridge deck;
    - To facilitate the waterproofing of the bridge deck, the existing road surface will be excavated to expose the top of the bridge deck. The deck surface will be prepared, and multiple layers of waterproofing membrane will be applied to the surface. New road surfacing material will be laid, and footpaths will be reconstructed.
- Installation of expansion joints;

- Concrete repairs to underside of the bridge;
- Relocation of underground utilities, where required;
- All ancillary works.

Description of the proposed development and surrounding area:

The proposed development is located along O'Hanrahan Bridge in the urban centre of New Ross, Co. Wexford. O'Hanrahan Bridge carries the R273 Regional Road over the River Barrow. The river forms the boundary between County Wexford and County Kilkenny for the most part. The land adjacent to the bridge is predominantly of commercial and residential use. The bridge is surrounded by a mix of historic buildings and structures, tourism sites and commercial properties on the eastern side, and residential, commercial, and industrial properties on the western side. The aim of the proposed development is to provide a shared pedestrian and cycleway from the New Ross Quay to Rosbercon Quay over the O'Hanrahan Bridge.

O'Hanrahan Bridge is a 9-span post-tensioned concrete beam and reinforced concrete slab bridge over the River Barrow in New Ross town, Co. Wexford. The overall length of the bridge is 175m with an out-to-out width of 11.6m. The proposed works aim to widen the O'Hanrahan bridge deck by approx. 1m in order to accommodate an enhanced combined pedestrian and cycleway. The widening works are to take place on the southern side of the bridge. In order to tie the new widened section into the quays at the eastern end and ensure continuity of the new cycleway, the scheme requires for an approx. 20m long section of the existing quay wall on the south-east corner of the bridge to be reconstructed up to 2m out from the existing quay wall. This section will require working instream. Similarly, approx. 60m section of the south-west corner of the bridge will require widening works by approximately 1m out from the existing wall; of which 5m will be directly instream. The remaining 55m will be in the embankment area. The length of new sheet piles in front of the wingwalls will be approximately 19m, of which 5m will be located directly in the river. The remaining 41m of new wall will be constructed in front of the existing flood wall, all driven at the top of the embankment above the water level.

Furthermore, concrete repair works will be undertaken on the existing bridge in areas where minor concrete defects are identified.

Potential Incidents:

Potential incidents requiring emergency response procedures:

- Fuel and oil spills;
- Road traffic accidents involving chemical or biological spills;
- Earth slippages;
- Extreme rainfall events, causing swelling of the River Barrow;
- Fires;
- Activities resulting in noise and vibration, air pollution, hazardous substances or impacts on water;
- Working within and in vicinity of River Barrow;
- Waste management; and,
- Discharge of effluent.

The Contractor will update the list of potential incidents based on their proposed construction methods and programme for the O'Hanrahan Bridge Widening and include, as a minimum, the following:

- The measures to be taken to reduce the risk potential;
- Procedures to be put in place to deal with the risk;
- Person responsible for dealing with incidents;
- Procedures for alerting key staff;
- Standby/rota systems;
- Clearly defined roles and responsibilities;
- Names of staff and contractors trained in incident response;

- The types and location of emergency response equipment available and appropriate personal protective equipment to be worn;
- A system of response coordination;
- Off-site support; and,
- Particular emergency service or persons to be notified in case of incident.

Date and version of the plan:	**Name or position of person responsible for compiling/approving the plan:**
Review Date:	**Date of next review:**

Objectives of the IRP:

To ensure works are carried out in such a way as to avoid injury, health hazards or pollution incidents, however, should any such incident occur, procedures and measures will be implemented to contain, limit and mitigate the effects as far as reasonably practicable.

List of external organisations consulted in the preparation of the IRP:

TBC by Contractor when preparing IRP

Distribution of the IRP

Recipient	No. of copies	Version

7.0 EXTERNAL CONTACTS

External Contacts		
Contact	**Office Hours**	**Out of Hours**
New Ross Fire Station	(051) 421 777	(051) 421 777
Gardaí: Emergency	999 / 112	999 / 112
Gardaí: New Ross Garda Station	(051) 426 030	(051) 426 030
Gardaí: New Ross Headquarters Garda Station	(051) 426 037	(051) 426 037
Gardaí: Wexford Divisional Headquarters Garda Station	(053) 916 5211	999 / 112
Community Hospital New Ross	(051) 421 305	999 / 112
Wexford Hospital	(053) 915 3000	(053) 915 3000 / (053) 915 3313
EPA Headquarters, Co. Wexford	(053) 916 0600	-
Waterford City and County Council Emergency Planning Department	076 102020	0761 102020
ESB Networks	(021) 238 6555	1800 372 999
Bord Gáis / Gas Networks	1850 20 50 50	1850 20 50 50
Waste Management Contractor	TBC	
Specialist Advice	TBC	-
Specialist Clean up Contractor	TBC	-
Wexford County Council	053 919 6000	053 919 6000
Kildare County Council, National Roads Office (Naas)	(045) 980 425 / (045) 988 900	1800 500 444
New Ross Municipal District	(053) 919 6700 / (051) 421 284	
Kilkenny County Council	0818 399399	0818 399399
Inland Fisheries Ireland	(01) 884 2600	To be agreed with IFI
National Parks & Wildlife Service	(01) 888 3200	To be agreed with NPWS

8.0 INTERNAL (CONTRACTORS) CONTACTS

Internal Contacts		
Contact	**Office Hours**	**Out of Hours**
Names and positions of staff authorised / trained to activate and coordinate the IRP	TBC	
Other Staff	TBC	
Managing Director	TBC	
Site Manager	TBC	
Health & Safety Manager	TBC	
Site Environmental Manager	TBC	

9.0 CHEMICAL PRODUCT AND WASTE INVENTORY

Inventory of Chemical Products and Wastes						
Trade Name / Substance	**Solid / liquid / gas or powder**	**UN number**	**Maximum amount**	**Location marked on site plan**	**Type of containment**	**Relevant health and environmental problems**

10.0 POLLUTION PREVENTION EQUIPMENT INVENTORY

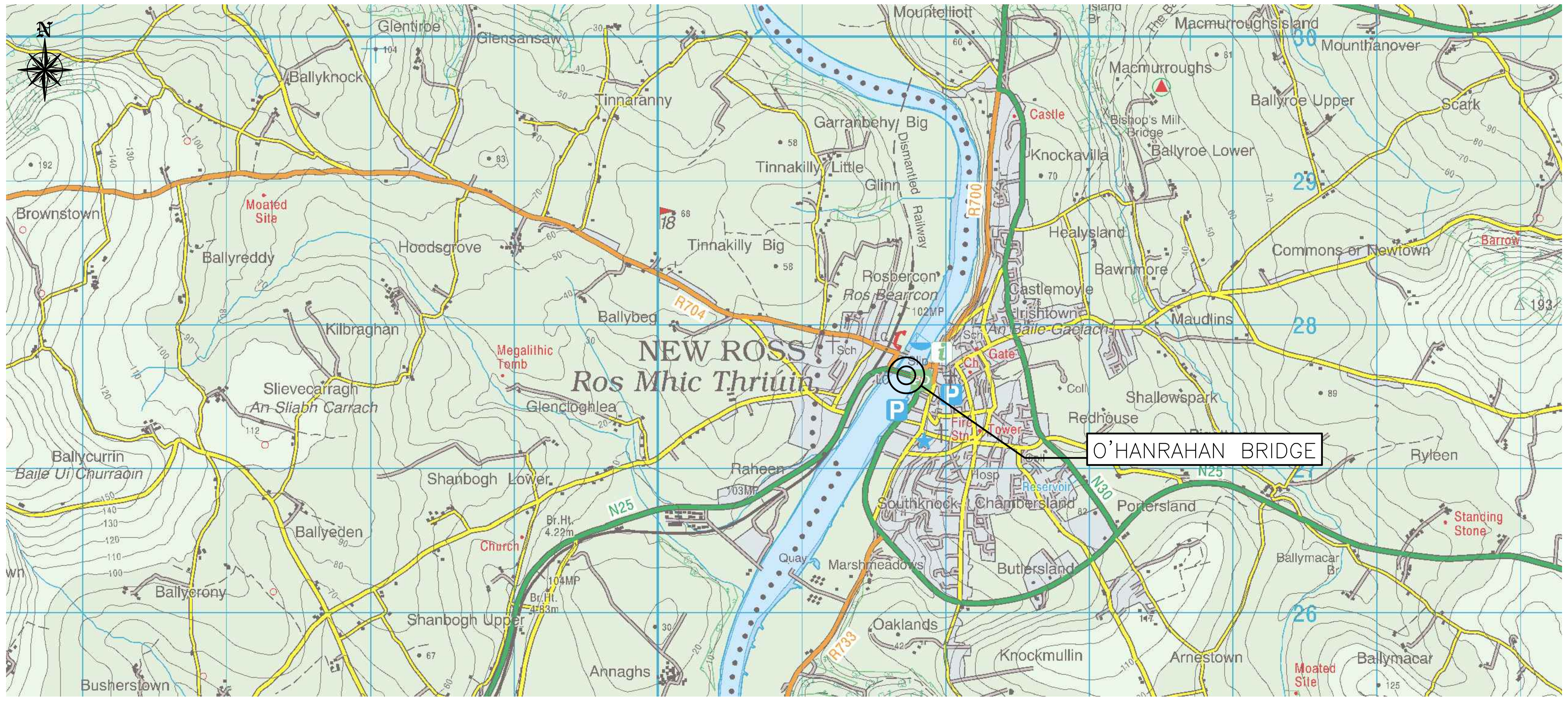
Inventory of Pollution Prevention Equipment (on- and off-site resources)			

11.0 DRAWINGS

Drawings of the proposed development are included in **Appendix A**.

Site Plan
WBRC-ROD-ENV-S101-DR-CB-30001- Location Plan of Proposed Development

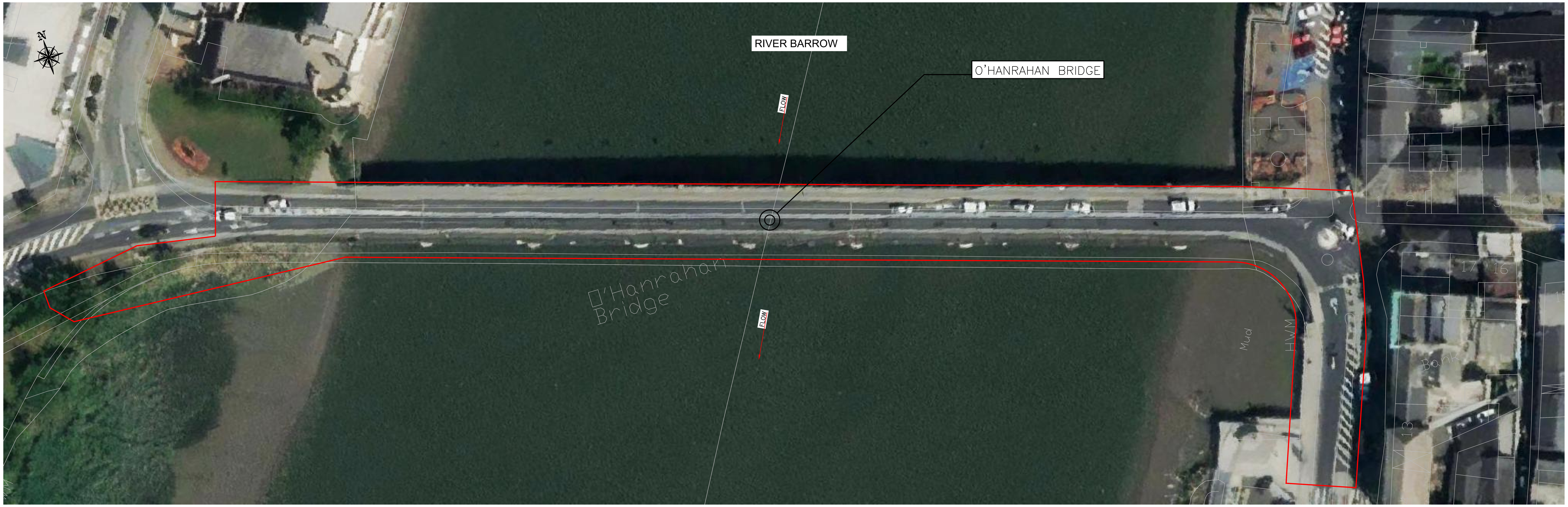
APPENDIX A



SITE LOCATION PLAN

A1 SCALE 1:25,000

A3 SCALE 1:50,000



SITE LAYOUT

A1 SCALE 1:400

A3 SCALE 1:800

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
2. ALL LEVELS ARE IN METRES ABOVE ORDNANCE DATUM AT MALIN HEAD.
3. ALL CO–ORDINATES ARE TO IRISH TRANSVERSE MERCATOR.
4. EXTENT OF SITE AREA PROVIDED BY THE EMPLOYER EXCLUDES AREA WHICH MAY BE TEMPORARY OCCUPIED SUBJECT TO TRAFFIC SAFETY AND MANAGEMENT AND DIVERSIONS.
5. THE CONTRACTOR IS REQUIRED TO PROVIDE ACCESS THROUGH THE EXTENT OF SITE AND AREA PROVIDED BY THE EMPLOYER IN ACCORDANCE WITH THE SPECIFICATION.
6. THE EXISTING POSITION AND LEVEL OF SERVICES SHOWN TO BE DETERMINED BY THE CONTRACTOR. THE CONTRACTOR SHALL PROVIDE PROTECTION TO EXISTING SERVICES

LEGEND:

DEVELOPMENT BOUNDARY

Comhairle Contae Loch Garman
Wexford County Council

Meanma agus Misneach

KILDARE NRO NATIONAL ROADS OFFICE

No.	Revision	Date	By	Chk'd	App'd

ROD ROUGHAN & O'DONOVAN
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Drawn	Designed	Checked	Approved	Suitability Code - Description
ZZX	CH	MR	JK	S4 - Stage Approval

Project Stage	Preliminary
Project Title	O'Hanrahan Bridge Widening Project
Drawing Title	Location Plan of Proposed Development

Drawing Number	Project	Originator	Volume	Location	Type	Role	Number
	WBRC	ROD	ENV	S101	DR	CB	30001

Scale (A1) As Shown | Date: MAY 2022 | Job No: 21.143 | Rev: P0

DO NOT SCALE USE FIGURED DIMENSIONS ONLY

24 October 2022 15:50:50 J:\2021\21143\21143-02_WIP\08 MODELS\01 CAD\01 DWG\01 STG 1 - PRELIMINARY\ENVIORNMENTAL DRAWINGS\WBRC-ROD-ENV-S101-DR-CB-30001.DWG

Appendix C
Traffic Analysis

Appendix C

APPENDIX C.1

Thomas Street Baseline Basic Results Summary

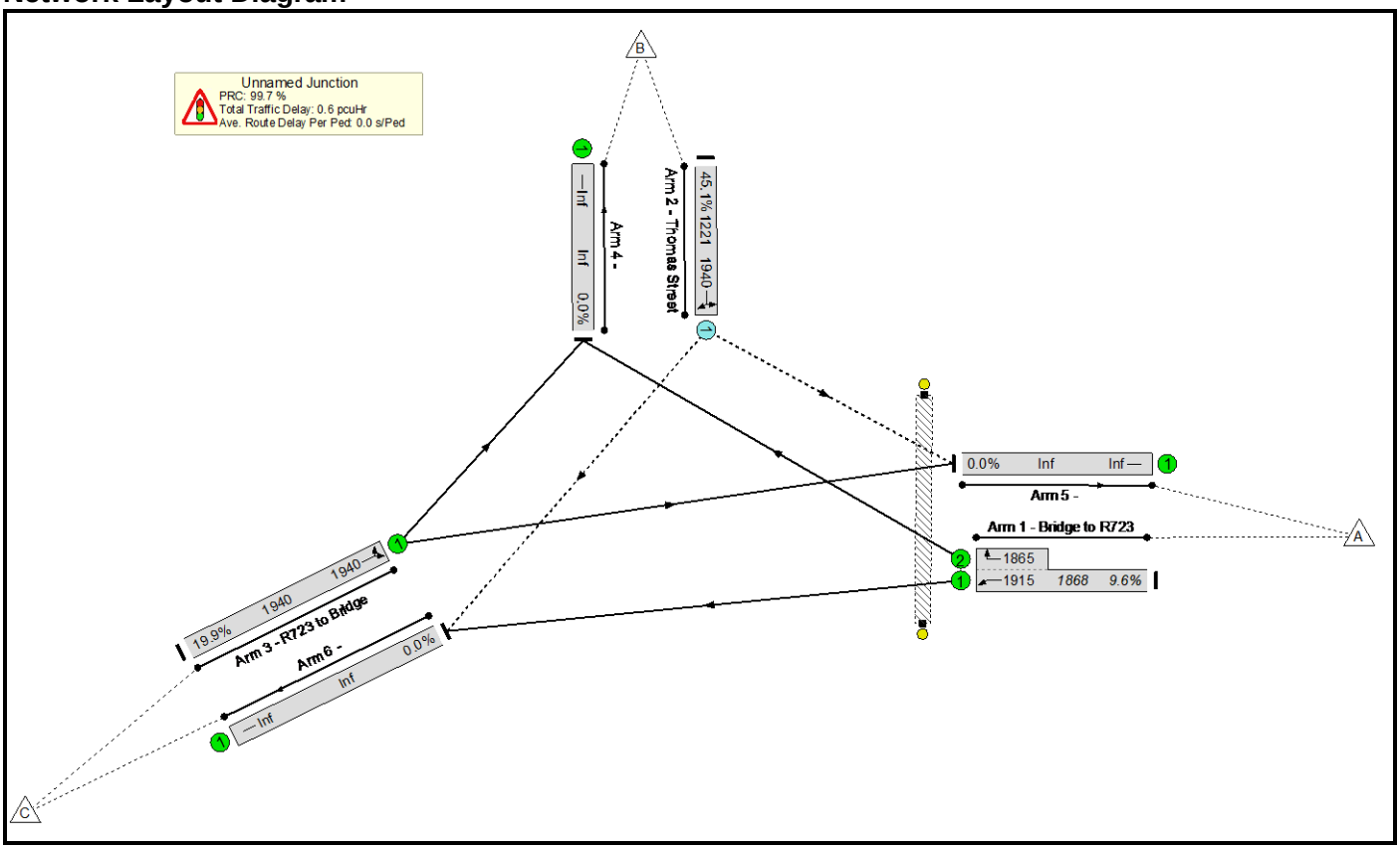
Basic Results Summary

User and Project Details

Project:	**21.143 O'Hanrahan Bridge Rehabilitation**
Title:	**Baseline Model**
Location:	New Ross
Site Ref(s):	Thomas Street (Site 7)
Additional detail:	R723 Bridge Street, Thomas Street Junction
File name:	21.143 OHanrahans Bridge_Thomas Street_Site 7.lsg3x
Author:	Parth Shah
Company:	ROD
Address:	Dublin 18

Scenario 1: 'Scenario 1 AM' (FG1: 'AM Traffic Flow Group', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

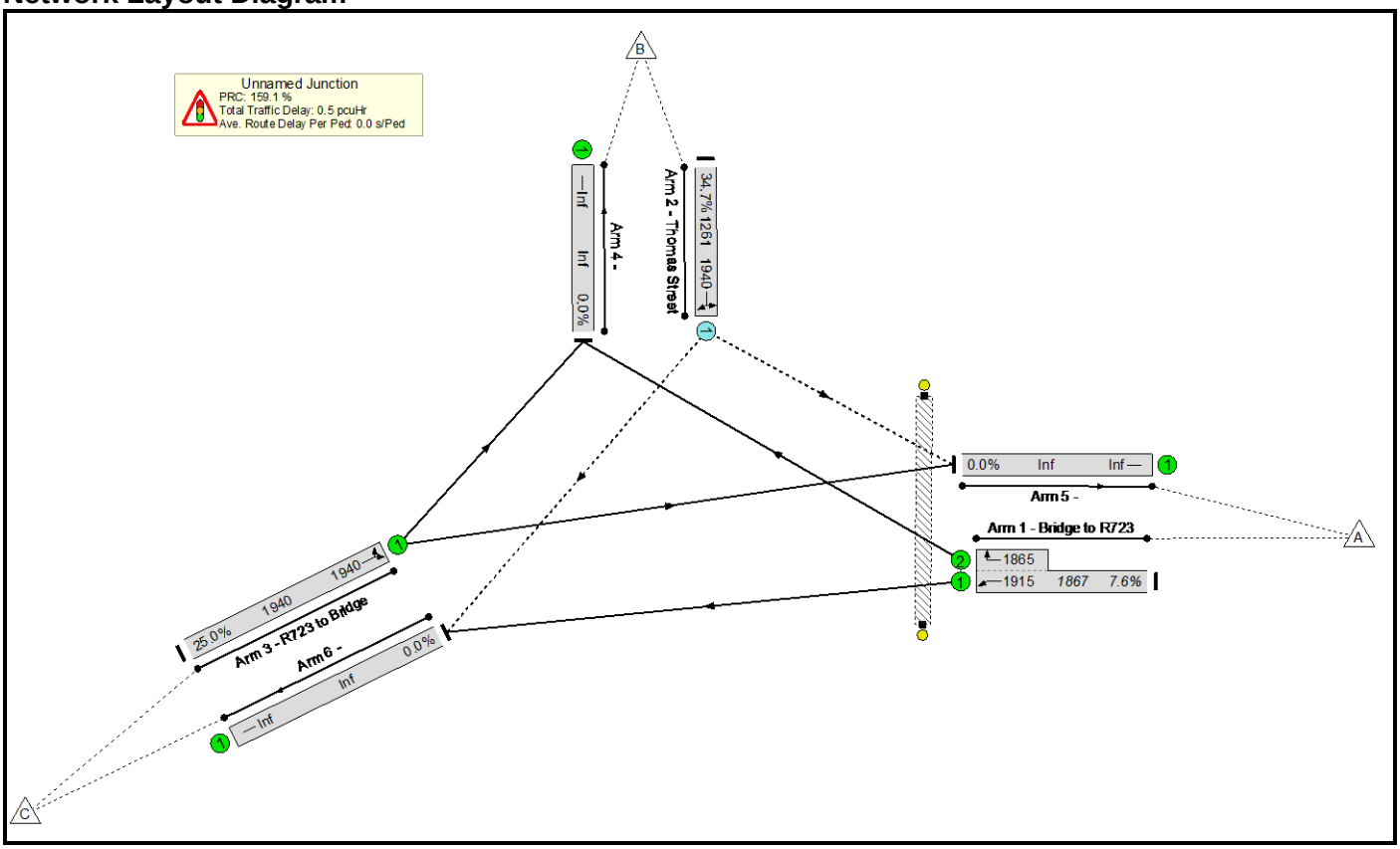
Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**45.1%**	**550**	**0**	**0**	**0.6**	**-**	**-**
Unnamed Junction	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**45.1%**	**550**	**0**	**0**	**0.6**	**-**	**-**
1/1+1/2	Bridge to R723 Right Ahead	U	-		-	-	-	180	1915:1865	1868	9.6%	-	-	-	0.1	1.1	0.1
2/1	Thomas Street Left Right	O	-		-	-	-	550	1940	1221	45.1%	550	0	0	0.4	2.7	0.4
3/1	R723 to Bridge Left Ahead	U	-		-	-	-	386	1940	1940	19.9%	-	-	-	0.1	1.2	0.1
Ped Link: P1	Unnamed Ped Link	-	D		1	7	-	0	-	0	0.0%	-	-	-	-	-	-

C1 PRC for Signalled Lanes (%): 0.0 Total Delay for Signalled Lanes (pcuHr): 0.00 Cycle Time (s): 90
PRC Over All Lanes (%): 99.7 Total Delay Over All Lanes(pcuHr): 0.59

Basic Results Summary

Scenario 2: 'Scenario 2 PM' (FG2: 'PM Traffic Flow Group', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**34.7%**	**438**	**0**	**0**	**0.5**	**-**	**-**
Unnamed Junction	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**34.7%**	**438**	**0**	**0**	**0.5**	**-**	**-**
1/1+1/2	Bridge to R723 Right Ahead	U	-		-	-	-	141	1915:1865	1867	7.6%	-	-	-	0.0	1.0	0.0
2/1	Thomas Street Left Right	O	-		-	-	-	438	1940	1261	34.7%	438	0	0	0.3	2.2	0.3
3/1	R723 to Bridge Left Ahead	U	-		-	-	-	485	1940	1940	25.0%	-	-	-	0.2	1.2	0.2
Ped Link: P1	Unnamed Ped Link	-	D		1	7	-	0	-	0	0.0%	-	-	-	-	-	-

C1 PRC for Signalled Lanes (%): 0.0 Total Delay for Signalled Lanes (pcuHr): 0.00 Cycle Time (s): 90
PRC Over All Lanes (%): 159.1 Total Delay Over All Lanes(pcuHr): 0.47

APPENDIX C.2

Thomas Street Construction Traffic Management Plan
Basic Results Summary

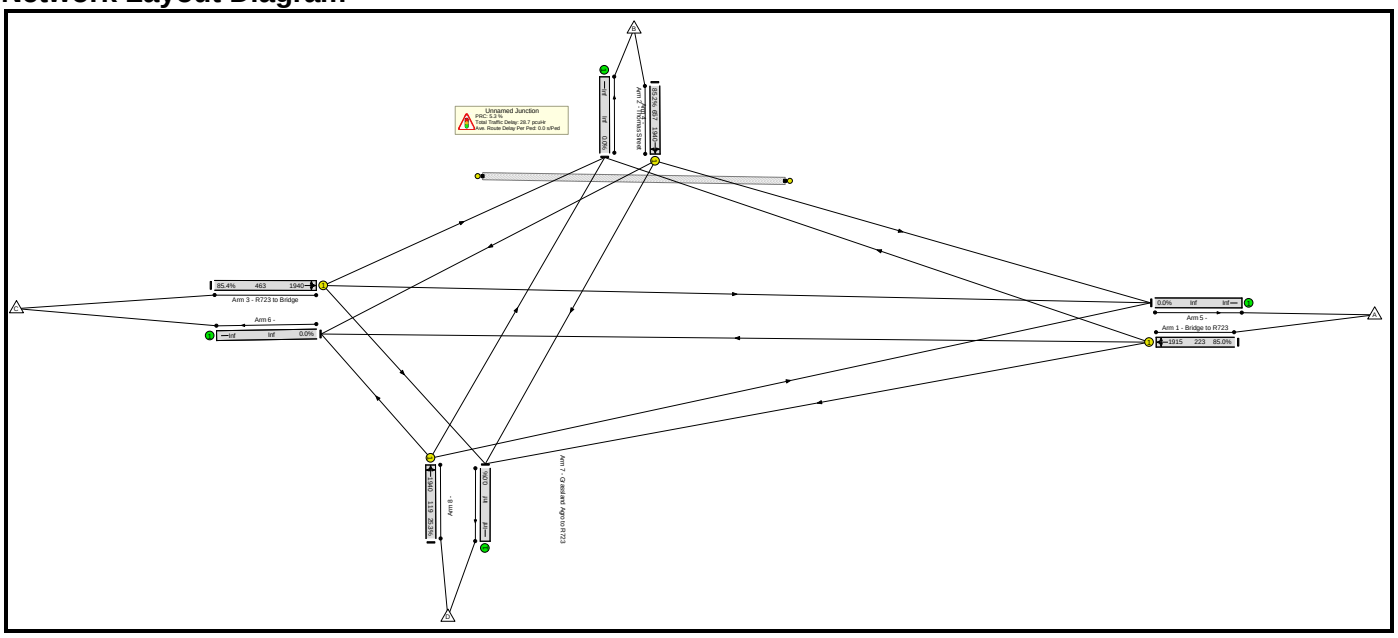
Basic Results Summary

User and Project Details

Project:	**21.143 O'Hanrahan Bridge Rehabilitation**
Title:	**Construction Stage Traffic Management**
Location:	New Ross
Site Ref(s):	Thomas Street (Site 7)
Additional detail:	R723 Bridge Street Thomas Street Junction
File name:	21.143 OHanrahans Bridge_Thomas Street_Site 7_Sec1.lsg3x
Author:	Parth Shah
Company:	ROD
Address:	Dublin 18

Scenario 1: 'AM' (FG1: 'AM Traffic Flow Group', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

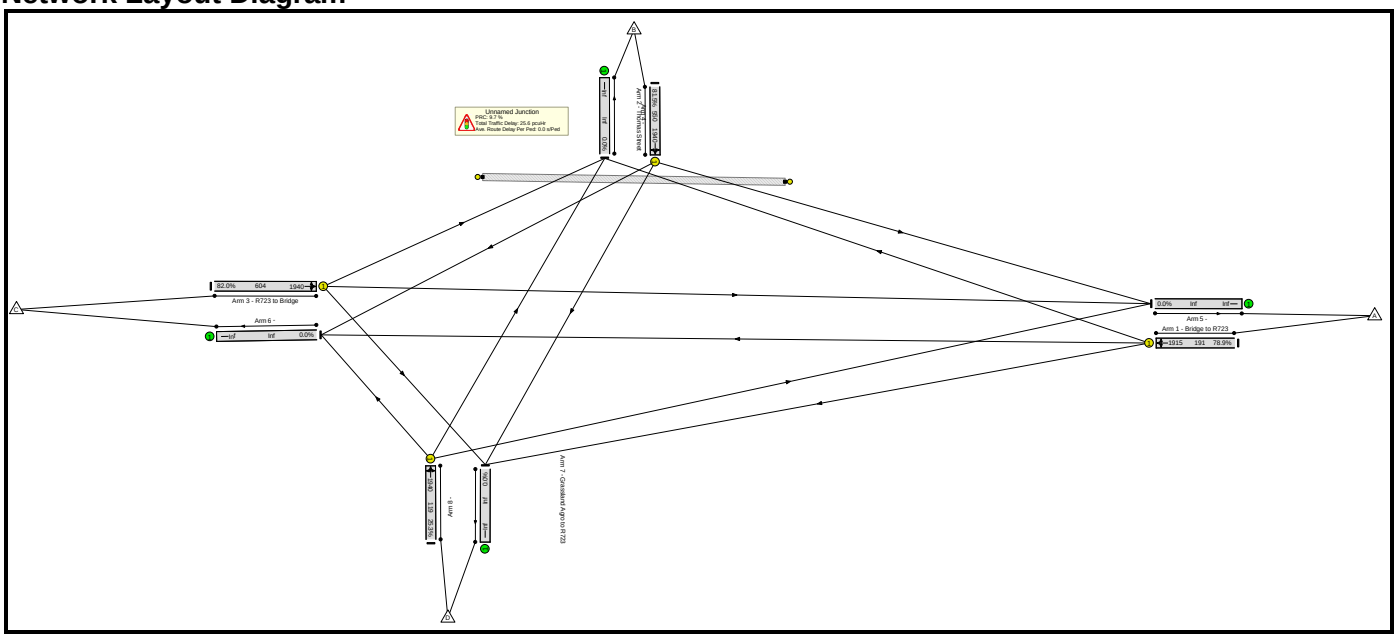
Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	-	-	-		-	-	-	-	-	-	**85.4%**	**0**	**0**	**0**	**28.7**	-	-
Unnamed Junction	-	-	-		-	-	-	-	-	-	**85.4%**	**0**	**0**	**0**	**28.7**	-	-
1/1	Bridge to R723 Right Ahead Left	U	A		1	20	-	190	1915	223	85.0%	-	-	-	6.6	124.9	11.8
2/1	Thomas Street Left Right Ahead	U	B		1	60	-	560	1940	657	85.2%	-	-	-	11.3	72.8	28.7
3/1	R723 to Bridge Left Ahead Right	U	C		1	42	-	396	1940	463	85.4%	-	-	-	9.9	90.2	21.6
7/1	Grassland Agro to R723 Ahead Right Left	U	D		1	10	-	30	1940	119	25.3%	-	-	-	0.8	100.9	1.6
Ped Link: P1	Unnamed Ped Link	-	E		1	6	-	0	-	0	0.0%	-	-	-	-	-	-

C1 PRC for Signalled Lanes (%): 5.3 Total Delay for Signalled Lanes (pcuHr): 28.68 Cycle Time (s): 180
PRC Over All Lanes (%): 5.3 Total Delay Over All Lanes(pcuHr): 28.68

Basic Results Summary

Scenario 2: 'PM' (FG2: 'PM Traffic Flow Group', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**82.0%**	**0**	**0**	**0**	**25.6**	**-**	**-**
Unnamed Junction	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**82.0%**	**0**	**0**	**0**	**25.6**	**-**	**-**
1/1	Bridge to R723 Right Ahead Left	U	A		1	17	-	151	1915	191	78.9%	-	-	-	5.0	120.1	9.1
2/1	Thomas Street Left Right Ahead	U	B		1	50	-	448	1940	550	81.5%	-	-	-	9.6	77.1	22.9
3/1	R723 to Bridge Left Ahead Right	U	C		1	55	-	495	1940	604	82.0%	-	-	-	10.1	73.3	25.0
7/1	Grassland Agro to R723 Ahead Right Left	U	D		1	10	-	30	1940	119	25.3%	-	-	-	0.8	100.9	1.6
Ped Link: P1	Unnamed Ped Link	-	E		1	6	-	0	-	0	0.0%	-	-	-	-	-	-

C1 PRC for Signalled Lanes (%): 9.7 Total Delay for Signalled Lanes (pcuHr): 25.55 Cycle Time (s): 180

PRC Over All Lanes (%): 9.7 Total Delay Over All Lanes(pcuHr): 25.55

APPENDIX C.3

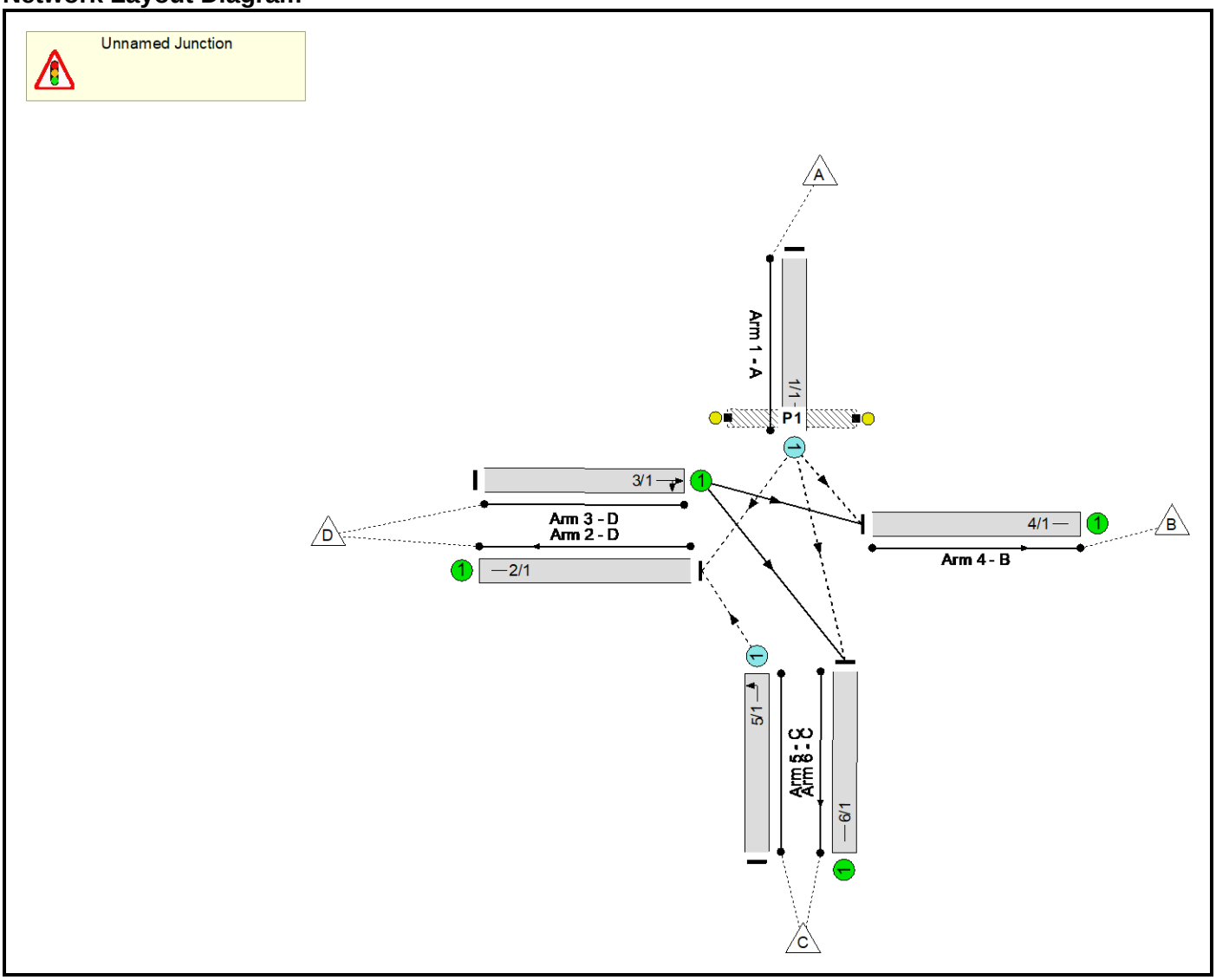
Baseline Model – Full Input Data and Results

Full Input Data And Results

User and Project Details

Project:	**21.143 O'Hanrahan Bridge**
Title:	**Baseline Model**
Location:	New Ross
Client:	Wexford County Council
Additional detail:	R723 Bridge Street, The Quay, Quay Street, North Quay Mini Roundabout
File name:	OHanrahans Bridge.lsg3x
Author:	JA
Company:	ROD
Address:	Dublin 18

Network Layout Diagram



Full Input Data And Results

Give-Way Lane Input Data

Junction: Unnamed Junction											
Lane	**Movement**	**Max Flow when Giving Way (PCU/Hr)**	**Min Flow when Giving Way (PCU/Hr)**	**Opposing Lane**	**Opp. Lane Coeff.**	**Opp. Mvmnts.**	**Right Turn Storage (PCU)**	**Non-Blocking Storage (PCU)**	**RTF**	**Right Turn Move up (s)**	**Max Turns in Intergreen (PCU)**
1/1 (A)	2/1 (Right)	1439	0	3/1	1.09	All	-	-	-	-	-
	4/1 (Left)	1439	0	3/1	1.09	All					
	6/1 (Ahead)	1439	0	3/1	1.09	All					
5/1 (C)	2/1 (Left)	1439	0	1/1	1.09	All	-	-	-	-	-

Full Input Data And Results

Lane Input Data

Junction: Unnamed Junction												
Lane	**Lane Type**	**Phases**	**Start Disp.**	**End Disp.**	**Physical Length (PCU)**	**Sat Flow Type**	**Def User Saturation Flow (PCU/Hr)**	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Turns**	**Turning Radius (m)**
1/1 (A)	O		2	3	60.0	Geom	-	3.25	0.00	Y	Arm 2 Right Arm 4 Left Arm 6 Ahead	10.00 6.00 Inf
2/1 (D)	U		2	3	60.0	Inf	-	-	-	-	-	-
3/1 (D)	U		2	3	60.0	Geom	-	3.25	0.00	Y	Arm 4 Ahead Arm 6 Right	Inf 12.00
4/1 (B)	U		2	3	60.0	Inf	-	-	-	-	-	-
5/1 (C)	O		2	3	60.0	Geom	-	3.25	0.00	Y	Arm 2 Left	6.00
6/1 (C)	U		2	3	60.0	Inf	-	-	-	-	-	-

Traffic Flow Groups

Flow Group	Start Time	End Time	Duration	Formula
1: 'AM Peak Hour'	08:00	09:00	01:00	
2: 'Peak Flow PM'	17:00	18:00	01:00	

Full Input Data And Results

Scenario 1: 'AM Peak Hour' (FG1: 'AM Peak Hour', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	10	115	168	293
	B	0	0	0	0	0
	C	0	0	0	377	377
	D	0	0	221	305	526
	Tot.	0	10	336	850	1196

Lane Saturation Flows

Junction: Unnamed Junction

Lane	Lane Width (m)	Gradient	Nearside Lane	Allowed Turns	Turning Radius (m)	Turning Prop.	Sat Flow (PCU/Hr)	Flared Sat Flow (PCU/Hr)
1/1 (A)	3.25	0.00	Y	Arm 2 Right	10.00	57.3 %	1772	1772
				Arm 4 Left	6.00	3.4 %		
				Arm 6 Ahead	Inf	39.2 %		
2/1 (D Lane 1)	Infinite Saturation Flow						Inf	Inf
3/1 (D)	3.25	0.00	Y	Arm 4 Ahead	Inf	0.0 %	1724	1724
				Arm 6 Right	12.00	100.0 %		
4/1 (B Lane 1)	Infinite Saturation Flow						Inf	Inf
5/1 (C)	3.25	0.00	Y	Arm 2 Left	6.00	100.0 %	1552	1552
6/1 (C Lane 1)	Infinite Saturation Flow						Inf	Inf

Full Input Data And Results

Scenario 2: 'PM Peak Hour' (FG2: 'Peak Flow PM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	26	144	103	273
	B	0	0	0	0	0
	C	0	0	0	364	364
	D	0	277	330	0	607
	Tot.	0	303	474	467	1244

Lane Saturation Flows

Junction: Unnamed Junction

Lane	Lane Width (m)	Gradient	Nearside Lane	Allowed Turns	Turning Radius (m)	Turning Prop.	Sat Flow (PCU/Hr)	Flared Sat Flow (PCU/Hr)
1/1 (A)	3.25	0.00	Y	Arm 2 Right	10.00	37.7 %	1796	1796
				Arm 4 Left	6.00	9.5 %		
				Arm 6 Ahead	Inf	52.7 %		
2/1 (D Lane 1)	Infinite Saturation Flow						Inf	Inf
3/1 (D)	3.25	0.00	Y	Arm 4 Ahead	Inf	45.6 %	1817	1817
				Arm 6 Right	12.00	54.4 %		
4/1 (B Lane 1)	Infinite Saturation Flow						Inf	Inf
5/1 (C)	3.25	0.00	Y	Arm 2 Left	6.00	100.0 %	1552	1552
6/1 (C Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 1: 'AM Peak Hour' (FG1: 'AM Peak Hour', Plan 1: 'Network Control Plan 1')

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**33.7%**
Unnamed Junction	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**33.7%**
1/1	A Right Left Ahead	O	N/A	N/A	-		-	-	-	293	1772	1198	24.5%
2/1	D	U	N/A	N/A	-		-	-	-	545	Inf	Inf	0.0%
3/1	D Ahead Right	U	N/A	N/A	-		-	-	-	221	1724	1724	12.8%
4/1	B	U	N/A	N/A	-		-	-	-	10	Inf	Inf	0.0%
5/1	C Left	O	N/A	N/A	-		-	-	-	377	1552	1120	33.7%
6/1	C	U	N/A	N/A	-		-	-	-	336	Inf	Inf	0.0%
Ped Link: P1	Pedestrain Link A	-	N/A	-	D		1	53	-	0	-	0	0.0%

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**670**	**0**	**0**	**0.0**	**0.5**	**0.0**	**0.5**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**670**	**0**	**0**	**0.0**	**0.5**	**0.0**	**0.5**	**-**	**-**	**-**	**-**
1/1	293	293	293	0	0	0.0	0.2	-	0.2	2.0	0.0	0.2	0.2
2/1	545	545	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
3/1	221	221	-	-	-	0.0	0.1	-	0.1	1.2	0.0	0.1	0.1
4/1	10	10	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	377	377	377	0	0	0.0	0.3	-	0.3	2.4	0.0	0.3	0.3
6/1	336	336	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
Ped Link: P1	0	0	-	-	-	-	-	-	-	-	-	-	-

C1 PRC for Signalled Lanes (%): 0.0 Total Delay for Signalled Lanes (pcuHr): 0.00 Cycle Time (s): na
PRC Over All Lanes (%): 167.3 Total Delay Over All Lanes(pcuHr): 0.49

Full Input Data And Results
Scenario 2: 'PM Peak Hour' (FG2: 'Peak Flow PM', Plan 1: 'Network Control Plan 1')

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**35.1%**
Unnamed Junction	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**35.1%**
1/1	A Right Left Ahead	O	N/A	N/A	-		-	-	-	273	1796	777	35.1%
2/1	D	U	N/A	N/A	-		-	-	-	467	Inf	Inf	0.0%
3/1	D Ahead Right	U	N/A	N/A	-		-	-	-	607	1817	1817	33.4%
4/1	B	U	N/A	N/A	-		-	-	-	303	Inf	Inf	0.0%
5/1	C Left	O	N/A	N/A	-		-	-	-	364	1552	1141	31.9%
6/1	C	U	N/A	N/A	-		-	-	-	474	Inf	Inf	0.0%
Ped Link: P1	Pedestrian Link A	-	N/A	-	D		1	53	-	0	-	0	0.0%

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**637**	**0**	**0**	**0.0**	**0.8**	**0.0**	**0.8**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**637**	**0**	**0**	**0.0**	**0.8**	**0.0**	**0.8**	**-**	**-**	**-**	**-**
1/1	273	273	273	0	0	0.0	0.3	-	0.3	3.6	0.0	0.3	0.3
2/1	467	467	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
3/1	607	607	-	-	-	0.0	0.3	-	0.3	1.5	0.0	0.3	0.3
4/1	303	303	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	364	364	364	0	0	0.0	0.2	-	0.2	2.3	0.0	0.2	0.2
6/1	474	474	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
Ped Link: P1	0	0	-	-	-	-	-	-	-	-	-	-	-

C1 PRC for Signalled Lanes (%): 0.0 Total Delay for Signalled Lanes (pcuHr): 0.00 Cycle Time (s): na
PRC Over All Lanes (%): 156.2 Total Delay Over All Lanes(pcuHr): 0.76

APPENDIX C.4

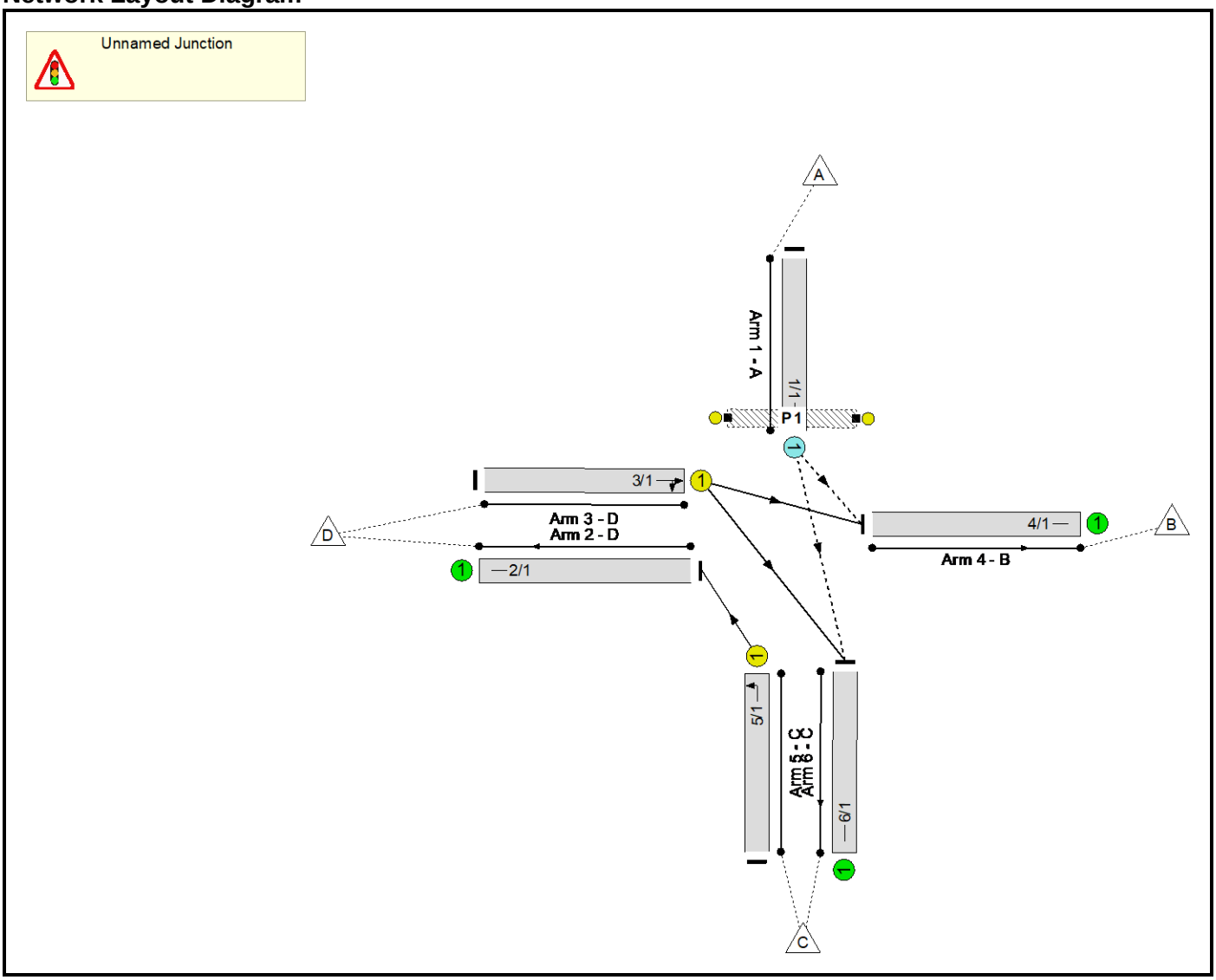
Construction Traffic Management Plan Model – Full Input Data and Results

Full Input Data And Results

User and Project Details

Project:	**21.143 O'Hanrahan Bridge**
Title:	**Construction Stage Traffic Management Plan Model**
Location:	New Ross
Client:	Wexford County Council
Additional detail:	R723 Bridge Street, The Quay, Quay Street, North Quay Mini Roundabout
File name:	OHanrahans Bridge CTMP.lsg3x
Author:	JA
Company:	ROD
Address:	Dublin 18

Network Layout Diagram



Full Input Data And Results

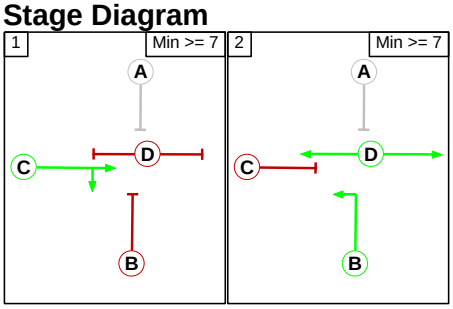
Phase Input Data

Phase Name	Phase Type	Assoc. Phase	Street Min	Cont Min
A	Traffic		7	7
B	Traffic		7	7
C	Traffic		7	7
D	Pedestrian		7	7

Phase Intergreens Matrix

		Starting Phase			
		A	B	C	D
Terminating Phase	A		-	-	-
	B	-		21	-
	C	-	21		5
	D	-	-	5	

Stage Diagram



Prohibited Stage Change

	To Stage		
		1	2
From Stage	1		21
	2	21	

Give-Way Lane Input Data

Junction: Unnamed Junction											
Lane	**Movement**	**Max Flow when Giving Way (PCU/Hr)**	**Min Flow when Giving Way (PCU/Hr)**	**Opposing Lane**	**Opp. Lane Coeff.**	**Opp. Mvmnts.**	**Right Turn Storage (PCU)**	**Non-Blocking Storage (PCU)**	**RTF**	**Right Turn Move up (s)**	**Max Turns in Intergreen (PCU)**
1/1 (A)	4/1 (Left)	1439	0	3/1	1.09	All	-	-	-	-	-
	6/1 (Ahead)	1439	0	3/1	1.09	All					

Full Input Data And Results

Lane Input Data

Junction: Unnamed Junction

Lane	Lane Type	Phases	Start Disp.	End Disp.	Physical Length (PCU)	Sat Flow Type	Def User Saturation Flow (PCU/Hr)	Lane Width (m)	Gradient	Nearside Lane	Turns	Turning Radius (m)
1/1 (A)	O		2	3	60.0	Geom	-	3.25	0.00	Y	Arm 4 Left	6.00
											Arm 6 Ahead	Inf
2/1 (D)	U		2	3	60.0	Inf	-	-	-	-	-	-
3/1 (D)	U	C	2	3	60.0	Geom	-	3.25	0.00	Y	Arm 4 Ahead	Inf
											Arm 6 Right	12.00
4/1 (B)	U		2	3	60.0	Inf	-	-	-	-	-	-
5/1 (C)	U	B	2	3	60.0	Geom	-	3.25	0.00	Y	Arm 2 Left	6.00
6/1 (C)	U		2	3	60.0	Inf	-	-	-	-	-	-

Traffic Flow Groups

Flow Group	Start Time	End Time	Duration	Formula
1: 'AM Peak Hour'	08:00	09:00	01:00	
2: 'Peak Flow PM'	17:00	18:00	01:00	

Scenario 1: 'AM Peak Hour' (FG1: 'AM Peak Hour', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	10	283	0	293
	B	0	0	0	0	0
	C	0	0	0	545	545
	D	0	221	305	0	526
	Tot.	0	231	588	545	1364

Full Input Data And Results

Lane Saturation Flows

Junction: Unnamed Junction								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (A)	3.25	0.00	Y	Arm 4 Left	6.00	3.4 %	1924	1924
				Arm 6 Ahead	Inf	96.6 %		
2/1 (D Lane 1)	Infinite Saturation Flow						Inf	Inf
3/1 (D)	3.25	0.00	Y	Arm 4 Ahead	Inf	42.0 %	1809	1809
				Arm 6 Right	12.00	58.0 %		
4/1 (B Lane 1)	Infinite Saturation Flow						Inf	Inf
5/1 (C)	3.25	0.00	Y	Arm 2 Left	6.00	100.0 %	1552	1552
6/1 (C Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 2: 'PM Peak Hour' (FG2: 'Peak Flow PM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	26	247	0	273
	B	0	0	0	0	0
	C	0	0	0	467	467
	D	0	277	330	0	607
	Tot.	0	303	577	467	1347

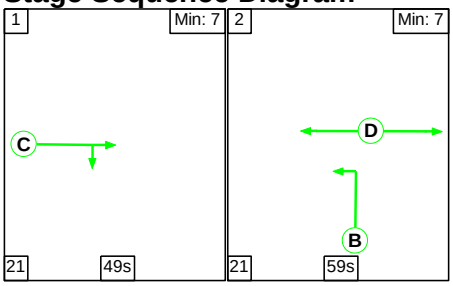
Lane Saturation Flows

Junction: Unnamed Junction								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (A)	3.25	0.00	Y	Arm 4 Left	6.00	9.5 %	1895	1895
				Arm 6 Ahead	Inf	90.5 %		
2/1 (D Lane 1)	Infinite Saturation Flow						Inf	Inf
3/1 (D)	3.25	0.00	Y	Arm 4 Ahead	Inf	45.6 %	1817	1817
				Arm 6 Right	12.00	54.4 %		
4/1 (B Lane 1)	Infinite Saturation Flow						Inf	Inf
5/1 (C)	3.25	0.00	Y	Arm 2 Left	6.00	100.0 %	1552	1552
6/1 (C Lane 1)	Infinite Saturation Flow						Inf	Inf

Full Input Data And Results

Scenario 1: 'AM Peak Hour' (FG1: 'AM Peak Hour', Plan 1: 'Network Control Plan 1')

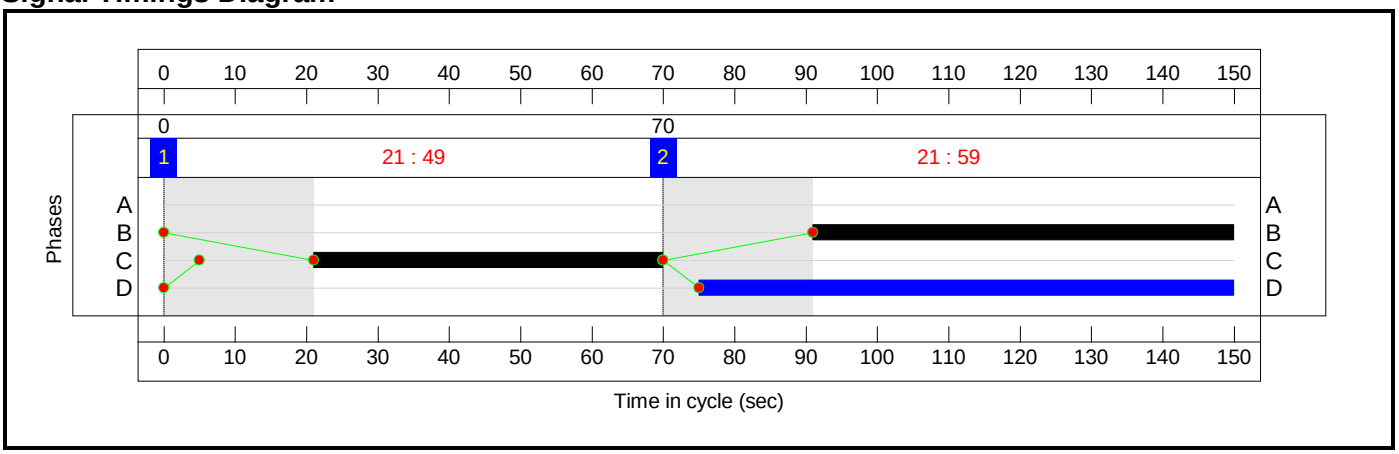
Stage Sequence Diagram



Stage Timings

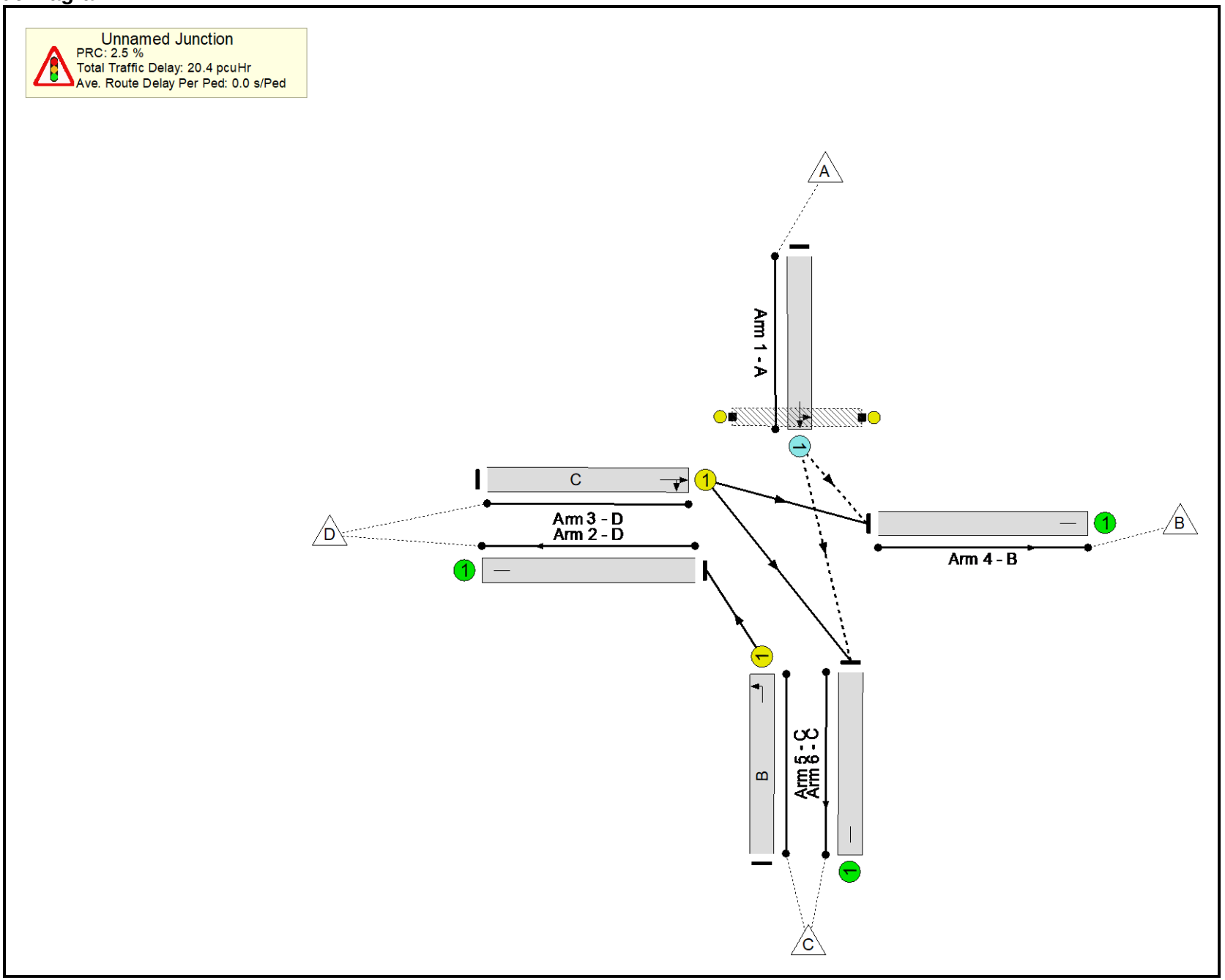
Stage	1	2
Duration	49	59
Change Point	0	70

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram



Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**87.8%**
Unnamed Junction	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**87.8%**
1/1	A Left Ahead	O	N/A	N/A	-		-	-	-	293	1924	1335	22.0%
2/1	D	U	N/A	N/A	-		-	-	-	545	Inf	Inf	0.0%
3/1	D Ahead Right	U	N/A	N/A	C		1	49	-	526	1809	603	87.2%
4/1	B	U	N/A	N/A	-		-	-	-	231	Inf	Inf	0.0%
5/1	C Left	U	N/A	N/A	B		1	59	-	545	1552	621	87.8%
6/1	C	U	N/A	N/A	-		-	-	-	588	Inf	Inf	0.0%
Ped Link: P1	Pedestrain Link A	-	N/A	-	D		1	75	-	0	-	0	0.0%

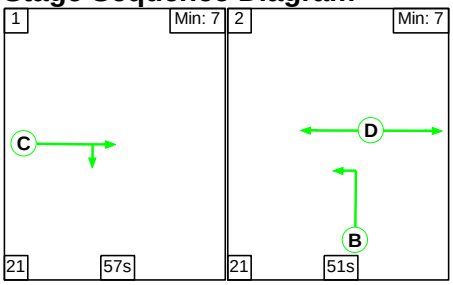
Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**52**	**241**	**0**	**13.8**	**6.6**	**0.0**	**20.4**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**52**	**241**	**0**	**13.8**	**6.6**	**0.0**	**20.4**	**-**	**-**	**-**	**-**
1/1	293	293	52	241	0	0.6	0.1	-	0.8	9.6	4.4	0.1	4.5
2/1	545	545	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
3/1	526	526	-	-	-	6.9	3.2	-	10.0	68.6	20.5	3.2	23.6
4/1	231	231	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	545	545	-	-	-	6.3	3.3	-	9.6	63.5	20.9	3.3	24.2
6/1	588	588	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
Ped Link: P1	0	0	-	-	-	-	-	-	-	-	-	-	-

C1 PRC for Signalled Lanes (%): 2.5 Total Delay for Signalled Lanes (pcuHr): 19.63 Cycle Time (s): 150
PRC Over All Lanes (%): 2.5 Total Delay Over All Lanes(pcuHr): 20.41

Full Input Data And Results

Scenario 2: 'PM Peak Hour' (FG2: 'Peak Flow PM', Plan 1: 'Network Control Plan 1')

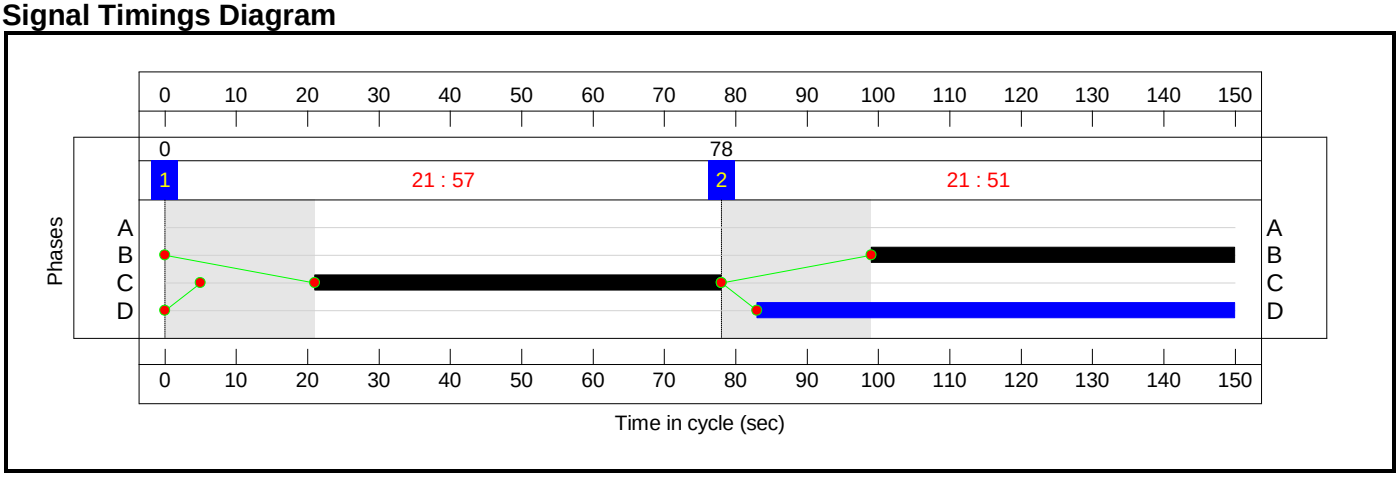
Stage Sequence Diagram



Stage Timings

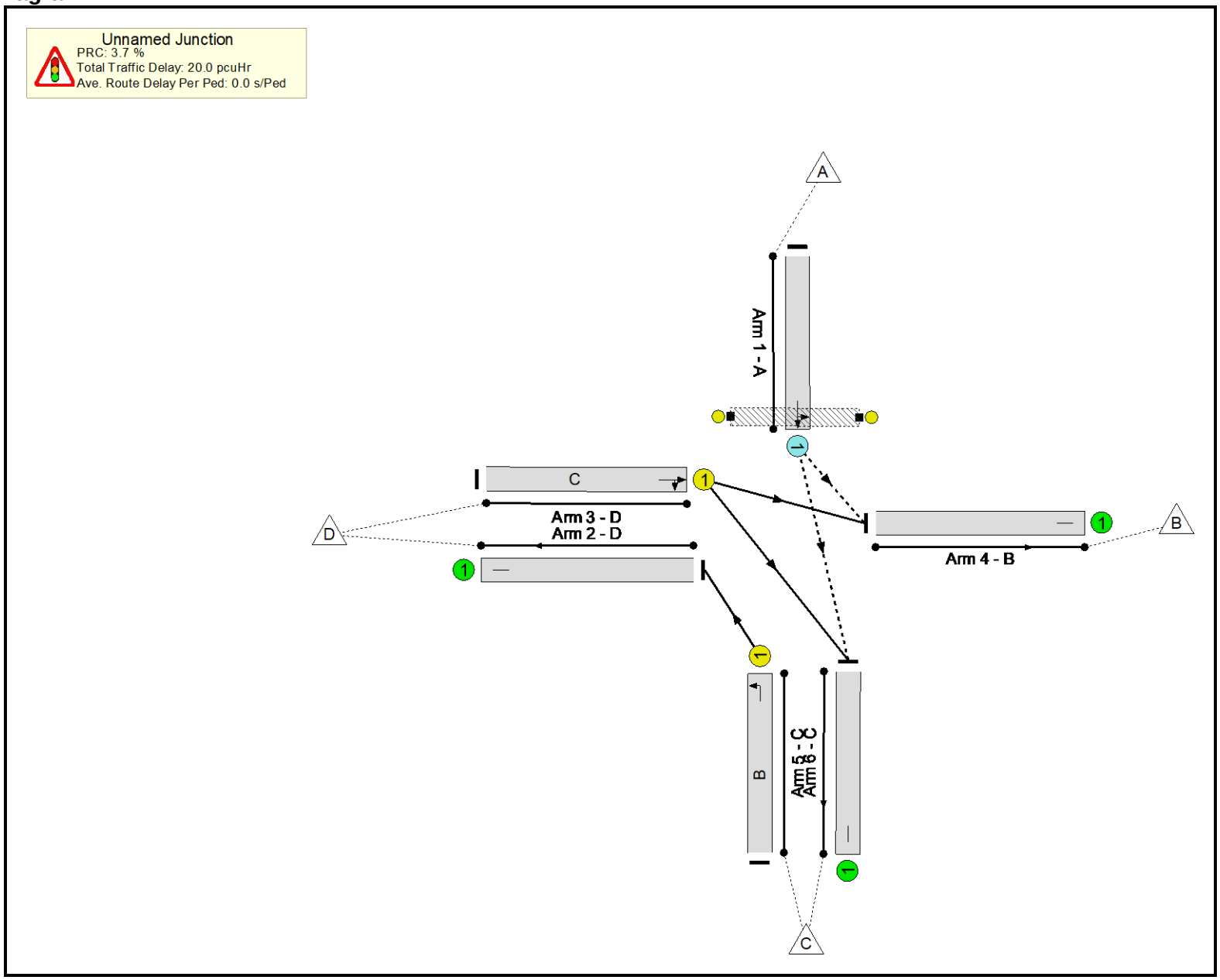
Stage	1	2
Duration	57	51
Change Point	0	78

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**86.8%**
Unnamed Junction	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**86.8%**
1/1	A Left Ahead	O	N/A	N/A	-		-	-	-	273	1895	1223	22.3%
2/1	D	U	N/A	N/A	-		-	-	-	467	Inf	Inf	0.0%
3/1	D Ahead Right	U	N/A	N/A	C		1	57	-	607	1817	703	86.4%
4/1	B	U	N/A	N/A	-		-	-	-	303	Inf	Inf	0.0%
5/1	C Left	U	N/A	N/A	B		1	51	-	467	1552	538	86.8%
6/1	C	U	N/A	N/A	-		-	-	-	577	Inf	Inf	0.0%
Ped Link: P1	Pedestrain Link A	-	N/A	-	D		1	67	-	0	-	0	0.0%

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**61**	**212**	**0**	**13.9**	**6.2**	**0.0**	**20.0**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**61**	**212**	**0**	**13.9**	**6.2**	**0.0**	**20.0**	**-**	**-**	**-**	**-**
1/1	273	273	61	212	0	0.8	0.1	-	0.9	12.1	4.7	0.1	4.8
2/1	467	467	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
3/1	607	607	-	-	-	7.1	3.0	-	10.1	60.1	23.3	3.0	26.3
4/1	303	303	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	467	467	-	-	-	5.9	3.0	-	9.0	69.1	18.2	3.0	21.2
6/1	577	577	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
Ped Link: P1	0	0	-	-	-	-	-	-	-	-	-	-	-

C1 PRC for Signalled Lanes (%): 3.7 Total Delay for Signalled Lanes (pcuHr): 19.10 Cycle Time (s): 150
PRC Over All Lanes (%): 3.7 Total Delay Over All Lanes(pcuHr): 20.02

APPENDIX C.5

Origin Destination Matrix – Calculations

19.145 - O'Hanrahan's Bridge, New Ross

Address	Junction Type	Site No	Date To	Time From	Time To
R700 North Quay / R700 Quay Street / R723 / Bridge Street	T-Junction	8	04/03/2020	08:00:00	9:00:00

A	North Quay
B	Quay Street
C	The Quay
D	O'Hanrahan Bridge

Vehicle	Total Vehicle	PCU Conversion Values	PCU Values
Car	6918	1	6918
LGV	1137	1	1137
OGV1	197	1.5	295.5
OGV2	243	2.3	558.9
PSV	67	1.5	100.5
M/C	13	0.4	5.2
P/C	7	0.4	2.8

Baseline

(AM) All Vehicles Traffic Count Matrice

Counts	A	B	C	D
A		10	115	168
B	0		0	0
C	0	~~2.5~~		377
D	0	221	304.8	

CTMP

(AM) All Vehicles Traffic Count Matrice

Counts	A	B	C	D
A		10	283	0
B	0		0	0
C	0	0		545
D	0	221	304.8	

No right turns from north Quay Permtted - flow has been redistributed to make through movement and return up from The Quay.

19.145 - O'Hanrahan's Bridge, New Ross

Address	Junction Type	Site No	Date To	Time From	Time To
R700 North Quay / R700 Quay Street / R723 / Bridge Street	T-Junction	8	04/03/2020	08:00:00	9:00:00

A	North Quay
B	Quay Street
C	The Quay
D	O'Hanrahan Bridge

Vehicle	Total Vehicle	PCU Conversion Values	PCU Values
Car	6918	1	6918
LGV	1137	1	1137
OGV1	197	1.5	295.5
OGV2	243	2.3	558.9
PSV	67	1.5	100.5
M/C	13	0.4	5.2
P/C	7	0.4	2.8

(AM) All Vehicles Traffic Count Matrice

Counts	A	B	C	D
A		26	144	103
B	0		0	0
C	0	15		364
D	0	277	330	

CTMP

(AM) All Vehicles Traffic Count Matrice

Counts	A	B	C	D
A		26	247	0
B	0		0	0
C	0	0		467
D	0	277	330.1	

No right turns from north Quay Permtted - flow has been redistributed to make through movement and return up from The Quay.

Appendix D
Benthic Survey Reports

APPENDIX D-1

Benthic Survey Report
Southeast Corner of O'Hanrahan Bridge

BENTHIC SURVEY

O' Hanrahan Bridge survey

New Ross

ASU Report M01/22-1

(January 2022)

Commissioned by: Roughan & O'Donovan Consulting Engineers
Carried out by: Aquatic Services Unit
January 2022

1. Introduction and Brief

Roughan & O'Donovan Consulting Engineers commissioned the Aquatic Services Unit to undertake a benthic biological survey of a small area of intertidal sediment located on the south-eastern corner of O' Hanrahan Bridge, New Ross, in order to identify the intertidal communities present.

2. Methodology

Fieldwork was carried out at low tide on the 14th of January 2022. A site walkover was undertaken to identify any hard benthos habitats and to obtain general overview of the site. Soft sediment sampling was undertaken at three locations, which were selected from the high water to low water level. These samples were taken using a 0.01m^2 core (11 cm diameter). Five replicate samples were collected at each location to a depth of 15cm. In addition, at each of the three sampling locations, a 0.25m^2 area was marked out and dug through to identify any large fauna which might not have appeared in the replicate core samples. A small sample of sediment was also collected from each site for granulometric and loss on ignition analyses. All sampling stations were positioned using a Garmin eTrex hand-held GPS. All stations are displayed on a map (Figure 1) with positions listed in Table I. Habitats were identified using the JNCC Marine Habitat Classification System (Connor *et al*., 2004).

Table I Location of sampling sites at New Ross. Sampling locations are presented in Irish Transverse Mercator (ITM)

Site	Easting	Northing
S_01	671750.7	627651.5
S_02	671745.1	627653.0
S_03	671734.9	627654.7

Figure 1 Map showing positions of sampling stations (Image courtesy of Google Earth, Image © 2021 Maxar Technologies).

Granulometric analysis was carried out on oven dried sediment samples from each station using the protocols described by Holme & McIntyre (1984). The sediment was passed through

a series of nested brass test sieves with the aid of a mechanical shaker. The brass sieves chosen were 4mm, 2mm, 1mm, 500µm, 250µm, 125µm and 63µm. The sediments were then divided into three fractions: % Gravel (>2mm), % Sand (<2.0mm >63µm) and % Silt-Clay (<63µm).

Organic matter was estimated using the Loss on Ignition (LOI) method. One gram of dried sediment was ashed at 450˚C for 6 hours and organic carbon was calculated as % sediment weight loss.

On returning to the laboratory all faunal samples were sieved through a 0.5 mm mesh sieve, preserved in buffered formalin and subsequently sorted by eye. All fauna were identified using standard keys to north-west European fauna.

3. Results

Site Overview

The study site is a near rectangular section of intertidal immediately downstream of the bridge at New Ross on the eastern side of the River Barrow estuary. The area in question abuts the eastern quays immediately upstream of the JFK Memorial. The area is bounded to the west by the river, to the north by a curved sheet-pile wall and to the east and south by near vertical stone quay walls (Figure 2A). The shore is accessed by a flight of steps on the southern boundary of the site (Figure 2B). The area in question covers an area of approximately 500m^2 at low spring tide, almost all covered in soft deep mud which gives way to a small triangle of gravel and rubble in the southeast corner (Figure 2C) and a narrow line of discarded bricks and rubble covered with a thin coating of mud along the southern boundary (Figure 2B). The mud is devoid of visible signs of infaunal activity, i.e. there are no visible burrows, no worm casts and no bivalve irrigation holes. There were no algae or other aquatic plants on the mud or gravel. The quay walls were covered in green algae (Figure 2D), the majority of which was *Vaucheria* sp., a genus of alga common in freshwater and estuarine sites. In addition, there were trace amounts of filamentous green algae and very small amounts of *Ulva intestinalis* also present. Higher up on the quay walls were scattered small amounts of the moss *Cinclidotus fontinaloides*, a species often found on rocks and other hard substrates above the water line but subject to frequent inundation. The only higher plant visible were very scarce amounts of stunted plants of an *Oenanthe* species, possibly *O. crocata* (Hemlock water-dropwort) a common species in freshwater sites. There were no rare or unusual plants noted.

Figure 2 (A) General overview of the site from behind the JFK Memorial. (B) Access steps at southern boundary, also showing mud-covered rubble. (C) Gravel, brick and other debris in south east corner of site. (D) View of algae-covered quay wall from river side. (E) View of the sediment surface along the low water edge of the mudflat. (F) View of the sediment surface along the mid shore level of the mudflat.

3.2.1 Soft Sediment Fauna

Overall faunal abundances were low in the area with only 3 taxa/groups encountered in the soft sediment replicate core samples (Table II) and no fauna recovered from the sediment dig through. All fauna identified during the present survey are typical of estuarine conditions and very common in Irish coastal waters.

Table II List of species recorded from soft sediment core samples. All values expressed as numbers per core (0.01m^2).

		Oligochaetae spp.	*Peringia ulvae*	*Corophium* sp.
1	A	139	1	-
	B	98	1	-
	C	236	-	-
	D	237	-	-
	E	232	-	-
2	A	30	-	-
	B	16	1	-
	C	29	-	1
	D	24	-	-
	E	49	1	-
3	A	24	-	1
	B	14	-	-
	C	10	-	-
	D	25	-	-
	E	20	1	-

3.2.2 Granulometry & Organic Carbon

As expected, results from the granulometric analysis confirmed the presence of very high mud levels (silt/clay) in the area (Table III & Figure 3), with a higher proportion of sand present at Station 3 located along the low shore level of the small tidal mud flat. The high levels of mud are reflected in the high loss on ignition values present in the area.

Table III Sediment analysis results for organic carbon and granulometry from O' Hanrahan Bridge, New Ross.

Station Number	Coarse %>2mm	Sand %<2mm>63µm	Silt-Clay %<63µm	LOI %	Substrate Type
S_01	0%	5.92%	94.08%	7.32%	Slightly Sandy Mud
S_02	0%	5.75%	94.25%	7.47%	Slightly Sandy Mud
S_03	0%	22.47%	77.53%	5.04%	Sandy Mud

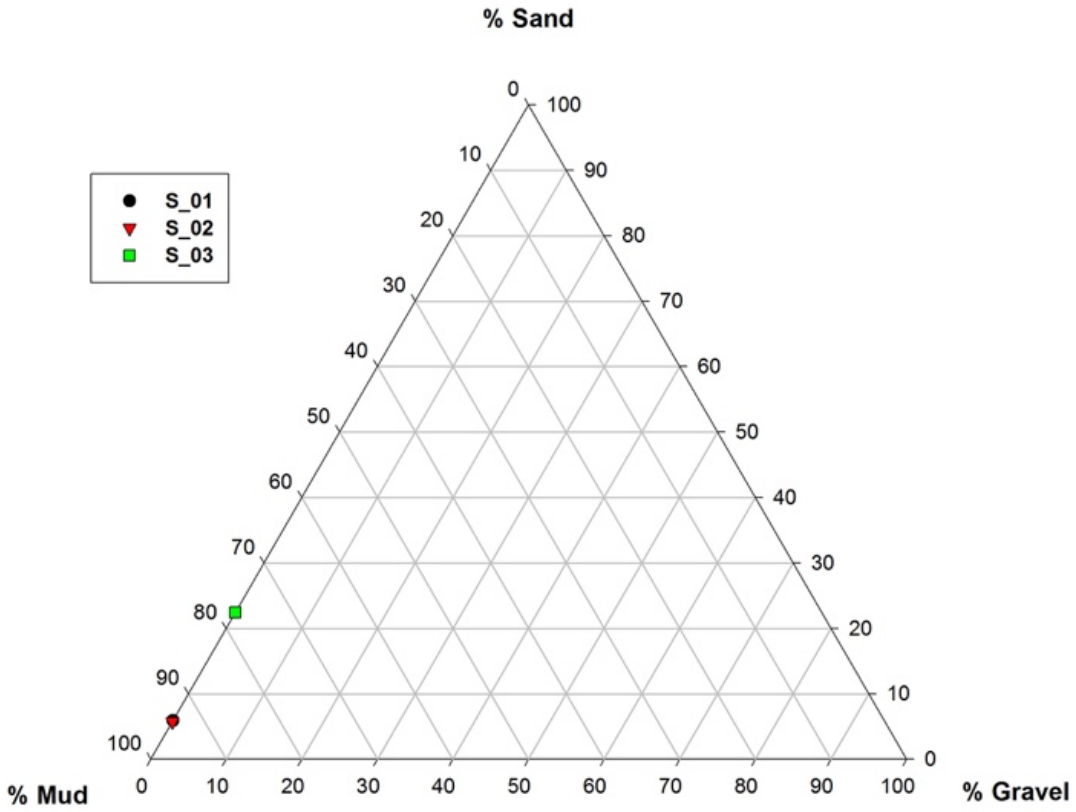


Figure 3 Ternary plot of granulometry results.

3.2.3 Habitat Assessment

The infaunal and granulometric results point to a single habitat type within the survey area. This has been identified as *Tubificoides benedii* and other oligochaetes in littoral mud [LS.LMu.UEst.Tben] (Connor *et al*., 2004). This habitat type has been described as extremely species-poor, consisting almost exclusively of oligochaetes. It is known to occur at the head of estuaries, in sheltered locations with no strong river flow and a strong freshwater influence, which is consistent with the conditions in the survey area at O' Hanrahans Bridge.

4. Conclusions

The habitats and taxa identified during the present survey are typical of upper estuarine systems, with no rare or protected species noted.

5. References

Connor, D.W., J.H. Allen, N. Golding, K.L. Howell, L.M. Lieberknecht, K.O. Northen AND J.B. Reker (2004) The Marine Habitat Classification for Britain and Ireland Version 04.05 ISBN 1 861 07561 8. In: JNCC (2015) The Marine Habitat Classification for Britain and Ireland Version 15.03. [July 2017]. Available from: https://mhc.jncc.gov.uk/

Holme, N.A. and McIntyre, A.D. (1984): Methods for the Study of Marine Benthos. Second Edition IBP Handbook 16.–399 pp. Oxford-London-Boston: Blackwell Scientific Publications

APPENDIX D-2

Benthic Survey Report
Southwest Corner of O'Hanrahan Bridge

BENTHIC SURVEY

O'Hanrahan Bridge survey

New Ross

ASU Report M10/22-1

(September 2022)

Commissioned by: Roughan & O'Donovan Consulting Engineers
Carried out by: Aquatic Services Unit
October 2022

1. Introduction and Brief

Roughan & O'Donovan Consulting Engineers, commissioned the Aquatic Services Unit (UCC) to undertake a benthic biological survey of a small area of intertidal sediment located on the south-western corner of O'Hanrahan Bridge, New Ross, in order to identify the intertidal communities present. An additional survey of the upper intertidal and supralittoral zones were undertaken to identify plant communities present in the area. The intertidal assessment was carried out by Derek Casey, MSc., Aquatic Services Unit, who has over 20 years professional experience in marine ecological assessments. The terrestrial survey was carried out by Mary O'Connor PhD. who has over 20 years professional experience as an ecologist/environmental scientist. She has worked for public and private sector clients and has several years' experience of ecological/environmental assessment and input into Environmental Impact Assessment and Appropriate Assessment Report.

2. Methodology

Soft sediment intertidal fieldwork was carried out at low tide on the 21st of September 2022. A site walkover was undertaken to obtain general overview of the site. Soft sediment sampling was undertaken at three locations, which were selected from the high water to low water level and were considered representative of the intertidal area in the vicinity of the proposed development. Five replicate 0.01m^2 cores (11cm diameter) were collected at each location to a depth of 15cm. In addition, at each of the three sampling locations, a 0.25m^2 area was marked out and dug through to identify any large fauna which might not have appeared in the replicate core samples. A small sample of sediment was also collected from each site for granulometric and loss on ignition analyses. All sampling stations were positioned using a Garmin eTrex hand-held GPS. The stations are displayed on a map (Figure 1) with positions listed in Table I. Habitats were identified using the JNCC Marine Habitat Classification System (Connor *et al*., 2004).

The terrestrial survey site visit was carried out on the 6th of September 2022. Habitats were classified according to (Fossitt 2000).

Table I Location of sampling sites at New Ross. Sampling locations are presented in Irish Transverse Mercator (ITM)

Site	Easting	Northing
S_01	671570	627716
S_02	671564	627715
S_03	671555	627720

Figure 1 Map showing positions of sampling stations (Image courtesy of Google Earth, Image © 2021 Maxar Technologies).

Granulometric analysis was carried out on oven dried sediment samples from each station using the protocols described by Holme & McIntyre (1984). The sediment was passed through a series of nested brass test sieves with the aid of a mechanical shaker. The brass sieves chosen were 4mm, 2mm, 1mm, 500µm, 250µm, 125µm and 63µm. The sediments were then divided into three fractions: % Gravel (>2mm), % Sand (<2.0mm >63µm) and % Silt-Clay (<63µm).

Organic matter was estimated using the Loss on Ignition (LOI) method. One gram of dried sediment was ashed at 450˚C for 6 hours and organic carbon was calculated as % sediment weight loss.

On returning to the laboratory all faunal samples were sieved through a 0.5 mm mesh sieve, preserved in buffered formalin and subsequently sorted by eye. All fauna were identified using standard keys to north-west European fauna.

3. Results

Site Overview

The study site is located along the western bank of the River Barrow, immediately downstream of O'Hanrahan Bridge. The site consists of a narrow band of very soft intertidal mud immediately adjacent to a reed bed and soft margins of grasslands. The sediment surface at the site was devoid of any visible fauna on the sediment surface i.e. no tracks or burrows were present on the sediment surface. Samples were collected in a transect from the low water extent to the highest tidal point of the soft sediment. A detailed description of the higher plants present at the site are presented in the botanical section of this report.

Figure 2 (A) View from bridge along the transect area between the reeds and River Barrow. (B) View along the soft-sediment intertidal bordering the reed bed along the western bank of the River Barrow. (C) Mudflats and reedbed next to broken ground typical of the supra-littoral margins at the site. (D) View of the small area of soft-sediment at the upper reaches of the mudflats bordering the reed beds. This is the location of S_03.

3.1 Botany

Reed Bed FS1 (Figure 3: Photos 1 & 2)

The River Barrow is tidal at New Ross and is considered to be at the upper estuarine extent of the Barrow. Fringing the muddy river channel of the Barrow River at Hanrahan's Bridge is typical reed bed vegetation which is common in upper estuarine environments on muddy substrates and where saline influence is more limited. *Phragmites* reed beds are an important component of emergent vegetation communities in estuarine systems. Here at the upper portion of the Estuary Common Reed (*Phragmites australis*) dominates over more halophytic plants which occur in more saline conditions such as Cord grasses (*Spartina* spp).

Common Reed (*P. australis*) is tall and a dominant competitor for light, so that dense stands of the common reed tend to be species poor in other plants but at the fringes of the reedbed trees (i.e . willows *Salix* spp) occur at the inland edge of the shore.

Fringing the reedbed towards the estuary side species such as Soft Stem Bulrush *Schoenoplectus* spp. (likely *tabermontani)* and Club Rush (*Bolboschoenus maritimus*) grow on the open mud and shoreward species such as some Reed Canary-grass (*Phalaris arundinacea*), Buck's horn plantain (*Plantago coronopus*) and willowherbs *(Epilobium* spp) also occur.

Links to Annex 1
Reedbed habitats are not protected as Annex 1 Habitats under the Natural Habitats Directive.

Willow Scrub WS1 (Figure 4: Photos 3 & 4)

At the upper extent of the Reed bed a small patch of White Willow (*Salix alba*) occurs; this is associated with some bramble (*Rubus fruticosus* agg.) on the landward side. The herbaceous layer consists of herbs, including nettle (*Urtica dioica*), Hogweed (*Heracleum sphondylium*), WillowHerbs eg. (*Epilobium hirsutum*) Hedge woundwort (*Stachys sylvatica*), Docks (*Rumex* spp) and rank grasses Couch Grass, False Oat Grass etc.

Links to Annex 1
This small area of willow scrub does not represent an Annex 1 Habitats under the Natural Habitats Directive.

Sea walls, piers and jetties CC1 (Figure 5: Photos 5 & 6)

Along the foreshore below the bridge there has been the import of protective rocks and an area of artificially made ground associated with the base of the bridge. Here vegetation has developed that is more typical of recolonising ground and is an eclectic mix of species. Species that indicate the coastal nature of the area include Sea Aster (*Aster tripolium*) and Common Mallow (*Malva sylvestris*). Also several species of disturbed ground occur including a variety of species of yellow asteraceae, Dandelions, Hawkbits, Sow thistles, docks (*Rumex* species), Brassicaceae, rank grasses Couch Grass, Cock's foot grass, False Oat Grass, Teasel, Willowherbs, Thistles, Plantains, Red Valerian, occasional woody saplings e.g. Ash.

Links to Annex 1
This small area of coastal built structure does not represent an Annex 1 Habitats under the Natural Habitat's directive.

Amenity Grassland GA2 (Figure 6: Photo 7)

A small area of amenity grassland (improved) occurs adjacent to the Bridge. This habitat is dominated by a variety of grasses including *Poa* species and with broadleaved herbs such as Daisy (*Bellis perennis*), Dandelion (*Taraxacum* spp.), clovers (*Trifolium* spp.) and plantains (*Plantago* spp.) are common.

Links to Annex 1
This small area of amenity grassland does not represent an Annex 1 Habitats under the Natural Habitat's directive.

Figure 3: Photo 1 and 2 Showing Reedbed and Fringing Club and Bulrushes on the Muddy Substrate at O'Hanrahan's Bridge.

Figure 4: Photo 3 and 4 shows a small area of Willow Scrub near O'Hanrahan's Bridge.

Figure 5: Photos 5 and 6 Shows vegetation on rock protection at O'Hanrahan's Bridge

Figure 6: Photo 7 Shows amenity grassland adjacent to O'Hanrahan's Bridge

3.2 Intertidal Soft Sediment

3.2.1 Soft Sediment Fauna

Overall faunal abundances in the area were high, dominated by oligochaetes with occasional high numbers of *Corophium* sp. and *Peringia ulvae*. However, diversity in the area is low, with only 3 taxa/groups encountered in the soft sediment replicate core samples (Table II) and no fauna recovered from the sediment dig through. All fauna identified during the present survey are typical of upper estuarine conditions and very common in Irish coastal waters.

		Oligochaetae spp.	*Peringia ulvae*	*Corophium* sp.
1	A	104	-	-
	B	250	-	10
	C	140	-	-
	D	210	-	-
	E	110	-	10
2	A	251	2	1
	B	280	-	4
	C	292	12	-
	D	388	24	-
	E	390	10	20
3	A	783	32	8
	B	704	12	12
	C	256	28	8
	D	654	22	6
	E	522	48	48

Table II List of species recorded from soft sediment core samples. All values expressed as numbers per core (0.01m^2).

3.2.2 Granulometry & Organic Carbon

As expected, results from the granulometric analysis confirmed the presence of very high mud levels (silt/clay) in the area (Table III & Figure 7). The high levels of mud are reflected in the relatively high loss on ignition values present in the area.

Station Number	Coarse %>2mm	Sand %<2mm>63µm	Silt-Clay %<63µm	LOI %	Substrate Type
S_01	0%	26.8%	73.2%	6.45%	Sandy Mud
S_02	0%	18.1%	81.9%	6.78%	Sandy Mud
S_03	0%	22.47%	77.53%	7.77%	Sandy Mud

Table III Sediment analysis results for organic carbon and granulometry from the south western corner of O'Hanrahan Bridge, New Ross.

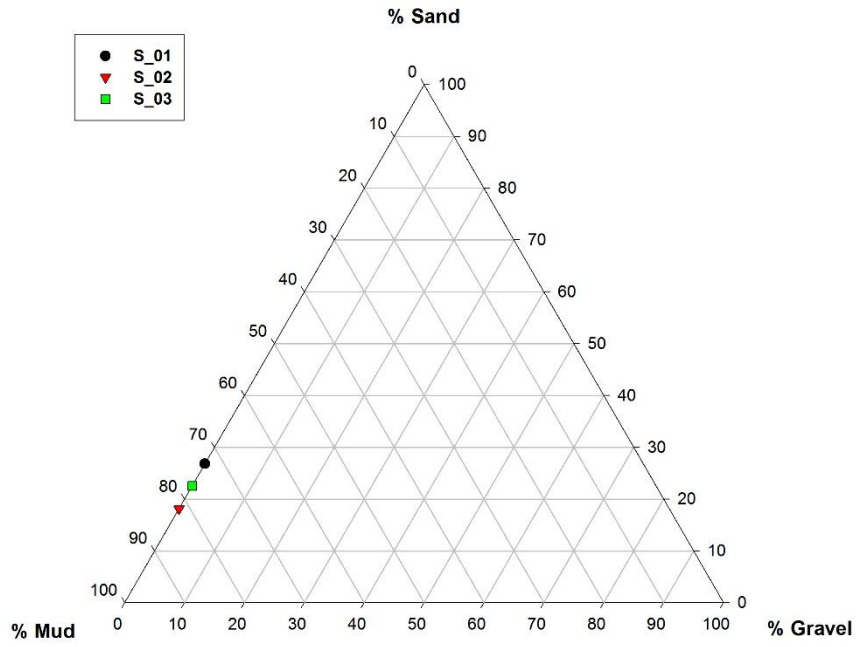


Figure 7 Ternary plot of granulometry results.

3.2.3 Soft Sediment Habitat Assessment

Results from the present survey are the same as those identified in a previous survey undertaken on the opposite bank of the River Barrow in January 2022. The infaunal and granulometric results point to a single habitat type within the survey area. This has been identified as *Tubificoides benedii* and other oligochaetes in littoral mud [LS.LMu.UEst.Tben] (Connor *et al*., 2004). This habitat type has been described as extremely species-poor, consisting almost exclusively of oligochaetes. This habitat is known to occur at the head of estuaries, in sheltered locations with no strong river flow and a strong freshwater influence, which is consistent with the conditions in the survey area. This is reflected in the plant species which have been identified in the upper intertidal and supra littoral, which are typical of a freshwater system, with a small number of low salinity, estuarine plants also present.

4. Conclusions

The habitats and taxa identified during the present survey are typical of upper estuarine systems, with no rare or protected species noted.

5. References

Connor, D.W., J.H. Allen, N. Golding, K.L. Howell, L.M. Lieberknecht, K.O. Northen AND J.B. Reker (2004) The Marine Habitat Classification for Britain and Ireland Version 04.05 ISBN 1 861 07561 8. In: JNCC (2015) The Marine Habitat Classification for Britain and Ireland Version 15.03. [July 2017]. Available from: https://mhc.jncc.gov.uk/

Fossitt J. 2000. A Guide to Habitats in Ireland. Heritage Council.

Holme, N.A. and McIntyre, A.D. (1984): Methods for the Study of Marine Benthos. Second Edition IBP Handbook 16.–399 pp. Oxford-London-Boston: Blackwell Scientific Publications.

Appendix E
Dust Management Plan

Appendix E

DUST MANAGEMENT PLAN

The objective of dust control at the site is to ensure that no significant nuisance occurs at nearby sensitive receptors. In order to develop a workable and transparent dust control strategy, the following management plan has been formulated by drawing on best practice guidance from Ireland, the UK (IAQM (2014), BRE (2003), The Scottish Office (1996), UK ODPM (2002)) and the USA (USEPA, 1997).

Site Management

The aim is to ensure good site management by avoiding dust becoming airborne at source. This will be done through good design and effective control strategies.

At the construction planning stage, the siting of activities and storage piles will take note of the location of sensitive receptors and prevailing wind directions in order to minimise the potential for significant dust nuisance. As the prevailing wind is predominantly south-westerly to south-easterly, locating construction compounds and storage piles downwind of sensitive receptors will minimise the potential for dust nuisance to occur at sensitive receptors.

Good site management will include the ability to respond to adverse weather conditions by either restricting operations on-site or quickly implementing effective control measures before the potential for nuisance occurs. When rainfall is greater than 0.2mm/day, dust generation is generally suppressed (IAQM, 2014; UK ODPM, 2002). The potential for significant dust generation is also reliant on threshold wind speeds of greater than 10 m/s (19.4 knots) (at 7m above ground) to release loose material from storage piles and other exposed materials (USEPA, 1986). Particular care should be taken during periods of high winds (gales) as these are periods where the potential for significant dust emissions are highest. The prevailing meteorological conditions in the vicinity of the site are favourable in general for the suppression of dust for a significant period of the year. Nevertheless, there will be infrequent periods were care will be needed to ensure that dust nuisance does not occur. The following measures shall be taken in order to avoid dust nuisance occurring under unfavourable meteorological conditions:

- The Principal Contractor or equivalent must monitor the contractors' performance to ensure that the proposed mitigation measures are implemented and that dust impacts and nuisance are minimised;
- During working hours, dust control methods will be monitored as appropriate, depending on the prevailing meteorological conditions;
- The name and contact details of a person to contact regarding air quality and dust issues shall be displayed on the site boundary, this notice board should also include head/regional office contact details;
- It is recommended that community engagement be undertaken before works commence on site explaining the nature and duration of the works to local residents and businesses;
- A complaints register will be kept on site detailing all telephone calls and letters of complaint received in connection with dust nuisance or air quality concerns, together with details of any remedial actions carried out;
- It is the responsibility of the contractor at all times to demonstrate full compliance with the dust control conditions herein;
- At all times, the procedures put in place will be strictly monitored and assessed.

The dust minimisation measures shall be reviewed at regular intervals during the works to ensure the effectiveness of the procedures in place and to maintain the goal of minimisation

of dust through the use of best practice and procedures. In the event of dust nuisance occurring outside the site boundary, site activities will be reviewed and satisfactory procedures implemented to rectify the problem. Specific dust control measures to be employed are described below.

Site Roads / Haulage Routes

Movement of construction trucks along site roads (particularly unpaved roads) can be a significant source of fugitive dust if control measures are not in place. The most effective means of suppressing dust emissions from unpaved roads is to apply speed restrictions. Studies show that these measures can have a control efficiency ranging from 25 to 80% (UK ODPM, 2002).

- A speed restriction of 20 km/hr will be applied as an effective control measure for dust for on-site vehicles using unpaved site roads;
- Access gates to the site shall be located at least 10m from sensitive receptors where possible;
- Bowsers or suitable watering equipment will be available during periods of dry weather throughout the construction period. Research has found that watering can reduce dust emissions by 50% (USEPA, 1997). Watering shall be conducted during sustained dry periods to ensure that unpaved areas are kept moist. The required application frequency will vary according to soil type, weather conditions and vehicular use;
- Any hard surface roads will be swept to remove mud and aggregate materials from their surface while any unsurfaced roads shall be restricted to essential site traffic only.

Land Clearing / Earth Moving

Land clearing / earth-moving works during periods of high winds and dry weather conditions can be a significant source of dust.

- During dry and windy periods, and when there is a likelihood of dust nuisance, watering shall be conducted to ensure moisture content of materials being moved is high enough to increase the stability of the soil and thus suppress dust;
- During periods of very high winds (gales), activities likely to generate significant dust emissions should be postponed until the gale has subsided.

Storage Piles

The location and moisture content of storage piles are important factors which determine their potential for dust emissions.

- Overburden material will be protected from exposure to wind by storing the material in sheltered regions of the site. Where possible storage piles should be located downwind of sensitive receptors;
- Regular watering will take place to ensure the moisture content is high enough to increase the stability of the soil and thus suppress dust. The regular watering of stockpiles has been found to have an 80% control efficiency (UK ODPM, 2002).
- Where feasible, hoarding will be erected around site boundaries to reduce visual impact. This will also have an added benefit of preventing larger particles from impacting on nearby sensitive receptors.

Site Traffic on Public Roads

Spillage and blow-off of debris, aggregates and fine material onto public roads should be reduced to a minimum by employing the following measures:

- Vehicles delivering or collecting material with potential for dust emissions shall be enclosed or covered with tarpaulin at all times to restrict the escape of dust;

- At the main site traffic exits, a wheel wash facility shall be installed if feasible. All trucks leaving the site must pass through the wheel wash. In addition, public roads outside the site shall be regularly inspected for cleanliness, as a minimum on a daily basis, and cleaned as necessary.

Summary of Dust Mitigation Measures

The pro-active control of fugitive dust will ensure that the prevention of significant emissions, rather than an inefficient attempt to control them once they have been released, will contribute towards the satisfactory performance of the contractor. The key features with respect to control of dust will be:

- The specification of a site policy on dust and the identification of the site management responsibilities for dust issues;
- The development of a documented system for managing site practices with regard to dust control;
- The development of a means by which the performance of the dust minimisation plan can be regularly monitored and assessed; and
- The specification of effective measures to deal with any complaints received.

Appendix F
Photomontages

Appendix F

O' Hanrahan Bridge Rehabilitation

LVIA Photomontages

This book contains imagery for the viewpoints chosen for the LVIA study

October 2022

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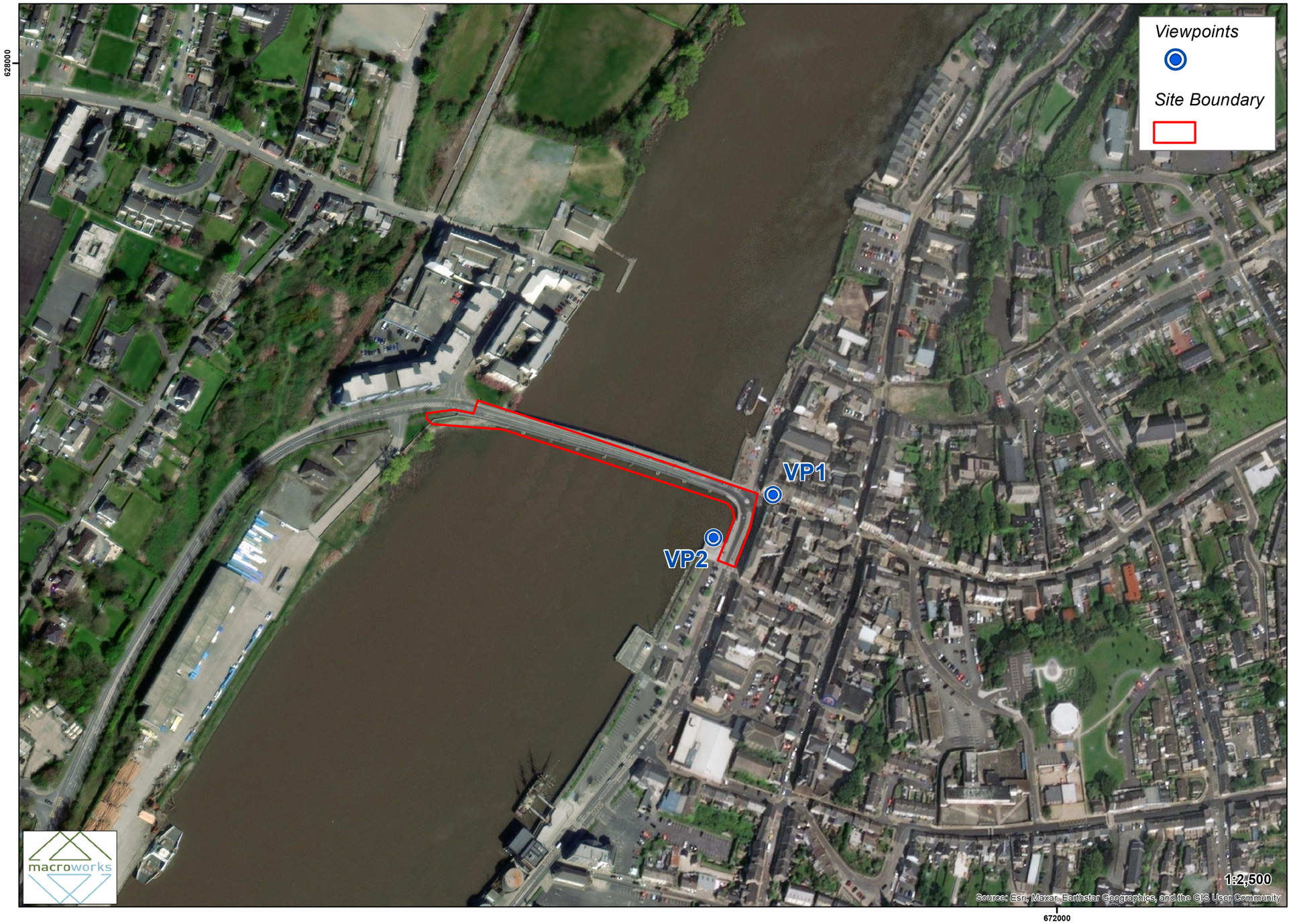
LVIA viewpoint locations selected for the O'Hanrahan Bridge project



Macro Works Technical Methodology for Verifiable Views

The verifiable views contained in this document have been prepared and presented following the guidance set by the British Landscape Institute 2011 – Advice Note 01/11. Viewpoints are selected and high quality photography in RAW format is captured using a digital SLR camera (Canon 1-D Mark II digital SLR – 50mm/Full Frame Sensor) with a fixed 50mm lens on a Monfrotto pano head and leveller.
Viewpoint locations are then spatially captured using a survey grade GPS unit (Survey point by Trimble Geoexplorer GeoXH 6000 Series System) to within 10cm of accuracy.
High resolution 360 degree panoramas are generated from the captured photography.

The scheme model is then placed using a Digital Terrain Model (created with a combination of LiDAR and OS Terrain Data) and real world reference points and is rendered in 3DS Max 2021 with identical image characteristics to that of the camera used for the baseline photography allowing the render and the photography to be merged with a high degree of accuracy.

Post-production is taken place in Adobe Photoshop. We work back and forth with the client to finalise each visualisation to ensure that each verifiable view is of a high standard.
Once each visualisation has been given final approval, we format the final views and accompanying information into a booklet in Adobe Illustrator.

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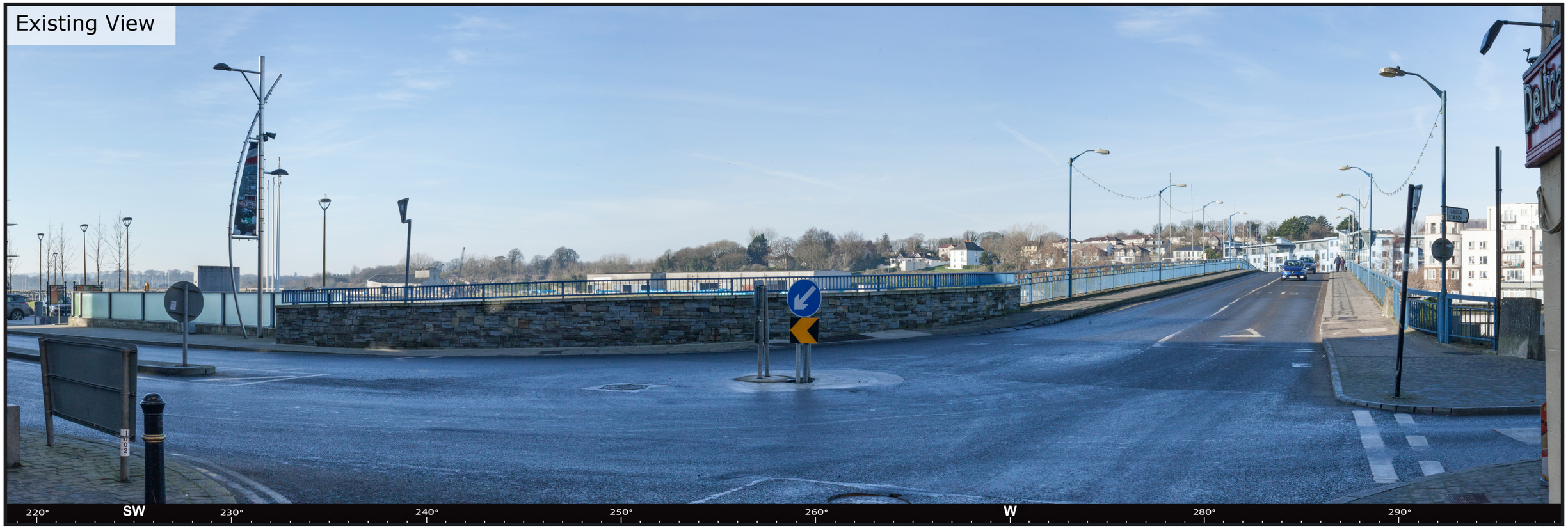
O' Hanrahan Bridge Rehabilitation

Imagery depicting the view towards the site (Existing and Montage)

VP1

Existing View



Montage View

These are 80° panoramic montages captured and presented in accordance with the guidance set by the British Landscape Institute 2011 - Advice Note 01/11.

To view these panoramas on a flat surface one must move from left to right along its length whilst maintaining a perpendicular viewing direction and the specified correct viewing distance of 30cm. To see this entire panoramic scene in reality would necessitate turning one's head through 40°.

Easting (ITM):	671784	Lens:	50mm / Full Frame Sensor	Date:	26/01/2022
Northing (ITM):	627678	Camera:	Canon 1-D Mark II digital SLR	Time:	11:23
Direction of View	102° W of Grid North	Camera Height:	1.7m Above Ground Level		
Angle of View:	80°				

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O' Hanrahan Bridge Rehabilitation

Imagery depicting the view towards the site (Existing and Montage)

VP2

Existing View

Montage View

These are 120° panoramic montages captured and presented in accordance with the guidance set by the British Landscape Institute 2011 - Advice Note 01/11.

To view these panoramas on a flat surface one must move from left to right along its length whilst maintaining a perpendicular viewing direction and the specified correct viewing distance of 30cm. To see this entire panoramic scene in reality would necessitate turning one's head through 80°.

Easting (ITM):	671739	Lens:	50mm / Full Frame Sensor	Date:	26/01/2022
Northing (ITM):	627639	Camera:	Canon 1-D Mark II digital SLR	Time:	11:27
Direction of View	2°W of Grid North	Camera Height:	1.7m Above Ground Level		
Angle of View:	120°				

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