PROJECT:

Castletroy Wastewater Treatment Plant Upgrade Project

REPORT:

Environmental Impact Assessment Report Volume 1: Non-Technical Summary

UISCE ÉIREANN : IRISH WATER

BARRY & PARTNERS

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SECTION 1: INTRODUCTION

1.1 Project Background

An Environmental Impact Assessment Report (EIAR) for the Castletroy Wastewater Treatment Plant (WwTP) Upgrade Project, hereafter referred to as the 'Proposed Development', has been prepared by J.B. Barry and Partners Ltd. on behalf of Uisce Éireann (formerly Irish Water) (the Applicant). The EIAR accompanies a planning application made directly to An Bord Pleanála (ABP) under Section 37E of the Planning and Development Act 2000 (as amended). An EIAR is an assessment and analysis of potential impacts on the receiving environment caused by a Proposed Development. As part of the screening and scoping stage for the project Environmental Impact Assessment Screening Report and Environmental Impact Assessment Scoping Report was prepared by J.B. Barry and Partners Ltd (2020), refer to **Volume 3, Appendix 1A and Appendix 1B respectively**.

This Non-Technical Summary (NTS) describes the Project, Environmental Impact Assessment (EIA) process and summarises the key environmental impacts arising from each of the environmental assessments carried out by a panel of experts in accordance with best practice. It summarises, in non-technical language, the EIA Report (EIAR) including the likely significant effects identified, the mitigation and monitoring measures proposed, also any residual effects arising from the Proposed Development that have been identified.

1.2 Project Need

The Castletroy WwTP Upgrade Project was initially an element of Uisce Éireann's 2017-2021 Investment Plan (i.e. Feasibility Study Report and Optioneering) and now forms part of the 2020-2024 Capital Investment Plan. Located west of Limerick City, the main Limerick (Bunlicky) WwTP has also been identified for inclusion in the investment plan. The Bunlicky and Castletroy upgrade projects are progressing independently, but the final combined increase in treatment capacity will promote future development across the Greater Limerick Area.

Castletroy Wastewater Treatment Plant (WwTP) has been providing wastewater treatment to East Limerick since 1992. It serves the suburbs of Castletroy, Annacotty, Mountshannon and Castleconnell, as well as the University of Limerick and other local industry. In 2018, Uisce Éireann identified that upgrade works were required at the WwTP to comply with current national and EU legislation, and also to support future growth demands as population grows and industry expands in the area.

The Castletroy WwTP facility is reported to cater for a Population Equivalent[1] (PE) of 45,000 (2020 AER). The WwTP is currently operating at near its design capacity[2] and dealing with expansions in population and industrial activity. If nothing is done the plant will become critically overloaded and there will be negative effects on the receiving environment, particularly in terms of water quality in the Lower River Shannon and Natura Habitats. Furthermore, there is no stormwater storage at existing WwTP so excess flows from storms and heavy rainfall events are discharged directly to the Lower River Shannon with minimal treatment.

[1] The amount of wastewater received at a treatment plant is measured in units known as population equivalent (or PE). The wastewater received from all sources i.e., industrial, tourism, commercial, residential, etc., is converted into these units, with 1 no.one unit of PE representing the wastewater treatment load typically generated by one person.

[2] The maximum PE that a treatment plant can accept is known as the design capacity.

The objective of the Proposed Development is to upgrade the existing Castletroy WwTP to cater for a 10-year growth period up to the year 2028 to 77,500 PE. This upgrade will allow for domestic, commercial, institutional, and industrial future projected loadings.

1.3 Site Description

1.3.1 Site Location

Castletroy is a Limerick suburb situated approximately 3km east of the City Centre. Castletroy WwTP is surrounded by the University of Limerick (UL) campus, between the university boat club and Dromroe student village. There is a walkway at the northern perimeter of the site along the banks of the Lower River Shannon. The site is predominantly enclosed as it is surrounded but by heavy vegetation, high trees and hedge rows. The WwTP discharge point is in the river channel, where Co. Limerick borders with Co. Clare. Figure 1.1 displays the site location and discharge point, with regard to the surrounding entities.

Figure 1.1: Castletroy WwTP Site Location

1.3.2 Existing Wastewater Treatment Processes

WwTPs are designed to reduce pollution levels of wastewater so that it can be returned to the environment, i.e. the Lower River Shannon, without having negative effects on receiving water quality.

Figure 1.2 displays the main elements of the wastewater treatment processes currently in operation at Castletroy WwTP. **Sections 1.4.1 to 1.4.4** provide a description of each element of the treatment process.

Inlet Works

Preliminary treatment - screening and/or separation of difficult to treat matter or things that will damage the process. It normally takes out: grease; wet wipes; sanitary material; litter; grit; stones; branches, and leaves. This prevents blockages and protects the equipment required for treatment.

Primary treatment - after preliminary treatment, the wastewater still contains organic and inorganic matter along with other suspended solids. These solids are removed from the sewage using a primary filtration unit and held in a storage container where they form a concentrated primary sludge. The primary sludge is removed offsite for further treatment and appropriate disposal, as per the Uisce Éireann National Wastewater Sludge Management Plan (NWSMP).

Figure 1.2: Castletroy WwTP Existing Layout

Secondary Treatment

Aeration (Biological Treatment) - the wastewater containing both soluble and suspended matter moves to the aeration tanks where bacteria are added. The bacteria, with the assistance of aeration/oxidisation, break down the organic matter creating activated sludge. The surplus activated sludge (SAS) is separated from the treated wastewater and pumped to an onsite sludge treatment facility where it is thickened and dewatered before offsite removal.

Clarification - following biological treatment, the flow is split into three secondary clarification tanks. The treated wastewater is held for a period of 2-3 hours which encourages any remaining biomass to settle and become sludge. Scrapers remove the sludge from the bottom of the tank, and Waste Activated Sludge (WAS) is sent to the sludge facilities for treatment and disposal. A portion of the activated sludge is returned to the aeration tank to facilitate the biological process, this is known as return activated sludge (RAS).

Sludge Treatment

Sludge thickening – sludge from the secondary processes, and occasionally also primary sludge, are mixed together in 2 no. picket fence thickeners (PFTs). The picket fence stirs the sludge which encourages settling and allows remaining liquid to be drawn off to increase the sludge density.

Sludge dewatering -existing facilities consist of 1 no. belt press and 1 no. centrifuge which is currently out of service. Thickened sludge travels along the belt press where it is compressed and dewatered until it has a cake like consistency.

Sludge disposal - cake sludge is dropped into a trailer where it is held until it is sent offsite for digestion (methane gas production) and/or lime stabilisation treatment, and eventual agricultural land-spreading.

Outfall Arrangement

Treated wastewater and stormwater are mixed together in a final effluent inspection chamber, then discharged to the main river channel in the Lower River Shannon through 3 no. pipes. The pipes extend approximately 75m into the river channel and each is fitted with 2 no. diffuser heads that disperse discharge and mix it with the receiving river flow.

1.4 The Planning Process

Pre-application consultation with An Bord Pleanála (ABP) was undertaken, with regard to Section 37B of the Planning and Development Act 2000 (as amended), to determine whether the Proposed Development project for Castletroy will be classified as Strategic Infrastructure Development (SID).

The Planning and Development Act 2000 (as amended) provides the statutory framework in Ireland for planning consents and the control of development. The Act (including the Strategic Infrastructure Act 2006) categorises development which is of strategic economic or social importance (i.e. 'Strategic Infrastructure Development') under its 7th Schedule. The 7th Schedule of the Act defines 'Environmental Infrastructure' as follows:

"*A wastewater treatment plant with a capacity greater than a population equivalent of 10,000 and, for the purpose of this provision, population equivalent shall be determined in accordance with Article 2, point 6, of Council Directive 91/271/EEC*".

Following consultations outlined in Section 37(B) of the Act, ABP has determined that the Proposed Development meets the criteria for Strategic Infrastructure Development (SID). Subsequently, as per Section 37E of the Act, the consent application for the Proposed Development will be made directly to An Bord Pleanála, accompanied by this Environmental Impact Assessment Report.

"*An application for permission for development in respect of which a notice has been served under section 37B(4)(a) shall be made to the Bord and shall be accompanied by an environmental impact statement in respect of the Proposed Development.*"

1.5 Consultation Undertaken

1.5.1 Introduction

Early stakeholder engagement (including dialogue, consultation and the disclosure of information) is a key element of project planning, development and implementation. Effective stakeholder engagement assists good design, builds relationships with local community, and reduces the potential for delays through the early identification of risks and issues.

Consultation has been undertaken with stakeholders during the development of the EIAR and statutory consent application in order to:

- Provide information on the Proposed Development;
- Ascertain and understand the views of stakeholders; and
- Seek input from stakeholders on the design, construction and assessment aspects of the Proposed Development.

1.5.2 Statutory Pre-Application Consultation with An Bord Pleanála

Consultation has been undertaken with An Bord Pleanála (the planning authority) as part of the formal pre-application consultation process for the Proposed Development.

Irish Water submitted a letter to An Bord Pleanála on 29th October 2021 requesting to enter into pre-application consultation to determine if the Proposed Development is 'Strategic Infrastructure Development'

in accordance with the Seventh Schedule of the Planning and Development Act, 2000, as amended. An Bord Pleanála was also required, as part of the pre-application consultation process, to give advice on procedural matters involved in making an application and to advise on matters relating to proper planning and sustainable development or the environment, which may have a bearing on its determination.

Pre-application consultation meetings were held with An Bord Pleanála on the 28th June 2021 and 30th August 2022. Following these meetings Uisce Éireann submitted a request to close the pre-consultation process, and on the 24th January 2023 An Bord Pleanála confirmed that the Proposed Development is 'Strategic Infrastructure Development' in accordance with the Seventh Schedule of the Planning and Development Act, 2000, as amended. An Bord Pleanála also provided a list of Statutory Consultees to which Uisce Éireann are obliged to engage with directly in the application process.

1.5.3 Non-Statutory Consultation

Uisce Éireann held a period of non-statutory consultation to engage with relevant stakeholders in relation to the Proposed Development, which commenced on 13th June 2022 for a duration of 6 weeks. Non- statutory consultees included the public, elected representatives, and other interested parties (i.e. local industry).

The following strategies were used to communicate with non-statutory consultees:

- Social media and poster campaigns promoting the project publications;
- Information webinars;
- Information web page; and
- Contact email address for submissions.

At the outset of the consultation period, the project team held a webinar/ online information event. They presented on the proposed design and associated environmental considerations, with an open questions forum at the end. The webinar information and environmental reports were also published on the project webpage, and submissions were welcomed for the duration of the consultation period via the project email address.

Feedback

The issues raised and feedback provided during the public consultation period were summarised in the Consultation Report. All issues raised were considered by the project team in developing and finalising its planning application and EIAR.

SECTION 2: ALTERNATIVES

2.1 The Do-nothing Scenario

The do-nothing scenario refers to what will happen if the Proposed Development was not implemented and appropriate upgrade to the wastewater treatment plant was not undertaken.

Currently Castletroy WwTP is not in compliance with either the Urban Wastewater Treatment Regulations or its discharge licence as granted by the Environmental Protection Agency (EPA) and other relative legislation. Accordingly, it follows that the 'Do-Nothing' scenario is not a viable option as Uisce Éireann will be in breach of its statutory obligations under national and EU legislation.

2.2 Alternative Treatment Locations

The feasibility of pumping to Bunlicky WwTP via the interceptor sewer was investigated and following on from three Workshops held in 2018 and 2019, Uisce Éireann considered the following treatment location options:

Option 1: Upgrade the existing Castletroy WwTP to meet 10-year growth projections, with infrastructure to meet 25-year growth projections.

Option 2: Partially upgrade the existing Castletroy WwTP and pump remaining load to Bunlicky WwTP.

Option 3: Decommission Castletroy WwTP and pump all wastewater to Bunlicky WwTP.

In summary, option (1) was deemed to be the most economically advantageous solution. It is the option with minimum footprint required hence minimising flood compensation within the site and meets the current future predicted Emission Limit Values (ELVs) required to protect the receiving water quality.

2.3 Alternative Processes (Technologies) for Treating Wastewater

Alternatives were considered with regard to each phase of the wastewater treatment process, as described in the **sections 2.3.1 to 2.3.6** below. In formulating the various treatment process options, the following options were considered during the design development of the treatment processes in the wastewater treatment plant:

- Design parameters and constraints to be considered in the design;
- Process options for the level of treatment required;
- Relevant legislation, best practice and industry design standards for wastewater treatment;
- Preliminary sizing of the various structural and MEICA elements of the treatment process;
- Possible layout arrangements for the proposed major process units; and
- Capital and operational expenditure for the preferred options.

2.3.1 Inlet Works

Two design options were considered for upgrading the inlet works:

Option 1: Excess flows are transferred directly to the proposed stormwater storage tank and returned to the inlet works for full treatment when the storm event has ended.

Option 2: Discharging excess storm flows through a high-level overflow pipe located in the wet well. Overflows are conveyed directly to the final effluent inspection chamber, by-passing the proposed storm tank and treatment process.

Option 1 is considered the optimal technical solution as it will utilise the available storm storage, as well as minimising chances of surcharging of the sewer network and causing localised flooding.

2.3.2 Stormwater Storage

There were two options for the stormwater storage tank layout as follows:

Option 1: To provide a rectangular stormwater storage tank.

Option 2: To provide a circular stormwater storage tank.

Option 1 provides a more efficient use of land and proves to be a more advantageous option.

2.3.3 Primary Treatment

Three options were considered for the primary treatment process as follows:

Option 1: The new system will bypass primary treatment stage and transfer screened sewage directly to secondary treatment.

Option 2: Construction of new conventional primary settlement tanks.

Option 3: Upgrade and increase capacity of the existing primary filtration system with additional primary sludge mechanical filtration units.

Option 3 is considered to be the optimal technical solution, as it reduces the impact of the development on the flood plain.

2.3.4 Secondary Treatment

Four process options for secondary treatment were considered as follows:

Option 1: Conventional Activated Sludge (CAS) (expansion of existing arrangement).

Option 2: HyBacs (Hybrid Activated Sludge)

Option 3: Aerobic Granular Sludge (AGS) e.g. Nereda

Option 4: Integrated fixed film activated sludge (IFAS)

Option 4, is considered to be the optimal technical solution. This option will cater for the future projected design loading to the plant with minimum footprint required and maximising the existing assets.

2.3.5 Sludge Treatment (Dewatering)

Two options were considered for sludge dewatering:

Option 1: Upgrading of the existing belt press equipment.

Option 2: Replacement of existing centrifuges.

Option 2 is considered to be the optimal solution as it offers a higher percentage of dry solids, higher hydraulic throughput with smaller footprint, greater odour control and less operator input.

2.3.6 Sludge Cake Storage

Two options were considered:

Option 1: Provide 3 no. covered sludge skips which are required to be installed outside the building.

Option 2: Retaining existing arrangement of 1 no. sludge trailer placed underneath existing belt press.

Option 1 was chosen solution because of the flexibility/additional storage that it offers.

SECTION 3: THE PROPOSED DEVELOPMENT

3.1 Introduction

This section describes the Proposed Development for which Uisce Éireann is seeking consent. Specifically, this section describes the design, operation and decommissioning elements of the Proposed Development, whilst the construction strategy is described separately in **Section 4**. This section of the EIAR has been prepared in accordance with Part 1 of Annex IV of the EIA Directive and describes the following:

- The strategy for procurement of the Proposed Development and how it will influence the detailed design;
- Design requirements;
- The design of the Proposed Development; and
- The operation of the Proposed Development.

3.2 Procurement Strategy

Uisce Éireann intends to procure the detailed design and construction of the Proposed Development using a Design and Build type contract. This form of contract has the benefit of encouraging innovation and value engineering, particularly for a project of this nature and scale, by giving the contractor responsibility for both the detailed design and construction of the development. Design and Build contracts traditionally also lead to shorter construction programmes. Under this type of contract, the successful contractor will ultimately be responsible for the final detailed design of the Proposed Development, within the constraints as outlined herein.

The contractor is required to comply with all of the performance requirements set out in the tender documentation including the statutory consent approvals and any associated conditions that may be granted by An Bord Pleanála, Department of Housing, Planning and Local Government, EPA and other statutory stakeholders.

Uisce Éireann has developed a detailed specimen design of the Proposed Development for assessment within this EIAR. This EIAR has considered the likely significant effects on the environment associated with our detailed specimen design. The contractor will develop this design further, in accordance with the proposed mitigation measures, and any conditions that may be prescribed as part of the consent for the Proposed Development, ensuring that there is no material change in terms of significant effects on the environment.

3.3 Design Requirements

The Proposed Development will cater for future population growth and industrial development in the area, in line with population projections for Limerick as set out in the National Planning Framework (NPF) Implementation Roadmap and the Southern Region Regional Economic Spatial Strategy (SRRSES). It will provide 20% Headroom allowance, in line with Uisce Éireann guidelines for large urban settlements. It will also ensure the WwTP continues to comply with requirements of the EPA Wastewater Discharge License (WWDL), Urban Wastewater Treatment Regulations (UWWTR) and other relevant Uisce Éireann Guidelines.

The initial upgrade works will cater for the 10-year growth projections up to 77,500 PE including a future IDA load of 5,500 PE. There will be provision made in the civil infrastructural development of the plant (tank sizing and pipework) for the 25-year growth projections of 81,100PE. However, a planning review will be required before any uplift above 77,500PE can be installed.

The Proposed Development also includes the installation of a new stormwater storage tank that will significantly reduce the annual rate of spills to the Lower River Shannon and make the WwTP compliant with the criteria outlined in the DoEHLG "Procedures and Criteria for Storm Water Overflows, 1995“.

3.4 Design of the Proposed Development

The Proposed Development comprises of the construction of new wastewater treatment plant upgrades at the existing Castletroy WwTP site. All works will be retained within the existing site boundary.

The WwTP will remain operational during the construction phase. All new structures will be constructed offline and connected during short duration temporary shutdowns. The shutdowns will be planned in a manner that will not affect WwTP performance. The main elements of the Proposed Development are listed as follows:

- Upgrade to the inlet works (screens and pumps);
- Installation of a new (additional) grit channel;
- Construction of a new stormwater storage tank;
- Upgrade to primary treatment process;
- Construction of a new primary sludge holding tank with odour abatement;
- Upgrade to secondary treatment aeration system;
- Upgrade to secondary clarifiers to improve hydraulic capacity;
- Construction of a new flood event pumping station;
- Construction of a new surface water attenuation tank;
- Installation of a new chemical dosing tank; and
- Upgrade and repurposing of the plant’s sludge treatment facilities.

3.5 Operation of the Proposed Development

This section describes the likely operational activities of relevance to this EIAR. The contractor will be responsible for operating the WwTP for an agreed period at the outset of the Proposed Development before handing back to LCCC operators. Site personnel will be responsible for the following management activities during the operation phase of the Proposed Development:

- General maintenance and monitoring of the WwTP processes;
- Sludge management in accordance with the National Wastewater Sludge Management Plan (NWSMP);
- Site Access and Deliveries;
- Environmental, health and safety procedures;
- Employment of approximately 3 - 5 personnel; and
- Decommissioning of WwTP buildings and process equipment that reach the end of design life.

SECTION 4: CONSTRUCTION STRATEGY

4.1 Construction

Uisce Éireann proposes to procure the construction of the plant upgrade by means of a Design and Build type contract. This type of contract has the benefit of encouraging innovation and value engineering, particularly for a project of this nature and scale, by giving the contractor responsibility for the detailed design and construction. Under this type of contract, the successful contractor will ultimately be responsible for the final detailed design and determination of appropriate construction activities required for the Proposed Development.

It will be the responsibility of the contractor (under the obligations of the Design and Build type contract) to ensure compliance with those measures that have been outlined in this EIAR to avoid and/or reduce significant adverse effects that have been identified. It will be the responsibility of the contractor to ensure compliance with or obtain the relevant licenses, permits and consents for such changes to what is defined in the granted planning consent.

The duration of the construction of the Proposed Development is estimated at between 24 and 36-months. An initial approximate 3-month period is likely to be required to undertake necessary site investigations and detailed design. A pre-construction badger survey is required to be carried out no more than 10-12 months in advance of construction. This survey will likely be undertaken following mobilisation of the Contractor to site and within the 3-month design period.

An invasive species management plan will be developed to prevent the spread of invasive plant species on and from the site. Preparation of the invasive species management plan will be carried out following commencement of the Contract. Civil works to construct the subsurface and above ground structures will take approximately 18-months. Open cut construction of interconnecting pipework will take approximately 2-months. Upgrade of the secondary treatment process with an IFAS technology will take approximately 2-months. Installation of process, mechanical and electrical equipment will take approximately 8-months. Site finishes and landscaping will take approximately 2-months. Testing and commissioning will take approximately 3-months. Trial operation of the upgraded processes will take approximately 3-months. Decommissioning of process, pipework, mechanical and electrical equipment will take approximately 2-months. Some of these above activities will be undertaken in parallel or overlap. It should be noted that some of the construction activities could be subject to seasonality restrictions.

No temporary working areas or land acquisition will be required to accommodate construction activities. All works will be undertaken within land owned by Uisce Éireann or Limerick City and County Council. Construction traffic will be required through the University of Limerick for the duration of the works.

The construction compound will be located within the site boundary of Castletroy WwTP and will provide site offices and welfare facilities for construction employees, as well as providing an area for material storage. Ground levels for the compound will be raised temporarily above the design flood level for the duration of the construction contract to prevent materials and equipment being damaged or carried away by flood water in the event of a flood.

Enabling works are required for various aspects of the Proposed Development, but no diversion of ESB underground or overhead power lines will be required. Modification to sludge dewatering building will be caried out to accommodate the new sludge dewatering centrifuge equipment. Other activities will include, excavation, remediation and dewatering where appropriate including treatment and/or removal of contaminated land and ground water followed by the construction of storm water storage tank, the primary treatment building, sub-surface pumping and flood event pumping stations, picket fence thickener and primary sludge holding tank, modification to the sludge dewatering building, upgrade of the secondary treatment process, construction of interconnecting pipework, testing and commissioning.

4.2 Management

An outline Construction Environmental Management Plan (CEMP) has been prepared with a schedule of mitigation measures. The contractor is required to integrate these measures into a detailed CEMP following appointment (prior to the commencement of any construction activities). The detailed CEMP will be required to have regard to the guidance (CIRIA (2015) Environmental Good Practice on Site Guide, 4th Edition) and industry best practice. The CEMP will be implemented throughout the construction and the contractor will be required to review and update the CEMP as construction progresses.

In addition to the CEMP, it is anticipated that the contractor will prepare a Construction Management Plan and relevant Works Method Statements in advance of any works commencing on site. Every effort will be made to ensure that any significant environmental effects as described in this EIAR will be avoided, prevented or reduced by adopting the mitigation measures outlined in this EIAR.

A detailed construction traffic management plan will be prepared by the contractor in advance of any works taking place on site and submitted to Limerick City and County Council for approval. High level agreements with both Limerick City and County Council and the University of Limerick will be sought in advance of works commencing, and any requirements or constraints will be incorporated into contract documents for the works.

It is anticipated that there will be up to approximately 80 construction employees on site during the peak construction period. The core construction working hours for the Proposed Development will be:

- 7am – 7pm: Monday to Friday;
- 8am – 2pm: Saturday.

Hoarding and fencing will be erected within the site to segregate construction works areas from plant operations that will remain in-situ for the duration of the construction works. Hoarding will also be erected along the south-eastern section, the hoarding/fencing will be up to approximately 2.4m high.

Site services will be installed in parallel with the rearrangement and diversion of existing utilities, where relevant. Site lighting will typically be provided by tower mounted 1,000W metal halide floodlights at the various work areas in the Proposed Development site. Site lighting during construction will be subject to a temporary design that minimises light pollution.

Construction of the Proposed Development will require the import of materials to site as well as the export of materials generated and surplus to requirements. Where practicable, efforts will be made to manage materials in accordance with the waste hierarchy and promote the reuse and recycling of materials on site.

SECTION 5: PLANNING AND POLICY

Uisce Éireann are seeking planning permission for the upgrade of the existing Castletroy WwTP at Dromore. This development constitutes a 'strategic infrastructure development' as defined under the Planning and Development (Strategic Infrastructure) Act 2006.

This section sets out the legislative context governing the planning and development of the Proposed Development. This includes a strategic review of the planning policy context at a national, regional and local level and other relevant statutory and non-statutory planning documents.

Under a European context the following were considered:

- EU Water Framework Directive (2000/60/EC);
- Birds and Natural Habitats Directives;
- Environmental Impact Assessment Directive (Consolidated 2011/92/EU and 2014/52/EU); and
- Public Participation Directive (2003/35/EC).

Under a National context the following were considered:

- National Legislative Framework for EIA (as transposed in the Planning and Development Acts 2000 to 2019 (the “Planning Acts”);
- Section 37A of the Planning and Development (Strategic Infrastructure Act) 2006;
- Project Ireland 2040 – National Planning Framework; and
- Water Services Strategic Plan 2015 – 2040;
- Water Services Policy Statement 2018-2025.

Regional strategies include the Regional Spatial and Economic Strategy for the Southern Region (RSES) which is a 12-year strategic regional development framework to guide development in the region. The primary aim of the RSES is to implement Project Ireland 2040 at the regional tier. The RSES seeks the provision of infrastructure and services in a sustainable, planned and infrastructure led manner to ensure the sustainable management of water, waste and other environmental resources. The key Regional Policy Objectives (RPOs) relating to the wastewater were considered. At a local level, the following policies and plans were taken into account:

- Limerick Development Plan 2022 – 2028;
- The Clare County Development Plan 2017-2023; and
- The Draft Clare County Development Plan 2023-2029.

In addition, the following reports and supporting studies were also considered:

- Irish Water Capital Investment Plan (CIP)– 2020 - 2024;
- Water Sector Transformation Policy Paper – Irish Water – Towards a National, Publicly-Owned, Regulated Water Services Utility 2021.

SECTION 6: TRAFFIC AND TRANSPORTATION

This assessment describes the likely significant effects on traffic and transportation associated with the construction and operation of the Proposed Development.

In order to determine traffic behaviour in the vicinity of the subject site, vehicle turning movement surveys were undertaken on Thursday, 12th May 2022 for six junctions near the subject site. The counts were carried out over the 12-hour period from 07:00 hours to 19:00 hours including both the morning and evening peak periods. The six junctions are :-

- Junction 1 - Plassey Park Road/ Limerick City and County Council Access Road;
- Junction 2 - Plassey Park Road/ Dublin Road/ Groody Road roundabout;
- Junction 3 - Plassey Park Road/ Plassey Road;
- Junction 4 - Plassey Road/ Dublin Road/ Kilmurry Road roundabout;
- Junction 5 - Plassey Park Road/ Dublin Road/ Castletroy College Road roundabout; and
- Junction 6 - Dublin Road/ Childers Road roundabout.

The assessment covered both construction and operation phases, but it is envisaged that likely significant effects during the construction phase will be greatest. To establish the future year flows, the traffic count survey data were factored up to the final year of construction (2026, subject to planning) by using TII Project Appraisal Guidelines: Unit 5.3 Travel Demand Projections to develop a “Do-nothing” scenario. Construction traffic associated with the Proposed Development was then applied to these future year flows to develop a “Do-something” scenario.

The traffic assessments during construction phase were carried out. The results demonstrate that all monitored junctions (except Junction 3) will operate within the normal design threshold in the morning and evening peak hours under 2026 “Do-nothing” and “Do-something” scenarios. For Junction 3, it will also operate within the normal design threshold in the evening peak hour under 2026 “Do-nothing” and “Do-something” scenarios. However, the Plassey Road arm on Junction 3 during the morning peak hour under 2026 “Do-nothing” and “Do-something” scenarios will slightly exceed the normal design threshold (but still less than its theoretical capacity of 1.0) with queues and delays for motorists evident. However, the analysis indicates that traffic from the Proposed Development during construction will have a minimal impact on this junction.

In addition, the busiest phase of the project in terms of site access for HGVs will be during the excavation and concrete pours for construction of the storm tank. However, the Limerick City and Council Access Road is not wide enough for two lorries to pass and does not have any lay-by area. In order to prevent traffic back-ups onto the Plassey Road, access via the internal roads of the University of Limerick campus may be required to create one-way traffic flow systems to facilitate the excavation and concrete pour periods. It is also expected that certain large plant and equipment may need to be transported via the main campus route. The contractor will develop a Construction Traffic Management Plan in full consultation with the relevant stakeholders, University of Limerick, Limerick City and County Council Transportation Department in advance of implementation.

During the operation phase, the estimated trips associated with the Proposed Development represent a tiny proportion of existing traffic flows on the surrounding road network and less than the thresholds for traffic impact assessment as stated in the Table 2.1 of TII Traffic and Transport Assessment Guidelines (i.e. 10% of the traffic flow on the existing road network and 5% in sensitive environments or where congestion exists). It is reasonable to assume that the number of trips generated by the Proposed Development will remain close to a constant number in future years while background traffic levels will show a steady increase.

The residual impacts associated with the construction phase of the Proposed Development will range from short term, imperceptible to short term, slight negative. No significant residual impacts are predicted during the operation phase.

SECTION 7: ODOUR

An odour impact assessment was prepared to assess the potential impact of odours associated with the Proposed Development on the sensitive residential and educational receptors in the vicinity of the Proposed Development site during the construction and operation phases and to determine if these impacts are significant.

The odour impact assessment was undertaken with reference to Guidance on the Assessment of Odour for Planning (Version 1.1 - July 2018), issued by the Institute of Air Quality Management (IAQM 2018).

Site visits to assess the relevant baseline odour surveys and the proximity of the nearest residential properties were undertaken during suitable meteorological conditions to allow for potentially worst-case conditions to prevail during the baseline odour surveys. The baseline surveys were undertaken in accordance with the EPA, Odour Impact Assessment Guidance for EPA Licensed Sites (AG5) (2021). During the odour surveys, odours from the existing Castletroy WwTP sources were noted to be detectable at the boundary of the Proposed Development site. During the off-site odour surveys, it was noted that faint WwTP-type odours were detected in proximity to nearby residential properties.

In the odour dispersion models, odour sources and odour emission rates have been derived for the 'existing' and 'proposed' odour models based on the sources identified during the odour surveys and the proposed design drawings and project description. These have included the three new Odour Control Units (OCU) that will be included in the proposed design. Receptor locations in proximity to the Castletroy WwTP have been selected for detailed assessment in the odour dispersion model.

The predicted 'difference' in odour concentrations between the existing Castletroy WwTP and the Proposed Development indicate a 68% to 81% reduction in odour concentrations at the nearest Sensitive Residential Properties.

Based on the odour dispersion model of the Proposed Development of the Castletroy WwTP, it is concluded that there will be no potential to give rise to significant nuisance, or to significant impairment of, or significant interference on the environment of future residents due to the operations of the Proposed Development.

The adopted Odour Impact Assessment Criteria will be achieved at the nearest sensitive locations in proximity to the Castletroy WwTP site.

No significant residual impacts are predicted during the construction phase. The residual impacts associated with the operation phase of the Proposed Development will be long term and slight positive.

SECTION 8: AIR QUALITY AND CLIMATE

An air quality and climate impact assessment was prepared to assess the potential impact of changes to the air quality and climate associated with the Proposed Development on the sensitive residential and educational receptors in the vicinity of the Proposed Development site during the construction and operation phases.

The construction activities of the Proposed Development have been examined to identify those that have the potential to give rise to dust and air pollutant emissions and a suitable risk assessment has been undertaken. As appropriate, construction mitigation measures have been outlined.

The air quality impact assessment was undertaken with reference to Air Quality Standards Regulations 2011 (S.I. No. 180 of 2011) & CAFE Directive 2008/50/EC. The rationale for describing the impact of the Proposed Development is derived from the Environmental Protection UK (EPUK) and Institute of Air Quality Management (IAQM) guidance (EPUK & IAQM) Land-Use Planning & Development Control: Planning for Air Quality (January 2017). As prescribed within Environmental Protection UK and the Institute of Air Quality Management, Land-use Planning & Development Control: Planning for Air Quality (January 2017) the Proposed Development has been assessed in accordance to Guidance on the Assessment of Dust from Demolition and Construction (IAQM) 2014.

National Air Quality Management Area(s) (AQMA) are air quality stations or designated zones that measure data to indicate the quality of the air. There are four EPA air quality stations in Limerick. The closest national ambient air quality monitoring station is on Henry Street, which is located approximately 3.6 km south-west of the Proposed Development site. Monitoring results are available for nitrogen dioxide, ozone, and particulate matter. The closest local network monitoring station is in Castletroy, located approximately 3km southeast of the Proposed Development site. This station monitors particulate matter only.

An assessment of the potential impact on air quality during construction has been undertaken. Using the IAQM methodology for the assessment of air quality and dust impacts from construction activities has indicated a 'Medium' level of risk. Therefore, appropriate recommended construction phase dust mitigation measures, in terms of dust soiling impacts, impacts on human health and ecological impacts have been recommended.

The existing Castletroy WwTP does not have a significant impact on local air quality as there is no significant source of air pollutants on the Castletroy WwTP site. The Proposed Development will not have a significant impact on local air quality as there is no significant source of air pollutants in the Proposed Development.

The operation of the existing Castletroy WwTP generates less than 20 vehicle movements per day to the Castletroy WwTP site. The operation of the existing Castletroy WwTP also accounts for less than 10 heavy goods vehicle (HGV) movements per day for sludge transportation to the Castletroy WwTP site. This will remain unchanged with the Proposed Development.

Despite the outcome of the impact assessment, Uisce Éireann are commitment to reducing carbon emissions and protecting the environment in a cumulative effort to support national objectives for climate change mitigation and to meet obligations under the National Climate Change Adaptation Framework. Therefore, in the procurement process, tenderers will be incentivised to include Green House Gas (GHG) emission reduction measures throughout the design and construction methodology.

There will be no significant residual impacts on air quality or climate during the construction or operation phases of the Proposed Development.

SECTION 9: NOISE AND VIBRATION

A noise impact assessment was prepared to assess the potential impact of noise and vibration associated with the Proposed Development on the nearest residential properties and educational receptors in the vicinity of the Proposed Development site during the construction and operation phases.

The construction activities of the Proposed Development have been examined to identify those that have the potential to give rise to noise and vibration and a suitable construction impact assessment has been undertaken. As appropriate, construction phase mitigation measures have been outlined.

The noise impact assessment and evaluation of the noise impact arising from the Proposed Development involved the completion of a baseline noise survey at sensitive receiver locations in proximity the site of the Proposed Development in accordance with suitable guideline methodology. This established the current baseline conditions. The existing daytime and night-time noise levels were dominated by road traffic and University of Limerick campus noise sources. However, during the noise surveys, between periods when occasional passing traffic occurred on the access road through the University of Limerick campus a faint shrill noise was noted to be audible in proximity to the nearest residential properties in closest proximity to the Castletroy WwTP site. The results of the baseline noise monitoring data indicate that the noise levels at the sensitive receivers in the area of the Proposed Development are broadly in accordance with the World Health Organisation (WHO) Guidelines for Community Noise.

There is the potential for temporary and intermittent increases in noise levels during the construction phase of the Proposed Development at the nearest residential properties. The worst-case construction noise levels at specific locations in proximity to the expected main areas of construction activity have been predicted using the methods of predicting construction noise levels set out in standards document BS 5228-1:2009+A1:2014. The recommended daytime construction noise limit will be achieved at the nearest residential properties. The construction noise impacts will be short-term and will not be significant. Also, the nature of the proposed works and its duration will mean that noise sensitive receivers will not be exposed to continuous construction noise impact during the construction period. Appropriate construction mitigation measures have been outlined and once implemented, the residual impacts from the construction period will not be significant.

The main potential noise sources from the Proposed Development during the operation phase will be due to the noise from water movements within tanks and associated noise from pumps, blowers and buildings. The potential noise impacts have been predicted in a noise prediction model. The predicted operation noise levels during daytime and night-time include for no traffic movements on site. The Castletroy WwTP site only generates occasional site traffic movements in terms of both staff cars and sludge tankers. The Proposed Development will not generate additional traffic movements and therefore, will not result in a significant traffic noise impact.

The predicted noise levels with the upgrade of the Castletroy WwTP in operation during daytime and night-time will be quieter than the existing WwTP due to the proposed changes including, an upgrade of the existing blowers which produce a ‘shrill’ noise, the proposed covering of the inlet works and improvements to the Sludge Building with negative pressure system improvements and permanent closing of the doors. In comparison to the WHO Guidelines for Community Noise (WHO 1999), the predicted noise levels due to the operation of the upgraded external plant and equipment noise sources is well in accordance with WHO guidelines. The predicted difference in noise level, between the existing Castletroy WwTP and with the Proposed Development results in a small noise level decrease at all receptor locations.

The residual impacts associated with the construction phase of the Proposed Development will be short term and insignificant for both noise and vibration. During the operational phase, there will be no significant impacts relating to vibration and there will be a long term, slight positive residual impact on noise.

SECTION 10: ARCHAEOLOGY, ARCHITECTURAL AND CULTURAL HERITAGE

An Archaeological Impact Assessment including site inspection, was undertaken in order to identify and describe known and potential archaeological and cultural heritage constraints within the Proposed Development area and its environs and to offer recommendations for the mitigation of such potential impacts.

The Proposed Development site contains no Recorded Monuments listed within the Record of Monuments and Places for County Limerick. The nearest recorded monument to the site, an enclosure (CL063-015) is located c. 0.66km to the northeast.

The site is located within Castletroy/Dromore Conservation Area as shown on ACA Map C-19/25-04 (ACA 9; Map 9 in Draft Limerick Development Plan). There are no Protected Structures listed in the Limerick County Development Plan 2010-2016 (updated in the Castletroy Local Area Plan 2019-2025) nor in the Draft Limerick County Development Plan 2022-2028 within the site. There are also no sites listed within the National Inventory of Architectural Heritage (NIAH). The closest such structure is Plassey Mills (RPS 1601, NIAH Reg. No. 21900504) located adjacent and to the east of the site.

There are no wrecks with known location within or adjacent to the site as listed within the Wreck Inventory of Ireland Database (WIID); however, 42 such wrecks are recorded as lost in the Shannon River.

The site was not subject to archaeological investigation previously. The nearest assessment to the site took place in advance of the new bridge scheme at Plassey, to the north of the site. An underwater assessment and survey under licence 00D056 identified a ship's timber measuring 1.9m in length; the timber was an isolated find that was washed downstream.

The National Museum of Ireland Topographical Files were reviewed. No finds are registered for Dromroe townland or Castletroy. However, two Roman coins were found in the north part of Sreelane townland, near the river's south shore c. 300 m east of the site.

There is no potential for direct impacts on known archaeology and cultural heritage. However, there is some limited potential for the development impacting upon unknown, buried archaeological remains if such are present within the site. Due to the necessity for deep excavations (in places between 2m OD/ c. 5m below existing ground surface); groundworks will result in excavations of estuarine deposits. Excavation of such have some limited potential to expose fish traps, trackways, canoes, boats or objects related to fishing and hunting, due to good preservation in waterlogged deposits. This could also include unrecorded archaeological remains that were sealed by made up ground, that could have been introduced to the site prior to the construction of the facility in the 1990s. Deeper excavations could expose estuarine deposits that might contain 'in situ' archaeological material or features.

With the implementation of appropriate mitigation measures, there will be no residual impacts on archaeology, architectural and cultural heritage during the construction or operation phases of the Proposed Development.

SECTION 11: BIODIVERSITY

The biodiversity assessment included a desk-based study of publicly available information, ecological walkover surveys including habitat surveys, otter surveys, badger surveys and invasive species surveys. The habitats within the site comprise amenity grassland, built infrastructure, scattered trees, treelines and drains, with woodland present adjacent to the site and Lower River Shannon SAC located north of the site. No signs of otter were found within the development site or along the Lower River Shannon in the vicinity of the site. A badger sett is present on the southern boundary of the site.

A Biodiversity Net Gain (BNG) assessment of the Proposed Development was carried out according to Uisce Éireann Biodiversity Guidelines. A landscaping plan for habitat creation and provision of bat boxes and a swift box within the site will be implemented, resulting in biodiversity net gain within the site post-development.

Giant Hogweed and Himalayan Balsam, Third Schedule Invasive Species, are present within the site and an Invasive Species Management Plan has been prepared in order to prevent their spread during construction of the Proposed Development.

An assessment of the impacts of the operational discharge of the WwTP as a result of the proposed upgrade works as well as the predicted increase in P.E, on aquatic habitats and fauna of the Lower River Shannon, was carried out. It is demonstrated that the current discharge is within Environmental Quality Standards (EQS) and in line with WFD objectives. It is also demonstrated that the calculated future discharge, including increased input, will be within EQS, and will therefore not significantly impact water quality in the Lower River Shannon. It is predicted that there will be no residual operational impacts on aquatic biodiversity.

In the absence of mitigation, the operation phase carries a risk of disturbance to fauna due to external lighting.

The impacts assessed during the construction phase of the Proposed Development include:

- Deterioration in water quality:
  The construction phase of the development carries a risk of sediment or pollutant run-off and groundwater contamination, impacting aquatic habitats and species of the Lower River Shannon.
- Habitat loss:
  The Proposed Development will result in loss of areas of amenity grassland and a number of scattered trees within the WwTP site.
- Disturbance of fauna:
  The construction of the development carries a risk of disturbance to fauna, in particular of badger and nesting birds.
- Biosecurity:
  The construction of the Proposed Development carries a risk of spread of invasive species currently present within the site outside of the site.

Appropriate mitigation measures will be implemented to avoid or reduce negative impacts on biodiversity during the construction phase. It is expected that there will be no residual construction impacts on biodiversity and overall will be a biodiversity net gain. This will be achieved through a combination of measures including creating a wet woodland (with oak, alder, grey willow, goat willow, hawthorn, holly and hazel) to the north of the site, planting of a treeline along the proposed new access track, installation of swift and bat boxes and a badger protective barrier, replacement of the existing lights with new lights which will shed less light on the neighbouring habitats, as well as silt fences to filter silt out of surface water runoff.

In conclusion, there will be no significant impacts on biodiversity during the construction phase and biodiversity net gain will create a long term, positive impact during the operational phase.

SECTION 12: LANDSCAPE AND VISUAL

This assessment considered the potential landscape and visual impacts of the Proposed Development. This assessment involved a desk-based review of available information including aerial photography and mapping of the Proposed Development. Site walkovers were carried out to verify desk-based findings and this included field surveys of specific areas and the capturing of photomontages (as included in this EIAR).

The majority of the works associated with the Proposed Development will include improvements to the landscaping within the WwTP in Castletroy, with the addition of tree and herbaceous planting along the west, north and east perimeter of the site. Some tree removal will occur within the site to allow for the construction of the Proposed Development. No tree removal is proposed from the perimeter of the site. This means that no further views will be opened towards the site to the users of the surrounding areas.

A series of photomontages around the site illustrate the existing and proposed views following the implementation of the Proposed Development. The proposed ecological enhancement of the on-site vegetation along the northern and western boundaries with trees, hedgerows and wildflower meadows is expected to benefit the amenity offered by the riverside footpath by reducing views towards the site.

No significant potential landscape and visual impacts are expected to arise from the proposals during the construction phase. The implementation of the proposed planting will have long-term positive impacts to the landscape and visual amenity.

SECTION 13: LAND AND SOILS

The land, soils, geology and hydrogeology assessment included a desk-based study of publicly available information, ground investigation data and a scheme walkover survey. The geology (soils and rock) beneath the study area of the Proposed Development mainly comprises made ground, alluvium/estuarine silt and clay and glacial till derived from limestone which are underlain by limestone rock.

The land within the development site boundary is classified industrial (site of current wastewater treatment facility). The surrounding land within the study area is principally urban comprising existing industrial, commercial, residential, and recreational.

Aquifers (which store/ produce groundwater) within the study area of the Proposed Development are classified as 'Locally Important', generally moderately productive or moderately productive in local zones, in terms of their ability to produce water.

The impacts assessed during the construction phase of the Proposed Development include:

- Loss or damage of topsoil/overburden materials;
- Excavation of potentially contaminated ground;
- Loss or damage/contamination of parts of an aquifer; and
- Change to groundwater flows.

Appropriate mitigation measures will be implemented to avoid or reduce negative impacts on land, soils, geology and hydrogeology during the construction phase. It is expected that there will be no residual construction impacts on land, soils, geology and hydrogeology.

The impacts assessed during the operation phase include the potential land, soils, geology and hydrogeology impacts associated with the pollution of groundwater and watercourses. In the operation phase the infrastructure will be maintained by the Uisce Éireann and will be subject to their management procedures to ensure that the correct measures are taken in the event of any accidental spillages. With the correct measures in place, there will be no long-term residual impacts as a result of the Proposed Development during the operation phase.

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SECTION 14: WATER

Sources of wastewater loading to the WwTP are from the domestic population, the University of Limerick, commercial and industrial sectors, and imported sludges and leachates. The WwTP treats the wastewater with secondary biological and nutrient removal processes. Stormwater overflows (SWOs) and final treated effluent are discharged into the main flow channel of the Lower River Shannon. The discharge point from the WwTP includes three outfall pipes which exit the final effluent inspection chamber. These outfall pipes extend approximately 75m into the main river channel, and each is fitted with 2 no. diffuser heads to disperse discharge and enhance mixing with the river flow.

The receiving water at the point of discharge is designated on ecological grounds as a Special Area of Conservation (SAC); applicable SAC is titled 'Lower River Shannon' with Site Code: 002165. Due to the proximity to the UL Boat Club, it is also considered to be recreational water, defined in IW Technical Standard IW-TEC-800-03 for Stormwater Overflows (SWOs) as '*waters where bathing and /or contact sports (immersion) is regularly practiced (e.g. wind-surfing, canoeing*)'.

During normal weather conditions the final effluent consists of treated discharge from the WwTP process (SW-1). There is currently no stormwater storage on site. During heavy rainfall and storm conditions, screened stormwater (SW-4) and unscreened emergency overflows (EO) discharge directly to the final effluent chamber. The screened and untreated storm flows are mixed with treated effluent and discharged to the Lower River Shannon at a rate of approximately 33 per bathing season. This arrangement is not in compliance with DoEHLG 'Procedures and Criteria in Relation to Stormwater Overflows', with regard to the lack of stormwater storage and also recreational water standards (no more than 7 spills per bating season).

A baseline water quality assessment was carried out using monitoring results for the primary wastewater parameters BOD, ammonia and ortho-Phosphate. Results were plotted for a 5-year period (2016-2021) with regard to their reference to their Environmental Quality Standards (EQS). Concentrations were typically within the high status EQS limits, but there were also a number of outlier results (spikes), likely due to storm events as mentioned above. Some results showed slightly higher concentrations upstream than downstream, indicating that background activities such as agriculture and surface run off also play a role in water quality in the river.

Further inspection of 2019-2021 monitoring results confirmed that average concentrations of primary wastewater parameters are within High EQS limits. The WwTP is not currently having any significant impact on receiving water quality in terms of increases in d/s concentrations or deterioration in the river's waste assimilative capacity (WAC).

A flood risk assessment (FRA) was carried out separately, but findings are relevant to the EIAR and design considerations for the Proposed Development. A desktop study of the national Catchment Flood Risk Assessment and Management (CFRAM) database indicates that site is in a high-risk category area, with portions of it lying within Flood Zones A and B. The National Flood Hazard Mapping Website shows records of severe flooding throughout the site in November 2009 due to the Lower River Shannon bursting its banks. Feedback during site visits indicates that there was a more recent flood in 2015, but it was less severe and water did not reach the green area in the middle of the site where the new infrastructure is proposed.

The standard best practice measures in the outline Construction and Environmental Management Plan CEMP (Refer to **Appendix 4A**) for the Proposed Development will mitigate significant negative effects on surface water quality and hydrology during construction. The Project Manager will take full ownership of the CEMP and will be responsible for storing all site records, including but not limited to, training records, incidents and emergencies, environmental quality monitoring records and updates to Method Statements. Subcontractors will be made aware of the site-specific Construction and Environmental Management Plan for the work. With mitigation measures in place, there will be no impact on receiving water quality during the construction phase.

Based on the water quality operational impacts assessment, there will be a slight reduction in WAC as the WwTP discharge rate increases, but it is not expected to breach high status environmental constraints if more stringent ELVs are put in place (subject to an WWDL review). i.e. creating a long term, slight negative impact on receiving water in the Lower River Shannon.

Conversely, there will be significant improvements in the rate of stormwater overflows due to the addition of stormwater storage, which will have a long term, significant positive impact on receiving water quality.

Therefore, a conservative conclusion has been reached for the assessment of the Proposed Development on receiving water quality in the operation phase, as having a long term, imperceptible/neutral residual impact.

SECTION 15: RESOURCE AND WASTE MANAGEMENT

An assessment of the likely significant effects of waste generation from the Proposed Development was undertaken. A desk study was carried out including a policy and legislation review and a review of current practice for waste management in Ireland. A description is provided of waste generation during the excavation, construction and operation of the Proposed Development.

An estimated 8,533 m^3 of excavation material requiring removal from site will be generated as a result of the Proposed Development during the construction phase. Of this it is estimated that all excavated material will be categorised as non-hazardous or hazardous in accordance with Council Directive 99/31/EC of 26 April 1999 on the landfill of waste and will require removal from site to authorised facilities in Ireland or abroad. Topsoil, soil, rock and naturally occurring excavation material excavated in the course of construction activities will be reused within the Proposed Development where feasible subject to further testing to determine if materials meet the specific engineering standards for their proposed end-use.

The most likely type of construction waste in the case of the Proposed Development, will be surplus concrete and unusable or damaged pipe segments which may arise on site. Where construction by-products are proposed to be further used on or off site this will take place in compliance with Article 27 of the European Communities (Waste Directive) Regulations, 2011. The contractor will be responsible for ensuring compliance with these Regulations where appropriate.

Where removal of waste from site is required, this will be delivered for recovery or recycling at facilities holding a Certificate of Registration, Waste Facility Permit or EPA Waste Licence.

The sludge produced by the Proposed Development will be thickened and dewatered to a minimum 18% dry solids, for appropriate disposal in accordance with the Irish Water National Wastewater Sludge Management Plan (NWSMP). The dewatered sludge will be transported to one or a number of licenced facilities that can provide treatment and final disposal that comply with Code of Practice, Domestic Wastewater Treatment Systems (2021), EU Code of Good Practice for Use of Biosolids in Agriculture and all other relevant legislation.

Screenings from the inlet works, SWO's and grit removal operations will continue to be collected by suitably permitted contractors and disposed of at an appropriately licensed facility in accordance with the Waste Management Acts, 1996 to 2011.

Municipal (non-household) office and food waste generated from the Administration Building will continue to be collected by a commercial waste collector as part of the regular waste collection service in the Castletroy Area. Future volumes of municipal waste are not expected to increase as staff numbers will not change.

Mitigation measures are recommended to minimise the effect of waste on the environment, reduce the quantity of waste sent for final disposal and to promote sustainable waste management practices. Management of waste and surplus excavation material will be at the discretion of the contractor who will be required to conform to relevant statutory requirements and the mitigation commitments made in the EIA Report.Following implementation of the mitigation measures the residual effects of the Proposed Development will be as follows:

- The residual effect of excavation waste is expected to be slight, negative and short-term.
- The impact of general construction waste is expected to be imperceptible and short term.
- The residual effect of operational waste is expected to be imperceptible and long term.

Implementation of best practice mitigation measures as proposed, will minimise waste being delivered to landfill and facilitate a high level of recycling and recovery of waste arising from the construction and operation of the Proposed Development.

SECTION 16: MATERIAL ASSETS

Likely significant effects on material assets have been evaluated during both the construction and operation of the proposed development. Specifically, material assets were considered in the form of:

- Land Use and Properties;
- Electricity;
- Telecommunications;
- Gas;
- Water Supply Infrastructure; and
- Foul and Surface Water Drainage.

A desk study, site visits and site-specific investigations were undertaken to provide the data to compile the description of the existing material assets.

The majority of likely significant effects associated with material assets will be experienced during construction and will consist mainly of local re-routing of existing services and utilities.

All construction activities in the vicinity of existing services and utilities will be carried out in consultation with the relevant service providers and undertaken in compliance with any requirements or guidelines that they may have. The contractor will be obliged to put measures in place to ensure that there are no interruptions to existing services and utilities unless this has been agreed in advance with the relevant service provider.

During construction and operation of the Proposed Development, there will be a slight increase in demand on some service networks, such as electricity, telecommunications and water supply. However, it is anticipated that the existing networks have sufficient capacity, and therefore, no significant effects are predicted during the construction or operation phases of the Proposed Development.

The proposed development will provide a robust wastewater network for the Castletroy agglomeration that will provide stormwater storage and accommodate future growth in the area. Therefore, there will be a significant, positive and long-term and permanent effect on the wastewater network in the operation phase of the Proposed Development.

SECTION 17: POPULATION AND HUMAN HEALTH

A desktop review of published policy documents and data was undertaken in relation to the study area. Potential impacts arising from construction and operation phases of the Proposed Development upon the population in the vicinity of the subject site and their health were assessed.

The study looked at population trends of the surrounding area to the subject site, this included areas in both Limerick and Clare Counties. The area includes the University of Limerick Campus and the National Technology Park (NTP) nearby at Plassey. As a result of these employment and educational opportunities the area contained some of the fastest growing residential areas in Munster between 2011 and 2016, with Castletroy earmarked in the Limerick County Development Plan 2022 as a continuing focus for strong growth. The presence of the university inflates the population figures for the academic term and skews the age profile of the area. The 17 and 24 year age group in the area represents almost three times the national average and 72% of the population is under the age of 40. This has implications for housing and other service provision.

The NTP and the university bring significant employment to the area, with the 2016 Census indicating there were 1.52 jobs to every worker in the area, compared to 1.26 in Limerick City and Suburbs and 1.06 in the Southern Regional Assembly area. Castletroy, is also a District Centre and performs an important retail and service role for the surrounding hinterland. Together these factors result in an overall inflow of workers to the area. However, the area is not uniform, with differences evident in the Pobal Deprivation Index, which shows more built-up, affluent areas to the south of the study area compared to less affluent, largely agricultural area to the north.

The potential likely and significant impact on human health have been assessed in other chapters of this report, in particular environmental factors such as air, water and soil through which contaminants could accumulate and potentially cause harm to the population. Similarly, nuisances such as traffic, noise and vibrations can impact on human health. The conclusions of these chapters have informed the following section.

The construction of the Proposed Development should not have a significant direct impact on the population numbers within the study area, as the workforce is anticipated to commute to the site. It will generate construction and associated employment, which may not be local workers and a significant direct impact on the local employment is not anticipated. However, it is likely that local businesses will benefit from the temporary daytime presence of this workforce.

It is anticipated that there will only be potentially slight and temporary disruptions to the operation of the university and local businesses due to construction traffic. A Traffic Management Plan will be prepared to ensure continued safe cyclists and pedestrian access. The potential for construction traffic and Green House Gas (GHG) emissions to impact air quality has been assessed as negligible. While dust emissions during construction have the potential to pose a negligible to slight short-term health impact, this is comprehensively addressed by the proposed mitigation measures. Similarly, construction noise has potential to give rise to a slight, short-term impact. However, vibration impacts are considered to be negligible.

As the proposed works are confined to within the site boundary, there should be no direct impact on recreational and sport-related water-users. There is potential for impacts on water quality arising at the construction stage, though this will be addressed fully through mitigation measures. The existing mature vegetation should filter views of the construction site, resulting in potential for only moderate, temporary visual impact on the resident and working population and recreational users in close proximity to the works (less than 0.5km). Any visual impacts reduce to slight and imperceptible from distances beyond that.

Once operational the performance improvements of the WwTP will have knock-on impacts on human health and wellbeing. The increased capacity will support future housing and employment growth in the area, positively impacting the health and wellbeing of the community. Increased effluent flow volumes are

anticipated to have a slight negative impact on receiving water quality. However, the proposed stormwater management improvements will result in a significant, positive impact on receiving water quality. Therefore, the ultimate (conservative) conclusion from the water assessment is the Proposed Development will have a long term neutral/imperceptible residual effect.

These upgrades will permit the continued successful operation and future expansion of water sports and riverside recreational uses. Any visual impact arising from the upgrade is considered to be slight and become negligible with distance. The operational WwTP is not expected to have negative effects in terms of air quality, climate, vibrations or traffic, with a slight positive impact anticipated in relation to noise.

Operational risks, while extremely unlikely, apply to a greater extent to the existing WwTP, with the proposed works minimising existing risks. Similarly, it is expected that there will be a reduced risk of flooding with a consequent positive impact on human health. The suite of mitigation and monitoring measures required to ensure the prevention of impacts on population and human health are included in the CEMP contained in the **Volume 3, Appendix 4A** to the EIAR.

The university and local residents have already been consulted about the Proposed Development. Direct impacts on these stakeholders are assessed to be minimal, however, they will be informed in advance about forthcoming construction works to minimise any potential impacts. Procedures will be put in place to ensure the successful management of construction traffic, access and parking and health and safety monitoring.

Once the mitigation measures as proposed are implemented no residual significant impacts are expected to arise as a result of the construction and operation of the Proposed Development.

SECTION 18: MAJOR ACCIDENTS AND NATURAL DISASTERS

The EIA Directive requires consideration of how vulnerable the Proposed Development is to Major Accidents and/or Natural Disasters and what will the resulting impact be. Examples of Major Accidents include unexpected or unplanned events, such as fires, explosions. Natural Disasters can include events such as floods.

The site-specific risk assessment identifies and quantifies risks due to the Proposed Development, focusing on: unplanned, but possible and plausible events occurring during the construction and operation of the Proposed Development.

An examination of all plausible risks associated with the Proposed Development was undertaken. The scenario with the highest risk score in terms of a major accident and/or natural disaster during the construction of the Proposed Development were identified as being, 'Flooding of WwTP site during the construction and operation' and 'Discharge, spillage of untreated wastewater into watercourse or groundwater table during operation'. The risk of flooding during the construction was considered a scenario that is 'unlikely' to occur and will have 'limited' consequences should it do so, representing a 'low risk scenario.' The risk of discharge, spillage or longer-term seepage of untreated wastewater into the watercourse or groundwater table was a scenario that is 'unlikely' to occur and will have 'limited' consequences should it do so, representing a 'low risk scenario.'

The construction and operation of the Proposed Development will be managed to minimise the risk of major accidents occurring and will have management plans in place to prevent environmental impacts if an accident occurs. All the earthworks' operations will be designed with adequate drainage to promote safe runoff and prevent ponding and flooding. A flood risk assessment has been carried out which recommends appropriate measures to mitigate the effects of flood risk. Further, a preliminary Construction and Environmental Management Plan (CEMP) has been submitted and will be developed into a detailed CEMP on award of contract, prior to the commencement of any works and implemented during the works. The CEMP will work to ensure that potential risks of major accident and/or disaster are identified, avoided and mitigated, as necessary.

Implementation of appropriate drainage and dewatering measures to control groundwater during construction to mitigate groundwater discharge will be carried out. The Proposed Development has been designed and will be constructed in line with best international current practice and, as such, mitigation against the risk of major accidents and/or disasters is embedded through the design. A maintenance programme will be implemented at the site, in compliance with the conditions of the Wastewater Discharge Authorisation, to ensure that all critical equipment is operating correctly, therefore reducing the risk of major accidents and/or disasters on site. The storage of diesel in a contained and bunded area on-site will mitigate 'by prevention' the risk of surface and/or ground pollution, as well as the risk of fire/explosion resulting from the potential spillage of fuel.

SECTION 19: CUMULATIVE AND INTERACTIVE EFFECTS

Cumulative effects are changes to the environment that are caused by an action in combination with other actions. They can arise from, and this EIA Report considers:

- The interaction between all of the different permitted and planned projects in the same area in combination with this Proposed Development; and
- The interaction between the various impacts within this Proposed Development

Potential cumulative impacts and resulting effects can arise from the Proposed Development when combined with other existing and/or approved projects. The cumulative impact assessments have been undertaken by each specialist in each relevant Section of this EIAR.

Interactions will consider the interaction between the various environmental aspects, for example the interaction between noise and ecology.

The proposed Castletroy WwTP Upgrade has the potential to interact with other industrial facilities that may or may not have a cumulative impact. A list of the projects are as follows:

- King's Island Flood Relief Scheme
- Castleconnell Flood Relief Scheme
- Corbally Baths Project
- Bunlicky WwTP upgrade

Various other developments around the vicinity of the site were taken into consideration to assess for cumulative effects. Limerick Co. Co. planning portal was accessed to examine planning applications in the vicinity of the site for the potential to act in combination with the Proposed Development. Active (within 5 years) planning applications in the surrounding area consist of housing projects and a small number of applications for industrial projects.

This EIAR has considered potential cumulative impacts arising from the construction and operation of the Proposed Development in accordance with the EIA Directive and corresponding guidelines. It has done so mainly through the integration of cumulative impacts in the undertaking of baseline surveys related to effects on Biodiversity, Water Quality, Noise and Vibration, Air Quality and Climate, Traffic and Transport, Landscape and Visual Impacts and Waste Management. The Proposed Development will not give rise to any significant interactive and cumulative impact.

SECTION 20: SUMMARY OF MITIGATION

The EIAR has assessed the impacts and resulting effects likely to occur as a result of the proposed Castletroy Wastewater Treatment Plant Upgrade Project (the Proposed Development) on the various aspects of the receiving environment.

In cases where impacts or potential impacts have been identified, mitigation has been proposed to reduce the significance of those impacts. These mitigation recommendations are contained in the specific environmental sections within Volume 2 of the EIAR. In addition to the mitigation measures proposed, appropriate management practices and commitments relating to construction activities are also provided.

The EPA Guidelines of the Information to be contained in Environmental Impact Assessment Report, 2022 defines mitigation measures as a 'A description of the measures envisaged to avoid, prevent, reduce or, if possible, offset any identified significant adverse effects on the environment and, where appropriate, of any proposed monitoring arrangements.'

All potential environmental impacts that have been identified that are associated with construction activity and methodology. A CEMP has been prepared and is included in **Volume 3, Appendix 4A** to the EIAR which will be updated and finalised by the Contractor prior to construction commencing. The CEMP incorporates the environmental commitments and mitigation contained in the EIAR and will be further updated to include any conditions that may be attached to a planning permission.