

KNOCKBROGAN EIAR

VOLUME II EIAR | Part 2

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CHAPTER SEVEN

MATERIAL ASSETS: BUILT SERVICES



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CHAPTER 7

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CHAPTER 7 | MATERIAL ASSETS: BUILT SERVICES

7.1 Introduction

This chapter of the EIAR was prepared to assess the potential significant effects of the proposed development on the environment. It will describe the methodology used to assess the potential impacts from the proposed development on the material assets in the study area, to describe baseline environment of the material assets in the study area, assess the likely impacts on these material assets, and sets out mitigation measures to be put in place to reduce the likely impacts of the material assets on the environment. This chapter considers the impacts on the material assets and not the people using the asset.

It should be read in conjunction with The Engineering Infrastructure Report submitted with the planning application.

7.2 Expertise & Qualifications

This chapter of the EIAR has been prepared by Brian O’Kennedy of Brian O’Kennedy & Associates Limited.

Brian O’Kennedy holds a membership of Engineers Ireland and is a Chartered Engineer CEng. He has 43 years’ experience in the civils and building sector and has worked on a wide variety of infrastructure and build projects, from design to installation stage.

7.3 Proposed Development

Please refer to Chapter 2 – Project Description - for the full development description.

In summary, the subject application is for a Large-Scale Residential Development (LRD) comprising of the construction of 212 no. residential units and all ancillary development works including footpaths, car and bicycle parking, drainage, bicycle and bin stores, lighting and landscaping/amenity areas at Knockbrogan, Bandon, Co. Cork.

Access will be provided via the existing access road onto the Old Cork Road permitted under reference 21/4059.

7.3.1 Aspects Relevant to this Chapter

7.3.1.1 Surface Water Drainage

It is proposed to service the proposed development by means of a connection to an existing 300mm and 225mm diameter surface water pipes located in the existing phase 2 of the site. This surface water pipe will connect to a newly laid 600 mm diameter concrete pipe in the L-2040 roadway to the east.

The proposed development has been sub-divided into 3 sub-catchments with individual attenuation tanks for each of these areas. These sub-catchments attenuate and control the discharge generated within to QBAR. Surface water run-off from the proposed development will be discharged, after attenuation and control, to QBAR.

The site’s surface water management infrastructure has been designed in accordance with the Greater Dublin Strategic Drainage Study 2005 (GSDSDS). Proposed surface water drains have been designed in accordance with the Greater Dublin Strategic Drainage Study 2005 (GSDSDS), Greater Dublin Regional Code of Practice (V6), the Department of the Environment’s “Recommendations for Site Development Works for Housing Areas” (1998), the Department of the Environment’s Building Regulations “Technical Guidance Document Part H Drainage and Waste Water Disposal” and BS EN 752: 2008 “Drain and Sewer Systems Outside Buildings”.

Sustainable drainage systems (SuDS) features incorporated in the design include swales, filter drains, permeable paving, and flow control devices in accordance with CIRIA publication C753 SuDS Manual. These design features will aid in managing rainwater close to where it falls, allow rainwater to soak into the ground, promote evapotranspiration, slow down and store runoff, treat runoff to reduce contamination through pollution prevention and controlling the runoff at source and reduce the risk of urban contaminants causing environmental pollution.

The proposed surface water drainage design has is outlined in more detail within the Engineering Infrastructure Report submitted as part of this application, under separate cover.

7.3.1.2 Wastewater Drainage

It is proposed that this development will be serviced internally by 150mm and 225mm diameter foul sewers and will include the provision of services connections, inspection chambers etc. throughout the site.

Foul sewers have been designed and will be constructed in accordance with the Uisce Éireann ‘Standard Details for Wastewater infrastructure’ and ‘Code of Practice for Wastewater Infrastructure’. In addition, foul sewers have been designed to the Building Regulations 1997, as amended, and specifically in accordance with the principles and methods set out in EN 752:2008 and DOE ‘Recommendations for Site Development Works’ (1998). In addition, HR Wallingford ‘Tables for the Hydraulic Design of Pipes, Sewers and Channels’ and Water UK/WRC ‘Sewers for Adoption – 6th Edition’ have been applied.

7.3.1.3 Water Supply

It is proposed that this development will be serviced by 225mm and 100mm diameter watermains and will include the provision of new fire hydrants and relevant infrastructure throughout the site.

As part of the UE confirmation of feasibility received under CDS25003539 , an upgrade is required to the existing water network to accommodate the proposed site. These upgrade works include a 300mm diameter water main to be installed from Bandon town centre up the R589 and across to the L-2040 roadway serving the development.

All connections, valves, hydrants, meters etc. have been designed and are to be installed in accordance with Uisce Éireann ‘Standard Details for Water Infrastructure’ and ‘Code of Practice for Water Infrastructure’ and the Department of the Environment’s Building Regulations “Technical Guidance Document B - Fire Safety (2020)”.

7.3.1.4 Electrical Supply

In order to facilitate the new development, the proposal is to install new electrical services to serve the houses. This involves the following:

- Rerouting existing overhead lines underground.

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- New Unit Substations.
- New underground ducting and electrical infrastructure to serve the development.
- New underground ducting and electrical infrastructure to serve the development lighting.

7.3.1.5 Gas Supply

It is not proposed that gas is provided to the houses and in the development.

7.3.1.6 Telecommunications

In order to facilitate the new development, the proposal is to install new underground ducting and telecommunications infrastructure to serve the houses.

7.4 Methodology

7.4.1 Relevant Legislation & Guidance

The Material Assets Assessment was prepared in accordance with relevant European Union and Irish legislation and guidance and in accordance with Schedule 6 of the Planning and Development Regulations 2001, as amended (S.I. No. 600 of 2001) and conforms to the relevant requirements as specified therein.

The following guidelines were referred to while preparing this appraisal:

- Guidelines on the information to be Contained in Environmental Impact Assessment Reports (Environmental Protection Agency (EPA) (EPA2023).
- Advice Notes on Current Practice in the Preparation of Environmental Impact Statements (EAP2023) and revised advice notes (EPA 2015b).
- Guidelines for Planning Authorities and An Coimisiún Pleanála on carrying out Environmental Impact Assessment (Department of Housing, Planning and Local Government 2018).
- Environmental Impact Assessment of Projects, Guidance on the preparation of the Environmental Impact Assessment Report (European Commission 2017).
- Code of Practice for Wastewater Infrastructure (IW-CDS-5030-03,2020).
- Code of Practice for Water Infrastructure (IW-CDS-5030-03,2020).
- Dept of Housing, Local Government & Heritage: Recommendations for Site Development Works for Housing Areas, 1998.
- ESB Networks Planning and Development Guidelines for Connection to the Electricity Network and Guidelines for Development near Overhead lines.
- ComReg's Code of Practice for Telecommunications Antennae and Support Structures and Guidelines for Telecommunications Infrastructure Development.
- Relevant EU Directives, including directive 2019/944/EU (electricity), and Directive 2018/1972/EU (telecommunications).

7.4.2 Site Surveys/Investigations

The scope of investigation consisted of a desk study, site surveys, and correspondence with utility providers. Water services information (surface water drainage, foul water drainage and water mains supply) was received from Uisce Éireann, formerly known as Irish Water, and Cork County Council.

7.4.3 Consultation

The proposed residential development at Knockbrogan, Bandon, Co Cork, and is in administrative area of Cork County Council.

Brian O'Kennedy & Associates reviewed the existing utilities (i.e. ESB, Gas & Telecom) in the vicinity of the site to identify the serving of the development from same and any potential impacts of existing infrastructure. They also engaged with local engineers from Uisce Éireann and Cork County Council to ascertain this information and access existing records in the vicinity of the development.

Assessment of the potential impacts of the proposed development on existing material assets in the vicinity of the site included:

- Review of Uisce Éireann utility plans (foul drainage and water supply).
- Consultation with Uisce Éireann and Cork County Council.
- Submission of a Pre-Connection Enquiry Application to Uisce Éireann.
- Submission of proposed designs to Uisce Éireann for Statement of Design Assessment.
- Review of ESB Networks Utility Plans.
- Review of Gas Networks Ireland Service Plans.
- Review of Eir E-Maps.
- Review of Virgin Media Maps.
- Site Investigation Desk Study by Priority Geotechnical on abutting lands

Mapping, where provided by these organisations, was overlaid with the project mapping and assessed.

7.5 Difficulties Encountered

No specific difficulties were encountered in the preparation of this chapter.

7.6 Baseline Environment

7.6.1 Surface Water Drainage

There is no existing surface water network within the existing site. It is evident that existing rainwater drainage from the site is by means of direct infiltration and percolation into the existing agricultural ground. The local groundwater flow direction is likely to mirror the site topography and catchment drainage. The greenfield run-off from the site, due to the existing topography, travels in a northern direction and southern direction towards the Bandon River.

7.6.2 Wastewater Drainage

There are no records or evidence of any foul water infrastructure within the proposed site. The nearest existing foul sewer is a concrete 300 mm diameter sewer located in Phases 1 & 2 of the same development. The sewer in the subject development will connect with these existing sewers. Phases 1 & 2 in turn, connect to a newly laid 300mm diameter sewer on the public L-2040 road (Old Cork Road). The sewer is Uisce Eireann owned and flows to the Uisce Eireann owned Bandon Wastewater Treatment Plant.

7.6.3 Water Supply

There is existing 100 mm diameter ductile iron water main located on the Old Cork Road to the western boundary of the Site. This watermain is owned and controlled by Uisce Eireann. New 225mm diameter HDPE watermain have been laid in Phase 1 of this development to facilitate Phases 2 & 3. A pumping station has been built in Phase 1.

7.6.4 Electrical Supply

There are an existing 10kVA power line running across the site. The development proposes to underground/divert these power lines. Ultimately the ESB Engineer will decide what route the lines will take following an application through the ESB networks portal.

It is anticipated that three new substations are required to be constructed within the new development area. All three will be strategically positioned to efficiently service the estate. The exact location and number will be dictated by the ESB at post-planning consultation stage.

The substations will each supply power to mini pillars distributed throughout the site. In turn, the mini pillars will provide electricity to the residential dwellings and public lighting within the development.

7.6.5 Gas Supply

There is no existing gas infrastructure near the proposed development, and it is not proposed to supply the development with gas supply. The proposed residential units will be served by electric air-to-water heat pumps to meet the requirements of Part L of the Building Regulations. Heat pumps run at an energy efficiency of approximately four times that of gas and are a renewable form of energy which is a requirement of the Building Regulations. No connections to the natural gas network will be required.

7.6.6 Telecommunications

Virgin and Eircom networks are installed along the Old Cork Road to the west of the subject site, and the design of the network has allowed for a connection to the proposed residential development through the existing phases 1 & 2.

7.7 The 'Do Nothing' Scenario

7.7.1 Do Nothing Scenario

In the do-nothing scenario (i.e. assuming the proposed development were not progressed), the built services and infrastructure at the site of the proposed development and in the immediate vicinity would likely remain as they are at present (greenfield and agricultural). No likely significant effects would arise in relation to material assets in this scenario.

7.8 Potential Significant Effects (Do Something Scenario)

Should the proposed development proceed as planned, it will impact upon material assets in the vicinity of the proposed works. The development has been designed to take account of the identified material assets and the implementation of the mitigation measures outlined in this chapter and will help reduce any negative impact on these material assets. A summary of impacts is as follows:

7.8.1 Construction Phase

The potential significant effects associated with the Material Assets - Built Services during the construction phase of this development has been summarised below.

7.8.1.1 Surface Water Drainage

New surface water drainage systems will be constructed on site to service the development, connecting to existing surface water drainage infrastructure in the receiving environment.

Potential Direct effects of the construction phase on surface water drainage systems are:

- Uncontrolled and/or misdirected surface water runoff to existing watercourses and drainage systems and to adjacent lands;
- Transmission of entrained soils/turbidity, construction materials and spilt liquids including hydrocarbons and other pollutants.

In the absence of mitigation measures the Direct impact of the construction phase on surface water drainage is Negative in quality, Significant in terms of significance, Likely in probability and Medium-term in duration.

Potential Indirect, Secondary and Cumulative impacts of the construction phase on surface water drainage systems are:

- Loss of hydraulic performance and increased frequency of flooding caused by siltation of existing drainage systems.
- Erosion of existing watercourses and surrounding lands causing loss of soil stability and consequent further erosion. Reduction in Biodiversity

In the absence of mitigation measures the Indirect, Secondary and Cumulative impact of the construction phase on surface water drainage services is Negative in quality, Significant in terms of significance, Likely in probability and Medium-term in duration.

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7.8.1.2 Wastewater Drainage

New wastewater drainage systems will be constructed on site to service the new development, connecting to existing wastewater infrastructure in the receiving environment.

Potential Direct effects of the construction phase on wastewater drainage services are:

- Blockage or partial reduction in the capacity of existing wastewater drainage services;
- Breakage of existing infrastructure causing uncontrolled discharges of wastewater;
- Discharges of surface water runoff to existing wastewater drainage services;
- Uncontrolled discharge of wastewater from the construction site welfare facilities to lands and watercourses downstream of the site causing pollution, potential flooding and risk to public health;

In the absence of mitigation measures the Direct impact of the construction phase of wastewater drainage services is Negative in quality, Significant in terms of significance, Likely in probability and Medium-term in duration.

Potential Indirect, Secondary and Cumulative effects of the construction phase on wastewater drainage services are:

- Overflowing of existing wastewater drainage systems due to reduction in capacity or blockages caused by the works;
- Increased pumping requirements and consequent increased energy demands and servicing requirements at existing wastewater drainage pumping stations due to increased flowrates;
- Reductions in efficiency of existing waste water treatment systems due to increased hydraulic loading and/or introduction of polluted waters;
- Reduction in Biodiversity.

In the absence of mitigation measures the Indirect, Secondary and Cumulative impact of the construction phase on wastewater drainage services is Negative in quality, Moderate in terms of significance, Unlikely in probability and Medium-term in duration.

7.8.1.3 Water Supply

New water supply systems will be constructed on site to service the new development, connecting to existing water supply infrastructure at the boundary of the site.

In addition to the construction of new on-site water supply services, the following alterations to existing water supply services will be performed during the construction phase:

- Approximately 1,000m of watermain upgrades on the R589 and the L-2040 Old Cork road have been permitted as part of Phase 1 and Phase 2. These upgrades will also facilitate the new development.

Potential Direct effects of the construction phase are:

- Breakages of existing water supply pipework causing large outflows of water and possible local flooding and reduced water supply to premises on the local water supply network;
- Closing of valves on the existing water supply network causing a loss of water supply to premises on the local network.

In the absence of mitigation measures the Direct impact of the construction phase on water supply services is Negative in quality, Moderate in terms of significance, Likely in probability and Medium-term in duration.

Potential Indirect, Secondary and Cumulative effects of the construction phase on water supply services are likely to have no significant effects.

7.8.1.4 Electrical Supply

For Electrical Supply, the permanent electricity connections will not be live during the construction phase until near completion.

Construction related activities will require temporary connection to the local electrical supply network. The potential impact from the construction phase of the proposed development on the local electrical supply network is likely to have no significant effects.

7.8.1.5 Telecommunications

No likely significant effects.

7.8.2 Operational Phase

During the operational phase, the site will contain operational surface water drainage, wastewater water drainage, water supply, electrical supply and telecommunications systems to serve the proposed development. Refer to Section 7.3 above for a description of built services for the development.

The potential significant effects associated with the Material Assets - Built Services during the operational phase of this development has been summarised below.

7.8.2.1 Surface Water Drainage

Potential Direct effects on surface water drainage services in operation are as follows:

- Poor general maintenance causing blockage of drainage systems and overflowing with a consequent risk of flooding;
- Poor general maintenance leading to poor performance of pollution control measures in the surface water drainage system and subsequent discharges of surface water containing sediments and pollutants to existing surface water drainage systems and watercourses;
- Poor maintenance of engineered pollution reduction devices in the surface water drainage system leading to discharge of surface water containing sediments and pollutants to existing surface water drainage systems, watercourses and groundwater aquifers.

In the absence of mitigation measures the Direct impact of the operational phase on surface water drainage services is Negative in quality, Moderate in terms of significance, Likely in probability and Permanent in duration.

Refer to Chapter 9 (Land & Soils) in relation to Indirect, Secondary and Cumulative impact on Land & Soils.

Potential Indirect, Secondary and Cumulative effects on surface water drainage services in operation are as follows:

- Reduction in biodiversity in the wider receiving environment.

Refer to Chapter 11 – Biodiversity – in relation to Indirect, Secondary and Cumulative impact on Biodiversity.

7.8.2.2 Wastewater Drainage

Potential Direct effects on wastewater drainage services in operation are as follows:

- Misconnection of surface water drainage services on site to the wastewater drainage network during the construction phase causing overloading of the wastewater network with surface water and possible resultant reduction in performance of downstream wastewater treatment activities;
- Poor quality control during the construction phase leading to partial or full blockages, overflowing and subsequent pollution of watercourses and hazard to public health.
- Poor quality control during the construction phase leading to excessive infiltration of groundwater into the wastewater drainage system and consequent increased need for conveyance, pumping and treatment of wastewater within the existing Uisce Éireann network

In the absence of mitigation measures the Direct impact of the operational phase on wastewater services is Negative in quality, Significant in terms of significance, Likely in probability and Permanent in duration.

Refer to Chapter 11 – Biodiversity – in relation to Direct impact on Biodiversity.

Potential Indirect, Secondary and Cumulative effects on wastewater drainage services in operation are as follows:

- Increased need for conveyance, pumping and treatment of wastewater in the existing wastewater drainage network leading to decreased service life of existing infrastructure.

In the absence of mitigation measures the Indirect, Secondary and Cumulative impact of the operational phase of wastewater drainage services is Negative in quality with a Slight significance, Likely probability and Permanent in duration.

7.8.2.3 Water Supply

Potential Direct effects on water supply services in operation are as follows:

- Poor quality control during the construction phase leading to water leakage from the site network consequent increased demand on the existing water supply network;
- Poor quality control during the construction phase leading to pipe breakages, loss of water from the network and network outages during consequent repair periods.

In the absence of mitigation measures the Direct impact of the operational phase on water supply services is Negative in quality, Moderate in significance, Likely probability, Permanent in duration.

Potential Indirect, Secondary and Cumulative effects on water supply services in operation are as follows:

- Increased production of water necessitated by excessive pipe leakages requiring greater energy inputs and maintenance requirements of the water treatment system

In the absence of mitigation measures the Indirect impact of the operational phase on water supply services is Negative in quality, Slight in terms of significance, Likely in probability and Permanent in duration.

7.8.2.4 Electrical Supply

The predicted impact of the operational phase on electrical supply services is Neutral in quality, Imperceptible in significance, Permanent in duration and Indirect in type.

7.8.2.5 Telecommunications

The predicted impact of the operational phase on telecommunications services is Neutral in quality, Imperceptible in significance, Permanent in duration and Indirect in type.

7.8.3 Cumulative Effects

Material assets will interact with other EIAR topics given the nature of the works. Project related traffic will also interact with the land resource in the area which is predominately urban and agricultural. Mitigation measures have been proposed within this EIAR to eliminate and reduce any adverse effects from this interaction on the land. The raw materials needed for the project also interact with the project traffic. Materials will be reused where possible. The methodologies chosen at design stage will result in a decrease in the amount of imported material, which in turn will reduce the impact of traffic on the surrounding roads and will result in less demand on non-renewable sources such as quarries.

Where roads are opened for the installation of pipelines, interaction will occur between material assets (namely the local road network and utility providers), traffic and population. Further consultation will be undertaken with utility providers in the project detailed design stage and mitigation measures put in place to minimise any adverse impacts.

The cumulative effect of the development on the foul, surface water, watermain and waste management systems are anticipated to be short term, neutral, and imperceptible. No significant impacts are anticipated.

Regarding the cumulative impact of the interactions of impacts, it is unlikely that any of these interactions will result in significant additional impacts that are not already anticipated in this EIAR. It is predicted that the proposed development will contribute to the improvement of the overall urban environment.

7.8.4 Summary

The following Table summarises the identified likely significant effects during the construction phase of the proposed development before mitigation measures are applied.

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Table 7 1 Summary of Construction Phase Likely Significant Effects in the absence of mitigation

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
Surface Water Drainage	Negative	Significant	Extent 1	Likely	Medium Term	Direct
	Negative	Significant	Extent 1	Likely	Medium Term	Indirect
Wastewater Drainage	Negative	Significant	Extent 2	Likely	Medium Term	Direct
	Negative	Moderate	Extent 2	Unlikely	Medium Term	Indirect
Water Supply	Negative	Moderate	Extent 3	Likely	Medium Term	Direct

The following Table summarises the identified likely significant effects during the operational phase of the proposed development before mitigation measures are applied.

Table 7 2 Summary of Operational Phase Likely Significant Effects in the absence of mitigation

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
Surface Water Drainage	Negative	Significant	Extent 1	Likely	Medium Term	Direct
	Negative	Significant	Extent 1	Likely	Medium Term	Indirect
Wastewater Drainage	Negative	Significant	Extent 2	Likely	Medium Term	Direct
	Negative	Moderate	Extent 2	Unlikely	Medium Term	Indirect
Water Supply	Negative	Moderate	Extent 3	Likely	Medium Term	Direct

With respect to the Extent listed in Table 7- 1 and 7-2 above, the following applies;

Extent 1 – Lands and Premises adjoining the subject site as well as southward along the L-2040 Old Cork Road including receiving waterbodies to the south.

Extent 2 - Lands and premises within the Bandon area served by existing wastewater infrastructure downstream of the site.

Extent 3 - Lands and premises served by the Bandon Water Treatment Plant and lands and premises adjoining the subject site as well as southward along the L-2040 Old Cork Road

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7.9 Mitigation Measures

Following assessment of the potential impacts, the proposed development was methodically reviewed, and mitigation methods were developed that will avoid, prevent or reduce any negative effects on the environment.

All possible measures will be taken to avoid unplanned disruptions to any services within the site during construction of the proposed development.

7.9.1 Construction Phase Mitigation

The following mitigation measures are proposed for the construction phase of the development with respect to Material Assets:

- The proposed development should comply with the provisions of the Construction Environment Management Plan with respect to construction waste.
- The proposed development will comply with the provisions of the Construction Environmental Management Plan.
- All new services will be constructed and provided in strict accordance with the codes of practice of the relevant utility companies and new connections to have an agreed permit for the works where required.
- To minimise impact of the wastewater/water infrastructure required for the development, best practice construction practices should be adhered to, and Uisce Eireann procedures followed.
- Temporary measures will be put in place to limit the rate of surface water run-off from site.
- The quality of surface water run-off to be managed and ensure the run-off from the site does not result in excessive siltation of the receiving drainage channels.
- Excavations are to be kept to a minimum, with excavated material stockpiled for reuse on site.
- The contractor will also be obliged to put measures in place to ensure that there are minimal or no interruptions to existing services and that all services and utilities are maintained, unless this has been agreed in advance with the relevant service provider and local authority.
- All watermains will be cleaned and tested in accordance with Uisce Eireann guidelines and standards prior to connection to the public watermain.
- All works in the vicinity of the local authority will be compliant with any requirements or guidelines.
- Road opening licences will be applied for and a temporary traffic management plan to be implemented when connecting utilities in the public road.

7.9.2 Operational Phase Mitigation

The following section discusses the mitigation approaches that will be followed during the operational phase of the development:

- All new foul and surface water drainage pipes to be pressure tested and CCTV surveyed to identify any possible defects.
- Water conservation measures to be implemented, which include water metering, rainwater capture, low flush and efficiency attachments.
- Ensure that all hydro brakes are designed to limit the flow of water from the development to the greenfield run-off rate.

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- All water main pipes to be pressure tested in accordance with Uisce Eireann details.
- All water mains will be cleaned and tested in accordance with Uisce Eireann guidelines and standards prior to connection to the public water main.

Uisce Eireann have confirmed that a wastewater connection for the development is feasible and have issued a confirmation of feasibility letter (COF). Connection agreements will be made with Uisce Eireann regarding wastewater discharge off site. As Uisce Eireann have confirmed that the system has capacity to accommodate the proposed development significant impacts to the system are therefore not considered likely. No additional mitigation measures will be required.

The surface water drainage has been designed to accommodate rainfall and flooding events and run off from the proposed development has been limited to the greenfield run-off rate. The flow generated will be limited to the existing greenfield run-off rate and will be attenuated to reflect the greenfield run-off rate. Due to measures already incorporated in the design, such as swales, filter drains and permeable paving no additional mitigation measures will be necessary on surface water during the operational phase.

7.10 Residual Impact Assessment

This section assesses potential significant environmental impacts which remain after mitigation measures are implemented.

7.10.1 Construction Phase

The construction stage of the proposed development will comprise of site clearance and preparation, excavation and the construction of the proposed development. The potential impacts associated with the construction stage of the proposed development on material assets are likely to be temporary and will cause minor/short term disturbance. Provided mitigation measures are adhered to as part of this development, there is unlikely to be any adverse impacts on material assets during the construction stage and any residual impacts on the existing foul and waste systems would be temporary and slight.

7.10.2 Operational Phase

The proposed development will have a positive impact on the surrounding environment by providing much needed housing in the area and meeting the needs of the growth in population.

The loading in the wastewater and watermains from the proposed development will be adequately accommodated in the foul and watermain network.

In compliance with the SUDs manual, the runoff from the development will mimic the existing greenfield runoff and hence have no impact in the surrounding network. Improved controls on the surface water along with silt management and/or silt traps the proposed development will result in an improvement in the quantity and quality of discharge off site.

7.10.3 Summary of Post-mitigation Effects

The following Table summarises the identified likely significant residual effects during the construction phase of the proposed development following the application of mitigation measures.

Table 7 3 Summary of Construction Phase Effects Post Mitigation

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
Surface Water Drainage	Neutral	Insignificant	Extent 4	Likely	Medium Term	Direct
	Neutral	Insignificant	Extent 4	Likely	Medium Term	Indirect
Wastewater Drainage	Neutral	Insignificant	Extent 5	Likely	Medium Term	Direct
	Neutral	Insignificant	Extent 5	Likely	Medium Term	Indirect
Water Supply	Neutral	Insignificant	Extent 6	Likely	Medium Term	Direct

The following Table summarises the identified likely residual significant effects during the operational phase of the proposed development post mitigation.

Table 7 4 Summary of Operational Phase Effects Post Mitigation

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
Surface Water Drainage	Neutral	Insignificant	Extent 4	Likely	Permanent	Direct
	Neutral	Insignificant	Extent 5	Likely	Permanent	Indirect
Wastewater Drainage	Neutral	Insignificant	Extent 5	Likely	Permanent	Direct
	Neutral	Insignificant	Extent 5	Likely	Permanent	Indirect
Water Supply	Neutral	Insignificant	Extent 6	Likely	Permanent	Direct Indirect

With respect to the Extent listed in Table 7- 1 and 7-2 above, the following applies;

Extent 1 – Lands and Premises adjoining the subject site as well as southward along the L-2040 Old Cork Road including receiving waterbodies to the south.

Extent 2 - Lands and premises within the Bandon area served by existing wastewater infrastructure downstream of the site.

Extent 3 - Lands and premises served by the Bandon Water Treatment Plant and lands and premises adjoining the subject site as well as southward along the L-2040 Old Cork Road

7.10.4 Cumulative Residual Effects

Considering the projects identified with respect to cumulative impact as outlined in Chapter 1, these have been taken into account in the context of the proposed development, and the cumulative residual impacts are considered to be neutral and not significant.

7.11 Risk of Major Accidents or Disasters

Regarding the cumulative impacts, all projects identified with respect to cumulative impact as outlined in Chapter 1, have been taken into account and the cumulative residual impacts are considered to be neutral and not significant.

Through the implementation of mitigation measures, there are no identified incidents or examples of major accidents and or natural disasters that present a sufficient combination of risk and consequence that are likely to lead to significant residual impacts or environmental effects or impacts on human health.

7.12 Worst Case Scenario

The European Commission EIAR Guidelines (2017) suggest that different future scenarios including a worst case scenario should be described. However, systematic risk assessments are employed only where the "worst case" impacts pose significant threats to the environment and/or human health. It is important to note that this is not applicable in the case of the proposed development and the likelihood of such a scenario occurring in respect of the proposed development is negligible.

7.13 Interactions

Interactions between Material Assets and other environmental topics are outlined throughout this EIAR document. The likely interactions between Material Assets and other environmental factors include interactions between the proposed drainage and wastewater arrangements and Chapter 10: Water and Hydrology of this EIAR.

7.14 Monitoring

All potable water will be cleaned and tested to the satisfaction of Uisce Éireann prior to the connection to the public potable water. In addition, all connections to the public potable water and foul water sewer will be carried out under the supervision of Uisce Éireann.

All new infrastructure, which is to serve the proposed development, is to be routinely inspected with any maintenance carried out, as required. Any monitoring of the built services required during the operational phase of the proposed project will be as advised by the relevant services providers.

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7.15 Summary of Mitigation and Monitoring

The following Table summarises the Construction Phase mitigation and monitoring measures.

Table 7 5 Summary of Construction Phase Mitigation and Monitoring

Likely Significant Effect	Quality	Significance
Surface Water Drainage, Wastewater Drainage, Water Supply	Implement the Construction Environmental Management Plan (CEMP)	Normal monitoring in accordance with the CEMP
Surface Water Drainage, Wastewater Drainage, Water Supply	Implement the Construction Environmental Management Plan (CEMP)	Normal monitoring in accordance with the CEMP
Surface Water Drainage, Wastewater Drainage, Water Supply	Liaise with all relevant Statutory Authorities and Service Providers prior to commencement of construction	No particular requirements
Surface Water Drainage,	Create and implement a surface water drainage construction quality control system	Inspection and checking in accordance with the implemented quality control system
Wastewater Drainage, Water Supply	implement the Uisce Eireann Quality Assurance system for construction of wastewater and water supply services	Inspection and checking in accordance with the requirements of the QA system
Electricity Supply	Implement the ESB Quality Assurance system for construction of electrical services infrastructure	Normal monitoring in accordance with the ESB
Telecommunications	Implement the Openeir Quality Assurance system for construction of telecommunication services infrastructure	Normal monitoring in accordance with Openeir

The following Table summarises the Operational Phase mitigation and monitoring measures.

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Table 7 6 Summary of Operational Phase Mitigation and Monitoring

Likely Significant Effect	Quality	Significance
Surface Water Drainage	Implement a Surface Water Management and Maintenance Plan	Implement the scheduled monitoring as part of the Surface Water Management and Maintenance Plan
Electricity Supply	Implement the ESB Quality Assurance system for construction of electrical services infrastructure	Normal monitoring in accordance with the ESB
Telecommunications	Implement the Openeir Quality Assurance system for construction of telecommunication services infrastructure	Normal monitoring in accordance with Openeir

7.16 Conclusion

The construction and operation of Material Assets: Built Services has the potential to result in environmental impacts on surface water drainage systems, wastewater drainage systems, water supply systems, electrical supply systems, telecommunications systems.

Mitigation measures as described in this chapter shall be implemented during the construction phase and during the operational phase to minimise the risk of impact on the environment.

7.17 References and Sources

- Guidelines on the information to be Contained in Environmental Impact Assessment Reports (Environmental Protection Agency (EPA) (EPA2023).
- Advice Notes on Current Practice in the Preparation of Environmental Impact Statements (EAP2023) and revised advice notes (EPA 2015b).
- Guidelines for Planning Authorities and An Coimisiún Pleanála on carrying out Environmental Impact Assessment (Department of Housing, Planning and Local Government 2018).
- Environmental Impact Assessment of Projects, Guidance on the preparation of the Environmental Impact Assessment Report (European Commission 2017).
- Code of Practice for Wastewater Infrastructure (IW-CDS-5030-03,2020).
- Code of Practice for Water Infrastructure (IW-CDS-5030-03,2020).
- Dept of Housing, Local Government & Heritage: Recommendations for Site Development Works for Housing Areas, 1998.
- ESB Networks Planning and Development Guidelines for Connection to the Electricity Network and Guidelines for Development near Overhead lines.
- ComReg’s Code of Practice for Telecommunications Antennae and Support Structures and Guidelines for Telecommunications Infrastructure Development.
- Relevant EU Directives, including directive 2019/944/EU (electricity), and Directive 2018/1972/EU (telecommunications).

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CHAPTER EIGHT

MATERIAL ASSETS: WASTE



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CHAPTER 8 | 8 Material Assets: Waste

8.1 Introduction

This chapter of the Environmental Impact Assessment Report (EIAR) considers the potential significant effects of the Proposed Development at Knockbrogan, Bandon, County Cork, on the receiving environment in respect of waste generation and material resource use. The assessment is structured in line with guidance from the Institute of Environmental Management and Assessment [1] and the Environmental Protection Agency [2] and evaluates waste-related impacts arising during the construction, and operational phases of the project.

The development forms Phase 3 of a large scale residential development (LRD), following on from Phases 1 and 2, which have already been approved and are at different stages of being developed. The assessment reflects the continuation and expansion of the waste management practices already established on site, while accounting for the additional demands and opportunities that will arise during this phase.

This chapter should be read in conjunction with the Construction Environmental Management Plan (CEMP), the Resource and Waste Management Plan (RWMP), , and relevant chapters of the EIAR including

- Population and Human Health;
- Material Assets (Infrastructure);
- Traffic and Transportation; and,
- Land and Soils.

8.2 Expertise & Qualifications

This chapter was prepared by Martin Kearns, Principal Environmental Consultant at Malone O'Regan Environmental. Martin holds a BSc in Applied Environmental Science. With over 15 years' experience in environmental assessment, waste, circular economy and compliance, he has led the preparation of multiple EIARs for strategic residential, commercial, and infrastructure developments. His areas of expertise include waste classification and licensing, Article 27 notifications under the Waste Directive Regulations, and the development of site-specific waste management strategies in line with Irish and EU legislative requirements.

8.3 Proposed Development

Please refer to Chapter 2 – Project Description for the full development description. In summary, the subject application is for a large-scale Residential Development (LRD) comprising of the construction of 212 no. residential units and all ancillary development works including footpaths, car and bicycle parking, drainage, bicycle and bin stores, lighting and landscaping/amenity areas at Knockbrogan, Bandon, Co. Cork. Access will be provided via the existing access road onto the Cork Road permitted under reference 21/4059.

8.4 Aspects Relevant to this Chapter

This section outlines the specific characteristics of the Proposed Development that are pertinent to waste generation, handling, and disposal. It provides a contextual basis for assessing the potential impacts and mitigation measures discussed in the subsequent sections of this chapter.

8.4.1.1 Excavation and Earthworks

The Proposed Development will require substantial excavation and groundworks to facilitate site preparation, installation of services, road construction, and the formation of development platforms for residential housing and associated infrastructure.

An estimated 35,762 m³ of cut material will be generated as part of these works. This volume includes both soil and subsoil, with a significant proportion expected to comprise competent fractured rock particularly in areas of deeper excavation and level adjustment. The fractured rock will be processed and crushed on-site using mobile plant to produce granular material suitable for reuse as sub-base for roads, footpaths, and hardstanding areas.

Approximately 35,246 m³ of fill material will be required for the proposed development. This requirement is expected to be fully met using site-won material generated through excavation, with a near balance of cut and fill achieved across the site. Consequently, no significant surplus of spoil is anticipated for off-site removal, thereby reducing pressure on external waste infrastructure and minimising haulage-related environmental impacts. As this scheme forms part of a larger, multi-phase residential development, the earthworks strategy has been designed with flexibility to accommodate minor variations in material volumes across phases.

In addition, the stripping of topsoil from the site will generate approximately 21,270 m³ of material, which will be retained entirely on-site. This topsoil is intended for re-use in landscaping works, including public open spaces, garden areas, boundary planting, and attenuation berms. The reuse of this material reflects good practice under the principles of the circular economy, and no export of topsoil is anticipated.

The overall excavation strategy has been designed to minimise off-site movements, promote reuse of site-won materials, and reduce reliance on imported aggregates or fill. By processing material on-site and maintaining a closed-loop materials cycle, the project significantly reduces potential adverse effects associated with transport emissions, road wear, and disposal of inert construction and demolition (C&D) waste.

All material management activities during the construction phase will be governed by the site-specific RWMP, prepared in accordance with the EPA's 2021 Best Practice Guidelines [3]. Where material is deemed unsuitable for reuse, it will be assessed and, if classified as waste, managed in accordance with the Waste Management Acts and relevant European legislation. Any reuse of material in accordance with Article 27 of S.I. No. 126 of 2011 will be documented and submitted to the EPA where appropriate.

While the proposed cut-and-fill strategy is expected to achieve a near balance, any surplus excavated material that may arise during construction will be subject to appropriate waste classification in accordance with the EPA's Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous [4]. Should surplus material require off-site removal, it will be categorised as either hazardous or non-hazardous through appropriate testing and assessment. Where material is deemed non-hazardous and suitable for beneficial reuse, efforts will be made to manage it as a by-product under Article 27 of the European Communities (Waste Directive) Regulations 2011, in line with EPA Guidance on Soil and Stone By-Products [5]. This approach supports national circular economy objectives by diverting material from disposal and promoting its reuse in accordance with the waste hierarchy. This excavation and earthworks approach is consistent with the objectives of the National Waste Management Plan for a Circular Economy [6] and supports the principles of sustainable resource efficiency outlined in the Institute of Environmental Management and Assessment (IEMA) Guide to Materials and Waste in Environmental Impact Assessment (2020) [1].

8.4.1.2 Construction Waste Generation

In addition to the reuse of site-won subsoil and topsoil as part of a balanced cut and fill strategy, the construction of the residential units, internal roads, drainage systems, and associated infrastructure will give rise to a variety of other construction-related waste streams.

The nature and composition of construction waste will be typical of a LRD and will primarily include inert and non-hazardous materials, with small quantities of hazardous waste potentially arising from specific materials such as adhesives, paints, or treated wood products.

The classification of these materials will be carried out in accordance with the European Waste Catalogue / List of Waste (LoW). The most commonly applicable LoW codes for the project are outlined in Table 8-1 below and include both non-hazardous and (where relevant) hazardous waste types, such as 17 05 04 (soil and stones) and 17 01 01 (concrete), with hazardous fractions identified with an asterisk (e.g., 17 06 05* insulation containing asbestos – not expected but included as precaution).

Table 8 1: Waste Categories

LoW Code	Description
17 01 01	Concrete
17 01 02	Brick
17 01 03	Tiles and Ceramics
17 01 07	Mix of concrete, brick, tiles, ceramics
17 02 01	Wood
17 02 02	Glass
17 02 03	Plastic
17 03 02	Bituminous Material
17 04 01	Copper, Bronze, Brass
17 04 02	Aluminium
17 04 03	Lead
17 04 04	Zinc
17 04 05	Iron and Steel
17 04 06	Tin
17 04 07	Mixed Metals
17 04 11	Cables
17 05 04	Soil and Stone
17 06 04	Insulation Material
17 08 02	Gypsum
17 09 04	Mixed C&D Waste
17 01 06*	Mix of concrete, bricks tiles containing hazardous substances

LoW Code	Description
17 02 04*	Glass, Plastic and Wood containing hazardous substances
17 03 01*	Bituminous mixtures containing coal tar
17 05 03*	Soils and Stones containing hazardous substances
17 04 09*	Metal waste containing hazardous substances

*Denote hazardous material

All construction waste will be managed under the site-specific RWMP, which will be finalised by the appointed contractor prior to commencement. This plan will include:

- On-site source segregation of recyclable and reusable waste streams;
- Designated waste storage areas with appropriate signage and containment;
- Compliance with Waste Management (Collection Permit) Regulations 2007–2017 (S.I. No. 820 of 2007);
- Use of permitted hauliers and authorised waste recovery/disposal facilities;
- Tracking of waste types, volumes, and destinations via waste records and Waste Collection Permits issued by the National Waste Collection Permit Office (NWCPO);
- Provision for reuse of materials where feasible, including return of packaging to suppliers undertake-back schemes.

The contractor will also be required to implement best-practice material management techniques to reduce overall waste generation, such as just-in-time deliveries, off-site prefabrication, and careful storage of materials to prevent damage and contamination.

While the majority of construction waste is expected to be non-hazardous and suitable for recycling or recovery, all handling will adhere to the requirements of the Waste Management Act 1996 (as amended) and associated regulations. Any waste identified as hazardous will be segregated and removed by a licensed hazardous waste contractor for treatment at an authorised facility.

In line with the principles of the National Waste Management Plan for a Circular Economy [4] and the IEMA EIAR Waste Guide [1], the construction phase of the Castle Rock Phase 3 development will be delivered with an emphasis on material efficiency, waste minimisation, and compliance with the waste hierarchy (prevention, reuse, recycling, recovery, and disposal as last resort).

8.4.1.3 Operational Waste from Residential Units

The development will result in the long-term generation of municipal solid waste (MSW) from the completed residential units. Anticipated waste types include:

- Dry recyclables, such as paper, cardboard, rigid plastics, and metal cans;
- Organic waste, primarily food waste, garden clippings, and compostable material;
- Residual waste, including mixed non-recyclable packaging, sanitary waste, and other non-recoverable items; and,
- Infrequent production of minor hazardous waste, such as batteries, small WEEE items, or chemical containers.

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Based on current national averages, a household of 2.5–3 persons is expected to generate approximately 25–30 kg of waste per week, distributed across the three bin types. This aligns with typical figures for suburban Irish housing and can be readily serviced by existing municipal and private waste contractors operating in the Bandon area.

As all units will be single dwellings with individual bin provision, operational waste will be entirely managed at household level, with no requirement for shared storage or commercial waste services. Waste generated will be non-hazardous in nature and compatible with standard three-bin collection systems used nationally.

Waste generated during the operational phase will be managed in accordance with the Cork County Council (Segregation, Storage and Presentation of Household and Commercial Waste) Bye-Laws 2019. These Bye-Laws outline the legal obligations for householders in relation to source segregation, bin presentation, and acceptable waste types, and are supported by design features within the development that promote correct segregation, reduce contamination, and encourage long-term compliance with the waste hierarchy. [5]

8.4.1.4 Waste Storage and Collection Infrastructure

The Proposed Development has been designed to support the efficient and compliant management of household waste through the provision of dedicated bin storage and collection infrastructure at each unit.

Every house will incorporate a private bin storage area within its curtilage. These areas will be designed to:

- Accommodate standard 240L or 360L bins for recyclables, organics, and residual waste;
- Be screened from public view through landscaping or fencing; and,
- Provide easy access for residents and facilitate direct presentation at kerbside on collection days.

The overall layout has been subjected to autotrack analysis to ensure that waste collection vehicles can safely and efficiently access all parts of the site. Roads, junctions, and turning areas have been dimensioned to support the movement of standard refuse collection trucks without the need for reversing into home zones or narrow turning heads.

No communal bin stores, shared waste compounds, or underground collection systems are required or proposed as part of this development. As all dwellings are standalone, household-level waste management is appropriate and sufficient.

In addition to physical design features, the development will incorporate clear kerb lines and presentation guidance to assist residents in placing bins for collection. Where appropriate, signage and informational material may be issued by the developer or estate manager to promote long-term compliance and avoid misuse or contamination of bins.

This infrastructure-first approach ensures alignment with the County Cork Waste Management Bye-Laws 2019 [5] and supports long-term household compliance with national waste legislation and circular economy targets.

8.4.1.5 Transport and Access Requirements

The export of waste during construction and the collection of municipal waste during operation will generate traffic movements involving HGVs and waste collection vehicles. These vehicle movements may temporarily contribute to local traffic volumes, emissions, and noise, particularly during the construction phase. Access routes will be designed to accommodate turning radii and service requirements of bin collection vehicles.

8.4.1.6 Resource Efficiency and Circular Economy Measures

The design and implementation of the Proposed Development incorporates a range of measures to promote resource efficiency and support Ireland's transition to a circular economy. These measures focus on reducing the consumption of raw materials, minimising waste generation, and maximising reuse and recycling across all phases of the project lifecycle.

From the outset, the development has been designed to facilitate material self-sufficiency. The earthworks strategy, in particular, reflects a balanced cut-and-fill design whereby all excavated subsoil and topsoil will be retained and reused on site. Subsoil material, including fractured rock, will be crushed on-site and reused as granular fill for road construction, hardstanding areas, and foundations, thereby displacing the need for imported aggregates. This approach not only reduces construction costs but also substantially lowers the environmental footprint associated with HGV movements, off-site disposal, and virgin material extraction.

The stripping and stockpiling of approximately 21,270 m³ of topsoil will be managed to ensure that the material is suitable for re-use in landscaping, berms, and public open spaces. Retention and re-use of this material on site avoids disposal and supports the delivery of high-quality green infrastructure without drawing on external resources.

The project will adopt construction techniques and material procurement practices that support waste prevention and efficient material use. These include:

- Off-site prefabrication or pre-cut materials where possible, reducing on-site wastage;
- Just-in-time delivery scheduling to minimise surplus and storage damage;
- Supplier take-back schemes for pallets, packaging, or unused products; and,
- Use of durable, low-maintenance materials that reduce long-term replacement and disposal rates.

The appointed contractor will be required to implement a RWMP that includes reuse targets and recycling rates consistent with the EPA's 2021 guidelines [3]. The plan will detail how recyclable materials (e.g., timber, metals, concrete, packaging) will be segregated at source and sent to authorised recovery facilities.

During the operational phase, the design supports household-level source segregation through a three-bin system and ensures each dwelling is equipped to facilitate compliance with the County Cork Waste Management Bye-Laws 2019. By enabling proper waste sorting at source, the development contributes to national recycling targets and diverts material from landfill [5].

8.5 Methodology

This chapter has been prepared in accordance with current Irish and international best practice for waste and material asset assessment in EIARs. The methodology follows a structured approach and is consistent with the framework outlined in the IEMA Guide to Materials and Waste in Environmental Impact Assessment (2020) [1].

The assessment considers both waste arisings and material use and addresses the potential for environmental effects across the demolition (if applicable), construction, and operational phases of the Proposed Development. It incorporates a combination of desk-based review, professional judgement, and policy-based appraisal, and draws on the following core activities:

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- Scoping and Baseline Review: Understanding the likely material and waste flows associated with the development and identifying available infrastructure, regulatory context, and regional waste capacity;
- Identification of Aspects and Impacts: Determining which aspects of the development generate or consume resources and identifying how these may result in environmental effects (e.g. waste generation, emissions from transport, landfill pressure);
- Impact Assessment: Evaluating the likely significance of effects using criteria aligned with IEMA guidance, considering:
 - Magnitude (e.g. volume of waste/material);
 - Sensitivity of receiving environment (e.g. waste infrastructure, proximity to sensitive receptors);
 - Duration, frequency, and reversibility of the impact; and,
 - Likelihood of occurrence.
- Mitigation and Enhancement Measures: Identifying design measures, operational protocols, and management plans to prevent, reduce, or offset adverse effects and support positive outcomes aligned with the circular economy; and,
- Residual and Cumulative Effects: Assessing any remaining effects post-mitigation and considering the potential for cumulative impacts with adjacent or concurrent developments.

8.5.1 References and Guidance

The following legislation and guidance documents informed the assessment methodology:

- IEMA - Guide to Materials and Waste in Environmental Impact Assessment (2020) [1]
- EPA - Guidelines on the Information to be Contained in EIARs (2022) [2];
- EPA - Best Practice Guidelines for the Preparation of RWMPs (EPA, 2021) [3];
- Government of Ireland - Waste Action Plan for a Circular Economy – Ireland’s National Waste Policy 2020 - 2025 (2020) [6];
- Cork County Waste Management Bye-Laws 2019 [5];
- National Waste Management Plan for a Circular Economy 2024–2030 [4];
- Southern Region Waste Management Plan 2015–2021 (until superseded) [7].
- S.I. No. 126 of 2011 – European Communities (Waste Directive) Regulations 2011, as amended [8];
- S.I. No. 820 of 2007– Waste Management (Collection Permit) Regulations 2007–2017 [9];
- Cork County Development Plan 2022–2028 – Including objectives on waste minimisation, sustainable infrastructure, and environmental protection [10].

8.5.2 Consultation

Pre-application consultation for the Proposed Development was undertaken with Cork County Council in accordance with the requirements of the LRD process. This included the submission of a pre-application request and participation in a formal Section 32 meeting held in July 2024. The Section 32 Opinion, issued by Cork County Council, identified several matters relevant to the Material Assets – Waste chapter, including the need for a clearly defined cut-and-fill strategy, clarification of the re-use of site-won materials, and the requirement for a robust RWMP. The planning authority emphasised that soil and stone intended for re-use must be managed in accordance with the EPA's Article 27 Guidance, and that recovery operations should be clearly distinguished from disposal activities.

At the 32B Consultation Meeting (Ref: CRH 4769), further emphasis was placed on ensuring that the Proposed Development integrates waste minimisation measures in line with the National Waste Management Plan for a Circular Economy, and that appropriate consideration be given to cumulative waste generation arising from Phase 1 and Phase 2 of the wider Castle Rock development. Cork County Council also advised that the EIAR should demonstrate how domestic waste will be stored and collected in a manner compliant with the County Cork Waste Management Bye-Laws 2019 [5], and how access for refuse vehicles has been incorporated into the site layout.

This feedback has been incorporated into the design approach, the mitigation measures proposed in this chapter, and the preparation of the accompanying RWMP.

8.6 Difficulties Encountered

No significant difficulties were encountered during initial drafting.

8.7 Baseline Environment

The Proposed Development is located within the administrative area of Cork County Council and falls under the remit of the Southern Waste Region, as defined under the National Waste Management Plan for a Circular Economy (2024–2030) [4]. This plan replaces the previous regional plans (including the Southern Region Waste Management Plan 2015–2021) [6] and introduces a national framework for waste planning and circular economy implementation.

Cork County is one of the largest local authorities in the country by geographic area and population, and as such, generates a significant portion of Ireland’s construction and municipal related waste. According to the EPA’s Circular Economy and Waste Statistics 2023 [10] Cork continues to experience strong levels of residential construction activity, which has implications for regional waste generation, material recovery, and infrastructure capacity.

The C&D waste stream continues to dominate Ireland’s overall waste profile. In 2023, an estimated 9 million tonnes of C&D waste were generated, up from 8.3 million tonnes in 2022 [10]. The majority (81%) comprised inert materials such as soil and stone. 73% of non-hazardous C&D waste (excluding soil and stone) was recovered or backfilled, surpassing the European target of 70% [10]. Soil and stones accounted for most of the backfilling, accounting for 75% of treatment of this waste stream.

Within the Cork region, there is access to a network of authorised waste facilities, including:

- Civic Amenity Sites (e.g., Bandon Recycling Centre at Shinagh);
- Permitted soil recovery facilities (e.g., for inert soil, stone, and rock);
- Authorised construction and demolition waste transfer stations;
- Kerbside household waste collection services, operated by licensed private contractors; and,
- Bring banks and WEEE collection points, available through Cork County Council’s waste infrastructure.

Bandon and its environs are currently serviced by multiple private waste collection companies operating under NWCPO authorisations. Standard three-bin collection systems are well established in the area, and the infrastructure exists to accommodate new housing developments such as the Proposed Development without placing significant stress on the existing municipal waste system.

There are no landfill facilities located directly within the Bandon urban area. However, inert and non-hazardous waste disposal options exist within the wider Cork region and are typically accessed only when reuse or recovery is not possible. In line with the waste hierarchy, disposal is regarded as the least preferred option and is typically avoided through proper planning, site material balancing, and contractor-led recovery practices.

No evidence of legacy waste deposits or historical landfilling was identified on the subject lands. The site is currently greenfield in character, with no known history of illegal dumping, waste activity, or contamination. Baseline conditions therefore indicate a site of low sensitivity with respect to existing waste-related pressures or constraints.

A portion of the Site is currently being used for the temporary storage of soil and stone arising from earlier construction phases (Phases 1 and 2). The materials currently stored on site include subsoil and topsoil, primarily generated during excavation works. These materials have been separately stockpiled and graded to allow for surface water runoff and to preserve their integrity for future reuse.

This interim use of the site has enabled a sustainable materials management strategy, avoiding unnecessary double-handling or off-site disposal. It is intended that the stored materials will be reincorporated into Phases 1 and 2 as backfilling progresses, including restoration of haul routes and berm construction. The area also currently facilitates construction access between phases, reducing traffic impacts on completed and occupied sections of the development. In summary, the regional context and site-specific conditions support the implementation of a self-contained, resource-efficient waste strategy. Cork County's existing waste infrastructure and regulatory framework are well placed to accommodate the operational and residual construction waste arising from the Proposed Development.

8.8 The 'Do Nothing' Scenario

Under the do-nothing scenario, the Proposed Development would not proceed, and the subject lands would remain in their current condition as undeveloped greenfield. No excavation, construction, or residential occupation would take place, and therefore, no direct waste generation associated with the Proposed Development would occur. From a material assets and waste perspective, this would result in a range of both positive and negative outcomes over the temporary (up to 1 year) and short-term (1–7 years) periods.

Temporary Scenario (0–1 year)

In the immediate term, the site would remain in agricultural or unmanaged open land use, with no disturbance to soils or generation of construction-related waste. No temporary impacts would arise in terms of material inputs or disposal requirements.

Short-Term Scenario (1–7 years)

Over the short-term period, the following outcomes are likely to arise in the do-nothing scenario:

- **No Construction Waste Generation.** The site would not give rise to any C&D waste, and there would be no demand for waste transport, recovery, or disposal infrastructure. This represents a neutral-to-positive outcome in terms of avoiding short-term pressure on regional facilities.
- **No Operational Waste Generation or Infrastructure Need.** As no households would be introduced to the site, there would be no generation of MSW, and no requirement for new kerbside bin collection routes or

estate waste infrastructure. Again, this represents a neutral outcome in terms of waste pressure but does not contribute to wider housing and service delivery goals.

- **Foregone Opportunities for Waste Reuse and Resource Efficiency.** One of the key objectives of the Proposed Development is to implement a self-contained, resource-efficient earthworks and construction programme. The reuse of site-won materials (rock, topsoil), the avoidance of importing aggregates, and the provision of compliant household waste infrastructure all contribute to national circular economy goals. Under the do-nothing scenario, these opportunities would be lost, resulting in a negative impact from a waste resource efficiency perspective.
- **Risk of Ad Hoc Use or Dumping.** In the absence of active development or occupation, unmanaged greenfield lands in edge-of-town contexts can sometimes become informal dumping grounds for small-scale waste (e.g., garden waste, construction debris). While no such issues are currently recorded on the site, the potential for illegal tipping or unauthorised use could arise if the site remains idle for an extended period. This would represent a negative impact, albeit one that can be managed through access control and enforcement.
- **Non-Contribution to Circular Economy Policy Objectives.** The National Waste Management Plan for a Circular Economy (2024–2030) places strong emphasis on embedding waste prevention, reuse, and recycling into the design and delivery of housing developments [4]. By not proceeding, the Proposed Development would not contribute to the achievement of these policy objectives in the local area, representing a lost opportunity rather than an active environmental burden.

8.9 Potential Significant Effects

8.9.1 Construction Phase

The construction phase of the Proposed Development will involve site clearance, bulk excavation, infrastructure installation, and the building of residential units and associated services. These activities will give rise to the generation of both inert and non-inert construction waste and will require the importation and consumption of construction materials such as aggregates, concrete, and prefabricated building elements. The assessment of potential significant effects considers both direct and indirect impacts associated with the generation, management, movement, and treatment of construction-related waste.

8.9.1.1 Direct Effects

The direct environmental effects of construction waste primarily relate to the handling, storage, transportation, and disposal or recovery of waste generated on-site.

These include:

- **Excavated Soil and Rock** - Approximately 35,762 m³ of material will be excavated as part of the site preparation and earthworks. Of this, an estimated 35,246 m³ will be reused as fill material within the development, achieving a near cut-and-fill balance. It is not anticipated that surplus material will require off-site export. Where suitable, fractured subsoil will be crushed in situ and repurposed as granular sub-base for roads and hardstanding areas. This approach reduces the need for imported aggregates, limits the classification of materials as waste. In the event that surplus material does arise, it will be subject to appropriate classification as hazardous or non-hazardous in accordance with EPA guidance [4]. Where non-hazardous and suitable for beneficial reuse, material may be managed as a by-product under Article 27

of the European Communities (Waste Directive) Regulations 2011, supporting national circular economy objectives and reducing reliance on disposal routes.

- Direct effects arising from this practice include reduced traffic volumes, minimised fossil fuel emissions, and lower noise and dust generation, compared to a scenario requiring off-site material transport and disposal. This is a positive direct effect in terms of sustainable waste management.
- Construction Waste Streams - The construction process will generate a variety of non-inert wastes, including:
 - Concrete and block off-cuts;
 - Timber from formwork and packaging;
 - Metals, plastics, insulation, and plasterboard; and,
 - General packaging waste.

If poorly managed, these materials could result in:

- Visual impacts from scattered or uncovered stockpiles;
- Dust, odour or leachate from biodegradable fractions;
- Localised soil or water contamination due to improper segregation or storage; and,
- Non-compliance with waste handling and permit obligations.

However, provided that the RWMP is fully implemented as proposed, including appropriate on-site segregation, signage, weatherproof containers, and use of permitted waste hauliers and authorised treatment facilities, these impacts are not expected to be significant.

Hazardous Waste - No hazardous waste is expected to arise in significant volumes during construction. However, small quantities of waste paints, adhesives, cleaning agents or treated wood may occur. If not segregated, these could contaminate larger waste streams and result in environmental or human health risks. The direct impact of this risk is low, provided compliance with EPA hazardous waste handling protocols is maintained.

8.9.1.2 Indirect Effects

Indirect effects relate to secondary environmental consequences that arise from the processing and downstream management of waste materials.

- Treatment and Recovery - Construction waste that is removed from site will be transferred to permitted recovery facilities for treatment. This will involve indirect impacts associated with:
 - Transport emissions (NO_x, CO₂, PM₁₀) from haulage vehicles;
 - Noise impacts from HGV traffic; and,
 - Energy use associated with processing and material recovery.

The scale of these effects is expected to be minimal, given the low volume of waste anticipated to be exported due to the near cut/fill balance and on-site reuse of rock.

- Landfill or Non-Recovery Disposal - Should any residual waste streams require disposal to landfill (e.g. non-recyclable plasterboard, contaminated loads), this would represent a negative indirect effect by contributing to landfill demand and resource loss. However, with proper implementation of the waste hierarchy and site controls, the volume of non-recoverable waste is expected to be negligible.

8.9.2 Operational Phase

Once occupied, the Proposed Development will give rise to the generation of MSW from residential households. This includes waste typically associated with domestic activity such as food and organic waste, dry recyclables (paper, cardboard, plastics, metals), and residual waste. The scale of waste production will be proportional to the number of occupied units, household size, and waste segregation practices.

8.9.2.1 Direct Effects

The direct effects during the operational phase primarily relate to the generation, storage, and presentation of household waste:

- Waste Generation at Source - Each dwelling will generate MSW on a weekly basis. Without proper management, the volume and nature of this waste could lead to nuisance effects such as odours, pest attraction (e.g. rodents or birds), litter from overflowing or unclosed bins, and visual impacts. Inadequate provision or use of the three-bin system may also result in poor segregation, leading to contamination of recyclable or compostable streams;
- Incorrect Segregation - Poor segregation at source, such as mixing recyclables with residual waste can undermine the efficiency of downstream recycling or composting infrastructure. This may result in higher disposal rates, reduced recovery rates, and non-compliance with County Cork Waste Management Bye-Laws 2019 [5]. Contamination of organic waste bins with plastic or non-compostables is a particular concern, as it can render the material unsuitable for anaerobic digestion or composting; and,
- On-Site Storage Challenges - While the design includes individual bin storage within each unit's curtilage, improper placement or insufficient use of these areas could lead to cluttered frontages, blocked footpaths, or accessibility issues for collection contractors.

8.9.2.2 Indirect Effects

The indirect effects of operational waste relate to downstream handling, service infrastructure, and broader environmental implications:

- Waste Collection and Haulage Impacts - Collection of household waste will involve regular movements of refuse trucks within the estate and on local roads. This introduces vehicle-related impacts such as noise, traffic safety considerations, and emissions (NO_x, CO₂, PM₁₀). However, such movements are routine and not likely to exceed the capacity of existing waste collection networks in the area;
- Impact on Waste Recovery Infrastructure - The cumulative effect of poorly segregated waste could place pressure on waste contractors and regional material recovery facilities (MRFs), composting plants, or waste-to-energy incinerators. This is particularly important given national targets under the Waste Framework Directive [7] and the National Waste Management Plan for a Circular Economy (2024–2030) [4]. Increased residual waste output may result in greater reliance on landfill or incineration, representing a negative indirect impact.
- Contribution to Policy Objectives - Conversely, if residents consistently follow best practices in waste segregation and bin usage, the Proposed Development can contribute positively to regional and national waste targets. This includes improved recycling rates, diversion of biodegradable waste from landfill, and increased recovery of packaging materials. While modest in scale, this represents a positive indirect effect in the context of long-term policy compliance.

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8.9.3 Cumulative Effects

This section considers whether the Proposed Development, when assessed cumulatively with other permitted or existing developments in the area, could give rise to significant effects in relation to waste generation, resource use, or pressure on waste infrastructure.

8.9.3.1 Castle Rock Development – Phases 1, 2, and 3

The Proposed Development (Phase 3) forms part of a wider masterplan at Castle Rock, Knockbrogan, Bandon. Phases 1 and 2 are already constructed or nearing completion. These earlier phases involved similar earthworks, construction, and operational characteristics and have already contributed to local waste arisings and infrastructure demand over the past several years.

From a construction waste perspective, the cumulative impact of Phases 1–3 is not considered significant. The Proposed Development incorporates a balanced cut-and-fill earthworks strategy, and all site-won topsoil and subsoil are intended for reuse within the site. The waste generated during construction of Phase 3 is therefore discrete and time-bound, with minimal overlap with past phases.

In terms of operational waste, the cumulative increase in municipal waste volumes across all three phases is acknowledged. However, this increase is incremental and consistent with the zoned residential use of the land. All units will be served by individual three-bin collection systems and designed in compliance with County Cork Waste Management Bye-Laws 2019 [5], ensuring that operational waste is managed within existing collection frameworks. All units with side access will have sufficient space to store refuse bins in the private rear amenity space. Mid-terrace dwellings will have dedicated bin storage in front of the building. Refer to Figures 8-1 and 8-2 for details. More detailed drawings (25 7230 P1110/1111 can be found within the overall submission within the architectural drawings which forms part of this submission.

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Figure 8 1:Site Layout Plan (Southwest) – Bins



Figure 8 2: Site Layout Plans (East) - Bins



The development does not require bespoke waste infrastructure (e.g. communal waste compounds, recycling banks) and will not significantly burden local services. Collection routes are already established in the area, and population increases associated with Phases 1–3 are consistent with planned housing delivery under the Cork County Development Plan 2022–2028 [9].

8.9.3.2 Local Developments in Bandon Area

Cumulative impacts have also been considered in the context of other consented or ongoing developments in the Bandon area, including residential, educational, and infrastructure upgrades. Based on planning records and the Cork County Council S.32 Opinion, no large-scale industrial or commercial developments with atypical waste demands are proposed in proximity to the site.

While the combined residential output of multiple developments will increase the total volume of household waste in the area over time, Cork County’s current kerbside collection network and permitted waste facilities (e.g. Shinagh Civic Amenity Site) are considered to have adequate capacity to absorb these increases without requiring system expansion.

In the context of the National Waste Management Plan for a Circular Economy (2024–2030), the small-to-moderate scale residential growth expected in Bandon aligns with regional waste planning objectives and does not represent a significant deviation from baseline projections.

8.9.4 Summary

The following Table 8-2 summarises the identified likely significant effects during the construction phase of the Proposed Development before mitigation measures are applied.

Table 8 2 Summary of Construction Phase Likely Significant Effects in the absence of mitigation Table 8 3 Table

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
Generation of construction and demolition (C&D) waste from site works, including subsoil, rock, concrete, timber, metal, packaging	Negative	Moderate	Local to regional	High	Short-term	Direct
Off-site disposal of excess or unsuitable material (if reuse not fully achieved)	Negative	Slight to Moderate	Local to regional	Low to Medium	Short-term	Indirect
On-site handling and storage of waste leading to littering, odour, or contamination risks	Negative	Slight	Site-specific	Medium	Temporary	Direct
Risk of improper segregation or classification of hazardous materials (e.g. treated timber, adhesives, paints)	Negative	Slight to Moderate	Site-specific	Low to Medium	Temporary	Direct
Resource consumption (imported aggregates, concrete, materials)	Negative	Moderate	Regional	High	Short-term	Indirect
Potential for unauthorised disposal or non-compliant removal of waste (e.g. breach of permit conditions)	Negative	Moderate	Regional	Low	Temporary	Indirect
Increased HGV movements associated with waste removal and material delivery	Negative	Slight	Local (transport routes)	Medium	Short-term	Indirect

The following Table 8-3 summarises the identified likely significant effects during the operational phase of the Proposed Development before mitigation measures are applied.

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Table 8 3 Summary of Operational Phase Likely Significant Effects in the absence of mitigation

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
Generation of municipal solid waste (MSW) from residential units	Negative	Slight	Local (site and neighbourhood)	High	Long-term	Direct
Incorrect segregation of household waste streams (e.g. contamination of recycling or organics)	Negative	Moderate	Local	Medium	Long-term	Direct
Nuisance effects from poor bin management (e.g. litter, odours, vermin)	Negative	Slight to Moderate	Site-specific	Medium	Long-term	Direct
Increased demand on existing municipal waste collection infrastructure	Negative	Slight	Local to regional	Low to Medium	Long-term	Indirect
Contribution to national circular economy targets through correct bin use	Positive	Slight to Moderate	Regional to national	Medium	Long-term	Indirect
Emissions and local impacts from refuse collection vehicles (noise, traffic)	Negative	Slight	Local (transport routes)	Medium	Long-term	Indirect
Residual disposal of unrecyclable household waste to landfill or incineration	Negative	Slight	Regional	High	Long-term	Indirect

8.10 Mitigation Measures

8.10.1 Construction Phase Mitigation

To manage waste arisings and material usage during the construction phase, a range of embedded and active mitigation measures will be implemented. These measures are aimed at avoiding the generation of waste where possible, maximising the beneficial reuse of site-won materials, and ensuring that all waste is handled in compliance with legal and environmental standards.

The key mitigation measures are as follows:

8.10.1.1 Balanced Earthworks and On-Site Reuse of Material

- The development has been designed to achieve a cut-and-fill balance, with approximately 35,762 m³ of cut material offset by a 35,246 m³ fill requirement;
- Fractured subsoil will be crushed on-site for reuse as granular sub-base in roads, footpaths, and hardstanding areas;

- Topsoil stripping (ca. 21,270 m³) will be retained entirely on-site for landscaping, berm formation, and open space finishing;
- This material management approach will avoid the need for off-site disposal or importation of material, minimising transport emissions and haulage impacts ; and,
- In the event that surplus excavated material arises during construction, it will be subject to appropriate waste classification in accordance with EPA Waste Classification Guidance to determine if it is hazardous or non-hazardous [4]. Where material is deemed non-hazardous and suitable for beneficial reuse, it may be managed as a by-product under Article 27 of the European Communities (Waste Directive) Regulations 2011, subject to EPA notification. This ensures full compliance with regulatory requirements while supporting the principles of the waste hierarchy and circular economy.

8.10.1.2 Preparation and Implementation of a Resource and Waste Management Plan (RWMP)

- A site-specific RWMP will be finalised by the main contractor in accordance with the EPA’s 2021 Best Practice Guidelines and the Waste Management Act 1996 (as amended);
- The plan will:
 - Identify all likely waste types and estimated quantities;
 - Specify on-site waste segregation, storage, and labelling protocols;
 - Set targets for reuse, recycling, and recovery rates; and,
 - Include procedures for monitoring, record-keeping, and reporting.

8.10.1.3 Use of Authorised Contractors and Facilities

- All waste will be collected by contractors holding a valid Waste Collection Permit issued by the NWCPO; and,
- All off-site movements of waste will be documented via waste transfer forms and sent only to authorised treatment, recovery, or disposal facilities.

8.10.1.4 Waste Handling, Storage, and Segregation on Site

- Dedicated, clearly marked waste storage areas will be established for:
 - Timber, metal, plastic, concrete, and mixed recyclables;
 - General residual C&D waste;
 - Any potentially hazardous materials (e.g. paints, adhesives).
- Containers will be weatherproof, lockable, and regularly emptied to prevent overflow, odour, or windblown litter; and,
- Waste will be removed from site on a regular basis to avoid stockpiling and fire risk.

8.10.1.5 Prevention of Hazardous Waste Generation and Cross-Contamination

- Materials with hazardous properties (e.g. adhesives, paints, treated timber) will be:
 - Used only as required;
 - Stored in banded, ventilated locations; and,
 - Segregated from non-hazardous waste streams.
- If hazardous waste is generated, it will be labelled, tracked, and removed by a licensed hazardous waste contractor.

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8.10.1.6 Training and Site Induction

- All construction personnel and subcontractors will receive site waste management training, including:
 - Waste segregation procedures;
 - Storage area use; and,
 - Spill prevention and response.
- The Site Manager or Environmental Officer will oversee compliance with the RWMP and ensure all subcontractors adhere to the agreed protocols.

8.10.1.7 Article 27 Notifications (as required)

Where site-won material is proposed for reuse and meets the definition of a by-product (not waste) under Article 27 of the European Communities (Waste Directive) Regulations 2011, a submission will be made to the EPA for confirmation of status.

8.10.2 Operational Phase Mitigation

Waste generation during the operational phase of the Proposed Development will be typical of a large residential development and will primarily consist of MSW from individual households. Although the scale and character of this waste are not expected to result in significant environmental effects, several measures will be implemented to prevent nuisance, ensure regulatory compliance, and support national waste policy objectives.

8.10.2.1 Provision of Compliant Waste Infrastructure at Unit Level

- Each dwelling will be provided with sufficient space to store three standard wheeled bins: one each for dry recyclables, organic waste, and residual waste, in accordance with the requirements of the Cork County Council (Segregation, Storage and Presentation of Household and Commercial Waste) Bye-Laws 2019.
- Bin storage areas will be:
 - Located within the curtilage of each dwelling;
 - Discretely screened or enclosed to minimise visual impact;
 - Accessible for residents and for kerbside presentation; and,
 - Sized to accommodate either 240L or 360L bins depending on household size.

8.10.2.2 Waste Collection Access and Layout Integration

- All internal roads, turning areas, and home zones have been designed to accommodate domestic refuse collection vehicles, based on autotrack analysis and standard bin-lift requirements.
- Residents will present bins kerbside in line with local waste collection schedules. No communal storage or bring bank facilities are proposed or required.

8.10.2.3 Design Measures to Prevent Nuisance

- Bin storage locations are set back from public paths and positioned to avoid conflict with windows, entrances, or public open spaces;
- Proper ventilation and screening are integrated into the design to prevent odours, vermin attraction, or wind-blown litter; and,

- In the event of missed collections or excessive accumulation (e.g. over public holidays), contingency arrangements may be implemented by waste collection providers.

8.10.2.4 Long-Term Alignment with Circular Economy Targets

- The layout and waste infrastructure have been designed to support long-term compliance with the waste hierarchy (prevention, reuse, recycling, recovery, disposal) and national policy under the National Waste Management Plan for a Circular Economy (2024–2030); and,
- By facilitating source segregation at household level and ensuring high-quality collection access, the development supports increased recycling rates, diversion of biodegradable waste from landfill, and improved circular resource flows.

8.11 Residual Impact Assessment

This section evaluates the residual impacts on waste and material assets that may remain after the implementation of all mitigation measures outlined in Section 8.9. The assessment considers both direct and indirect effects of construction and operational waste generation, taking into account the design features, management plans, and regulatory controls proposed for the development.

This section assesses potential significant environmental impacts which remain after mitigation measures are implemented.

8.11.1 Construction Phase

8.11.1.1 Direct Effects

Following mitigation, the direct effects of construction-related waste generation will be significantly reduced through the implementation of a balanced cut-and-fill strategy, the reuse of site-won materials, and the application of a site-specific RWMP.

The reuse of excavated subsoil and topsoil within the site will minimise the need for off-site disposal or import of aggregates, thereby eliminating the majority of earthworks-related waste impacts. Segregation and appropriate storage of all C&D waste streams on-site will ensure controlled handling and reduce the risk of litter, dust, odour, or accidental contamination.

Residual direct effects may include:

- Minor nuisance potential from temporary waste storage (e.g. visual clutter, windblown debris);
- Low volumes of non-recoverable waste requiring transport to landfill; and
- Isolated arisings of hazardous materials (e.g. paints, sealants, treated timber) that require specialised handling and disposal.

These effects are expected to be temporary in duration, site-specific in extent, and of low magnitude due to the control measures applied.

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8.11.1.2 Indirect Effects

Indirect residual impacts may arise from:

- Transport emissions associated with waste removal (e.g. noise, PM₁₀, CO₂ from HGVs);
- Energy use in processing recyclable C&D materials off-site; and,
- Residual landfill demand for unrecyclable waste fractions.

These effects are considered minor, short-term, and not significant, particularly as the development will largely avoid off-site disposal of excavated material through on-site reuse.

8.11.1.3 Residual Construction Impacts

Direct and indirect impacts are assessed as slight negative, temporary, local in extent, and not significant.

8.11.2 Operational Phase

8.11.2.1 Direct Effects

During operation, direct effects relate to the ongoing generation, storage, and presentation of MSW by individual households. These will be mitigated through the provision of compliant bin storage, estate management oversight, and resident education as outlined in Section 8.9.2.

Residual direct effects may include:

- Improper segregation or contamination of recycling/organic bins, leading to reduced recovery rates;
- Localised nuisances such as odours, littering, or vermin in cases of misused or overflowing bins; and,
- Intermittent issues with bin presentation or accessibility due to human behaviour.

These effects are expected to be minor in scale, long-term in duration, and fully manageable through routine estate oversight.

8.11.2.2 Indirect Effects

Residual indirect effects during operation include:

- Ongoing use of refuse collection vehicles, contributing to local emissions, road wear, and traffic interactions;
- Contribution to regional residual waste tonnage, where unrecyclable or contaminated waste streams require incineration or landfill; and,
- Moderate cumulative burden on regional material recovery and treatment infrastructure.

While the development supports the waste hierarchy and is designed to align with circular economy principles, a baseline volume of residual waste disposal will remain.

8.11.2.3 Residual Operational Impact:

Direct and indirect effects are assessed as slight negative, long-term, local to regional in extent, and not significant.

8.11.3 Summary of Post-mitigation Effects

The following Table 8-4 summarises the identified likely significant residual effects during the construction phase of the Proposed Development following the application of mitigation measures.

Table 8 4 Summary of Construction Phase Effects Post Mitigation

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
Temporary visual or nuisance effects from on-site waste storage	Negative	Slight	Site-specific	Low	Temporary	Direct
Disposal of non-recoverable residual construction waste	Negative	Slight	Local to regional	Low	Short-term	Indirect
Specialist removal of small quantities of hazardous construction waste	Negative	Slight	Local	Low	Temporary	Direct
Transport emissions from HGVs removing waste to authorised facilities	Negative	Slight	Local to regional	Medium	Short-term	Indirect
Energy and resource use in downstream waste treatment/recycling	Negative	Slight	Regional	Medium	Short-term	Indirect

The following Table summarises the identified likely residual significant effects during the operational phase of the Proposed Development post mitigation.

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Table 8 5 Summary of Operational Phase Effects Post Mitigation

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
Occasional incorrect segregation or contamination of household waste	Negative	Slight	Local	Medium	Long-term	Direct
Minor nuisance from bin misuse (odour, litter, overflow) in isolated cases	Negative	Slight	Site-specific	Low to Medium	Long-term	Direct
Emissions and road wear from collection vehicle movements	Negative	Slight	Local to regional	Medium	Long-term	Indirect
Residual disposal of unrecyclable household waste (e.g. to landfill or Waste to Energy)	Negative	Slight	Regional	High	Long-term	Indirect
Contribution to regional recycling/diversion targets through bin provision	Positive	Slight to Moderate	Regional to national	Medium	Long-term	Indirect

8.11.4 Cumulative Residual Effects

Following the implementation of mitigation measures across the construction, and operational phases, some minor residual effects related to waste generation and management may persist. While these are not considered significant in isolation, their combined influence alongside other permitted or planned developments in the Knockbrogan area may contribute to incremental pressures, particularly on regional waste infrastructure and services.

Key developments with potential for cumulative interaction include:

- Phase 1 Residential Development (Planning Ref. 21/4059 & ABP-312689-22): Currently nearing completion to the west of the subject site, comprising 59 residential units;
- Phase 2 Residential Development (Planning Ref. 24/5216 & ABP-320810-24): Permission granted for 71 residential units. Works are anticipated to commence in mid-2025;
- Creche Development (Planning Ref. 24/5147): Located adjacent to Phase 1, was granted conditional permission. This development will add to operational municipal waste volumes and require dedicated storage and collection arrangements;
- Residential Development at Watergate Street (Ref. 234015 & ABP-319115-24): Comprising 20 apartments and associated site works, including demolition and construction-related waste generation; and,
- Additional Residential Scheme (Ref. 236540): Comprising 77 dwelling units and a single-storey crèche, granted in early 2025 at Knockbrogan.

When considered cumulatively with the Proposed Development, these schemes are expected to generate notable quantities of C&D waste within a compressed timeframe, alongside long-term household waste growth.

Potential cumulative effects include:

- Short-term pressures on permitted and licensed soil recovery facilities and regional material recycling centres, particularly for inert C&D waste (soil, stone, concrete);
- Incremental demand on municipal waste collection services, especially for operational-phase waste streams (e.g., recyclables, organics, residuals), as new housing units become occupied across Knockbrogan and Bandon;
- Cumulative HGV activity associated with material delivery, waste export, and routine waste collection, potentially contributing to localised increases in traffic volume, dust, and emissions (e.g. NO_x, PM); and,
- Challenges related to waste segregation and recycling compliance across several concurrent residential developments, which could undermine the effectiveness of source separation systems if not supported by ongoing resident education and consistent estate management practices.

Although these effects are expected to be slight in significance, they underline the importance of coordinated waste planning at area level. Collaboration between developers, Cork County Council, and licensed waste operators will be necessary to ensure that:

- Collection services are scaled appropriately;
- Waste infrastructure remains fit for purpose; and,
- Source segregation systems are supported through consistent education and estate management.

8.12 Risk of Major Accidents or Disasters

The proposed residential development at Knockbrogan, Bandon, is not considered to present a significant vulnerability to major accidents or disasters in the context of waste generation or management. This conclusion is based on the nature of the project, its location, and the waste handling procedures proposed during each phase of the development.

8.12.1 Location and Site Context

- The site is not located within or adjacent to any Seveso III (COMAH) designated zone.
- There are no known major accident hazard pipelines, high-risk industrial installations, or designated flood risk zones within or near the site boundary.
- The Proposed Development comprises conventional residential units and associated infrastructure, all of which are low-risk in terms of hazardous material use or storage.

8.12.2 Construction Phase Risks

During the construction phase, all waste-related activities will be managed in accordance with a detailed RWMP. This will include:

- Identification and safe handling of any hazardous materials, if encountered (e.g., contaminated soils, paints, adhesives);
- Secure on-site storage in designated waste areas, with bunding and weather protection as appropriate;
- Emergency response procedures and pollution prevention measures integrated into the CEMP; and,
- Compliance with the Waste Management Act 1996 (as amended) and the European Communities (Waste Directive) Regulations 2011.

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8.12.3 Operational Phase Risks

The operational phase presents no material accident risk associated with waste. Risk management measures include:

- No hazardous substances will be stored or used beyond standard domestic cleaning products;
- All domestic waste will be handled via segregated storage systems and collected by licensed waste contractors;
- Bin storage areas will be secure, ventilated, and hard-surfaced, minimising risk of fire, pest attraction, or environmental leakage; and,
- No industrial or commercial-scale waste streams are anticipated.

Given the absence of hazardous infrastructure, the routine nature of the waste streams, and the robust mitigation measures proposed, the risk of significant environmental effects arising from major accidents or disasters related to waste is considered negligible. This topic is therefore not a significant environmental issue for the Proposed Development in the context of the Material Assets – Waste chapter.

8.13 Worst Case Scenario

The worst-case scenario in relation to material assets - waste would arise in the event that the proposed mitigation measures outlined in the RWMP and CEMP are not effectively implemented or enforced during the respective phases of the development.

8.13.1 Construction Phase

In a worst-case construction scenario, poor contractor compliance or inadequate site management could result in:

- Unsegregated or misclassified waste, reducing recovery rates and increasing landfill disposal;
- Unauthorised or illegal dumping, contrary to the Waste Management Act 1996 and associated European Waste Catalogue (EWC) codes;
- Environmental pollution risks, such as fuel or chemical spills, particularly in the absence of bunded storage or designated containment areas;
- Increased traffic and nuisance impacts, due to inefficient waste logistics, unmanaged stockpiles, or uncovered skips; and,
- Failure to track waste consignments, undermining traceability and compliance obligations under waste collection permit and Article 27 by-product requirements (if applicable).

These could result in moderate to significant effects in terms of emissions, non-compliance, and reputational harm.

8.13.2 Operational Phase

If operational waste management measures in accordance with the Cork County Council (Segregation, Storage and Presentation of Household and Commercial Waste) Bye-Laws 2019, are not followed, the following outcomes may occur:

- Insufficient or poorly located waste storage areas, leading to overflow, odour nuisance, pest attraction, and visual degradation;

- Incorrect segregation of household waste, with recyclables and organics contaminated and diverted to landfill or incineration;
- Increased strain on local authority or private collection services, including inefficient routing and higher service costs;
- Fire risk or health hazards, due to overfilling, or misuse; and,
- Lowered recycling rates and missed national targets, in contravention of the National Waste Management Plan for a Circular Economy 2024–2030.

While the likelihood of this worst-case scenario is low, the consequences could be moderate, affecting public health, visual amenity, and compliance with national waste regulations.

However, with the adoption of the RWMP and CEMP, clear estate management procedures, resident education, and regular monitoring, the Proposed Development is well-positioned to avoid these risks and ensure alignment with circular economy principles.

8.14 Interactions

Waste generation and management during the construction and operational phases of the Proposed Development may interact with the following environmental topics:

- Human Health – via potential nuisance (e.g. odour, vermin, litter);
- Traffic – through the movement of HGVs associated with waste export or collection;
- Soils and Water – through possible leachate or surface runoff from waste storage areas (if poorly contained);
- Air – from dust or emissions during C&D waste handling; and,
- Noise – from vehicle movements or waste handling on-site.

These interactions have been assessed as part of the relevant chapters and are not considered significant with mitigation in place.

8.15 Monitoring

Monitoring of waste management performance will be undertaken across the project lifecycle:

- Construction Phase:
 - Implementation of the RWMP will be overseen by the appointed Waste Manager or Environmental Clerk of Works (ECOW);
 - Records will be maintained for waste volumes, segregation rates, and transfer documentation; and,
 - Inspections will verify compliance with permit conditions, segregation standards, and bunding requirements.
- Operational Phase:
 - Monitoring of waste volumes, bin usage, and contamination rates will be undertaken by the estate manager in collaboration with licensed waste contractors; and,
 - Feedback mechanisms may be used to improve resident compliance (e.g. contamination tagging, bin audits).

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All monitoring results will support compliance with County Cork Waste Management Bye-Laws 2019 [5] and circular economy targets set out in national policy.

8.16 Summary of Mitigation and Monitoring

The following Table 8-6 summarises the Construction Phase mitigation and monitoring measures.

Table 8 6 Summary of Construction Phase Mitigation and Monitoring

Likely Significant Effect	Quality	Significance	Mitigation Measures	Monitoring Measures
Generation of construction and demolition waste	Negative	Moderate (Pre-Mitigation) to Slight (Post-Mitigation)	Site-specific RWMP; on-site segregation and source tracking; reuse of site-won materials; use of authorised waste contractors and facilities	Waste logs maintained by site Waste Manager; regular site inspections; contractor compliance checks
Disposal of non-recoverable waste	Negative	Slight	Waste classification; use of licensed waste collectors and authorised recovery/disposal facilities	Transfer documentation audits; periodic checks of disposal routes
Hazardous material handling and risk of pollution	Negative	Slight	Secure bunded storage; hazardous waste segregation; pollution control within CEMP	Visual inspections; incident log; review of spill response and containment procedures
Increased HGV movements and associated emissions	Negative	Slight	Balanced cut/fill strategy; in-situ reuse of subsoil; reduction of off-site haulage	Review of transport logs and delivery schedules

The following Table 8-7 summarises the Operational Phase mitigation and monitoring measures.

Table 8 7 Summary of Operational Phase Mitigation and Monitoring

Likely Significant Effect	Quality	Significance	Mitigation Measures	Monitoring Measures
Generation of household municipal solid waste	Negative	Slight	Three-bin system per unit in compliance with Bye-Laws; individual bin storage areas; estate-wide waste infrastructure integration	Waste contractor feedback; periodic review of collection service performance
Incorrect segregation and contamination of recyclables/organics	Negative	Moderate (Pre-Mitigation) → Slight (Post-Mitigation)	Resident education (welcome packs, guidance); bin design to encourage compliance	Bin contamination tagging and audits by estate manager and/or contractor
Nuisance risks (odour, litter, pests) from poor bin management	Negative	Slight	Properly designed and ventilated bin storage areas; hard-surfaced and secure locations	Estate manager visual checks; resident complaints log if required
Contribution to national recycling and landfill diversion targets	Contribution to national recycling and landfill diversion targets	Contribution to national recycling and landfill diversion targets	Contribution to national recycling and landfill diversion targets	Contribution to national recycling and landfill diversion targets

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8.17 Conclusion

This Material Assets – Waste Chapter has assessed the likely significant effects arising from the generation, handling, and management of waste during the construction and operational phases of the Proposed Development. The assessment has been carried out in accordance with best practice guidance, including the IEMA Guide to Materials and Waste in Environmental Impact Assessment (2020), the EPA EIAR Guidelines (2022), and the National Waste Management Plan for a Circular Economy (2024–2030).

During the construction phase, the Proposed Development is expected to generate typical volumes of C&D waste, including excavated soil, rock, and construction material off-cuts. A key embedded mitigation measure is the adoption of a balanced cut-and-fill strategy, which allows for the full reuse of site-won materials on-site, thereby avoiding the need for off-site disposal or importation of aggregates. A site-specific RWMP will be implemented to ensure best practice in segregation, recovery, and documentation of all waste streams.

In the operational phase, household municipal waste will be generated by individual dwellings in line with local averages. Waste infrastructure has been designed to comply with the Cork County Council (Segregation, Storage and Presentation of Household and Commercial Waste) Bye-Laws 2019 [5], with individual three-bin storage provided at each unit. Collection will be undertaken by licensed contractors under existing regional waste service arrangements. Operational mitigation includes clear resident guidance on bin use and estate management oversight to ensure compliance and prevent nuisance effects.

No significant residual effects are anticipated once mitigation measures are implemented. Cumulative and worst-case scenarios have been assessed and found to present low levels of risk, provided that the mitigation, monitoring, and management procedures outlined in this chapter are properly enforced.

The Proposed Development aligns with the principles of the waste hierarchy and supports Ireland’s transition to a circular economy by:

- Minimising waste generation at source;
- Maximising reuse and on-site recovery of materials;
- Enabling source segregation and recycling at the household level; and,
- Avoiding undue pressure on regional waste infrastructure.

In conclusion, the Proposed Development can be delivered without giving rise to significant adverse effects in relation to waste generation, handling, or infrastructure capacity. With the proposed mitigation and monitoring in place, the development is considered environmentally sustainable in the context of material assets and waste.

8.18 References and Sources

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CHAPTER NINE

LAND & SOILS



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CHAPTER NINE

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CHAPTER 9 | LAND & SOILS

9.1 Introduction

This chapter of the EIAR was prepared to assess the potential significant effects of the proposed development for Knockbrogan, Bandon, Co. Cork. It evaluates the likely significant effects, if any, which the Proposed Development will have on land, soils and geology.

This chapter contains necessary information as defined in the Environmental Protection Agency (EPA) Guidelines on the Information to be contained in Environmental Impact Assessment Reports' (EPA, 2022). Reference is made to hydrogeology, but this aspect is covered in more detail in Chapter 10 (Hydrology and Hydrogeology).

The chapter initially provides a description of the receiving environment of the site and the potential impacts of the development. When assessing the potential impacts, this assessment considers the significance of the environmental attributes, and the predicted scale, and duration of the likely effects.

The chapter also outlines the proposed mitigation measures that will reduce or eliminate the identified potential impacts and define the residual effects of the Proposed Overall Development (the effect after the implementation of mitigation measures).

This chapter should be read in conjunction with Chapter 10 (Hydrology and Hydrogeology) and also in conjunction with Chapter 2 for the EIAR which goes into further detail with regards to the site description.

9.2 Expertise & Qualifications

This chapter of the EIAR has been prepared by Marcelo Allende and Harry Reynolds of AWN Consulting. Marcelo Allende (BSc, BEng) is a Principal Environmental Consultant (Hydrologist) with AWN Consulting with over 20 years of experience in water resources technical studies, conceptual and numerical hydrological/hydrogeological modelling and environmental consultancy. Marcelo holds a degree in Water Resource Civil Engineering (BEng, Hons) from the University of Chile and a Bachelor of Science in Engineering (BSc, Hons). He has worked on a wide range of projects including multi-aspect environmental investigations, geo-environmental impact assessments, surface and groundwater resource management, hydrological and hydrogeological conceptual and numerical modelling, strategic and site specific flood risk assessments (Stage 1,2 and 3), Due Diligence reporting, baselines studies, soils, surface water and groundwater monitoring and field sampling programmes on a variety of brownfield and greenfield sites throughout Ireland as well as overseas in Chile, Argentina, Peru and Panama. He also has detailed knowledge of environmental guidance, legislation, regulations & standards and expertise in GIS (expert level) and MATTE studies at COMAH establishments. He is currently a member of the International Association of Hydrogeologists (IAH, Irish Group) and a member of Engineers Ireland (MIEI).

Harry Reynolds is an Environmental Consultant in AWN Consulting with ongoing roles within the water department. Harry has a BSc (Hons) in Environmental Science from Atlantic Technological University, Sligo. In 2022, he won the Academic Excellence award for the highest overall marks in his department, and the ESAI Undergraduate of the year award for his thesis. Harry has worked on a range of large scale projects involving EIA screening, EIA reports, SEA reports, baseline studies, GIS mapping and groundwater and surface water monitoring on various operational developments and greenfield sites. Harry now works on projects involving EIA Reports and EIA screening for a range of developments.

9.3 Proposed Development

A full description of the proposed development is provided in Chapter 2, Project Description. Please also Refer to the Site Layout Plan prepared by Brian O' Kennedy & Associates Ltd. In summary, the subject application is for a large-scale Residential Development (LRD) comprising of the construction of 212 no. residential units and all ancillary development works including footpaths, car and bicycle parking, drainage, bicycle and bin stores, lighting and landscaping/amenity areas at Knockbrogan, Bandon, Co. Cork. Access will be provided via the existing access road onto the Cork Road permitted under reference 21/4059.

9.4 Methodology

9.4.1 Criteria for Rating of Effects

The section establishes the criteria and guidance used to rate the significance of the potential impacts of the Proposed Development project on the land, soil and geological aspects of the site and surrounding area.

This chapter is prepared in line with the 'Guidelines on the Information to be contained in Environmental Impact Assessment Reports' (EPA, 2022) and due consideration is also given to the guidelines provided by the Institute of Geologists of Ireland (IGI) in the document entitled 'Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements' (IGI 2013).

The document entitled 'Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes' by the Transport Infrastructure Ireland (TII) formerly National Roads Authority (NRA) (TII, 2009) is referenced where the methodology for assessment of impact is appropriate. Furthermore, in line with the TII Guidelines, an assessment of the attribute importance has been undertaken in order to provide a basis for the assessment of impact provided. The attribute importance considers the potential as well as the existing use of the surface water features as a water resource (i.e., water supply, fisheries and other uses) as well as ecological habitat requirements. The TII criteria for rating the soil and geology related attributes are presented in Appendix 9.1.

The quality, significance, and duration of the potential impacts, residual effects, and cumulative effects are described using standard EIA descriptive terminology (EPA, 2022) that is set out in Chapter 1 of this EIAR.

The principal attributes (and effects) to be assessed include the following:

- Geological heritage sites within the vicinity of/ within the perimeter of the Proposed Development site.
- Landfills, industrial sites in the vicinity of the site and the potential risk of encountering contaminated ground.
- The quality, drainage characteristics and range of agricultural use(s) of subsoil around the site.
- Quarries or mines in the vicinity and the potential implications (if any) for existing activities and extractable reserves.
- The extent of topsoil and subsoil cover and the potential use of this material on site as well as any requirement to remove it off-site as waste for disposal (D) or recovery (R) options.

9.4.2 Relevant Legislation & Guidance

The baseline study and impact assessment have will be out in accordance with the following key guidance and established best practice:

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- Environmental Protection Agency (EPA) Advice notes on current practice in the preparation of Environmental Impact Statement (EPA, 2003) and Guidelines on the Information to be contained in Environmental Impact Statements (EPA, 2022a).
- TII/National Roads Authority Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (TII/formerly NRA, 2009).
- Transport Infrastructure Ireland - Road Drainage and Water Environment (TII, 2015).
- Institute of Geologists Ireland (IGI) -Geology in Environmental Impact Statements, a guide (IGI, 2002) and Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements (IGI, 2013).
- The Planning System and Flood Risk Management, Guidelines for Planning Authorities (Department of the Environment, Heritage and Local Government (DoEHLG) and the Office of Public Works (OPW).

Land soil and geology resource management in Ireland is dealt with in the following key pieces of legislation and guidelines:

- Institute of Geologists Ireland (IGI) -Geology in Environmental Impact Statements, a guide (IGI, 2002) and Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements (IGI, 2013).
- Waste Management Acts 1996 as amended.
- Environment Agency (EA), Land contamination: risk assessment (EA 2020).
- BS 10175:2011 + A2:2017 Investigation of potentially contaminated sites. Code of practice (British Standards Institute 2017).
- CIRIA C552 Contaminated Land Risk Assessment: A Guide to Good Practice (CIRIA 2001).
- TII/National Roads Authority Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (TII/formerly NRA, 2009).
- Transport Infrastructure Ireland, The Management of Waste from National Road Construction Projects (TII 2017).
- Environmental Protection Agency, Guidance on the Management of Contaminated Land and Groundwater at EPA Licensed Sites (EPA 2013).
- Local Authority planning guidance as applicable.
- Consolidated EIA Directive 2011/92/EU and 2014/52/EU.

9.4.3 Sources of Information

Desk-based geological information on the substrata (both Quaternary deposits and bedrock geology) underlying the extent of the site was obtained through accessing databases and other archives where available. Data was sourced from the following:

- Geological Survey of Ireland (GSI) - on-line mapping, Geo-hazard Database, Geological Heritage Sites & Sites of Special Scientific Interest, Bedrock Memoirs and 1: 100,000 mapping.
- Teagasc soil and subsoil database.
- Ordnance Survey Ireland - aerial photographs and historical mapping.
- Environmental Protection Agency (EPA) – website mapping and database information.
- National Parks and Wildlife Services (NPWS) – Protected Site Register.

Site specific data was derived from the following sources:

- Brian O’Kennedy and Associated Ltd. – Engineering Infrastructure Report for 212 Dwellings at Knockbrogan, Bandon, Co. Cork (2025).
- Various plans and drawings.

9.4.4 Site Surveys/Investigations

No Site Surveys/ Investigations have taken place

9.5 Difficulties Encountered

There were no difficulties encountered in the preparation of this EIAR chapter.

9.6 Baseline Environment

9.6.1 Site Description

The Proposed Site Development is located in Knockbrogan, Bandon, Co Cork, covering a total area of approximately 7.844 hectares. It is c. 24km southwest of Cork city centre. The site is located within five joined fields and has been in long term agricultural use - being used annually for crop growing. The eastern boundary has low-level sod and stone mature ditch bordering further agricultural lands. The western boundary is a similar low-level ditch. The northern and southern boundaries are mature ditches mainly bounding farmland with an element of the south boundary adjacent to an existing housing estate.

The topography of the site is relatively flat on the northern portion of the site, however, the southern portion of the site is sloping approximately between 10% and 12%. The height of the site above ordnance datum (AOD) ranges from approximately 57.0 m AOD at its lowest point to 77.5 m AOD at the highest point. The site at present is a greenfield site unoccupied by any structures or buildings, as shown in Figure 9 1.

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Figure 9 1: Site Location and Surrounding Land Use

9.6.2 Existing Land Use and Site History

The site at present is unoccupied by any structure or buildings, and it is predominantly used for agricultural uses. Historical Ordnance Survey maps (www.tailte.ie) were examined during the preparation of this EIAR Chapter.

The 1830 Ordnance Survey 6" maps indicate that the site was unoccupied at that time and was primarily utilised for farming activities. Furthermore, the surrounding area looks unoccupied and was also likely used for farming activities, see Figure 9 2 to Figure 9 4 below.



Figure 9 2: 25inch Historic Map



Figure 9 3: 6" First Edition Colour Map

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Figure 9 4: Imagery Colour Map 2011-2013

Subsequent review of the historic 6" colour maps show very little changed in terms of land use both on the site and the surrounding area.

Further review of ITM Imagery mapping from 2001 to 2013 confirms that the proposed site remained unoccupied throughout this period and continued to be used for farming activities (Figure 9-5 above). However, the surrounding area changed quite a bit from 2001 onwards, with residential developments located both north and south of the site.

9.6.3 Surrounding Land Use

There are no licenced facilities within the site boundary or adjacent to the Proposed Development. Table 9.1 below shows the closest Industrial Emissions or Integrated Pollution Control (IE/IPC) facilities to the Proposed Development according to the EPA (2025) within a 5 km radius of the proposed development.

Anglo Beef Processors Ireland is the nearest of these facilities, located c. 410m north of the Proposed Development as shown in Figure 9 5. There is no hydraulic connectivity between this site and proposed development.

Table 9 1: EPA Licenced facilities nearby to the Proposed Development site (EPA, 2025)

Registration number	Name	Category	License type	Distance (km) & Direction
P0188	Anglo Beef Processors Ireland T/A ABP Bandon	Industry	IE	0.4 km North
P0477	Acorn Water Limited	Industry	IE	0.5 km East
P0942	Derek Good	Industry	IE	3.8 km Northeast
P0005	MSD International GmbH, trading as MSD Ireland (Brinny)	Industry	IE	4.0 km North



Figure 9 5 EPA Licenced Facilities in proximity of the Site (EPA, 2025)

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9.6.4 Quaternary Geology

According to GSI (2025), quaternary sediments in the site indicates the principal subsoil type in the area comprises of Till derived from Devonian and Carboniferous sandstones and shales, however, there is also a small pocket of Bedrock outcrop or subcrop on the west of the site, as shown in Figure 9 6. Glacial tills typically are cohesive deposits of low permeability. To date, no site investigation works have been carried out within the proposed site boundary or in the adjacent areas.

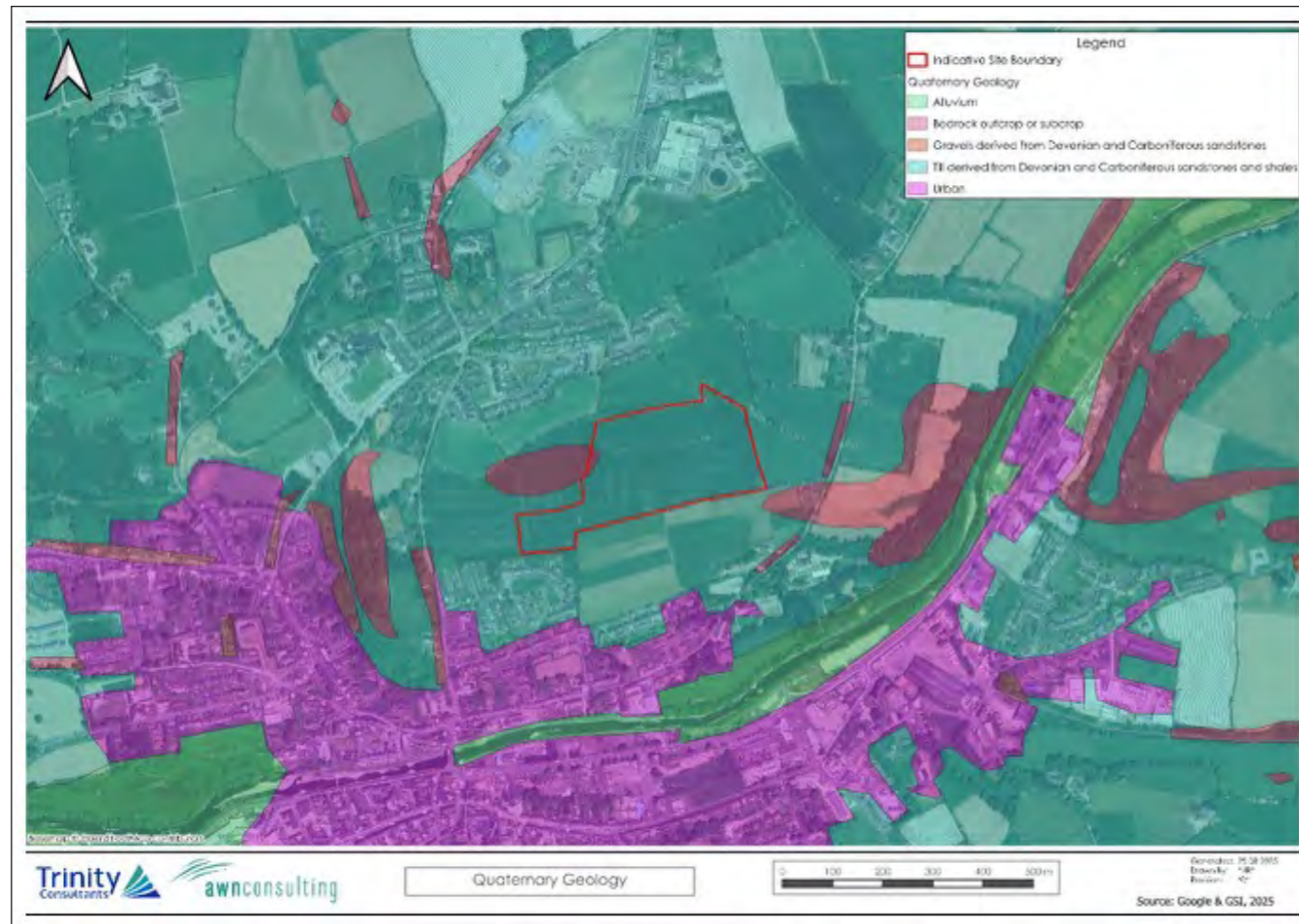


Figure 9 6: Quaternary Geology (GSI, 2025)

9.6.5 Bedrock Geology

The Geological Survey of Ireland (GSI, 2025) identifies the bedrock underlying the proposed site and its surrounding area as comprising one principal geological formation which is the Kinsale Formation (see Figure 9 7). These lithological units provide valuable insight into the geological history of the area and have direct relevance to considerations of ground stability, drainage characteristics, and potential excavation constraints for the proposed development.



Figure 9 7: Bedrock Geology (GSI 2025)

As mentioned in Chapter 10, the groundwater vulnerability rating is classified as ‘High’ Vulnerability on the east portion of the site, which indicates that the depth of bedrock would be 3-5 m below ground level. However, the groundwater vulnerability rating is classified as ‘Extreme’ Vulnerability on the west portion of the site, which indicates that the depth of bedrock would be around 0-3 m below ground level in this area. There is also a small pocket of rock at the surface on the west boundary of the site which is consistent with this classification.

9.6.6 Geological Heritage Sites

According to the Geological Survey of Ireland (GSI, 2025) the proposed site development does not lie within or is in close proximity to any Geological Heritage Sites. The nearest site is Courtmacsherry Estuary (Site Code: CK039) located c. 10km south of the site.

9.6.7 Economic Geology

The GSI (2025) mineral database was consulted to determine whether there were any mineral sites in close proximity to the study area. There were 2 mineral sites identified within a 5 km radius of the proposed site development shown in Figure 9 8. The location and description of these mineral localities in relation to the site are presented in Table 9.2 below. The closest mineral location to the site is Mineral Location reference number 4096, which is c. 1.7km to the east.



Figure 9 8: Economic Geology (GSI 2025)

Table 9 2: Mineral Localities within 5km of the site

Mineral Location Ref	Mineral Type	Key Mineral	Description	Comments	Location	County
4096	MESL	Slate	Non-Metallic	Quarry in dark bluish grey slates, cleaved vertically.	Carrigcannon	Cork
4095	MESL	Slate	Non-Metallic	Quarry in smooth dark bluish slates once used for roofing	Laragh	Cork

9.6.8 Geohazards

Much of the Earth's surface is covered by unconsolidated sediments which can be especially prone to instability. Water often plays a key role in lubricating slope failure. Instability is often significantly increased by man's activities in building houses, roads, drainage and agricultural changes. Landslides, mud flows, bog bursts (in Ireland) and debris flows are a result. In general, Ireland suffers few landslides. Landslides are more common in unconsolidated material than in bedrock, and where the sea constantly erodes the material at the base of a cliff landslides and falls lead to recession of the cliffs. Landslides have also occurred in Ireland in recent years in upland peat areas due to disturbance of peat associated with construction activities.

Based on the GSI spatial map viewer, the landslide susceptibility classification within the site boundary is 'Low' as shown in Figure 9 9 (GSI, 2025), with a small section on the west site boundary that is classified as 'Low (inferred)'. Due to the local topography and the underlying strata, there is a negligible risk of a landslide event occurring at the site. There are no active volcanoes in Ireland so there is no risk from volcanic activity.

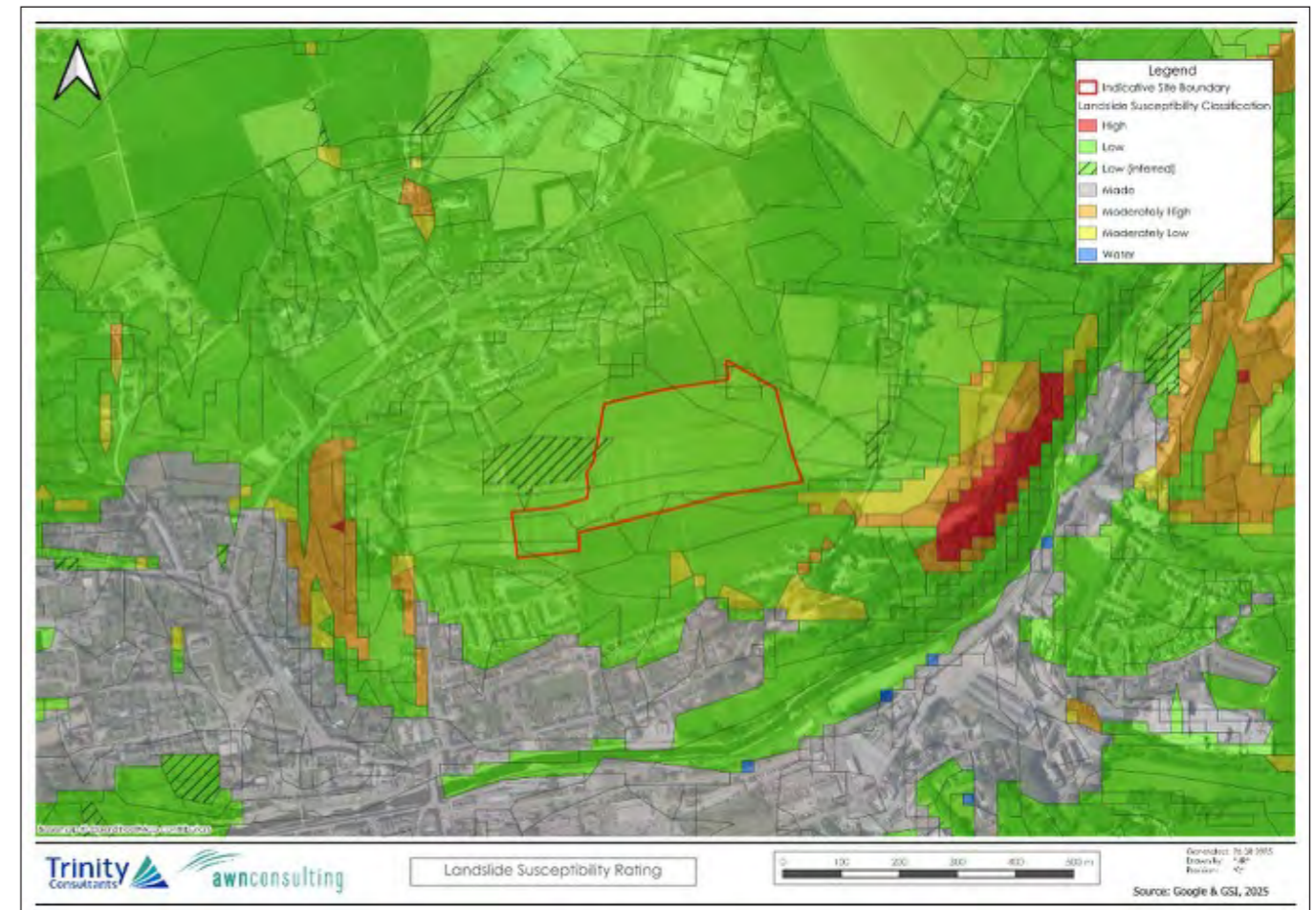


Figure 9 9: Landslide Susceptibility Rating

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9.6.9 Rating of Site Importance of the Geological Feature

Based on the NRA/TII methodology, the criteria for rating the importance of geological features, the importance of the bedrock and soil features at this site is rated as 'Low' Importance (refer to Appendix 9.1). This is based on the assessment that the attribute has a low quality, significance or value on a local scale.

9.7 Characteristics of the Proposed Development

The purpose of this section is to provide an overview of the key relevant details of the construction phase and operational phase of the Proposed Development. The information presented in this section is informed by the project design, but it is not a complete description of the Proposed Development. Therefore, it should be read in conjunction with the full development package. For a more comprehensive understanding of the Proposed Development, please refer to Chapter 2 (Project Description) of the EIA Report. Chapter 2 provides a detailed overview of the lifecycle of the project, including reference to the architectural and civil engineering, drawings, plans, reports, and other relevant document in order to define the Proposed Development.

As outlined below the activities required for the construction phase of the Proposed Development represents the greatest risk of potential impact on the soil and geological environment. These activities primarily pertain to the site preparation / enabling works, excavation, and infilling activities required to facilitate construction of the Proposed Development.

9.7.1 Construction Phase

9.7.1.1 Site Levelling and Excavations

The Proposed Development requires the excavation of ca. 35,246m³ of subsoil for the building foundations and the laying out of the hardstanding, drainage and other infrastructure. Excavated soil will be repurposed on-site as part of the overall development. If required, temporary stockpiling of materials will occur primarily within the construction compound. In addition, the stripping of topsoil from the site will generate approximately 21,270 m³ of material, which will be retained entirely on-site. This topsoil is intended for re-use in landscaping works, including public open spaces, garden areas, boundary planting, and attenuation berms

9.7.1.2 Storage of Hazardous Material

During the construction phase there will be a requirement for the temporary storage of fuels. Liquid materials i.e., fuel storage will be located within temporary bunded areas, doubled skinned tanks or bunded containers (all bunds will conform to standard bunding specifications - BS8007-1987) to prevent spillage.

Construction activities will necessitate storage of cement and concrete materials, temporary oils, and fuels on site. Small localised accidental releases of contaminating substances including hydrocarbons have the potential to occur from construction traffic and vehicles operating on site. There is limited potential for leaks or spills of petroleum hydrocarbons during the construction of the development. Unmitigated leaks or spills may lead to contamination of soil and/or groundwater. Soils that are contaminated by petroleum hydrocarbons can affect soil health.

9.7.1.3 Import/Export of Materials

The proposed works are expected to generate an estimated cut volume of ca. 35,762 m³ and a corresponding fill volume of 35,246 m³. The required fill volume will be met entirely using material generated from on-site excavation. The underlying subsoil predominantly consists of fractured rock, which is proposed to be crushed in situ for use as sub-base material for roads and hardstanding areas. Based on the planned reuse and site operations, no significant surplus or shortfall of material is anticipated.

9.7.2 Operational Phase

The Proposed Development will result in the increase in hardstanding area. This provides protection to the underlying aquifer but also reduces local recharge in this area of the aquifer. As the aquifer is classified as a 'Locally Important Aquifer (LI)- Bedrock which is Generally Unproductive in Local Zones' area of aquifer is relatively unproductive and will have no significant change in the natural hydrogeological regime. The operational stage of the development will not involve further disturbance to the topsoil, subsoils and geology of the area. Increase in hardstand could have a local effect on the land, soils and geology.

It should be noted that there is no requirement for bulk fuels or diesel storage will be required.

Therefore, there will be no requirements for mitigations for land soil or geology post construction phase of the development.

9.8 Potential Impacts Of The Proposed Development

An analysis of the potential effects of the Proposed Development on the land, soils and geological environment during the construction and operational phases are outlined below. Due to the inter-relationship between land, soils, and geology; and hydrology and hydrogeology the following impacts discussed will be considered applicable to both Chapter 9 (Land, Soils and Geology) and 10 (Hydrology and Hydrogeology) of this EIA Report. Mitigation measures included in the design of this project to address these potential impacts are presented in Section 9.9.

9.8.1 Construction Phase

9.8.1.1 Accidental Spills, Leaks and Discharges

There is potential for pollutants associated with construction activity, such as hydrocarbons, oils, and other contaminants, to impact the site. If a spill occurs, contaminated water and collected surface water run-off from construction areas can pose a short-term risk to the underlying subsoil and rock if the contaminated water is allowed to percolate to the aquifer unmitigated which could contribute to localized contamination.

9.8.1.2 Potential impacts on Land, Soils and Geology

Soil requiring removal offsite will be removed regularly to ensure there is minimal need for stockpiling. Some of the material will be re-used on site for backfill. Any surplus material will be transported off site and disposed of at a fully authorised soil recovery site. It is estimated a cut volume of ca. 35,762 m³ and a corresponding fill volume of 35,246 m³. In addition, ca. 21,270 m³ of topsoil will be excavated and is intended to be stored and reused entirely on site as part of the overall development.

As stated above, the excavation of topsoil and subsoil will be required for levelling of the site. Local removal and reinstatement (including infilling) of soil within the development area will increase the aquifer vulnerability during construction prior to paving and installation of stormwater drainage and services. Capping of significant areas of the site by hardstand/building following construction and installation of drainage will minimize the potential for contamination of the aquifer beneath the site.

In the absence of mitigation measures the potential impacts during the construction phase on land, soils and geology are **short-term, significant** and **negative**.

9.8.1.3 Potential Impacts on Human Health and Populations

A reduction in soil quality via unmitigated pollutants entering the soil has the potential to lead to negative impacts on human health and populations. Hydrocarbons and petroleum products for example have a risk for humans by inhaling the fumes / dust from contaminated soil. Depending on the type of contaminant and the level of exposure, soil contamination can have serious health implications. No hazardous waste has been identified within the vicinity of the proposed development or its surrounding areas.

Given the historical and current use of the land—primarily agricultural—it is unlikely that hazardous waste or soil contamination is present within the site or surrounding areas. However, as a precautionary measure, it is recommended that a soil sampling and analysis is carried out to assess and verify soil quality across the site for reusability and disposal.

In the absence of mitigation measures the potential impacts during the construction phase on Human Health and Populations are **short term, significant** and **negative**.

9.8.2 Operational Phase

9.8.2.1 Potential impacts on Land, Soils and Geology

There will be no requirement for excavation of topsoil, subsoil and near-surface rock head during the operational phase. The majority of the site will be capped by hardstand/building during construction and installation of drainage will minimize the potential for contamination of the aquifer beneath the site during the operational phase.

Therefore, there will be no requirements for mitigations against increased run-off and sediment loading post construction phase of the development.

Therefore, on this basis in the absence of mitigation measures the potential impacts during the operational phase on land, soils and geology due to the potential for contamination of soils are **neutral, imperceptible** and **long term**.

9.8.2.2 Potential Impacts on Human Health and Populations

There is no sensitive economic, or historical geology at the site. During the operational phase of the Proposed Development there is no potential for impact on human health and populations due to changes in land, soil, and geology.

Therefore, on this basis in the absence of mitigation measures the potential impacts during the operational phase on human health and populations due to the potential for contamination of soils are **neutral, imperceptible** and **long term**.

9.9 Mitigation Measures

9.9.1 Construction Phase

In order to reduce impacts on the land, soils and geological environment, a number of mitigation measures will be adopted as part of the construction works on site. The measures will address the main activities of potential impact which include:

- Control of soil excavation and export from site.
- Sources of fill and aggregates for the Proposed Development.
- Fuel and chemical handling, transport and storage; and
- Control of water during construction.

9.9.1.1 Construction Environmental Management Plan

The main purpose of a CEMP is to provide a mechanism for implementation of the various mitigation and monitoring measures which are described in the EIAR. The CEMP demonstrates the applicant's commitment to implementing the Proposed Development in such a way as to avoid or minimise the potential environmental effects arising from construction activities. All personnel will be required to understand and implement the requirements of the plan.

Construction works and the proposed mitigation measures outlined in the CEMP are informed by best practice guidance on the prevention of pollution during development projects including but not limited to:

- Construction Industry Research and Information Association (CIRIA), Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors (C532);
- Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters (2016);
- Construction Industry Research and Information Association (CIRIA) Environmental Good Practice on Site (4th edition), (C741);
- Enterprise Ireland Best Practice Guide, Oil Storage Guidelines (BPGCS005);
- Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites (Eastern Regional Fisheries Board);
- Central Fisheries Board Channels and Challenges – The enhancement of Salmonid Rivers;
- CIRIA C532 Control of Water Pollution from Construction Sites Guidance for Consultants and Contractors;
- CIRIA C648 Control of Water Pollution from Constructional Sites;
- Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes (NRA 2008); and
- Inland Fisheries Ireland (IFI) – A Guideline on Planning for Watercourses in the Urban Environment.

The CEMP will be implemented and adhered to by the construction contractor and will be overseen and updated as required if site conditions change by the Project Manager, Environmental Manager, Resource Manager and Ecological Clerk of Works, where relevant. All personnel working on the Site will be trained in the implementation of the procedures.

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The CEMP sets out the proposed procedures and operations to be utilised on the proposed construction site. All mitigation measures outlined here, and within the CEMP will be implemented during the construction phase, as well as any additional measures required pursuant to consent conditions which may be imposed.

During the project planning phase, a comprehensive emergency response plan will be developed by the construction contractor. This plan will outline a well-defined procedure for effectively managing emergencies as they arise. Furthermore, it's imperative to disseminate this emergency protocol to all site personnel during the site induction process. This plan will include for events such as:

- Pollution incidents: These may involve spillages, the malfunction of temporary structures, embankment collapse, acts of vandalism, fires, and other related events.
- Extreme weather occurrences: Events such as heavy rainfall, flooding, are important factors to consider due to their potential impact on the construction process.

The construction contractor will be required to implement emergency response procedures that align with industry best practice guidance. All personnel working on the site will be informed of the emergency procedures in place.

9.9.1.2 Soil Excavation, Removal and Infill

There will be a need for soil excavation on-site. The earthworks will include the excavation of level platforms and foundations for building and the importation of stone material for access roads, etc. The design of road levels and finished floor levels has been carried out in such a way as to minimise cut / fill type earthworks operations.

The proposed works are expected to generate an estimated cut volume of ca. 35,762 m³ and a corresponding fill volume of 35,246 m³. In addition, ca. 21,270 m³ of topsoil will be excavated and is intended to be stored and reused entirely on site as part of the overall development.

Material that is exported from site, if not correctly managed or handled, could impact negatively on human beings (onsite and offsite) as well as soil environments. All excavated materials will be visually assessed by suitably qualified persons for signs of possible contamination such as staining or strong odours. Should any unusual staining or odour be noticed, samples of this soil will be analysed for the presence of potential contaminants to ensure that historical pollution of the soil has not occurred.

Contractors should prepare and adhere to a method statement indicating the extent of the areas likely to be affected and demonstrating that this is the minimum disturbance necessary to achieve the required works.

Stockpiles have the potential to cause negative impacts on air and water quality. The effects of soil stripping and stockpiling will be mitigated through the implementation of an appropriate earthworks handling protocol during construction.

Dust suppression measures (e.g. damping down during dry periods), vehicle wheel washes, road sweeping, and general housekeeping will ensure that the surrounding environment are free of nuisance dust and dirt on roads.

9.9.1.3 Sources of Engineering Fill and Aggregates

All imported fill and aggregate that may be required for the Proposed Development will be sourced from reputable suppliers. All suppliers will be vetted for:

- Aggregate compliance certificates/declarations of conformity for the classes of material specified for the Proposed Development.
- Environmental Management status; and
- Regulatory and Legal Compliance status of the Company

However, it should be noted that all the required fill volume will be met entirely using material generated from on-site excavation.

9.9.1.4 Cement/concrete works

Where feasible all ready-mixed concrete will be brought to site by truck. A suitable risk assessment for wet concreting will be completed prior to works being carried out which will include measures to prevent discharge of alkaline wastewaters or contaminated storm water to the underlying subsoil.

No wash-down or wash-out of ready-mix concrete vehicles during the construction works will be carried out at the site within any riparian or buffer zone. Wash-outs will only be allowed to take place in designated areas with an impervious surface where all wash water is contained and removed from site by road tanker or discharged to foul sewer as already agreed with Uisce Éireann (Irish Water).

The construction contractor will be required to implement emergency response procedures, and these will be in line with industry guidance. Relevant personnel working on the site will be suitably trained in the implementation of the procedures.

9.9.1.5 Fuel and Chemical Handling

The following mitigation measures will be taken at the construction stage in order to prevent any spillages to ground of fuels and prevent any resulting soil and/or water quality impacts:

- Designation of a bunded refuelling areas on the site if refuelling cannot be undertaken off site.
- Provision of spill kit facilities across the site.
- Where mobile fuel bowsers are used, the following measures will be taken:
 - Any flexible pipe, tap or valve will be fitted with a lock and will be secured when not in use.
 - The pump or valve will be fitted with a lock and will be secured when not in use.
 - All bowsers to carry a spill kit and relevant operatives must have spill response training.
 - Portable generators or similar fuel containing equipment will be placed on suitable drip trays.

In the case of drummed fuel or other potentially polluting substances which may be used during construction the following measures will be adopted:

- Secure storage of all containers that contain potential polluting substances in a dedicated internally bunded chemical storage cabinet unit or inside a concrete bunded area.
- Clear labelling of containers so that appropriate remedial measures can be taken in the event of a spillage.
- All drums to be quality approved and manufactured to a recognised standard.
- If drums are to be moved around the site, they will be secured and on spill pallets; and
- Drums to be loaded and unloaded by competent and trained personnel using appropriate equipment.

In addition to the measures above, all excavated materials will be visually assessed by suitably qualified persons for signs of possible contamination such as staining or strong odours. Should any unusual staining or odour be noticed, samples of this soil will be analysed for the presence of potential contaminants to ensure that historical pollution of the soil has not occurred. Should it be determined that any of the soil excavated is contaminated, this will be segregated and appropriately disposed of by a suitably permitted/licensed waste disposal contractor.

Refuelling of construction vehicles and the addition of hydraulic oils or lubricants to vehicles will take place in designated bunded refuelling areas, which will be away from surface water gulleys or drains. In the event of a machine requiring refuelling outside of this area, fuel will be transported in a mobile double skinned tank. An adequate supply of spill kits and hydrocarbon adsorbent packs will be stored in this area. All relevant personnel will be fully trained in the use of this equipment. Guidelines such as “Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors” (CIRIA 532, 2001) will be complied with.

The construction contractor will be required to implement emergency response procedures, and these will be in line with industry guidance. All personnel working on the Site will be suitably trained in the implementation of the procedures.

9.9.1.6 Environmental Procedures

There will be comprehensive emergency response procedures and standard operating procedures to respond to chemical spillage all types. All employees will be provided with such equipment, information, training and supervision as is necessary to implement the emergency response procedures and standard operating procedures.

The predicted impact on land and soils during the construction phase is **neutral, imperceptible** and **short-term**, the magnitude of impact is considered negligible.

9.9.2 Operational Phase

9.9.2.1 Emergency Response Procedures

There should be comprehensive emergency response procedures and standard operating procedures to respond to an onsite fuel spillage. All employees should be provided with such equipment, information, training and supervision as is necessary to implement the emergency response procedures and standard operating procedures.

9.9.2.2 Fuel Storage

The provision of spill kit facilities and training of operatives in use of same; should be undertaken at the operational stage in order to manage any leaks from fuel storage and vehicles resulting in soil and/or groundwater quality impacts:

9.9.2.3 Increase in hard stand

A significant proportion of the development area will be covered in hardstand. This provides protection to the underlying soil and aquifer but also reduces local recharge in this area of the aquifer. Surface water and Ground water management and mitigation measure are discussed in further detail in Chapter 10 (Hydrology and Hydrogeology).

9.10 Interactions and Cumulative Effects

9.10.1 Interactions

This EIAR addresses potential interactions and inter-relationships between the environmental factors discussed. This covers both the construction and operational phases of the proposed development.

The EIAR must also consider in-combination effects, or the interactions between the different factors discussed.

Dust emissions have the potential to settle on plants causing impacts to local ecology. Mitigation measures during the construction phase of the proposed development will ensure that dust generation is minimised and the effect on biodiversity will be **short term, imperceptible** and **neutral**.

Surface water runoff interaction with excavated soils can also have an effect on water quality in the area, with chemicals or suspended solids having an effect on soil fertility and contamination. With the proposed mitigation measures outlined in this chapter and in Chapter 10 of the EIAR (Hydrology and Hydrogeology), the potential interaction between these is reduced to a **short-term, imperceptible, neutral effect**.

9.10.2 Cumulative Effects

Existing developments that are already built and in operation contribute to the characterisation of the baseline environment. As such any further environmental impacts that the Proposed Development may have in addition to these already constructed and operational developments has been assessed in the preceding sections of this chapter.

Any future application on these lands will be subject to planning approval and environmental assessment as required. Any new development proposed on the lands after the submission of the Proposed Development would be accompanied by an EIA, or EIA Screening as required and take into consideration the development of this site.

9.10.2.1 Construction Phase

In relation to the potential cumulative impact on hydrology during the construction phase, the construction works which would have potential cumulative impacts are as follows:

- Stockpiled material will be stored on hardstand away from surface water drains, and gullies will be protected during works to ensure there is no discharge of silt-laden water into the surrounding surface water drainage or to ground.
- Contamination of surface water from accidental spillage and leakage from construction traffic and construction materials is possible unless project-specific measures are put in place for each development and complied with.

The implementation of mitigation and monitoring measures previously detailed above as well as the compliance of other developments with their respective planning conditions, will ensure there will be minimal cumulative potential for change to the soils and geological environment during the construction phase of the proposed development.

The residual cumulative impact of the proposed development in combination with other planned or permitted developments can therefore be considered to be **neutral, imperceptible** and **short-term**.

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9.10.2.2 Operational Phase

The proposed development and other permitted developments will result in an increase in hard standing which will result in localised reduced recharge to ground.

The implementation of mitigation and monitoring measures previously detailed above as well as the compliance of other developments with their respective planning conditions, will ensure there will be minimal cumulative potential for change to the soil and geological environment during the operational phase of the proposed development.

The residual cumulative impact of the proposed development in combination with other planned or permitted developments can therefore be considered to be **neutral, imperceptible** and **long-term**.

9.11 Residual Effects of The Proposed Development

9.11.1 Construction Phase

9.11.1.1 Land, Soils and Geology

The implementation of the mitigation measures detailed in Section 9.9, will ensure that the potential impacts on land, soils and geology during the construction phase are adequately mitigated. The residual effect on the soils and bedrock during the construction phase is considered to be **neutral, imperceptible** and **short-term**.

Following the TII criteria (refer to Appendix 9.1) for rating the magnitude and significance of impacts on the geological and hydrogeological related attributes, the magnitude of impact is considered **negligible**.

9.11.1.2 Human Health and Populations

The implementation of the mitigation measures detailed in Section 9.9, will ensure that the potential impacts on human health and populations during the construction phase are adequately mitigated. The residual effect on the soils and bedrock during the construction phase is considered to be **neutral, imperceptible** and **short-term**.

9.11.2 Operational Phase

9.11.2.1 Land, Soils and Geology

The implementation of the mitigation measures detailed in section 9.9, will ensure that the potential impacts on land, soils and geology once the Proposed Development is constructed and operational are adequately mitigated. The residual effect on the soils and geology during the operational phase is considered to be **neutral, imperceptible** and **long-term**.

Following the TII criteria (refer to Appendix 9.1) for rating the magnitude and significance of impacts on the geological and hydrogeological related attributes, the magnitude of impact is considered **negligible**.

9.11.2.2 Human Health and Populations

The implementation of the mitigation and monitoring measures detailed above, will ensure that the potential impacts on human health and populations once the Proposed Development is constructed and operational are adequately mitigated. The residual effect on human health and populations during the operational phase is considered to be **neutral, imperceptible** and **long-term**.

9.11.2.3 Storage of Hazardous Material

The implementation of mitigation measures highlighted in Section 9.9 will ensure that the potential impacts on the land, soils and geological environment do not occur during the operational phase and that the residual effect will be **short-term, imperceptible** and **neutral**.

Following the TII criteria (Appendix 9.1) for rating the magnitude and significance of impacts on the geological and hydrogeological related attributes, the magnitude of impact is considered **negligible**.

9.12 References and Sources

- CIRIA (2005). Environmental Good Practice on Site (C650).
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- Enterprise Ireland (n.d.). Best Practice Guide BPGCS005: Oil Storage Guidelines.
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CHAPTER TEN

HYDROLOGY & HYDROGEOLOGY



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CHAPTER TEN

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CHAPTER 10 | HYDROLOGY & HYDROGEOLOGY

10.1 Introduction

This chapter of the EIAR was prepared to assess the potential significant effects of the proposed development for Knockbrogan, Bandon, Co. Cork. It evaluates the likely significant effects, if any, which the Proposed Development will have on hydrology (surface water) and hydrogeology (groundwater).

This chapter contains necessary information as defined in the Environmental Protection Agency (EPA) Guidelines on the Information to be contained in Environmental Impact Assessment Reports' (EPA, 2022). Reference is made to geology, but this aspect is covered in more detail in Chapter 9 (Land, Soils and Geology).

The chapter initially provides a description of the receiving environment of the site and the potential impacts of the development. When assessing the potential impacts, this assessment considers the significance of the environmental attributes, and the predicted scale, and duration of the likely effects.

The chapter also outlines the proposed mitigation measures that will reduce or eliminate the identified potential impacts and define the residual effects of the Proposed Overall Development (the effect after the implementation of mitigation measures).

This chapter should be read in conjunction with Chapter 9 (Land & Soils) and Chapter 11 (Biodiversity).

It also should be read in conjunction with Chapter 2 for the EIAR which goes into further detail with regards to the site description.

10.2 Expertise & Qualifications

This chapter of the EIAR has been prepared by Marcelo Allende and Harry Reynolds of AWN Consulting. Marcelo Allende (BSc, BEng) is a Principal Environmental Consultant (Hydrologist) with AWN Consulting with over 20 years of experience in water resources technical studies, conceptual and numerical hydrological/hydrogeological modelling and environmental consultancy. Marcelo holds a degree in Water Resource Civil Engineering (BEng, Hons) from the University of Chile and a Bachelor of Science in Engineering (BSc, Hons). He has worked on a wide range of projects including multi-aspect environmental investigations, geo-environmental impact assessments, surface and groundwater resource management, hydrological and hydrogeological conceptual and numerical modelling, strategic and site specific flood risk assessments (Stage 1,2 and 3), Due Diligence reporting, baselines studies, soils, surface water and groundwater monitoring and field sampling programmes on a variety of brownfield and greenfield sites throughout Ireland as well as overseas in Chile, Argentina, Peru and Panama. He also has detailed knowledge of environmental guidance, legislation, regulations & standards and expertise in GIS (expert level) and MATTE studies at COMAH establishments. He is currently a member of the International Association of Hydrogeologists (IAH, Irish Group) and a member of Engineers Ireland (MIEI).

Harry Reynolds is an Environmental Consultant in AWN Consulting with ongoing roles within the water department. Harry has a BSc (Hons) in Environmental Science from Atlantic Technological University, Sligo. In 2022, he won the Academic Excellence award for the highest overall marks in his department, and the ESAI Undergraduate of the year award for his thesis. Harry has worked on a range of large scale projects involving EIA screening, EIA reports,

SEA reports, baseline studies, GIS mapping and groundwater and surface water monitoring on various operational developments and greenfield sites. Harry now works on projects involving EIA Reports and EIA screening for a range of developments.

10.3 Proposed Development

A full description of the proposed development is provided in Chapter 2, Project Description. Please also Refer to the Site Layout Plan prepared by Brian O' Kennedy & Associates Ltd. In summary, the subject application is for a large-scale Residential Development (LRD) comprising of the construction of 212 no. residential units and all ancillary development works including footpaths, car and bicycle parking, drainage, bicycle and bin stores, lighting and landscaping/amenity areas at Knockbrogan, Bandon, Co. Cork. Access will be provided via the existing access road onto the Cork Road permitted under reference 21/4059.

10.4 Methodology

10.4.1 Criteria for Rating of Effects

This section establishes the criteria, and guidance used to rate the significance of the potential impacts of the Proposed Development project on the hydrological and hydrogeological aspects of the site and surrounding area.

The document entitled 'Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes' by the Transport Infrastructure Ireland (TII, 2009, previously NRA) is referenced where the methodology for assessment of impact is appropriate.

Furthermore, in line with this TII Guidelines, an assessment of the attribute importance has been undertaken in order to provide a basis for the assessment of impact provided. The attribute importance considers the potential as well as the existing use of the surface water features as a water resource (i.e., water supply, fisheries and other uses) as well as ecological habitat requirements. The TII criteria for rating the hydrological and hydrogeological related attributes are presented in Appendix 10.1 of this EIAR.

The quality, significance, and duration of the potential impacts, residual effects, and cumulative effects are described using standard EIA descriptive terminology set out in Chapter 1 of this EIAR.

The principal attributes (and effects) to be assessed include the following:

- Water Framework Directive (WFD) Status and potential for increased risk of deterioration of this status due to the activities of the site.
- River and aquifer water quality in the vicinity of the site (where available).
- Surface, transitional and coastal watercourses near the site and potential impact on surface water quality arising from Proposed Development related works including any discharge of surface water run-off.
- Localised flooding (potential increase or reduction) and floodplains including benefitting lands and drainage districts (if any); and
- Surface water features within the area of the site.
- High-yielding water supply springs/ wells in the vicinity of the site to within a 2km radius and the potential for increased risk presented by the Proposed Development.

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- Classification (regionally important, locally important etc) and extent of aquifers underlying the site perimeter area and increased risks presented to them by the Proposed Development e.g. removal of subsoil cover, removal of aquifer (in whole or part), drawdown in water levels, alteration in established flow regimes, change in groundwater quality.
- Natural hydrogeological/ karst features in the area and potential for increased risk presented by the activities at the site; and,
- Groundwater-fed ecosystems and the increased risk presented by operations both spatially and temporarily.

10.4.2 Water Framework Directive (WFD) Status

Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy; commonly known as the Water Framework Directive (WFD) establishes a framework for community action in the field of water policy.

The WFD requires 'Good Water Status' for all European waters to be achieved through a system of river basin management planning and extensive monitoring by 2015 or, at the least, by 2027. 'Good status' means both 'Good Ecological Status' and 'Good Chemical Status'. In 2009 the first River Basin Management Plan (RBMP) 2009-2015 was published. The second cycle river basin management plan was carried out between 2018-2021 with the previous management districts now merged into one Ireland River Basin District (Ireland RBD). The third cycle river basin management plan namely, The Water Action Plan 2025 - A River Basin Management Plan for Ireland, (Department of Housing Local Government & Heritage, Sept 2024) is currently in place.

During the development of this Plan, a prioritisation exercise was undertaken by the local authorities, the EPA and other stakeholders to identify those water bodies that require immediate action within this plan cycle to 2021. During the catchment characterisation, the EPA identified those water bodies either 'At Risk' of not achieving their objectives or 'Under Review'. The outcome of this prioritisation process was the selection of 190 Areas for Action across the 5 Local Authority regions. Within these 190 areas, a total of 726 water bodies were selected for initial actions during this RBMP cycle. There are 832 water bodies identified as being 'At Risk' of not achieving their environmental objectives under this Plan that have not been included in the Areas for Action. For most of these water bodies, targeted actions will be undertaken in The Water Action Plan 2025. The Water Action Plan 2025 has been reviewed in the context of ensuring mitigation measures comply with current and expected future measures required to be implemented for protection of water body status within the context of the Proposed Development.

A separate Water Framework Directive (WFD) Screening Report that is included with the application documentation complements this chapter and is presented in Appendix 10.2.

10.4.3 Relevant Legislation & Guidance

As outlined in Chapter 1 the information provided complies with all relevant EU and Irish legislation and includes consideration of the objectives as outlined in the Cork County Development Plan 2022-2028. Relevant legislation includes:

- EPA Guidelines on the Information to be contained in Environmental Impact Assessment Reports (2022).
- Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (TII, 2009, previously NRA). The TII criteria for rating the hydrogeological and hydrological related attributes are presented in Appendix 9.1 and 9.2 of this EIAR.
- Water Framework Directive 2000/60/EC.

The strategies and objectives of the WFD in Ireland have influenced a range of national legislation, regulations and guidelines. These include the following:

- European Communities (Water Policy) Regulations, 2003 (S.I. No. 722 of 2003).
- European Communities (Drinking Water) Regulations 2023 (S.I. 99 of 2023).
- European Communities Environmental Objectives (Surface Waters); Regulations, 2009 (S.I. No. 272 of 2009 as amended SI No. 77 of 2019).
- European Communities Environmental Objectives (Groundwater) Regulations, 2010 (S.I. No. 9 of 2010 S.I. No. 366 of 2016).
- European Communities (Good Agricultural Practice for Protection of Waters) Regulations, 2022.
- European Communities (Technical Specifications for the Chemical Analysis and Monitoring of Water Status) Regulations, 2011 (S.I. No. 489 of 2011).
- Statutory Instrument (SI) No. 293 of 1988 European Communities (Quality of Salmonid Waters) Regulations 1988.
- Local Government (Water Pollution) Acts 1977-2007.
- (European Communities Environmental Objectives (Groundwater) Regulations (S.I. 9 of 2010 and amendments) and European Communities Environmental Objectives (Surface Water) Regulations (S.I. 272 of 2009 and amendments).
- Water Services Guidelines for Planning Authorities Draft (Department of Housing, Planning and Local Government, 2018).
- Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites (Eastern Regional Fisheries Board).
- Central Fisheries Board Channels and Challenges – The enhancement of Salmonid Rivers.
- CIRIA C532 Control of Water Pollution from Construction Sites Guidance for Consultants and Contractors.
- CIRIA C648 Control of Water Pollution from Constructional Sites.
- Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes (NRA 2008); and
- Inland Fisheries Ireland (IFI) – A Guideline on Planning for Watercourses in the Urban Environment.

10.4.4 Sources of information

Desk-based hydrological information in the vicinity of the site was obtained through accessing databases and other archives where available. Data was sourced from the following:

- Latest EPA Envision water quality monitoring data for watercourses in the area.
- Geological Survey of Ireland (GSI) - on-line mapping, Geo-hazard Database, Geological Heritage Sites & Sites of Special Scientific Interest, Bedrock Memoirs and 1:100,000 mapping.
- River Basin Management Plan for Ireland 2022-2027 (Department of Housing, Planning and Local Government, 2018).
- Water Action Plan 2024 - A River Basin Management Plan for Ireland, (Department of Housing Local Government & Heritage, Sept 2024).
- The Planning System and Flood Risk Management, Guidelines for Planning Authorities (Department of the Environment, Heritage and Local Government (DoEHLG) and the Office of Public Works (OPW, 2009).
- Office of Public Works (OPW) flood mapping data (www.floodmaps.ie).

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- Relevant Eastern Catchment Flood Risk Assessment and Management (CFRAM) Flood Reports.
- National Parks and Wildlife Services (NPWS) – Protected Site Register.
- Cork City and County Development Plan 2022-2028 – Strategic Flood Risk Assessment (SFRA, 2023-2029).

Site specific data was derived from the following sources:

- Brian O’Kennedy & Associates Ltd. Engineers & Architects - Engineering Infrastructure Report for 212 dwellings for Castle Rock Homes (Bandon) Ltd. (2025).
- Various plans and drawings.

10.4.5 Site Surveys/Investigations

No Site Surveys/ Investigations have taken place

10.5 Difficulties Encountered

There were no difficulties encountered in the preparation of this EIAR

10.6 Baseline Environment

10.6.1 Site Description

The Proposed Site Development is located in Knockbrogan, Bandon, Co Cork, covering a total area of approximately 7.844 hectares. It is c. 24km southwest of Cork city centre. The site is located within five joined fields and has been in long term agricultural use - being used annually for crop growing. The eastern boundary has low-level sod and stone mature ditch bordering further agricultural lands. The western boundary is a similar low-level ditch. The northern and southern boundaries are mature ditches mainly bounding farmland with an element of the south boundary adjacent to an existing housing estate.

The topography of the site is relatively flat on the northern portion of the site, however, the southern portion of the site is sloping approximately between 10% and 12%. The height of the site above ordnance datum (AOD) ranges from approximately 57.0 m AOD at its lowest point to 77.5 m AOD at the highest point. The site at present is a greenfield site unoccupied by any structures or buildings, as shown in Figure 10 1 below.



Figure 10 1: Site Location and Surrounding Land Use

10.7 Hydrology

10.7.1.1 Regional Hydrological Environment

The proposed development site is located within the Bandon-Ilen WFD Catchment (Catchment ID: 20) and the Bandon_SC_050 WFD sub-catchment (EPA, 2025). There are no existing drainage features evident on the lands. No water run-off channels are evident on any part of the lands (Brian O’Kennedy & Associates Ltd. Engineers & Architects, 2025).

The nearest waterbody to the Site Boundary is the Bandon River (EPA Code: IE_SW_20B020800), located c. 320m south of the proposed development. Along with this, there is a stream located c. 325m northeast of the proposed site (EPA Name: KILBEG_NORTH) and another stream located c. 320m west of the proposed site (EPA Name: KILBROGAN), both of which flow directly into the Bandon River (EPA Code: IE_SW_20B020800) to the south (see figure 10-2).

The Kilbeg North Stream (EPA Code: IE_SW_20B020800) originates just south of the Kilbrogan Business Park, c. 370m north of the proposed development. The Kilbrogan Stream (EPA Code: IE_SW_20B020800) rises in Kilbrogan, north of Convent Hill road (L2011), c. 1 km west of the proposed development. Both streams flow into the Bandon River, which then flows east to the Upper Bandon Estuary (EPA Code: IE_SW_080_0300), as shown in Figure 10 2 below.



Figure 10 2: Hydrological Environment

10.7.1.2 Local Hydrological Environment

There are no existing drainage features evident on the lands. No water run-off channels are evident on any part of the lands (Brian O’Kennedy & Associates Ltd. Engineers & Architects, 2025).

The phase 3 development site has a high point at the west end. From here a ridge falls eastwards. The eastern boundary has a low-level sod and stone mature ditch bordering further agricultural lands. The western boundary is a similar low-level ditch bordering the phase 2 development. The northern and southern boundaries are nature ditches mainly bounding farmland with an element of the south boundary adjacent to existing housing estate.

Overland flow paths which run perpendicular to the contours are shown in Figure 10 3 below. All these paths are believed to flow towards Bandon River to the southeast of the subject site.



Figure 10 3: Overland Flow Paths (Source: Brian O’Kennedy and Associates, 2025)

10.7.2 Surface Water Quality

Surface water quality is monitored periodically by the EPA at various regional locations along with principal and other smaller watercourses. The EPA assess the water quality of rivers and streams across Ireland using a biological assessment method, which is regarded as a representative indicator of the status of such waters and reflects the overall trend in conditions of the watercourse. The biological indicators range from Q5 - Q1. Level Q5 denotes a watercourse with good water quality and high community diversity, whereas Level Q1 denotes very low community diversity and bad water quality. In relation to the Proposed Development site, there is an active surface waterbody EPA monitoring station downstream of the proposed development on the Bandon River (but slightly upstream of where the Kilbeg North Stream enters). The monitoring stations name is ‘1.5km d/s Bandon Br’ (Station ID: RS20B020800) and its most recent Q Value Score in 2024 was ‘4’, which indicates ‘Good’ WFD status when compared to the Summary of Surface Water Quality Levels (see Table 10 1 below).

Table 10 1 Summary of Surface Water Quality Levels

Q Value	WFD Status	Pollution Status	Condition
Q5, Q4-5	High	Unpolluted	Satisfactory
Q4	Good	Unpolluted	Satisfactory
Q3-4	Moderate	Slightly polluted	Unsatisfactory
Q3, Q2-3	Poor	Moderately polluted	Unsatisfactory
Q2, Q1-2	Bad	Seriously polluted	Unsatisfactory

The EPA also classified water bodies in accordance with the WFD water quality status. Rivers, lakes, estuaries and coastal waters can be awarded one of five statuses: High, Good, Moderate, Poor, Bad. Groundwater has just two statuses – Good and Poor.

According to EPA (2025), Bandon River (BANDON_090) has a WFD status (2016-2021) of ‘Good’ as shown in Figure 10 4 and a WFD risk score of ‘achieving Good Status’ by 2027. This ‘Good’ status assigned to the Bandon River is due to its good biological (invertebrate) status or potential. The Upper Bandon Estuary has a WFD status (2016-2021) of ‘Poor’ and a risk score of ‘At risk’ of not achieving good status. The Phytoplankton Status or Potential was ‘Poor’ in the Upper Bandon Estuary, and due to this Ecological Status was also ‘Poor’.



Figure 10 4: WFD Surface Waterbody Quality Status 2016-2021

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10.7.3 Bathing Waters and Recreational Waterbodies

The local environment also includes areas of natural resources that relate to populations and human health that may be impacted by the Proposed Development, this includes economic resources, recreational and bathing waters, and drinking water resources.

A review of Environmental Sensitivity Mapping online maps that includes the Register of Protected Areas (RPA) under the Water Framework Directive (WFD) has shown that there are no Recreational Waters, Bathing Waterbodies RPA, within the proposed development or located near the Bandon River. The nearest Recreational Waters, Bathing Waterbodies RPA to the proposed development is Coolmaine (Bathing Water ID: IESWBWC090_0000_0100) located c.12.3 km south.

10.7.4 Water Supplies

A review of the Environmental Protection Agency (EPA) online mapping, which includes the Register of Protected Areas (RPA) established under the Water Framework Directive (WFD), indicates that there are no Nutrient Sensitive Areas within the proposed development. The nearest Nutrient Sensitive Area is the Bandon Estuary Upper (EPA Code: IE_SW_080_0300), located 4.3 km east. These areas are designated in accordance with the Urban Wastewater Treatment (UWWT) Directive (91/271/EEC) and relevant national legislation, including S.I. 254/2001, S.I. 440/2004, and S.I. 48/2010. In this context, the identified waterbody is used to define the extent of the nutrient-sensitive designation. Furthermore, there are no recorded Public Supply Source Protection Area or Group Scheme Preliminary Source Protection Areas in the vicinity of the Proposed Development site.

10.7.5 Existing Water and Wastewater Utilities

Uisce Éireann have an existing 100mm diameter watermain in the L-2040 public roadway which is currently serving Phase 1 of the Blossom Hill development. There is an existing surface water drainage and a foul sewer network in the L-2040 public roadway (Cork Road).

10.7.6 Drainage and Flooding

The EU Floods Directive (2007/60/EC) required Member States to undertake a national preliminary flood risk assessment by 2011 to identify areas where significant flood risk exists or might be considered likely to occur. Member States were also required to prepare catchment-based Flood Risk Management Plans by 2018 that will set out flood risk management objectives, actions and measures. The OPW in co-operation with various Local Authorities produced a number of PFRAs which aimed to map out current and possible future flood risk areas and develop risk assessment plans. As part of the CFRAM programme provisional flood maps had been produced by the OPW which have been used in this assessment.

There are no recorded past flood events within the vicinity of the proposed site development. However, it does record instances of historic flooding in close proximity to the site. Recurring flooding has been reported to the south of the site when the Bandon River overtops its banks.

According to Flood maps available online (OPW, 2025), there is probability of flooding along the Bandon River.

However, according to the Engineering Infrastructure Report by Brian O’Kennedy & Associates Ltd. Engineers & Architects (2025), the proposed development, including all proposed residential dwellings, is located within Flood Zone C as defined by the requirements of “The Planning System and Flood Risk Management, Guidelines for Planning Authorities”, i.e., outside of the Low Probability flood plain (1:1000-year or 0.1% AEP). The OPW Historical flood events along the Bandon River is presented in Figure 10 5 below.



Figure 10 5: OPW Historical flood events (Flood Maps, 2025)

10.7.7 Designated Areas

The NPWS (2025) on-line database has been reviewed to determine the location of areas of conservation within/near the Proposed Development site, and there are no Special Protected Areas (SPA) established under the EU Birds Directive (79/409/EEC), or Special Areas of Conservation (SAC) established under the Habitats Directive within the boundary of the Proposed Development site. Furthermore, there are no Natural Heritage Areas (NHA), or proposed Natural Heritage Areas (pNHA) established under the Wildlife Acts, 1976 and 2000 (as amended)

within the boundary of the Proposed Development site. The European sites and pNHA in closest proximity to the Proposed Development are as follows:

- Bandon Valley Above Inishannon pNHA (Site Code: 001740) c. 1.6km northeast.
- Bandon Valley West Of Bandon pNHA (Site Code: 001034) c. 1.6km west.
- Bandon Valley Below Inishannon pNHA (Site Code: 001515) c. 5.8km east.
- Courtmacsherry Estuary SAC (Site Code 001230) c. 9.5km south;
- Courtmacsherry Estuary pNHA (Site Code 001230) c. 9.5km south;
- Courtmacsherry Bay SPA (Site Code 004219) c. 10.1km south

According to NPWS (2025), the nearest Natura 2000 Site is Courtmacsherry Estuary SAC (Site Code 001230) located c. 9.5km south of the proposed development and the Courtmacsherry Bay SPA (Site Code 004219) located c. 10.1km south of the proposed development, as shown in Figure 10 6 below. The development site has no hydrological connection with either of these SAC/SPAs. The development site also has no hydrological connection with ‘Bandon Valley Above Inishannon’ pNHA (Site Code: 001740).

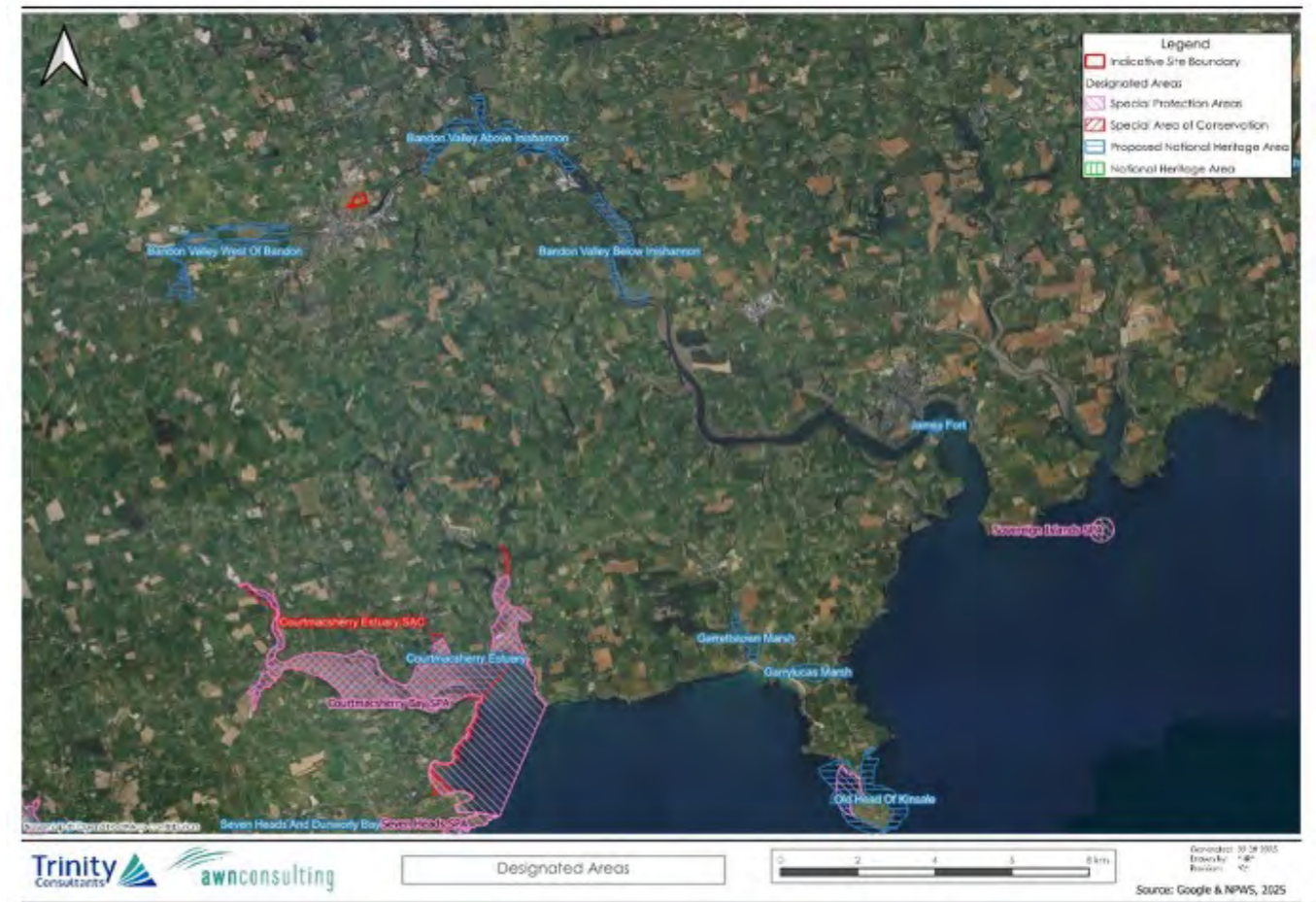


Figure 10 6: Designated Areas

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HYDROLOGY & HYDROGEOLOGY

10.7.8 Rating of Importance of Hydrological Attributes

Based on the TII methodology (2009) (See Appendix 10.1) the importance of the hydrological features at this site is rated as 'Low' importance based on the assessment that the attribute has a low-quality significance or value on a local scale, based on the fact that it is not an area of water supply, within a flood zone or an amenity area.

10.8 Hydrogeology

10.8.1 Aquifer Classification

The GSI has devised a system for classifying the bedrock aquifers in Ireland. The aquifer classification for bedrock depends on a number of parameters including, the area extent of the aquifer (km²), well yield (m³/d), specific capacity (m³/d/m) and groundwater transmissivity (mm³/d). There are three main classifications: regionally important, locally important and poor aquifers. Where an aquifer has been classified as regionally important, it is further subdivided according to the main groundwater flow regime within it. This sub-division includes regionally important fissured aquifers (Rf) and regionally important karstified aquifers (Rk). Locally important aquifers are sub-divided into those that are generally moderately productive (Lm) and those that are generally moderately productive only in local zones (LI). Similarly, poor aquifers are classed as either generally unproductive except for local zones (PI) or generally unproductive (Pu).

The GSI (2025) classifies the principal aquifer types in Ireland as:

Bedrock Aquifer

- Rkc – Regionally Important Aquifer – Karstified (conduit)
- Rkd – Regionally Important Aquifer – Karstified (diffuse)
- RK – Regionally Important Aquifer – Karstified
- Rf – Regionally Important Aquifer – Fissured bedrock
- Lm – Locally Important Aquifer – Bedrock which is Generally Moderately Productive
- Lk – Locally Important Aquifer – Karstified
- LI – Locally Important Aquifer – Bedrock which is Moderately Productive only in Local Zones
- PI – Poor Aquifer – Bedrock which is Generally Unproductive except for Local Zones
- PU – Poor Aquifer – Bedrock which is Generally Unproductive

Gravel Aquifer

- Lg - Locally Important Aquifer - Sand & Gravel
- Rg - Regionally Important Aquifer - Sand & Gravel

According to GSI (2025), the bedrock aquifer underlying the site is a Locally Important Aquifer (LI), i.e. Bedrock which is Moderately Productive only in Local Zones as presented in Figure 10 7. The potential for local vertical or horizontal migration within this type of aquifer is moderate depending on the area but may not have extensive regional connectivity. As such the aquifer is not a significant pathway for off-site migration.



Figure 10 7: Aquifer Classification

The site is underlain by the Bandon groundwater body (GWB) (European Code: IE_SW_G_086), which has been investigated by the GSI, it is underlain predominantly by the Kinsale (CDKINS) formation.

Groundwater flow occurs in fractures and faults. In the dominant units limited fracturing and in-filling of fractures are to be expected. The permeability of individual fractures and the degree of interconnection will be generally low, with fracturing confined to local zones. Permeability is highest in the upper few metres but generally decreases rapidly with depth. In general, groundwater flow is concentrated in the upper 15 m of the aquifer, although deeper inflows from along fault zones or connected fractures can be encountered. Significant yields can be obtained where boreholes are drilled into known fault zones. In these rocks groundwater flow paths are expected to be relatively short, typically 30-300 m, with groundwater discharging to small springs, or to the streams and rivers that traverse the aquifer. Flow directions are expected to approximately follow the local surface water catchments. Groundwater is generally unconfined in this groundwater body. Baseflow from this groundwater body to rivers and streams is likely to be relatively low.

10.8.2 Aquifer Vulnerability

Aquifer vulnerability is a term used to represent the intrinsic geological and hydrogeological characteristics that determine the ease with which groundwater may be contaminated generally by human activities. Due to the nature of the flow of groundwater through bedrock in Ireland, which is almost completely through fissures/ fractures, the main feature that protects groundwater from potential contamination, and therefore the most important feature in the protection of groundwater, is the subsoil (which can consist solely of or of mixtures of peat, sand, gravel, glacial till, clays or silts).

Groundwater vulnerability is an indication of how easily the aquifer can become contaminated by human activity. It is dependent on the thickness and permeability of the overlying soils and depth to the water table. For example, a bedrock aquifer with minimal thickness of overburden or with a thin layer of permeable overburden will be more vulnerable to contamination than a bedrock aquifer which has a thick layer of low permeability overburden. Extreme groundwater vulnerability is also associated with karst landforms as these are a direct pathway for water and contaminants to enter the aquifer from the surface.

According to GSI regional mapping, the groundwater vulnerability rating is classified as ‘High’ Vulnerability on the east portion of the site, which indicates that the depth of bedrock would be 3-5 m below ground level. However, the groundwater vulnerability rating is classified as ‘Extreme’ Vulnerability on the west portion of the site, which indicates that the depth of bedrock would be around 0-3 m below ground level. Groundwater classified as ‘Extreme’ Vulnerability has natural characteristics that make it extremely vulnerable to contamination by human activities for the proposed development as shown in Figure 10 8 (GSI, 2025). There is also a small pocket of rock at the surface on the west boundary of the site.

Aquifer vulnerability classifications are primarily based on the permeability and thickness of subsoils. Refer to Table 10 2 below.

Table 10 2: Vulnerability Mapping Guidelines (Source: DoELG, EPA, GSI, 1999)

Vulnerability Rating	Hydrogeological Condition				
	Subsoil Permeability (type) and Thickness			Unsaturated Zone (Sand / gravel aquifers only)	Karst Features (<30 m radius)
	High Permeability (sand/ gravel)	Moderate Permeability (e.g. sandy subsoil)	Low Permeability (e.g. clayey subsoil, clay, peat)		
Extreme (E)	0 – 3 m	0 – 3 m	0 – 3 m	0 – 3 m	-
High (H)	>3 m	3 – 10 m	3 – 5 m	>3 m	n/a
Moderate (M)	n/a	>10 m	5 – 10 m	n/a	n/a
Low (L)	n/a	n/a	>10 m	n/a	n/a

Notes: (1) n/a: Not applicable (2) Precises permeability values cannot be given at present(3) Release point of contaminants is assumed to be 1 – 2 m below ground surface

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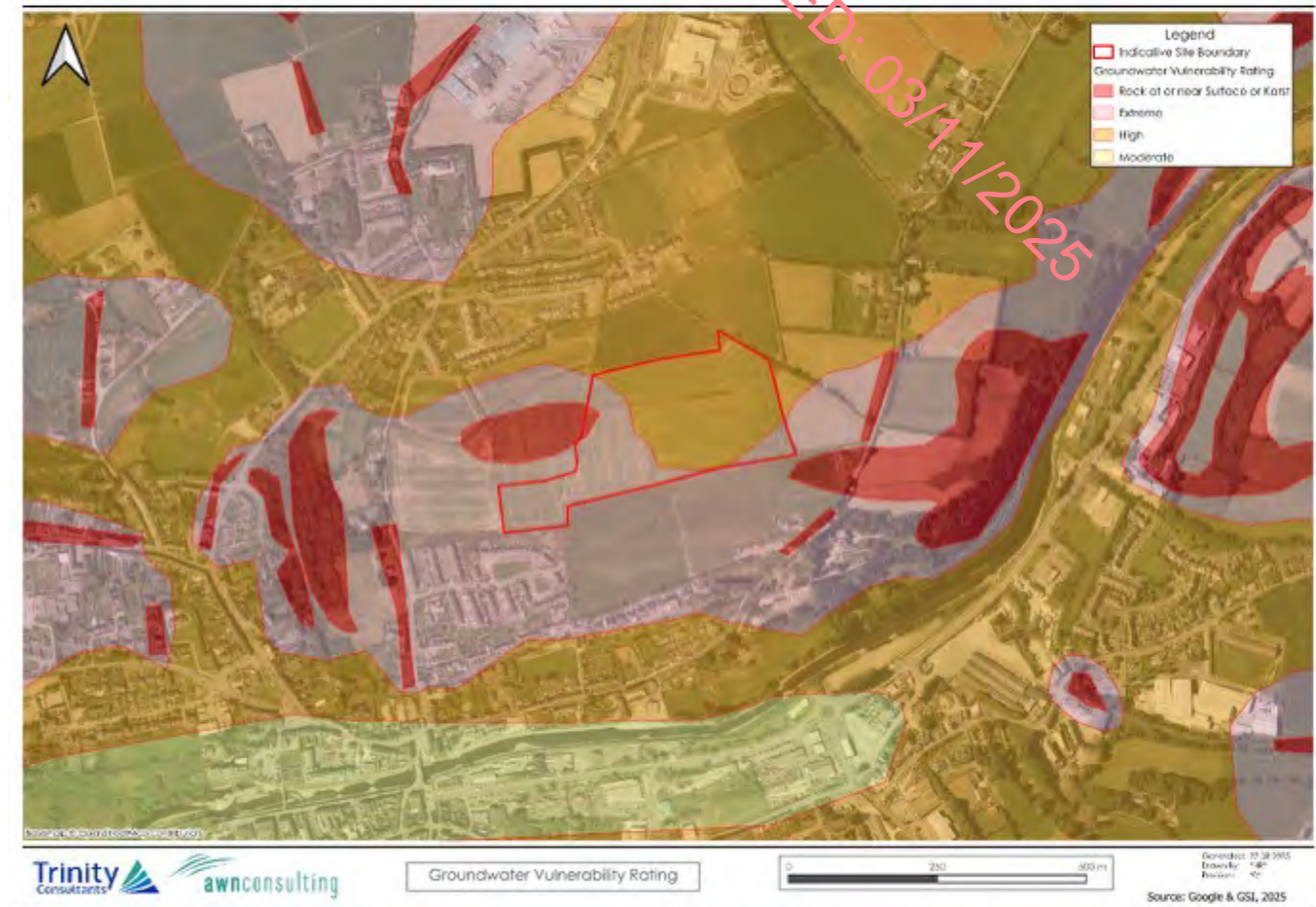


Figure 10 8: Groundwater Vulnerability Map

10.8.3 Groundwater Wells

The GSI Well Card Index is a record of wells drilled in Ireland, water supply and site investigation boreholes. It is noted that this record is not comprehensive as licensing of wells is not currently a requirement in the Republic of Ireland. The current well index shows there is no well located within the boundary of the Proposed Development site. There are 19 no. wells mapped in the wider study area within a 1km radius of the Proposed Development site.

As stated in Section 10.7.4 above, there are no recorded Public Supply Source Protection Area or Group Scheme Preliminary Source Protection Areas in the vicinity of the Proposed Development site.

The nearest Group Scheme Preliminary Source Protection area is Faran, located c. 14.7 km north of the proposed site. The nearest Public Supply Source Protection area is Crookstown Pound Cross PWS located c. 11.6 km north. Neither of these areas share a hydrological or hydrogeological connection to the site.

Figure 10 9 below presents the GSI well search for the area surrounding the site.

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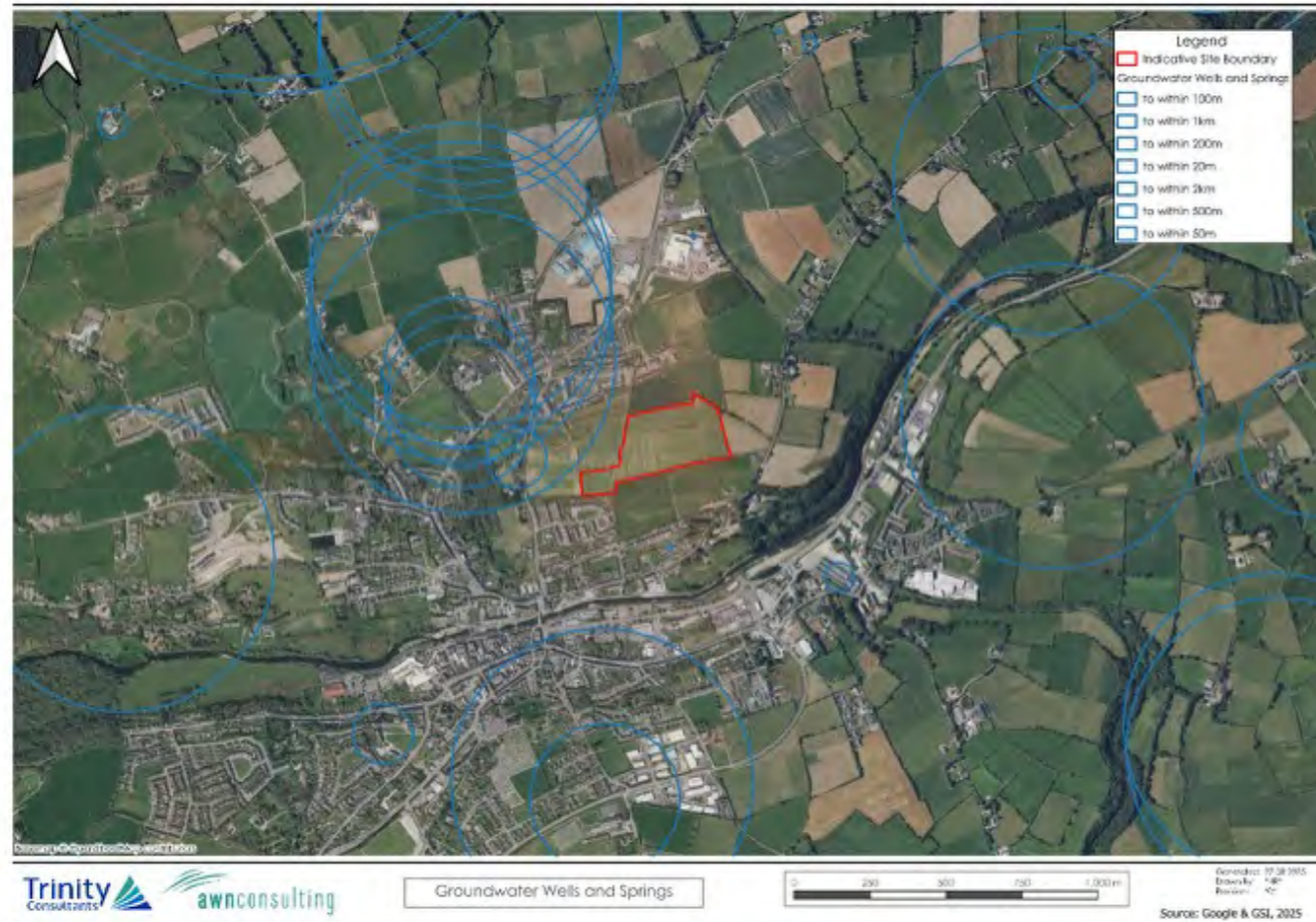


Figure 10 9: Groundwater Wells and Springs

A search of the GSI groundwater well database was conducted to identify registered wells in the vicinity of the proposed development. It should be noted that not all wells are registered in Ireland.

There are no. 19 registered wells within 1km radius of the Development site (see Table 10 3), also presented in Figure 10 9 above. The closest well is located c. 30m northwest of the proposed development site and the following uses are reported.

Table 10 3: Summary of Nearby Wells

GIS Reference	Accuracy (m)	Reported Use	Depth (m)	Reported Yield (m3/day)	Yield Class
1405SWW136	1,000	Unknown	10.2	Unknown	Unknown
1405SWW016	1,000	Unknown	16.8	Unknown	Unknown
1405SWW017	1,000	Unknown	21.3	28	Poor
1405SWW018	1,000	Unknown	14.6	21.8	Poor
1405SWW034	1,000	Unknown	19.8	27.3	Poor
1405SWW035	1,000	Unknown	25	28	Poor
1405SWW036	1,000	Unknown	20.7	43.6	Moderate
1405SWW193	500	Industrial	88.4	163.7	Good
1405SWW195	500	Industrial	88.4	54.5	Moderate
1405SWW111	200	Unknown	22.9	28	Poor
1405SWW125	200	Unknown	30.5	28	Poor
1405SWW127	1,000	Unknown	33.5	32.7	Poor
1405SWW128	500	Unknown	25	27.3	Poor
1405SWW182	100	Industrial	Unknown	Unknown	Good
1405SWW038	1,000	Unknown	0.9	28	Poor
1405SWW020	20	Industrial	121.9	218	Good
1405SWW194	500	Industrial	88.4	65.5	Moderate
1405SWW037	1,000	Unknown	12.2	27.3	Poor
1405SWW019	20	Industrial	124.4	109	Good

10.8.4 Groundwater Quality

The Water Framework Directive (WFD) 2000/60/EC was adopted in 2000 as a single piece of legislation covering rivers, lakes, groundwater, transitional (estuarine) and coastal waters. In addition to protecting said waters, its objectives include the attainment of ‘Good Status’ in water bodies that are of lesser status at present and retaining ‘Good Status’ or better where such status exists at present. The EPA co-ordinates the activities of the River Basin Districts, local authorities and state agencies in implementing the Directive, and operates a groundwater quality monitoring programme undertaking surveys and studies across the Republic of Ireland.

Presently, the groundwater body in the region of the site (Bandon GWB - European Code: IE_SW_G_086) for which the site is located entirely within, has a WFD status of “Good” (WFD Period: 2016-2021) and a WFD risk score (3rd Cycle) of “Not at Risk” of not achieving good status, meaning it has achieved its objectives

10.8.5 Rating of Site Importance of the Hydrogeological Features

Based on the TII methodology (2009) (See Appendix 10.1) the importance of the hydrogeological features at this site is rated as 'Medium' importance based on the assessment that the attribute has a low-quality significance or value on a local scale, based on the fact that the bedrock aquifer underlying the site as a Locally Important Aquifer, the groundwater vulnerability is classified as High to Extreme. However, there are no recorded Public Supply Source Protection Area or Group Scheme Preliminary Source Protection Areas in the vicinity of the Proposed Development site.

10.9 Characteristics of the Proposed Development

The purpose of this section is to provide an overview of the key relevant details of the construction phase and operational phase of the Proposed Development. The information presented in this section is informed by the project design, but it is not a complete description of the Proposed Development. Therefore, it should be read in conjunction with the full development package. For a more comprehensive understanding of the Proposed Development, please refer to Chapter 2 'Description of the Proposed Development' of the EIA Report. Chapter 2 provides a detailed overview of the lifecycle of the project, including reference to the architectural and civil engineering, drawings, plans, reports, and other relevant document in order to define the Proposed Development.

The Proposed Development as set out in the public notices consists of an overall site area of c. 7.844 ha.

10.9.1 Construction Phase

The activities required for the construction phase of the Proposed Development represent the greatest risks of potential impact on the hydrological and hydrogeological environment. These activities primarily pertain to the site preparation, excavation and infilling activities required to facilitate construction of the Proposed Development.

10.9.1.1 Site Levelling and Excavations

There will be a need for soil excavation on-site. The earthworks will include the excavation of level platforms and foundations for building and the importation of stone material for access roads, etc. The design of road levels and finished floor levels has been carried out in such a way as to minimise cut / fill type earthworks operations.

The proposed works are expected to generate an estimated cut volume of ca. 35,762 m³ and a corresponding fill volume of 35,246 m³. In addition, ca. 21,270 m³ of topsoil will be excavated and is intended to be stored and reused entirely on site as part of the overall development.

The required fill volume will be met entirely using material generated from on-site excavation. The underlying subsoil predominantly consists of fractured rock, which is proposed to be crushed in situ for use as sub-base material for roads and hardstanding areas. Based on the planned reuse and site operations, no significant surplus or shortfall of material is anticipated. However, any excavated material that does not get reused will be removed from the site. This will be taken for appropriate offsite reuse, recovery, recycling and / or disposal.

This activity may temporarily increase the vulnerability of the underlying aquifer, as referenced in Section 10.8.2, the Geological Survey Ireland (GSI) has classified the vulnerability of the area encompassing the proposed

development site as 'High' (H) to 'Extreme' (E). This classification reflects pre-development conditions, prior to the installation of paving, stormwater drainage infrastructure, and associated services.

Local minor dewatering may be required during excavation works and groundworks (depending on the time of year development works are carried out). However, there may be potential for change in groundwater levels as a result of local changes in the groundwater regime at the site due to the limited extent of dewatering activities and the natural recharge capacity of the underlying "Locally Important Aquifer (LI)", which may allow for the maintenance of groundwater levels. This ensures that the aquifer's integrity and functionality remain unaffected by any temporary dewatering measures.

Storage of soils/aggregates

The employment of good construction management practices and full adherence to a Construction Environmental Management Plan (CEMP) will minimise the risk of pollution of soil, storm water run-off, or groundwater. Such practices include the proper storage of spoil / loose materials on site, such as excavated materials to be used for landscaping purposes; Aggregate materials such as sands and gravels will be stored in clearly marked receptacles in a secure compound area within the contractors' compound on site.

Temporary storage of spoil will be managed to prevent accidental release of dust emissions and uncontrolled surface water run-off which may contain sediment and solid matter. Any excavated material temporarily stockpiled onsite for re-use during reinstatement will be managed to prevent accidental release of dust and uncontrolled surface water run-off which may contain sediment etc.

10.9.1.3 Storage of hazardous materials

Temporary storage of fuel will be required on site for construction traffic. Liquid materials i.e., fuel storage will be located within the site compound in temporary designated bunded areas, doubled skinned tanks or bunded containers (all bunds will conform to standard bunding specifications - BS8007-1987) to prevent spillage.

Construction activities will necessitate storage of cement and concrete materials, temporary oils, and fuels on site. Small localised accidental releases of contaminating substances including hydrocarbons have the potential to occur from construction traffic and vehicles operating on site.

10.9.1.4 Import/Export of Materials

There will be a requirement for deliveries and refuelling of imported engineering fill (sands and gravels), and other construction materials including; steel structure, concrete, cladding, ducting and piping. Construction materials will be brought to site by road. Refuelling will be completed in accordance with the best standard practice refuelling procedure. To support the construction of proposed roads, car parks, and buildings, additional fill material may need to be imported.

A 'Just in Time' delivery system will operate to minimise storage of materials. Construction materials will be transported in clean vehicles. Lorries/trucks will be properly enclosed or covered during transportation of friable construction materials and spoil to prevent the escape material along the public roadway. Where possible it is proposed to source general construction materials from the local area to minimise transportation distances.

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Soil requiring removal offsite will be removed from site regularly to ensure there is minimal need for stockpiling. Some of the topsoil removed will be re-used on site for backfill. Any surplus topsoil, subsoil and bedrock material will be transported off site and disposed of at a fully authorised soil recovery site or licenced landfill based on the waste soil classification.

10.9.1.5 Collection and disposal of collected water (rainfall run-off and perched groundwater)

Due to the expected excavation levels, pumping out of standing water may be necessary. Localised perched groundwater within the cohesive deposits/ weathered bedrock, or pooling surface water during and after heavy rainfall events is expected. Dewatering (removing of perched groundwater) is necessary to create a dry working environment and prevent water from seeping into the excavation and flooding the construction site. If dewatering is necessary, it will occur via suitably installed dewatering wells/sumps containing pumps to abstract groundwater and surface water (rainfall landing on the site).

During construction water will discharge the existing stormwater network in the L-2040 public roadway. Where required, a wastewater discharge licence will be applied for to manage surface water on site during the construction phase. This shall permit the discharge of trade effluent arising from groundwater/surface water ingress on the construction site. In case of any exceedances of discharge permit conditions, water will be disposed of to a licenced facility. The treatment and monitoring of this water prior to disposal will occur outside the construction site in a regional facility north of the site.

10.9.2 Operational Phase

The Proposed Development characteristics which relate to the hydrological and hydrogeological environment during operation are summarised below.

10.9.2.1 Surface Water Infrastructure

The surface water network is laid out to provide gravity falls without the necessity for pumping. The network generally runs from east to west. There is a northern section of phase 3 running west to east and then south to connect to the eastern end of the main section of the network. The proposed Phase 3 surface water network connects at two locations to the existing phase 1 and phase 2 element of the Blossomhill development. Network is connected to public sewers in the L2040 public roadway. The surface water design calculations for phases 1 & 2 have taken account of and are sized to accommodate phase 3 run-off volumes.

To ensure appropriate water quality treatment, a range of Sustainable Drainage System (SuDS) measures will be implemented across the site. These will include Attenuation Tanks, Filter Drains, Permeable Paving, Swales and Petrol Interceptor. Filtration units will be installed on both the inlet and outlet pipework associated with the underground attenuation tanks to serve as a final stage of treatment, reducing levels of total suspended solids, hydrocarbons, and heavy metals in the surface water runoff.

For further technical details regarding the design, specification, and operation of the SuDS measures, reference should be made to the Project Engineers' report prepared by Brian O'Kennedy & Associates.

10.9.2.2 Wastewater Infrastructure

The foul sewer system serving the development will operate by gravity flow. The sewers will discharge westward via Phases 2 & 1 towards the existing foul sewer network in the L-2040 public roadway. This roadway has been widened and a new 300mm diameter foul sewer has been installed. It is proposed to connect into this newly laid public sewer via Phases 2 & 1. Both Phase 1 and Phase 2 foul sewers have been sized to accommodate the proposed extra discharge from the subject Phase 3 development.

A Confirmation of Feasibility from Irish Water has been received. The Phase 2 design outlined the requirements of upgrade works to watermains between the town and the site location. The Irish Water engineering design of this upgrade is fully taking account of all proposed development works on the Old Cork Road including the subject Phase 3.

The wastewater would be conveyed to the Bandon Wastewater Treatment Plant (WWTP) (D0136) for full treatment. According to its 2024 Annual Environmental Report (AER), the facility currently has the capacity to accommodate the anticipated increase in influent arising from the proposed development. Following treatment, the final effluent from Bandon WWTP is discharged into Bandon River.

For further technical details regarding the design of the foul water infrastructure, reference should be made to the Project Engineers' report prepared by Brian O'Kennedy & Associates.

10.9.2.3 Water Supply

Uisce Éireann have an existing 100mm diameter watermain in the L-2040 public roadway which is currently serving Phase 1 of the Blossom Hill development. The COF confirmation for Phase 2 requires upgrading this 100mm watermain to a new 250mm diameter watermain in the public roads serving the development, along with a pressure boosting pump station within the development. The pressure boosting pump station has been installed and commissioned in Phase 1-this is sized to supply Phases 1, 2 & 3 of the development. Larger diameter 225mm diameter pipework has also been laid on site to supply the pump station. The applicant is currently waiting on starting the installation of the larger diameter pipework in the public road which will be adequate to serve all three phases of the development.

10.10 Potential Impacts of the Proposed Development

An analysis of the potential impacts of the Proposed Development on the hydrological and hydrogeological environment during the construction and operation is outlined below. Due to the inter-relationship between land, soils and geology with hydrogeology and surface water (hydrology) the following impacts discussed will be considered applicable to both Chapter 9 and 10 of the EIA Report. Mitigation measures included in the design of this project to address these potential impacts are presented in Section 10.12 of this EIA.

There is no likely potential impact on any protected habitat based on the design criteria and distance of any hydrological or hydrogeological pathways.

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10.10.1 Construction Phase

10.10.1.1 Potential Impacts on Surface Water and Groundwater Quality

There is potential for run-off water to become contaminated with pollutants released during construction activity. If not mitigated, contaminated water can pose a temporary risk to the Bandon River and the underlying 'Locally Important Aquifer' i.e. the Bandon groundwater body (GWB) (European Code: IE_SW_G_086). During construction of the development, the potential of contamination is associated with the following sources:

- Suspended solids (muddy water with increased turbidity (measure of the degree to which the water loses its transparency due to the presence of suspended particulates)) – arising from excavation and ground disturbance;
- Excavations/ top and sub soil stripping- Increase sediment run off (erosion during rainfall periods), Pollutant mobilisation (heavy metal runoff), Loss of vegetation;
- Cement/concrete (increase turbidity and pH) – arising from construction materials;
- Hydrocarbons and other construction chemicals (ecotoxic) – accidental spillages from construction plant or onsite storage;
- Wastewater (nutrient and microbial rich) – arising from accidental discharge from on-site toilets and washrooms. Construction phase sewerage will be contained in a tank and taken by tanker off site for disposal at a licensed waste management facility.

In the absence of mitigation, rainfall run-off during the construction phase may contain increased silt levels or otherwise become polluted from construction activities. Suspended solids in runoff water may result in an increase in suspended sediment load, resulting in increased turbidity, which may in turn impact on local infiltration capacity, downstream infrastructure or watercourses. Concreting operations pose a potential risk of discharging concrete materials into exposed surfaces and percolate to the underlying groundwater. Concrete, especially the cement component, has a high alkalinity level. There is also the potential risk of unintentional discharge of stored materials like fuels, oils, and paints, which could have negative impacts on surface water bodies on-site and downstream, and the underlying groundwater.

There are no potential impacts from wastewater on the hydrological and hydrogeological environment as this will be discharged of appropriately.

In the absence of mitigation measures, the potential impacts during the construction phase on surface water quality and groundwater quality are **negative, slight** and **short term**.

10.10.1.2 Potential Impacts on Surface Water and Groundwater Flow and Quality

Surface water runoff during the construction phase may contain increased silt levels or become polluted from construction activities. Runoff containing large amounts of silt can cause damage to surface water systems and receiving watercourses. Silt water can arise from dewatering excavations, exposed ground, stockpiles and access roads.

The gradual introduction of impermeable surfaces and the compaction of soils across the construction site as a result of the land clearing and earthworks will reduce the infiltration capacity and increase the rate and volume of direct surface run-off. The potential impact of this is a possible increase in surface water run-off along with

sediment loading, which could potentially impact local drainage if not adequately mitigated. This increase in the rate and volume of direct surface run-off can result in increased sediment loading, scouring impacts on local drainage and watercourses, and downstream impacts.

There are no surface water or groundwater abstractions proposed, therefore no potential impacts on the existing surface water and groundwater regime.

There are no proposed permanent diversions of any waterbodies as part of the Proposed Development.

In the absence of mitigation measures the potential impacts during the construction phase on surface water and groundwater quantity and flow are **negative, slight** and **short term**.

10.10.1.3 Potential Impacts on Water Framework Directive Status

AWN Consulting have prepared a Water Framework Directive (WFD) Screening Report that is included with the application documentation (Appendix 10.2 of the EIAR).

The WFD assessment indicates that, based on the current understanding of the Proposed Development, there is a potential of accidental discharges during the construction phase (as set out in Section 10.11.1). However, these are temporary short-lived events that will not impact on the status of the Bandon River, Upper Bandon Estuary downstream or the underlying Bandon groundwater body (GWB) in the short or long-term. This is based on the low expected loading of any potential contaminant, the significant distance to these waterbodies, natural attenuation in the subsoils, and the high level of dilution in the downstream waterbodies. As such, there is no potential for any accidental release into the Bandon River and the Proposed Development will not cause any significant deterioration or change in water quality status or prevent attainment, or potential to achieve the WFD objectives or to meet the requirements and/or objectives in the third cycle river basin management plan (2022-2027) i.e. Water Action Plan 2025 - A River Basin Management Plan for Ireland.

In the absence of mitigation measures the potential impacts during the construction phase on the Water Framework Directive (WFD) status due to changes to the hydrological environment are **negative, slight** and **short-term**.

10.10.2 Operational Phase

10.10.2.1 Potential Impacts on Surface Water and Groundwater Quality

There is an indirect hydrological connection to the Bandon River during the construction and operational phase through the local drainage network. Surface water runoff from roads, car parking, and hardstanding areas, can potentially contain minor levels of contaminants such as hydrocarbons from trafficked areas.

The surface water runoff during the operational phase will more likely impact stormwater drainage, rather than directly impact the water bodies i.e. Bandon Stream, and Upper Bandon Estuary and Bandon GWB underlying the site, due to the hardstand and drainage infrastructure proposed.

The surface water drainage strategy includes the Proposed Development to be served by a SuDS that is to be integrated with the developments landscaping features and is typically to comprise a combination of multiple measures. Any surface water flows from the Proposed Development will be directed to underground attenuation system which discharge to the public stormwater network.

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The foul water drainage strategy for the proposed development includes the development of a gravity flow system connecting into the existing foul sewer network in the L-2040 public roadway. From here, the wastewater will be conveyed through the foul sewer network to the Bandon WWTP (D0136), where it will undergo full treatment before being discharged into Bandon River. The Bandon WWTP currently has sufficient operational capacity to accommodate the projected additional load from the proposed development.

In the absence of mitigation measures (or design measures) the potential impacts during the operational phase on surface water and groundwater quality are **negative, significant** and **long term**.

10.10.2.2 Potential Impacts on Surface Water and Groundwater Flow and Quality

The proposed incorporation of hardstand area and the use of SuDS design measures will have a minor effect on local recharge to ground and has the potential to result in increased run-off from the site if not adequately mitigated.

However, the impact on the overall groundwater regime will be maybe significant considering the site area is underlying "Locally Important" Aquifer (LI), which may impact groundwater levels.

An increase in surface water runoff can have an adverse effect on the hydrological regime of downstream environments via flooding and inundation to downstream properties.

As described in Section 10.7.6 above, there are no recorded past flood events within the proposed site development. Therefore, there is a low flood risk associated with the Proposed Development site.

The design of the Proposed Development and drainage infrastructure proposed will ensure that the run-off rate is restricted to greenfield run-off. The development includes the implementation of SuDS and an underground attenuation system. The design includes for a 100-year plus climate change allowance and discharge surface water to the downstream network at an appropriately determined rate. There are no surface water or groundwater abstractions proposed, therefore no potential impacts on the quantity of surface water or groundwater.

The proposed measures ensure that the Proposed Development will not be impacted by predicted flood events.

In the absence of mitigation measures (or design measures) the potential impacts during the operational phase on surface water and groundwater flow and quantity are **negative, slight**, and **short-term**.

10.10.2.3 Waste Water Discharge

As stated in Section 10.11.2 above, all foul water generated on the Proposed Development will be directed to a gravity flow system connecting into the existing public network. From there, the wastewater will be conveyed through the foul sewer network to the Bandon WWTP (D0136), where it will undergo full treatment before being discharged into Bandon River. The Bandon WWTP currently has sufficient operational capacity to accommodate the projected additional load from the proposed development.

Therefore, no potential impacts are anticipated on Bandon River, Upper Bandon Estuary, or the Bandon GWB. The potential impacts on Natura 2000 sites located downstream of the Proposed Development site are further explained in Chapter 11 (Biodiversity).

On the basis of the design and characteristics of the Proposed Development, in the absence of mitigation measures (or design measures) the potential impacts during the operational phase on the foul water network, Bandon River, Bandon Estuary, or the Bandon GWB from the proposed foul water drainage are negative, significant and short-term in respect of wastewater loading.

10.10.2.4 Potential Impacts on Water Framework Directive Status

There are limited discharges of surface water during the operational phase to the Bandon River. However, these discharges will be adequately attenuated via SuDS measures. Any surface water flows from the Proposed Development will be directed to the attenuation system and flow control devices will be installed downstream of the system to ensure the surface water runoff is stored maximising storage potential, prior to entering the network downstream. These proposed design measures ensure there is no long-term negative impact to the WFD water quality status of the Bandon River, Upper Bandon Estuary or the underlying Bandon groundwater body (GWB).

In the scenario of an accidental release of diesel or unmitigated leak of fuel from car park areas and roads, these are temporary short-lived events that will not impact on the status of the waterbodies mentioned above in the long-term. This is based on the low expected loading of any potential contaminant, the significant distance to these waterbodies, natural attenuation in the subsoils, and the high level of dilution in the downstream waterbodies.

As such, there is no potential for any accidental release into the Bandon River and the Proposed Development will not cause any significant deterioration or change in water quality status or prevent attainment, or potential to achieve the WFD objectives or to meet the requirements and/or objectives in the third cycle river basin management plan (2022-2027) i.e. Water Action Plan 2025 - A River Basin Management Plan for Ireland

The Bandon WWTP has capacity available for the Proposed Development. Therefore, the proposed peak effluent discharge calculated for the Proposed Development is not likely to have an impact on the capacity at WWTP or the overall water quality within the Bandon River, Upper Bandon Estuary or the underlying aquifer Bandon groundwater body as defined within the Water Framework Directive.

Therefore, there is no potential for impacts on water framework directive status as a result of the Proposed Development during operation (refer to Appendix 10.2 for WFD assessment).

10.11 Mitigation Measures

10.11.1 Construction Phase Mitigation

10.11.1.1 Construction & Environmental Management Plan

The CEMP outlines and explains the construction techniques and methodologies which will be implemented during construction of the proposed development.

Construction works and the proposed mitigation measures are informed by best practice guidance on the prevention of pollution during development projects including but not limited to:

- Construction Industry Research and Information Association (CIRIA), Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors (C532);

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- Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters (2016);
- Construction Industry Research and Information Association (CIRIA) Environmental Good Practice on Site (4th edition), (C741);
- Enterprise Ireland Best Practice Guide, Oil Storage Guidelines (BPGCS005).
- Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites (Eastern Regional Fisheries Board);
- Central Fisheries Board Channels and Challenges – The enhancement of Salmonid Rivers;
- CIRIA C532 Control of Water Pollution from Construction Sites Guidance for Consultants and Contractors;
- CIRIA C648 Control of Water Pollution from Constructional Sites;
- Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes (NRA 2008); and
- Inland Fisheries Ireland (IFI) – A Guideline on Planning for Watercourses in the Urban Environment.

The CEMP sets out the proposed procedures and operations to be utilised on the proposed construction site to protect water quality. The CEMP will be implemented and adhered to by the construction contractor and will be overseen and updated as required if site conditions change by the Project Manager, Environmental Manager and Ecological Clerk of Works where relevant. All personnel working on the site will be trained in the implementation of the procedures. All relevant personnel will be fully trained in the use of this equipment. Guidelines such as “Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors” (CIRIA 532, 2001) will be complied with.

All mitigation measures outlined here, and within the CEMP will be implemented during the construction phase, as well as any additional measures required pursuant to planning conditions which may be imposed.

10.11.1.2 Suspended solids

As there is potential for run-off to indirectly discharge to a watercourse (Bandon River and eventually Upper Bandon Estuary), in order to manage the potential impact associated with sediment and sediment runoff the following mitigation measures will be implemented during the construction phase.

- During earthworks and excavation works care will be taken to ensure that exposed soil surfaces are stable to minimise erosion. All exposed soil surfaces will be within the excavation site which limits the potential for any offsite impacts.
- Silt reduction measures on site will include a combination of silt traps and hydrobrakes measures.
- Any hard surface site roads will be swept to remove mud and aggregate materials from their surface while any unsurfaced roads shall be restricted to essential site traffic only.
- Aggregate materials such as sands and gravels will be stored in clearly marked receptacles within a secure compound area to prevent contamination.
- Movement of material will be minimised to reduce the degradation of soil structure and generation of dust.
- Excavations will remain open for as little time as possible before the placement of fill. This will help to minimise the potential for water ingress into excavations.
- Weather conditions will be considered when planning construction activities to minimise the risk of run-off from the site.

10.11.1.3 Cement/concrete works

Where feasible all ready-mixed concrete will be brought to site by truck. A suitable risk assessment for wet concreting will be completed prior to works being carried out which will include measures to prevent discharge of alkaline wastewaters or contaminated storm water to the underlying subsoil and aquifer.

Wash-outs will only be allowed to take place in designated areas with an impervious surface where all wash water is contained and removed from site by road tanker.

The construction contractor will be required to implement emergency response procedures, and these will be in line with industry guidance. Relevant personnel working on the site will be suitably trained in the implementation of the procedures.

10.11.1.4 Hydrocarbons and other construction chemicals

The following mitigation measures will be implemented during the construction phase in order to prevent any spillages to ground of fuels and other construction chemicals and prevent any resulting to surface water (and groundwater) systems:

- Designation of bunded refuelling areas on the site;
- Provision of spill kit facilities across the site;
- Where mobile fuel bowsers are used, the following measures will be taken:
 - Any flexible pipe, tap or valve will be fitted with a lock and will be secured when not in use;
 - The pump or valve will be fitted with a lock and will be secured when not in use;
 - All bowsers to carry a spill kit and relevant operatives must have spill response training;
 - Portable generators or similar fuel containing equipment will be placed on suitable drip trays.

In the case of drummed fuel or other potentially polluting substances which may be used during the construction phase, the following measures will be adopted:

- Secure storage of all containers that contain potential polluting substances in a dedicated internally bunded chemical storage cabinet unit or inside a concrete bunded area;
- Oil and fuel storage tanks shall be stored in designated areas, and these areas shall be stored within temporary bunded areas, doubled skinned tanks or bunded containers to a volume of 110% of the capacity of the largest tank/container. Drainage from the bunded area(s) shall be diverted for collection and safe disposal.
- Clear labelling of containers so that appropriate remedial measures can be taken in the event of a spillage;
- All drums to be quality approved and manufactured to a recognised standard;
- If drums are to be moved around the Site, they will be secured and on spill pallets; and
- Drums will be loaded and unloaded by competent and trained personnel using appropriate equipment.

In addition to the measures above, all excavated materials will be visually assessed by suitably qualified persons for signs of possible contamination such as staining or strong odours. Should any unusual staining or odour be noticed, samples of this soil will be analysed for the presence of potential contaminants to ensure that historical pollution of the soil has not occurred. Should it be determined that any of the soil excavated is contaminated, this will be segregated and appropriately disposed of by a suitably permitted/licensed waste disposal contractor.

Refuelling of construction vehicles and the addition of hydraulic oils or lubricants to vehicles will take place in designated bunded refuelling areas, which will be away from surface water gulleys or drains. In the event of a machine requiring refuelling outside of this area, fuel will be transported in a mobile double skinned tank. An adequate supply of spill kits and hydrocarbon adsorbent packs will be stored in this area. All relevant personnel will be fully trained in the use of this equipment. Guidelines such as "Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors" (CIRIA 532, 2001) will be complied with.

The construction contractor will be required to implement emergency response procedures, and these will be in line with industry guidance. All personnel working on the Site will be suitably trained in the implementation of the procedures.

10.11.1.5 Wastewater Management

Foul wastewater arising from the site will be managed and controlled for the duration of the construction works.

Foul water from the offices and welfare facilities on the site will be collected in portable sanitary facilities and disposed of appropriately by licenced contractor.

The construction contractor will implement emergency response procedures, and these will be in line with industry guidance. All personnel working on the site will be suitably trained in the implementation of the procedures.

10.11.1.6 Surface Water and Groundwater Flow and Quantity

Surface water discharge from the site will be managed and controlled for the duration of the construction works until the surface water drainage system of the Proposed Development is complete.

The construction contractor will be required to manage suspended solids during the construction phase and will be permitted to discharge treated construction water to the established stormwater network.

The construction activities will require surface water management to prevent pollution and degradation of habitats from a chemical spill or run off containing excessive suspended solids that complies with guidelines and best practices such as "Control of Water Pollution from Construction Sites and Guidance for Consultants and Contractors" (CIRIA 532, 2001)

10.11.2 Operational Phase Mitigation

10.11.2.1 Surface Water and Groundwater and Quantity

The design has taken account of the potential impacts of the development on surface water quality; measures have been incorporated in the design to mitigate these potential impacts.

The proposed surface water management design establishes an indirect hydrological connection to the Bandon River and Upper Bandon Estuary, located near the site, during the operational phase.

To mitigate potential contamination from surface water runoff, which may originate from roads and hardstanding

areas, a sustainable drainage system (SuDS) will be implemented. This system is designed to minimize the risk of contaminants, such as hydrocarbons, entering the stormwater drainage network and subsequently impacting surface water bodies like the Bandon River and Upper Bandon Estuary, as well as groundwater bodies, including the Bandon GWB underlying the site.

The surface water drainage strategy integrates various measures, including attenuation ponds, rainwater harvesting, permeable paving and downstream defenders. These features will effectively manage surface water flows, directing them to an underground attenuation pond and infiltration tanks to maximize their storage potential. Flow control devices will be installed downstream of the pond outlet pipes to ensure that surface water runoff is stored efficiently before entering the receiving environment.

Refer to the Engineering Report, prepared by Brian O'Kennedy & Associates submitted separately as part of the planning application for further information on the proposed storm water management and design.

10.11.2.2 Surface Water and Groundwater Flow and Quantity

The proposed incorporation of hardstand areas and SuDS design measures may slightly reduce local groundwater recharge and increase runoff if not properly managed, potentially causing flooding and affecting downstream environments. However, the overall impact on the groundwater regime is expected to be insignificant due to the site's small area relative to the total aquifer, and construction will avoid areas with localized flooding to mitigate flood risks.

To mitigate these risks, the design of the development and its drainage infrastructure will ensure that runoff rates are restricted to those of greenfield conditions. The development will incorporate SuDS and an underground attenuation system, with a design that up to and including the 100-year plus climate change allowance and discharge surface water to the downstream network at an appropriately determined rate. The proposed surface water management strategy aims to prevent surcharging during a 1 in 2-year storm events up to and including the 1 in 100 years plus allowance for climate change.

Furthermore, there are no proposed surface water or groundwater abstractions, eliminating potential impacts on the quantity of surface water or groundwater resources.

10.12 Monitoring Measures

10.12.1 Construction Phase

During construction phase the following monitoring measures will be considered. Monitoring will be undertaken in accordance with planning conditions and undertaken by the contractor in compliance with the project CEMP.

Contractors will carry out regular inspections to confirm compliance with the CEMP. Daily inspections by contractors will address potential environmental impacts including dust, litter, waste management and general housekeeping.

Weekly checks will be carried out to ensure surface water drains are not blocked by silt, or other items.

Regular inspection of surface water run-off and sediments controls (e.g., silt traps). Inspection and maintenance

of the silt control measures during construction phase is crucial to ensuring that they work as intended. They will remain in place throughout the entire.

10.12.2 Operation Phase

No future surface water monitoring is proposed for the Proposed Development due to the low hazard potential at the site.

Hydrocarbon interceptors will be maintained and cleaned out in accordance with the manufacturer's instructions.

Maintenance of the surface water drainage system and foul sewers as per normal urban developments is recommended to minimise any accidental discharges to surface water.

10.13 Interactions and Cumulative Effects

10.13.1 Interactions

This EIAR addresses potential interactions and inter-relationships between the environmental factors discussed. This covers both the construction and operational phases of the proposed development.

The EIAR must also consider in-combination effects, or the interactions between the different factors discussed.

Dust emissions have the potential to settle on plants causing impacts to local ecology. Mitigation measures during the construction phase of the proposed development will ensure that dust generation is minimised and the effect on biodiversity will be short term, imperceptible and neutral. There is potential for impacts to biodiversity associated with uncontrolled discharges to surface waters during operational phase. With the implementation of mitigation measures outlined in this chapter and Chapter 11 of the EIAR, and in the CEMP, interactions between biodiversity and hydrology/hydrogeology will be **short-term, imperceptible, neutral**.

Surface water runoff can also have an effect on soil quality in the area, with chemicals or suspended solids having an effect on soil fertility and contamination. With the proposed mitigation measures outlined in this chapter and in Chapter 9 of the EIAR (Land and Soils), the potential interaction between these is reduced to a **short-term, imperceptible, neutral** effect.

10.13.2 Cumulative Effects

Existing developments that are already built and in operation contribute to the characterisation of the baseline environment. As such any further environmental impacts that the Proposed Development may have in addition to these already constructed and operational developments has been assessed in the preceding sections of this chapter.

Any future application on these lands will be subject to planning approval and environmental assessment as required. Any new development proposed on the lands after the submission of the Proposed Development would be accompanied by an EIA, or EIA Screening as required and take into consideration the development of this site.

10.13.2.1 Construction Phase

In relation to the potential cumulative impact on hydrology during the construction phase, the construction works which would have potential cumulative impacts are as follows:

- Surface water run-off during the construction phase may contain increased silt levels or become polluted from construction activities. Run-off containing large amounts of silt can cause damage to surface water systems and receiving watercourses.
- Stockpiled material will be stored on hardstand away from surface water drains, and gullies will be protected during works to ensure there is no discharge of silt-laden water into the surrounding surface water drainage or to ground.
- Contamination of surface water from accidental spillage and leakage from construction traffic and construction materials is possible unless project-specific measures are put in place for each development and complied with.

The works contractors for other planned or permitted developments will be obliged to ensure that measures are in place to protect surface water and groundwater quality in compliance with legislative standards for receiving groundwater quality (European Communities Environmental Objectives (Groundwater) Regulations (S.I. 9 of 2010 and S.I. 266 of 2016) and surface water quality (European Communities Environmental Objectives (Surface Water) Regulations (S.I. 272 of 2009 and S.I. 77 of 2019)).

The implementation of mitigation and monitoring measures previously detailed above as well as the compliance of other developments with their respective planning conditions, will ensure there will be minimal cumulative potential for change to the hydrological and hydrogeological environment during the construction phase of the proposed development.

The residual cumulative impact of the proposed development in combination with other planned or permitted developments can therefore be considered to be **neutral, imperceptible** and **short-term**.

10.13.2.2 Operational Phase

The proposed development and other permitted developments will result in an increase in hard standing which will result in localised reduced recharge to ground.

All developments are required to ensure they do not have an impact on the receiving water environment in accordance with the relevant legislative standards for receiving groundwater quality (European Communities Environmental Objectives (Groundwater) Regulations (S.I. 9 of 2010 and S.I. 266 of 2016) and surface water quality (European Communities Environmental Objectives (Surface Water) Regulations (S.I. 272 of 2009 and S.I. 77 of 2019)).

The implementation of mitigation and monitoring measures previously detailed above as well as the compliance of other developments with their respective planning conditions, will ensure there will be minimal cumulative potential for change to the hydrological and hydrogeological environment during the operational phase of the proposed development.

The residual cumulative impact of the proposed development in combination with other planned or permitted developments can therefore be considered to be **neutral, imperceptible** and **long-term**.

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10.14 Residual Impact Assessment

10.14.1 Construction Phase

10.14.1.1 Surface Water and Groundwater and Quantity

The implementation of the mitigation and monitoring measures detailed in Section 10.12 and 10.13, will ensure that the potential impacts on surface water and groundwater quality during the construction phase are adequately mitigated. There will be no change to overall flow and quality within the hydrological and hydrogeological regime as a result of construction.

The residual effect on surface water and groundwater quality during the construction phase is considered to be neutral, imperceptible and short-term.

10.14.1.2 Surface Water and Groundwater Flow and Quantity

The implementation of the mitigation and monitoring measures detailed in Section 10.12 and 10.13, will ensure that the potential impacts on surface water and groundwater flow and quantity during the construction phase are adequately mitigated. There will be no change to overall flow and quality within the hydrological and hydrogeological regime as a result of construction.

The residual effect on surface water and groundwater flow and quantity during the construction phase is considered to be neutral, imperceptible and short-term.

10.14.2 Operational Phase

10.14.2.1 Surface Water and Groundwater and Quantity

The implementation of the mitigation and monitoring measures detailed in Section 10.12 and 10.13, will ensure that the potential impacts on surface water and groundwater quality once the Proposed Development is constructed and operational are adequately mitigated.

The residual effect on surface water quality during the operational phase is considered to be neutral, imperceptible and long-term.

10.14.2.2 Surface Water and Groundwater Flow and Quantity

The implementation of the mitigation and monitoring measures detailed in Section 10.12 and 10.13, will ensure that the potential impacts on surface water and groundwater flow and quantity once the Proposed Development is constructed and operational are adequately mitigated.

The residual effect on surface water and groundwater flow and quantity during the operational phase is considered to be neutral, imperceptible and long-term.

10.15 References and Sources

- Environmental Protection Agency (EPA) – website mapping and database information. Envision water quality monitoring data for watercourses in the area;
- Geological Survey of Ireland (GSI) - on-line mapping, Geo-hazard Database, Geological Heritage Sites & Sites of Special Scientific Interest, Bedrock Memoirs and 1: 100,000 mapping;
- River Basin Management Plan for Ireland 2018-2021.
- Water Action Plan 2025 - A River Basin Management Plan for Ireland, (Department of Housing Local Government & Heritage, Sept 2024).
- The Planning System and Flood Risk Management, Guidelines for Planning Authorities (Department of the Environment, Heritage and Local Government (DoEHLG) and the Office of Public Works (OPW));
- Office of Public Works (OPW) flood mapping data (www.floodmaps.ie)
- Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors' (CIRIA 532, 2001); and
- National Parks and Wildlife Services (NPWS) – Protected Site Register.
- Hydrometric data (www.floodinfo.ie/map/floodmaps/), OPW CFRAM Flood Risk Mapping, www.epa.ie/hydronet.
- Brian O’Kennedy & Associates Ltd. Engineers & Architects - Engineering Infrastructure Report for 212 dwellings for Castle Rock Homes (Bandon) Ltd. (2025)

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CHAPTER ELEVEN

BIODIVERSITY

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CHAPTER 11

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CHAPTER 11 | BIODIVERSITY

11.1 Introduction

This chapter of the EIAR was prepared to assess the potential significant effects of the proposed development on ecology and biodiversity.

A detailed ecological appraisal has been carried out by a fully qualified and experienced MOR Environmental Ecologist in line with *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine* (2018 and revisions) [1].

This Biodiversity Chapter should be read in conjunction with the Stage 1: Appropriate Assessment which forms part of the planning application and the appendices attached.

11.2 Expertise & Qualifications

This chapter of the EIAR was prepared by Ms Annie Coady, Malone O'Regan Environmental ('MOR Environmental') – Environmental Consultant. Annie is a qualifying member of the Chartered Institute of Ecology and Environmental Management ('CIEEM') with over two years of experience working in the environmental consultancy sector. As part of her role, Annie regularly conducts ecological surveys and assessments for various projects across Ireland and has experience in conducting surveys in accordance with Best Practice Guidelines.

This chapter of the EIAR was reviewed and approved by Ms. Kathryn Broderick, Principal Consultant - Ecologist. Kathryn has over nine years' experience working in the ecological consultancy sector. As part of her role, Kathryn is required to undertake habitat surveys and appraisals as well as specialist- protected species surveys in support of Ecological Impact Assessments ('EIAs') and Appropriate Assessments ('AAs'). Kathryn has also completed a diploma in Environmental Law and Planning, which had a focus on EIA and AA, which has provided her with a comprehensive understanding of the legal context and requirements of these types of assessments.

11.3 Proposed Development

Please refer to Chapter 2 – Project Description for the full development description. In summary, the subject application is for a large-scale Residential Development ('LRD') comprising the construction of

212 no. residential units and all ancillary development works, including footpaths, car and bicycle parking, drainage, bicycle and bin stores, lighting and landscaping/amenity areas at Knockbrogan, Bandon, Co. Cork. Access will be provided via the existing access road onto the Cork Road permitted under reference 21/4059.

11.4 Methodology

11.4.1 Relevant Guidance

The following standards and guidance documents were utilised to characterise the baseline conditions of the Site, the assessment of potential impacts to biodiversity and the appropriate mitigation measures required:

- CIEEM, *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine* (2018 and revisions) [1];
- National Road Authority ('NRA'), *Guidelines for Assessment of Ecological Impacts of National Roads Schemes* [2];
- Fossitt's Guide to Habitats in Ireland [3];
- Heritage Council's *Best Practice Guidance for Habitat Survey & Mapping* [4];
- NRA, *Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes*, [5];
- Scottish Badgers, *Surveying for Badgers: Good Practice Guidelines*, [6];
- *The Mammal Society, 'Surveying Badgers'* [7];
- DoEHLG, *'Bat Mitigation Guidelines for Ireland'* [8];
- Bat Conservation Trust ('BCT'), *'Bat Surveys for Professional Ecologists Good Practice Guidelines'* [9];
- Scottish Natural Heritage ('SNH'), *'Technical Advice Note #2: Otter Surveys'* [10];
- DoAHG, *'National Otter Survey of Ireland 2010 / 12'* [11];
- Construction Industry Research and Information Association ('CIRIA'), C532 – Control of Water Pollution from Construction, Guidance for Consultants and Contractors [12];
- CIRIA, C811- Environmental Good Practice on Site (5th edition) [13];
- NRA, *'Guidelines for the Treatment of Bats during the Construction of National Road Schemes'* [14];
- NRA *'Guidance for the Treatment of Badgers Prior to the Construction of National Road Schemes'* [15];
- NRA, *'Guidelines on the Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads'* [16]; and, *'Requirements for the Protection of Fisheries Habitat during Construction and Development'* [17].

11.4.2 Desk Study

The desk study focused on identifying European designated sites within a 15km radius of the Site, nationally designated sites within a 5km radius of the Site and records of legally protected and notable species within 2km of the Site.

The area for which biological data were collected was based on an assessment of the ecological zone of influence of the Site (i.e. the area that could be affected by the scheme within which there is the potential for significant ecological effects).

The following literature sources were consulted as part of the desktop study:

- Review of aerial maps of the Site and surrounding area;
- The National Parks and Wildlife Service ('NPWS') website was consulted with regard to the most up-to-date details on conservation objectives for the Natura 2000 sites relevant to this assessment [18];

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- The National Biodiversity Data Centre ('NBDC') website was consulted with regard to species distributions [19];
- The Cork County Planning Portal to obtain details about existing / proposed developments in the vicinity of the Site [20]; and,
- The Environmental Protection Agency ('EPA') Maps website was consulted to obtain details
- about watercourses in the vicinity of the Site [21].

11.4.3 Site Surveys

11.4.3.1 Habitat Survey

An initial site walkover was undertaken on 10th April 2025 by a suitably qualified and experienced MOR Environmental Ecologist. This survey aimed to assess the extent and quality of habitats present on the Site and to identify any potential ecological receptors.

During the initial site walkover, a habitat survey was undertaken for the Site utilising the Heritage Council's – 'A Guide to Habitats in Ireland' [4]. This is the standard habitat classification system used in Ireland and includes both a desk-based and field-based assessment.

Updated site walkovers were undertaken on

- 28th May 2025; and,
- 21st August 2025.

The assessment was extended to also identify the potential for these habitats to support other features of nature conservation importance, such as species afforded legal protection under either Irish or European legislation, see Section 11.4.3.2.

Following the completion of the initial site walkover, it was deemed necessary to undertake additional specialist surveys for breeding birds and bats. Details of these specialist surveys can be found in Section 11.4.3.2 below.

11.4.3.2 Hedgerow Appraisal

A comprehensive hedgerow assessment was undertaken on 21st August 2025 in accordance with *Hedgerow Appraisal System – Best Practice Guidance on hedgerow Survey, Data Collation and Appraisal* [22]. The survey involved a systematic walkover and detailed appraisal of all hedgerows within the Site.

11.4.3.3 Protected / Notable Species

The methodologies used to establish the presence / potential presence of faunal species are summarised below. These relate to those species / biological taxa that the desk study and habitat types present indicated could occur on the Site.

Flora

The Site was assessed for the presence of notable / protected flora species in accordance with the following:

- Flora (Protection) Order 2022 (S.I. No. 235/2022); and,
- Ireland Red List No 10: Vascular Plants [23].

Amphibians

The Site was assessed for its potential to provide sheltering, foraging, and breeding habitat for amphibians, in line with the NRA, now Transport Infrastructure Ireland ('TII'), *Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes* [5].

These include static or slow-moving waterbodies suitable for egg-laying, and terrestrial habitats comprising open areas with mixed-height vegetation, such as heathland, rough grassland, open scrub or water body margins. Suitable well drained and frost-free areas are needed to enable amphibians to survive the winter.

Badger

The survey aimed to identify and examine areas where badgers (*Meles meles*) might occur by noting any evidence of badger activity. This included:

- Mammal paths;
- Badger hairs caught in sett entrances / fences / vegetation;
- Paw prints;
- Evidence of foraging (usually in the form of 'snuffle holes');
- Badger Scat (isolated badger droppings);
- Latrines (shallow pits/holes occurring together comprised of exposed badger droppings);
- and,
- Badger setts.

The field survey of the Site was conducted in line with the following relevant guidance for badger:

- Scottish Badgers, '*Surveying for Badgers: Good Practice Guidelines*,' [6];
- The Mammal Society, '*Surveying Badgers*,' [7]; and,
- NRA, now TII, '*Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes*,' [15].

Bats

An initial assessment was carried out during the habitat survey for the suitability of the habitats within the Site to provide bat roosting, foraging and flight path habitats. Bat habitats and commuting routes identified were considered in relation to the wider landscape to determine connectivity for local bat populations, and through the examination of aerial mapping.

Assessment criteria for evaluating the potential suitability of the Site for bats were carried out in line with 'Bat Surveys for professional Ecologists: Good Practice Guidelines' [24]. Refer to Table 11-1.

Table 11-1: Guidelines for assessing the potential suitability of proposed development sites for bats, based on the presence of habitat features within the landscape, to be applied using professional judgement [24].

Potential Suitability	Description of Roosting habitats in structures	Description of Potential flight-paths and foraging habitats
None	No habitat features on site likely to be used by any roosting bats at any time of the year (i.e. a complete absence of crevice/suitable shelter at all ground/underground levels).	No habitat features on site likely to be used by any commuting or foraging bats at any time of the year (i.e. no habitats that provide continuous lines of shade/protection for flight-lines, or generate/shelter insect populations available to foraging bats).
Negligible ¹	No obvious habitat features on site likely to be used by roosting bats; however, a small element of uncertainty remains as bats can use small and apparently unsuitable features on occasion.	No obvious habitat features on site likely to be used as flight-paths or by foraging bats, however a small element of uncertainty remains in order to account for non-standard bat behaviour.
Low	A structure with one or more potential roost sites that could be used by individual bats opportunistically at any time of the year. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions ² and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e., unlikely to be suitable for maternity and not a classic cool/stable hibernation site, but could be used by individual hibernating bats ³).	Habitat that could be used by small numbers of bats as flight-paths such as a gappy hedgerow or unvegetated stream, but isolated, i.e., not very well connected to the surrounding landscape by another habitat. Suitable, but isolated habitat that could be used by small numbers of foraging bats such as a lone tree (not in a parkland situation) or a patch of scrub.
Moderate	conditions and surrounding habitat but unlikely to support a roost of high conservation status (with respect to roost type only, such as maternity and hibernation – the categorisation described in this table is made irrespective of species conservation status, which is established after presence is confirmed).	bats for flight-paths such as river valleys, streams, hedgerows, lines of trees and woodland edge. High-quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging bats such as broadleaved woodland, tree-lined watercourses and grazed parkland. Site is close to and connected to known roosts.

¹ Negligible is defined as 'so small or unimportant as to be not worth considering, insignificant'. This category may be used where there are places that a bat could roost or forage (due to one attribute) but it is unlikely that they actually would (due to another attribute).

² For example, in terms of temperature, humidity, height above ground level, light levels or levels of disturbance.

³ Evidence from the Netherlands shows mass swarming events of common pipistrelle bats in the autumn followed by mass hibernation in a diverse range of building types in urban environments ([] and []). Common pipistrelle swarming has been observed in the UK ([] and []) and winter hibernation of numbers of this species has been detected at Seaton Delaval Hall in Northumberland ([]). This phenomenon requires some research in the UK, but ecologists should be aware of the potential for larger numbers of this species to be present during the autumn and winter in prominent buildings in the landscape, urban or otherwise.

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Potential Suitability	Description of Roosting habitats in structures	Description of Potential flight-paths and foraging habitats
High	A structure with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat. These structures have the potential to support high conservation status roost, e.g. maternity or classic cool/stable hibernation site.	Continuous, high-quality habitat that is well connected to the wider landscape that is likely to be used regularly by commuting bats such as river valleys, streams, hedgerows, lines of trees and woodland edge. High-quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging bats such as broadleaved woodland, tree-lined watercourses and grazed parkland.

Ground Level Tree Inspection

As part of the walkover, all trees within the Site were assessed for the presence of features that could be utilised by roosting bats, using close-focusing binoculars and a powerful focused-beam light source.

The following criteria were used to assess mature trees on-site:

- Presence of natural cavities, splits, cracks, loose bark and rot holes in the trunk or boughs of the tree;
- Presence of dense and woody ivy (*Hedera helix*) growth that could be used by bats for roosting;
- Evidence of bat droppings, which may also be seen as a black streak beneath holes, cracks, branches, etc; and,
- Presence of smooth edges with dark marks and urine stains at potential entrances to roosts. The potential suitability of any PRFs identified were then categorised as per Table 11-2 (Table 6.2 in
- BCT guidance [24].

Table 11-2: Guidelines for Categorising the Potential Suitability of PRF's

PRF Suitability	Description
PRF-I	PRFI is only suitable for individual bats or very small numbers of bats, either due to size or lack of suitable surrounding habitats.
PRF-M	PRFM is suitable for multiple bats and may, therefore, be used by a maternity colony.

This assessment was undertaken outside the optimal period for ground-level tree inspections, which is considered to be from December to March inclusive [24].

Nighttime Bat Walkover ('NBW') Surveys

Given the presence of hedgerow / treelines on-site, which have the potential to support commuting and foraging bats, NBW surveys were undertaken to establish the importance of the on-site habitats for foraging and commuting bats. Surveys were undertaken on 18th August 2025 and on 11th September 2025.

The survey design was informed by previous experience and the following publications:

- *Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes* [25];
- *A Conservation Plan for Irish Vesper Bats Irish Wildlife Manual No. 20* [26];
- *UK Bat Mitigation Guidelines: A guide to impact assessment, mitigation and compensation for developments affecting bats. Version 1.2.* [27];
- *Bat Mitigation Guidelines for Ireland – V2. Irish Wildlife Manuals, No. 134* [10] a publication by the NPWS [28]; and,
- *Bat Surveys for Professional Ecologists - Good Practice Guidelines (4th ed.)*. London: The Bat Conservation Trust [24].

The surveys commenced 15 minutes before sunset and ended 2 hours after sunset, therefore encompassing the typical emergence times of Irish bat species.

The first hour of the NBW survey involved a stationary vantage point ('VP') period to assess general levels of bat activity and flight paths within the Site. The second hour and 15 minutes of the survey involved the surveyors walking predetermined transects (T) around the Site to assess activity levels along the linear features and other areas of the Site that the daytime bat walkover identified as providing suitable habitats for foraging and commuting bats.

The surveyors used an Echo Meter Touch2 Pro to listen for bat calls. These bat calls were recorded using this Echo Meter Touch2 Pro and stored on the EchoMeter App. A combination of visual observation and listening to ultrasonic bat calls were used during the emergence and NBW survey. Surveyors continuously recorded any signs of bat activity using the Echo Meter Touch2 Pro and noted any visual observations.

The metadata from the surveys is outlined in Table 11-3. Two MOR Environmental Ecologists surveyed separate locations of the Site; see Figure 11-1 for the locations of the stationary VPs and transects walked during the survey.

Table 11-3: Bat Survey Metadata

Date	Survey Type	Sunset	Survey Times (Start – End)	Weather	Temperature (°C)
25/08/2025	NBW	20:53	20:38 – 22:53	Dry, light breeze	18°C - 17°C
11/09/2025	NBW	20:00	19:45 – 22:00	Dry with breeze	13°C - 12°C



Figure 11-1: Bat Survey Locations

The Site was assessed for its potential to support important assemblages of birds of rare or notable species, as well as designated bird species. Surveys aimed to identify and examine the suitability of the Site for potential wintering and breeding birds. Any bird activity onsite and potential nesting habitats were noted.

Following the identification of breeding bird habitats onsite, it was deemed necessary to undertake targeted surveys for breeding birds in 2025.

Three breeding bird transect surveys were undertaken on 15th May, 28th May and 10th June 2025 by a suitably qualified MOR Environmental Ecologists. The breeding bird surveys were conducted in line with the methodology described in:

- British Trust of Ornithology ('BTO') - *A Field Guide to Monitoring Nests*; [29]; and,
- Common Bird Census in *Bird Monitoring Methods* [30].

All birds were recorded through sight and sound. Optical equipment was used, including binoculars, in order to minimise disturbance to potentially breeding birds. Suitable vegetation onsite was examined for the presence of nests. During the survey, the behavioural activity of the recorded birds was noted using the BTO breeding status codes. Birds that displayed non-territorial behaviours were recorded as well (i.e. birds that were flying over the Site, birds that were foraging and not calling, birds that were loafing). Birds were then classified as non-breeding, possibly breeding and confirmed breeding based on the behaviours exhibited.

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The criteria for each classification are described below:

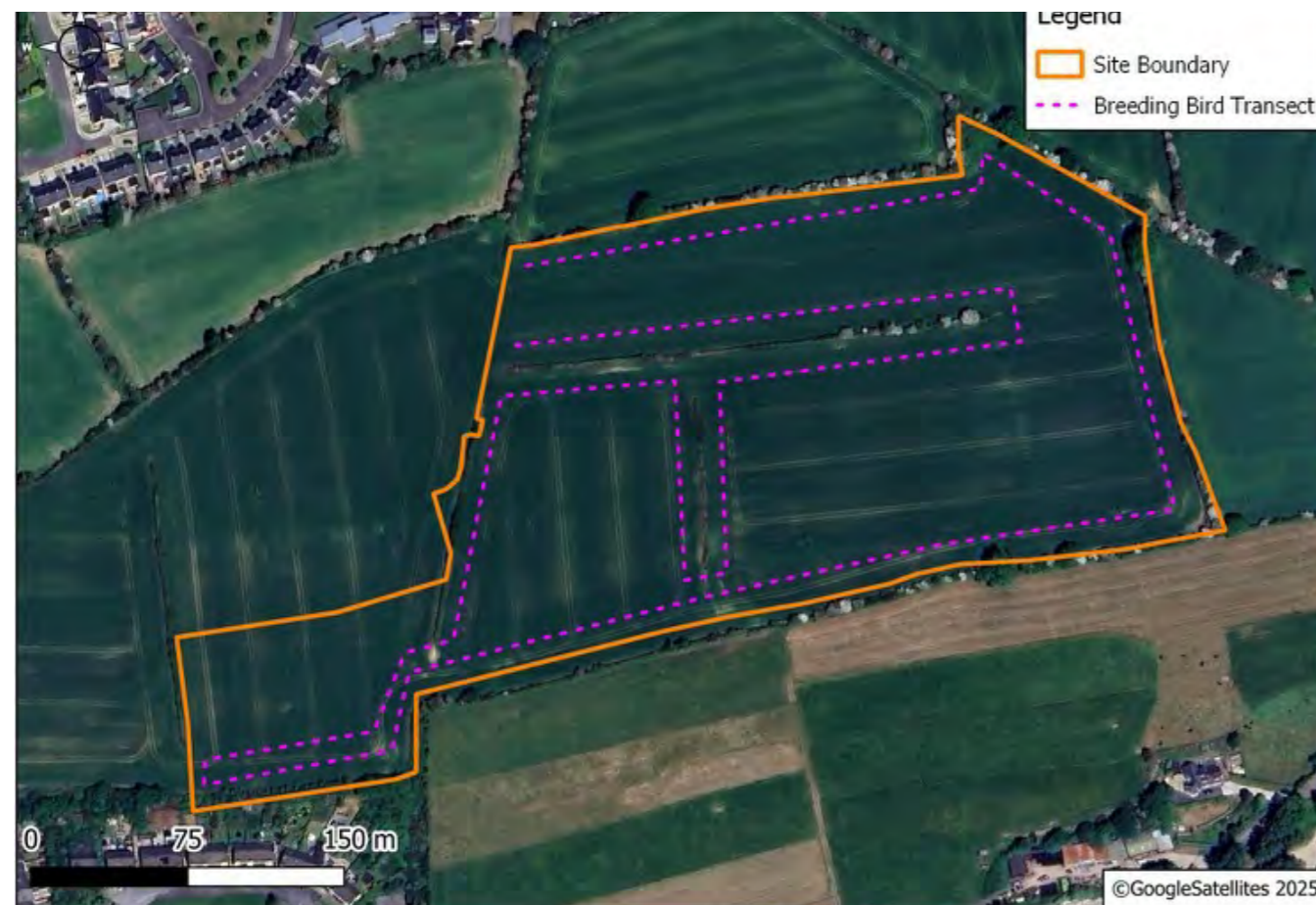
- Non-breeding – Birds that were flying over the Site, birds that were foraging and not calling, birds that were loafing;
- Possible Breeding – Birds observed in suitable nesting habitat and displaying either territorial and / or courtship behaviours, nest building behaviours or observed visiting a possible nest; and,
- Confirmed Breeding – Birds observed either on nest or carrying faecal sac or food, sighting of a nest with eggs / chicks, used nests, eggshells or recently fledged young.

The metadata for the breeding bird survey are described in Table 11-4 and the transect is illustrated in Figure 11-2.

Table 11-4: Breeding Bird Survey Metadata

Visit No.	Date	Temperature (°C) (Start – End)	Wind (Beaufort Wind Scale)	Rain	Cloud Cover
Visit 1	15/05/2025	11°C - 14°C	2	None	None
Visit 2	28/05/2025	13°C - 14°C	3	None	20%
Visit 3	10/06/2025	14°C - 15°C	2	None	70%

Figure 11-2: Breeding Bird Survey Transect



Hedgehogs and Pygmy Shrews

The habitats within and adjacent to the Site were appraised for their potential to support hedgehogs (*Erinaceus europaeus*) and pygmy shrews (*Sorex minutus*) in line with the NRA, now TII, 'Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes' [5].

Otter

The survey aimed to identify and examine areas where otter might occur by noting any evidence of otter observed. Evidence of otter searched for included:

- Holts (features log piles, caves and cavities);
- Slides (flattered areas of mud or vegetation);
- Paw prints;
- Evidence of foraging (usually in the form of feeding remains such as fish scales, shellfish, etc.); and,
- Spraints.

The field survey of the Site was conducted in line with the following relevant guidance for otter:

- NRA, now TII, 'Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes,' [5].

Invasive Species

The Site was visually assessed for the presence of any noxious / invasive species that are regulated under the European Union (Invasive Alien Species) Regulations 2024 (S.I. No. 374/2024) [31] such as Japanese knotweed (*Reynoutria japonica*) and Himalayan balsam (*Impatiens glandulifera*).

The Site was also assessed for the presence of non-regulated invasive species that have the potential to impact local biodiversity.

Other Species

In addition, an assessment was carried out of the potential for the Site to support any other species considered to be of value for biodiversity, including those that were identified as occurring locally based on the findings of the desktop study and professional judgment.

11.4.4 Assessment Methodology

The starting point for the assessment was to undertake a scoping exercise for those ecological receptors that would require further consideration as part of the assessment. This involved differentiating the biodiversity receptors (i.e., designated sites, habitats, and species populations) that could be significantly affected by the Proposed Development.

The approach that was used for determining which receptors have the potential to be significantly affected by the Proposed Development involved using baseline data collected through the desk study and field surveys for the Site. Based on professional judgement, data from the following radii was

collected: 2km away for protected species, 15km for Natura 2000 sites and 5km away from Natural

Heritage Areas. The desk and field-based data were used to determine:

- Which, if any, of the species or habitat that have been recorded are legally protected or controlled (see Box 1 below); and,
- Which, if any, sites, areas of habitat and species that have been recorded are of importance for biodiversity conservation.

The next stage of the assessment was to determine whether the identified receptors are of sufficient biodiversity value that an impact upon them would be of potential significance in terms of this EIAR. In this regard:

- Biodiversity conservation value relates to the quality and / or size of sites or habitats, or the size of species' populations; and,
- Potential significance means that the effect could be of sufficient concern or, for positive effects, of such substantial benefit that it could be material to influencing the decision on planning.

Receptors that have been identified as having sufficient value, and for which an impact upon them could be of potential significance, have been taken forward for further consideration. Legally protected species were also considered further (refer to Box 1 below). This involved:

- Identifying, for each receptor, any significant impact that is likely to be caused by the Proposed Development, which has the potential to lead to a significant effect and / or to contravene relevant legislation;
- Determining the area within which the likely impacts would cause a potentially significant impact on the identified receptor and / or could contravene relevant legislation (ecological zone of influence); and,
- If the receptor occurs or is likely to occur within the zone of influence and concluding that the receptor could be significantly affected and / or the relevant legislation contravened, the receptor would be subject to further assessment.

11.4.5 Evaluation of the Conservation Importance of the Site

In terms of biodiversity conservation, the Site was evaluated using the ecological evaluation guidance given in the TII, formerly known as the NRA, guidance on assessment of ecological impacts of National Road Schemes of International importance [2], using the following scale

- International importance;
- National importance;
- County importance (or vice-county in the case of plant or insect species);
- Local importance (higher value); and,
- Local importance (lower value).

11.4.6 Consultation

Cognisance has been given to the Opinion Letter issued by Cork County Council in relation to any ecological concerns raised about the Site. The Opinion Letter contained commentary raised by the Biodiversity Officer of Cork County Council. This included undertaking bat surveys, a hedgerow appraisal including the impact of infilling proximal to the hedgerow, along with appropriate mitigation for avian species.

11.5 Difficulties Encountered

The hedgerow / treeline along the southwest border of the Site could not be fully assessed due to a fence in place. This hedgerow / treeline was assessed using binoculars. It is not considered that this will alter the findings of the results.

No other survey limitations were encountered.

11.6 Planning Context

11.6.1 Legislation / Policy Context

Within Ireland, a number of sites of international or national importance to nature conservation, as well as many species of animal and plants are afforded some degree of legal protection, for details see Box 1.

Box 1 Designated Wildlife Sites and Protected and Otherwise Notable Habitats and Species

The National Park and Wildlife Service ('NPWS') notifies sites in Ireland that are of international or national importance for nature conservation (although some sites that are of national importance for certain species have not been so designated). The NPWS notifies sites in Ireland that are of international or national importance for nature conservation (although some sites that are of national importance for certain species have not been so designated).

Internationally important sites may also be designated as:

- Special Areas of Conservation ('SACs') and Candidate Special Area of Conservation ('cSACs'): the legal requirements relating to the designation and management of SACs in Ireland are set out in the European Communities (Birds and Natural Habitats) Regulations 2011-2021 (S.I. No. 477/2011);
- Special Protection Areas ('SPAs') and candidate Special Protected Areas ('cSPAs'): strictly protected sites classified in accordance with Article 4 of the EC Directive on the Conservation of Wild Birds (2009/147/EC), also known as the Birds Directive; and,
- Ramsar sites: wetlands of international importance designated under the Ramsar Convention, to which Ireland is a signatory.

Other statutory site designations relating to nature conservation are:

- Natural Heritage Areas ('NHA'): these represent examples of some of the most important natural and semi-natural terrestrial and coastal habitats in the country and are afforded protection under the Wildlife (Amendment) Act 2000. NHAs are legally protected from damage and receive protection from the date they are formally proposed for designation; and,
- Proposed Natural Heritage Areas ('pNHAs'): these sites are not afforded the same protection as NHAs. These sites are proposed by the NPWS but are not statutorily proposed or designated. Prior to statutory designation these are subject to a very limited legal protection. They are, however, sites of significance for wildlife and habitats and are important for the purposes of this Biodiversity Chapter.

Legally protected species

Many species of animal and plant receive some degree of legal protection. For the purposes of this study, legal protection refers to:

- Species included in the Wildlife (Amendment) Act 2000, excluding species that are only protected in relation to their sale, reflecting the fact that the site disposal will not include any proposals relating to the sale of species; and,
- Species afforded protection under the Flora (Protection) Order 2022 (S.I.No.235/2022).

Other notable habitat/species categories

- Biodiversity Action Plan ('BAP') species: those targeted in local or national BAPs as being of particular conservation concern (priority species).
- Red and Amber List birds: those listed as being of high or medium conservation concern as listed by Birdwatch Ireland on the Birds of Conservation Concern in Ireland 2020-2026 [32].

Other Irish Red Data Book species [23] and Nationally/Regionally/Locally Notable species where appropriate.

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11.6.2 National Planning Context

A study of biodiversity-related planning policy at the national and local level has been undertaken for the Site and locality to highlight any potential conflicts with the relevant legislation and guidance documents as outlined in Box 1.

11.6.2.1 Project Ireland 2040 National Planning Framework

Project Ireland 2040 was launched by the Government in February 2018 [33] and incorporates two policy documents - the National Planning Framework ('NPF') and the National Development Plan ('NDP').

Following a decision of the Government in June 2023, the preparation of a revised NPF [34] commenced to take account of changes that have occurred since it was published (in 2018) and to build on the existing framework. Public consultation took place from 10th July 2024 to 12th September

2024, following which the Government agreed to progress and publish a draft schedule of amendments to the First Revision to the NPF in November 2024. On 8th April 2025, the Government approved the revised NPF following the conclusion of environmental assessments, which included a Strategic Environmental Assessment ('SEA'), NIS and Appropriate Assessment Determination and a Strategic Flood Risk Assessment ('SFRA'). Both houses of the Oireachtas, the Seanad and the Dáil, approved this document as of 30th April 2025. The revised NPF is a direct replacement of the NPF and, therefore, is detailed further below.

First Revision to National Planning Framework (April 2025)

Objectives under the 'Strategic Planning for Biodiversity' section of the revised NPF [34] include the following:

National Policy Objective 84:

'In line with the National Biodiversity Action Plan and European Union Nature Restoration Law, and best available scientific information, regional and local planning authorities shall support the preparation and implementation of the National Restoration Plan.'

National Policy Objective 85:

'In line with the National Biodiversity Action Plan; the conservation, enhancement, mitigation and restoration of biodiversity is to be supported by:

- a) *Integrating policies and objectives for the protection and restoration of biodiversity, including the principles of the mitigation hierarchy of - avoid, minimise, restore and offset - of potential biodiversity impacts, in statutory land-use plan.*
- b) *Retention of existing habitats which are currently important for maintaining biodiversity (at local/regional/national/international levels), in the first instance, is preferable to replacement/restoration of habitats, in the interests of ensuring continuity of habitat provision and reduction of associated risks and costs.'*

National Policy Objective 86:

'In line with the objectives of the National Biodiversity Action Plan, planning authorities should seek to address no net loss of biodiversity within their plan making functions.'

National Policy Objective 87:

'Enhance the conservation status and improve the management of protected areas and protected species by:

- *Implementing relevant EU Directives to protect Ireland's environment and wildlife and support the objectives of the National Biodiversity Action Plan;*
- *Developing and utilising licensing and consent systems to facilitate sustainable activities within Natura 2000 sites;*
- *Continued research, survey programmes and monitoring of habitats and species.'*

National Policy Objective 88

Facilitate the protection and restoration of biodiversity [including in European sites and the habitats and species for which they are selected] through the preparation of national guidance in relation to Planning and Biodiversity to:

- *Plan and manage for integration of biodiversity protection and restoration in future planning and development;*
- *Ensure a consistent and strategic approach to biodiversity protection and restoration across planning authorities and administrative boundaries, and*
- *Support the implementation of the National Biodiversity Action Plan (2023-2030) and the forthcoming National Restoration Plan.*

The National Development Plan (2021 – 2030)

The National Planning Framework and the National Development Plan will continue to align and form a single vision for Ireland under Project Ireland 2040.

The National Development Plan also lists the following items as strategic investment priorities in relation to National Heritage and biodiversity:

- *'Implementation of the current and future National Biodiversity Action Plan, delivery of National Parks and Wildlife Service Farm Plans and LIFE projects, enhanced wildlife crime investigation capacity and identification and delivery conservation measures at designated sites as identified in the Prioritised Action Framework for Ireland (2021-2027).'*
- *'Investment in nature and biodiversity, to improve the quality of natural habitats and support native plants and animals, including those under threat, and to bolster broader societal wellness and sustainability goals.'*
- *'Future-proofing obligations under the Biodiversity Strategy 2030, including potential national designations and the preparation and delivery of a National Restoration Plan.'*

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11.6.3 Ireland's 4th National Biodiversity Action Plan

The 4th National Biodiversity Action Plan ('NBAP') 2023-2030 sets out several strategic objectives that lay out a clear framework for Ireland's approach to biodiversity and demonstrates Ireland's commitment to protect our biodiversity and also halt decline [35].

'This National Biodiversity Action Plan 2023-2030 builds upon the achievements of the previous Plan. It will continue to implement actions within the framework of five strategic objectives, while addressing new and emerging issues.' The five objectives are as follows:

- **Objective 1:** Adopt a Whole of Government, Whole of Society Approach to Biodiversity;
- **Objective 2:** Meet Urgent Conservation and Restoration Needs;
- **Objective 3:** Secure Nature's Contribution to People;
- **Objective 4:** Enhance the Evidence Base for Action on Biodiversity; and,
- **Objective 5:** Strengthen Ireland's Contribution to International Biodiversity Initiatives.

The following Objective Outcomes were considered relevant to the Proposed Development and this report:

Outcome 2A:

'The protection of existing designated areas and protected species is strengthened and conservation and restoration within the existing protected area network are enhanced.'

Outcome 2D

'Biodiversity and ecosystem services in the marine and freshwater environment are conserved and restored.'

Outcome 2H:

'Invasive alien species ('IAS') are controlled and managed on an all-island basis to reduce the harmful impact they have on biodiversity and measures are undertaken to tackle the introduction and spread of new IAS to the environment.'

Outcome 3B:

'The role of biodiversity in supporting wellbeing, livelihoods, enterprise and employment is recognised and enhanced.'

Outcome 3C:

'Planning and development will facilitate and secure biodiversity's contributions to people.'

11.6.4 Regional Planning Context

The Regional Spatial and Economic Strategy for the Southern Region ('RSES') recognises the need to conserve and enhance biodiversity through co-ordinated spatial planning between the counties within the southern region of Ireland [36] This strategy came into effect on 31st January 2020.

Under the biodiversity section, Regional Policy Objective 126 states that the Southern Regional

Assembly will:

- a) *'Promote biodiversity protection and habitat connectivity both within protected areas and in the landscape through promoting the integration of green infrastructure and ecosystem services, including landscape, heritage, biodiversity and management of invasive and alien species in the preparation of statutory and non-statutory land-use plans. The RSES recognises the role of the National Biodiversity Data Centre through its Citizen Science initiatives;*
- b) *Support local authorities acting together with relevant stakeholders in implementing measures designed to identify, conserve and enhance the biodiversity of the Region; seek and support the implementation of the All-Ireland Pollinator Plan, National Biodiversity Action Plan and National Raised Bog SAC Management Plan;*
- c) *Local Authorities are required to carry out required screening of proposed projects and any draft land-use plan or amendment/ variation to any such plan for any potential ecological impact on areas designated or proposed for inclusion as Natura 2000/ European Sites and shall decide if an Appropriate Assessment is necessary, of the potential impacts of the project or plan on the conservation objectives of any Natura 2000/European Site;*
- d) *Support local authorities to carry out, monitor and review biodiversity plans throughout the Region. Planning authorities should set objectives in their land use plans to implement and monitor the actions as set out in the National and County Biodiversity Plans, as the conservation of biodiversity is an essential component of sustainable development. Local authorities should address the issue of fisheries protection and invasive introduced species and encourage the use of native species for landscape planting in rural areas, in the review of their biodiversity plans; and,*
- e) *Support local authorities to work with all stakeholders to conserve, manage and where possible enhance the Regions natural heritage including all habitats, species, landscapes and geological heritage of conservation interest and to promote increased understanding and awareness of the natural heritage of the Region.'*

The RSES also contains policies relating to invasive species. Regional Policy Objective 127 states that it is an objective to:

- a) *'Support coordination between the Region's local authorities in terms of their measures to survey invasive species in their counties and coordinate regional responses;*
- b) *Encourage greater awareness of potential threats caused by invasive species and how they are spread; and,*
- c) *Carefully consider and implement the management of invasive species where there is a corridor, such as hydrological connections to European Sites in order to prevent the spread of invasive to sensitive sites.'*

11.6.5 Local Planning Context

Cork County Development Plan Volume One Main Policy Material - 2022-2028 ('CCDP') contains a number of policies and objectives that relate directly to the protection of biodiversity and natural heritage in the context of proposed developments [37]. The policies and objectives of the CCDP with regard to the natural environment that are relevant to the Proposed Development are as follows [37]:

Objective GI 14-1: Countrywide Green and Blue Infrastructure Objectives

- b) Develop the green infrastructure network (including green corridors) to ensure the conservation and enhancement of biodiversity, including the protection of Natura 2000 European Sites, the provision of accessible parks, open spaces and recreational facilities (particularly within settlements), the sustainable management of water, the maintenance of landscape character and the protection and enhancement of architectural and archaeological heritage;
- d) Recognise rivers and streams (and their wider riparian corridors) as one of the natural foundations for multi-functional green and blue infrastructure corridors. Seek to strengthen ecological linkages which watercourses have with other water-dependent habitats, as well as with hedges / treelines, woodland and scrub in the wider landscape;

Objective BE 15-1: Support and comply with national biodiversity protection policies:

- a) Support and comply with the objectives of the National Biodiversity Plan 2017-2021 (and any future National Biodiversity Plan which may be adopted during the period of this Plan) as appropriate;
- b) Implement the current County Biodiversity Action Plan and any future updated Plan; and,
- c) Support and comply with the biodiversity policy set out in other national and regional policy documents as appropriate.

Objective BE 15-2: Protect sites, habitats, and species:

- a) Protect all natural heritage sites which are designated or proposed for designation under European legislation, National legislation and International Agreements. Maintain and, where possible, enhance appropriate ecological linkages between these. This includes Special Areas of Conservation, Special Protection Areas, Marine Protected Areas, Natural Heritage Areas, proposed Natural Heritage Areas, Statutory Nature Reserves, Refuges for Fauna and Ramsar Sites. These sites are listed in Volume 2 of the Plan;
- b) Provide protection to species listed in the Flora Protection Order 2015, to Annexes of the Habitats and Birds Directives, and to animal species protected under the Wildlife Acts in accordance with relevant legal requirements. These species are listed in Volume 2 of the Plan;
- c) Protect and, where possible, enhance areas of local biodiversity value, ecological corridors and habitats that are features of the County's ecological network. This includes rivers, lakes, streams and ponds, peatland and other wetland habitats, woodlands, hedgerows, tree lines, veteran trees, natural and semi-natural grasslands as well as coastal and marine habitats. It particularly includes habitats of special conservation significance in Cork, as listed in Volume 2 of the Plan;
- d) Recognise the value of protecting geological heritage sites of local and national interest, as they become notified to the local authority, and protect them from inappropriate development;

- e) Encourage, pursuant to Article 10 of the Habitats Directive, the protection and enhancement of features of the landscape, such as traditional field boundaries, important for the ecological coherence of the Natura 2000 network and essential for the migration, dispersal and genetic exchange of wild species; and,
- f) Encourage, pursuant to Article 10 of the Habitats Directive, the protection and enhancement of features of the landscape, such as traditional field boundaries, important for the ecological coherence of the Natura 2000 network and essential for the migration, dispersal and genetic exchange of wild species.

Objective BE 15-6: Biodiversity and New Development

Provide for the protection and enhancement of biodiversity in the development management process and when licensing or permitting other activities by:

- a) Providing ongoing support and guidance to developers on incorporating biodiversity considerations into new development through preplanning communications and the Council's guidance document 'Biodiversity and the Planning Process – guidance for developments on the management of biodiversity issues during the planning process' and any updated versions of this advice;
- b) Encouraging the retention and integration of existing trees, hedgerows and other features of high natural value within new developments;
- c) Requiring the incorporation of primarily native trees and other plant species, particularly pollinator-friendly species, in the landscaping of new development; and,
- d) Fulfilling Appropriate Assessment and Environmental Impact Assessment obligations and carrying out Ecological Impact Assessment in relation to development and activities, as appropriate.

Objective BE 15-7: Control of Alien Species

Implement best practice to minimise the risk of spread of invasive alien species, on Council-owned or managed land, and require the development and implementation of Invasive Alien Species Management Plans for new developments where required.

Objective BE 15-8: Trees and Woodlands

- a) Protect trees, the subject of Tree Preservation Orders;
- b) Make use of Tree Preservation Orders to protect important trees or groups of trees which may be at risk or any tree(s) that warrant an order given its important amenity or historic value;
- c) Encourage the provision of trees for urban shading and cooling in developments in urban environments and as an integral part of the public realm;
- d) Preserve and enhance the general level of tree cover in both town and country. Ensure that development proposals do not compromise important trees and include an appropriate level of new tree planting; and,
- e) Where appropriate, to protect mature trees / groups of mature trees and mature hedgerows that are not formally protected under the Tree Preservation Orders.

11.7 Baseline Environment

11.7.1 Desk Study Results

11.7.1.1 European Designated Sites

In accordance with the European Commission Methodological Guidance [38] and Objective BE 15-2of the CCDP [37], a list of European sites that can be potentially affected by the Proposed Development has been compiled. Guidance for Planning Authorities prepared by the Department of Environment, Heritage and Local Government [39] states that defining the likely Zone of Influence for the screening and the approach used will depend on the nature, size, location, and the likely effects of the project. The key variables determining whether or not a particular European Designated site is likely to be negatively affected by a project are:

- The physical distance from the Site to the European Designated site;
- The presence of impact pathways;
- The sensitivities of the ecological receptors; and,
- The potential for in-combination effects.

All SPAs and SACs within 15km have been considered to assess their ecological pathways and functional links. As acknowledged in the OPR guidelines [40], few projects have a Zone of Influence this large; however, the identification of European Designated sites within 15km has become widely accepted as the starting point for the screening process. For this reason, all SPAs and SACs within 15km have been identified for consideration as part of the screening.

There are two European sites located within 15km of the Site - these are identified in Figure 11-3 and Table 11-5.

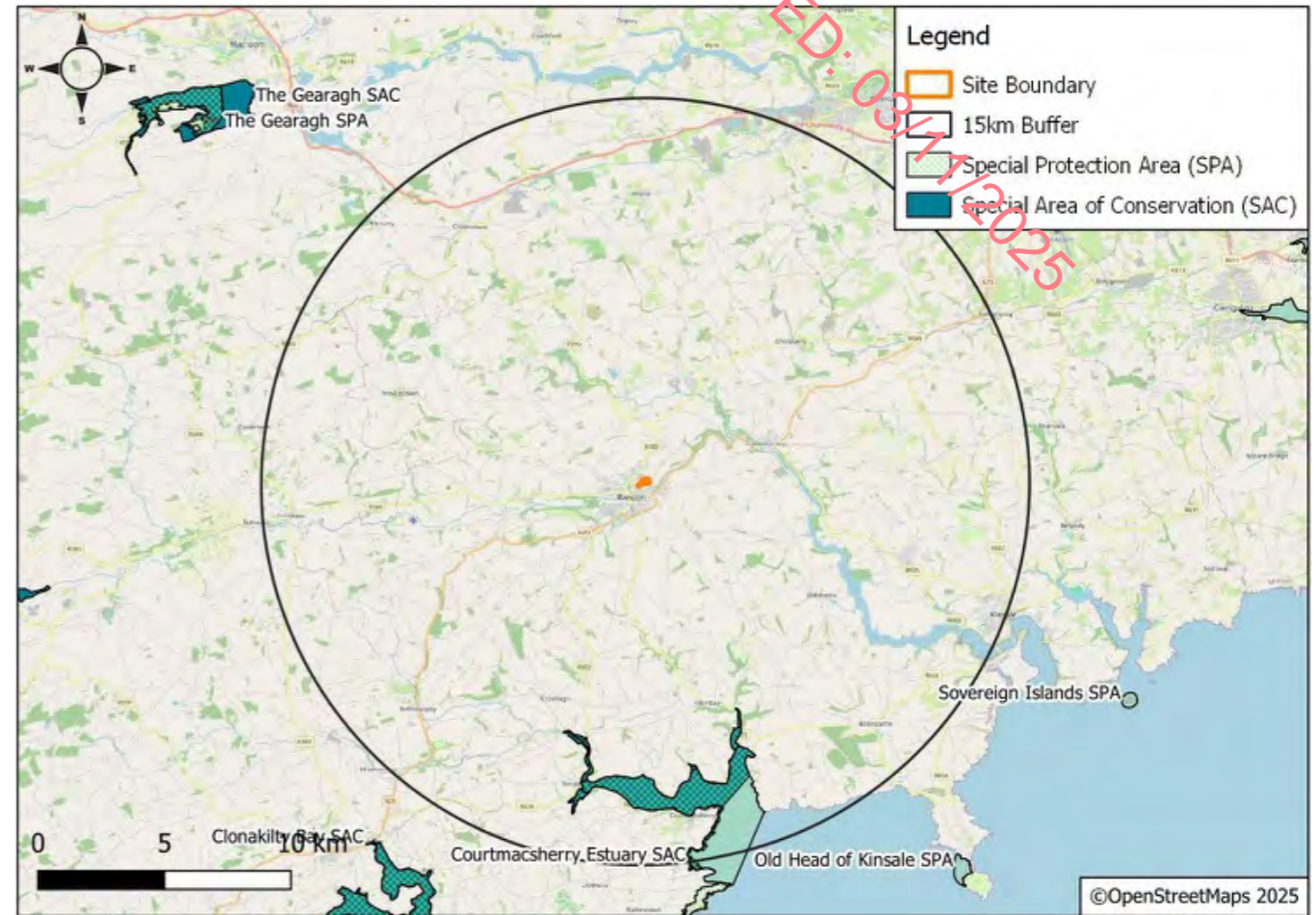


Figure 11-3: European Designated Sites within 15km of the Site

Table 11-5: European Designated sites within 15km of the Site

Site Name	Code	Distance (km)	Direction from the Site
Special Areas of Conservation ('SAC')			
Courtmacsherry Estuary SAC	001230	9.5km	S
Special Protection Area ('SPA')			
Courtmacsherry Bay SPA	004219	10km	S

No hydrological connection was identified between the Site and any European Designated Site. Further consideration to these European Designated sites is provided in the Stage 1: Appropriate Assessment Screening Report that has been submitted as part of the overall planning application.

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11.7.1.2 Nationally Designed Sites

Nationally designated sites within 5km of the Site were investigated as per Objective BE 15-2 of the CCDP [37].

No Natural Heritage Areas ('NHA') are located within 5km of the Site. However, two proposed National Heritage Areas ('pNHA') are located within 5km of the Site. Refer to Table 11-6 and Figure 11-4 for context.

Table 11-6: Proposed Natural Heritage Areas within 5km of the Site

Site Name	Code	Distance (km) & Direction	Qualifying Interest
Proposed National Heritage Areas ('pNHA')			
Boyne Valley Above Inishannon	001740	1.6km NE	<p>The Bandon River flows almost due east for much of its course, following a natural synclinal valley that itself extends to Cloyne. At Inishannon however, the river turns abruptly to the south, crossing several ridges before reaching the sea at Kinsale. The interest of the valley lies partly in its aquatic habitats since the river has not been deepened artificially as is so often the case. Four areas of scientific interest are located along the river. This site covers a section of the river 3km east of Bandon running approximately a further 4km downstream to Inishannon.</p> <p>The recent survey of this area reports it to be very scenic. Woodlands occur where the meanders of the valley approach the valley's edge and create steep slopes. The woodlands are semi-natural, mostly planted with species such as Sycamore (<i>Acer pseudoplatanus</i>) and Beech (<i>Fagus sylvatica</i>) mixed in with the native oaks (<i>Quercus</i> spp.). Some areas of commercial plantation occur near the railway tunnel and at Drumkeen Wood. The spread of Rhododendron (<i>Rhododendron ponticum</i>) is limited to small areas of the site.</p> <p>Lower down in the Bandon Valley birdlife is more associated with woodland and involves characteristic species like owls, Sparrowhawk, Woodcock and Jay.</p> <p>Cormorant and Heron fish throughout the river.</p> <p>The valley is reported to have Otter in many places, a species listed in Annex II of the E.U. Habitats Directive as it is threatened within the E.U.</p> <p>This area is important as it contains an example of oak woodland on steep valley sides. The Bandon Valley is especially valuable for its woodlands and unmodified river bed, which are a rare habitat in a European context.</p>
Bandon Valley West of Bandon	001034	1.6km SW	<p>The Bandon River flows almost due east for much of its course, following a natural synclinal valley that itself extends to Cloyne in East Cork. At Inishannon however, the river turns abruptly to the south crossing several ridges before reaching the sea at Kinsale. The interest of the valley lies partly in its aquatic habitats since the river has not been deepened artificially as is so often the case. Four Areas of Scientific Interest are located along the river. This site covers a section of river approximately 3km in length running downstream to within 1km west of Bandon. The Castlebernard Estate woodlands run along sections of the bank here.</p> <p>The banks of the river have old estate woodlands with mature oak (<i>Quercus</i> spp.) and some Ash (<i>Fraxinus excelsior</i>). Rhododendron (<i>Rhododendron ponticum</i>) and Cherry Laurel (<i>Prunus laurocerasus</i>) invasion is occurring but as yet is not widespread. Felling of woodlands in this area has recently been widespread and hence greater importance can be placed on the remaining areas.</p> <p>The 1986 An Forbas Forbatha report notes that the upper part of the Bandon River, before it sinks into a narrow gorge at Bandon, floods occasionally in winter and at such times attracts birds such as Lapwing and Curlew as well as Mallard and Teal. Cormorant and Heron fish throughout the course of the river.</p> <p>The Bandon Valley is reported to have Otters in many places, a species listed on Annex II of the EU Habitats Directive as it is threatened within the EU. The main land uses within the site are tree felling and clearing. This has much reduced the area of interest in recent years. Fishing is also important in this area. This site is important as it contains remnants of broadleaved oak woodland. The Bandon Valley is especially valuable for its woodlands and unmodified river bed, a rare enough habitat in a European context.</p>

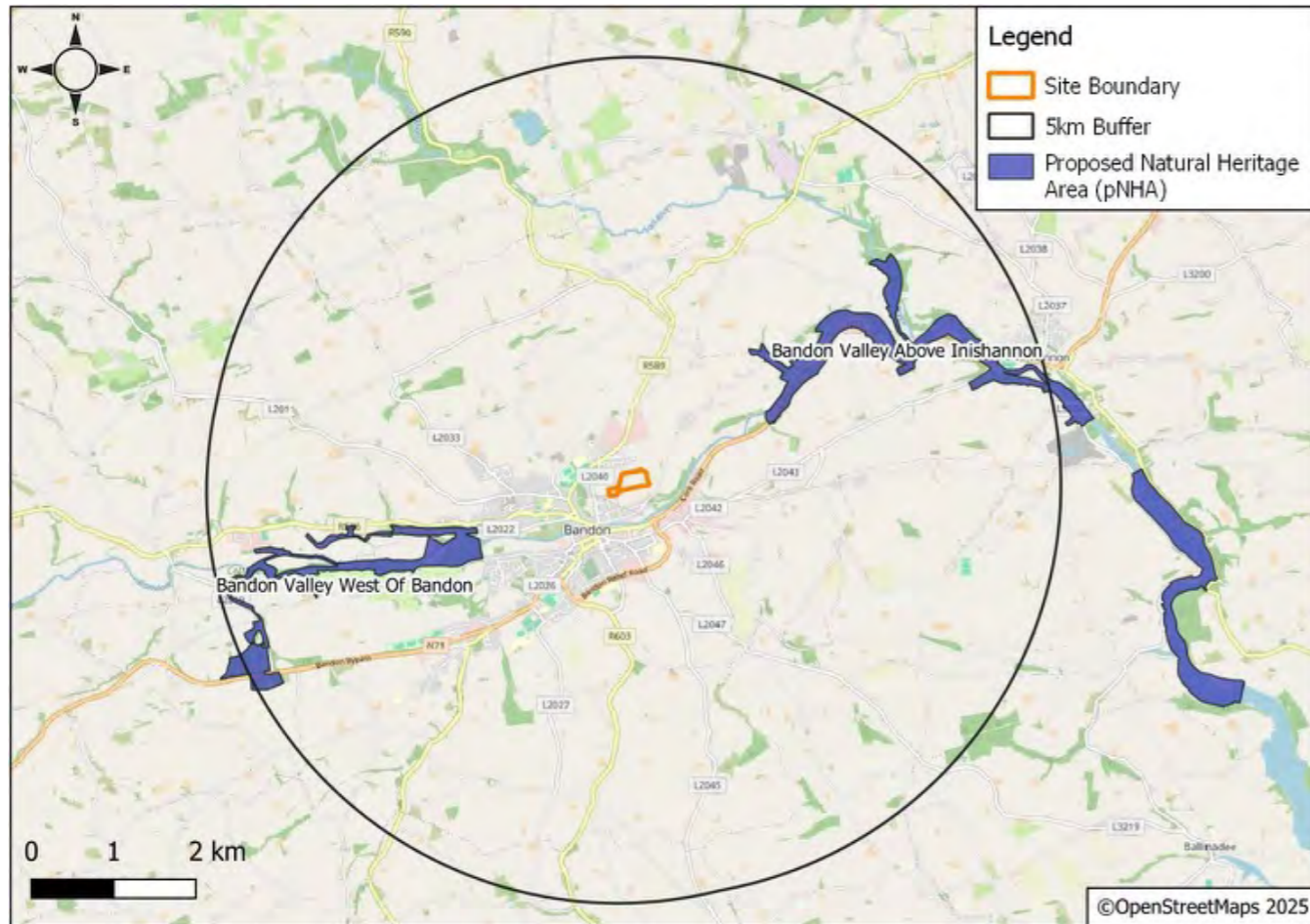


Figure 11-4: Nationally Designated sites within 5km of the Site

11.7.1.3 Notable / Protected Species

Table 11-7 provides a summary of records of legally protected or otherwise notable species that occur within 2km of the Site at the time of writing this report. The NBDC records were checked on 25th April

2025. The following NBDC 2km grids have been checked: W45R, W45S, W45T, W45W, W45X, W45Y, W55B, W55C and W55D. [19].

Only species recorded within the past 10 years were included in Table 11-7. The parameter of 10 years was chosen based on habitat adaptation and modification; it is considered that any records over 10 years old are not representative of the current distribution of species populations.

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Table 11-7: Protected / Notable Species recorded within 2km of the Site

Common Name	Scientific Name	Date of last record	Designation
Amphibians			
Common Frog	<i>Rana temporaria</i>	29/03/2020	Wildlife Acts 1976 / 2000 EU Habitats Directive Annex V
Bird Species			
Barn Owl	<i>Tyto alba</i>	03/02/2021	Wildlife Acts 1976 / 2000 Birds of Conservation Concern Red List
Barn Swallow	<i>Hirundo rustica</i>	15/04/2020	Wildlife Acts 1976 / 2000 Birds of Conservation Concern Amber List
Black-headed Gull	<i>Larus ridibundus</i>	22/02/2019	Wildlife Acts 1976 / 2000 Birds of Conservation Concern Amber List
Common Kingfisher	<i>Alcedo atthis</i>	03/06/2022	Wildlife Acts 1976 / 2000 EU Birds Directive Annex I Bird Species Birds of Conservation Concern Amber List
Common Linnet	<i>Carduelis cannabina</i>	04/03/2018	Wildlife Acts 1976 / 2000 Birds of Conservation Concern Amber List
Common Pheasant	<i>Phasianus colchicus</i>	22/05/2016	Wildlife Acts 1976 / 2000 EU Habitats Directive Annex II Section I and Annex III and Section I Bird Species Birds of Conservation Concern Green List
Common Snipe	<i>Gallinago gallinago</i>	01/01/2023	Wildlife Acts 1976 / 2000 EU Habitats Directive Annex II Section I and Annex III and Section III Bird Species Birds of Conservation Concern Red List
Common Starling	<i>Sturnus vulgaris</i>	22/02/2019	Wildlife Acts 1976 / 2000 Birds of Conservation Concern Amber List
Common Swift	<i>Apus apus</i>	13/05/2024	Wildlife Acts 1976 / 2000 Birds of Conservation Concern Red List
Common Wood Pigeon	<i>Columba palumbus</i>	22/02/2019	Wildlife Acts 1976 / 2000 EU Habitats Directive Annex II Section I and Annex III Section I Bird Species Birds of Conservation Concern Green List
Eurasian Curlew	<i>Numenius arquata</i>	25/04/2021	Wildlife Acts 1976 / 2000 EU Habitats Directive Annex II Section II Bird Species Birds of Conservation Concern Red List
Great Cormorant	<i>Phalacrocorax carbo</i>	10/03/2020	Wildlife Acts 1976 / 2000 Birds of Conservation Concern Amber List
House Sparrow	<i>Passer domesticus</i>	14/05/2020	Wildlife Acts 1976 / 2000 Birds of Conservation Concern Amber List
Mallard	<i>Anas platyrhynchos</i>	03/09/2021	Wildlife Acts 1976 / 2000 EU Birds Directive Annex II Section I and Annex III and Section I Bird Species Birds of Conservation Concern Amber List

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Common Name	Scientific Name	Date of last record	Designation
Bird Species			
Mute Swan	Cygnus olor	12/04/2016	Wildlife Acts 1976 / 2000 Birds of Conservation Concern Amber List
Peregrine Falcon	Falco columbarius	08/11/2020	Wildlife Acts 1976 / 2000 EU Habitats Directive Annex I Bird Species Birds of Conservation Concern Green List
Sand Martin	Riparia riparia	22/04/2019	Wildlife Acts 1976 / 2000 Birds of Conservation Concern Amber List
Yellowhammer	Emberiza citrinella	04/05/2021	Wildlife Acts 1976 / 2000 Birds of Conservation Concern Red List
Bat Species			
Daubenton's Bat	Myotis daubentonii	30/08/2019	Wildlife Acts 1976 / 2000 EU Habitats Directive Annex IV
Common Pipistrelle	Pipistrellus pipistrellus	02/08/2016	Wildlife Acts 1976 / 2000 sensu lato EU Habitats Directive Annex IV
Leisler's Bat	Nyctalus leisleri	11/08/2016	Wildlife Acts 1976 / 2000 EU Habitats Directive Annex IV
Terrestrial Mammals			
Eurasian Badger	Meles meles	31/12/2015	Wildlife Acts 1976 / 2000
Eurasian Red Squirrel	Sciurus vulgaris	13/04/2018	Wildlife Acts 1976 / 2000
European Otter	Lutra lutra	07/04/2017	Wildlife Acts 1976 / 2000 EU Habitats Directive Annex II and IV
Pine Marten	Martes martes	14/04/2016	Wildlife Acts 1976 / 2000 EU Habitats Directive Annex V
West European Hedgehog	Erinaceus europaeus	12/09/2023	Wildlife Acts 1976 / 2000
Invasive species*			
Brown Rat	Rattus norvegicus	02/10/2015	High Impact Invasive Species Regulation S.I. 374 (Ireland)
Fallow Deer	Dama dama	13/04/2016	High Impact Invasive Species Regulation S.I. 374 (Ireland)
Giant Knotweed	Fallopia sachalinensis	29/07/2015	High Impact Invasive Species Regulation S.I. 374 (Ireland)
Harlequin Ladybird	Harmonia axyridis	24/10/2022	High Impact Invasive Species Regulation S.I. 374 (Ireland)

*Only invasive species that are regulated under S.I. 477 were included in the Table.

Common Name	Scientific Name	Date of last record	Designation
Invasive species*			
Himalayan Balsam	Impatiens glandulifera	23/06/2022	High Impact Invasive Species Regulation S.I. 374 (Ireland)
Japanese Knotweed	Reynoutria japonica	21/06/2021	High Impact Invasive Species Regulation S.I. 374 (Ireland)
Three-cornered Garlic	Allium triquetrum	14/02/2023	Medium Impact Invasive Species Regulation S.I. 374 (Ireland)
Water Fern	Azolla filiculoides	20/03/2022	Medium Impact Invasive Species Regulation S.I. 374 (Ireland)

11.7.2 Field Survey Results

11.7.2.1 Habitat Survey

The following section provides details of the field-based assessment that was undertaken for the Site on 10th April 2025 and 21st August 2025. A description of the habitats and features of ecological significance are outlined below and illustrated in Figures 11-5 and 11-6.

Buildings and Artificial Surfaces (BL3)

The northern and southwestern area of the Site comprised artificial surfaces consisting of gravel and stone. Two tracks of artificial surfaces extend through the agricultural grassland and join the spoil heap to the northwest of the Site. There were no species of interest present in this habitat.

Hedgerow (WL1)

Hedgerows traverse the Site and comprise a section of the western perimeter of the Site. These hedgerows have grown over an old stone wall, which is now defunct. The species present include bramble (*Rubus fruticosus*), gorse (*Ulex europaeus*), hawthorn (*Crataegus monogyna*), blackthorn (*Prunus spinosa*) and ivy (*Hedera helix*). The understory comprised navelwort (*Umbilicus rupestris*), nettle (*Urtica dioica*), foxglove (*Digitalis purpurea*), ragwort (*Jacobaea vulgaris*) and bracken (*Pteridium aquilinum*).

Hedgerow / Treeline (WL1 / WL2)

A hedgerow / treeline comprises the north, east and south perimeter of the Site. The species present included hawthorn, blackthorn, bramble, gorse, ash (*Fraxinus excelsior*), holly (*Ilex aquifolium*), Crab apple (*Malus sylvestris*), sessile oak (*Quercus petraea*), pedunculate oak (*Quercus robur*), sycamore (*Acer pseudoplatanus*), grey willow (*Salix cinerea*), alder (*Alnus glutinosa*) and sweet briar (*Rosa rubiginosa*).

The species present in the understory included: hairy willowherb (*Epilobium hirsutum*), fringed willowherb (*Epilobium ciliatum*), foxglove, ivy, creeping buttercup (*Ranunculus repens*), bracken, field speedwell (*Veronica*

persica), hedge bindweed (*Calystegia sepium*), nettle, bitter dock (*Rumex obtusifolius*), false oat grass (*Arrhenatherum elatius*), cleavers (*Galium aparine*), cow parsnip (*Heracleum sphondylium*), creeping thistle (*Cirsium arvense*), marsh hedge nettle (*Stachys palustris*), perennial ryegrass (*Lolium perenne*), ragwort and sessile oak saplings.

Improved Agricultural Grassland (GA1)

The Site is predominantly comprised of improved agricultural grassland. The species present included perennial ryegrass (*Lolium perenne*), Yorkshire fog (*Holcus lanatus*), chickweed (*Stellaria media*), dandelion (*Taraxacum officinale*), nettle, purple deadnettle (*Lamium purpureum*) and bitter dock (*Rumex obtusifolius*).

Recolonising Bare Ground (ED3)

Areas of recolonising bare ground were identified around the spoil heaps in the northern section of the Site and in the western section of the Site. The species present included: perennial ryegrass, ragwort, bitter dock, bramble, willowherb sp., creeping buttercup (*Ranunculus repens*), dandelion and hairy bittercress (*Cardamine hirsuta*).

Spoil and Bare Ground (ED2)

Three large spoil heaps are present in the northern and western sections of the Site. The northern side of the spoil heap on the west of the Site is vegetated.

Species present included ragwort, bitter dock, bramble, willowherb sp., creeping buttercup, dandelion and hairy bittercress. No notable species were identified on the western section of the Site.

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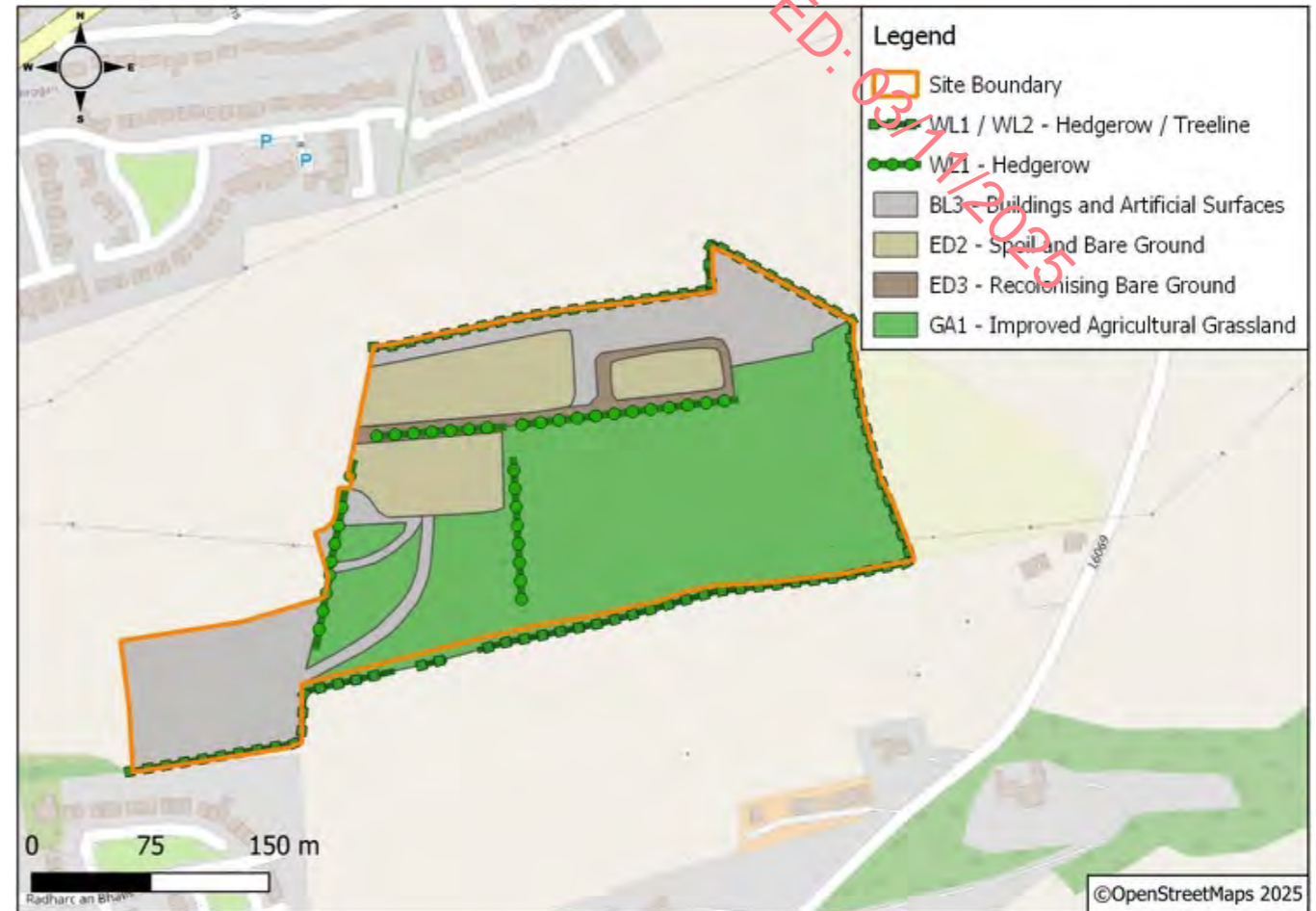


Figure 11-5: Habitat Map

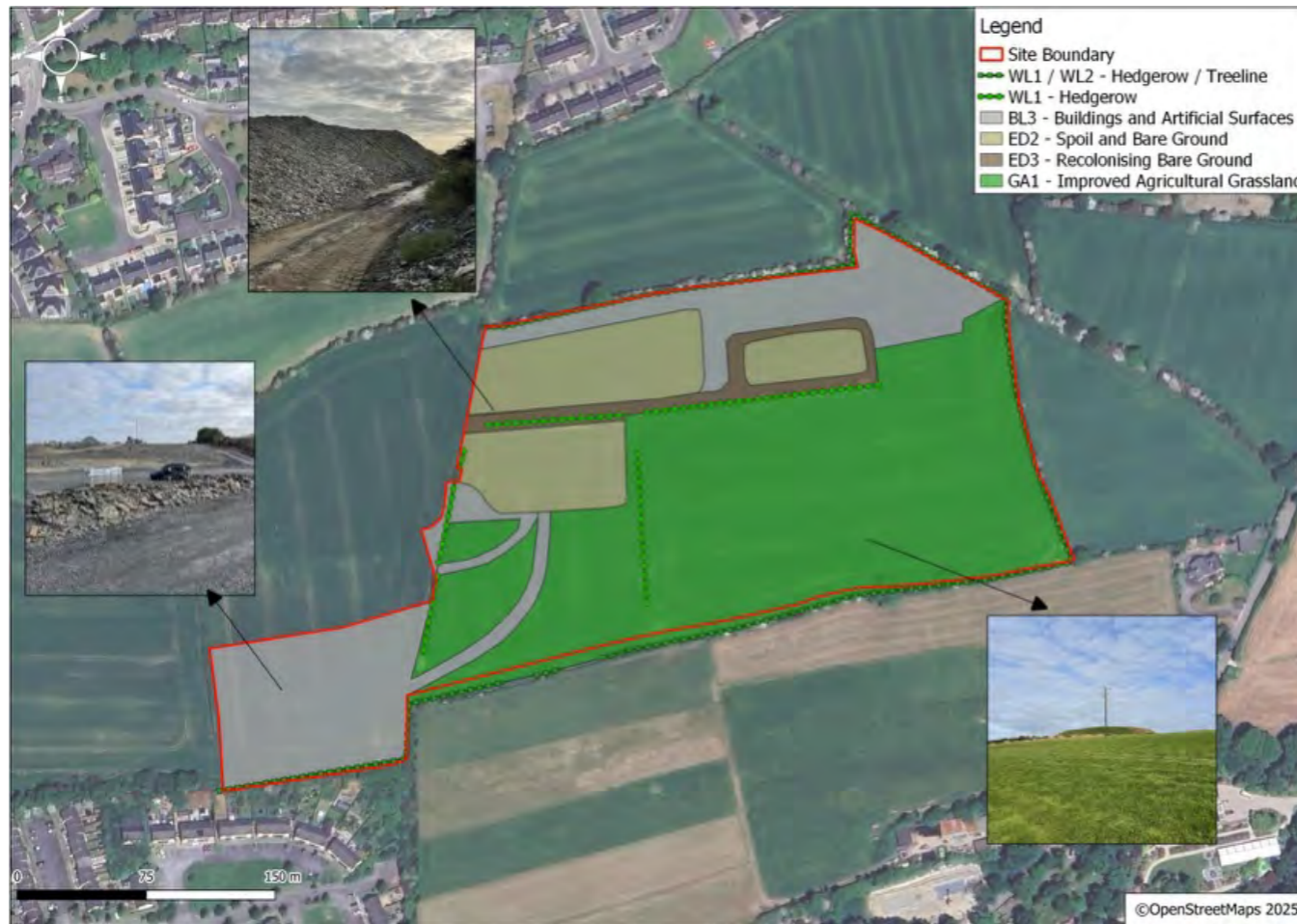


Figure 11-6: Habitat Map with pictures

11.7.2.2 Hedgerow Assessment

A comprehensive hedgerow assessment was undertaken on 21st August 2025 in accordance with the *Hedgerow Appraisal System – Best Practice Guidance on Hedgerow Survey, Data Collation and Appraisal*. All of the hedgerows within the Site correspond to boundary features as shown on the 1st Edition OS maps [41].

For the purposes of the appraisal, the hedgerow / treelines and hedgerows onsite were divided into eight distinct hedgerows / treelines (H1-H8), and each was assessed individually. All hedgerows were mature in character, with varying lengths, heights, and widths. The assessment followed standard hedgerow survey guidelines, considering species composition, structure, condition, connectivity and potential ecological value. A detailed description of these sections is provided below, with their locations illustrated in Figure 11-7 and Figure 11-8.

Table 11-8: Hedgerow Appraisal

Hedgerow / Treeline	Appraisal Description
H1	<p>H1 is a mature hedgerow / treeline located along the northern boundary of the Site. H1 measures ca. 220m in length, with an average height of 2.5m and maximum height of 6m. The average width was ca. 1m.</p> <p>H1 is connected to other hedgerow / treelines within and adjacent to the Site and in the vicinity of the Site, and contributes to landscape connectivity.</p> <p>The woody species composition includes hawthorn, gorse, bramble, ash, blackthorn and holly. The understory species included hairy willowherb, foxglove, ivy, creeping buttercup, bracken, field speedwell, hedge bindweed, fringed willowherb, nettle and bitter dock. No species rich ground flora was identified.</p> <p>An artificial embankment, consisting of topsoil / stone has been excavated alongside H1. The overall condition of this hedgerow is considered good with section of poor condition.</p>
H2	<p>H2 is a well-established mature hedgerow / treeline located on the northeastern boundary of the Site. H2 measures ca. 135m in length, with an average height 4m and maximum height of 7m. has a width of ca. 1.5-2m. The average width was ca. 1.5-2m.</p> <p>H2 is connected to hedgerow / treelines within the Site and in the vicinity of the Site and contributes to landscape connectivity.</p> <p>The woody species consists of hawthorn, holly, bramble, crab apple, blackthorn, ash, sessile oak and sycamore. The understory species included fringed willowherb, foxglove, false oat grass, nettle, cleavers, hedge bindweed, cow parsnip, creeping thistle, ivy and marsh hedge nettle. No species rich ground flora was identified.</p> <p>The ground layer of H2 has been impacted in sections by the topsoil / stone laid against it. The overall condition of this hedgerow is considered good.</p>
H3	<p>H3 is a mature hedgerow / treeline located along the eastern boundary of the Site. H3 measures ca. 155m in length with an average height of 3m and a maximum height of 7m. The average width was ca. 1m.</p> <p>H3 is connected to the hedgerow / treelines onsite and the hedgerow / treelines in the vicinity of the Site.</p> <p>The woody species consist of blackthorn, ash, hawthorn, holly, bramble, gorse, pedunculate oak and sycamore. The understory consists of nettle, ivy, sessile oak saplings, false oat grass, bracken and perennial ryegrass. No species rich ground flora was identified. H3 had some mammal paths present throughout. The overall condition of this hedgerow is considered good.</p>

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Hedgerow / Treeline	Appraisal Description
H4	<p>H4 is a mature hedgerow / treeline located along the southern boundary of the Site. This is longest hedgerow / treeline onsite measuring ca. 390m with an average height of H4 is 2.5m with a maximum height of 8m. The average width was ca 1.5-2m.</p> <p>This hedgerow / treeline was formed from a bank of earth and old stone wall as stones as present underneath. The woody species of H4 include hawthorn, blackthorn, bramble, gorse, holly, sessile oak, ash, sycamore and crab apple. The understory consisted of nettle, ivy, bracken, creeping thistle, cleavers, cow parsnip and marsh hedge nettle. No species rich ground flora was identified.</p> <p>Some evidence of little was present in the form of plastic bags. Mammal paths were evident going through H4 into the agricultural field to the south. There were some gaps in high woody trees in the western section of this hedgerow / treeline. These sections consisted mainly of brambles and were ca. 1m high. The overall condition of this hedgerow is considered good with sections of the hedgerow being considered fair.</p>
H5	<p>H5 is located along the west of the Site. It measures ca. 110m in length with an average height between 1.5 – 2.5m. The average width was ca. 1m.</p> <p>This hedgerow grew over an old stone wall which is now defunct. The woody species consist of bramble, gorse, hawthorn and blackthorn. The understory species present are bracken, nettle, foxglove, perennial ryegrass and creeping buttercup. No species rich ground flora was identified.</p> <p>This is an isolated hedgerow and does not provide connectivity to the wider landscape. A section of this hedgerow has been removed to facilitate the Phase 2 development. Another section has been removed to facilitate an access track to a spoil heap. A spoil heap is located in close proximity to the northern part of this hedgerow. H5 has been impacted in sections by the topsoil / stone and is considered in poor condition.</p>
H6	<p>H6 transects the middle of the Site, running parallel to H1. H6 measures ca. 235m in length and varies from 1.5m in height to a maximum of 2.5m. The average width of was 1-1.5m.</p> <p>This hedgerow grew over an old stone wall which is now defunct. The eastern section of the hedgerow is 2.5m with blackthorn, hawthorn and grey willow. Other species in the shorter sections of the hedgerow are bramble and gorse. The understory consists of nettle, ragwort and ivy. No species rich ground flora was identified.</p> <p>This is an isolated hedgerow. A small gap is present in the middle of H6. The stockpile to the south is ca. 2m from H6 and the stockpiles to the north of H6 are ca. 3m away H6 has been impacted in sections by the topsoil / stone and is considered in poor condition. .</p>

Hedgerow / Treeline	Appraisal Description
H7	<p>H7 runs from north to south in the centre of the Site. It measures ca. 80m in length with an average height of 1.5m. The average width was ca. 1m..</p> <p>This hedgerow grew over an old stone wall which is now defunct. This hedgerow has no canopy layer. The species composition is gorse, bramble, ivy and sweet briar. The understory consisted of nettle and grasses.</p> <p>This is an isolated hedgerow and does not provide connectivity to the wider landscape. An abundance of rabbit burrows are present throughout H7 and is considered to be in good condition.</p>
H8	<p>H8 was assessed from a distance as there was a fence and berm in front of it. This hedgerow / treeline is ranges from mature to semi mature in nature and situated along the southwestern boundary of the Site. H8 measured ca. 135m in length with an average height of 3-4m. The average width was ca. 1m.</p> <p>The species present included alder, oak, gorse, silver birch, ash, rowan and bramble. It was noted that the ash have ash dieback infection. H8 is linked to the hedgerow / treelines onsite and the hedgerow / treelines in the vicinity of the Site.</p> <p>A sod and stone embankment was noted along this hedgerow and is considered to be in fair condition</p>

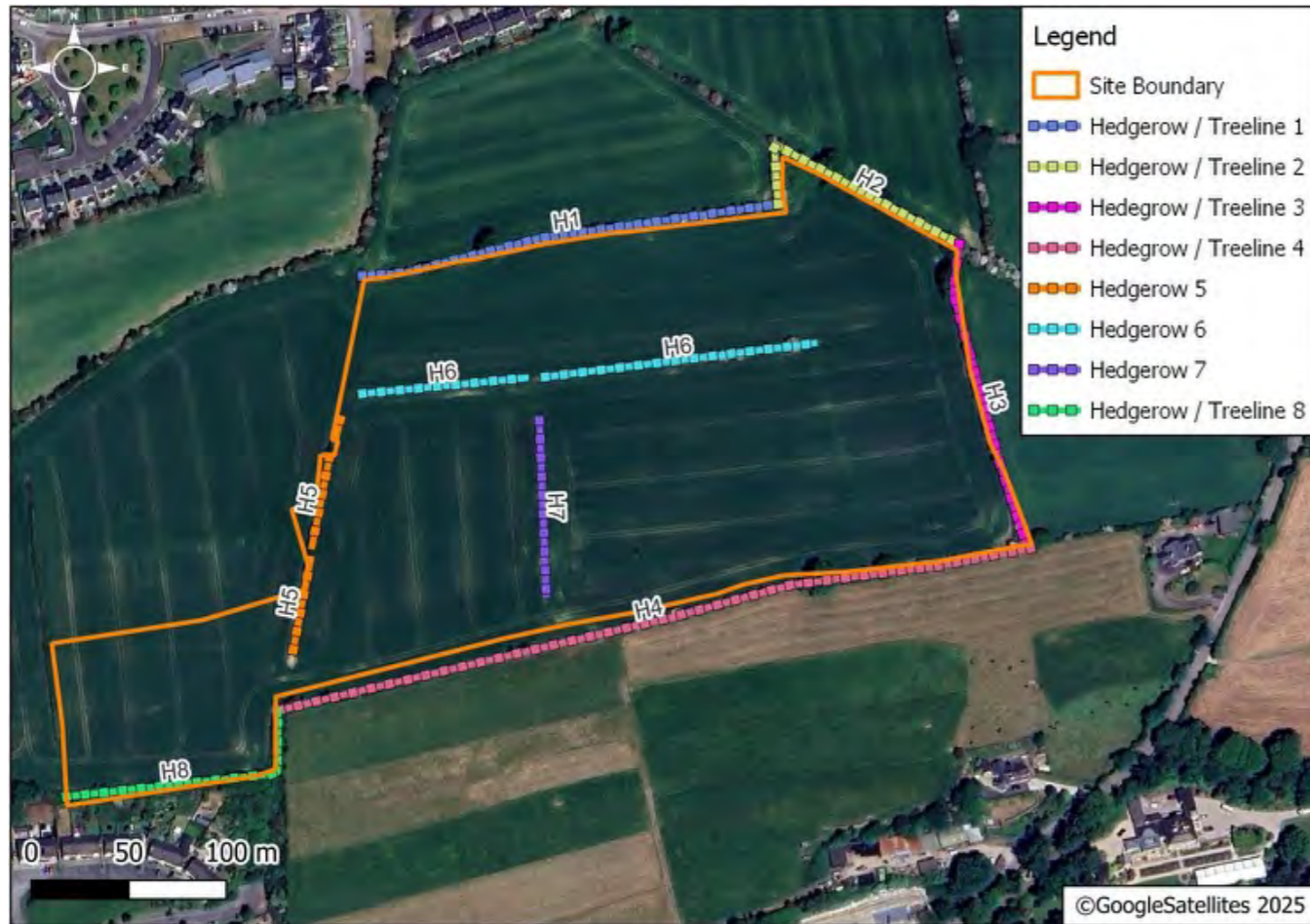


Figure 11-7: Hedgerow locations



Figure 11-8: Hedgerow locations with pictures

11.7.2.3 Notable / Protected Species

Flora

No plant species protected under the Flora Protection Order ('FPO') were recorded onsite. Additionally, the NBDC did not hold records of plant species protected under the FPO in the last 10 years at the time of writing this report [19].

Amphibians

The NBDC held records of common frog within 2km of the Site in the last 10 years [19]. However, no amphibians were recorded onsite during the surveys within the drainage ditches or any other habitats. Amphibians require static or slow-moving water bodies in order to successfully lay their eggs and tend to favour shallow areas where they are less susceptible to being preyed on by fish.

No suitable waterbodies for breeding amphibians are on-site or in close proximity to the Site. Badger

The NBDC held records of badger within 2km of the Site in the last 10 years [19]. In addition, a badger scat was noted on-site during a Site visit.

However, the Site itself is not considered to be suitable for the construction of badger setts given the high levels of anthropogenic disturbances on-site and immediate surroundings due to ongoing construction of the Bandon Masterplan. Nonetheless, as badgers are common and widespread across Ireland, it is likely that the Site may be utilised by this species for foraging and commuting purposes.

Bats

NBDC Records and Landscape Suitability

The NBDC held records of three out of the nine bat species in Ireland within 2km of the Site in the last

10 years - daubenton's bat, common pipistrelle and leisler's bat [19]. As per the NBDC landscape suitability metric, the Site and surrounding area is considered to be of Moderate - High suitability for bats (Landscape Suitability Metric Score: 28 – 36) [19].

Please note the landscape suitability metric is calculated using a desk-based model only and is a regional-scale assessment. The metric is not tailored to local site-specific ecological features or conditions but rather averages over a much larger landscape. The metric is an average score; it does not guarantee that the Site itself is of Moderate - High bat suitability.

The predictor layers are constructed from this database, ranging in scale from 0.5km to 20.5km, which shows suitable regions for each species to exist but makes large generalisations of species occurrence rather than site-specific detail obtained during field surveys. The metric is not a substitute for a Site visit to assess bat suitability by a suitably qualified and experienced ecologist following the current best practice guidelines [42].

Following the Site visit, it was concluded that the suitability metric does reflect the current site-specific conditions.

Bat Commuting and Foraging Suitability

Bats are known to follow linear features as they commute through the landscape. Therefore, the well-established hedgerows / treelines and extending into the adjacent fields provide suitable foraging habitat and connectivity to the wider landscape for commuting bats. The area of agricultural grassland onsite also provides suitable foraging habitat for bats.

Bat Roost Suitability

Bats are known to roost in mature trees and buildings with suitable access points and potential roost features ('PRF's). A ground-level tree assessment and preliminary roost assessment were undertaken as part of the Site walkover to assess the Site for bat roost suitability.

Proximity to ongoing construction and traffic was also taken into account when determining the suitability of PRFs, as noise can negatively affect bat activity at over 20m away from noise sources [43]. Overall, no PRFs were identified within trees present within the Site.

As a precautionary measure and following the request issued by the Council, which was subsequent to a Section 32B meeting which took place on the 9th July 2025 via MS Teams, bat emergence and NBW surveys were undertaken.

NBW Results

Dusk 18/08/2025

Sunset was at 20:53.

VP1 / T1

No bats were observed during the survey. The first bat recorded at VP1 was a Leisler's bat ('LB') at 21:29. Another LB was recorded at 21:33. A soprano pipistrelle ('SP') was recorded at 21:36. A common pipistrelle ('CP') was recorded at 21:45. LB were recorded at 21:51 and 21:52.

T1 started at 21:53. A CP was recorded in the northeast of the Site at 22:10. At 22:36 a LB was recorded along the northern boundary of the Site. A SP was recorded along the northern boundary at 22: 48. See Figure 11-9 for the location of the recordings.

VP2 / T2

No bats were observed during the survey. The first bat recorded at VP2 was a SP at 21:25. A CP was recorded at 21:35 and a LB was recorded at 31:36. CP was the only bat recorded during the rest of the VP section of the survey. These recordings were at 21:38, 21:44, 21:46 and 21:49.

T2 started at 21:53. A LB was recorded at 21:59 along the southern boundary of the Site and at 22:02 in the southeast corner. SP was recorded at 22:19 and 22:41 along the internal hedgerows. A CP was recorded at 22:42 in the west of the Site. See Figure 11-9 for the location of the recordings.

Dusk 11/09/2025

Sunset was at 20:00.

VP1 / T1

No bats were observed during the survey. LB was recorded at 20.31. Two SP were recorded at 20.44 and 20.48.

T2 started at 21.00. There were two recordings of LB at 21.34 and 21.46 at the hedgerow / treelines in the eastern and northeastern sections of the Site respectively.

See Figure 11-9 for the location of the recordings.

VP2 / T2

No bats were observed during the survey. The only bat recorded at VP2 was a CP at 20.37.

T2 started at 21:00. A SP was recorded at 21:17 in the southeast section of Site. A LB was recorded at 21.46 near the centre of the Site. See Figure 11-9 for the location of the recordings.

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Figure 11-9: Bat Survey Results

The following bats were recorded during the dusk NBW survey:

- Leisler’s bat, Soprano pipistrelle and common pipistrelle were recorded. These species are relatively widespread and the most frequently encountered species in Ireland;
- No bats were roosting onsite;
- The bats were not recorded within 15 minutes of sunset, indicating that a roost is not in close proximity to the Site.

Birds

Breeding Birds

The hedgerow / treelines onsite are considered suitable for a range of nesting birds. Three breeding bird surveys were undertaken on 15th May, 28th May and 10th June 2025. Table 11-8 contains a summary of birds recorded onsite and their status according to the Birds of Conservation Concern in Ireland(‘BoCCI’), which is the third assessment of the status of all regularly occurring birds on the island of Ireland [32].

A total of 20 species were recorded onsite or were flying over the Site. Of these species, 13 were observed displaying territorial behaviours and were classified as ‘possible breeding’, and one was recorded as ‘confirmed breeding’. Six were recorded as ‘non-breeding’.

Of the 20 species recorded:

- 11 were Green BoCCI listed non-annex species – blackbird (*Turdus merula*), Blue tit (*Cyanistes caeruleus*), chaffinch (*Fringilla coelebs*), dunnoek (*Prunella modularis*), great tit (*parus major*), hooded crow (*Corvus corax*), jackdaw (*Corvus mandala*), song thrush (*Turdos philomelius*), robin (*Erithacus rubeula*), wood pigeon (*Columna livia*), and wren (*Troglodytes troglodytes*);
- Eight were Amber BoCCI listed – goldcrest (*Regulus regulus*), herring gull (*Larus argentatus*), house martin (*Delichon urbicum*), linnnet (*Carduelis cannabina*), little gull (*Larus minutus*), starling (*Sturnus vulgaris*), swallow (*Hirundo rustica*) and wheatear (*Oenanthe Oenanthe*); and,
- One was red BoCCI listed - yellowhammer (*Emberiza citronella*).

One large nest was observed in a holly tree in the hedgerow / treeline in the southwest corner of the

Site. However, no activity bird was recorded in this nest during the breeding bird surveys.

Details on the species that were recorded and notes of their behaviour during the surveys are provided in Table 11-8.

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Table 11-9: Breeding Bird Survey Results

BoCCI Status	Species	Latin Name	Number Recorded			Notes	Breeding Status
			Visit 1	Visit 2	Visit 3		
GREEN	Blackbird	<i>Turdus merula</i>	7	2	4	<p>Visit 1: Two individuals were flushed from hedgerow / treelines: one from the northeast corner of the Site and one from the southwest corner of the Site. One individual was noted calling from the hedgerow / treeline on the eastern border of the Site. Individuals were observed foraging within the improved agricultural grassland in the central and southern sections of the Site. A male and female were also observed foraging within the grassland and hedgerow / treeline in the South of the Site.</p> <p>Visit 2: One individual male was observed flying, foraging and then perching on a soil heap in the northwest corner of the Site. One individual was noted calling from the hedgerow / treeline in the east of the Site.</p> <p>Visit 3: One male individual was noted calling and perched within the hedgerow / treeline on the northeast corner of the Site. One male individual was observed flying over the improved agricultural grassland to the east of the Site. One male individual was also observed flying over the hedgerow / treeline on the southern Site boundary and perching on a telephone wire. One further male individual was observed flying into a tree on the southern boundary of the Site to perch.</p>	Possible Breeding
GREEN	Blue Tit	<i>Cyanistes caeruleus</i>	0	5	3	<p>Visit 1: No individuals were recorded during this survey.</p> <p>Visit 2: One individual was noted calling from within the hedgerow / treeline on the southeastern corner of the Site. Nearby, 3 chicks were observed calling from within hedgerow / treeline. One further individual was observed perched on the hedge in the central area of the Site. Visit 3: One individual was noted calling from the hedgerow / treeline on the eastern border of the Site. Two individuals were noted calling from within hedgerow / treeline on the southern boundary of the Site.</p>	Confirmed Breeding
GREEN	Chaffinch	<i>Fringilla coelebs</i>	5	2	4	<p>Visit 1: Three individuals were noted calling from within the hedgerow / treelines on the northern, northeastern and southern boundaries of the Site. One individual was noted calling from within the hedge which ran through the centre of the Site. One individual was also observed perched in the hedgerow / treeline on the eastern boundary of the Site.</p> <p>Visit 2: Two individuals were noted calling from within the hedgerow / treeline on the eastern boundary of the Site. Visit 3: One individual was noted calling from the hedgerow / treelines in the northeast corner of the Site. Two individuals were also noted calling from the hedgerow / treeline on the eastern boundary of the Site. One further individual was observed flying over the improved agricultural grassland and perching in the hedgerow / treeline on the southern boundary of the Site.</p>	Possible Breeding
GREEN	Dunnock	<i>Prunella modularis</i>	2	3	1	<p>Visit 1: One individual was noted calling from the hedgerow / treeline located on the western boundary of the Site. One individual was observed foraging over the recolonising bare ground in the northeast section of the Site.</p> <p>Visit 2: One individual was noted calling from the hedgerow / treeline on the eastern boundary of the Site. One individual was flushed from within the hedge located to the centre of the Site. One individual was observed foraging over the bare ground located in the centre of the Site.</p> <p>Visit 3: One individual was noted calling from the hedgerow / treeline on the northern boundary of the Site.</p>	Possible Breeding
GREEN	Great Tit	<i>Parus major</i>	2	0	0	<p>Visit 1: One individual was noted calling from the hedgerow / treeline in the northeast corner of the Site. One individual was observed perched in the hedge within the central area of the Site.</p> <p>Visit 2: No individuals were recorded during this survey.</p> <p>Visit 3: No individuals were recorded during this survey.</p>	Possible Breeding

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BoCCI Status	Species	Latin Name	Number Recorded			Notes	Breeding Status
			Visit 1	Visit 2	Visit 3		
GREEN	Hooded Crow	<i>Corvus corax</i>	2	2	2	<p>Visit 1: One individual was flushed from the hedgerow / treeline located on the northeastern Site boundary. One individual was observed flying over the improved agricultural grassland in the south- central section of the Site.</p> <p>Visit 2: One individual was observed perched on a spoil heap in the northwest corner of the Site. One individual was observed perched in a tree in the southwest corner of the Site. One individual was observed flying south over the improved agricultural grassland located in the centre of the Site.</p> <p>Visit 3: Two individuals were flushed from the hedge which was located within the centre of the Site.</p>	Non-breeding.
GREEN	Jackdaw	<i>Corvus Non-mandula</i>	9	5	2	<p>Visit 1: Individuals were observed flying over numerous parts of the Site including the spoil heaps in the northwest of the Site, the improved agricultural grassland and spoil heaps in the southwest of the Site and the improved agricultural grassland in the southeast of the Site. One individual was observed foraging and flying over the recolonising bare ground in the northeast of the Site.</p> <p>Visit 2: Two individuals were observed foraging with the spoil heap in the northwest corner of the Site. One individual was observed flying over the improved agricultural grassland in the south of the Site. Another two individuals were observed perched on telephone wires in the southeast corner of the Site.</p> <p>Visit 3: Individuals were observed flying over the improved agricultural grassland in the south of the Site and the hardstanding in the southeast corner of the Site.</p>	breeding
GREEN	Song Thrush	<i>Turdus</i>	4	0	0	<p>Visit 1: One individual was noted calling from the hedgerow / treeline in the southeast corner of the Site. Three individuals were observed perched in the hedgerow / treeline in the southwest corner of the Site. Visit 2: No individuals were recorded during this survey. Visit 3: No individuals were recorded during this survey.</p>	Possible
GREEN	Robin	<i>Erithacus rubeula</i>	5	3	3	<p>Visit 1: Individuals were noted calling from hedgerow / treelines on the northern, northeastern, eastern, and southeastern boundaries of the Site. Visit 2: Two individuals were noted calling from the hedgerow / treeline on the northern boundary of the Site. One individual was noted calling from the hedgerow / treeline on the eastern boundary of the Site Visit 3: Individuals were noted calling from the hedgerow / treeline to the east and south of the Site and observed perching on the hedgerow / treeline bounding the south of the Site.</p>	Possible Breeding
GREEN	Wood Pigeon	<i>Columba livia</i>	3	9	4	<p>Visit 1: Three individuals in all were flushed from hedgerow / treelines on the eastern, southeastern and southern boundaries of the Site.</p> <p>Visit 2: One individual was flushed from the hardstanding in the northeast corner of the Site. Two individuals were observed foraging in the spoil heap in the same section of the Site. One individual was flushed from the hedgerow / treeline on the northeast boundary of the Site and flew west. Five individuals were observed perched in the hedge running through the centre of the Site and flew north.</p> <p>Visit 3: Two individuals were observed flying and perching within the hardstanding. Two further individuals were flushed from the within the hardstanding with one flying south.</p>	Non-breeding
GREEN	Wren	<i>Troglodytes troglodytes</i>	2	2	3	<p>Visit 1: Individuals were noted calling from the hedgerow / treelines on the northern and northern eastern boundary of the Site.</p> <p>Visit 2: Two individuals were noted calling from the hedgerow / treeline on the northern boundary of the Site.</p> <p>Visit 3: Individuals were noted calling from within the hedgerow / treelines on the eastern and southeastern Site boundaries.</p>	Possible Breeding
AMBER	Goldcrest	<i>Regulus regulus</i>	0	1	0	<p>Visit 1: No individuals were recorded during this survey. Visit 2: One individual was noted calling from within the hedgerow / treeline in the southeast corner of the Site. Visit 3: No individuals were recorded during this survey.</p>	Possible Breeding

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BoCCI Status	Species	Latin Name	Number Recorded			Notes	Breeding Status
			Visit 1	Visit 2	Visit 3		
AMBER	Herring Gull	<i>Larus Non-argentatus</i>	1	1	2	<p>Visit 1: One individual was observed flying over the improved agricultural grassland in the southern section of the Site. Another individual was seen flying high over the Site.</p> <p>Visit 2: One individual was observed flying north to south over the improved agricultural grassland to the south of the Site.</p> <p>Visit 3: Two individuals were observed flying south over the improved agricultural grassland to the south of the Site. breeding</p>	Non-breeding
AMBER	House Martin	<i>Delichon urbicum</i>	0	0	10	<p>Visit 1: No individuals were recorded during this survey. Visit 2: No individuals were recorded during this survey. Visit 3: Five individuals were observed foraging and flying within the hardstanding and spoil heaps within the northeast section of the Site. Five individuals were observed foraging and flying within the improved agricultural grassland and bare ground in the south of the Site.</p>	Non-breeding
AMBER	Linnet	<i>Carduelis cannabina</i>	0	1	2	<p>Visit 1: No individuals were recorded during this survey. Visit 2: One individual was noted calling from within the hedgerow / treeline in the northeastern boundary of the Site. Visit 3: Two individuals were observed foraging and flying within the improved agricultural grassland and spoil heaps within the centre of the Site.</p>	Posasible Breeding
AMBER	Little Gull	<i>Larus minutus</i>	4	0	0	<p>Visit 1: Four individuals were noted calling and observed flying over the improved agricultural grassland in the centre of the Site. Visit 2: No individuals were recorded during this survey. Visit 3: No individuals were recorded during this survey.</p>	Possible Breeding
AMBER	Starling	<i>Sturnus vulgaris</i>	28	24	0	<p>Visit 1: Four individuals were noted calling and perched on the hedgerow / treeline on the southern boundary of the Site and were also observed foraging within the southern section of the Site. One individual was noted calling and was flushed from the hedgerow / treeline on the southwest boundary of the Site. Individuals were also observed flying over the spoil heaps and improved agricultural grassland in the northwest section of the Site, one carrying nesting material and another carrying food. Ca. 20 individuals were observed foraging within the improved agricultural grassland located in the centre of the Site. One individual was also observed perched and calling from the hedgerow in centre of Site.</p> <p>Visit 2: Two individuals were observed flying in a southerly direction over the improved agricultural grassland and the hardstanding in the northeast of the Site. Five individuals were observed perched on telephone wires in the southeast corner of the Site. Three individuals were flushed from within the improved agricultural grassland in the south of the Site, of which one was carrying food, and flew in a southerly direction. 14 individuals were flushed from within the improved agricultural grassland inside the southern boundary of the Site and flew in a northeasterly direction.</p> <p>Visit 3: No individuals were recorded during this survey.</p>	Possible Breeding
AMBER	Swallow	<i>Hirundo rustica</i>	2	9	4	<p>Visit 1: Two individuals were noted flying over the improved agricultural grassland in the southwest section of the Site.</p> <p>Visit 2: Four individuals were observed flying over the improved agricultural grassland and bare ground in the northeast corner of the Site. Four individuals were also observed foraging over the improved agricultural grassland in the southeast corner of the Site. One individual was observed flying inside the southern boundary of the Site.</p> <p>Visit 3: One individual was observed flying and foraging within the hardstanding and spoil heaps in the northeast corner of the Site. Three individuals were observed foraging and carrying nest materials withing the improved agricultural grassland and bare ground in the southwest of the Site.</p>	Possible Breeding
AMBER	Wheatear	<i>Oenanthe Oenanthe</i>	4	0	0	<p>Visit 1: Four individuals were noted foraging within the improved agricultural grassland in the western section of the Site. Visit 2: No individuals were observed during this survey. Visit 3: No individuals were observed during this survey.</p>	Possible Breeding

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BoCCI Status	Species	Latin Name	Number Recorded			Notes	Breeding Status
			Visit 1	Visit 2	Visit 3		
RED Listed	Yellowhammer	<i>Emberiza citrinella</i>	1	0	1	<p>Visit 1: One individual was noted calling from the hedgerow / treeline located on the northeastern corner of the Site.</p> <p>Visit 2: No individuals were observed during this survey.</p> <p>Visit 3: One individual was noted calling from the hedge which ran through the central section of the Site.</p>	Possible breeding.

Wintering Birds

The Site was not deemed suitable for wintering birds based on the anthropogenic disturbance on-site and adjacent construction. Furthermore, there are no posts and minimal suitable trees that could be used for potential roosting wintering birds. Additionally, the Site would not be considered a good foraging habitat for winter birds due to the lack of shelter, low vegetation cover and the agricultural grassland being species poor.

Otter

The NBDC held records for otter within 2km of the Site in the last 10 years [19]. The Site is not considered to be suitable for otter given the lack of suitable waterbodies or drainage ditches onsite or in close proximity to the Site.

Hedgehogs and Pygmy Shrews

The NBDC held records of hedgehog within 2km of the Site within the last 10 years [19]. No records of pygmy shrew were recorded by the NBDC within 2km of the Site [19].

Hedgehogs and pygmy shrews are common and widespread species that typically occur in scrub, woodland, and rank grassland habitats. The hedgerow / treeline bounding the Site has the potential to support foraging and commuting hedgehogs and pygmy shrews. Although no direct evidence of this species was recorded onsite, it should be noted that a number of small mammal paths were identified that may be utilised by this species.

Invasive Species

The NBDC held records of Brown Rat, Fallow Deer, Giant Knotweed, Harlequin Ladybird, Himalayan Balsam, Japanese Knotweed, Three-cornered Garlic and Water Fern within 2km of the Site in the last 10 years. These are non-native, highly invasive plant species subject to restrictions under European Union (Invasive Alien Species) Regulations 2024 (S.I. No. 374/2024) [31].

Additionally, a medium impact invasive species – sycamore was recorded onsite. This species is not subject to regulations. No other invasive species were recorded onsite.

Other Species

The NBDC held records for red squirrel and pine marten within 2km of the Site in the last 10 years [19]. Red squirrel require coniferous and deciduous woodland for drey construction. No evidence of squirrels in the form of dreys, feeding remains or visual sightings were noted during the Site surveys.

Pine Martens display a preference for woodland habitats, especially conifer trees, to forage and shelter but have also been recorded in scrub, crags and rocky areas. Pine marten tend to avoid open areas which are devoid of suitable cover. The habitats onsite are not considered to be suitable for pine marten.

Evidence of rabbits in the form of burrows and droppings were noted on-site, along with sighting of rabbits during the breeding bird surveys. Mammal paths were noted in the southern section of the Site. A fox was noted commuting through the Site during the hedgerow assessment. The hedgerow /

treelines provide suitable foraging habitats and connectivity to the wider landscape for a range of commonly occurring species.

11.8 The ‘Do Nothing’ Scenario

Article IV, of the EIA Directive states that the description of the baseline scenario should include:

“An outline of the likely evolution thereof without implementation of the project as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge.”

Given the location and nature of the onsite habitats as described above, it is not considered that they are of significant conservation value. Should the Site be left undeveloped, it is considered likely that the site would remain in use for agricultural practices. Given this probability, it is likely that the site would be managed in the same way and consist of species poor agricultural grassland with hedgerow/ treelines.

11.9 Potential Significant Effects

Based on the methodology that is set out in Section 11.4, Table 11-10 sets out the findings of the evaluation of important and legally protected receptors. Each receptor is assessed and a scoping justification for each receptor is provided for the Construction and Operational Phases of the Proposed Development.

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Table 11-10: Valuation of Potential Ecological Receptors

Potential Biodiversity Receptor	Relevant Legislation	Valuation	Scoping Justification	Scoping Result
Protected Sites				
European Designated Sites	European Communities (Natural Habitats) Regulations 1997 (as amended)	Internationally designated sites for conservation.	<p>A Stage 1: Appropriate Assessment - Screening Report (AA) has been prepared as part of the overall planning application in line with Objective BE 15-2 of the CCDP [37]. The AA concluded that the Proposed Development would not cause any adverse effects on any European designated sites or any of their designated features of interest.</p> <p>For full details on the assessment of impacts to European designated sites, refer to the AA submitted as part of planning. Progression to Stage 2 of the Appropriate Assessment process (i.e., Natura Impact Statement) was not considered necessary</p>	<p>European Designated Sites have been scoped in for further consideration.</p> <p>Refer to the AA report submitted as part of planning for further details.</p>
Nationally Designated Sites	Wildlife Act 2000 (as amended)	Nationally designated sites for conservation.	Nationally designated conservation sites within 5km of the Site were investigated as per Objective BE 15-2 of the CCDP [37]. However, two proposed Natural Heritage Areas (pNHAs) are located within 5km of the Site. Impacts on this pNHA can be discounted given the intervening urban land, the lack of hydrologically connection and the distance separating this site from the Proposed Development.	Nationally Designated Sites have been scoped out from further consideration.
Habitats				
Artificial Surfaces (BL3)	N/A	Low Local Value	This habitat is of low ecological value and any alteration / loss of this habitat is not considered to be significant. Therefore, the impact of the Proposed Development on this habitat is not significant and this receptor has been scoped out from further consideration	Artificial Surfaces have been scoped out from further consideration.
Hedgerow / Treeline (WL1 / WL2)	Wildlife Act 2000 (as amended)	Moderate Local Value	<p>In order to facilitate the Proposed Development, sections of hedgerow groups will be removed onsite. A total of 233m of hedgerow will be removed along the entirety of Section H5 and a section along H6. A hedgerow appraisal was completed as part of the Site, with detailed description of each section illustrated in Figure 11-7 and Figure 11-8 in section 11.7.2 above.</p> <p>The appraisal confirmed that no notable or protected species were recorded within these hedgerow sections, which were assessed as being of good to fair condition.</p> <p>Furthermore, these hedgerows had been subject to recent disturbance associated with adjacent construction activities, including topsoil placement, and the creation of new access tracks, which has further reduced their ecological value due to potential impact on their root protection area.</p> <p>It should be noted that H7 is an isolated hedgerow, with no current connectivity to the wider area however this hedgerow will be fully retained and protected during the construction phase of the Proposed Development.</p>	Hedgerow / Stonewall – defunct has been scoped in for further consideration

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Potential Biodiversity Receptor	Relevant Legislation	Valuation	Scoping Justification	Scoping Result
Protected Sites				
Hedgerow / Treeline (WL1 / WL2)	Wildlife Act 2000 (as amended)	Moderate Local Value	<p>As part of the construction works, protective measures will be implemented to ensure all retained trees are protected during the construction phase as outlined in Section 11.10.2.3.</p> <p>Additionally, restrictions apply with regards to the time of year in which vegetation can be cut (see Nesting Birds below). Therefore, any vegetation clearance will need to take account of protected species.</p> <p>To compensate for the loss of vegetation as part of the Proposed Development of native hedgerow, compensatory and supplementary planting will be implemented to strengthen and replace the existing linear habitats onsite. A total of 1259m of hedgerow will be retained and protected while ca. 66m of additional hedgerow will be planted onsite. As part of Landscape works onsite, H7, currently isolated will be connected to the wider hedgerow network through additional planting and improve the overall condition of this hedgerow.</p> <p>Further compensatory planting throughout the Site is proposed as part of the Landscape Plan prepared by Simon Ronan Landscape Architects and submitted as part of the planning application.</p>	Hedgerow / Stonewall – defunct has been scoped in for further consideration
Hedgerow / Treeline	Wildlife Act 2000 (as amended)	Moderate Local Value	<p>In order to facilitate the Proposed Development, sections of hedgerow groups will be removed onsite. A total of 233m of hedgerow will be removed along the entirety of Section H5 and a section along H6. A hedgerow appraisal was completed as part of the Site, with detailed description of each section illustrated in Figure 11-7 and Figure 11-8 in section 11.7.2 above.</p> <p>Hedgerow / Treeline H1, H2, H3, H4, a section of H6, H7, and H8 will be fully retained and protected.</p> <p>This is in line with Objective BE 15-6 and BE15-8 of the CCDP [37].</p> <p>It should be noted that sections of H1 and H2 have experienced ground layer impacts due to the placement of topsoil and stone, which may have affected their root protection areas. The overall condition of these hedgerows is considered poor to good.</p> <p>Therefore, to ensure no further impacts occur, as part of the construction works, protective measures will be implemented to ensure all retained trees are protected during the construction phase as outlined in Tree Survey and Protection Measures prepared by GeoTree as part of the Tree Appraisal and Arboricultural Assessment.</p> <p>Additionally, restrictions apply with regards to the time of year in which vegetation can be cut (see Nesting Birds below). Therefore, any vegetation clearance will need to take account of protected species.</p> <p>To compensate for the loss of vegetation as part of the Proposed Development</p>	Hedgerow / Treeline has been scoped in for further consideration

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Potential Biodiversity Receptor	Relevant Legislation	Valuation	Scoping Justification	Scoping Result
Protected Sites				
Hedgerow / Treeline	Wildlife Act 2000 (as amended)	Moderate Local Value	<ul style="list-style-type: none"> Overall, 1,259 m of hedgerow will be retained and protected; An additional 66m of hedgerow will be planted will be established to enhanced connectivity; and, A total of 820 trees will be planted, comprising woodland and street trees. All planting and habitat management proposals are detailed in the Landscape Plan, which should be referred to for full specifications. 	Hedgerow / Treeline has been scoped in for further consideration
Improved Agricultural Grassland (GA1)	N/A	Low Local Value	<p>This habitat will be removed in order to facilitate the Proposed Development. This is a common habitat type throughout Ireland and provides limited ecological value. This habitat is not of significant conservation value and the loss is not considered significant.</p> <p>Furthermore, additional planting as part of the Proposed Development will be undertaken to compensate for the loss of vegetation removed. See Landscaping Plan for full details. Therefore, the impact of the Proposed Development on improved agricultural grassland is not significant and this receptor has been scoped out from further consideration.</p>	Improved Agricultural Grassland has been scoped out from further consideration
Recolonising Bare Ground (ED3)	N/A	Low Local Value	<p>This habitat is of low ecological value, and the loss of this habitat is not considered to be significant.</p> <p>Therefore, the impact of the Proposed Development on this habitat is not significant. This receptor has been scoped out from further consideration.</p>	Recolonising Bare Ground has been scoped out from further consideration
Spoil and Bare Ground (ED2)	N/A	Low Local Value	<p>The spoils heaps onsite will be removed to facilitate the Proposed Development. This habitat is of low ecological value and the loss of this habitat is not considered to be significant.</p> <p>Therefore, the impact of the Proposed Development on this habitat is not significant. This receptor has been scoped out from further consideration</p>	Spoil and Bare Ground has been scoped out from further consideration
Flora and Fauna				
Protected Flora	Flora (Protection) Order 2022 (S.I. No. 235/2022)	N/A	<p>No plant species protected under the Flora Protection Order were noted onsite. Overall, the impact of the Proposed Development on protected flora is considered unlikely to be significant. Therefore, this receptor has been scoped out from further consideration.</p>	Flora species have been scoped out from further consideration.
Amphibians	Wildlife Act 2000 (as amended) EU Habitats Directive Annex	Low Local Value	<p>The NBDC held records of common frog within 2km of the Site in Site in the past 10 years [19]. The Site is not considered to be of significant value to amphibians given the fact that no evidence of amphibians was identified onsite and no suitable waterbodies / drainage ditches for breeding amphibians were recorded.</p> <p>However, should any amphibians be discovered onsite during the construction works, a suitably qualified ecologist will be consulted for advice and any works that have the potential to impact on amphibians will cease until appropriate mitigation measures are in place. However, no species-specific mitigation is required at this stage and this receptor has been scoped out from further consideration.</p>	Amphibians have been scoped out from further consideration.

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Potential Biodiversity Receptor	Relevant Legislation	Valuation	Scoping Justification	Scoping Result
Protected Sites				
Badgers	Wildlife Act 2000 (as amended)	Low Local Value	<p>The NBDC recorded badgers within 2km of the Site in the past 10 years [19]. Field surveys confirmed evidence of badger activity including badger scat. No setts were identified within the Site.</p> <p>Overall, the Site is considered to be suboptimal for badger sett construction given the close proximity of the Site to adjacent construction and anthropogenic disturbance. The Site is considered to be suitable for commuting and foraging badgers.</p> <p>The habitats that will be directly impacted by the Proposed Development will be of relatively low suitability for sett creation, and the majority of hedgerows and treelines, which provide key foraging and commuting routes, will be retained.</p> <p>However, given that badger utilise the site for foraging and commuting purposes and given the suitable habitats within the wider area for badger and other small mammals, and the potential for this species to become entrapped in trenches / excavations, appropriate measures to prevent impacts on badger will be required.</p> <p>Therefore, mitigation measures will be implemented for badgers as part of the Proposed Development, see Section 5.6.</p>	Badgers have been scoped in for further consideration
Bats	Wildlife Act 2000 (as amended) EU Habitats Directive Annex IV	Moderate Local Value	<p>The NBDC held records of three out of the nine bat species in Ireland within 2km of the Site in the last 10 years - daubenton's bat, common pipistrelle and leisler's bat [19].</p> <p>Roosting Bats</p> <p>As part of the ground-level tree assessment and bat roost suitability assessment, it was established that no trees within the hedgerows / treelines were identified with bat roost potential. In order to facilitate the Proposed Development, sections of onsite hedgerow will be removed. There are no potential bat roost features in these hedgerows.</p> <p>The majority of hedgerow / treelines onsite are to be retained as part of the Proposed Development. However, ca. 233m of hedge / treeline will be removed to facilitate the Proposed Development. Furthermore, none of the trees / hedgerow to be removed had potential bat roost features.</p> <p>Commuting and Foraging</p> <p>The ground-based assessment and nighttime bat walkover concluded that the Site would provide good foraging and commuting habitat for bats. It was established that:</p> <ul style="list-style-type: none"> • The majority hedgerows / treelines provide suitable foraging habitat and connectivity to the wider landscape for commuting bats; and, • The areas of improved agricultural grassland are also suitable foraging habitats for bats. <p>The bat survey onsite found that LB, CP and SP were utilising the Site. The majority of all hedgerow / treeline will be retained as part of the works. However, ca. 233m of hedge / treeline within the Site will be removed to facilitate site works.</p> <p>It should be noted that as part of the Landscape Plan, as part of the mitigation and compensation measures, along with onsite enhancement, it is proposed to plant the following:</p> <ul style="list-style-type: none"> • Overall, 1,259 m of hedgerow will be retained and protected; • An additional 66m of hedgerow will be planted will be established to enhanced connectivity; and, • A total of 820 trees will be planted, comprising woodland and street trees 	Bats have been scoped in for further consideration

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Potential Biodiversity Receptor	Relevant Legislation	Valuation	Scoping Justification	Scoping Result
Protected Sites				
Bats	Wildlife Act 2000 (as amended) EU Habitats Directive Annex IV	Moderate Local Value	<p>This vegetation will provide opportunities for foraging and commuting bats. Furthermore, based on the current Site and due to the presence of suitable foraging and commuting habitat on-site, it is recommended that the installation of bat boxes be considered in the Site design along with suitable commuting and foraging routes.</p> <p>Lighting Impacts The foraging and roosting behaviour of bats can be adversely affected by luminance. Inappropriate lighting can result in delayed emergence and, subsequently, bats missing peak insect levels at dusk. The foraging behaviour of bats can also be altered by short wave frequency ('UV') light, causing insect populations to congregate around the light and increasing the chances of bats being preyed on. Excess luminance can also cause bats to desert roosts due to light spillage on roost exit points.</p> <p>Therefore, the installation of inappropriate lighting, resulting in light spillage, has the potential to cause adverse effects to bats and other species within the area. Lighting mitigation measures will occur as part of the Proposed Development, and therefore, limited impacts on nocturnal species from light spillage will occur.</p>	Bats have been scoped in for further consideration
Birds	Nesting Birds Wildlife Act 2000 (as amended)	Moderate Local Value	<p>The NBDC held records for protected bird species within 2km of the Site in the last 10 years [19]– see Table 11-7. Breeding Birds</p> <p>The treelines / hedgerows onsite are considered to provide suitable nesting habitat for breeding bird species. Blue tits were found to be confirmed breeding during the breeding bird surveys onsite.</p> <p>Any temporary disturbance arising from the proposed construction works is not considered to be significant. It is considered that any birds along the Site would be habituated to high levels of noise. In addition, there are alternative / more suitable habitats within the wider area for any birds affected by the proposed works to disperse into. Nonetheless, precautionary mitigation will be implemented to avoid any potential impacts to breeding birds, refer to Section 11.10.2.3 for further details.</p> <p>Wintering Birds There are high levels of anthropogenic disturbance onsite and in the vicinity of the Site, including agricultural practices, large spoil heaps and the adjacent construction site. Overall, the Site is not considered to be suitable for wintering bird species</p>	Breeding Birds have been scoped in for further consideration
Otter	Wildlife Act 2000 (as amended)	Low Local Value	<p>The NBDC held records for otter within 2km of the Site in the past 10 years. No otter activity or suitable habitat was noted during the habitat survey. No habitats onsite were considered to be of significant value to otter given the lack of drainage ditches or watercourses onsite. Furthermore, given the intervening land and roads between the Kilbrogan stream and the River Bandon, it is highly unlikely that otter would utilise the Site.</p> <p>Therefore, otter have been scoped out from further consideration.</p>	Otter have been scoped out further consideration

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Potential Biodiversity Receptor	Relevant Legislation	Valuation	Scoping Justification	Scoping Result
Protected Sites				
Hedgehogs and Pygmy Shrews	Wildlife Act 2000 (as amended)	Low Local Value	<p>The NBDC held records for hedgehog within 2km of the Site in the past 10 years. No evidence of hedgehogs or pygmy shrews were identified on-site</p> <p>Given the presence of suitable habitats onsite and within the wider area for hedgehogs and other nocturnal and terrestrial species, standard protection measures for these species will be incorporated into the construction works in line with Objective BE 15-2 (b).</p>	Hedgehogs and Pygmy Shrews have been scoped in for further consideration
Invasive	Species dependent	N/A	<p>The NBDC held records of Brown Rat, Fallow Deer, Giant Knotweed, Harlequin Ladybird, Himalayan Balsam, Japanese Knotweed, Three-cornered Garlic and Water Fern within 2km of the Site in the last 10 years. These are non-native, highly invasive plant species subject to restrictions under European Union (Invasive Alien Species) Regulations 2024 (S.I. No. 374/2024) [31].</p> <p>Only a medium impact invasive species – sycamore was noted on the Site during the field surveys. This species is not subject to restrictions.</p> <p>However, given the potential for invasive species within the wider area entering the proposed construction area, standard measures will be implemented in order to ensure no invasive species are introduced onsite during the construction phase (see Section 11.10.2.3). This is in compliance with Objective BE 15-7 of the CCDP [37].</p>	Invasive Species have been scoped in for further consideration
Other fauna	N/A	N/A	<p>The NBDC held records of red squirrel and pine martin within 2km of the Site [19]. However, the habitats onsite are not suitable for these species.</p> <p>Foxes and rabbits were observed by surveyors onsite. No other species of conservation interest were noted onsite. However, given the presence of suitable habitats onsite and within the adjacent lands for terrestrial mammals, standard protection measures for these species will be incorporated into the works.</p>	Other Species have been scoped in for further consideration

11.9.1 Summary of Potential Impacts

Following a detailed assessment, the following receptors were identified as significant receptors and were brought forward for further consideration, see Section 11.10 below and the AA submitted as part of planning:

- Hedgerow / Stonewall – defunct (WL1 / BL1) ;
- Hedgerow / Treeline (WL1 / WL2);
- Badgers;
- Bats;
- Breeding Birds;
- Hedgehogs and pygmy shrews
- Invasive species; and,
- Other species.

In addition to the species listed above, general mitigation / best practice measures have also been included for the Proposed Development. As noted above, the project presents opportunities for enhancing the area for biodiversity. Further details of ecological enhancement measures are provided below.

11.9.2 Cumulative Effects

Following a review of the Cork County Planning Files [20], no projects were identified that are considered to have significant effect along or in-combination with the Proposed Development. Furthermore, based on the following, it is not anticipated that the Proposed Development will result in any significant cumulative impacts in relation to biodiversity:

- The Site is located on lands zoned for 'Residential' use;
- The Proposed Development will be consistent with the National and Local planning policies and objectives as outlined in Section 11.6, which refers to:
 - The avoidance of impacts on European Designated sites; and,
 - The integration, protection and enhancement of biodiversity landscape features wherever possible.

In addition, any potential cumulative impacts will be reduced as all works will be completed in line with relevant best practice and legislation and the mitigation details within this EIAR. Therefore, it is considered highly unlikely that any significant cumulative impacts will arise as a result of the Proposed Development.

Based on the moderate ecological value of the Site, the nature of the activities at the Site as well as the biodiversity sensitive design measures and ecological enhancement measures it is considered that the Proposed Development will not result in any significant cumulative impacts in relation to significant impacts on flora or fauna and will not cause any adverse effect on the integrity of any European site or biodiversity in combination with other plans and projects.

11.10 Mitigation Measures

The following mitigation measures will be incorporated and adhered to during the Construction and Operation Phases of the Proposed Development to ensure that the works do not result in contravention of wildlife legislation.

11.10.1 Incorporated Design Mitigation

- A comprehensive Landscape Plan has been developed by Simon Ronan Landscape Architects for the Proposed Development, which includes compensation for the loss of vegetation on site. Please refer to the Landscape Concept Report for full details submitted as part of the planning application;
- The Proposed Development has been designed to retain the majority of the hedgerow / treelines onsite, as outlined in Landscape Plan;
- The Landscape Management Plan and ecological enhancement measures for the Proposed

Development will be implemented as part of the works;

- All boundary trees and hedgerow / treelines that are to be retained will be protected from unnecessary damage; and,
- The Proposed Development has been designed to include a range of SuDS measures.

11.10.2 Construction Phase Mitigation

During the construction phase, all works will comply with all relevant legislation and best practice guidance to reduce any potential environmental impacts. The following guidance relevant to biodiversity will be referred to:

- C532 – Control of Water Pollution from Construction, Guidance for Consultants and

Contractors [12];

- CIRIA C811- Environmental Good Practice on Site (5th edition) [13];
- Guidance for the Treatment of Bats Prior to the Construction of National Road Schemes [14];
- and,
- Guidance for the Treatment of Badgers Prior to the Construction of National Road Schemes[15]; and,
- Guidelines on the Management of Noxious Weeds and Non-Native Invasive Plant Species on

National Roads [16].

A detailed Construction Environmental Management Plan ('CEMP') will be submitted to the planning Authority in advance of works commencing at the Site. The following guidance will be referred to and will be followed during the Construction Phase of the project to prevent water pollution and impacts on flora and fauna that may occur within the area.

The following mitigation measures will be incorporated and adhered to in order to ensure that the proposed works do not result in any contravention of wildlife legislation:

- All activities will comply with all relevant legislation and best practice to reduce any potential environmental impacts. The mitigation measures detailed within this EIAR will be fully adhered to;
- The Site manager shall ensure that all personnel working onsite will be trained and made aware of the mitigation measures detailed within this EIAR;

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- An Ecological Clerk of Works ('ECoW') will be appointed for the construction works and will be available should protected or notable species be encountered during operations at the Site; and,
- In advance of works, all Site personnel will receive a toolbox talk regarding the mitigation measures outlined in the CEMP and EIAR. Everybody working onsite must understand the role and authority of the ECOW.

An ECOW will inspect the Site in advance of works commencing and will undertake Site inspections as required during the works, to ensure that all works will be completed in line with the CEMP and all wildlife legislation.

11.10.2.1 Protection of Water Quality

During the Construction Phase, all works will comply with all relevant legislation and best practice to reduce potential environmental impacts of the works. Furthermore, as a precautionary principle, the following mitigation measures will be put in place to ensure that water quality will be protected within the vicinity of the Site and further downstream. The measures that will be put in place to remove the risk from potential contamination and emergency procedures to be implemented in the event of an accidental release or spill of potentially contaminating substances are outlined below.

Therefore, in order to ensure that the proposed works do not have an impact on the River

Bandon and the downstream river network, surface water mitigation measures will be implemented.

These procedures will be communicated to all relevant site staff. Construction stage works will be undertaken in accordance with an approved CEMP. The following best practice guidelines will be followed, which are based on Inland Fisheries Ireland and NRA, now known as the TII [45] guidance documents:

General Mitigation Measures for the Protection of Water Quality

The following mitigation measures will be put in place to ensure that water quality is protected within the River Bandon and subsequently the wider river network downstream of the Site. These measures will be put in place to remove the risk from potential contamination and will include emergency procedures to be implemented in the event of an accidental release or spill of potentially contaminating substances, as outlined below. These procedures will be communicated to all relevant site staff.

Sediment control measures will be put in place to prevent suspended solids in runoff from entering the River Bandon. These measures include the following:

- The proposed working area will be clearly defined, and construction activities will be carefully planned to minimise ground disturbance;
- Existing vegetation will be retained where possible and runoff will be diverted away from stripped areas;
- The works area onsite will be sprayed during periods of dry weather in order to suppress dust migration from the Site;
- Weather conditions will be considered when planning construction activities to minimise risk of runoff from the proposed works;

The following mitigation measures will be implemented during the proposed works to minimise the likelihood of oil/fuel release to surface water during refuelling of plant and equipment:

- Prior to any works commencing, all construction equipment will be checked to ensure that they are mechanically sound to avoid leaks of oil, fuel, hydraulic fluids and grease;
- Preventative maintenance and relevant maintenance logs will be kept for all on-site plant and equipment;
- The Appointed Contactor will put in place a specific, step-by-step refuelling procedure which will be communicated to all relevant employees on-site;
- Only designated trained operators will be authorised to refuel plant on-site;
- Refuelling of plant and machinery will be completed in a controlled manner using drip trays (bund container trays) in a dedicated refuelling area;
- All oil stored onsite for construction vehicles will be kept in a lock and bund protected area;
- Bunds for the storage of hydrocarbons and chemicals during construction will have a holding capacity of 110% of the volume to be stored and will be regularly inspected for leaks and signs of damage; and,
- Procedures and contingency plans will be set up to deal with emergency accidents or spills.
- Only emergency breakdown maintenance will be carried out on-site.

The proposed measures to remove the risk from potential contamination and emergency procedures to be implemented in the event of an accidental release or spill of potentially contaminating substances are outlined below:

- Adequate spill kits, including absorbent booms and other absorbent material, will be maintained on-site;
- All contractor workers will be appropriately trained in the use of spill kits;
- Any spillages will be cleaned up immediately and disposed of correctly; and,
- Any sediments impacted by contamination will be excavated and stored in appropriate sealed containers for disposal offsite in accordance with all relevant waste management legislation.

Therefore, following the implementation of the above mitigation measures, it is concluded that the works required for the Proposed Development will not adversely affect the water quality within the River Bandon and therefore, will not adversely affect the wider river network downstream of the Site.

11.10.2.2 Protection Measures for Trees and Root Systems

During the Construction Phase, any boundary hedgerows/treelines to be retained will be protected for the duration of the construction activities on site and in accordance with BS 5837. All retained hedge/treeline will be protected from unnecessary damage, and care will be taken to protect these features from both direct and indirect disturbance. The following protection measures will be adhered to during the works:

- Trees, treelines and hedgerows to be retained and located within close proximity to the construction areas will be fenced off by effective construction proof barriers before construction works commence. These barriers will remain in place for the duration of the works to prevent accidental disturbance and define the limits of the construction area;
- Care will be taken to prevent any damage/disturbance to root systems through the implementation of a buffer zone/construction exclusion zone of unexcavated ground will be maintained along the retained features;

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- Where machinery access has to encroach treeline/hedgerow features that are being retained, a root protection area will be established. Additionally, suitable ground protection will be put in place to prevent any significant soil compaction or root damage. This should take the form of suitable ground protection mats or cellular confinement system capable of supporting appropriate weight;
- All weather notices will be erected on the fences and fencing will be inspected on a regular basis during the construction process;
- Trench digging or other excavations works will not be permitted within close proximity to retained trees and hedgerows unless approved and supervised by the project ECoW;
- No materials, equipment or machinery will be stored within close proximity to retained treelines/hedgerows;
- Notice boards, wires, etc. will not be attached to any trees; and,
- Site offices, materials and contractor parking will be outside of the Construction exclusion zone.

Following the completion of the construction works, the project ECoW will assess the retained trees and hedgerow to ensure that the above mitigation measures have been complied with. As part of the Landscape Plan prepared for the Proposed Development, additional planting will take place throughout the Site.

11.10.2.3 Protection Measures for Species

Breeding Birds

In order to ensure that no disturbances occur to breeding birds that may potentially use the Site or the adjacent lands, the following mitigation measures will be put in place:

- As per Section 40 of the Wildlife Act 1976, as amended by Section 46 of the Wildlife (Amendment) Act 2000, the cutting, grubbing, burning or destruction by other means of vegetation growing on uncultivated land or ditches will be restricted during the nesting and breeding season for birds and wildlife, from 1st March to 31st August;
- Therefore, any vegetation clearance required within the Site will take place outside of the nesting bird season (1st March to 31st August). Vegetation clearance is restricted as per Section 40 of the Wildlife Act 1976, as amended by Section 46 of the Wildlife (Amendment) Act 2000;
- In the event that works need to be undertaken within the main breeding season, the following measures will be implemented:
 - Prior to the works commencing, consultation with the NPWS will be undertaken by the ECoW; and,
 - Prior to the vegetation removal, the ECoW will inspect the Site.
- All vegetation clearance works will be undertaken in a systematic way under the direction of the ECoW; in the unlikely event that birds nest within the active working area during the Construction Phase, works within the area will stop, and the project ECoW will be consulted;
- During the construction phase, annual breeding bird monitoring will be undertaken by the project ECoW to ensure no impacts occur to breeding birds within the vicinity of the Site.

Measures for Non-volant Mammals

Given the presence of onsite habitats with features that have the potential to support sheltering, foraging and commuting mammals such as badger and hedgehogs and in order to ensure that the works in relation to the Proposed Development will not have significant impacts on terrestrial mammals, general construction

procedures and mitigation measures will be undertaken. These mitigation measures are in line with the NRA (now TII) guidance for badgers [15]. These include the following measures:

- Should construction works be required outside of daylight hours, the appointed project ECoW will be consulted as required;
- All vegetation clearance will be undertaken in a systematic way to allow any potential species that may be utilising these areas to disperse naturally as works progress;
- New drainage infrastructure will be laid in sections and backfilled;
- Waste will be kept contained in a designated area to avoid animals becoming trapped in litter;
- Where deep excavations will be required on-site, appropriate measures to protect mammals from ingress will be installed; and,
- If unidentified burrows are identified within the works area during construction, the project ECoW will be contacted for advice, and any works that have the potential to impact on these species will cease until appropriate mitigation measures are in place.

Construction noise can also impact species such as badger, which include disturbance, behavioural impacts, stress, and displacement from feeding grounds. In order to ensure that impacts can be avoided, the following mitigation measures will be implemented during the construction phase:

- In advance of works, all Site personnel will receive a Site induction or toolbox talk which will include reference to measures detailed in the CEMP;
- Activities and deliveries to the Site to occur only during permitted hours;
- Onsite policy for all plant and equipment, including Site delivery vehicles, to power off rather than to be left with idling engines;
- Management of deliveries and vehicles to minimise vehicles idling onsite;
- All plant where possible shall be low noise rated. Careful selection of quiet plant and machinery to undertake the required work, where available;
- Minimise the drop height of materials;
- Start-up plant and vehicles sequentially rather than all together;
- Noise construction works will be limited to 8am to 6pm on weekdays;
- Positioning of hoarding and enclosures around noisy works or plant as required; and,
- Handling of all materials will take place in a manner which minimises noise emissions.

Given the location of the Proposed Development in a semi-urban area and the relatively high levels of human activity, any species utilising the area are likely to be habituated to elevated noise levels or will avoid this area. It is therefore concluded that, provided the above mitigation measures will be followed during the construction works, no impacts will occur.

Nocturnal Species

All lighting installed within the Proposed Development site will be completed with sensitivity for local wildlife while still providing the necessary lighting for human usage during construction. Therefore, appropriate lighting, as detailed below, should be used during construction:

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- Construction should be limited to daylight hours in order to minimise adverse effects on nocturnal fauna;
- Light Emitting Diodes ('LED's') will be used, and the brightness will be set as low as possible;
- Lighting will be kept to the minimum necessary for health and safety purposes;
- Lighting will only be utilised during working periods where required and will be shut down during non-working periods;
- Lighting will be directed away from landscaped areas and retained sections of hedgerows, treelines;
- LED luminaires will be used because they are highly directional, lower intensity, good colour rendition and dimming capability;
- Luminaires will feature peak wavelengths higher than 550nm to avoid the component of light most disturbing to bats;
- The use of specialist bollards or low-level downward directional luminaires should be considered in bat-sensitive areas to retain darkness above;
- Column heights should be carefully considered to minimise light spill;
- The shortest column height allowed should be used where possible;
- Only luminaires with an upward light ratio of 0% and with good optical control should be used;
- Luminaires should always be mounted on the horizontal, i.e. no upward tilt;
- Any external security lighting should be set on motion-sensors and short (1min) timers; and,
- Accessories such as baffles, hoods or louvres can be used to reduce light spill and direct it only to where it is needed.

Monitoring of light levels along the treelines and hedgerow areas will be undertaken pre-construction, during-construction and post-construction to identify any areas where light spill is affecting background levels. Where monitoring detects that light spill is affecting these habitat areas, remedial measures will be implemented to ensure that background light levels are maintained.

Invasive Species

A medium-impact invasive species Sycamore (*Acer pseudoplatanus*), was identified on the Site. However, high-impact invasive species have been recorded within 2km of the Site [19].

To mitigate against the unintentional introduction of invasive species during construction, the following biosecurity measures will be implemented. These measures are in line with NRA (now TII) *Guidance for the Management of Noxious Weeds and Non-Native Invasive Plant Species* []:

- All vehicles, machinery and any other equipment that may be used for the works will be washed prior to its use on-site to prevent the import of plant material and seeds;
- Before machinery or equipment is unloaded at the Site, equipment will be visually inspected to ensure that all adherent material and debris has been removed;
- Any vehicles and machinery that are not clean will not be permitted entry to the Site;
- All materials to be imported to the Site, including additional planting, will be sourced from a reputable supplier and records of all material / supplies to Site will be maintained; and,
- In advance of works, all site personnel will receive an induction regarding invasive species.

11.10.3 Operational Phase Mitigation

11.10.3.1 Protection of Water Quality

The additional hard surfacing onsite will result in an increase in surface water runoff. However, a new network of pipework with SuDS features and attenuation storage structures will be implemented. This is in line with Objective 11-10 of the CCDP [37]. This will prevent potential pollutants from surface water runoff, such as hydrocarbons, flowing down and entering the River Bandon.

The following individual SuDS measures are considered appropriate for this particular development and will be incorporated:

- Drained swale;
- Filter drains;
- Permeable paving;
- Petrol, oil interceptor grit trap; and,
- Attenuation tank.

The SuDS design reflects the layout and topography of the Site:

- Permeable paving has been incorporated in the external hardstanding of all dwellings. Soakaways have also been incorporated to accommodate roof water run off – both of these measures will intercept surface water at sources;
- Permeable paving has been incorporated into the 'homezone' areas in front of house numbers 15 to 26, 43 to 62 and 187 to 198 comprising 2,657m²;
- Filter drains have been incorporated into select areas to address the potential for rainwater exceedance scenario;
- Swales have been incorporated where gradients allow. The swales will be appropriately planted to enhance biodiversity gains. The swales will serve specific areas of road run-off by drainage from road gullies. These areas will deliver a high level of water treatment;
- Due to the sloping nature of the Site the incorporation of Detention Basins and / or Retention Basins is not feasible.

For full details, please refer to the Engineering Infrastructure Report prepared by Brian O Kennedy & Associates Ltd ('BOK') submitted as part of this planning application.

11.10.3.2 Protection of Fauna

Nocturnal Species

Nocturnal species, such as bats, are impacted by lighting. Therefore, it is important that lighting installed on-site is completed with sensitivity for local wildlife whilst still providing the necessary lighting for human usage.

The lighting strategy has been designed to mitigate against any potential impacts on nocturnal species in line with the Bat Conservation Trust (BCT) Guidelines on 'Bats and Artificial Lighting in the UK' [47].

An external Outdoor Lighting Report was completed by Schreder. Please refer to this completed report for further details including illuminance levels along roads and walkways onsite. The lighting strategy involves avoiding excessive lighting. The following measures have been incorporated into the lighting design:

- Avoidance of excessive lighting;
- Lighting has only been installed where necessary for public safety;
- Sensitive lamp design to reduce light reflectance;
- Lighting will be aimed only where it is needed, with upward lighting shielded and a preference for downward directional focus;
- Light Emitting Diodes ('LED's') will be used, and the brightness will be set as low as possible;
- Lighting will be directed away from landscaped areas and retained sections of mixed broadleaved woodland;
- Hoods/cowling will be installed, and this will greatly reduce back spillage of lighting; and,
- Lighting will be turned down / off when not required;
- Use of bat-sensitive lighting in the form of 'warm white' $\leq 3000^{\circ}\text{K}$ luminaires. Luminaires should feature peak wavelengths higher than 550nm to avoid the component of light most disturbing to bats; and,
- Lighting has been designed and selected with specific shutters and filters to minimise any potential for back spills into the sensitive locations.

Following the installation of the lighting for the Proposed Development, the ECoW will undertake a further Site inspection in order to check the lighting patterns and lux levels along the Site boundaries to ensure that there will be no impacts to bats or other nocturnal species

11.10.4 Ecological Enhancement Measures

11.10.4.1 Ecological Linkages

An ecological corridor is generally a linear habitat feature (such as water courses, treelines, hedgerows, etc.) that links areas of habitats and allows for different species to move between these areas. Ecological corridors are considered to be important for a variety of different reasons, most notably for the maintenance of genetic diversity and the avoidance of fragmentation within the landscape and risks associated with inbreeding.

The importance of ecological corridors is well documented, and there are provisions in both European and Irish legislation for the protection of such features, which provide ecological coherence.

Article 10 of the Directive specifically refers to linear landscape features and stepping-stone habitats:

'Member States shall endeavour, where they consider it necessary, in their land-use planning and development policies and, in particular, with a view to improving the ecological coherence of the Natura 2000 network, to encourage the management of features of the landscape which are of major importance for wild fauna and flora.

Such features as those which, by virtue of their linear and continuous structure (such as rivers with their banks or the traditional systems for marking field boundaries) or their function as stepping stones (such as ponds or small woods), are essential for the migration, dispersal and genetic exchange of wild species.'

The Local Government (Planning and Development) Act, 1963 (Third Schedule, Part IV, Paragraph 8A) was amended as a result of the adoption of the Habitats Directive, and local authorities can now refuse planning permission without compensation for developments which threaten functioning ecological corridors or steppingstones. The amendment cites the following:

'Protection of features of the landscape which are of major importance for wild fauna and flora in accordance with the Habitats Directive.' (S.I. 94 of 1997, 26(c)).'

As part of the Proposed Development, the majority of existing linkages across the Site, will be protected and enhanced with additional hedgerow / tree planting.

Taking the above into consideration, it is recommended that, where possible, existing ecological corridors be protected and enhanced. The following measures are recommended for the protection of hedgerow/treeline ecological corridors:

- A post-construction inspection of hedgerow / treelines to determine the health of the plants;
- Where dead trees are identified - removal of dead trees and replacement with new suitably sized native tree species; and,
- Where sparse areas are identified – additional supplementary planting of native tree species should be undertaken.

11.10.4.2 Habitat Connectivity

Habitat connectivity is generally known as the degree to which the environment facilitates or obstructs species movement and other ecological processes. The Site forms part of a wider ecological framework, where existing hedgerow networks play a vital role in linking surrounding agricultural lands and supporting regional biodiversity. These linear habitats function as wildlife corridors, providing food sources, shelter, and nesting opportunities for birds, small mammals, and pollinating insects.

There are opportunities within the Site to increase the habitat connectivity and support local biodiversity of the local area, such as:

- Maintaining hedgerow/treelines onsite; and,
- Planting additional hedgerows.

11.10.4.3 Habitat Enhancement

Habitat creation and enhancement measures will be implemented in order to increase opportunities for a variety of wildlife that are appropriate to the Site.

Habitat loss will be compensated for through the creation of new habitats within the Proposed Development. These areas will provide new treelines, hedge line, scrub, wildflower and grassland habitat, which will help to compensate for the habitat lost.

The Site boundaries will receive additional natural planting to enhance the existing and retained scrub and woodland habitats. Soft landscaping plan is proposed within Site including for newly created soft landscaped areas and detail planting schedules and required maintenance with the benefit of biodiversity in mind during the Operational Phase.

11.10.4.4 Landscape Plan

A comprehensive Landscape Plan and report has been prepared by Simon Ronan Landscape Architects and has been submitted as part of this planning application. The following will take place as part of the Landscape Plan:

- Woodland tree planting;
- Street trees, small feature trees and podium trees;
- Wildflower & shrub planting;
- Woodland understory & shade-loving plants;
- Meadow and pollinator friendly planting;
- Hedgerow planting; and,
- Creation of open green areas to include landscaped plazas and pocket parks.

Full details of the proposed tree, shrub and plant species for the above design elements are outlined in the Landscape Plan and includes many native species.

The plan has been designed to maintain a degree of connectivity to the wider landscape (where possible) through the retention of the hedge/treeline and additional planting. Additional planting will be introduced on site to compensate for the removal of vegetation during the site clearance work.

The planting strategy prioritizes biodiversity and sustainability by sourcing native trees from Tree Council-approved nurseries and selecting all planting species and wildflower seed mixes from the Irish Pollinator Plan. This ensures the landscape supports local ecosystems, enhances pollinator habitats, and promotes long-term ecological resilience

11.10.4.5 Fauna Enhancement

11.10.4.5.1 Bats

Provision of artificial roosting sites

Given the levels of activity recorded during the onsite surveys, it is proposed to install artificial bat boxes within the Site.

Artificial bat boxes will be erected on suitable mature trees within the Site. Artificial bat boxes can provide vital roosting places in habitats devoid of natural roosting opportunities. Bat boxes can also provide additional suitable roosting habitats for bats in an area.

Bat boxes should be placed in a position sheltered from strong wind and exposed to the sun for part of the day. The boxes will be located in / close to linear features, such as the hedgerow / treelines, and will be placed a minimum of 2m above the ground. Figure 11-10 below shows suitable bat roost box examples, including a Pole Mounted Bat Box, Bat Box Schwegler 1FF and Vivara Small Bat Box.

The exact location of the bat boxes will be determined by an experienced ecologist after the completion of the construction phase of the Proposed Development. This is to allow the ecologist to assess the exact conditions that have been created and thus to ensure that the bat boxes are sited in the most appropriate location possible.

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Figure 11-10: Suitable Bat Boxes

11.10.4.5.2 Birds

A variety of bird nest boxes designed to attract a variety of nesting bird species will be erected on suitable trees within the Site. The creation of a nesting habitat, along with the creation of a species-rich habitat, will encourage an abundance of invertebrate life (a potential food source) and will be beneficial to local birds. General bird boxes designed to cater for a variety of species will be used, the number and location of which will be specified by an ecologist. Refer to the examples provided in Figure 11-11.

An example is the 1B Schwegler Nest Box - This nest box will attract a wide range of species and is available with different entrance hole sizes to prevent birds from competing with each other for the boxes.

Different bird species require different entrance sizes as outlined below:

- The circular 26mm entrance hole suits blue, marsh, coal and crested tit and possibly wren. All other species are prevented from using the nest box due to the smaller entrance hole;
- The circular 32mm entrance hole will attract great, blue, marsh, coal and crested tit, redstart, nuthatch, collared and pied flycatcher, wryneck, tree and house sparrow;
- The 45mm entrance hole will attract starlings; and,
- Open-fronted nest boxes will attract robins, wrens, pied and grey wagtail, song thrush and blackbirds.

The exact location of the bird boxes will be determined by an experienced ecologist after the completion of the proposed works. This is to allow the ecologist to assess the exact conditions that have been created and thus to ensure that the bird boxes are sited in the most appropriate location possible. However, it is recommended that bird boxes be facing between north and south-east to avoid strong winds, rain and sunshine. In addition, bird boxes should be tilted slightly forward to ensure that rain runs off the top, and there should be a clear flight path to access the nestbox hole. Also, bird boxes with a hole should be placed ca. 2-4m off the ground, whereas open-fronted bird boxes should be placed lower than 2m among dense vegetation where predators will not easily see it.

It should be noted that the distance between nest boxes can vary. Species such as house sparrow and starling have a preference for nesting in colonies and therefore the bird boxes should be placed closer to each other, whereas species robins and tits can be highly territorial and therefore the nest boxes should be separate by a greater distance.



Figure 11-11: Bird Box Examples

11.10.4.5.3 Hibernacula and Habitat Piles

Hibernacula and habitat piles are valuable habitats and support a range of biodiversity, including insects, amphibians and small mammals. These habitats act as refuges and hibernation sites for amphibians as well as a host of other species of inverts and small mammals. The objective is to create a diversity of habitats within the Proposed Development.

Hibernacula and habitat piles can be created through the placement of either piles of rocks or logs around the margins of hedgerows / treelines, near wetland habitats and adjacent to drainage ditches. It is proposed to create these enhancement measures using the material generated by the vegetation clearance works on-site. Refer to the examples below, Figures 11-12 and 11-13.

Figure 11-12: Typical hibernaculum and cross-section

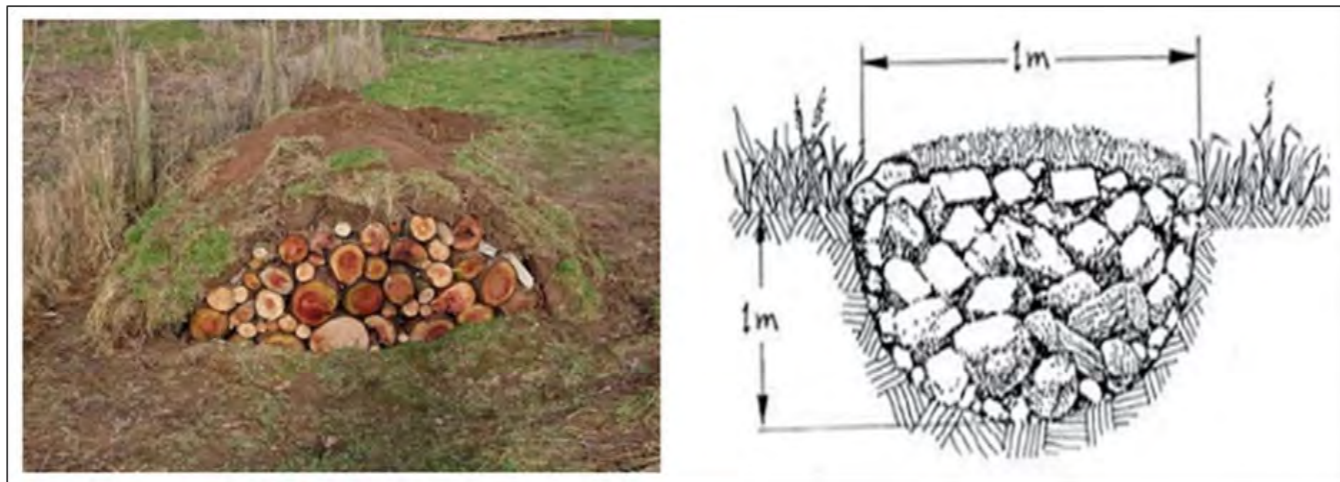


Figure 11-13: Habitat Piles

11.10.4.5.4 Insect Hotels

The primary purpose of insect hotels is to provide additional habitat space for small organisms, insects and other invertebrates. The objective is to create a diversity of habitats within the Proposed Development.

They can be built from a variety of natural and / or repurposed materials. Deadwood provides a habitat for beetles, centipedes, woodlice and spiders, and materials with holes act as shelter for solitary bees, which are crucial for pollination. The artificial shelters can come in a variety of sizes and can be used by a range of smaller animals, such as toads and hedgehogs, who can use these artificial habitats for hibernation or breeding (see Figure 11-14).

Insect hotels should be positioned in areas sheltered from wind and rain and with access to sunlight. The artificial shelters should be placed 1.5m off the ground to reduce access to insect predators. Insect hotels can be free-standing or attached to existing features such as trees, posts or walls.

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Figure 11-14: Artificial Deadwood Habitats

11.10.4.6 Visible Biodiversity

In order to promote biodiversity within the Site, consideration could be given to the creation of visible landmarks that draw attention to the importance of biodiversity while also attracting the interest of the residents. Biodiversity landscape features could be installed within the Site and promote a green image for the area; for examples see Figure 11-15.

Figure 11-15: Visible Biodiversity



11.10.4.6.1 Interpretive Signboards

Biodiversity awareness of the onsite biodiversity should be emphasised and encouraged where appropriate. Actions to educate residents on the local biodiversity should be supported and promoted. This can be through the placement of interpretive signboards within the Site outlining biodiversity measures and species that can be found onsite. See examples in Figure 11-16.



Figure 11-16: Examples of Interpretive Signboards

11.11 Residual Impact Assessment

This section assesses potential significant environmental impacts which remain after mitigation measures are implemented.

Based on the methodology set out in Section 11.4, the initial assessment of ecological receptors (Table 11-10) screened out the following habitats and species:

- European Designated sites;
- Nationally Designated sites;
- Artificial surfaces (BL3);
- Improved Agricultural Grassland (GA1);
- Recolonising Bare Ground (ED3);
- Spoil and Bare Ground (ED2);
- Protected Flora;
- Amphibians; and,
- Otter.

These ecological receptors were screened out from further assessment as the potential impacts were not considered to be significant, refer to Table 11-10 for further details. The following species and habitats outlined in Table 11-10, were identified as receptors that warranted further consideration to avoid impacts:

- Hedgerow / Stonewall – defunct (WL1 / BL1) ;
- Hedgerow / Treeline (WL1 / WL2);
- Badgers;
- Bats;
- Breeding Birds;
- Hedgehogs and pygmy shrews;
- Invasive species; and,
- Other species.

Mitigation has been proposed for each of these ecological receptors alongside enhancement measures for the Site as part of the landscape plans as outlined in Section 11.10.4.4. The results of these measures on these ecological receptors and the resulting residual impact are described below in Table 11-10.

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Table 11-11: Summary of Construction Phase Effects Post Mitigation

Receptor	Potential Impact	Assessment of Impacts Post Mitigation and Enhancement	Residual Impact
Hedgerow / Stonewall	Vegetation removal / disturbance to root systems	Following the implementation of the proposed tree protection measures, outlined in Section 11.10, all retained hedgerow / stonewalls and hedgerow / treelines onsite will be protected from disturbance / damage during the construction phase of the Proposed Development	Imperceptible
Hedgerow / Treeline			
Badger	Disturbance & entrapment	Following the implementation of the mitigation measures outlined in Section 11.10, it is considered that potential impacts terrestrial fauna will be imperceptible and as such there will be no residual impacts.	Imperceptible
Hedgehogs and pygmy shrews			
Other species			
Bats	Disturbance from lighting	Following the implementation of the approved lighting plan and a review of lighting patterns and lux levels by the ECoW, it is considered that the potential impacts on bats and other nocturnal fauna will be imperceptible.	Imperceptible
Breeding Birds	Loss of nesting habitat Disturbance	Following the implementation of the mitigation measures outlined in Section 11.10, it is considered that potential impacts on birds will be imperceptible and as such there will be no residual impacts	Imperceptible
Invasive species	Introduction and spread of invasive species	Provided the mitigation outlined in Section 11.10 is followed, it is considered that no impacts will occur to valued ecological receptors as a result of the spread or introduction of invasive species.	Imperceptible

11.12 Interactions

Biodiversity interacts with the following:

- Chapter 5: Landscape and Visuals. In assessment of the impact on landscape and visual aspects, cognisance has been given to the alterations to the existing land cover of the Site. The Proposed Development will have a slight positive residual impact on local biodiversity through the implementation of the landscape management plan and ecological enhancement measures. Additionally, the placement of bird and bat boxes around the Site along with the retention of the majority of linear features will provide suitable habitats for roosting bats and breeding birds around the Site;
- Chapter 9: Land, Soils and Geology. Excavations and site clearance works could adversely impact the integrity and the quality of the trees and hedgerows onsite, and subsequently
- impacting on fauna species such as birds and bats. However, the mitigation measures outlined in this EIAR will ensure that no significant impacts occur on retained linear features;
- Chapter 10: Hydrology and Hydrogeology. The ecological status of the Bandon River will not be impacted with the implementation of the appropriate mitigation measures as outlined in this EIAR;

- Chapter 12: Noise and Vibration. Fauna are often sensitive to acoustic disturbances. However, given the disturbance to the Site and close proximity to construction works, it is considered likely that fauna in the vicinity of the Site has been habituated to elevated acoustics. It is not anticipated that there will be any significant change to noise levels .

11.13 Monitoring

The ECoW will inspect the Site in advance of construction works commencing and will undertake monthly Site inspections during the works. In addition, the ECoW will be present during any works adjacent to or near waterbodies or treelines to ensure that these works are completed in line with the mitigation measures detailed within this EIAR.

As outlined in Section 11.10.2.3, the ECoW will undertake an inspection of the lighting patterns and lux levels along the Site boundaries once lighting has been installed onsite. Additionally, monitoring of bat species will be undertaken.

An arborist will be required to assess the health of retained hedgerows following the completion of construction.

11.14 Conclusion

Based on the findings of a detailed desk-based study, a review of all the ecological information available for the Site and wider area and field surveys by MOR Environmental Ecologists, it is considered reasonable to conclude the following:

- The Site itself is currently of moderate local ecological value;
- The bat surveys did not identify any bats roosting onsite;
- The Site is not considered to be of high suitability or a site of importance for any Annex I or Annex II species or Red listed birds;
- The Proposed Development will not result in any significant impacts on ecological receptors identified both onsite and in the surrounding area following the implementation of appropriate mitigation measures; and,
- The proposed landscape planting and biodiversity enhancement measures will supplement the existing vegetation onsite and provide additional habitats and opportunities for species already existing within the area.

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CHAPTER TWELVE

NOISE & VIBRATION

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CHAPTER 12 | NOISE & VIBRATION

12.1 Introduction

This EIAR Chapter has been prepared by AWN Consulting Ltd (AWN) to assess the potential noise and vibration effects of the proposed development in the context of current relevant standards and guidance.

This chapter includes a description of the receiving ambient noise climate in the vicinity of the subject site and an assessment of the potential noise and vibration impact associated with the proposed development, during both the short-term construction phase and the long-term operational phase. The assessment of direct, indirect and cumulative noise and vibration effects on the surrounding environment have been considered in this chapter.

A full project description is included in Chapter 2: Project Description, of this Environmental Impact Assessment Report (EIAR).

12.2 Expertise & Qualifications

This chapter of the EIAR has been prepared by Leo Williams, Senior Acoustic Consultant at AWN Consulting Ltd. He holds a Bachelor's and Master's in Mechanical and Manufacturing Engineering from Trinity College Dublin. He is a Member of the Institute of Acoustics and has completed the IOA Diploma in Acoustics and Noise Control. Leo has carried out environmental noise and vibration assessments for numerous mixed-used residential developments and been involved in the preparation of EIARs for the following projects:

- Dublin Central Masterplan Site
- The Paddocks Phase 2, Waterford.
- Jacob's Island Residential development, Cork.

12.3 Proposed Development

Please refer to Chapter 2 – Project Description for the full development description. In summary, the subject application is for a large-scale Residential Development (LRD) comprising of the construction of 212 no. residential units and all ancillary development works including footpaths, car and bicycle parking, drainage, bicycle and bin stores, lighting and landscaping/amenity areas at Knockbrogan, Bandon, Co. Cork. Access will be provided via the existing access road onto the Cork Road permitted under reference 21/4059.

12.4 Methodology

12.4.1 Assessment Overview

The following methodology has been prepared based on the requirements of the Environmental Protection Agency (EPA) Guidelines the Information to be Contained in Environmental Impact Assessment Reports (EPA 2022) and on AWN's experience of preparing the noise and vibration chapters for similar developments. The following approach has been used for this assessment:

- Baseline noise monitoring has been undertaken at the development site in order to characterise the existing noise environment;

- A review of relevant standards and guidelines has been carried out in order to set a range of acceptable noise and vibration criteria for the construction and operational phases of the proposed development;
- Predictive calculations have been performed to estimate the likely noise emissions during the construction phase of the proposed development at the nearest Noise Sensitive Locations (NSLs) to the site;
- Predictive calculations have been performed to assess the potential effects associated with the operation of the proposed development at NSLs surrounding the site;
- An assessment has been completed of potential cumulative effects that may arise as a result of the proposed development along with other existing or proposed plans and projects;
- A schedule of mitigation measures has been proposed, where relevant, to control the noise and vibration emissions associated with both the construction and operational phases of the proposed development.

12.4.2 Criteria for Rating of Impacts

The assessment has been undertaken with reference to the most appropriate guidance documents relating to environmental noise and vibration which are set out in the following sections. There are no statutory standards in Ireland relating to noise and vibration limit values for construction works or for environmental noise relating to the operational phase. In the absence of specific statutory Irish guidelines, the assessment has made reference to non-statutory national guidelines, where available, in addition to international standards and guidelines relating to noise and / or vibration impact for environmental sources.

In addition to specific noise and vibration guidance documents, the assessment has been conducted in accordance with the EPA document *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports* (EPA, 2022).

The significance of noise and vibration effects has been assessed in accordance with the EPA 2022 Guidelines. With regard to the quality of the effect, ratings may have positive, neutral or negative applications.

12.4.3 Assessment Criteria and Guidelines – Construction Phase

Local Authorities typically control construction activities by imposing limits on the hours of construction and consider noise limits at their discretion. Construction noise sources include construction plant and machinery and construction related traffic on surrounding roads. Reference is made to the following guidelines and standards to inform the most appropriate construction noise and vibration significance thresholds and assessment methodologies:

- British Standard Institute (BSI) British Standard (BS) 5228-1:2009 +A1 2014 Code of Practice for noise and vibration control of construction and open sites - Part 1: Noise (hereafter referred to as BS 5228-1) (BSI 2014a);
- BS 5228-2:2009+A1:2014 Code of Practice for noise and vibration control of construction and open sites - Part 2: Vibration (hereafter referred to as BS 5228 - 2) (BSI 2014b);
- BS 7385: 1993 Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from ground borne vibration (hereafter referred to as BS 7385-2). (BSI 1993);
- BS 6472-1: 2008 Guide to evaluation of human exposure to vibration in buildings, Part 1 Vibration sources other than blasting (hereafter referred to as BS 6472-1) (BSI 2008); and,
- UK Highways England (now National Highways) (UKHE) Design Manual for Roads and Bridges (DMRB) LA 111 Sustainability and Environmental Appraisal LA 111 Noise and Vibration Revision 2 (hereafter referred to as DMRB Noise and Vibration) (UKHE 2020);

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12.4.3.1 Construction Noise

The British Standard BS 5228–1 (BSI 2014a) ‘ABC’ method is referenced here for the purposes of setting appropriate construction noise limits for the development. This is the most widely accepted standard for this purpose in Ireland.

The approach adopted calls for the designation of a noise sensitive location into a specific category (A, B or C) based on exiting ambient noise levels in the absence of construction noise. For the appropriate assessment period (i.e. daytime in this instance) the ambient noise level is determined and rounded to the nearest 5 dB. This then sets a threshold noise value that, if exceeded at this location, indicates a potential significant noise effect is associated with the construction activities, depending on context. Note that, in accordance with the BS5228-1 guidance, this assessment criterion is only applicable to residential receptors.

Table 12 1 sets out the construction noise thresholds (CNTs) at the façade of residential receptors for the different baseline noise categorises from BS 5228-1.

Table 12 1 Threshold of Potential Significant Effect at Dwellings

Assessment Category and threshold value period (LAeq)	Threshold value, in decibels (dB)		
	Category A A	Category B B	Category C C
Daytime (07:00 – 19:00) and Saturdays (07:00 – 13:00)	65	70	75
Evenings and weekends D	55	60	65
Night-time (23:00 to 07:00hrs)	45	50	55

Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are less than these values.

Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are the same as category A values.

Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are higher than category A values.

12.4.3.2 Proposed Noise Thresholds

Taking into account the proposed documents outlined above and making reference to the baseline noise environment monitored around the development site (see section 12.6.1.5), BS 5228-1 has been used to inform the assessment approach for construction noise.

The following Construction Noise Threshold (CNT) levels are proposed for the construction stage of the proposed development:

- For residential NSLs in proximity to the main site development works, Category A values are deemed appropriate using the ABC method.
- There are no scheduled night-time construction works proposed as part of the proposed development.

12.4.3.3 Significance of Construction Noise Levels (CNLs)

In order to assist with interpretation of significance relating a calculated construction noise level (CNL), Table 12-2 includes guidance as to the likely magnitude of impact associated with construction noise, relative to the CNT. This guidance is derived from DMRB: Noise and Vibration (UKHE 2020) and adapted to include the EPA EIAR Guidelines.

Table 12 2 Construction Noise Significance Ratings

Construction Noise Level per Period	Guidelines for Noise Impact Assessment Significance (DMRB)	EPA EIAR Significance Effects	Determination
Below or equal to baseline noise level	Negligible	Not Significant	Depending on CNT, duration & baseline noise level
Above baseline noise level and below or equal to CNT	Minor	Slight to Moderate	
Above CNT and below or equal to CNT +5 dB	Moderate	Moderate to Significant	
Above CNT +5 dB	Major	Significant, to Very Significant	

12.4.3.4 Construction Vibration

Vibration standards come in two varieties: those dealing with human comfort and those dealing with cosmetic or structural damage to buildings. For the purpose of the proposed development, the range of relevant criteria used for surface construction works for both building protection and human comfort are expressed in terms of Peak Particle Velocity (PPV) in mm/s.

Peak Particle Velocity (PPV) is a measure of the velocity of vibration displacement in terms of millimetres per second (mm/s). It is defined as follows within BS 7385-2 (BSI 1993) as ‘the maximum instantaneous velocity of a particle at a point during a given time interval’.

Building Response

There is no published statutory Irish guidance relating to the maximum permissible vibration level. The following standards are the most widely accepted in this context and are referenced here in relation to cosmetic or structural damage to buildings:

- British Standard BS 5228-2 (BSI 2014b); and
- British Standard BS 7385-2 (BSI 1993)

BS7385-2 (BSI 1993) and BS5228-2 (BSI 2014b) advise that, for soundly constructed residential properties and similar light-framed structures that are generally in good repair, a threshold for minor or cosmetic (i.e. non-structural) damage should be taken as a peak component particle velocity (in frequency range of predominant pulse) of 15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz and 50 mm/s at 40 Hz and above for transient vibration.

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Where the dynamic loading caused by continuous vibration is such as to give rise to dynamic magnification due to resonance, especially at the lower frequencies where lower guide values apply, then the guide values in Table B.2 of BS5228-2 (BSI 2014b) might need to be reduced by up to 50%. On a cautious basis, therefore, continuous vibration limits are set as 50% of those for transient vibration across all frequency ranges. For buildings or structures that are structurally unsound, lower vibration magnitudes will apply, typically 50% of those for structurally sound buildings. Protected or historic buildings are not automatically assumed to be more vulnerable to vibration unless they have existing structural defects. The recommended transient vibration thresholds from BS5228-2 (BSI 2014b) for the avoidance of cosmetic damage to light framed and residential buildings are summarised in Table 12-3.

Table 12 3 Recommended Construction Vibration Threshold for Control of Building Damage

Allowable vibration (in terms of peak particle velocity) at the closest part of sensitive property to the source of vibration, at a frequency of: -		
Less than 15Hz	15 to 40Hz	40Hz and above
15mm/s	20mm/s	50mm/s

Human Response

Human response to vibration stimuli occurs at orders of magnitude below those associated with any form of building damage, hence vibration levels lower than those indicated in Table 12-3 can lead to concern. Table 12-4 presents the significance table relating to potential effects to building occupants during construction based on guidance from BS5228-2 (BSI 2014b), the DMRB Noise and Vibration (UKHE 2020) document and the associated EPA significant ratings.

Table 12 4 Guidance on Effects of Human Response to PPV Magnitudes

Vibration Level, mm/s PPV	BS 5228-2 (Note A, B, C)	EPA Significance Ratings
≥10	Vibration is likely to be intolerable for any more than a very brief exposure to a level of 10mm/s.	Very Significant
≥1 to <10	Increasing likelihood of complaints in residential environments but can be tolerated at the lower end of the scale if prior warning and explanation has been given to residents.	Significant to Very Significant
≥0.3 to < 1	Increasing likelihood of perceptible vibration in residential environments.	Slight to Moderate
< 0.3	Vibration is unlikely to be perceptible in even the most sensitive situations for most vibration frequencies associated with construction.	Not significant

Notes from BS5228-2:

- A) The magnitudes of the values presented apply to a measurement position that is representative of the point of entry into the recipient.

- B) A transfer function (which relates an external level to an internal level) needs to be applied if only external measurements are available.
- C) Single or infrequent occurrences of these levels do not necessarily correspond to the stated effect in every case. The values are provided to give an initial indication of potential effects, and where these values are routinely measured or expected then an assessment in accordance with BS 6472 (BSI 2008), and/or other available guidance, might be appropriate to determine whether the time varying exposure is likely to give rise to any degree of adverse comment.

12.4.3.5 Construction Phase Traffic Noise

Vehicular movement to and from the construction site for the proposed development will make use of the existing road network. In order to assess the potential impact of additional traffic on the human perception of noise, the following two guidelines are referenced: DMRB Noise and Vibration (UKHE 2020) and the EPA Guidelines (EPA, 2022). For construction traffic, due to the short-term period over which this impact occurs, the magnitude of impacts is assessed against the 'short term' period in accordance with the DMRB Noise and Vibration (UKHE 2020) document.

Table 12-5 sets out the classification of changes in noise level to impact on human perception based on the guidance contained in these documents.

Table 12 5 Classification of Magnitude of traffic noise changes for Construction Traffic

Change in Sound Level (dB)	Subjective Reaction	DMRB Magnitude of Impact (Short-term)	EPA Significance of Effect
Less than 1 dB	Inaudible	Negligible	Imperceptible
1 – 2.9	Barely Perceptible	Minor	Not Significant to Slight
3 – 4.9	Perceptible	Moderate	Moderate
≥ 5	Up to a doubling of loudness	Major	Significant

12.4.4 Assessment Criteria and Guidelines – Operation Phase

12.4.4.1 Additional Traffic

There are no specific guidelines or limits relating to traffic related sources along the local or surrounding roads. Given that traffic from the development will make use of existing roads already carrying traffic volumes, it is appropriate to assess the calculated increase in traffic noise levels that will arise because of vehicular movements associated with the development. In order to assist with the interpretation of the noise associated with additional vehicular traffic on public roads, Table 12 6 is taken from the DMRB.

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Table 12 6 Significance in Change of Noise Level

Change in Sound Level (dB)	Subjective Reaction	Magnitude of Impact	EPA Glossary of Effects ¹
0.0 – 0.9	Inaudible	Negligible	Imperceptible
1.0 – 2.9	Barely perceptible		Not significant
3 – 4.9	Perceptible	Minor	Slight, moderate
5 – 9.9	Up to a doubling of loudness	Moderate	Significant
10+	Doubling of loudness and above	Major	Very significant

The guidance outlined in Table 12 6 will be used to assess the predicted increases in traffic levels on public roads associated with the proposed development and comment on the likely long-term impacts during the operational phase.

12.5 Difficulties Encountered

No difficulties were encountered in the preparation of this chapter.

12.6 Baseline Environment

12.6.1 Baseline Survey

An environmental noise survey has been conducted at the site to assess the existing noise environment. The survey was conducted in general accordance with ISO 1996: 2017: *Acoustics – Description, measurement and assessment of environmental noise*.

12.6.1.1 Survey Periods

The attended noise survey was carried out on 12th August 2025 between 14:27 hrs and 16:59 hrs.

The weather during the survey period was dry with cloud coverage. Wind speeds were noted to be low and were not considered to have had a detrimental effect on the noise measurements.

12.6.1.2 Personnel and Instrumentation

AWN Consulting undertook the baseline noise survey at the proposed development site.

Table 12 7 Instrumentation Details

Equipment	Type	Serial Number	Calibration Date
Sound Level Meter	Rion NL-52	586940	20 th February 2024

¹EPA Guidelines on the Information to be contained in Environmental Impact Assessment Reports, (2022)

12.6.1.3 Noise Measurement Parameters

The noise survey results are presented in terms of the following parameters: -

- L_{Aeq}** is the equivalent continuous sound level. It is a type of average and is used to describe a fluctuating noise in terms of a single noise level over the sample period.
- L_{AFmax}** is the instantaneous maximum sound level measured during the sample period using the ‘F’ time weighting which samples over a 125 ms period.
- L_{A90}** is the sound level that is exceeded for 90% of the sample period. It is typically used as a descriptor for background noise.

The “A” suffix denotes the fact that the sound levels have been “A-weighted” in order to account for the non-linear nature of human hearing. All sound levels in this chapter are expressed in terms of decibels (dB) relative to 2x10⁻⁵ Pa.

12.6.1.4 Noise Survey Locations

The following attended survey locations were selected as presented in Figure 12 1. These locations were selected to capture noise levels experienced across the site.

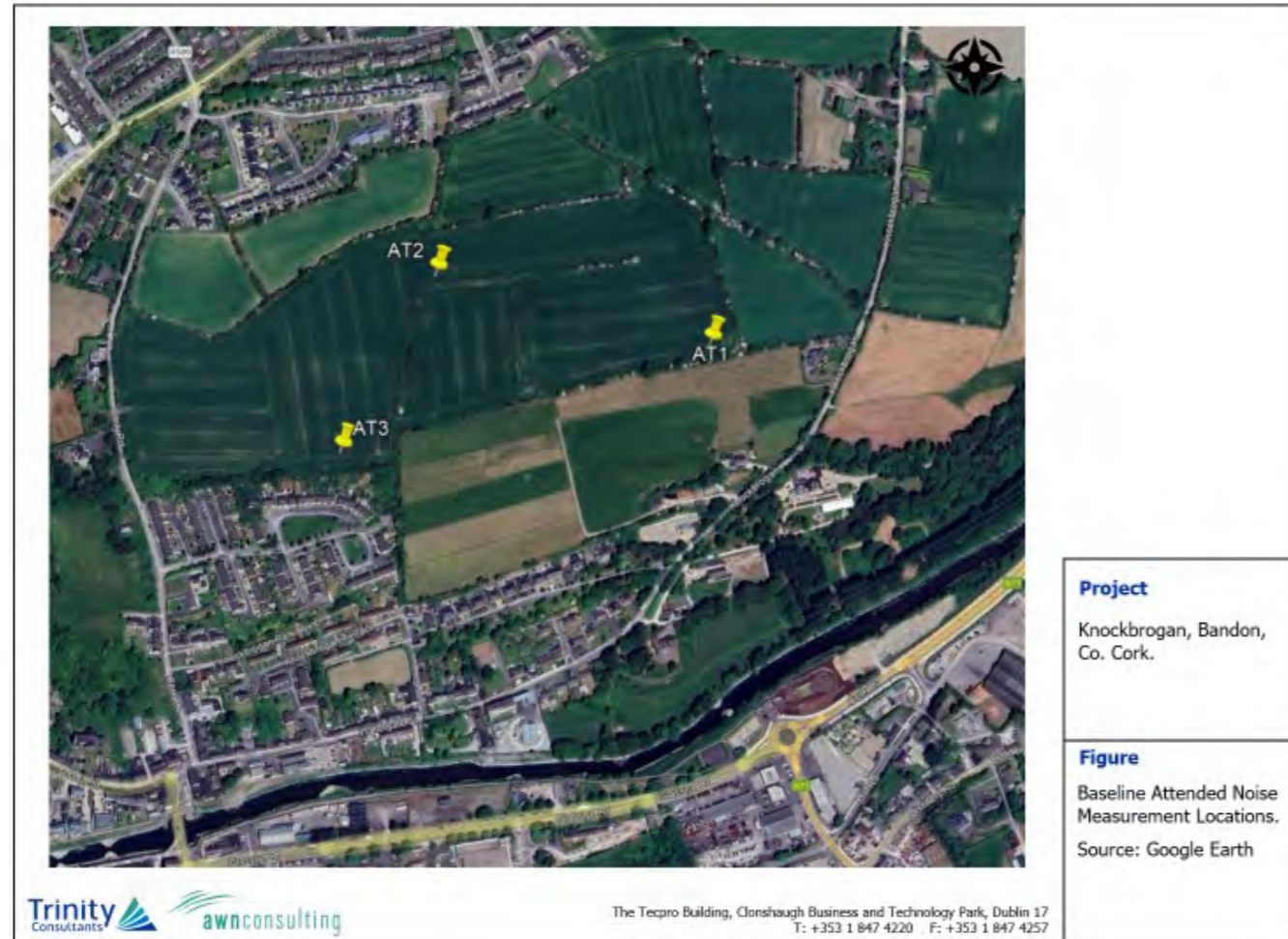
AT1 – Located near the proposed building locations at the east of the site and nearby existing manufacturing buildings to the south to capture a representative measurement of the existing noise environment in the area where construction is planned.

AT2 – Located to the north of the site near the existing residential properties at the northern boundary to capture a representative measurement of the existing noise environment in the area where construction is planned.

AT3 – Located to the west of the site near the existing residential properties at the south west boundary of the site to capture a representative measurement of the existing noise environment in the area where construction is planned.

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Figure 12 1 Attended Noise Survey Locations



12.6.1.5 Survey Results

15-minute attended measurements were taken at AT1, AT2 and AT3 to obtain samples of prevailing sound levels across the site.

The survey results for the attended monitoring are presented in Table 12 7 to Table 12 9.

12.6.1.5.1 Location AT1

Table 12 8 Noise Survey Results – AT1

Location	Start Time	Measured Noise Levels (dB re. 2x10 ⁻⁵ Pa)		
		L _{Aeq}	L _{AFmax}	L _{A90}
AT1	14:27	50	70	42
	15:20	45	54	42
	16:10	45	58	42

The noise environment was dominated by distant road traffic along the N71 and R589. In addition to these dominating factors there was a helicopter flyover at the southern end of the site, distant construction, foliage rustling and activity from the nearby industrial buildings to the south. Ambient noise levels ranged from 45 – 50 dB L_{Aeq,15min}. Background noise levels were of the order of 42 dB

L_{A90,15min}.

12.6.1.5.2 Location AT2

Table 12 9 Noise Survey Results – AT2

Location	Start Time	Measured Noise Levels (dB re. 2x10 ⁻⁵ Pa)		
		L _{Aeq}	L _{AFmax}	L _{A90}
AT2	14:45	42	50	39
	15:37	50	74	42
	16:27	43	55	39

The noise environment was dominated by distant road traffic along the N71 and R589. In addition to these dominating factors there was construction activity nearby briefly, a car horn, foliage rustling, birdsong and distant industrial / plant noise. Ambient noise levels ranged from 42 – 50 dB L_{Aeq,15min}. Background noise levels ranged from 39 – 42 dB L_{A90,15min}.

12.6.1.5.3 Location AT3

Table 12 10 Noise Survey Results – AT3

Location	Start Time	Measured Noise Levels (dB re. 2x10 ⁻⁵ Pa)		
		L _{Aeq}	L _{AFmax}	L _{A90}
AT3	15:03	46	57	44
	15:54	47	63	44
	16:44	45	54	42

The noise environment was dominated by distant road traffic along the N71 and R589. In addition to these dominating factors there distant construction, birdsong, foliage rustling and activity from the nearby industrial / plant buildings to the south. Ambient noise levels ranged from 45 – 47 dB L_{Aeq,15min}. Background noise levels ranged from 42 – 44 dB L_{A90,15min}.

12.7 The ‘Do Nothing’ Scenario

In the absence of the proposed project, the existing noise and vibration levels within the study area are expected to remain largely unchanged. The current baseline conditions characterised by the noise surveys within Section 12.6.1 will continue to prevail.

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12.8 Characteristics of the Proposed Development

The proposed development comprises a mix of residential units and all associated site works. A full description of the development is available in included in Chapter 2: Project Description.

When considering a development of this nature, the potential noise and vibration impact on the surroundings must be considered for each of two distinct stages:

- the construction and demolition phase, and;
- the operational phase.

12.8.1 Construction Phase

The highest potential noise and vibration impact of the proposed development will occur during the construction phase due to the activity of mobile plant and construction plant items with high source noise levels. The effects from construction across this time period is deemed short term in nature.

During the construction phase, activities will involve site set up which will include site clearance, the setting out site provisions of services works which will require extensive excavation and laying of sewers. Following this structural and building works associated with the residential units will be undertaken. For each stage there will be on-site plant and equipment operating in addition to construction traffic including movement of machinery and materials within and to and from the construction site. It is planned to construct the proposed development over 4 no. phases.

A variety of items of plant will be in use during these construction work all of which have the potential to generate high levels of noise. These will include excavators, loaders, dozers, cranes and static plant such as generators, compressors and pumps.

Vibration associated with the proposed construction site activities will be low due to the distance between the works and the nearest structures and buildings.

The potential impact associated with these above activities are discussed in the following sections.

12.8.2 Operational Phase

Once operational, there are no major noise sources associated with the proposed development, which is residential in nature. The main potential source of outward noise from the proposed development is associated with traffic flows to and from the development site on the surrounding road network. This activity is not associated with any significant noise effects to the surrounding noise environment.

12.9 Potential Significant Effects

12.9.1 Construction Phase

12.9.1.1 Noise

The highest potential noise and vibration impact of the proposed development will occur during the construction phase due to the operation of various plant machinery used to construct the various phases in addition to Heavy Goods Vehicles (HGVs) movement to, from and around the site. However, impacts during this phase are short-term in duration.

BS 5228-1 contains noise level data for various construction machinery. The noise levels relating to site clearance, ground excavation, and loading lorries (dozers, tracked excavators and wheeled loaders) are typically in the range of 76 to 82 dB $L_{Aeq,T}$ at a distance of 10 m. For this assessment, a worst-case scenario is assumed of 3 no. such items with a sound pressure level (SPL) of 81 dB at 10 m operating simultaneously along the closest works boundary. This would result in a total noise level of 86 dB at 10 m and an equivalent combined sound power level of 114 dB $L_{w(A)}$. This worst-case scenario is the typical assumption made for developments of this size, on the basis that it is unlikely that more than 3 no. items of such plant/equipment would be operating simultaneously in such close proximity to each other. A combined construction noise level of 86 dB at 10 m also allows for 5 items of plant with an operational noise level of 78 dB each operating simultaneously along the closest works boundary, which is associated with typical construction mobile plant items, cranes etc., all of which will occur on the site.

Guidance on the approximate attenuation achieved by barriers surrounding the site is also provided in BS 5228-1. It states that when the top of the plant is just visible to the receiver over the noise barrier, an approximate attenuation of 5 dB can be assumed, while a 10 dB attenuation can be assumed when the noise screen completely hides the sources from the receiver.

It is assumed that a standard site perimeter hoarding of 2.4m height will be installed around the site boundary.

The former scenario will be assumed in this case as the nearest noise-sensitive locations first floor partially overlook the site. Table 12.16 shows the potential noise levels calculated at various distances based on the assumed sound power level and attenuation provided by the barrier of 5 dB.

The closest noise sensitive locations have been identified and described below.

NSL1	Houses to the south at Radharc na Bhaile, approximately 55m from areas of major construction works.
NSL2	Houses to the west located along the Cork Road, approximately 200m from areas of major construction works.
NSL3	Houses to the north at Ard na Chuilinn, approximately 160m from areas of major construction works.
NSL4	Houses to the east along the L6069, approximately 100m-200m from areas of major construction works.

The construction noise threshold is determined by referring to Table 12 1 (BS 5228-1) and the baseline ambient noise levels (as referred to in Section 12.6.1), as outlined in the assessment criteria section.

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The standard working hours for the proposed development as outlined within the CEMP are as follows:

- **Monday to Friday: 07:00 to 19:00hrs;**
- **Saturdays: 08:00 to 16:00hrs,**

Should there be a requirement for works outside of the normal working hours a written submission seeking authorisation will be made to Cork County Council.

Based on the prevailing noise environment measured, the construction noise thresholds are defined from Category A as appropriate and defined within Table 12 1

Category A sets the following construction noise thresholds:

- Monday to Friday (07:00 – 19:00) **65 dB L_{Aeq,T}**
- Saturdays (07:00 – 13:00hrs) **65 dB L_{Aeq,T}**
- Evening and Saturday (13:00 – 23:00hrs) **55 dB L_{Aeq,T}**

Table 12 10 below presents the predicted daytime noise levels from an indicative construction period at these noise sensitive locations (NSLs) during periods of general construction.

Table 12 11 Predicted daytime noise levels from an indicative construction period.

Description of Noise Source	Sound Power Level (dB L _w (A))	Calculated noise levels at varying distances (dB L _{Aeq,T})				
		55m	75m	100m	150m	200m
3 no. items each with SPL of 81 dB at 10 m or 5 items each with SPL of 78 dB at 10m operating simultaneously.	114	59	55	52	48	45

The calculated noise levels in Table 12 10 show that construction noise is predicted to be below the recommended criteria outlined in Section 12-6, at these nearest residential locations. The predicted noise levels range from 6 dB to 20 dB below the CNT, depending on the distance to the various NSLs. With reference to Table 12 2, the expected effect is therefore expected to be negative, not significant to moderate and short term.

12.9.1.2 Construction Traffic

During the construction phase, traffic associated with the proposed development would consist of a mix of Light Goods Vehicles (LGVs) and Heavy Goods Vehicles (HGVs) travelling to and from the site.

In terms of the additional traffic on local roads that will be generated as a result of this development the following comment is presented: Considering that in order to increase traffic noise levels by 1 dB, traffic volumes would need to increase by the order of 25%. It is determined that additional traffic introduced onto the local road network associated with the construction of the proposed development will not result in a significant noise effect. The resultant noise impact is expected to be negative, slight and short term.

12.9.1.3 Vibration

During ground-breaking in the excavation phase, there is potential for vibration to propagate through the ground.

It is anticipated that excavations will be made using standard excavation machinery, which typically do not generate appreciable levels of vibration close to the source. Taking this into account and considering the distance that surrounding sensitive properties are from the works and the attenuation of vibration levels over distance, the resultant vibration levels are expected to be well below a level that would cause disturbance to building occupants or even be perceptible. The resultant noise impact is expected to be neutral, imperceptible and short term.

12.9.2 Operational Phase

12.9.2.1 Noise

During the operational phase of the proposed development, there will be an increase in vehicular traffic on some surrounding roads associated with the proposed development.

A traffic impact assessment relating to the proposed development has been prepared by Hegsons Design Consultancy Limited, as part of this EIAR. Using this information, the related noise impacts along the relevant road links has been assessed.

Figure 12 2 below outlines the breakdown of sections of road and Table 12 12 and Table 12 13 display the predicted change in noise level at different road links around the site for the year of opening and the design year using the Annual Average Daily Traffic (AADT) flows along the road links under consideration.

Figure 12.2 Traffic Noise Assessment – Assessed Road Links



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Table 12 12 Predicted Change in Traffic Noise Level – Opening Year

Road Link	Opening Year (2028)		
	AADT Without Development	AADT With Development	Change in Noise Level (dB)
1	12,388	12,529	0.0
2	19,317	19,653	+0.1
3	22,532	22,805	+0.1
4	14,010	14,142	0.0
5	12,598	12,615	0.0
6	8,853	8,897	0.0
7	10,922	10,995	0.0
8	11,940	11,985	0.0
9	17,928	18,021	0.0

Table 12 13 Predicted Change in Traffic Noise Level – Design Year

Road Link	Design Year (2043)		
	AADT Without Development	AADT With Development	Change in Noise Level (dB)
1	14,125	14,688	+0.2
2	21,954	23,297	+0.3
3	25,744	26,833	+0.2
4	15,974	16,505	+0.1
5	14,534	14,602	0.0
6	10,206	10,385	+0.1
7	12,560	12,852	+0.1
8	13,724	13,903	+0.1
9	20,642	21,014	+0.1

For the opening year (2028) traffic flows, the predicted changes in noise level along the assessed road links is +0.1 dB. For the design year (2043) traffic flows, the predicted changes in noise level along the road links +0.1 to +0.3 dB.

With reference to Table 12.7, the predicted change in noise level associated with additional traffic on the existing road network, is negligible in magnitude. The impact is therefore negative, imperceptible and long term.

12.9.2.2 Vibration

There are no sources of operational vibration of note associated with the operational phase of the proposed development.

12.9.3 Cumulative Effects

12.9.3.1 Construction Phase

In the event that construction activities at nearby sites are taking place concurrently with the construction of the proposed development, there is potential for cumulative noise impacts to occur. Due to the nature of construction works associated with the proposed development, noise levels from this site will dominate the noise environment when occurring in proximity to the noise sensitive locations along its immediate boundary. The noise contribution from other construction sites would need be equal to those associated with the proposed development in order to result in any cumulative effect.

In the event of the two construction phases of the proposed development overlapping predicted construction noise levels within Section 12.9.1.1 may rise by the order of +3 dB. In this scenario, predicted cumulative noise levels remain below the CNT at the nearest NSLs and therefore the impact is negative, moderate and short term in nature.

12.9.3.2 Operational Phase

The traffic data presented in the Transport Assessment contain flows associated with surrounding committed developments and therefore the assessment in this document is inherently cumulative.

The cumulative impact is therefore negative, imperceptible and long term.

12.9.4 Summary

The impact assessment for both the construction phase and operational phase concludes noise and vibration impacts are classified as moderate or lesser in magnitude, as such no specific mitigation measures are deemed necessary in the reduction of significant impacts.

Best practice noise control measures are presented in Section 12.10.2 to ameliorate the level of noise associated with construction activity.

The following Table summarises the identified likely effects during the construction phase of the proposed development before mitigation measures are applied.

Table 12 14 Summary of Construction Phase Likely Significant Effects in the absence of mitigation

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
Construction noise	Negative	Not significant to moderate	~300m radius of proposed development	Likely	Short term	Direct
Construction vibration	Neutral	Imperceptible				

The following Table summarises the identified likely significant effects during the operational phase of the proposed development before mitigation measures are applied.

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Table 12 15 Summary of Operational Phase Likely Significant Effects in the absence of mitigation

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
Traffic Noise	Negative	Imperceptible	Road network within ~800m radius	Likely	Long term	Direct

12.10 Mitigation Measures

12.10.1 Incorporated Design Mitigation

No mitigation measures are proposed to be incorporated into the design.

12.10.2 Construction Phase Mitigation

The assessment detailed in Section 12.9.1.1 has found that predicted construction noise levels do not exceed the threshold whereby a significant impact would be likely. Therefore, while the contractor should employ best practice noise control measures, specific mitigation measures are not necessary.

Aside from this, best practice noise control measures are highlighted so as to reduce the risk of unnecessary excessive noise generation:

- limiting the hours during which site activities likely to create high levels of noise or vibration are permitted;
- establishing channels of communication between the contractor/developer, Local Authority and residents;
- appointing a site representative responsible for matters relating to noise and vibration; and
- monitoring levels of noise and/or vibration during critical periods and at sensitive locations.
- selection of plant with low inherent potential for generation of noise and/ or vibration;
- erection of barriers as necessary around items such as generators or high duty compressors;
- situate any noisy plant as far away from sensitive properties as permitted by site constraints and the use of vibration isolated support structures where necessary.

12.10.3 Operational Phase Mitigation

There are no mitigation measures proposed for either noise or vibration during the operational phase.

12.11 Residual Impact Assessment

12.11.1 Construction Phase

12.11.1.1 Noise

Predicted construction noise levels range from 6 dB to 20 dB below the CNT, depending on the distance to the various NSLs. With reference to Table 12 2, the expected effect is therefore expected to be negative, not significant to moderate and short term.

It is determined that additional traffic introduced onto the local road network associated with the construction of the proposed development will not result in a significant noise effect. The resultant noise impact is expected to be negative, slight and short term.

12.11.1.2 Vibration

Vibration levels associated with construction activities are expected to be well below a level that would cause disturbance to building occupants or even be perceptible. The resultant noise impact is expected to be neutral, imperceptible and short term.

12.11.2 Operational Phase

12.11.2.1 Noise

For the opening year (2028) traffic flows, the predicted changes in noise level along the assessed road links is +0.1 dB. For the design year (2043) traffic flows, the predicted changes in noise level along the road links +0.1 to +0.3 dB.

With reference to Table 12.7, the predicted change in noise level associated with additional traffic on the existing road network, is negligible in magnitude. The impact is therefore negative, imperceptible and long term.

12.11.2.2 Vibration

There are no sources of operational vibration of note associated with the operational phase of the proposed development.

12.11.3 Summary of Post-mitigation Effects

The following Table summarises the identified likely residual effects during the construction phase of the proposed development following the application of mitigation measures.

Table 12 16 Summary of Construction Phase Effects Post Mitigation

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
Construction noise	Negative	Not significant to moderate	~300m radius of proposed development	Likely	Short term	Direct
Construction vibration	Neutral	Imperceptible	N/A	Likely	Short term	Direct

The following Table summarises the identified likely residual effects during the operational phase of the proposed development post mitigation.

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Table 12.17 Summary of Operational Phase Effects Post Mitigation

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
Traffic Noise	Negative	Imperceptible	Road network within ~800m radius	Likely	Long term	Direct

12.12 Risk of Major Accidents or Disasters

Risk of major accidents is not relevant to the noise and vibration assessments.

12.13 Worst Case Scenario

As specific mitigation measures are not proposed, the worst case scenario is not applicable to noise and vibration.

12.14 Interactions

This chapter has used information from the Traffic chapter and the architectural drawings to inform the assessment of noise and vibration impacts. With increased traffic movements, the noise levels in the surrounding area increase. The impacts of the proposed development on the noise environment are assessed by reviewing the change in traffic flows on roads close to the site. In this assessment, the impact of the interactions between traffic and noise are considered to be negative, long term and imperceptible due to the low-level changes in traffic flows associated with the proposed development.

12.15 Monitoring

Noise and vibration monitoring is not an output of the noise and vibration assessments for either construction or operational phases.

12.16 Summary of Mitigation and Monitoring

In the absence of identified potential significant effects, no specific mitigation or monitoring measures are proposed.

12.17 Conclusion

In conclusion, an assessment of noise and vibration impacts associated with the proposed residential development has been conducted for both the construction and operational phases. Reference has been made to the most up to date and relevant standards and guidance and all findings of the report have been compiled within this EIAR chapter.

A baseline noise survey has been carried out to determine the prevailing noise environment and to inform the impact assessment.

During the construction phase, noise and vibration levels are expected to be higher due to activities such as excavation, and the use of heavy machinery. The assessment has identified varying effects, the highest being

moderate in significance. Best practice control measures are presented for information purposes in order to ameliorate noise emissions.

In the operational phase, the primary sources of noise will be from traffic associated with the proposed development. The predicted noise levels are expected to be within acceptable limits as defined by relevant standards and guidelines.

Both construction and operational vibration associated with the proposed development is anticipated to be not significant.

12.18 References and Sources

- British Standard Institute (BSI) British Standard (BS) 5228-1:2009 +A1 2014 Code of Practice for noise and vibration control of construction and open sites - Part 1: Noise
- BS 5228-2:2009+A1:2014 Code of Practice for noise and vibration control of construction and open sites - Part 2: Vibration (BSI 2014b);
- BS 7385: 1993 Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from ground borne vibration (hereafter referred to as BS 7385-2). (BSI 1993);
- BS 6472-1: 2008 Guide to evaluation of human exposure to vibration in buildings, Part 1 Vibration sources other than blasting (BSI 2008);
- BS 8233:2014 Guidance on sound insulation and noise reduction for buildings
- BS 4142: 2014 +A1 2019 Methods for Rating and Assessing Industrial and Commercial Sound (BSI 2019);
- UK Highways England (UKHE) Design Manual for Roads and Bridges (DMRB) LA 111 Sustainability and Environmental Appraisal LA 111 Noise and Vibration Revision 2 (UKHE 2020);
- S.I. No. 549/2018 – European Communities (Environmental Noise) Regulations 2018
- S.I. No. 241/2006 - European Communities Noise Emission by Equipment for Use Outdoors (Amendment) Regulations 2006;
- International Organization for Standardization (ISO) 9613-2:1996 Acoustics – Attenuation of sound during propagation outdoors - Part 2: General method of calculation (ISO 1996);
- ISO 1996-1: 2016 Acoustics - Description, measurement and assessment of environmental noise. Part 1: Basic quantities and assessment procedures (ISO 2016);
- ISO 1996-2:2017 - Description, measurement and assessment of environmental noise - Part 2: Determination of sound pressure levels (ISO 2017), and;
- The UK Department of Transport Calculation of Road Traffic Noise (UK Department of Transport 1998).

CHAPTER THIRTEEN

AIR QUALITY

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CHAPTER THIRTEEN

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CHAPTER 13 | AIR QUALITY

13.1 Introduction

This chapter assesses the likely air quality impacts associated with the proposed largescale residential development situated in Knockbrogan, Bandon, Co. Cork.

This report assesses the baseline air quality conditions at the site and evaluates the potential effects of the proposed development's construction and operation. Where required, appropriate mitigation measures to limit any identified likely significant adverse impacts to air quality are recommended.

Please refer to Chapter 2 – Project Description for the full development description. In summary, the subject application is for a large-scale Residential Development (LRD) comprising of the construction of residential units and all ancillary development works including footpaths, car and bicycle parking, drainage, bicycle and bin stores, lighting and landscaping/amenity areas at Knockbrogan, Bandon, Co. Cork. Access will be provided via the existing access road onto the Cork Road permitted under reference 21/4059. This Chapter should be read in conjunction with Chapter 6 Material Assets Traffic and Transport and the Traffic and Transportation Assessment submitted with the planning application.

13.1.1 Expertise & Qualifications

This chapter was completed by Tanmay Gojamgunde. Tanmay is an environmental consultant in the Air Quality & Climate section of AWN Consulting, a Trinity Consultants Company. He holds a MSc in Air Pollution Management and Control from the University of Birmingham and has also completed BTech in Environmental Engineering. As part of the MSc, he worked on 'The Impact of bus-fleet electrification on air quality in Birmingham' utilising advanced dispersion modelling tools and emission inventory toolkit. Prior to joining AWN, Tanmay contributed to several key environmental projects in India, including Delhi's first air quality monitoring program (R ASMAN), air quality and traffic planning assessments with IIT Kanpur, and EIAR's for industrial district in Kanpur and residential developments in Ireland. He also specialises in conducting air dispersion modelling assessments of emissions, emission inventories, R programming and extends to broader aspects of environmental engineering.

This chapter was reviewed by Ciara Nolan. Ciara is a principal environmental consultant in the Air Quality & Climate section of AWN Consulting. She holds a BSc in Energy Systems Engineering from University College Dublin and has also completed an MSc in Applied Environmental Science at UCD. She is a Member of the Institute of Air Quality Management (MIAQM) and the Institution of Environmental Sciences (MIEnvSc). She has over 8 years of experience in undertaking air quality and climate assessments. She has prepared air quality and climate impact assessments as part of EIARs for residential developments including Woodbrook, Shankill (Planning Application Ref. ABP30584419), Ballygossan Park, Skerries (Planning Application Ref. LRD0010/S3), SHD Ratoath (Planning Application Ref. SH305196), SHD Rathmullen, Drogheda (Planning Application Ref. SH305552), commercial and industrial developments by Dublin Airport Authority, Abbvie, Mountpark, Pfizer, Takeda, as well as renewable energy developments such as Crockahenny Windfarm, Upperchurch Windfarm, Knocknamona Windfarm and Keerglen Windfarm. She also specialises in conducting air dispersion modelling assessments of emissions from data centres, energy centres and the chemical industry as part of EPA Industrial Emissions Licences for Echelon DC, AWS, Takeda, MSD and Regeneron. She has undertaken air quality and climate impact assessments for transportation schemes, primarily regional and national road schemes, from constraints, through to route selection and EIAR stage.

13.1.2 Aspects Relevant to this Assessment

During the construction phase construction dust emission have the potential to impact air quality. Dust emissions will primarily occur as a result of site preparation works, earthworks and the movement of trucks on site and exiting the site. There is also the potential for engine emissions from site vehicles and machinery to impact air quality. Construction phase impacts will be short-term in duration.

Engine emissions from vehicles accessing the site have the potential to impact air quality during the operational phase of the development through the release of nitrogen dioxide (NO₂) and particulate matter (as PM₁₀ and PM_{2.5}). Operational phase impacts will be long-term in duration.

13.2 Methodology

13.2.1 Relevant Legislation & Guidance

The principal guidance and best practice documents used to inform the assessment of potential impacts on air quality are summarised below.

- Guidance on the Assessment of Dust from Demolition and Construction v2.2 (Institute of Air Quality Management [IAQM] (hereafter referred to as the IAQM Guidelines) (IAQM, 2024);
- A Guide To The Assessment Of Air Quality Impacts On Designated Nature Conservation Sites (Version 1.1) (IAQM, 2020); and
- PE-ENV-01106: Air Quality Assessment of Specified Infrastructure Projects (Transport Infrastructure Ireland [TII], 2022).
- In addition to specific air quality guidance documents, the following guidelines were considered and consulted in the preparation of this chapter:
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (hereafter referred to as the Environmental Protection Agency (EPA) Guidelines) (EPA, 2022);
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Department of Housing, Planning & Local Government, 2018); and
- Environmental Impact Assessment (EIA) Directive Guidance on the Preparation of the Environmental Impact Assessment Report (European Commission, 2017).

13.2.2 Criteria for Rating of Impacts

13.2.2.1 Ambient Air Quality Standards

To reduce the risk to health from poor air quality, national and European statutory bodies have set limit values in ambient air for a range of air pollutants. These limit values or 'Air Quality Standards' are health or environmental-based levels for which additional factors may be considered. For example, natural background levels, environmental conditions and socio-economic factors may all play a part in the limit value which is set.

Air quality significance criteria are assessed on the basis of compliance with the appropriate standards or limit values. The applicable standards in Ireland are set out in Directive (EU) 2024/2881 of the European Parliament and of the Council of 23 October 2024 on ambient air quality and cleaner air for Europe (recast). This directive

supersedes EU Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe (CAFE Directive). Directive (EU) 2024/2881 sets out air quality standards for pollutants to be reached by 2026 and by 2030 which are more closely aligned with the World Health Organisation (WHO) air quality guidelines.

The ambient air quality limit values for pollutants are set out in Annex I of Directive (EU) 2024/2881. Table 1 of Annex I in Directive (EU) 2024/2881 sets out the updated air quality limit values for pollutants to be achieved by 1 January 2030, which are more closely aligned with the WHO air quality guidelines. Table 2 of Annex I in Directive (EU) 2024/2881 sets out the limit values for air pollutants which are to be achieved by 11 December 2026 and are also applicable up to 2030. The limit values in Table 2 of Annex I are the same as the limits set under Directive 2008/50/EC and the Air Quality Standards Regulations 2022.

The Ambient Air Quality Standards Regulations 2022 (S.I. 739 of 2022) (the Air Quality Standards Regulations 2022) further transposed the CAFE Directive and revoked the Air Quality Standards Regulations 2011, as amended. With the adoption of Directive (EU) 2024/2881, Ireland must transpose this directive into national law, i.e. update the Air Quality Standards Regulations, before December 2026.

In relation to the proposed development, the applicable limit values are for nitrogen dioxide (NO2) and particulate matter (PM10 and PM2.5). Table 13.1 outlines the limit values pre-2030 and post-2030 for the specified pollutants.

Table 13.1 Ambient Air Quality Limit Values

Pollutant	Directive (EU) 2024/2881 Annex I Table 2		Directive (EU) 2024/2881 Annex I Table 1	
	Limit Type	Limit Value (to be attained by 2026 and applicable until 2030)	Limit Type	Limit Value (to be attained by 2030)
Nitrogen Dioxide (NO2)	Hourly limit for protection of human health - not to be exceeded more than 18 times/year	200 µg/m³	Hourly limit for protection of human health - not to be exceeded more than 3 times/year	200 µg/m³
	N/A	N/A	24-hour limit for protection of human health - not to be exceeded more than 18 times/year	50 µg/m³
	Annual limit for protection of human health	40 µg/m³	Annual limit for protection of human health	20 µg/m³

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Pollutant	Directive (EU) 2024/2881 Annex I Table 2		Directive (EU) 2024/2881 Annex I Table 1	
	Limit Type	Limit Value (to be attained by 2026 and applicable until 2030)	Limit Type	Limit Value (to be attained by 2030)
Particulate Matter (as PM ₁₀)	24-hour limit for protection of human health - not to be exceeded more than 35 times/year	50 µg/m³	24-hour limit for protection of human health - not to be exceeded more than 18 times/year	45 µg/m³
	Annual limit for protection of human health	40 µg/m³	Annual limit for protection of human health	20 µg/m³
Particulate Matter (as PM _{2.5})	N/A	N/A	24-hour limit for protection of human health - not to be exceeded more than 18 times/year	25 µg/m³
	Annual limit for protection of human health	25 µg/m³	Annual limit for protection of human health	10 µg/m³

13.2.2.2 WHO Air Quality Guidelines & Clean Air Strategy

In April 2023, the Government of Ireland published the Clean Air Strategy for Ireland (Government of Ireland, 2023), which provides a high-level strategic policy framework needed to reduce air pollution. The strategy commits Ireland to achieving the 2021 WHO Air Quality Guidelines Interim Target 3 (IT3) by 2026 (Table 13.2), the IT4 targets by 2030 and the final targets by 2040 (Table 13.2). The strategy notes that a significant number of EPA monitoring stations observed air pollution levels in 2021 above the WHO targets; 80% of these stations would fail to meet the final PM_{2.5} target of 5 µg/m³. The strategy also acknowledges that “meeting the WHO targets will be challenging and will require legislative and societal change, especially with regard to both PM_{2.5} and NO₂”.

Annex II of Directive (EU) 2024/2881 gives assessment thresholds which align with the clean air strategy final 2040 WHO targets. Directive (EU) 2024/2881 states that “Member States shall endeavour to achieve and preserve the best ambient air quality and a high level of protection of human health and the environment, with the aim of achieving a zero-pollution objective as referred to in Article 1(1), in line with WHO recommendations, and below the assessment thresholds laid down in Annex II.”

These assessment thresholds relate to monitoring of ambient air quality by Member States, where “exceedances of the assessment thresholds specified in Annex II shall be determined on the basis of concentrations during the previous 5 years where sufficient data are available. An assessment threshold shall be deemed to have been exceeded if it has been exceeded during at least 3 separate years out of those previous 5 years.”

Table 13 2 WHO Air Quality Guidelines 2021

Pollutant	Limit Type	IT3 (2026)	IT4 (2030)	Final Target (2040)
NO ₂	24-hour limit for protection of human health	-	-	25 µg/m ³
	Annual limit for protection of human health	20 µg/m ³	-	10 µg/m ³
PM (as PM ₁₀)	24-hour limit for protection of human health	75 µg/m ³	50 µg/m ³	45 µg/m ³
	Annual limit for protection of human health	30 µg/m ³	20 µg/m ³	15 µg/m ³
PM (as PM _{2.5})	24-hour limit for protection of human health	37.5 µg/m ³	25 µg/m ³	15 µg/m ³
	Annual limit for protection of human health	15 µg/m ³	10 µg/m ³	5 µg/m ³

The applicable air quality limit values for the purposes of this assessment are those set out in Table 13-1. The pre-2030 limit values in Table 2 of Annex I of Directive (EU) 2024/2881 are applicable for the construction phase and Opening Year 2028 for the proposed development. The limit values stipulated in Table 1 of Annex I of Directive (EU) 2024/2881 are applicable for the Design Year 2043 for the proposed development.

13.2.2.3 Dust Deposition Guidelines

The concern from a health perspective is focused on particles of dust that are less than 10 microns (PM₁₀) and less than 2.5 microns (PM_{2.5}). The EU ambient air quality standards outlined in Table 13-1 have set ambient air quality limit values for PM₁₀ and PM_{2.5}.

With regards to larger dust particles that can give rise to nuisance dust, there are no statutory guidelines regarding the maximum dust deposition levels that may be generated during the construction phase of a development in Ireland. Furthermore, no specific criteria have been stipulated for nuisance dust in respect of this development.

With regard to dust deposition, the German TA-Luft standard for dust deposition (non-hazardous dust) (German VDI, 2002) sets a maximum permissible emission level for dust deposition of 350 mg/m²/day averaged over a one-year period at any receptors outside the site boundary. The TA-Luft standard has been applied for the purpose of this assessment based on recommendations from the EPA in Ireland in the document titled *Environmental Management Guidelines - Environmental Management in the Extractive Industry (Non-Scheduled Minerals)* (EPA, 2006). The document recommends that the TA-Luft limit of 350 mg/m²/day be applied to the site boundary of quarries. This limit value can be implemented with regard to dust impacts from construction of the proposed development.

13.2.2.4 Air Quality & Traffic Significance Criteria

The Transport Infrastructure Ireland (TII) guidance document *Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106* (TII, 2022) details a methodology for determining air quality impact significance criteria for road schemes which can be applied to any project that causes a change in traffic. The degree of impact is determined based on the percentage change in pollutant concentrations relative to the Do-Nothing scenario. The TII significance criteria are outlined in Table 4.9 of *Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106* (TII, 2022) and reproduced in Table 13-3 below. These criteria have been adopted for the proposed development to predict the impact of NO₂, PM₁₀ and PM_{2.5} emissions as a result of the proposed development.

Table 13 3 Air Quality & Traffic Significance Criteria

Long-term average concentration at receptor in assessment year	% Change in concentration relative to Air Quality Limit Value (AQLV)			
	1%	2-5%	6-10%	>10%
75% or less of AQLV	Neutral	Neutral	Slight	Moderate
76 – 94% of AQLV	Neutral	Slight	Moderate	Moderate
95 – 102% of AQLV	Slight	Moderate	Moderate	Substantial
103 – 109% of AQLV	Moderate	Moderate	Substantial	Substantial
110% or more of AQLV	Moderate	Substantial	Substantial	Substantial

Source: Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106 (TII, 2022)

As per Table 13-3 a neutral effect is one where a change in concentration at a receptor is:

- 5% or less where the Opening Year, without the proposed development, annual mean concentration is 75% or less of the standard; or
- 1% or less where the Opening Year, without the proposed development, annual mean concentration is 94% or less of the standard.

Where an effect does not meet the criteria for neutral, as described above, the effect can either be positive or negative. The TII guidance (TII, 2022) states that “the evaluation of significance of effects for the operational phase should be undertaken for the Opening Year only as the Design Year is likely to show lower total pollutant concentrations and changes in concentration” (TII, 2022).

Non-significant effects (i.e. of local importance only) are ‘neutral’ or ‘slight’ changes in concentrations while significant effects can be changes in pollutant concentrations that are either ‘moderate’ or ‘substantial’. However, the TII guidance (TII, 2022) states that these must be considered in the context of the project and ‘moderate’ or ‘substantial’ increases are not necessarily always significant effects.

The impact descriptors in Table 13-3 are used to describe the impact at each modelled receptor location, and the significance of the impacts is then determined, aligning with the terminology in the EPA guidelines (EPA, 2022). Whilst it may be determined that there are ‘slight’, ‘moderate’ or ‘substantial’ impacts at one or more receptors, an overall judgement should be made of whether the proposed development is ‘significant’ or ‘not significant’ in terms of air quality. Factors to consider when determining the overall significance of a proposed development are provided in Table 4.10 of the TII guidance (TII, 2022).

13.2.3 Construction Phase

13.2.3.1 Construction Dust Assessment

The Institute of Air Quality Management in the UK (IAQM) guidance document ‘Guidance on the Assessment of Dust from Demolition and Construction’ (IAQM, 2024) outlines an assessment method for predicting the impact of dust emissions from construction activities based on the scale and nature of the works and the sensitivity of the area to dust impacts. The IAQM methodology has been applied to the construction phase of this development to predict the likely risk of dust impacts in the absence of mitigation measures and to

determine the level of site-specific mitigation required. The use of UK guidance is recommended by Transport Infrastructure Ireland in their guidance document *Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106* (TII, 2022).

The major dust generating activities are divided into four types within the IAQM guidance (IAQM, 2024) to reflect their different potential impacts. These are:

- Demolition;
- Earthworks;
- Construction; and
- Trackout (transport of dust and dirt from the construction site onto the public road network).

The magnitude of each of the four categories is divided into Large, Medium or Small scale depending on the nature of the activities involved. The criteria for determining the category for the works involved are outlined in Table 13-4, these are based on the IAQM guidance (IAQM, 2024). The magnitude of each activity is combined with the overall sensitivity of the area to determine the risk of dust impacts from site activities. This allows the level of site-specific mitigation to be determined.

Table 13-4 IAQM Criteria to Determine Dust Emissions Magnitude

Dust Emission Magnitude		
Small	Medium	Large
Demolition		
<ul style="list-style-type: none"> • Total building volume <12,000 m³ • Construction material with low potential for dust release (e.g. metal cladding or timber) • Demolition activities <6 m above ground • Demolition during wetter months 	<ul style="list-style-type: none"> • Total building volume 12,000 - 75,000 m³ • Potentially dusty construction material • Demolition activities 6 – 12 m above ground level 	<ul style="list-style-type: none"> • Total building volume >75,000 m³ • Potentially dusty construction material (e.g. concrete) • On-site crushing and screening • Demolition activities >12 m above ground level
Earthworks		
<ul style="list-style-type: none"> • Total site area <18,000 m² • Soil type with large grain size (e.g. sand) • <5 heavy earth moving vehicles active at any one time • Formation of bunds <3 m in height • Earthworks during wetter months 	<ul style="list-style-type: none"> • Total site area 18,000 m² - 110,000 m² • Moderately dusty soil type (e.g. silt) • 5 – 10 heavy earth moving vehicles active at any one time • Formation of bunds 3 – 6 m in height 	<ul style="list-style-type: none"> • Total site area >110,000 m² • Potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size) • >10 heavy earth moving vehicles active at any one time • Formation of bunds >6 m in height

Dust Emission Magnitude		
Small	Medium	Large
Construction		
<ul style="list-style-type: none"> • Total building volume <12,000 m³ • Construction material with low potential for dust release (e.g. metal cladding or timber) 	<ul style="list-style-type: none"> • Total building volume 12,000 - 75,000 m³ • Potentially dusty construction material (e.g. concrete) • On-site concrete batching 	<ul style="list-style-type: none"> • Total building volume >75,000 m³ • On-site concrete batching • Sandblasting
Trackout (Truck Movements)		
<ul style="list-style-type: none"> • <20 HDV (>3.5 t) outward movements in any one day • Surface material with low potential for dust release • Unpaved road length <50 m 	<ul style="list-style-type: none"> • 20 – 50 HDV (>3.5 t) outward movements in any one day • Moderately dusty surface material (e.g. high clay content) • Unpaved road length 50 -100 m 	<ul style="list-style-type: none"> • >50 HDV (>3.5 t) outward movements in any one day • Potentially dusty surface material (e.g. high clay content) • Unpaved road length >100 m

Once the dust emission magnitude has been determined the next step, according to the IAQM guidance (IAQM, 2024), is to establish the level of risk by combining the magnitude with the overall sensitivity of the area to dust soiling, human health and ecological effects. The level of risk associated with each activity is determined using the criteria in Table 13 5.

Table 13 5 IAQM Criteria to Determine Risk of Dust Impacts

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
Demolition			
High	High risk	Medium risk	Medium risk
Medium	High risk	Medium risk	Low risk
Low	Medium risk	Low risk	Negligible
Earthworks			
High	High risk	Medium risk	Low risk
Medium	Medium risk	Medium risk	Low risk
Low	Low risk	Low risk	Negligible
Construction			
High	High risk	Medium risk	Low risk
Medium	Medium risk	Medium risk	Low risk
Low	Low risk	Low risk	Negligible
Trackout			
High	High risk	Medium risk	Low risk
Medium	Medium risk	Medium risk	Low risk
Low	Low risk	Low risk	Negligible

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13.2.3.2 Construction Phase Traffic Assessment

Construction phase traffic also has the potential to impact air quality. The TII guidance Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106 (TII, 2022), states that road links meeting one or more of the following criteria can be defined as being ‘affected’ by a proposed development and should be included in the local air quality assessment. While the guidance is specific to infrastructure projects, the approach can be applied to any development that causes a change in traffic.

- Annual average daily traffic (AADT) changes by 1,000 or more;
- Heavy duty vehicle (HDV) AADT changes by 200 or more;
- Daily average speed change by 10 kph or more;
- Peak hour speed change by 20 kph or more;
- A change in road alignment by 5m or greater.

HEGSONS Design Consultancy Limited (hereafter HEGSONS) have prepared a Traffic and Transport Impact Assessment for the proposed development, enclosed separately, and have prepared Chapter 6 Material Assets – Traffic and Transport of this EIAR. As per Chapter 6, it has been determined by HEGSONS that the construction stage traffic will not increase by 1,000 AADT, or 200 HDV AADT, or that the development will not result in speed changes or changes in road alignment during the construction phase. Therefore, the traffic does not meet the above scoping criteria. A detailed air quality assessment of construction stage traffic emissions has been scoped out from any further assessment as there is no potential for significant impacts to air quality with respect with human or ecological receptors

13.2.4 Operational Phase

Operational phase traffic has the potential to impact local air quality as a result of increased vehicle movements associated with the proposed development. The TII scoping criteria detailed in Section 13.2.3.2 were used to determine if any road links are affected by the proposed development and require inclusion in a detailed air dispersion modelling assessment. HEGSONS have prepared a Traffic and Transport Impact Assessment for the proposed development, enclosed separately, and have prepared Chapter 6 Material Assets – Traffic and Transport. There is predicted to be a greater than 1,000 AADT increase on a small number of road links. As a result, an assessment of traffic related emissions was conducted. Additionally, traffic associated with other cumulative developments in the vicinity of the proposed development was included in the figures supplied to ensure a full cumulative assessment was conducted. See Traffic and Transport Assessment and Chapter 6 Material Assets – Traffic and Transport for further details.

The impact of traffic emissions on air quality is assessed for both human and ecological receptors within 200 m of impacted roads as per the TII PE-ENV-01106 guidance (TII, 2022). The following sections describe the methodology for each assessment.

The impact to air quality as a result of changes in traffic is assessed at sensitive human receptors in the vicinity of affected roads. These are discussed in further detail within Section 13.4.3.2 and shown graphically in Figure 13.3.

The TII guidance (2022) states that modelling should be conducted for NO₂, PM₁₀ and PM_{2.5} for the Base, Opening and Design Years for both the Do Minimum (Do Nothing – i.e. assuming the proposed development is not in place) and Do Something (with the proposed development in place) scenarios. Modelling of operational NO₂, PM₁₀ and

PM_{2.5} concentrations has been conducted for the Do Nothing and Do Something scenarios using the TII Road Emissions Model (REM) online calculator tool (TII, 2025).

The following inputs are required for the REM tool: receptor locations, light duty vehicle (LDV) annual average daily traffic movements (AADT), annual average daily heavy-duty vehicles (HDV AADT), annual average traffic speeds, road link lengths, road type, project county location and pollutant background concentrations. The Default fleet mix option was selected along with the Intermediate Case fleet data base selection for cars, the ICE Sales Ban 2035 fleet data base for LGVs and the EU Target for the HGV fleet data base, as per TII Guidance (TII, 2025). The Intermediate Case assumes a linear interpolation between the Business-as-Usual case – where current trends in vehicle ownership continue and the Climate Action Plan (CAP) case – where adoption of low emission light duty vehicles occurs. The ICE Sales Ban 2035 represents a sales ban on new combustion engine vehicles to be implemented by 2035, and the EU Target for HGV represents interim targets for emissions from sales of new HGVs.

Using this input data the model predicts the road traffic contribution to ambient ground level concentrations at the identified sensitive receptors using generic meteorological data. The TII REM uses county-based Irish fleet composition for different road types, for different European emission standards from pre-Euro to Euro 6/VI with scaling factors to reflect improvements in fuel quality, retrofitting, and technology conversions. The TII REM also includes emission factors for PM₁₀ emissions associated with brake and tyre wear (TII, 2024). The predicted road contributions are then added to the existing background concentrations to give the predicted ambient concentrations. The ambient concentrations are then compared with the relevant ambient air quality standards to assess the compliance of the proposed development with these ambient air quality standards.

The TII guidance (2022) also states that impacts to sensitive ecology due to traffic emissions should be considered. Consideration should be given to designated sites within 2km of the proposed development. However, a detailed assessment is only required at a local level, where there is a designated site within 200m of impacted road links. The TII guidance (TII, 2022) notes that only sites that are sensitive to nitrogen and acid deposition need to be included in the assessment. It is not necessary to include sites for example that have been designated as a geological feature or water course. There are no designated ecological sites within 200m of the site or impacted road links and therefore no assessment was required as there is no potential for significant impacts to the designated sites due to changes in air quality.

13.2.4.1 Traffic Data used in Modelling Assessment

Traffic flow information is detailed in Table 13.6 as obtained from HEGSONS for the purposes of this assessment. Data for the Base Year 2025 and the Do Nothing and Do Something scenarios for the Opening Year 2028 and Design Year 2043 were provided. The traffic data included traffic associated with the development site and other cumulative sites as relevant (see Chapter 6 for further details).

The modelling assessment has been undertaken for road links that were within 200 m of receptors. Background concentrations have been included as per Section 13.4.2 of this chapter based on available EPA background monitoring data (EPA, 2024).

Table 13 6 Traffic Data used in Operational Phase Air Quality Assessment

Road Name	Speed (kph)	Base Year LDV AADT (HDV AADT)	Opening Year		Design Year	
			Do Nothing	Do Something	Do Nothing	Do Something
			LDV AADT (HDV AADT)	LDV AADT (HDV AADT)	LDV AADT (HDV AADT)	LDV AADT (HDV AADT)
L2040 Old Macroom Road	50	15299 (977)	18158 (1159)	18473 (1179)	20636 (1317)	21899 (1398)
Bandon Bridge Road	50	18634 (1189)	21180 (1352)	21436 (1368)	24199 (1545)	25223 (1610)

13.3 Difficulties Encountered

There were no difficulties encountered when compiling this assessment.

13.4 Baseline Environment

13.4.1 Meteorological Data

A key factor in assessing temporal and spatial variations in air quality is the prevailing meteorological conditions. Depending on wind speed and direction, individual receptors may experience very significant variations in pollutant levels under the same source strength (i.e. traffic levels) (WHO, 2006). Wind is of key importance in dispersing air pollutants and for ground level sources, such as traffic emissions, pollutant concentrations are generally inversely related to wind speed. Thus, concentrations of pollutants derived from traffic sources will generally be greatest under very calm conditions and low wind speeds when the movement of air is restricted. In relation to PM₁₀, the situation is more complex due to the range of sources of this pollutant. Smaller particles (less than PM_{2.5}) from traffic sources will be dispersed more rapidly at higher wind speeds. However, fugitive emissions of coarse particles (PM_{2.5} - PM₁₀) will actually increase at higher wind speeds. Thus, measured levels of PM₁₀ will be a non-linear function of wind speed.

The nearest representative weather station collating detailed weather records is Cork Airport meteorological station, which is located approximately 19.5 km north-east of the site. Cork Airport meteorological data has been examined to identify the prevailing wind direction and average wind speeds over a five-year period (Figure 13 1). For data collated during five representative years (2020 – 2024), the predominant wind direction is westerly to south-westerly with generally moderate wind speeds (Met Éireann, 2025).

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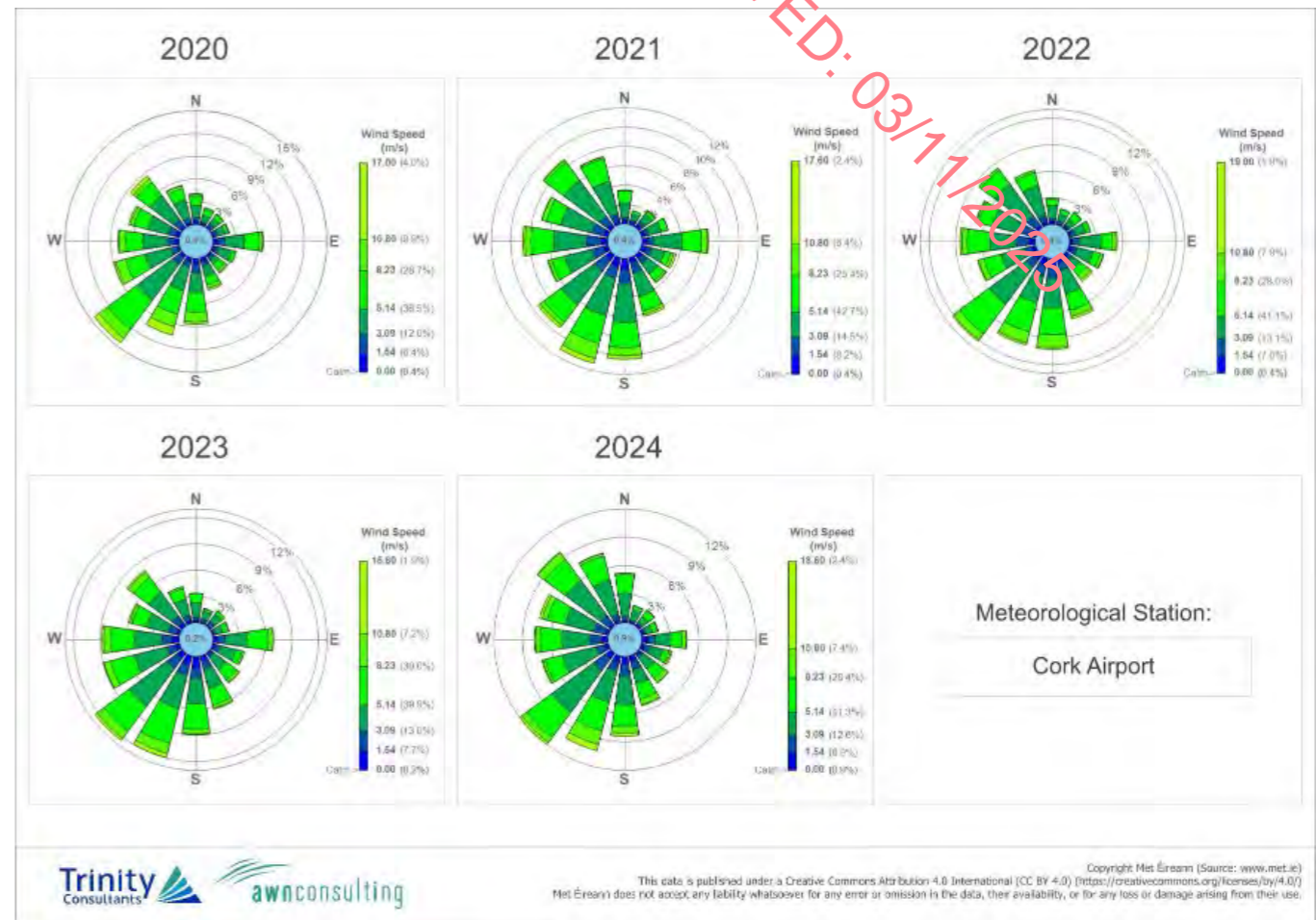


Figure 13 1 Wind Roses for Cork Airport Meteorological Station

13.4.2 Baseline Air Quality

Air quality monitoring programs have been undertaken in recent years by the EPA. The most recent annual report on air quality in Ireland is 'Air Quality In Ireland 2023' (EPA, 2024). The EPA website details the range and scope of monitoring undertaken throughout Ireland and provides both monitoring data and the results of previous air quality assessments.

As part of the implementation of the Air Quality Standards Regulations 2022 (S.I. No. 739 of 2022), as amended, four air quality zones have been defined in Ireland for air quality management and assessment purposes (EPA, 2024). Dublin is defined as Zone A and Cork as Zone B. Zone C is composed of 23 towns with a population of greater than 15,000. The remainder of the country, which represents rural Ireland but also includes all towns with a population of less than 15,000, is defined as Zone D.

In terms of air monitoring and assessment, the proposed development site is within Zone D (EPA, 2024). The long-term monitoring data has been used to determine background concentrations for the key pollutants in the region

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of the proposed development. The background concentration accounts for all non-traffic derived emissions (e.g. natural sources, industry, home heating etc.). The use of publicly available long-term datasets is recommended by TII in their PE-ENV-0016 guidance (2022). This use of long-term data sets is preferred over on-site baseline air monitoring surveys as it gives a better indication of long-term trends in air quality. The use of long-term monitoring data from the EPA is considered appropriate for determining the background air quality in the area of the proposed development.

Continuous monitoring by the EPA is carried out at a number of monitoring stations within Zone D; these include urban background sites, roadside (traffic) sites and suburban background sites. It is necessary to select monitoring stations that are representative of the site location. Not all monitoring stations are considered suitable for determining background pollutant concentrations and must be reviewed on a case-by-case basis to determine the most appropriate EPA monitoring sites for the current assessment.

The EPA, on their website (EPA, 2025), state that background sites generally represent overall area-wide exposure more closely than roadside sites. Roadside monitoring sites are heavily influenced by traffic emissions and are not considered representative of area-wide pollutant levels.

The full suite of EPA Zone D monitoring locations were reviewed. A mix of rural and suburban background was determined to be the most representative background for the area of the proposed development. Influences from traffic emissions will be captured within the traffic modelling assessment and therefore, a combination of rural and suburban background concentrations give the best indication of other, non-traffic derived sources of pollutants.

13.4.2.1 NO₂

Long-term NO₂ monitoring was carried out at the representative Zone D rural background locations of Emo Court Co. Laois and Kilkitt, and Zone D suburban background locations of Castlebar and Edenderry for the period 2019 – 2023 (Table 13 7) (EPA, 2024). Long-term average concentrations are significantly below the annual average limit of 40 µg/m³. Average results range from 2 – 9 µg/m³. The overall annual average concentration for this 5-year period is 5 µg/m³. Additionally, there were no exceedances of the hourly limit value of 200 µg/m³. Based on the above information a conservative estimate of the current background NO₂ concentration for the region of the proposed development is 5 µg/m³.

Table 13 7 Trends In Zone D Air Quality - Nitrogen Dioxide (NO₂)

Station	Averaging Period	Year				
		2019	2020	2021	2022	2023
Emo Court Co. Laois (rural)	Annual Mean NO ₂ (µg/m ³)	4	3	4	3	2
	1-hr Mean > 200 µg/m ³ (days)	-	0	0	0	0
Kilkitt (rural)	Annual Mean NO ₂ (µg/m ³)	5	2	2	2	2
	1-hr Mean > 200 µg/m ³ (days)	-	0	0	0	0
Castlebar (suburban)	Annual Mean NO ₂ (µg/m ³)	8	6	6	8	7
	1-hr Mean > 200 µg/m ³ (days)	-	0	0	0	0
Edenderry (suburban)	Annual Mean NO ₂ (µg/m ³)	-	-	9	7	9
	1-hr Mean > 200 µg/m ³ (days)	-	-	0	0	0

13.4.2.2 PM₁₀

Continuous PM₁₀ monitoring was carried out at representative suburban and rural Zone D locations from 2019 – 2023; Kilkitt, Claremorris, Castlebar, Cobh Carrignafoy, Enniscorthy and Macroom. Annual average PM₁₀ concentrations across the sites ranged from 7– 28 µg/m³ over the 2019 – 2023 period (Table 13 8). The overall annual average concentration for this 5-year period is 13 µg/m³. There were at most 14 exceedances of the daily limit of 50 µg/m³ in 2019 (at Enniscorthy). However, 35 exceedances are permitted per year (EPA, 2024). Based on the EPA data, a conservative estimate of the current background PM₁₀ concentration in the region of the proposed development is 13 µg/m³.

Table 13 8 Trends In Zone D Air Quality - PM₁₀

Station	Averaging Period	Year				
		2019	2020	2021	2022	2023
Kilkitt (rural)	Annual Mean PM ₁₀ (µg/m ³)	7	8	8	9	7
	24-hr Mean > 50 µg/m ³ (days)	1	0	-	0	0
Claremorris (rural)	Annual Mean PM ₁₀ (µg/m ³)	11	10	10	8	8
	24-hr Mean > 50 µg/m ³ (days)	0	0	0	0	0
Castlebar (suburban)	Annual Mean PM ₁₀ (µg/m ³)	16	14	10	11	10
	24-hr Mean > 50 µg/m ³ (days)	1	2	1	0	-
Cobh Carrignafoy (suburban)	Annual Mean PM ₁₀ (µg/m ³)	13	13	12	13	12
	24-hr Mean > 50 µg/m ³ (days)	0	0	1	0	-
Enniscorthy (suburban)	Annual Mean PM ₁₀ (µg/m ³)	18	15	14	15	13
	24-hr Mean > 50 µg/m ³ (days)	14	5	1	5	-
Macroom (suburban)	Annual Mean PM ₁₀ (µg/m ³)	28	15	15	16	11
	24-hr Mean > 50 µg/m ³ (days)	2	6	2	7	-

13.4.2.3 PM_{2.5}

Average PM_{2.5} levels in Claremorris, Shannon Estuary/Askeaton, Macroom and Mallow over the period 2019 - 2023 ranged from 4 - 15 µg/m³ (EPA, 2024). The overall annual average concentration for this 5-year period is 7 µg/m³ (Table 13 9). Based on this information, an estimate of the background PM_{2.5} concentration in the region of the proposed development is 7 µg/m³.

Table 13 9 Trends In Zone D Air Quality - PM_{2.5}

Station	Averaging Period	Year				
		2019	2020	2021	2022	2023
Claremorris (rural)	Annual Mean PM _{2.5} (µg/m ³)	4	5	8	6	5
Shannon Estuary/Askeaton, Co. Limerick (rural)	Annual Mean PM _{2.5} (µg/m ³)	-	4	6	5	5
Macroom (suburban)	Annual Mean PM _{2.5} (µg/m ³)	15	11	10	11	7
Mallow (suburban)	Annual Mean PM _{2.5} (µg/m ³)	-	10	8	7	6

13.4.2.4 Summary

Based on the above information the air quality in the Zone D locations, such as Bandon is generally good, with concentrations of the key pollutants generally well below the current relevant limit values set out in Table 2 of Annex I of Directive (EU) 2024/2881. The current pollutant concentrations at these monitoring sites are also generally in compliance with the 2030 limit values set out in Directive (EU) 2024/2881 and the clean air strategy, however, concentrations are approaching or exceeding the limit values in certain locations. Further measures will be needed at a national scale to reduce air pollution in future years. The EPA have indicated that road transport emissions are contributing to increased levels of NO₂ with the potential for breaches in the annual NO₂ limit value in future years at locations within urban centres and roadside locations. In addition, burning of solid fuels for home heating is contributing to increased levels of particulate matter (PM₁₀ and PM_{2.5}). The EPA predict that exceedances in the particulate matter limit values are likely in future years if burning of solid fuels for residential heating continues (EPA, 2024).

13.4.3 Sensitivity of the Receiving Environment

13.4.3.1 Construction Phase

In line with the UK Institute of Air Quality Management (IAQM) guidance document ‘Guidance on the Assessment of Dust from Demolition and Construction’ (IAQM, 2024) prior to assessing the impact of dust from a proposed development, the sensitivity of the area must first be assessed as outlined below. Both receptor sensitivity and proximity to proposed works areas are taken into consideration. For the purposes of this assessment, high sensitivity receptors are regarded as residential properties where people are likely to spend the majority of their time. Commercial properties and places of work are regarded as medium sensitivity while low sensitivity receptors are places where people are present for short periods or do not expect a high level of amenity. Table 13 10 outlines the criteria for determining the sensitivity of the area to dust soiling and dust-related human health effects as per the IAQM guidance (IAQM, 2024).

Table 13 10 Criteria for Determining the Sensitivity of the Area

Sensitivity of the Area to Dust Soiling Effects on People and Property					
Receptor Sensitivity	Number of Receptors	Distance from Source (m)			
		<20	<50	<100	<250
High	>100	High	High	Medium	Low
	10 - 100	High	Medium	Low	Low
Medium	1 - 10	Medium	Low	Low	Low
	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

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Sensitivity of the Area to Human Health Impacts						
Receptor Sensitivity	Annual Mean PM ₁₀ Concentration	Number of Receptors	Distance from Source (m)			
			<20	<50	<100	<250
High	< 24 µg/m ³	>100	Medium	Low	Low	Low
		10 -100	Low	Low	Low	Low
Medium	< 24 µg/m ³	1 - 10	Low	Low	Low	Low
		>10	Low	Low	Low	Low
Low	< 24 µg/m ³	1 - 10	Low	Low	Low	Low
		>1	Low	Low	Low	Low

In terms of receptor sensitivity to dust soiling, there are a number of highly sensitive residential properties within 100 m of the proposed development boundary (Figure 13 2). There are 10-100 high sensitivity residential properties within 20m of the site boundary, there are a further 10-100 high sensitivity receptors within 50m and >100 properties within 100m of the site boundary. Based on these receptor numbers and using the IAQM criteria in Table 13 10, the sensitivity of the area to dust soiling impacts from the proposed development is high.

In addition to sensitivity to dust soiling, the IAQM guidelines also outline the assessment criteria for determining the sensitivity of the area to human health impacts. The criteria take into consideration the current annual mean PM10 concentration, receptor sensitivity based on type (residential receptors are classified as high sensitivity) and the number of receptors affected within various distance bands from the construction works. A conservative estimate of the current annual mean PM₁₀ concentration in the vicinity of the proposed development is 13 µg/m³. There are 10-100 high sensitivity receptors within 20 m of the proposed development boundary (Figure 13 2). As the proposed site is adjacent to the Castle Rock Homes Bandon Phase 1 and Phase 2, these receptors have also been taken into account for the construction phase dust assessment. Based on the IAQM criteria outlined in Table 13 10 the worst-case sensitivity of the area to dust-related human health effects is low.

The IAQM guidelines also outline the assessment criteria for determining the sensitivity of the area to dust-related ecological impacts. Dust emissions can coat vegetation leading to a reduction in the photosynthesising ability of the plant, as well as other effects. The guidance states that dust impacts to vegetation can occur up to 50 m from the site, and 50 m from site access roads, up to 250 m for the site entrance. The sensitivity of the area is determined based on the distance to the source, the designation of the site, (European, National or local designation) and the potential dust sensitivity of the ecologically important species present. There are no sensitive ecological receptors that meet these criteria within the study area and there is no potential for impacts to sensitive ecology from construction dust emissions and no further assessment is required.

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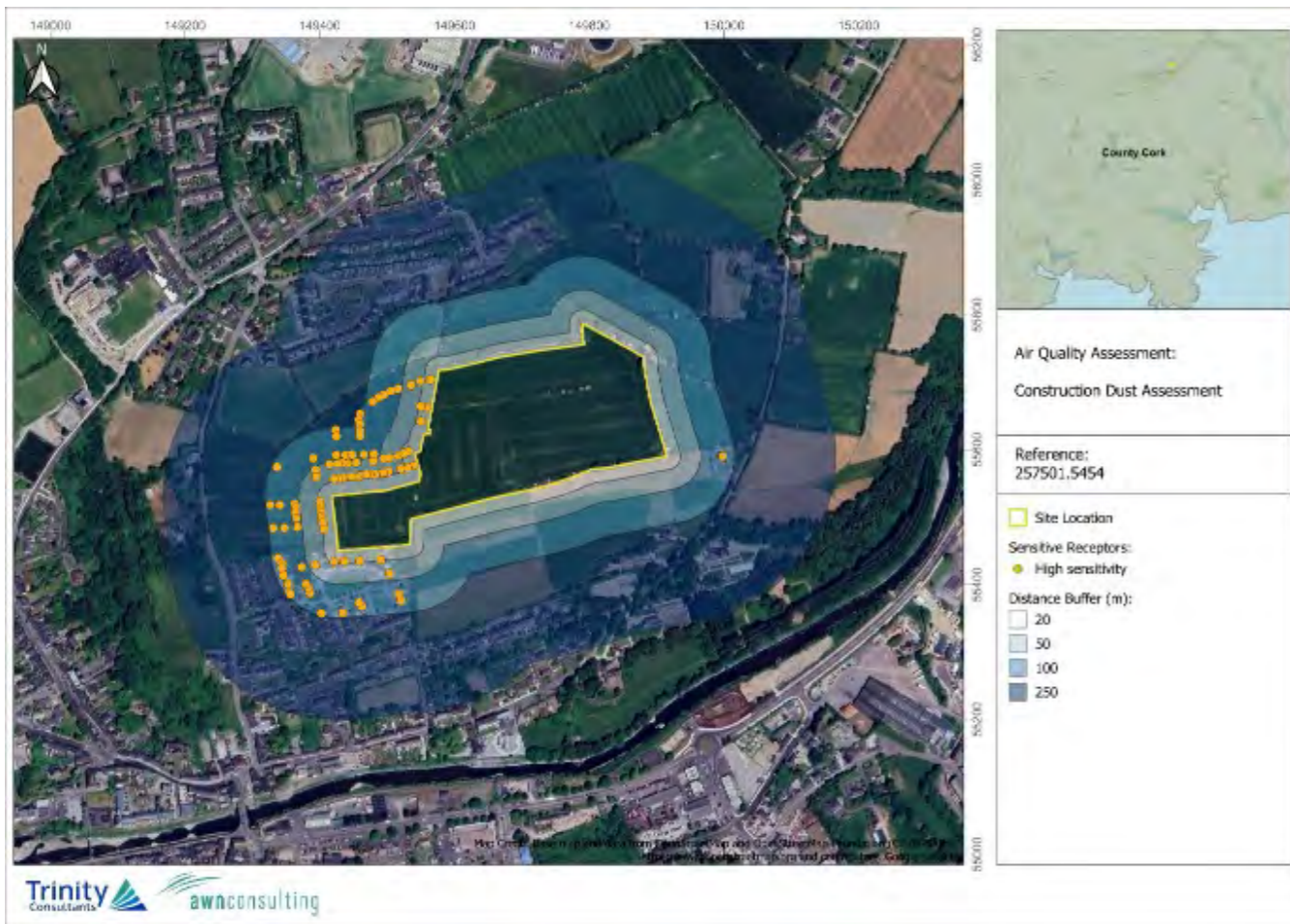


Figure 13 2 Sensitive Receptors within 250m of Site

13.4.3.2 Operational Phase

The impact to air quality due to changes in traffic is assessed at sensitive receptors in the vicinity of affected roads. The TII guidance (2022) states that a proportionate number of representative receptors, which are located in areas which will experience the highest concentrations or greatest improvements because of the proposed development, are to be included in the modelling. The TII criteria state that receptors within 200 m of impacted road links should be assessed; roads which are greater than 200 m from receptors will not impact pollutant concentrations at that receptor (TII, 2022). The TII guidance (2022) defines sensitive receptor locations for the purposes of modelling annual mean pollutant concentrations as: residential housing, schools, hospitals, care homes and short term accommodation such as hotels, i.e. locations where members of the public are likely to be regularly present for 24 hours. A total of 2 no. high sensitivity residential receptors (R1 and R2) were included in the modelling assessment associated with the impacted road links (Link 1 and Link 2) (see Figure 13 3). These road links are the Old Macroom road and the Bandon Bridge road.

The receptors chosen are representative of the affected receptors within 200m of impacted roads and all other receptors in these areas will experience similar or lesser air quality related impacts from traffic emissions. Pollutant concentrations from traffic emissions will be highest in closest proximity to the source, at road level. Pollutant concentrations will decrease with increasing distance from the road.

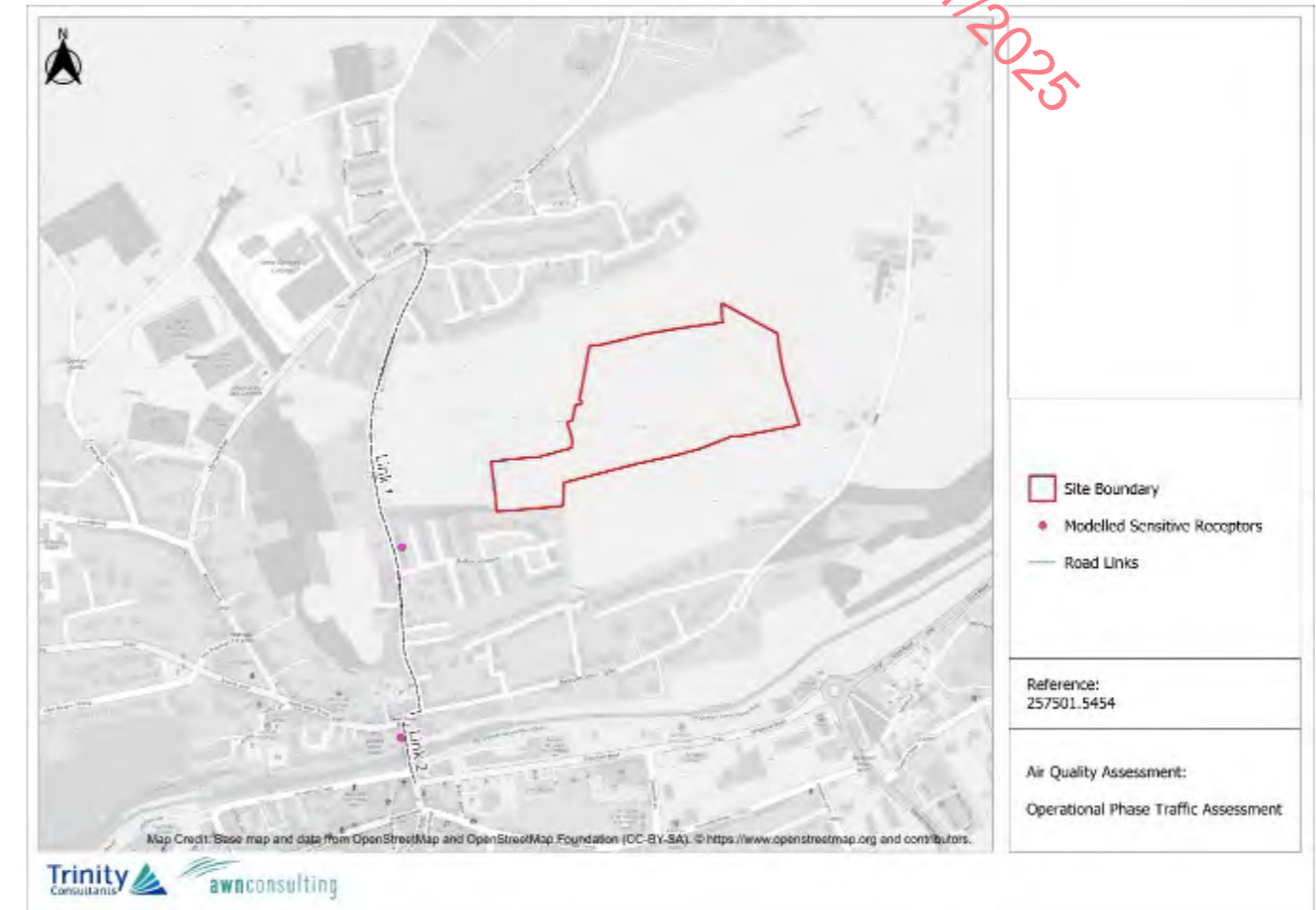


Figure 13 3 Location of Sensitive Receptors used in Operational Phase Air Quality Assessment

13.5 The 'Do Nothing' Scenario

In the Do-Nothing scenario, ambient air quality at the site will remain as per the baseline and will change in accordance with trends within the wider area (including influences from potential new developments in the surrounding area, changes in road traffic, etc).

The Do-Nothing scenario associated with the operational phase of the development is assessed within Section 13.6.2 and it was found to be long-term, direct, localised, negative and not significant in EIA terms.

13.6 Potential Significant Effects

13.6.1 Construction Phase

13.6.1.1 Construction Dust Assessment

The greatest potential impact on air quality during the construction phase of the proposed development is from construction dust emissions and the potential for nuisance dust. While construction dust tends to be deposited within 250 m of a construction site, the majority of the deposition occurs within the first 50 m (IAQM, 2024). The extent of any dust generation depends on the nature of the dust (soils, peat, sands, gravels, silts etc.) and the nature of the construction activity. In addition, the potential for dust dispersion and deposition depends on local meteorological factors such as rainfall, wind speed and wind direction. A review of Cork Airport meteorological data indicates that the prevailing wind direction is westerly to south-westerly and wind speeds are generally moderate in nature (Section 13.4.1). In addition, dust generation is considered negligible on days where rainfall is greater than 0.2 mm. A review of historical 30-year average data for Cork Airport meteorological station indicates that on average 194 days per year have rainfall over 0.2 mm (Met Éireann, 2025). Therefore, it can be determined that 53% of the time dust generation will be reduced due to natural meteorological conditions.

To determine the level of dust mitigation required during the proposed works, the potential dust emission magnitude for each dust generating activity needs to be taken into account, in conjunction with the previously established sensitivity of the area (Section 13.4.3.1). The major dust generating activities are divided into four types within the IAQM (IAQM, 2024) guidance to reflect their different potential impacts. These are: demolition, earthworks, construction and trackout (movement of heavy vehicles).

13.6.1.1.1 Determining the Potential Dust Emission Magnitude

The magnitude of the works under each category can be classified as either small, medium or large depending on the scale of the works involved. The magnitude of each activity has been determined below for the proposed development using the criteria in Table 13 4.

- **Demolition:** The dust emission magnitude for the demolition activities is not applicable as there is no demolition required as part of the proposed development.
- **Earthworks:** The dust emission magnitude for the proposed earthwork activities can be classified as medium as the total site area is between 18,000 – 110,000 m².
- **Construction:** The dust emission magnitude for the proposed construction activities can be classified as large as a worst-case as the total volume of buildings to be constructed will be greater than 75,000 m³.
- **Trackout:** The dust emission magnitude for the proposed trackout can be classified as medium, as there will be between 20 - 50 outward HGV movements per day during the construction phase of the proposed development.

13.6.1.1.2 Determining the Risk of Dust Impacts

Once the dust emission magnitude has been determined the next step, according to the IAQM guidance (IAQM, 2024), is to establish the level of risk by combining the magnitude with the overall sensitivity of the area to dust soiling and dust-related human health effects (Section 13.4.3.1). The level of risk associated with each activity is determined using the criteria in Table 13 5. The overall risk of dust impacts from the construction works is shown in Table 13 11 for each category.

- **Demolition:** There is no demolition required as part of the proposed development.
- **Earthworks:** As the overall sensitivity of the area to dust soiling is high, when combined with a medium dust emission magnitude, this produces an overall medium risk of dust soiling impacts (as per the criteria in Table 13 5). As the overall sensitivity of the area to dust-related human health effects is low, this results in a low risk of dust-related human health effects (as per the criteria in Table 13 5).
- **Construction:** Combining the large dust emissions magnitude for the construction activities with the high sensitivity to dust soiling results in a high risk of dust soiling impacts using the criteria in Table 13 5. There is an overall low risk of dust-related human health impacts as a result of the proposed construction activities.
- **Trackout:** Combining the medium dust emission magnitude for the trackout activities with the high sensitivity to dust soiling results in a medium risk of dust soiling impacts using the criteria in Table 13 5. There is an overall low risk of dust-related human health impacts as a result of the proposed trackout activities.

There is a high risk of dust soiling impacts and at most low risk of dust-related human health impacts associated with the proposed works. As a result, best practice dust mitigation measures associated with high-risk works will be implemented to ensure there are no significant impacts at nearby sensitive receptors. In the absence of mitigation, dust impacts are predicted to be direct, **short-term, negative** and **slight**.

Table 13 11 Risk of Dust Impacts used to Define Site-Specific Mitigation

Receptor	Receptor Sensitivity	Dust Emission Magnitude	Risk of Dust-Related Impacts
Demolition			
Dust Soiling	High	n/a	n/a
Human Health	Low		n/a
Earthworks			
Dust Soiling	High	Medium	Medium Risk
Human Health	Low		Low Risk
Construction			
Dust Soiling	High	Large	High Risk
Human Health	Low		Low Risk
Trackout			
Dust Soiling	High	Medium	Medium Risk
Human Health	Low		Low Risk

13.6.1.2 Construction Phase Traffic Assessment

There is also the potential for traffic emissions to impact air quality with respect to human health in the short-term over the construction phase, particularly, due to the increase in HGVs accessing the site. The construction stage traffic has been reviewed, and a detailed air quality assessment has been scoped out as none of the road links impacted by the proposed development satisfy the TII assessment criteria in Section 13.2.3.2.

Therefore, it can be determined that the construction stage traffic will have an **imperceptible, neutral, short-term** and **not significant** impact on air quality.

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13.6.2 Operational Phase

There is the potential for vehicles accessing the site to result in emissions of NO₂, PM₁₀ and PM_{2.5}.

13.6.2.1 Operational Phase Traffic Assessment

The potential impact of the proposed development has been assessed by modelling emissions from the traffic generated due to the development. The traffic data has included specific cumulative developments within the area to provide for a worst-case assessment and to assess potential cumulative impacts (see Transport Assessment and Chapter 6 Traffic & Transportation, both prepared by HEGSONS for further details).

The traffic data includes the Do Nothing (DN) scenario and Do Something (DS) scenario. The impact of NO₂, PM₁₀ and PM_{2.5} emissions for the Opening and Design Years was predicted at the nearest sensitive receptors to the impacted road links. This assessment allows the significance of the development, with respect to both relative and absolute impacts, to be determined.

The TII guidance PE-ENV-01106 (TII, 2022) details a methodology for determining air quality impact significance criteria for TII road schemes and infrastructure projects. However, this significance criteria can be applied to any development that causes a change in traffic. The degree of impact is determined based on both the absolute and relative impact of the proposed development. Results are compared against the ‘Do Nothing’ scenario, which assumes that the proposed development is not in place in future years, to determine the degree of impact.

Traffic related air emissions have the potential to impact air quality which can affect human health. The following details the results of the air dispersion modelling assessment of traffic emissions to determine the impact to human health. The predicted pollutant concentrations have been compared against the ambient air quality limit values set out in Table 13 1. The current limit values set out in Table 2 of Annex I of Directive (EU) 2024/2881 are applicable to the Opening Year 2028 and the limit values set out in Table 1 of Annex I of Directive (EU) 2024/2881 are applicable to the Design Year 2043 as the assessment year is post-2030.

13.6.2.1.1 NO₂

The results of the NO₂ modelling are shown in Table 13 12. In the Opening Year 2028, predicted annual mean concentrations of NO₂ are in compliance with the annual mean limit value of 40 µg/m³ reaching at most 22% of the limit. In addition, the TII guidance (2022) states that the hourly limit value for NO₂ of 200 µg/m³ is unlikely to be exceeded at roadside locations unless the annual mean is above 60 µg/m³. As predicted NO₂ concentrations are significantly below 60 µg/m³ (Table 13 12), it can be concluded that the short-term NO₂ limit value will be complied with at all receptor locations. Some increases in NO₂ concentrations are predicted at the worst-case receptors assessed in the Opening Year when compared with the Do-Nothing scenario (see Table 13 12). Concentrations are predicted to increase by at most 0.02 µg/m³ at receptors R1 and R2. When comparing the change in concentration with the air quality limit value, it results in a maximum change of 0.05% at receptor R1. The other receptor in the area will experience similar or lesser impacts and all increases are considered ‘neutral’ as per the TII criteria in Table 13 3.

In the Design Year 2043, predicted annual mean NO₂ concentrations are in compliance of the limit value of 20 µg/m³ at the worst-case receptors assessed, reaching at most 27% of the limit. The proposed development will result in a ‘neutral’ increase in NO₂ concentrations according to the TII significance criteria in Table 13 3, with

concentrations increasing by at most 0.01 µg/m³ as a result of the proposed development (at receptor R2, see Table 13 12), which is an increase of 0.05% when compared with the applicable annual mean limit value for NO₂. Therefore, the impact of the proposed development on NO₂ concentrations is neutral.

Table 13 12 Predicted Annual Mean NO₂ Concentrations (µg/m³)

Receptor	Impact Opening Year						Description
	DN	% of AQLV	DS	% of AQLV	DS-DN	% Change of AQLV	
R1	8.10	20%	8.12	20%	0.02	0.05%	Neutral
R2	8.74	22%	8.76	22%	0.02	0.05%	Neutral
Receptor	Impact Design Year						Description
	DN	% of AQLV	DS	% of AQLV	DS-DN	% Change of AQLV	
R1	5.26	26%	5.26	26%	0.00	0.00%	Neutral
R2	5.31	27%	5.32	27%	0.01	0.05%	Neutral

13.6.2.1.2 PM₁₀

The results of the PM₁₀ modelling can be seen in Table 13 13 for the Opening Year 2028 and Design Year 2043.

In the Opening Year 2028, annual mean PM₁₀ concentrations are in compliance with the annual mean limit value of 40 µg/m³ reaching at most 45% of the limit. In the Design Year 2043 annual mean PM₁₀ concentrations are also in compliance with the annual mean limit value of 20 µg/m³ reaching at most 88% of the limit. In addition, the proposed development will result in 1 exceedance of the daily PM₁₀ limit value (Table 13 2) in both the opening and design years, however, 35 exceedances are allowable per year in the Opening Year and 18 exceedances are allowable in the Design Year before the standard is deemed to have been breached (see Table 13-1).

The changes in PM₁₀ concentrations as a result of the proposed development can be assessed relative to the ‘Do Nothing’ (DN) levels. In the Opening Year 2028 annual PM₁₀ concentrations will increase by at most 0.03 µg/m³ at receptor R1, this is a 0.07% increase when compared with the annual mean limit value of 40 µg/m³. This is considered a ‘neutral’ impact as per the TII criteria in Table 13 3. The other receptor in the area will experience lesser impacts and all increases at receptors are considered ‘neutral’ as per the TII criteria in Table 13 3.

In the Design Year 2043 the proposed development will result in a maximum increase of 0.09 µg/m³ at receptor R1, which is a 0.45% increase when compared with the annual mean limit of 20 µg/m³. The changes in concentrations in the Design Year are considered ‘neutral’ based on the TII criteria in Table 13 3.

Table 13 13 Predicted Annual Mean PM₁₀ Concentrations (µg/m³).

Receptor	Impact Opening Year						Description
	DN	% of AQLV	DS	% of AQLV	DS-DN	% Change of AQLV	
R1	16.94	42%	16.97	42%	0.03	0.07%	Neutral
R2	17.78	44%	17.80	45%	0.02	0.05%	Neutral
Receptor	Impact Design Year						Description
	DN	% of AQLV	DS	% of AQLV	DS-DN	% Change of AQLV	
R1	16.73	84%	16.82	84%	0.09	0.45%	Neutral
R2	17.54	88%	17.61	88%	0.07	0.35%	Neutral

13.6.2.1.3 PM2.5

In relation to changes in PM_{2.5} concentrations as a result of the proposed development, the results of the assessment can be seen in Table 13 14 for the modelled Opening Year 2028 and Design Year 2043.

In the Opening Year 2028, predicted annual mean concentrations of PM_{2.5} are in compliance with the annual mean limit value of 25 µg/m³ reaching at most 38% of the limit. There is predicted to be an increase in PM_{2.5} concentrations at the worst-case receptors assessed in the Opening Year when compared with the Do-Nothing scenario (see Table 13 14). Concentrations are predicted to increase by at most 0.01 µg/m³ at receptor R2. When comparing the change in concentration with the air quality limit value, it results in a maximum change of 0.04% at receptor R2. This is considered a 'neutral' impact as per the TII criteria in Table 13 3. The other receptor in the area will experience similar or lesser impacts and all increases at other modelled receptors are considered 'neutral' as per the TII criteria in Table 13 3.

In the Design Year 2043, predicted annual mean PM_{2.5} concentrations are in compliance with the limit value of 10 µg/m³ at all receptors assessed. Concentrations reach at most 95% of the annual mean limit value at R2. The proposed development will result in a 'neutral' increase in PM_{2.5} concentrations according to the TII significance criteria Table 13 3, with concentrations increasing by at most 0.05 µg/m³ as a result of the proposed development (at receptor R1, see Table 13 14), which is an increase of 0.50% when compared with the annual mean limit value of 10 µg/m³ for PM_{2.5}.

Table 13 14 Predicted Annual Mean PM_{2.5} Concentrations (µg/m³)

Receptor	Impact Opening Year						Description
	DN	% of AQLV	DS	% of AQLV	DS-DN	% Change of AQLV	
R1	9.09	36%	9.10	36%	0.01	0.04%	Neutral
R2	9.53	38%	9.54	38%	0.01	0.04%	Neutral
Receptor	Impact Design Year						Description
	DN	% of AQLV	DS	% of AQLV	DS-DN	% Change of AQLV	
R1	8.89	90%	9.04	90%	0.05	0.50%	Neutral
R2	9.42	94%	9.46	95%	0.04	0.40%	Neutral

13.6.2.1.4 Significance of Predicted Changes in NO₂, PM₁₀ and PM_{2.5} Concentrations

As outlined in Section 13.2.2.4, the TII guidance (2022) states that the significance of effects should be assessed based on the opening year only. Non-significant effects are 'neutral' or 'slight' changes in concentrations while significant effects can be changes in pollutant concentrations that are either 'moderate' or 'substantial'. However, the TII guidance (2022) states that these must be considered in the context of the project and 'moderate' or 'substantial' increases are not necessarily always significant effects.

In relation to NO₂, PM₁₀ and PM_{2.5} the predicted changes in concentrations are 'neutral' at the worst-case receptors assessed. Therefore, according to the TII criteria as outlined in Section 13.2.2.4, the impact is **not significant**.

For the purposes of this assessment, it has been assumed that the current estimated background pollutant concentrations are applicable for both the opening and design years, with no decreases in future background

concentrations allowed for. There will be some decreases in background concentrations in future years. However, at present there is no guidance-based methodology available for estimating future year background concentrations and therefore, as a conservative approach, the current estimated background concentrations have been applied to future years.

Due to the large uncertainty in future improvements in fleet composition and emissions, such as projected changes to vehicle registration and electric vehicle uptake, the future year emission rates utilised by the TII REM tool do not account for the full implementation of these measures. Predicted design year concentrations are therefore currently overly conservative as future emissions improvements are not fully taken into account, as well as no improvement in background concentrations being assumed.

As a result, the opening year predicted concentrations are the most appropriate for determining the significance of effects as per Section 13.2.2.4.

It can be concluded that the impact of traffic emissions on air quality and human health during the operational phase is **long-term, direct, localised, negative** and **not significant** in EIA terms.

The measures set out in the Clean Air Strategy for Ireland (Government of Ireland 2023) aim to work towards solutions to ensure that air pollution concentrations are reduced in order to comply with the future changes in limit values. Ireland will need to continue to implement and develop measures to ensure continuing improvements in air quality in future years in order to meet the objectives of the Clean Air Strategy for Ireland (Government of Ireland, 2023) and to ensure the ambient air quality limit values set out in Directive (EU) 2024/2881 are achieved. The estimated background concentrations used in the assessment are the largest contribution to predicted pollutant concentrations, rather than pollutant contributions associated with the proposed development. Strategies to improve air quality at a national level in future years will contribute to reducing background concentrations and therefore it is envisioned that air quality will improve in the future.

13.6.3 Summary

The following Table summarises the identified likely significant effects during the construction phase of the proposed development before mitigation measures are applied.

Table 13 15 Summary of Construction Phase Likely Significant Effects in the absence of mitigation

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
Construction Dust Impact	Negative	Not significant - slight	Localised	Likely	Short-term	Direct
Construction Traffic Impacts	Neutral	Not significant - imperceptible	Localised	Likely	Short-term	Direct

The following Table summarises the identified likely significant effects during the operational phase of the proposed development before mitigation measures are applied.

Table 13 16 Summary of Operational Phase Likely Significant Effects in the absence of mitigation

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
Operational Traffic Impacts	Negative	Not significant	Localised	Likely	Long-term	Direct

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13.6.4 Cumulative Effects

13.6.4.1 Construction Phase

Cumulative construction dust impacts may occur if other large-scale developments within 500 m of the site are under construction simultaneously.

A review of the planned and permitted projects within the last ten years in vicinity of the site was undertaken to identify developments with the potential for cumulative construction phase impacts. There is the potential for the construction phase of the proposed development to coincide with that of the following permitted developments:

- Castle Rock Homes Bandon development, represents Phase 1 of development while the current application represents Phase 3 of development (App. Ref. 214059);
- Castle Rock Homes Bandon development phase 2 (App. Ref. 245216);
- Construction of 77 no. dwelling houses. (App. Ref. 236540)

If these sites were to commence construction at the same time, the cumulative effects will be short-term and slight. Otherwise, no significant cumulative impacts have been identified.

The dust mitigation measures outlined in Section 13.7.1 will be applied during the construction phase which will avoid significant cumulative impacts on air quality. With appropriate mitigation measures in place, the predicted cumulative impacts on air quality associated with the construction phase of the proposed development is **short-term, direct, negative and not significant**.

13.6.4.2 Operational Phase

Cumulative developments were included in the traffic figures supplied for the operational phase assessment and therefore the cumulative effect is included within the operational stage effect for the proposed development outlined in Section 13.6.2. The effect is predicted to be direct, localised, negative and not significant with regards to air quality.

13.7 Mitigation Measures

13.7.1 Construction Phase Mitigation

The proposed development has been assessed as having a high risk of dust soiling impacts and a low risk of dust related human health impacts during the construction phase as a result of earthworks, construction and trackout activities (see Section 13.6.1). Therefore, the following dust mitigation measures shall be implemented during the construction phase of the proposed development. These measures are appropriate for sites with a high risk of dust impacts and aim to ensure that no significant nuisance occurs at nearby sensitive receptors. The mitigation measures draw on best practice guidance from Ireland (DCC (2018), DLRCC (2022)), the UK (IAQM (2024), BRE (2003), The Scottish Office (1996), UK ODPM (2002)) and the USA (USEPA, 1997). These measures will be incorporated into the Construction Environmental Management Plan (CEMP) prepared for the site. The measures are divided into different categories for different activities.

Communications

- Develop and implement a stakeholder communications plan that includes community engagement before works commence on site. Community engagement includes explaining the nature and duration of the works to local residents and businesses.
- The name and contact details of a person to contact regarding air quality and dust issues shall be displayed on the site boundary, this notice board should also include head/regional office contact details.
- Site Management
- During working hours, dust control methods will be monitored as appropriate, depending on the prevailing meteorological conditions. Dry and windy conditions are favourable to dust suspension therefore mitigations must be implemented if undertaking dust generating activities during these weather conditions.
- A complaints register will be kept on site detailing all telephone calls and letters of complaint received in connection with dust nuisance or air quality concerns, together with details of any remedial actions carried out.

Preparing and Maintaining the Site

- Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.
- Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.
- Avoid site runoff of water or mud.
- Keep site fencing, barriers and scaffolding clean using wet methods.
- Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below.
- Cover, seed or fence stockpiles to prevent wind whipping.
- Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period.

Operating Vehicles / Machinery and Sustainable Travel

- Ensure all vehicles switch off engines when stationary - no idling vehicles.
- Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery powered equipment where practicable.
- Impose and signpost a maximum-speed-limit of 15 kph haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate).
- Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.
- Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing)

Operations

- Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.
- Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.

- Use enclosed chutes and conveyors and covered skips.
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.
- Ensure equipment is readily available on site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.

Waste Management

- Avoid bonfires and burning of waste materials.

Measures Specific to Earthworks

- Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable.
- Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable.
- Only remove the cover in small areas during work and not all at once.
- During dry and windy periods, and when there is a likelihood of dust nuisance, a bowser will operate to ensure moisture content is high enough to increase the stability of the soil and thus suppress dust.
- Measures Specific to Construction
- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.
- Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery.
- For smaller supplies of fine powder materials ensure bags are sealed after use and stored appropriately to prevent dust

Measures Specific to Construction

- Avoid scabbling (roughening of concrete surfaces) if possible.
- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.

Measures Specific to Trackout

- A speed restriction of 15 kph will be applied as an effective control measure for dust for on-site vehicles.
- Avoid dry sweeping of large areas.
- Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.
- Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.
- Record all inspections of haul routes and any subsequent action in a site logbook.
- Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.
- Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).
- Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permit.
- Access gates to be located at least 10 m from receptors where possible.

Monitoring

- Undertake daily on-site and off-site inspections, where receptors (including roads) are nearby, to monitor dust, record inspection results in the site inspection log. This should include regular dust soiling checks of surfaces such as street furniture, cars and windowsills within 100 m of site boundary, with cleaning to be provided if necessary.
- Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.

13.7.2 Operational Phase Mitigation

No site-specific mitigation measures are proposed for the operational phase as impacts are predicted to be not significant.

13.8 Residual Impact Assessment

13.8.1 Construction Phase

To minimise dust emissions during construction, a series of mitigation measures have been prepared as outlined in Section 13.7.1. Provided the dust minimisation measures are adhered to, the predicted residual air quality impacts during the construction phase are **short-term, direct, negative, localised** and **not significant**.

Best practice mitigation measures are proposed for the construction phase of the proposed development, which will focus on the proactive control of dust and other air pollutants, to minimise generation of emissions at source. The mitigation measures that will be put in place during construction will ensure that the impact complies with all EU ambient air quality legislative limit values, which are based on the protection of human health (Table 13.1). Therefore, the predicted residual, dust-related, human health impact of the construction phase of the proposed development is **short-term, direct, negative, localised** and **not significant**.

13.8.2 Operational Phase

The air quality assessment of traffic emissions has looked at specific impacts at receptors in close proximity to the impacted road links. The air modelling assessment of operational traffic emissions has shown that predicted concentrations of NO₂, PM₁₀ and PM_{2.5} with the proposed development in place are in compliance with the relevant ambient air quality limit values which are set for the protection of human health. Therefore, the operational phase effect on air quality and human health as a result of increased traffic is **long-term, direct, localised** and **negative** which is overall **not significant** in EIA terms.

13.8.3 Summary of Post-mitigation Effects

The following table summarises the identified likely significant residual effects during the construction phase of the proposed development following the application of mitigation measures.

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Table 13 17 Summary of Construction Phase Effects Post Mitigation

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
Impact of construction dust from earthworks, construction and trackout in terms of dust soiling, and human health	Negative	Not significant	Areas within 250m of site as per Section 13.4.3.1.	Likely	Short-term	Direct
Impact of construction phase traffic on air quality	Neutral	Imperceptible	Receptors within 200m of impacted roads as per Section 13.2.3.	Likely	Short-term	Direct

The following table summarises the identified likely residual significant effects during the operational phase of the proposed development post mitigation.

Table 13 18 Summary of Operational Phase Effects Post Mitigation

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
Impact of operational phase traffic on air quality	Negative	Not significant	Worst-case receptors within 200m of impacted road links	Likely	Long-term	Direct

13.8.4 Cumulative Residual Effects

The primary potential cumulative residual effect relates to construction dust emissions. According to the IAQM guidance (IAQM, 2024), if the construction phase of the proposed development coincides with the construction phase of any other large scale permitted projects within 500m of the site, there is a possibility of cumulative residual dust effects occurring at any nearby sensitive receptors. Should simultaneous construction phases occur, it would lead to cumulative residual dust soiling and dust-related effects on human health, specifically localised to the works area associated with the proposed works.

However, should the construction phases of the development and any localised permitted developments coincide, it is predicted that once the mitigation measures outlined in Section 13.7.1 are put in place impacts will not be significant. Impacts will be short-term, direct, localised, negative and not significant. No significant cumulative adverse impacts to air quality are predicted for the construction or operational phases.

13.9 Risk of Major Accidents or Disasters

There are no likely risks of major accidents and disasters in relation to air quality associated with the proposed development due to the nature and scale of the development. The proposed development is residential in nature and will not require large scale quantities of hazardous materials or fuels.

13.10 Worst Case Scenario

Reasonable worst-case estimates have been used as part of this assessment. As a result, Section 13.8 details the worst-case residual effect of the proposed development.

13.11 Interactions

13.11.1 Air Quality and Population & Human Health

13.11.1.1 Construction Phase

An adverse air quality impact during the construction phase can cause health and dust nuisance issues. There is a low risk of dust-related human health impacts during the construction phase of the proposed development. Best practice mitigation measures will be implemented during the construction phase to ensure that the impact of the proposed development complies with all ambient air quality legislative limits. Therefore, the predicted impact is direct, short-term, negative, localised and not significant with respect to Population and Human Health during the construction phase.

13.11.1.2 Operational Phase

Vehicles accessing the site will emit pollutants which may impact Air Quality and Human Health. However, the increased number of vehicles associated with the proposed development will not cause a significant change in air pollutant emissions in the locality. It has been assessed that emissions will be in compliance with the ambient air quality standards which are set for the protection of human health. Impacts will be long-term, localised, direct, negative and not significant.

13.11.2 Air Quality and Climate

Air Quality and Climate have interactions as the emissions from the burning of fossil fuels during the construction and operational phases generate both air quality and climate impacts. There is no impact on climate due to air quality. However, the sources of impacts on air quality and climate are strongly linked.

13.11.3 Air Quality and Land & Soils

13.11.3.1 Construction Phase

Construction phase activities such as land clearing, excavations, stockpiling of materials etc. have the potential for interactions between Air Quality and Land & Soils in the form of dust emissions. With the appropriate mitigation measures to prevent fugitive dust emissions, it is predicted that there will be no significant interactions between air quality and land and soils during the construction phase.

13.11.3.2 Operational Phase

There are no potentially significant interactions identified between Air Quality, and Land & Soils during the operational phase.

13.11.4 Air Quality and Biodiversity

13.11.4.1 Construction Phase

Dust generation can occur during extended dry weather periods due to construction traffic along haul routes and construction activities such as excavations and infilling works. Dust emissions can coat vegetation leading to a reduction in the photosynthesising ability as well as other effects. There are no designated ecological sites within 250 m of the proposed development site area. Significant dust impacts are not predicted beyond this distance. Dust mitigation measures will be implemented on site as set out in Section 13.7.1. With the implementation of these mitigation measures dust emissions will be minimised and impacts will be direct, short-term, negative, localised and not significant with respect to biodiversity.

13.11.4.2 Operational Phase

There are no potentially significant interactions identified between Air Quality, and Biodiversity during the operational phase.

13.11.5 Air Quality and Material Assets – Traffic & Transport

13.11.5.1 Construction Phase

Interactions between Air Quality and Traffic can be significant. With increased traffic movements and reduced engine efficiency, i.e. due to congestion, the emissions of vehicles increase. The impacts of the proposed development on air quality are assessed by reviewing the change in annual average daily traffic on roads close to the site. In this assessment, the impact of the interactions between Traffic and Air Quality are linked but there is no potential for significant impacts from traffic on air quality. The effects are considered to be direct, short-term, neutral, localised and not significant during the construction phase.

13.11.5.2 Operational Phase

The impact of the interactions between Traffic and Air Quality are considered to be long-term, direct, negative and not significant during the operational phase.

13.12 Monitoring

13.12.1 Construction Phase

The following monitoring measures are proposed to ensure the dust mitigation measures are working satisfactorily:

- Undertake daily on-site and off-site inspections, where receptors (including roads) are nearby, to monitor dust, record inspection results in the site inspection log. This should include regular dust soiling checks of surfaces such as street furniture, cars and windowsills within 100 m of site boundary, with cleaning to be provided if necessary.
- Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.
- Monitoring of construction dust deposition along the site boundary to nearby sensitive receptors during the construction phase of the proposed development is recommended to ensure mitigation measures are working satisfactorily. This can be carried out using the Bergerhoff method in accordance with the requirements of the German Standard VDI 2119. The Bergerhoff Gauge consists of a collecting vessel and a stand with a protecting gauge. The collecting vessel is secured to the stand with the opening of the collecting vessel located approximately 2m above ground level. The TA Luft limit value is 350 mg/m²/day during the monitoring period of 30 days (+/- 2 days). Monitoring shall ensure that the dust mitigation measures are working satisfactorily as construction works progress.

13.12.2 Operational Phase

There is no monitoring recommended for the operational phase of the proposed development as impacts to air quality are predicted to be imperceptible.

13.13 Summary of Mitigation and Monitoring

The following Table summarises the Construction Phase mitigation and monitoring measures.

Table 13 19 Summary of Construction Phase Mitigation and Monitoring

Likely Significant Effect	Quality	Significance
Impact of construction dust from demolition, earthworks, construction and trackout in terms of dust soiling and human health	Dust control measures as per IAQM Guidance (IAQM, 2024) and Section 13.7.1.	Monitoring of construction dust deposition as per Section 13.12.1.

The following table summarises the Operational Phase mitigation and monitoring measures.

Table 13 20 Summary of Operational Phase Mitigation and Monitoring

Likely Significant Effect	Quality	Significance
No mitigation or monitoring required for the operational phase of the development as impacts to air quality are predicted to be not significant.		

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13.14 Conclusion

This chapter has reviewed and analysed the potential and the predicted impacts of the proposed development with regards to air quality. These impacts have been considered for both the construction and operational phases of the proposed development. The cumulative impact of the proposed development and surrounding developments have also been considered.

Provided all mitigation measures as set out in this chapter, the overall predicted effect of the proposed development is not significant.

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