Chapter 13
Water

Contents

13 Water

13.1 Introduction

This Chapter of the Environmental Impact Assessment Report (EIAR) assesses the impact of the BusConnects Galway: Cross-City Link (University Road to Dublin Road) (hereafter 'the Proposed Scheme'), on the surface water environment during the Construction and Operational Phases. The following attributes of each surface waterbody (receptor) will be considered: hydrology, hydromorphology and water quality.

During the Construction Phase, the potential surface water impacts associated with the development of the Proposed Scheme have been assessed (see Section 13.4.3). This includes impacts from construction runoff and watercourse disturbance due to utility diversions, road resurfacing and road realignments.

During the Operational Phase, the potential surface water impacts associated with changes in surface water runoff, increased impermeable surfaces and watercourse disturbance have been assessed (see Section 13.4.4).

The assessment has been carried out according to best practice and guidelines (see Section 13.2.2) relating to surface water assessment and has taken account of experience in assessment of similar large-scale infrastructural projects.

An assessment of the compliance of the Proposed Scheme with Water Framework Directive (WFD) requirements for the water bodies within the Study Area is provided in Section 13.3.6.

Flooding has been assessed within a dedicated Flood Risk Assessment (FRA) in Appendix 13.1 in Volume 4 of this EIAR. The results of the FRA have been summarised in Sections 13.3.9 of this chapter.

The aim of the Proposed Scheme when in operation is to provide enhanced walking, cycling and bus infrastructure in Galway City, which will enable and deliver efficient, safe, and integrated sustainable transport movement along the corridor. The objectives of the Proposed Scheme are described in Chapter 1 (Introduction) of this EIAR. The Proposed Scheme which is described in Chapter 4 (Proposed Project Description) of this EIAR has been designed to meet these objectives.

The design of the Proposed Scheme has evolved through the application of a comprehensive design iteration process with particular emphasis on minimising the potential for environmental impacts where practicable whilst ensuring the objectives of the Proposed Scheme are maintained. In addition, feedback received from the comprehensive consultation programme undertaken throughout the option selection and design development programme was taken into account where appropriate.

13.2 Methodology

This section presents the study area and appraisal method for the assessment of impacts on Water.

13.2.1 Study Area

The study area for this assessment has been set to extend to approximately 250m* beyond the footprint of the Proposed Scheme as any significant impacts are considered to occur at local waterbodies at the stated offset. It is deemed that the 250m distance from the study area will capture all those waterbodies that will have connection to the works. Therefore, any identified surface waterbodies within that area have been considered as receptors including those classified under 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 (hereafter referred to as the WFD), including riverine, transitional waterbodies, lake (water) bodies and coastal waterbodies, and non-WFD classified waterbodies. Existing and proposed artificial drainage features such as existing Sustainable Drainage Systems (SUDS) have not been considered as receptors within the assessment.

13.2.2 Relevant Guidelines, Policy, and Legislation

13.2.2.1 Water Framework Directive (WFD)

The WFD established a framework for the protection of both surface and groundwater bodies. The WFD provides a vehicle for establishing a system to improve and / or maintain the quality of waterbodies across the European Communities (EC). It requires all waterbodies (river, lakes, groundwater, transitional, coastal) to attain 'Good Status' (qualitative and quantitative) by 2027.

There are several WFD objectives in respect of which the quality of water is protected. The key objectives at European level are the general protection of aquatic ecology, specific protection of unique and valuable habitats, the protection of drinking water resources, and the protection of bathing water. The objective is to achieve this through a system of river basin management planning and extensive monitoring. 'Good Status' means both 'Good Ecological Status' and 'Good Chemical Status'.

The WFD was transposed into Irish law in December 2003 by S.I. No. 722/2003 – European Communities (Water Policy) Regulations 2003 (hereafter referred to as the WFD Regulations). The WFD Regulations outline the water protection and water management measures required to maintain high status of waters where it exists, prevent any deterioration in existing water status and achieve at least "Good" status for all waters.

* Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes, National Roads Authority (now known as TII), 2009.

The WFD Regulations, S.I. No. 272/2009 - European Communities Environmental Objectives (Surface Waters) Regulations 2009 (hereafter referred to as the Surface Waters Regulations) and S.I. No. 9/2010 - European Communities Environmental Objectives (Groundwater) Regulations 2010 (hereafter referred to as the Groundwater Regulations) govern the shape of the WFD characterisation, monitoring and status assessment programmes in terms of assigning responsibilities for the monitoring of different water categories, determining the quality elements and undertaking the characterisation and classification assessments.

The WFD Regulations (2003) require the assessment of permanent impacts of a scheme / project on WFD waterbodies, (rivers, lakes, estuaries, coastal waters, and groundwater). Typically, the permanent impacts include all operational impacts, but can also include impacts from construction depending on the programme (i.e., length and / or nature of the works, etc.) of the Proposed Scheme as some could be considered permanent if they cannot be mitigated. An assessment of the compliance of the Proposed Scheme with WFD requirements is provided in Section 13.3.6 and a summary of the conclusions of the WFD assessment is provided in Section 13.3.10. In the absence of WFD assessment guidance in Ireland, the assessment has been carried out using the UK Environment Agency's "Water Framework Directive assessment: Estuarine and Coastal waters" 2016 (updated 2017) (Environment Agency 2016). No specific guidance exists for freshwater bodies; however, this guidance was used as the basis of the UK's Planning Inspectorate (PINS) Advisory Note 18 "Water Framework Directive" June 2017 (PINS 2017) in which it sets out the stages of an assessment. On this basis it was considered appropriate to use for the assessment of the Proposed Scheme.

13.2.2.2 River Basin Management Plans

River Basin Management Plans (RBMP) provide the mechanism for ensuring an integrated approach to the protection, improvement and sustainable management of the water environment and are published every six years.

The second cycle RBMP 2018 - 2021 was published by the Department of Housing, Planning and Local Government (DHPLG) in April 2018 and covers the entire country (DHPLG 2018). For the second cycle, the original (2009) Eastern, South-Eastern, South-Western, Western and Shannon River Basin Districts were merged to form one national River Basin District (RBD) which covers the whole of Ireland. For those waterbodies 'At Risk' of failing to meet the objectives of WFD, the RBMP 2018 - 2021 identified the most significant pressures impacting them as follows: agriculture (53%), hydromorphology (24%), urban wastewater (20%), forestry (16%), domestic wastewater (11%), urban runoff (9%), peat (8%), extractive industry (7%) and mines and quarries (6%).

The draft third cycle RMBP (2022-2027) was launched for public consultation in September 2021, with a closing date of 31 March 2022. The final plan of the third cycle RBMP is due for publication 2022. It has set out clear strategies to protect all water bodies that are at "good or better" status and to improve on those classified as "below good" status by 2027 (DHPLG, 2022).

13.2.2.3 Other Relevant Legislation

Table 13.1 details of other legislation and policy relevant to this assessment and which informed the preparation of this Chapter where required.

Table 13.1: Other Relevant Legislation

Legislation Level	Title
European Legislation	Council Directive 91/271/EEC of 21 May 1991 concerning urban waste-water treatment; Council Directive 98/83/EC of 3 November 1998 on the quality of water intended for human consumption; Directive 2007/60/EC of the European Parliament and of the Council of 23 October 2007 on the assessment and management of flood risks; and Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014, amending Directive 2011/92/EU of the European Parliament and the Council of 13 December 2011 on the assessment of the impacts of certain public and private projects on the environment (hereafter referred to as the Environmental Impact Assessment (EIA) Directive).
Primary Legislation	Number 1 of 1977 - The Local Government (Water Pollution) Act; Number 21 of 1990 - Local Government (Water Pollution) (Amendment) Act, 1990; and S.I. No. 92/2020 - Planning and Development Act 2000 (Exempted Development) (No. 2) Regulations 2020.
Secondary Legislation	S.I. No. 108/1978 - Local Government (Water Pollution) Regulations, 1978; S.I. No. 81/1988 - European Communities (Quality of Water Intended for Human Consumption) Regulations 1988; S.I. No. 293/1988 - European Communities (Quality of Salmonid Waters) Regulations, 1988; S.I. No. 722/2003 - European Communities (Water Policy) Regulations 2003, as amended; S.I. No. 268/2006 - European Communities (Quality of Shellfish Waters) Regulations, 2006; S.I. No. 278/2007 - European Communities (Drinking Water) (No. 2) Regulations 2007; S.I. No. 272/2009 - European Communities Environmental Objectives (Surface Waters) Regulations, 2009;

Legislation Level	Title
	S.I. No. 9/2010 - European Communities Environmental Objectives (Groundwater) Regulations, 2010; S.I. No. 122/2010 - European Communities (Assessment and Management of Flood Risks) Regulations, 2010; S.I. No. 351/2011 - Bathing Water Quality (Amendment) Regulations, 2011; S.I. No. 122/2014 - European Union (Drinking Water) Regulations 2014; S.I. No. 350/2014 - European Union (Water Policy) Regulations 2014; S.I. No. 495/2015 - European Communities (Assessment and Management of Flood Risks) (Amendment) Regulations 2015; and S.I. No. 296/2018 - European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018.

13.2.2.4 Guidelines

The assessment has been undertaken in accordance with the Guidelines on the information to be contained in Environmental Impact Assessment Reports (hereafter referred to as the EPA Guidelines) (EPA 2022). The following additional guidance detailed in Table 13.2 has also been consulted during the preparation of this Chapter, where relevant. These additional guidance documents are derived from the WFD and aim at satisfying the requirements relevant to the development proposal.

Table 13.2: Relevant Guidelines

EIA Topic	Guidance
General	Transport Infrastructure Ireland (TII) Road Drainage and the Water Environment Guidance Document (TII 2015)
Water	National Road Authority (NRA) Guidelines for the Crossing of Watercourses During the Construction of National Road Schemes (NRA 2005) *; NRA Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (hereafter referred to as the TII Assessment Guidelines) (NRA 2009) *; and The Department of the Environment, Heritage, and Local Government (DEHLG) and the Office of Public Works (OPW) Planning System and Flood Risk Management Guidelines for Planning Authorities (hereafter referred to as the FRM Guidelines) (DEHLG and OPW 2009).

EIA Topic	Guidance
*The NRA merged with the Railway Procurement Agency and was effectively dissolved on 1 August 2015. The merger of the two agencies is called Transport Infrastructure Ireland (TII). As a result, all previous NRA documents are now referred to as TII documents.	

13.2.3 Data Collection and Collation

Information presented in this section on the baseline environment including hydrology, hydromorphology and water quality of the receptors within the study area has been collected and collated by undertaking both a desk study and field surveys. Table 13.3 presents information on data sources used to undertake the desk study.

13.2.3.1 Data Sources used to Undertake Desk Study

Table 13.3: Source of Information

Guidance	Description
General	Ordnance Survey of Ireland (OSI) - current and historic mapping; and Aerial photography (i.e., Google Earth).
Surface Water Quality and Hydromorphology	WFD Ireland Database, EPA - water quality monitoring database and reports. EPA Water Environment Maps (EPA 2020a), EPA Environmental Data Maps, National Parks and Wildlife Service (NPWS) - designated sites, and Inland Fisheries Ireland (IFI) - fishery resources.
Hydrology	Catchment Summaries, RBMP 2018-2021, and EPA - flow and water level measurements.
Water / Flood Risk	OPW National Flood Information Portal (OPW 2020).

13.2.3.2 Field Surveys

Field walkover assessments were carried out on November 18th, 2021. All watercourse crossings within the study area were visited to inform the assessment of baseline conditions and pathways to impacts of the Proposed Scheme.

Water quality sampling data was obtained from the EPA's water quality monitoring programme. Specifically, all culvert and bridge crossing locations and fluvial flood inundation extents were visited. Observations were made from bridges and from the top of riverbanks. The following observations were recorded at each survey location:

- Flow conditions (recording observations such as homogenous flow, low flow, or high flow);
- Riverbed (recording observations such as the sediment type and whether there was any deposition);
- Water quality (recording any potential sources of pollution as well as visual indicators of poor quality (e.g., presence of sewage fungus, litter, or foam lines);
- Bank stability (recording any instances of erosion and aggradation);
- Natural and manmade features of the river (including modifications, examples of structures could include culverts, weirs, or bridges);
- Runoff pathway and runoff risk (recording the pathway for any surface runoff to the watercourse and the likelihood of surface runoff to the river;
- Riparian vegetation (recording the surrounding vegetation); and
- Outfalls and discharges (recording any outfalls and discharges and whether these were active at the time of the survey).

Information gathered during the field surveys is summarised in Section 13.3.1.

13.2.4 Appraisal Method for the Assessment of Impacts

13.2.4.1 General Approach

The following method for the assessment of impacts has been adapted from the TII Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (TII 2015), specifically Section 5.6. The assessment also took account of the guidance set out in the EPA Guidelines.

The surface water environment is intrinsically linked to flood risk, ecological receptors, and groundwater, considered in the FRA Report (Appendix 13.1 in Volume 4 of this EIAR), Chapter 12 (Biodiversity) and Chapter 14 (Land, Soils, Geology & Hydrogeology) of this EIAR respectively.

Commercial and recreational use of the water environment is not included in the scope of this Chapter, as commercial and recreational interests are considered and assessed in Chapter 18 (Material Assets) and Chapter 10 (Population) of this EIAR.

The TII Guidelines (NRA 2009) outline how impact type, magnitude, and duration should be considered relative to the importance of the hydrological receptor and its sensitivity to change to determine significance of the impacts.

The overall impact on surface water receptors (i.e., rivers, canals, transitional waterbodies, coastal waterbodies, and lakes) because of the Proposed Scheme will be determined based on two parameters:

- The sensitivity of the waterbody attributes (hydrology, water quality and geomorphology) to change; and
- The magnitude of the impacts on waterbody attributes.

13.2.4.2 Sensitivity of Receptors

The sensitivity of surface water attributes to changes because of the Proposed Scheme are determined by a set of criteria including their relative importance or 'value' (e.g., whether features are of national, regional, or local value). Table 13.4 outlines the criteria for estimating the sensitivity of receptors and their attributes.

Table 13.4: Sensitivity of Receptor

Sensitivity	Criteria	Typical Example
Extremely High	Receptor (or receptor attribute) has a very high quality or value on an international scale	Any WFD waterbody which is protected by European Union (EU) legislation (e.g., Designated European Sites (Special Areas of Conservation (SAC) and Special Protection Areas (SPA)) or 'Salmonid Waters', and A waterbody that appears to be in natural equilibrium and exhibits a natural range of morphological features (such as pools and riffles). There is a diverse range of fluvial processes present, free from any modification or anthropogenic influence.
Very High	Receptor (or receptor attribute) has a high quality or value on an international scale or very high quality or value at a national scale	Any WFD waterbody (specific EPA segment) which has a direct hydrological connection of <2km to European Sites or protected ecosystems of international status (SAC / SPA or Salmonid Waters), WFD waterbody ecosystem protected by national legislation (Natural Heritage Area (NHA) status), A waterbody that appears to be largely in natural equilibrium and exhibits a diverse range of morphological features (such as pools and riffles), There is a diverse range of fluvial processes present, with very limited modifications; and Nutrient Sensitive Areas.
High	Receptor (or receptor attribute) has a moderate value at an international scale	A WFD waterbody with High or Good WFD Status, A Moderate WFD Status (2013 - 2018) waterbody with some hydrological connection (<2km) to European Sites

Sensitivity	Criteria	Typical Example
	or high quality or value on a national scale	or protected ecosystems of international status (SAC / SPA or Salmonid Waters) further downstream, WFD waterbody which has a direct hydrological connection to sites/ecosystems protected by national legislation (NHA status), A waterbody that appears to be in some natural equilibrium and exhibits some morphological features (such as pools and riffles). There is a diverse range of fluvial processes present, with very limited signs of modification or other anthropogenic influences, and Direct hydrological connectivity to Nutrient Sensitive Areas.
Medium	Receptor (or receptor attribute) has some limited value at a national scale	WFD waterbody with Moderate WFD Status (2013 - 2018), WFD waterbody with limited (>2km <5km) hydrological importance for sensitive or protected ecosystems (much further downstream), A waterbody showing signs of modification or culverting, recovering to a natural equilibrium, and exhibiting a limited range of morphological features (such as pools and riffles). The watercourse is one with a limited range of fluvial processes and is affected by modification or other anthropogenic influences, Evidence of historical channel change through artificial channel straightening and re-profiling; and Some hydrological connection downstream Nutrient Sensitive Areas.
Low	Receptor (or receptor attribute) has a low quality or value on a local scale	Waterbody with Bad to Poor WFD Status (2013 - 2018), A WFD waterbody with >5km (or no) hydrological connection to European Sites or national designated sites, Or A non-WFD water feature with minimal hydrological importance to sensitive or protected ecosystems; and / or economic and social uses, A highly modified watercourse that has been changed by channel modification, culverting, or other anthropogenic pressures. The watercourse exhibits no morphological diversity and has a uniform channel, showing no evidence of active fluvial processes and not likely to be

Sensitivity	Criteria	Typical Example
		affected by modification. Highly likely to be affected by anthropogenic factors. Heavily engineered or artificially modified and could dry up during summer months; and Many existing pressures which are adversely affecting biodiversity.

13.2.4.3 Magnitude of Impact

The scale or magnitude of potential impacts (both beneficial and adverse) depends on both the degree and extent to which the Proposed Scheme may impact the surface water receptors during the Construction and Operational Phases.

Factors that have been considered to determine the magnitude of potential impacts include the following (EPA 2022):

- Nature of the impacts;
- Intensity and complexity of the impacts;
- Expected onset, duration, frequency, and reversibility of the impacts;
- Cumulation of the impacts with other existing and / or approved projects impacts; and
- Possibility of effectively reducing the impacts.

The criteria for assessing the magnitude of impact are presented in Table 13.5.

Table 13.5: Criteria for Assessing Magnitude of Impact[†]

Magnitude of Impact	Criteria
Large Adverse	Results in loss of receptor and / or quality and integrity of receptor.
Moderate Adverse	Results in impact on integrity of receptor or loss of part of receptor.
Small Adverse	Results in minor impact on integrity of receptor or loss of small part of receptor.
Negligible	Results in an impact on receptor but of insufficient magnitude to affect either use or integrity.

[†] Box 5.2 - Guidelines and Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (NRA 2009).

Magnitude of Impact	Criteria
Small Beneficial	Results in minor improvement of receptor quality.
Moderate Beneficial	Results in moderate improvement of receptor quality.
Large Beneficial	Results in major improvement of receptor quality.

13.2.4.4 Significance of Impact

The significance of an impact is determined by combining the sensitivity of the receptor with the potential magnitude of impact, as listed in Table 13.6.

Table 13.6: Categories of Environmental Impacts (EPA 2022)

Sensitivity	Magnitude of Impact			
	Negligible	Small	Moderate	Large
Extremely High	Imperceptible	Significant	Profound	Profound
Very High	Imperceptible	Significant / Moderate	Profound / Significant	Profound
High	Imperceptible	Moderate / Slight	Significant / Moderate	Profound / Significant
Medium	Imperceptible	Slight	Moderate	Significant
Low	Imperceptible	Imperceptible	Slight	Slight / Moderate

Description of the categories are explained in the EPA (2022) guidance and are given in Table 13.7.

Table 13.7: Description of Impacts (EPA 2022)

Impact Categories	Description
Profound adverse	Where the Proposed Scheme will potentially result in degradation of the water environment because of profoundly adverse impacts on at least one water attribute. For example:

Impact Categories	Description
	• Deterioration of overall status in a High or Good WFD status Class waterbody; • Long-term deterioration of an EU Designated Salmonid fishery; • Loss or extensive change to a site / habitat protected under EU or Irish legislation: SAC, SPA, Ramsar site, Water Protection Zone, Salmonid Water; and • High risk of pollution from spillages when discharging into a Good or High-status Class under the WFD. Where the Proposed Scheme will potentially result in an increased flood risk. For example: • Significant increase in impermeable areas; • Development within Flood Zones and / or increased runoff without Sustainable Drainage Systems (SUDS), and • Where the Proposed Scheme will potentially result in adverse impacts on receptor Hydromorphology including changes in drainage regime.
Significant adverse	Where the Proposed Scheme will potentially result in the degradation of the water environment because of significant adverse impacts on at least one attribute. For example: • Potential contribution towards the deterioration of a WFD quality element; • Potential failure of any Environmental Quality Standard (EQS) in a Moderate or Poor WFD status waterbody; • Loss or damage to channel morphology that may contribute to a reduction in waterbody WFD hydromorphology classification; • Potential short-term failure of any EQS in a High or Good WFD status waterbody; • Moderate / Low risk of pollution from spillages in a Good WFD status waterbody; • Moderate / High risk in a Moderate or Poor WFD status waterbody; • Partial loss or change to a fishery; and • Impact on the integrity of the existing flora and fauna.
Moderate adverse	Where the Proposed Scheme will potentially result in a degradation of the water environment because of moderate adverse impacts on one or more attributes. For example:

Impact Categories	Description
	• Potential short-term failure of any EQS in a Moderate or Poor WFD status waterbody; • Loss or damage to channel morphology but insufficient to have any impact on waterbody WFD hydromorphology classification; • Moderate / Low risk of pollution from spillages in a Moderate or Poor WFD status waterbody; and • Temporary loss to, or loss in productivity of, a fishery.
Slight adverse	Where the impact of the Proposed Scheme is slight because it will result in no appreciable negative impact on the identified attribute. For example: • No risk identified of failing any EQS; • Minimal or no measurable change from baseline conditions in terms of sediment transport, channel morphology and natural fluvial processes; and • Risk of pollution from spillages is Low.
Imperceptible	Where the impact of the Proposed Scheme has no noticeable change to baseline conditions.
No Impact	Where there is no impact of the Proposed Scheme
Slight beneficial	Where the impact of the Proposed Scheme is slight because it will result in no appreciable positive impact on the identified attribute.
Moderate beneficial	All other situations where the Proposed Scheme provides an opportunity to enhance the water environment or provide an improved level of protection to an attribute. For example: Assessment show that EQS will Pass from previous Fail condition for existing discharges; and Reduction by 50% or more in existing pollution risk from spillages into High to Poor status waterbodies (when previous spillage risk was Moderate).
Significant beneficial	Where the Proposed Scheme provides an opportunity to enhance the water environment because it will result in a significant improvement for an attribute. For example: • Contribution toward the improvement of a WFD quality element status; • Assessment shows that EQS will Pass from previous Refer or Fail condition for existing discharges;

Impact Categories	Description
	• Reduction by 50% or more in likelihood of pollution to waterbodies from spillages from existing discharges through retrofitting of pollution control to outfalls into a High to Poor waterbody (existing risk is Moderate); and • Recharge of aquifer through provision of treated discharges to ground resulting in measurable improvements to a connected site/habitat of local nature conservation value i.e., Local Nature Reserve.
Profound beneficial	It is extremely unlikely that any new or improved development will fit into this category. However, proposals could have a large positive impact from a 'very' or 'highly' significant improvement to a water attribute(s), with insignificant adverse impacts on other water attributes. For example: • Improvement of one or more WFD quality elements contributing to or resulting in the improvement of the overall status of a WFD waterbodies overall status; • Removal of an existing polluting discharge through provision of pollution prevention measures, or any other measure, affecting a site / habitat protected under EU or Irish legislation (SAC, SPA, Ramsar site, NHA and Salmonid Water); and • Reduction by 50% or more in the existing likelihood of pollution arising from a spillage affecting a site / habitat protected under EU or Irish legislation (SAC, SPA, Ramsar site, NHA and Salmonid Water) where existing risk is Moderate.

13.2.4.5 Methodology for the Operational Phase of the Traffic Impact Assessment

To determine the potential impacts, because of increases or decreases in traffic, data from the Traffic Impact Assessment (Chapter 6 - Traffic & Transport) of this EIAR in relation to modal shifts as well as absolute numbers (Average Annual Daily Traffic (AADT)) have been reviewed and compared to existing drainage patterns .

To determine the potential for impacts because of displaced traffic onto the local road network, a 'decision tree' approach was adopted (see Diagram 13.1). The first question in the decision tree was whether the resultant AADT of displaced traffic is greater or less than 10,000.

In line with the TII Road Drainage and the Environment (TII 2015), it is considered that roads carrying less than 10,000 vehicles AADT are lightly trafficked and therefore pollutants occur in lower concentrations.

Most of the increase in AADT because of the Proposed Scheme is <1,000, but certain roads (lower section of College Road, Lough Atalia Road, and various other roads) have displaced traffic <5,000. A notable increase (i.e., <10,000) is on Newcastle Road.

However, the drainage system is connected to a separate system and outside of the study area. As such no significant impact on receptors are considered likely. These road sections can therefore be screened out of further assessment.

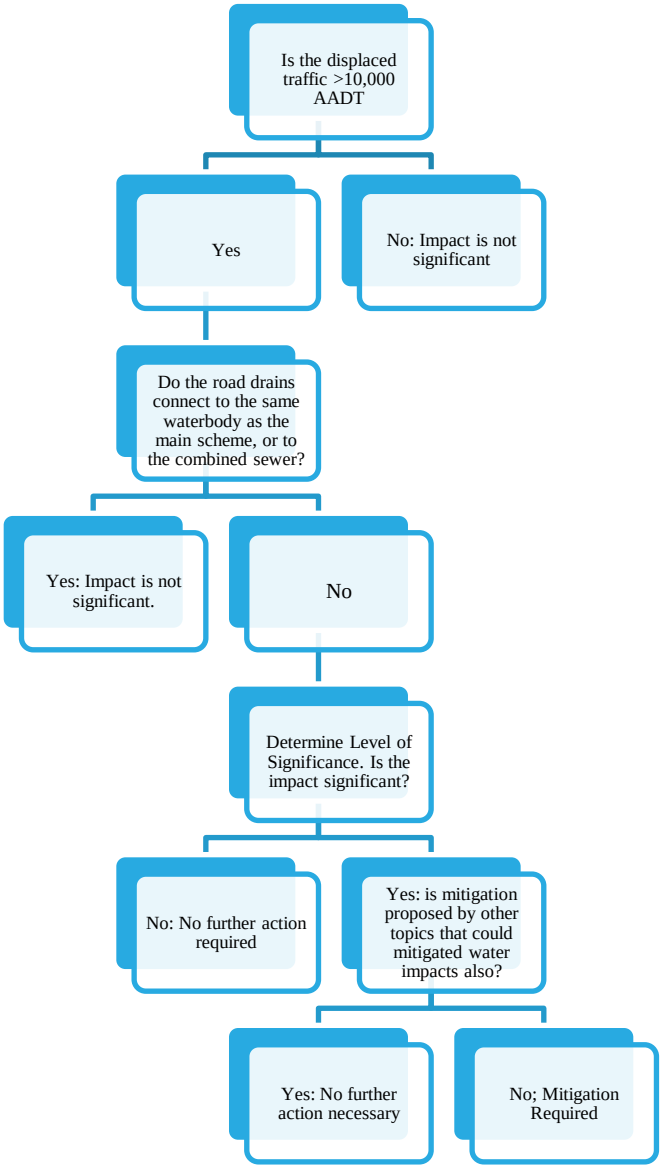

Diagram 13.1: Traffic Assessment Decision Tree

13.3 Baseline Environment

13.3.1 Field Survey

A walkover survey of sections of the Study Area was completed on November 18th, 2021. Specifically, manhole and drainage outfall locations were surveyed. Weather conditions were recorded as dry on the day of the survey. The results of the field survey are detailed in Table 13.8.

Table 13.8: Field Survey Notes

Survey Attribute	Survey Notes
Survey Locations	College Road, Lough Atalia Road, Dublin Road, Moneenageisha Road, University Road, Woodquay Street, etc.
Visual Flow	Drainage pipes generally dry or very small flow.
Condition of Manholes	Manholes inspected are generally in good condition. However, some require cleaning to avoid the risk of blockage.
Surface water ponding	None observed
Structural Deterioration	All in good condition.
Runoff Risk	None observed
Other	Some of the manholes are located on the main road pavement.

13.3.2 Existing Drainage System and Outfall Locations

A desk study of the existing road drainage system within the study area, using online mapping tools (Google Street view and OpenStreetMap) and historical sewer network information, was conducted to determine the existing road drainage and outfall locations provided currently.

The existing system within the Study Area is serviced by surface water and combined drainage network. Flows are typically collected in standard gully grates and routed via a gravity network to outfall points. There are no SUDS/attenuation measures on the existing system. A summary of the outfall drainage system types and outfall locations are listed in Table 13.9 and shown in Diagram 13.2.

Table 13.9: Outfall Drainage System types and Outfall Locations

Catchment	Existing Network Type	Existing Outfalls
University Road/Canal Road Upper	Combined Sewer	Mutton Island Wastewater Treatment Plant.
Gaol Road	Surface Water	Distillery River.
St Vincent's Avenue	Surface Water	Friar's River.
Dyke Road	Combined Sewer	River Corrib.
Williamsgate Street	Surface Water and Combined Sewer	Mutton Island Wastewater Treatment Plant.
Merchant's Road and Forthill Street/ Bóthar Bhreandain Uí Eithir	Surface Water	Mutton Island Wastewater Treatment Plant.
College Road (Fairgreen Road)	Surface Water	Lough Atalia
Loyola Park	Surface water	Lough Atalia
College Road (Loyola Park)	Surface Water	Lough Atalia
Lough Atalia Road	Surface Water	Mutton Island Wastewater Treatment Pantology via Atalia Pumping Station
College Road/Lough Atalia Road	Surface Water	Lough Atalia
College Road/Dublin Road	Surface Water	Lough Atalia
Sailin	Surface Water	Lough Atalia
Dublin Road	Surface Water	Lough Atalia

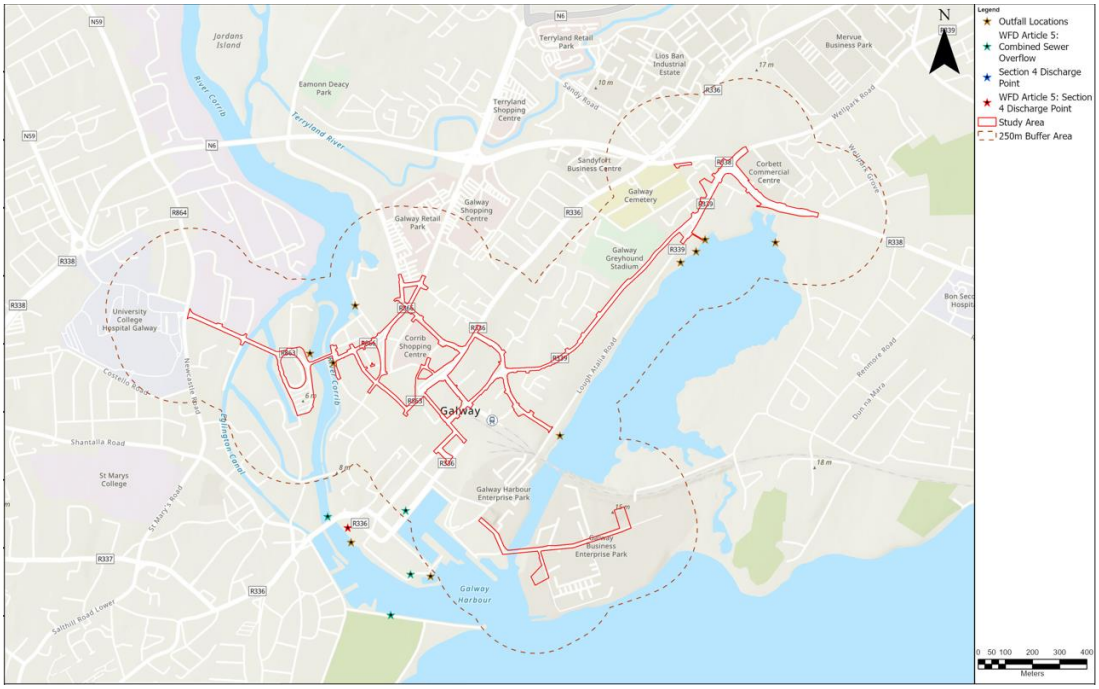

Diagram 13.2: Outfall Locations

It can be summarised that the main surface water receptors for the drainage system within the study area are:

- River Corrib,
- Distillery River,
- Friar's River, and
- Lough Atalia.

Both Distillery River and Friar's River are parts of the Corrib River system. The Corrib River has a Q4 (Good) status. Lough Atalia (Galway Bay Complex) and River Corrib both form parts of SACs.

13.3.3 Sustainable Urban Drainage System

The drainage system design is based on principles of best practice options for drainage design in accordance with the SUDS hierarchy as described in the CIRIA SUDS manual (CIRIA 2015).

The CIRIA SUDS manual recommends that when considering SUDS solutions, the preferred approach is a hierarchy whereby runoff using source control solutions (e.g. pervious surfacing) are considered first; where source control is not possible or cannot fully address an increase in runoff from a development, residual flows are then managed using site controls (e.g. bioretention/infiltration basins); if this is not practical or residual flows remain above existing runoff rates, regional controls (e.g. attenuation ponds or tanks) are used.

SUDS provide the dual benefits of controlling flows and treating water quality.

In areas where the catchment is proposed to remain unchanged as no additional impermeable areas are proposed, the design consists of relocating existing gullies (where possible) to new locations and provision of petrol interceptors and attenuation systems where required.

The drainage design principles ensure that there will be no net increase in the surface water flow discharged to identified receptors. Attenuation will be in the form of filter drains and/ or attenuation tanks. These measures will allow a level of treatment to be provided before discharge to the receptor, reducing the impact on water quality as well as preventing an increase in runoff rates.

13.3.4 WFD Catchment Overview

Diagram 13.3 shows the WFD Catchment/Sub catchment near the study area.

Under the Water Framework Directive (WFD), river water quality is monitored by the EPA and assigned an overall status based on the lowest status for the quality element monitored within that river waterbody. The River Water Quality Status of the River Corrib (CORRIB_020) for the 2013-2018 monitoring period is ‘Good’. The water quality in Lough Atalia (Corrib Estuary) is monitored as part of the River Corrib estuary waterbody. The Transitional Waterbody WFD status (2013-2018) of Lough Atalia (and the River Corrib estuary waterbody) is ‘Good’.

Under the WFD, an Approved Risk is assigned to each waterbody. The River Corrib (CORRIB_020) and Lough Atalia (Corrib Estuary) are each assigned ‘Not at risk’ status as river and transitional waterbodies respectively under the WFD.

13.3.4.1 Hydrometric Areas

The study area lies within Hydrometric Area (HA) 29 Galway Bay South East and HA 30 Corrib as shown in Diagram 13.3.

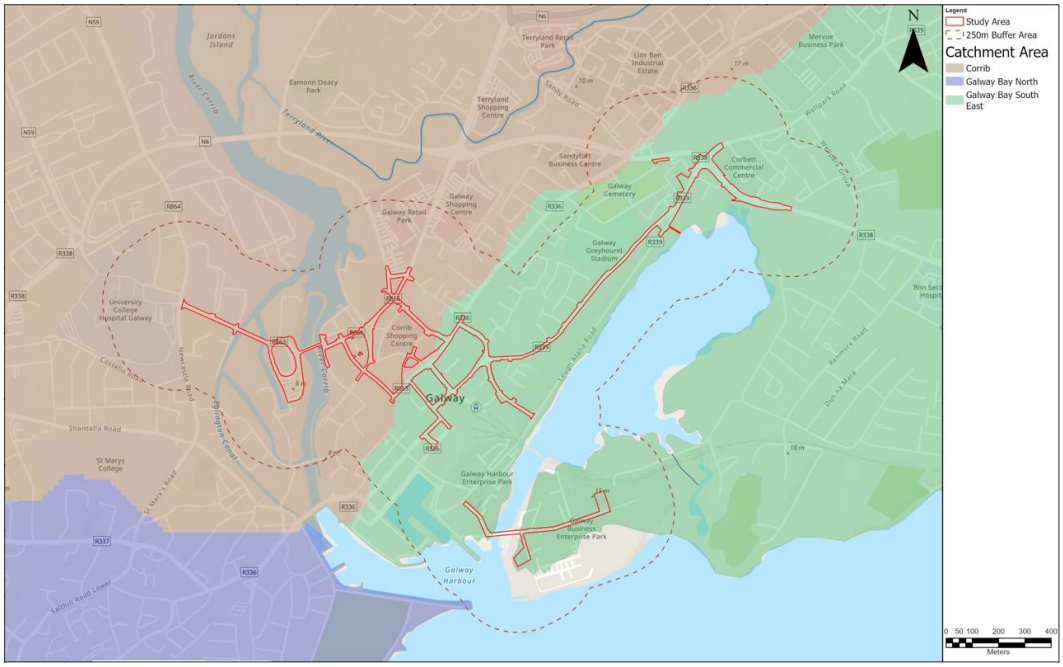

Diagram 13.3: Hydrometric Areas within and around the Study Area

- The Galway Bay South East Catchment Assessment 2010-2015 (HA 29) (EPA, 2018) describes the catchment as drained by all streams entering tidal water in Galway Bay between Black Head and Renmore Point, draining a total area of 1,270 km². The total population of the catchment is approximately 74,400, with a population density of 59 people per km².
- The Corrib Catchment Assessment 2010-2015 (HA 30) (EPA, 2018) describes the catchment as drained by the River Corrib and all streams entering tidal water between Renmore Point and Nimmo's Pier, Galway, a total area of 3,112 km². The total population of the catchment is approximately 116,900 with a population density of 38 people per km².

Both catchments are underlain by karstified limestone with highly interconnected groundwater and surface water systems. Whilst the catchment areas are split between Galway City, it remains the largest urban centre for both catchments. Other main urban centres include Athenry, Loughrea, Gort, and Oranmore to the east and Tuam, Ballinrobe, Claremorris and Ballyhaunis to the west.

There are three drainage catchments/sub-catchments within the study area as shown in Diagram 13.4. From west to east the catchments/sub-catchments are the Corrib Catchment including Terryland River Valley, Trusky Stream, and Lough Atalia catchment in the east of the study area.

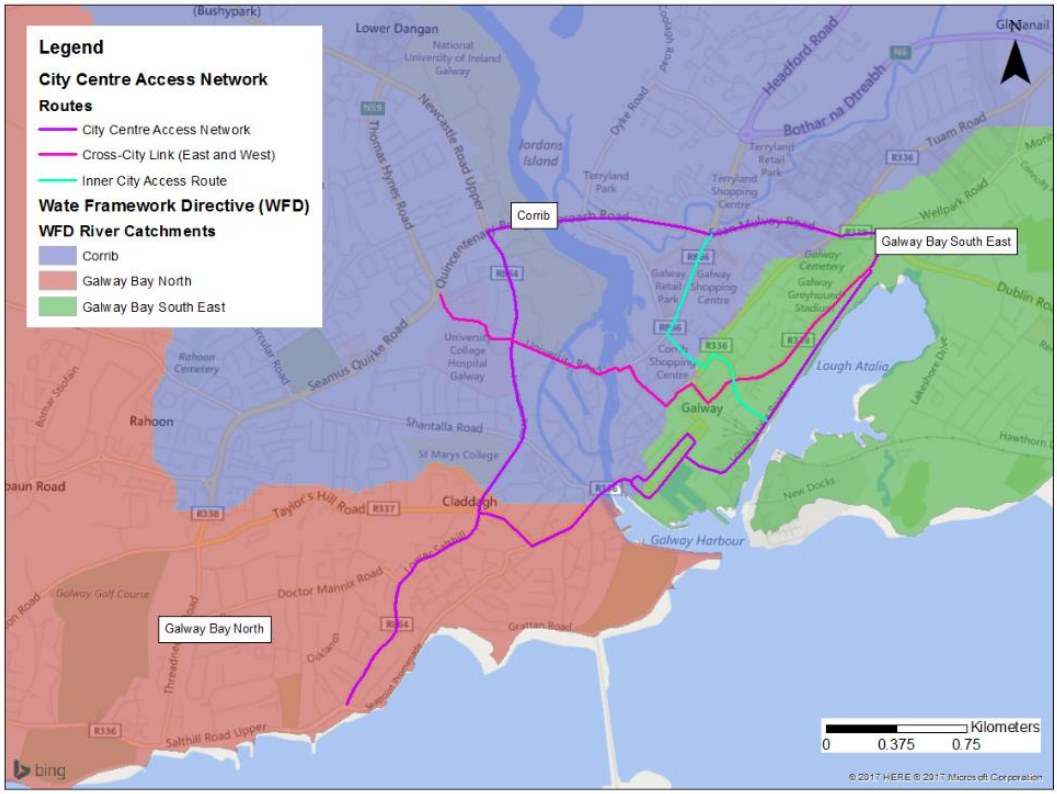

Diagram 13.4: WFD River Catchments in Galway City

The Lower River Corrib flows through Galway City centre from north to south. There are four bridges crossing the River Corrib in Galway City; from north to south, these are the Quincentenary Bridge, Salmon Weir Bridge, O'Briens Bridge and Wolfe Tone Bridge. The Office of Public Works (OPW) regulates the water levels in the River Corrib through gated control at the Salmon weir. Gates are opened and closed by the OPW depending on existing and forecasted rainfall conditions. The canals and mill races through the city are fed by the River Corrib upstream of the Salmon Weir and outfall into the Corrib Estuary.

The Eglinton canal is the main canal network west of the main River Corrib channel. The canal opens off the Lower River Corrib north of the Salmon Weir Bridge and loops west around Nuns Island, re-joining the River Corrib estuary upstream of Wolfe Tone Bridge at the Claddagh Basin. There are several small canals that offshoot from the Eglinton canal including, from west to east along University Road to Newtownsmith: the Eglinton Canal, the Gaol River, Persse's Distillery River (formerly called Mill Race), the Lower River Corrib and Friar's River (formerly called Waterside canal). The canal is prone to siltation as the flow through is restricted by lock gates, weirs, and turbines.

13.3.4.2 Hydrometric and National Monitoring Stations

The active hydrometric stations within the two hydrometric areas in proximity to the study area are shown in Table 13.10. The location of the national water monitoring stations in the study area are provided in Table 13.11.

Table 13.10: Active Hydrometric Stations near the Study Area

Station Name	Station No.	Water Body	Catchment Area, km2	Responsible Organisation	Measurement	Grid Reference (m)
Angliham	30089	Lough Corrib	3122	OPW	Water Level	E128992 N230240
Dangan	30098	Corrib River	3121	OPW	Water Level and Flow	E128264 N227831
Galway Barrage	30099	River Corrib	3135	OPW	Water Level	E129589 N225788
Wolfe Tone Br.	30061	Corrib Estuary	3136	OPW	Water Level	E129616 N224896
Galway Port	29062	Galway Bay	N/A	Marine Institute	Water Level	E130115 N224787

Table 13.11: National Water Monitoring Stations

Station Name	Station ID	Water Body	Responsible Organisation	Grid Reference (m)
Salmon Weir Bridge	RS30C020600	River Corrib	Galway City Council	E129598 N225525
Corrib - Waterside	RS30C020500	River Corrib	Galway City Council	E128264 N225873
Quincentennial Bridge	RS30C020460	River Corrib	Galway City Council	E129306 N226310
Br d/s Terryland Br on Ring Road	RS30T010500	Terryland River	Galway City Council	E129640 N226326
CORRIB - Just u/s Terryland River	RS30C020450	Corrib River	Galway City Council	E130115 N224787

13.3.5 Surface Water WFD Status

The EPA River dataset is designed as a geometric river network for monitoring, management, and reporting purposes. The EPA has split up rivers and streams into smaller sections to allow areas to be easily distinguished. These segments are assigned segment codes (estuaries and canals are not assigned segment codes). The EPA's segmented coding and naming system has been applied throughout this Chapter.

WFD designated waterbodies within the 500m study area included in this assessment shown on Diagram 13.5.

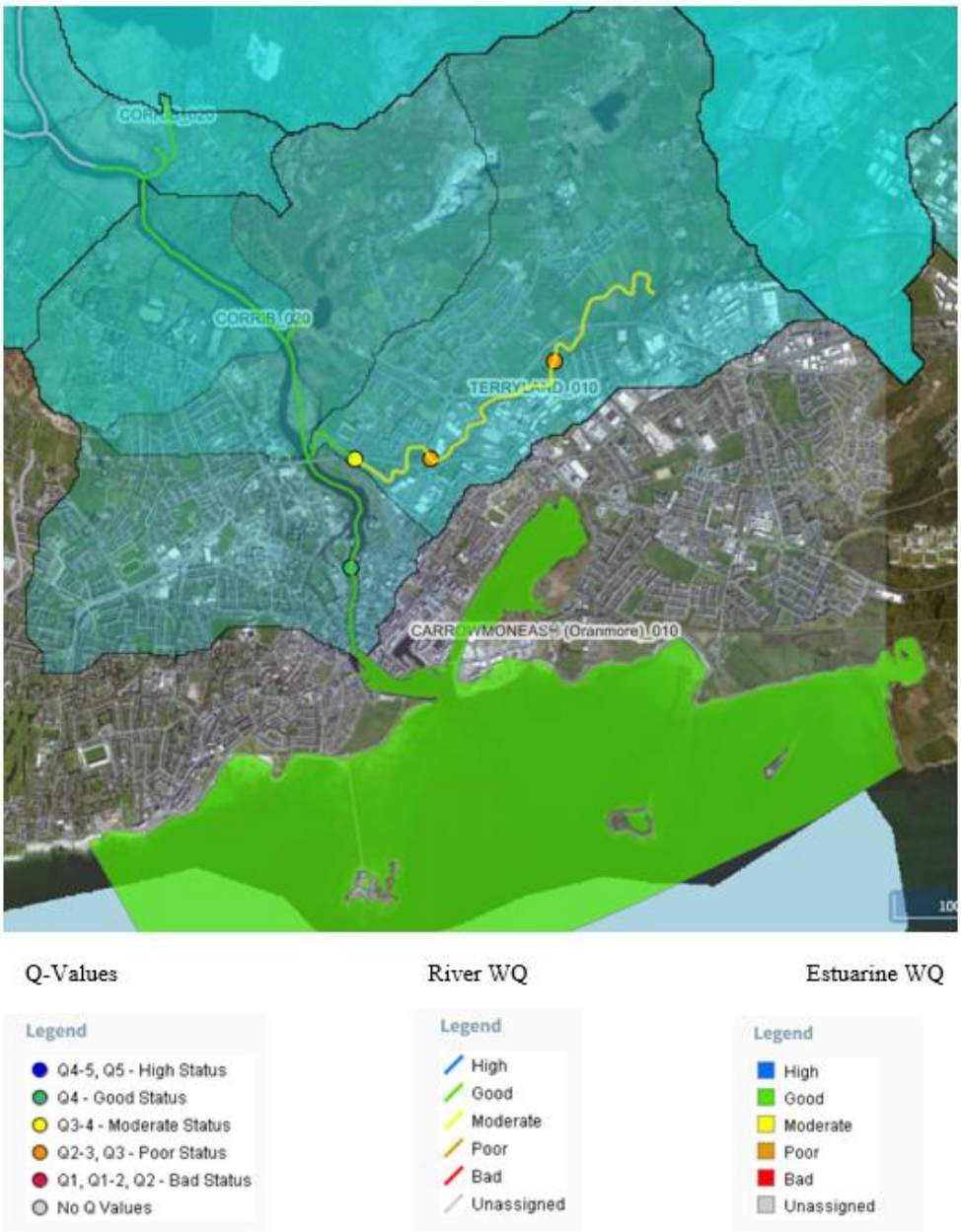

Diagram 13.5: River Q-Values, River, and Estuarine Water Quality

The WFD status of the rivers and streams within the Study Area of the Proposed Scheme are detailed in Table 13.12.

13.3.5.1 Surface Water Features

The four main WFD waterbodies within the study area are as follows:

- Corrib_020,
- Terryland_010,
- Carrowmoneash [Oranmore]_010, and
- Corrib Estuary.

The desk study identified four other surface waterbodies within the study area which are not classified as a WFD waterbody:

- Eglinton Canal,
- Gaol River,
- Persse's Distillery River (formerly called Mill Race), and
- Friar's River (formerly called Waterside canal).

All waterbodies within the study area flow into the Galway Bay and the Corrib Estuary. The RBMP 2018 - 2021 (DHPLG 2018) does not list any of the waterbodies within the study area as 'Priority Areas for Action'.

The overarching hydromorphology of the study area includes highly modified straight planform waterbodies with walled or artificial riparian zones.

The following EU designated sites are in proximity: Lough Corrib Special Protection Area (0004042); Lough Corrib Special Area of Conservation (000297); Galway Bay Complex Special Area of Conservation (SAC) (000268); and Inner Galway Bay Special Protection Area (SPA) (004031).

A summary of the baseline condition of each of these waterbodies and their associated flood risk within the study area is detailed below. Table 13.12 details the distances and number of crossings of each waterbody within the study area.

Table 13.12: Surface Water Features

Waterbody	Nearest Scheme Section	Approximate Distance from Proposed Scheme (m)	Number of Crossings by Proposed Scheme
Corrib_020	Salmon Weir Bridge	0	1
Terryland_010	Dyke Road	350m (north of Dyke Road)	0
Carrowmoneash (Oranmore)_010	Temporary Construction Compound	200m (north of Construction Compound)	0

Waterbody	Nearest Scheme Section	Approximate Distance from Proposed Scheme (m)	Number of Crossings by Proposed Scheme
Lough Atalia/ Corrib Estuary	College Road/Moneenageisha Junction/Dublin Road	100m (south west of junction at College Road and Lough Atalia Road)	0
Eglinton Canal	University Road	0	1
Gaol River	University Road	0	1
Persse's Distillery River	Salmon Weir Bridge	0	1
Friar's River	Salmon Weir Bridge	0	1

Corrib_020

The Corrib_020 flows from Lough Corrib, approximately 5km north of Galway, through Galway City and into the Galway Bay (SAC and SPA) and Corrib Estuary. There are four bridges crossing the Corrib_020 in Galway City; from north to south, these are the Quincentenary Bridge, Salmon Weir Bridge, O'Brien's Bridge and Wolfe Tone Bridge. The Proposed Scheme will cross the Corrib_020 on the existing Salmon Weir Bridge.

The Office of Public Works (OPW) regulates the water levels in the River Corrib through gated control at the Salmon Weir. Gates are opened and closed by the OPW depending on existing and forecasted rainfall conditions.

The Corrib_020 has a total length of 6.32km. Along the Corrib_020, land use to the north of Galway City is for agricultural purposes whilst land use to the south, is predominantly urban.

As shown in Table 13.14, the WFD status of the Corrib_020 is 'Good' and it is classified as 'not at risk' of achieving 'Good' Status by 2027.

The most recent Biological Q Value assessment of the Corrib_020 was 21/06/2018. Only one station (station code RS30C020600) is located on this watercourse which gave a recorded Q Value of Q4 (see Table 13.8).

The EPA River Quality Surveys: Biological (EPA 2020b) reported that: '*The River Corrib at the Weir Bridge in Galway city maintained Good ecological conditions in 2018.*'

Overall, the Corrib_020 has 'Good' status and is assigned Extremely High sensitivity due to being designated as a Salmonid River, the EU Designation as SAC and its hydrological connection with Galway Bay, Lough Atalia and the Corrib Estuary.

Terryland_010

Terryland_010 flows from north east of Galway City between Bothar na dTreabh and Tuam Road westwards towards Dyke Road and discharging into the Corrib_020 north of the N6 Bridge and Terryland Castle. There are various crossings of the Terryland_010 as it meanders through the north west and north of Galway City including the N6, Headford Road, Sandy Road and Bothar na dTreabh. The Whilst Terryland_010 is within the study area, the Proposed Scheme does not cross the Terryland_010 at any location.

The Terryland_010 has a total length of 3.71km. Land use across the entire length of Terryland_010 is urban with a mix of residential and industrial.

As shown in Table 13.14, the WFD status of Terryland_010 is 'Moderate' and it is classified as 'at risk' of achieving 'Good' status by 2027.

In terms of Biological Value, there are three stations (station code RS30T010200, RS30T010400 and RS30T010500) The most recent Biological Q Value assessment of the Terryland_010 was 21/06/2018 with samples taken from station RS30T010500 located at 'Terryland Bridge on N6 Ring Road' which returned a Biological Value of Q3-Q4 (see Table 13.8).

The EPA River Quality Surveys: Biological (EPA 2020b) reported that: Terryland_010 had '*Unsatisfactory conditions persist at this site but a slight improvement in ecological quality from Poor to Moderate was noted in 2018.'*

Overall, the Terryland River (Terryland_010) has a WFD classification status of "Poor" (2015) and is "at risk" status and is assigned 'High' sensitivity due to being hydrologically connected with the Corrib_020 which is a designated as a Salmonid River and hydrologically connected with Galway Bay SAC and SPA.

Carrowmoneash [Oranmore]_SC_010

The Carrowmoneash (Oranmore)_010 flows from Renmore Lough which is located between Galway Harbour Enterprise Park and Renmore Barracks in the south east of Galway City. The river flows north under the Portarlington-Galway Railway and into Lough Atalia before flowing southwards to the Corrib Estuary. There is one existing crossing of the river which is at the railway line. The Proposed Scheme will not cross this river however the haul route to the proposed temporary construction compounds will utilise the existing bridge crossing within the Galway Harbour Enterprise Park.

The Carrowmoneash [Oranmore]_SC_010 is known to be under pressure from nutrient (phosphate and ammonia) in its upper reaches and urban diffuse and wastewater pressure in its lower reaches. Land use in the vicinity of the river is predominantly industrial.

As shown in Table 13.14, the WFD status of Carrowmoneash [Oranmore]_010 is 'Unassigned' and it is classified as 'at risk' of achieving 'Good' status by 2027.

There is no Biological Q Value available for this watercourse.

Overall, the Carrowmoneash (Oranmore)_010 has 'Unassigned' status and is assigned 'High' sensitivity due to being hydrologically connected with Lough Atalia which is located within Galway Bay SAC and SPA.

Lough Atalia/Corrib Estuary

Lough Atalia is a located to the east of Galway City Centre and is within the Galway Bay Complex SAC and Inner Galway Bay SPA. The lough is a tidal waterbody and part of the Corrib Estuary. The Corrib Estuary is a transitional waterbody. There are two existing crossings of Lough Atalia at the seaward end of the lough: the railway crossing and the road bridge crossing in Galway Harbour Enterprise Park. There are no proposed new crossings as part of the Proposed Scheme. However, the haul route to the proposed temporary construction compounds will utilise the existing bridge crossing within the Galway Harbour Enterprise Park.

Lough Atalia has a total catchment of approximately 50 ha. Land use in the vicinity of the lough is a mix of residential, commercial, educational, and industrial.

The water quality in Lough Atalia (Corrib Estuary) is monitored as part of the River Corrib estuary waterbody. The Transitional Waterbody WFD status (2013-2018) of Lough Atalia is 'Good' and is classified as 'Not at risk' status by 2027.

There is no Biological Q Value available for Lough Atalia.

Overall, Lough Atalia (Corrib Estuary) has 'Good' status and is assigned 'Extremely High' sensitivity due to being within the EU designated Galway Bay SAC and SPA.

Non-designated Waterbodies

The four non-designated waterbodies (Eglinton Canal, Gaol River, Persse's Distillery River, and Friar's River) are fed by the River Corrib upstream of the Salmon Weir and outfall into the Corrib Estuary.

The Eglinton canal is the main canal network west of the main River Corrib channel. The canal opens off the Lower River Corrib north of the Salmon Weir Bridge and loops west around Nuns Island, where it is culverted before re-joining the River Corrib estuary upstream of Wolfe Tone Bridge at the Claddagh Basin. There are other small canals that offshoot from the Eglinton Canal including the Gaol River, Persse's Distillery River (formerly called Mill Race), the Lower River Corrib and Friar's River (formerly called Waterside canal). The canal is prone to siltation as the flow through is restricted by lock gates, weirs, and turbines.

Overall, the four non-designated waterbodies are hydrologically connected with the Corrib_020.

As the Corrib_020 flows through Galway City, the four non-designated watercourses are separated from the main river to the north of the Salmon Weir and reconnect with Corrib_020 again at the Claddagh Basin, before flowing seaward into the Galway Bay SAC and SPA. Therefore, each watercourse is assigned 'High' sensitivity due to the hydrological connections with the Corrib_020.

13.3.5.2 Designated Sites

The designated sites that have been summarised in this section are located within the study area. The sites described comprise EU designated sites, proposed Natural Heritage Area (pNHA), salmonid rivers, shellfish areas and marine bathing waters. There are no known Nutrient Sensitive Areas within the study area.

The following EU designated sites are close to the Proposed Scheme:

- Lough Corrib Special Protection Area (site code: 0004042);
- Lough Corrib Special Area of Conservation (site code: 000297);
- Galway Bay Complex Special Area of Conservation (site code: 000268); and
- Inner Galway Bay Special Protection Area (site code: 004031).

The Inner Galway Bay is also identified as a proposed Natural Heritage Area (pNHA). The River Corrib is a designated Salmonid River. There are no designated shellfish areas within the study area and the closest shellfish area is the Outer Galway Bay Indreabhan which is approximately 28km west of Galway City. According to Bathing Water Quality in Ireland 2020 (EPA, 2021), there are four bathing waters within Galway City Council and the bathing water quality classification is confirmed in Table 13.13. All the bathing waters are downstream of the Proposed Scheme.

Table 13.13: Bathing Water Classification (EPA, 2021)

Identified Bathing Water	**Bathing Water Classification**			
	2017	**2018**	**2019**	**2020**
Ballyloughane Beach	Poor	Sufficient	Poor	Sufficient
Grattan Road Beach	Good	Sufficient	Sufficient	Sufficient
Salthill Beach	Excellent	Excellent	Excellent	Excellent
Silverstrand Beach	Excellent	Excellent	Excellent	Excellent

13.3.5.3 Non-Designated Waterbodies

In addition, there are four non-designated watercourses adjacent to the Proposed Scheme:

- Eglinton Canal,
- Gaol River,
- Persse's Distillery River (formerly called Mill Race), and
- Friar's River (formerly called Waterside canal).

The Eglinton Canal and Gaol River are not designated for nature conservation but discharge downstream to the River Corrib, which is designated under the Lough Corrib SAC, refer to Table 13.14.

Table 13.14: WFD Waterbodies

WFD Sub-catchment	Waterbody Name & Code	Type	WFD Status (2013-18)	Key Pressures: Elements causing or with potential to cause less than good status[3]	Risk Categorisation
Corrib_SC_010	Corrib Lower (IE_WE_30_666a)	Lake	Good	Invasive species	At risk
	Terryland_010 (E_WE_30T010500)	River	Moderate	Urban runoff & Hydromorphology	At risk
	Corrib Upper (IE_WE_30_666b)	Lake	Good	Invasive species	Review
	Menlough (IE_WE_30_290)	Lake	Unassigned	None identified	Not at risk
	Corrib_010 (IE_WE_30C020300)	River	Unassigned	None identified	Not at risk
	Carrowmoneash (Oranmore)_010	River	Unassigned	Domestic Wastewater, Urban	At risk

[3] Corrib catchment Report (HA 30), 3rd Cycle Draft Report. 2021. Catchment Science and Management Unit, Environmental Protection Agency.

WFD Sub-catchment	Waterbody Name & Code	Type	WFD Status (2013-18)	Key Pressures: Elements causing or with potential to cause less than good status[3]	Risk Categorisation
Carrowmoneash [Oranmore]_SC_010	(IE_WE_29C050400)			Wastewater, and Urban Runoff	
	ROCKHILL (Galway)_010 (IE_WE_29R090950)	River	Unassigned	Domestic Wastewater and Agriculture (pasture)	Review
Corrib	Lough Atalia / Corrib Estuary (IE_WE_170_0700)	Transitional	Good	No significant pressure affecting the Corrib Estuary	Not at risk

13.3.6 Summary of WFD Assessment

Taking into consideration the anticipated impacts of the Proposed Scheme on the biological, physico-chemical and hydromorphological quality elements, and implementation of good practice design measures, it is concluded that it will not compromise progress towards achieving "Good" Status or cause a deterioration of the overall GEP of any of the water bodies that are in scope. Therefore, the Proposed Scheme does not require assessment under Article 4.7 (Table 13.15).

Table 13.15: WFD Assessment

Environmental Objective	Proposed Scheme	Compliance with the WFD Directive
No changes affecting high status sites	No waterbodies identified as high status	Yes
No changes that will cause failure to meet surface water Good Ecological Status (GES) or Good Ecological Potential (GEP) or result in a deterioration of surface water GES or GEP	After consideration as part of the detailed compliance assessment, the Proposed Scheme will not cause deterioration in the status of the water bodies during construction; during operation, no significant impacts are predicted. Good practice measures employed during construction and operation will minimise any risk to the waterbodies.	Yes

No changes which will permanently prevent or compromise the Environmental Objectives being met in other water bodies	The Proposed Scheme will not cause a permanent exclusion or compromise achieving the WFD objectives in any other bodies of water within the River Basin District.	Yes
No changes that will cause failure to meet good groundwater status or result in a deterioration groundwater status.	The Proposed Scheme will not cause deterioration in the status of the of the groundwater bodies.	Yes

13.3.7 EPA Surface Water Monitoring

The EPA assesses the water quality of rivers and streams across Ireland using a biological assessment method (McGarrigle et al. 2002). The EPA assigns biological river quality (biotic index) ratings from Q5 to Q1 to watercourse sections (refer to Table 13.16). Q5 denotes a watercourse with high water quality and high community diversity, whereas Q1 denotes very low community diversity and bad water quality. This data will be used to inform baseline receptor importance.

The WFD also considers highly modified waterbodies (HMWB) and artificial surface waterbodies (AWB). The WFD requires HMWB and AWB to achieve good ecological potential rather than Good Status.

Table 13.16: EPA Scheme of Biotic Indices or Quality (Q) Values (EPA 2018)

Biotic Index 'Q' Value	WFD Status	Pollution Status	Condition	Quality Class
Q5, Q4 - Q5	High	Unpolluted	Satisfactory	Class A
Q4	Good	Unpolluted	Satisfactory	Class A
Q3 - Q4	Moderate	Slightly Polluted	Unsatisfactory	Class B
Q3, Q2 - Q3	Poor	Moderately Polluted	Unsatisfactory	Class C
Q2, Q1 - Q2, Q1	Bad	Seriously Polluted	Unsatisfactory	Class D

13.3.8 Drinking Water Supply (Surface Water)

There are no Geological Survey Ireland (GSI) Public Supply Source Protection Areas or National Federation of Group Water Schemes (NFGWS) Source Protection Areas within the study area. The River Corrib, from Lough Corrib to

O'Brien's Bridge is designated Drinking Water (Corrib_020). Abstraction for Galway City water supply takes place at a location downstream of Quincentenary Bridge for treatment at Terryland WTP.

The nearest surface water abstraction point is on River Corrib downstream of Quincentenary Bridge for treatment at Terryland Water Treatment Works. This abstraction point is within the Lough Corrib SAC (Site Code 000297) and SPA (Site Code 004042) which is approximately 1.0 km north of the Proposed Scheme. This is a major public water supply abstraction point (approximately 46,000 m^3/day) which supplies approximately 70,000 people, serving Galway City and its environs. However, since it is not downstream of the study area, this has not been included in the assessment.

13.3.9 Flood Risk

A full assessment of the Flood Risk is included in Appendix 13.1 in Volume 4 of this EIAR. Only a summary of the baseline flood risk and the assessment of future risk from the Flood Risk Assessment is provided here for completeness.

The FRA was prepared in accordance with the Department of the Environmental, Heritage and Local Government (DEHLG) and the Office of Public Works (OPW) Planning System and Flood Risk Management Guidelines for Planning Authorities (DEHLG and OPW 2009).

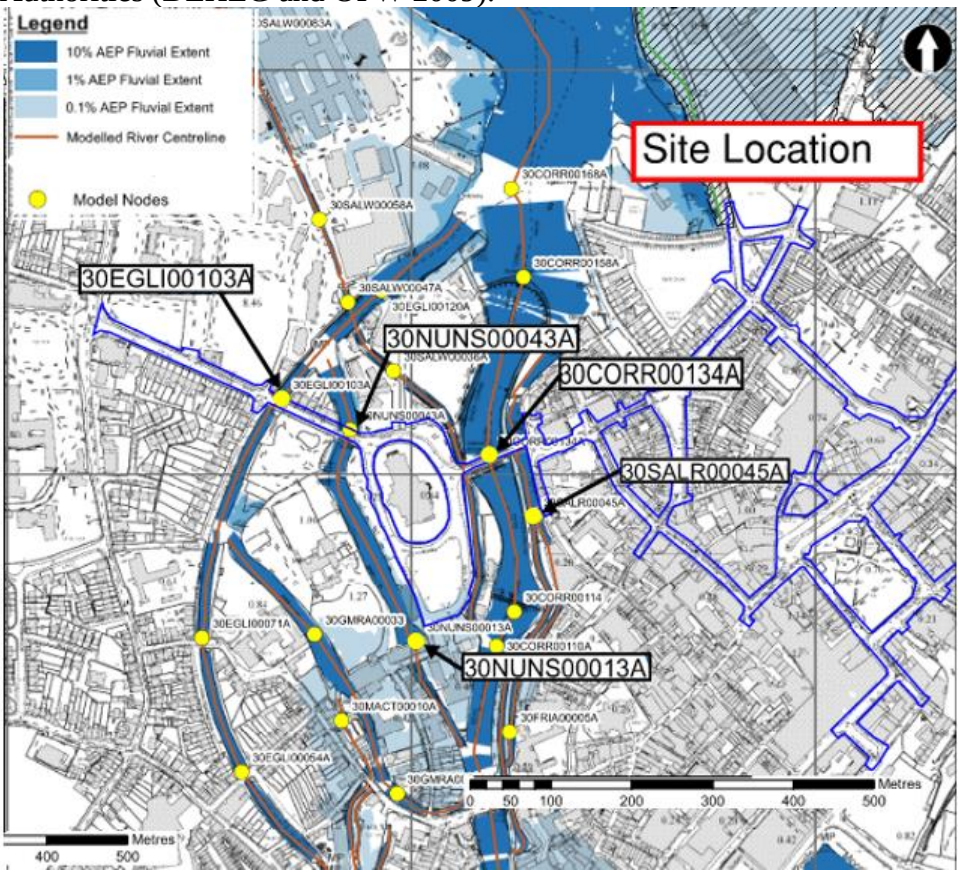

Diagram 13.6: **Shows the Fluvial Flood Risk Map and Diagram 13.7 shows the Tidal Flood Risk Map for the Area**.

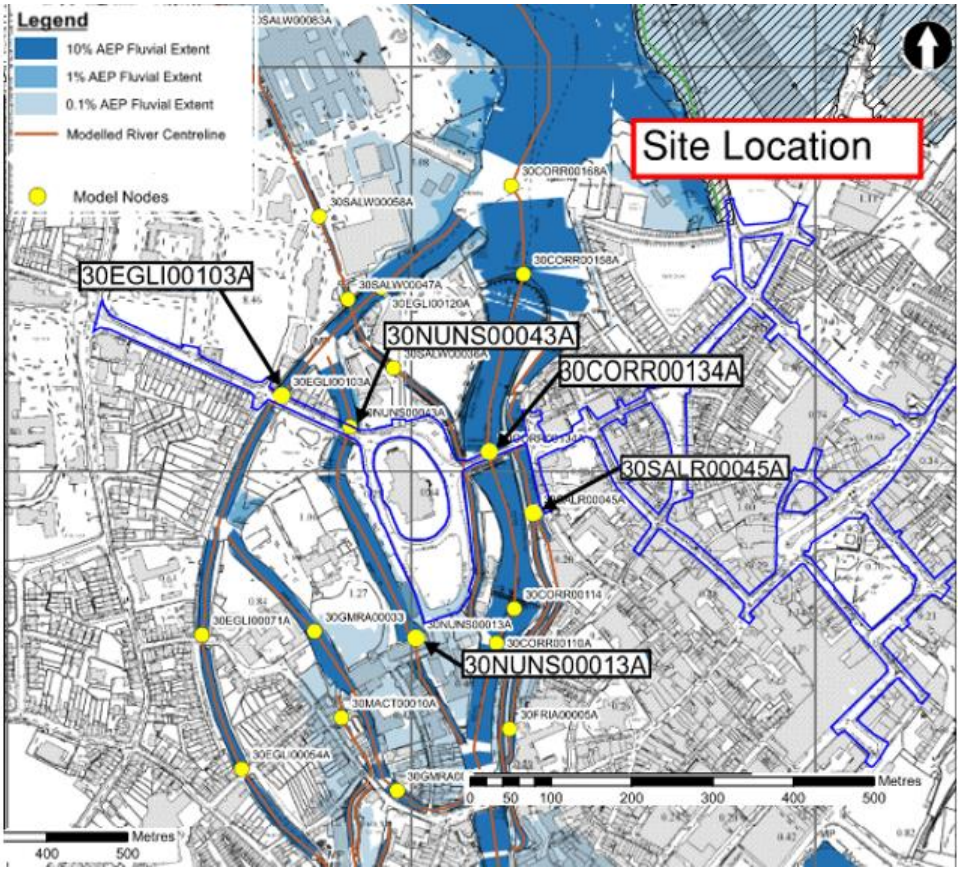

Diagram 13.6: Fluvial Flood Risk Map

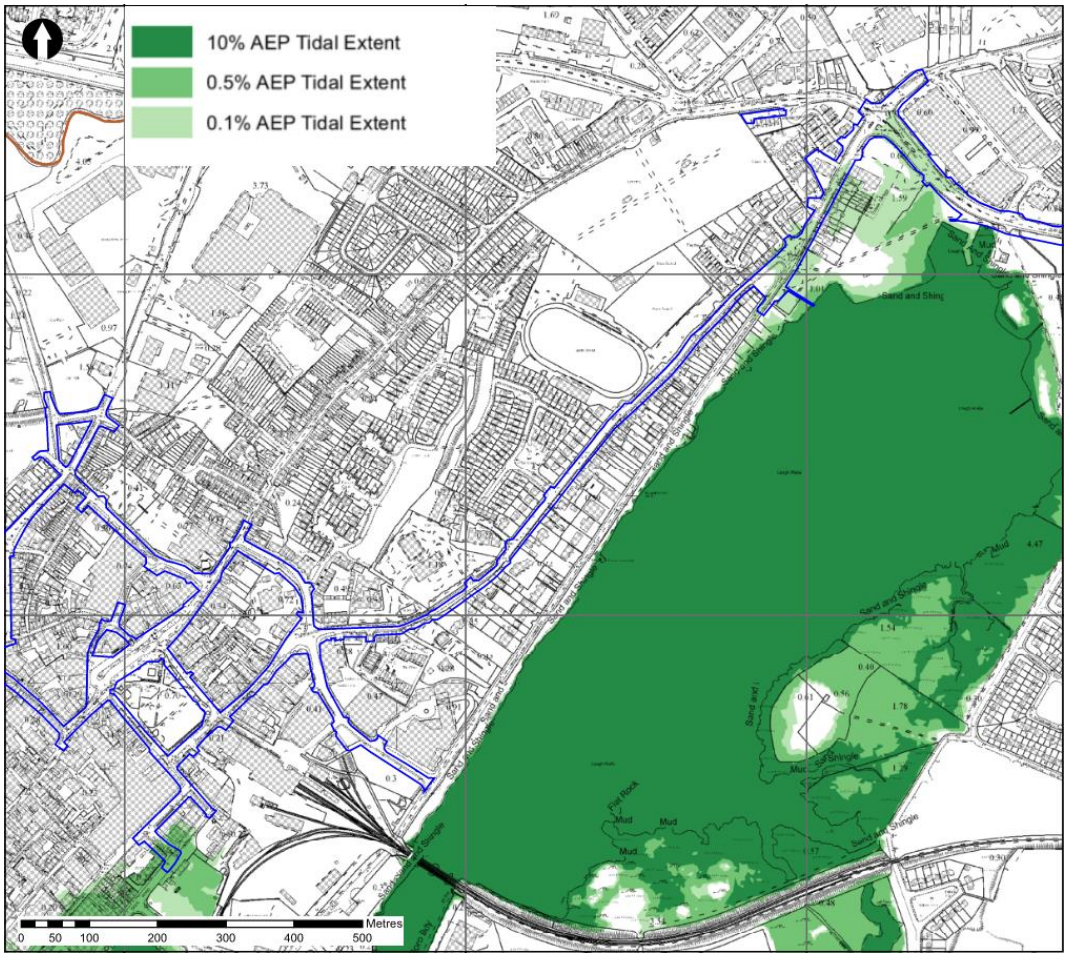

Diagram 13.7: Tidal Flood Risk Map

The FRA concludes that:

a) Fluvial Flooding: -

- a small portion of the Study Area (Nun's Island) is within the 0.1% Annual Exceedance Probability (AEP) event flood extent. The 1% and the 0.1% AEP flood levels at the nearest nodes (30NUNS00013A) are at 6.38m AD and 6.87m OD, respectively. The centreline of the road is at 6.57m OD on the southern side of the road and hence floods at 0.1% AEP fluvial event.

b) Tidal Flooding: -

- a small portion of the Study Area is (Dock Road) is within the 0.5% AEP event.
- Significant portion of the Study Area on College Road and Dublin Road is within the 0.5% of Tidal Event.

c) Pluvial Event: -

- The risk of pluvial flooding was considered generally low. Moreover, the risk of pluvial flooding is further mitigated by landscaping and drainage system.

d) Groundwater Flooding: -

- The risk of groundwater flooding is considered generally low or non-existent. However, due to the proximity of the study area the various surface water bodies, the water table is expected to be at relatively at shallow depth which can increase the risk during excavation works.

e) Mechanical/Operational Failure:-

- There are several bridges and locks on River Corrib which may fail or block due to mechanical error, deterioration, and operational. However, none of this are anticipated to impact on the flood risk within the study area.

A Development Management Justification Test is completed in accordance with the guidelines. This was to ensure the development proposal is not at risk of flooding to itself or does not increase the risk elsewhere. Although not all parts of the development are considered at risk as they are outside of Flood Zone A or B, the Justification Test was applied for the whole development area.

The Proposed Scheme was determined to have satisfied all requirements of the justification test outlined in the guidelines.

As flood risks are present is some areas, risk reduction measures are implemented as outlined in the FRA which enabled the Justification Test to be passed. These measures include:

- Upgraded road drainage system including various forms of SUDs for surface water management,
- Routine maintenance plan for the drainage system, and
- Tidal flood risk warning awareness system by Galway City Council, as is current practice.

13.3.10 Known Pressures

The EPA online database (EPA 2020) was reviewed to determine the presence of point source environmental pressures within the study area. The presence / absence of urban wastewater treatment plants (UWWTP) and associated storm water overflows (SWOs) and Industrial Emissions Licence (IEL) / Integrated Pollution Control (IPC) licensed sites were examined. The following IE / IPC licensed sites were identified within the 500m distance from Scheme boundary:

- IPC Licensed Facility Heiton Buckley Limited, Well Park, Galway, Reg No. P0339;
- IPC Licensed Facility Thermo King Ireland Limited, Monivea Road, Mervue, Galway, Reg No. P0142; and
- IE Licensed Facility Trane Technologies International Limited, Monivea Road, Mervue, Galway, Reg No. P0994.

The other main pressure identified for the waterbodies in the study area include diffuse pollution and discharges from SWOs.

These pressures result mainly from discharge of surface water and/or SWOs within the existing drainage system.

Failure in the drainage system, either because of insufficient capacity, poor maintenance, or incorrectly connected wastewater from domestic or commercial properties is likely to exacerbate these issues within the study area.

13.3.11 Summary of Baseline Receptor Sensitivity

A qualitative assessment of the sensitivity of the baseline environment was established based on the review of national data base used for determining the WFD status.

The ratings used are outlined in Section 13.2.4 based on the likely impact on the receiving environment during construction and maintenance of the Scheme (Table 13.17).

Table 13.17: Baseline Receptor Sensitivity

Waterbody	Attributes	Indicator/Feature	Sensitivity
Corrib_020	WFD 'Good'	Salmonid watercourse, hydrologically connected to Galway Bay SAC and SPA	Extremely High
Terryland_010	WFD 'Moderate'	Hydrologically connected to Galway Bay SAC and SPA	High
Carrowmoneash (Oranmore)_010	WFD 'Unassigned'	Hydrologically connected to Galway Bay SAC and SPA	High
Lough Atalia/ Corrib Estuary	WFD 'Good'	Designated SAC and SPA within Inner Galway Bay Complex	Extremely High
Eglinton Canal	Heavily modified	Hydrologically connected to Galway Bay SAC and SPA	High
Gaol River	Heavily modified	Hydrologically connected to Galway Bay SAC and SPA	High

Waterbody	Attributes	Indicator/Feature	Sensitivity
Persse's Distillery River	Heavily modified	Hydrologically connected to Galway Bay SAC and SPA	High
Friar's River	Heavily modified	Hydrologically connected to Galway Bay SAC and SPA	High

13.4 Potential Impacts

13.4.1 Introduction

The main hydrological impacts to the character of the receiving waters within the study area are those associated with working near water bodies generating sediment which may find its way to the watercourses via the road drainage system during construction. The existing road drainage system has surface runoff outfalls at several locations within the River Corrib system and Lough Atalia as shown in Diagram 13.2.

Known sources of pressure within the study area are outlined in Section 13.3.10 and no new outfalls (except that the existing Lough Atalia is to be relocated from the southern to the northern side of the playground) are proposed under the current development proposal. The proposed upgrade to the existing drainage system to match the needs of the development proposal is an opportunity to mitigate the impacts on the receiving waters. This is achieved by means of SUDS such as petrol interceptors, infiltration systems, attenuation facilities, etc. The general principles followed for sustainable urban drainage system design is outlined in Section 13.3.3.

13.4.2 Do Nothing Scenario

In this EIAR, the 'evolution of the baseline without the development' is described as the 'Do Nothing' scenario.

The Baseline (Section 13.3) describes the existing pressures on the waterbodies within the study area. These are identified and categorised under the RBMP for Ireland 2018-2021 process under baseline conditions (i.e., what is there at present) and reported by the EPA. The RBMP categorises significant pressures impacting waterbodies in Ireland into 14 categories, and identifies measures and actions aimed at addressing each pressure. This supports the analysis of future trends expected in the water environment to determine the 'evolution of the baseline without the development'. Future trends will be more noticeable, predictable, and measurable in the short to medium-term in relation to water quality, whereas hydrological and hydromorphological changes are subject to more long-term trends.

Future trends are determined based on the significant pressures identified under the RBMP, and the measures and actions in relation to policy and monitoring identified for the waterbodies to meet the requirements of the WFD Directive and any information available detailing progress on those measures or actions.

The most significant waterbody 'At Risk' of achieving "Good" status close to the Study Area is the Terryland_010 (Status 2013-2018: Moderate) where hydromorphology from diffuse sources (urban runoff) were identified as significant sources of pressure. Urban runoff may comprise a mixture of misconnections, leakage from sewers and runoff from paved and unpaved areas and has been identified as a significant pressure to Terryland_010. Galway City and the Local Authority Water Programme (LAWPRO) is required to collaborate to determine the nature and extent of the impacts.

With this action in place to locate and improve deficient infrastructure, it is anticipated that pressures from urban wastewater and urban runoff will be reduced over the coming years. Therefore, in the absence of the Proposed Scheme the surface water environment in the area should improve, albeit in the long term, particularly in relation to water quality.

13.4.3 Construction Phase Impacts

13.4.3.1 Overall Scheme

There are several potential construction-related impacts which could occur during the construction of the Proposed Scheme if not carefully designed and impacts mitigated where identified. The potential for any impacts for the Proposed Scheme are considered for the various construction activities and each receiving waterbody (the Corrib System and Lough Atalia) within the study area. These may include the following:

Impact on Hydrology

- Change in the natural hydrological regime due to an increase in discharge because of dewatering activities (where required) during construction. This may alter the groundwater regime and affect the baseflow to a surface water receptor,
- Potential for disrupting local drainage systems due to diversions required to accommodate the construction works,
- Modifications to the hydraulic characteristics of water features through modifications to the channel dimensions during construction of outfalls and culverts, where required; and
- Potential for temporary increase in hard standing areas and / or soil compaction during construction works which could result in temporary increased runoff rates to waterbodies.

Impact on Water Quality

- Discharge of silty water runoff containing high loads of suspended solids from construction activities. This includes the stripping of topsoil / road surface

during site preparation; the construction of widened roads; the dewatering of excavations and the storage of excavated material.

- Contamination of waterbodies with anthropogenic substances such as oil, chemicals, or concrete washings. This could occur because of a spillage or leakage of oils and fuels stored on site or direct from construction machinery; and the storage of materials or waste near waterbodies or drains connected to the waterbodies.

Impact on Hydromorphology

- Increased sediment loading because of silty water runoff or dewatering activities, introducing a sediment plume, potentially leading to the smothering of bed substrate and changes to existing morphological features.

Surface water management measures are incorporated within the CEMP to mitigate against adverse impacts on hydrology, hydromorphology and water quality of both the Corrib System and Lough Atalia during construction. Therefore, the Proposed Scheme presents no significant impacts to surface water and groundwater quality provided the proposed mitigation measures within the CEMP are implemented.

13.4.3.2 Footpath Widening, Road Resurfacing, Carriage Widening and Road Crossing Trenches

The Proposed Scheme will involve widening of existing footpath, widening and/or resurfacing of carriageway, and excavation of trenches for road crossing.

The principal potential impact of these activities is related to generation of silt/sediment during construction and discharge to sensitive water bodies (Corrib system and Lough Atalia). The risk of accidental spillage and oils and fuel at the Construction Compounds and work sites can also increase. Oils and fuel will be stored within bunded in designated areas. Drainage from designated areas will be collected and disposed safely. These and other best practice measures are included in the CEMP and will be implemented during construction. In the absence of additional mitigation measures, the potential magnitude of impact is negligible, resulting in a short term and imperceptible impact.

13.4.3.3 Impact from Drainage Outfalls

As outlined earlier, there will be no new outfall other than a slight change of location of one of the existing outfalls at Lough Atalia (moved to the other side of the playground) and therefore there will be no net increase in the runoff discharge to the receiving water bodies. However, construction activities have a potential to increase the pollution risk to receiving water bodies during soil stripping, concrete works, accidental spills, operation of plant and equipment, etc. Flood events can also increase the potential input of sediment and other construction material into the water bodies.

The two most important surface water receptors within the Study Area are the River Corrib and Lough Atalia. The River Corrib is a designated Salmonid River. Lough Atalia is within the Galway Bay Complex SAC (Site Code 268). The Inner Galway Bay is also identified as a pNHA and SPA. These sites have international importance and hence assigned *Extremely High* sensitivity.

Good practice measures outlined in the CEMP employed during construction will minimise the identified risks to the receiving water bodies. Therefore, in the absence of mitigation measures, the potential magnitude of impact is negligible, resulting in a short term, and imperceptible impact.

13.4.3.4 Site Compound

Chapter 5 (Construction) of the EIAR outlines the principal Construction Phase activities required to complete the Proposed Scheme and includes details of activities such as road and footpath widening, new and / or improved footpaths and cycle lanes, pavement repairs, new or improved lighting, bus shelters, removal of boundary walls and any other upgrade works, where relevant.

In addition to the main works involved, the location of the Construction Compounds, the location and duration of any necessary traffic diversions, hours of working, and numbers of personnel involved needs careful consideration. Three compounds are proposed: two at Galway Harbour Enterprise Park and another at Galway Cathedral Car Park (Satellite). The first Construction Compound at Galway Harbour Enterprise Parks is approximately 2,180m^2 in area and will contain site offices, and welfare facilities for GCC and contractor personnel. The second Construction Compound at Galway Harbour Enterprise Park is approximately 2,710m^2 in area and will be used to store materials for reuse such as topsoil, subsoil, concrete, rock etc., together with materials delivered to site for use in the construction of the scheme, e.g., pipes and ducting. Items of plant and equipment will also be stored within this Construction Compounds including the provision of a crusher. The satellite compound will have an area of 2,990m^2, approximately and will also be used to store plant and materials, together with site personnel welfare facilities.

All Compounds are at proximity to hydrologically sensitive receptors and will be in place for the full duration of the extent of the works and will be removed and the ground fully reinstated following completion of the works they support. The duration of the Construction Phase is estimated to be 18-20 months which spans longer than a hydrologic year. Therefore, there is a risk of contaminated surface water runoff discharging into the receptors during storm events, albeit for a short term.

13.4.4 Operational Phase

Potential impacts for the Operational Phase are related to water quality and hydromorphology. No changes to hydrology are expected (other than a minor change of outfall location at Lough Atalia) as the drainage design includes attenuation measures (i.e., SUDS) to mitigate against any potential increase in surface runoff rates. Surface water runoff from the Proposed Scheme discharges

the River Corrib and Lough Atalia, both of which have been identified to have international importance.

Potential impacts during the operational phase may include:

- Deterioration in water quality from increased levels of 'routine' road contaminates, such as hydrocarbons, metals, sediment, and chloride (seasonal) due to:
    - Potential increase in pollution and sediment load entering surface water receptors from upgraded or widened roads,
    - Changes to the quality of surface runoff due to changes to the nature, frequency of vehicles using the Proposed Scheme; and
    - Dispersal of traffic onto other local road network which may drain to a different catchment or have less stringent pollution control infrastructure.

Potential hydromorphology changes may include changes in the flow regime due to increased surface water runoff or discharges, from the improved drainage system, resulting in changes to sedimentation processes and morphology.

The amendments to the existing drainage system and the minor change to the location of the outfall at Lough Atalia will have long term, small beneficial magnitude of impact, resulting in a slight beneficial impact on receptor quality.

13.5 Mitigation and Monitoring Measures

This section sets out mitigation measures and good practice guides that are proposed to avoid, prevent, or reduce risks of the potential impacts on the aquatic environment outlined in Section 13.4.3 and 13.4.4 and, where appropriate, identify any proposed monitoring arrangements during the Construction and Operational Phases. Impacts associated to changes in traffic was reviewed and scoped out as not significant in Section 13.2.4.5. Therefore, in the absence of mitigation measures, the potential operational phase impact due to changes in the nature of the traffic is negligible and imperceptible impact.

Construction works will take place in accordance with the CEMP (the CEMP is included in Appendix 5.1 in Volume 4 of the EIAR). The Surface Water Management Plan (SWMP), which forms part of the CEMP sets out the good practice measures that will be implemented to minimise pollution discharge into local water courses.

Mitigation measures that will be implemented during the various phases of the scheme are detailed in the following sections.

13.5.1 Construction Phase

13.5.1.1 Overall Scheme

The Proposed Scheme has a potential to cause environmental impact during construction if not mitigated against. The mitigation measures proposed for management of surface runoff are generally contained in good practice guidance

documents that should be adhered to during the construction over or near water bodies. Some of the relevant guidance documents include:

- Guidelines on Protection of Fisheries During Construction Works in and adjacent to Waters - Inland Fisheries Ireland, 2016
- CIRIA C532 Control of Water Pollution from Construction Sites Guidance for Consultants and Contractors, and
- CIRIA C648 Control of Water Pollution from Constructional Sites

Following on from the above guidelines, the following general and specific mitigation measures are outlined:

- Appropriate timing of the works to avoid flooding seasons and water pollution incidents, as is current standard practice;
- A site boundary fence will be constructed around the construction footprint with adequate vegetation buffer to prevent unintentional discharge to adjacent watercourses;
- A silt fence will be used during construction at the outfall at Lough Atalia where a sediment laden runoff is likely to be generated;
- While working near water bodies (Corrib River and Lough Atalia), it is required to capture and treat all surface runoff before discharging to these water bodies;
- Sampling and monitoring of storm water discharges from construction sites, the need, location, and frequency as determined by the Environmental Clerk of Works (ECoW). Parameters of interest may include Turbidity (or TSS), pH, and hydrocarbons.

A SWMP is provided as part of the CEMP. The CEMP includes a list of control measures to be implemented during the Construction Phase:

- A requirement for an Emergency Incident Response Plan (EIRP);
- Construction Compound management including the storage of fuels and materials;
- Control of sediment generation and discharge;
- Provision of SUDs (attenuation pond and petrol interceptor) before discharge of construction dewatering water to the receiving waters;
- Use of pre cast concrete where possible or construction method to be approved by the ECoW; and
- Management of vehicles and plant including refuelling and wheel wash facilities – spills and discharge are contained and prevented from entering the surface water receptor.

13.5.1.2 Construction Compound

The storage facilities at the Construction Compounds shall be fenced off at a minimum distance of at least 5m from surface water receptors. This and other measures included in the Construction Environmental Management Plan (CEMP refer to Appendix 5.1 of Volume 4 of this EIAR) (to be updated by the appointed Contractor) relevant to the site compound will be implemented by the appointed Contractor during construction.

13.5.1.3 Surface Water Quality Monitoring

As outlined in the SWMP, the Appointed Contractor shall carry out visual monitoring of surface water control measures (settlement tanks, silt fences, fuel storage areas etc.) on a daily basis. In addition, weekly visual inspections of the water bodies in proximity to Proposed Scheme will be carried out by the Appointed Contractor. Refer to the CEMP (Appendix 5.1 of Volume 4 of this EIAR) for further information.

13.5.2 Operational Phase

Surface water runoff for the proposed development is hydrologically connected to water bodies (River Corrib and Lough Atalia) which have international importance. There are 4 no. existing surface water outfalls to Lough Atalia and 3 no. outfalls into the Corrib System. No significant hydrological regime change is anticipated as the net increase in the impervious area is only marginal. Moreover, the drainage system is designed in such a way that any discharge to the receiving water body is restricted to predevelopment rate.

The infrastructure, including the maintenance regime for SUDS (Swales and Raingardens) will be maintained by the local authority and will be subject to their management procedures. No other mitigation measures are proposed for the operational phase of the Proposed Scheme.

13.5.3 Monitoring Requirements

No routine monitoring requirement is anticipated during operation of the works.

13.6 Residual Impacts

13.6.1 Construction Phase

Following implementation of the mitigation measures and good practice guides outlined in Section 13.5 and those included in the SWMP of the CEMP, no significant impacts are anticipated on any of the receptors in this study area.

An outline of the various sections of the Scheme and description predicted residual impacts are presented in Table 13.18:

Table 13.18: Review of Construction Stage Residual Impacts

Section	Project Activity	Predicted Impacts		
		Description of Impacts	**Predicted Impact (Pre-Mitigation and Monitoring)**	**Predicted Impact (Post-Mitigation and Monitoring)**
University Road	Footpath widening, gully relocation, entry treatments, bus shelter erection	Minimal sediment release expected. Accidental spills, release of fuel and oil from the construction compound, etc.	Imperceptible, short term	Imperceptible, short term
Gaol Road and Galway Cathedral	Footpath widening, gulley relocation, construction of footpaths and paved areas, consolidation of existing footpath.			
Newtownsmith/Waterside	Footpath widening, gulley relocation, construction of footpaths and paved areas.			
St Vincent's Avenue/Walsh's Terrace	Footpath widening, gully relocation, entry treatments			
Woodquay/Daly's Place/Mary Street	Footpath widening, gully relocation, ducting for proposed signalisation works			
Dyke Road/Headford Road	Resurfacing and associated works			

Section	Project Activity	Predicted Impacts		
		Description of Impacts	Predicted Impact (Pre-Mitigation and Monitoring)	Predicted Impact (Post-Mitigation and Monitoring)
St Francis Street/Eglington Street/Williamsgate Street	Footpath widening, gully relocation, ducting for proposed signalisation works			
Bothar na mBan/St. Brendan's Avenue	Gully relocation, entry treatments, carriageway widening, demolition of two private properties			
Prospect Hill	Footpath widening gully relocation entry treatments ducting for proposed signalisation works			
Eyre Square North/Eyre Square East/Eyre Square	Footpath widening, gully relocation, entry treatments, carriageway widening, ducting for proposed signalisation works			
Victoria Place/Merchant's Road/Queen Street	Footpath widening, gully relocation, entry treatments,			

Section	Project Activity	Predicted Impacts		
		Description of Impacts	Predicted Impact (Pre-Mitigation and Monitoring)	Predicted Impact (Post-Mitigation and Monitoring)
	ducting for proposed signalisation			
Foster Street	Footpath widening, gully relocation			
College Road/Foster Street/Fairgreen Road/Bothar Ui hEithir Junction	Footpath widening, gully relocation, ducting for proposed signalisation works			
Bothar Ui Eithir	Footpath widening, gully relocation, entry treatment			
Fairgreen Road	Footpath widening, gully relocation, entry treatments			
College Road (to Junction with Lough Atalia Road)	Footpath widening, Gully relocation, entry treatments, ducting for proposed signalisation works			
College Road/Lough Atalia Road Junction	Footpath widening, gully relocation, entry treatments, ducting for proposed signalisation works			

Section	Project Activity	Predicted Impacts		
		Description of Impacts	Predicted Impact (Pre-Mitigation and Monitoring)	Predicted Impact (Post-Mitigation and Monitoring)
College Road/Lough Atalia Road to Moneenageisha Junction	Remove boundary walls (including petrol station), carriageway widening, entry treatments			
Moneenageisha Junction	Footpath widening, gully relocation, entry treatments, ducting for proposed signalisation works			
R338 Dublin Road	Footpath widening, gully relocation, carriageway widening, ducting for proposed signalisation works			

13.6.2 Operational Phase

No operational residual significant impacts are anticipated for any waterbody in the study area (refer to Table 13.19), whilst meeting the scheme objectives set out in Chapter 1 (Introduction) of this EIAR.

Table 13.19: Summary of Predicted Operational Residual Impact

WFD Waterbody Name	Project Activity	Predicted Impacts		
		Description of Impacts	Predicted Impact (Pre-Mitigation and Monitoring)	Predicted Impact (Post-Mitigation and Monitoring)
Corrib_020	Marginal increase in impermeable	Marginal increase in surface water run off	Slight, beneficial, long term	Slight, beneficial, long term

	area draining to the waterbody			
Corrib Estuary/ Lough Atalia	Marginal increase in impermeable area draining to the waterbody	Marginal increase in surface water run off	Slight, beneficial, long term	Slight, beneficial, long term

13.7 References

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CIRIA C532 Control of Water Pollution from Construction Sites Guidance for Consultants and Contractors,

CIRIA C648 Control of Water Pollution from Constructional Sites

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EPA, The Galway Bay Southeast Catchment Assessment 2010-2015 (HA 29)

EU Directive 2007/60/EC of 23 October 2007 on the assessment and management of flood risks

EU Directive 91/271/EEC of 21 May 1991 concerning urban waste-water treatment

EU Directive 98/83/EC of 3 November 1998 on the quality of water intended for human consumption

EU, Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014, amending Directive 2011/92/EU of the European Parliament and the Council of 13 December 2011 on the assessment of the impacts of certain public and private projects on the environment

Government of Ireland Number 1 of 1977 - The Local Government (Water Pollution) Act;

Government of Ireland Number 21 of 1990 - Local Government (Water Pollution) (Amendment) Act, 1990; and

Government of Ireland S.I. No. 108/1978 - Local Government (Water Pollution) Regulations, 1978;

Government of Ireland S.I. No. 122/2010 - European Communities (Assessment and Management of Flood Risks) Regulations, 2010;

Government of Ireland S.I. No. 122/2014 - European Union (Drinking Water) Regulations 2014;

Government of Ireland S.I. No. 268/2006 - European Communities (Quality of Shellfish Waters) Regulations, 2006;

Government of Ireland S.I. No. 272/2009 - European Communities Environmental Objectives (Surface Waters) Regulations, 2009

Government of Ireland S.I. No. 278/2007 - European Communities (Drinking Water) (No. 2) Regulations 2007;

Government of Ireland S.I. No. 293/1988 - European Communities (Quality of Salmonid Waters) Regulations, 1988;

Government of Ireland S.I. No. 296/2018 - European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018McGarrigle, et al. (2002). Water Quality in Ireland 1998–2000, Environmental Protection Agency, Wexford, Ireland.

Government of Ireland S.I. No. 350/2014 - European Union (Water Policy) Regulations 2014;

Government of Ireland S.I. No. 351/2011 - Bathing Water Quality (Amendment) Regulations, 2011;

Government of Ireland S.I. No. 495/2015 - European Communities (Assessment and Management of Flood Risks) (Amendment) Regulations 2015; and

Government of Ireland S.I. No. 722/2003 - European Communities (Water Policy) Regulations 2003, as amended;

Government of Ireland S.I. No. 81/1988 - European Communities (Quality of Water Intended for Human Consumption) Regulations 1988;

Government of Ireland S.I. No. 9/2010 - European Communities Environmental Objectives (Groundwater) Regulations, 2010;

Government of Ireland S.I. No. 92/2020 - Planning and Development Act 2000 (Exempted Development) (No. 2) Regulations 2020.

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