



# **Water Supply Project Eastern and Midlands Region**

Uisce Éireann

## **EIA Scoping Methodology Report**

November 2023

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## EIA Scoping Methodology Report

Acronyms and Abbreviations	Meaning
AQLV	Air Quality Standard Values
BPS	Booster Pumping Station
BPT	Break Pressure Tank
CIEEM	Chartered Institute of Ecology and Environmental Management
dB	Decibel
DMRB	Design Manual for Roads and Bridges
DoEHLG	Department of Environment, Heritage and Local Government
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EPA	Environmental Protection Agency
FCV	Flow Control Valve
GHG	Greenhouse Gas
GLVIA	Guidelines for Landscape and Visual Impact Assessment
GWDE	Groundwater Dependent Terrestrial Ecosystem
Hz	Hertz
IAQM	Institute of Air Quality Management
IEMA	Institute of Environmental Management and Assessment
MAND	Major Accidents and/or Natural Disasters
NH <sub>3</sub>	Ammonia
NHA	Natural Heritage Areas
NO <sub>2</sub>	Nitrogen Dioxide
NO <sub>x</sub>	Oxides of Nitrogen
NRA	National Roads Authority
NSL	Noise Sensitive Location
NWRP	National Water Resources Plan
PM <sub>10</sub>	Particulate Matter with a diameter of 10 microns or less
PM <sub>2.5</sub>	Particulate Matter with a diameter of 2.5 microns or less
PPV	Peak Particle Velocity
RWI&PS	Raw Water Intake and Pumping Station
RWRM	Raw Water Rising Mains
SAC	Special Area of Conservation
SPA	Special Protection Area
TII	Transport Infrastructure Ireland
TPR	Termination Point Reservoir
WFD	Water Framework Directive
WHO	World Health Organisation
WTP	Water Treatment Plant
ZoI	Zone of Influence
ZTV	Zone of Theoretical Visibility

# 1. Introduction

## 1.1 The Proposed Project

1. The Proposed Project consists of the following:
  - Abstraction of raw water from Parteen Basin on the Lower River Shannon downstream of Lough Derg and the towns of Ballina and Killaloe. The Proposed Project will be designed to abstract enough water to address the forecast supply demand balance deficit at year 2050. Current projections indicate a treated water deficit of approximately 300 million litres per day (Mld);
  - Raw Water Intake and Pumping Station (RWI&PS) on the eastern shore of Parteen Basin and pumping from there, via twin 2 kilometre (km) long/1500 millimetre (mm) diameter Raw Water Rising Mains (RWRM) to a Water Treatment Plant (WTP), which includes a High Lift Pumping Station;
  - Approximately 170km of 1600mm diameter treated water steel pipeline, comprising 37km of pressurised pipeline from the WTP, near Birdhill, County Tipperary, to the Break Pressure Tank (BPT) near Cloughjordan, County Tipperary, and 133km of gravity<sup>1</sup> pipeline, extending from the BPT to the Termination Point Reservoir (TPR) at Peamount, Co. Dublin;
  - A Booster Pumping Station (BPS) east of Birr, County Offaly, and valves and other ancillary apparatus along the length of the pipeline, including the Flow Control Valve (FCV);
  - Power connections to the infrastructure sites<sup>2</sup> and line valves, including uprating of the existing Ardnacrusha – Birdhill 38 kilovolt (kV) overhead line to deliver adequate electrical power to the RWI&PS and WTP; and
  - Provision of take-off points at strategic locations between the WTP and TPR to facilitate future connections to supply communities in the Midlands. The connecting pipelines and associated infrastructure would be delivered through separate projects, yet to be commenced, and subject to their own separate consenting processes.
2. A graphical overview of the Proposed Project, including the locations of the water supply infrastructure and routing of the pipeline, are shown in Image 1.1.
3. The Proposed Project is aligned with the Eastern and Midlands Regional Water Resources Plan, which has now been adopted together with the National Water Resources Plan Framework Plan. The Proposed Project is a strategic national project to address existing water supply deficits and future water supply needs for housing, commercial and industrial growth in an area comprising 40 per cent of Ireland's population. In this regard, the Proposed Project is critical infrastructure for the sustainable development of the country.
4. The Proposed Project would have a permanent wayleave, which is land where Uisce Éireann would retain rights of access for inspection, operation, maintenance and repair of the RWRMs, Gravity Pipeline and Pressure Pipeline and associated infrastructure, and where certain restrictions would apply, limiting development and restricting certain tree planting within the permanent wayleave. The permanent wayleave associated with the RWRMs, Gravity Pipeline and Pressure Pipeline would be approximately 20 metres (m) in width and is normally positioned centred on the pipeline. Additional permanent wayleaves associated with pipeline connections to permanent washout locations would be approximately 10m in width.
5. In addition to the permanent infrastructure elements described above, the Construction Phase of the Proposed Project would require the establishment of temporary working facilities and the use of certain lands on a temporary basis during construction. Land has been identified for the establishment of temporary Construction Compounds (to accommodate office space and plant and equipment) and temporary Pipe Storage Depots. The existing road network would be used as Haul Roads for the transport of materials to and from the construction sites. All of these temporary facilities and traffic management arrangements are collectively referred to as temporary works. A construction working width would include all land temporarily required for the period of construction of the Proposed Project.

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<sup>1</sup> Flows up to approximately 170Mld can be transferred from the BPT to the TPR under gravity. However, when demand for water increases above 170Mld, pipeline frictional losses increase to the point where gravitational flow alone is insufficient to deliver water to the TPR. To provide the additional pressure required to deliver flows up to the peak demand, an electrically-powered BPS is required.

<sup>2</sup> For the purpose of this report, 'infrastructure sites' is the collective term for the RWI&PS, WTP, BPT, BPS, and TPR.

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6. The Proposed Project Boundary encompasses all permanent and temporary land-take required for the Proposed Project and is the boundary that will be subject to the planning application.
7. The Proposed Project infrastructure has the capacity to address identified water supply needs for communities located in counties through which the pipeline travels. The Proposed Project includes take-off points to facilitate these potential future connections, however the future connecting infrastructure will be the subject of separate consenting processes.
8. The Proposed Project is now at an advanced stage of preliminary design. It is this Proposed Project that Uisce Éireann intends to seek planning permission for from An Bord Pleanála.

**Image 1.1: Graphical Overview of the Proposed Water Supply Infrastructure**



## 1.2 Environmental Impact Assessment Report

9. As part of the planning application, an Environmental Impact Assessment Report (EIAR) must be submitted by Uisce Éireann. The EIAR will report the findings of the environmental assessment undertaken by Uisce Éireann for the Proposed Project. This will include:
  - The identification of the features of the environment along the route of the Proposed Project;
  - The assessment of likely significant effects on those features that could arise from building, operating, maintaining, or decommissioning the Proposed Project;
  - Setting out measures to avoid or reduce likely adverse significant effects (referred to as 'mitigation measures'); and
  - Reporting the significant residual environmental effects – both beneficial and adverse – which remain after the application of the mitigation measures.

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10. The EIAR will be undertaken in line with the requirements of Directive 2014/52/EU which was transposed into law in 2018 via the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018. These came in into force on 1 September 2018.
11. There has been substantial progress with the environmental assessment to date, which has been supported by desk studies, modelling and field surveys. In accordance with the mitigation hierarchy, a number of measures have already been adopted within the Proposed Project to avoid or reduce the likely significant effects on the environment, including:
  - Routing the pipeline and Haul Roads to avoid sensitive receptors, as far as reasonably practicable;
  - Reducing the volumes of materials to be delivered or volumes of waste to be removed from site;
  - Use of trenchless construction techniques to tunnel under large rivers;
  - Selecting locations for the infrastructure sites which reduce visual and cultural heritage effects, as far as reasonably practicable; and
  - Carbon saving measures, such as the inclusion of renewable energy provision in the form of solar panels at some of the infrastructure sites.

### 1.3 EIAR Scoping and Purpose of this Report

12. As part of the EIA process, the matters to be included in the EIAR (the scope) and the way that it is proposed that the assessment will be undertaken (the method) must be defined. This Scoping Methodology Report sets out the proposed scope and methodology for the EIAR for each environmental topic. The objectives of the report are to consult and seek agreement from the competent authorities on the proposed scope and methodology for the assessment prior to submission of the EIAR with the planning application to An Bord Pleanála. Consultation on this EIAR Scoping Methodology Report is being undertaken to invite response from competent authorities and regulators on the content of the EIAR. Consultation feedback will be considered in the preparation of the EIAR for the planning application.



## 2. Approach to EIAR

### 2.1 EIAR Methodology

13. The assessment of likely significant environmental effects will be conducted in accordance with the EPA Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (2022) (hereafter referred to as the EPA Guidelines (2022)) and EPA Advice Notes for Preparing Environmental Impact Statements Draft (Draft 2015). The EIAR will also have regard of the European Commission Environmental Impact Assessment of Projects - Guidance on the Preparation of the Environmental Impact Assessment Report (2017).
14. In addition to the applicable EIA legislation and guidance, relevant EU Directives and national legislation relating to the specialist areas will be considered as part of the assessment process.
15. The overall assessment approach will include the following steps:
  - Inclusion of measures to 'avoid' likely significant effects within the Proposed Project (i.e. embedded mitigation);
  - Desktop data gathering and field survey data obtained to date;
  - Assigning the receptor sensitivity;
  - Assessing and characterising the magnitude of impacts and significance of likely significant effects;
  - Incorporating measures to avoid and mitigate (reduce) likely significant effects; and
  - Reporting the residual significant effects after mitigation.

#### 2.1.1 Likely Significant Effects

16. For each environmental topic chapter, an impact assessment section will identify, describe and assess the likely significant effects which may arise either directly or indirectly from the Proposed Project. 'Impacts' are defined as the changes resulting from an action required for the Proposed Project and 'effects' are defined as the consequences of impacts.
17. The EIAR will clearly set out the criteria and standards of significance, sensitivity, and magnitude used to identify the likely significant effects. Any assumptions and/or limitations in reaching assessment conclusions will also be recorded. An explanation will be provided for each environmental topic on the criteria that have been applied, including reference to the appropriate published guidance for each of the environmental topics.
18. The EIAR will evaluate the Construction Phase, Operational Phase and Decommissioning of the Proposed Project and the likelihood, extent, magnitude, duration and significance of likely significant effects will be described. The potential for cumulative or in-combination effects to arise will also be considered.
19. For all environmental topics, the residual significant effects, i.e. those effects predicted once mitigation and monitoring measures are taken into consideration, will be identified.

#### 2.1.2 Mitigation Measures

20. The EIAR will propose mitigation where likely significant effects are identified. The EIAR will include a final chapter that contains a Schedule of Mitigation and Monitoring Measures which will bring together all of the mitigation measures recommended in the various EIAR chapters for ease of reference.

### 2.2 General Assessment Criteria

21. The EPA Guidelines (2022) provide a description of general criteria for assessing and defining the environmental effects of a project. These are set out in Table 2.1. Chapters 3 to 17 set out how these criteria will be applied at a topic level in the EIAR, in addition to any other topic-specific guidance and assessment criteria that will be applied. Certain topics do not use the EPA approach, because they use calculations and thresholds to assess effects in numerical terms. This includes noise and vibration, traffic and transport and air quality. In all cases, professional judgement will be applied to the assessment to underpin the outcomes.

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22. Where professional judgement is used, this will be accompanied by text to explain the reasons and justification.

**Table 2.1: Description of Effects - Reproduced from the EPA Guidelines (2022)**

Description of Effects	
<b>Quality of Effects</b> It is important to inform the non-specialist reader whether an effect is positive, negative or neutral	<b>Positive Effects</b> A change which improves the quality of the environment (for example, by increasing species diversity, or improving the reproductive capacity of an ecosystem, or by removing nuisances or improving amenities)
	<b>Neutral Effects</b> No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error
	<b>Negative/Adverse Effects</b> A change which reduces the quality of the environment (for example, lessening species diversity or diminishing the reproductive capacity of an ecosystem, or damaging health or property or by causing nuisance)
<b>Describing the Significance of Effects</b> 'Significance' is a concept that can have different meanings for different topics – in the absence of specific definitions for different topics the following definitions may be useful	<b>Imperceptible</b> An effect capable of measurement but without significant consequences
	<b>Not Significant</b> An effect which causes noticeable changes in the character of the environment but without significant consequences
	<b>Slight Effects</b> An effect which causes noticeable changes in the character of the environment without affecting its sensitivities
	<b>Moderate Effects</b> An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends
	<b>Significant Effects</b> An effect which, by its character, magnitude, duration or intensity, alters a sensitive aspect of the environment
	<b>Very Significant</b> An effect which, by its character, magnitude, duration or intensity, significantly alters most of a sensitive aspect of the environment
	<b>Profound Effects</b> An effect which obliterates sensitive characteristics
<b>Describing the Extent and Context of Effects</b> Context can affect the perception of significance. It is important to establish if the effect is unique or, perhaps, commonly or increasingly experienced	<b>Extent</b> Describe the size of the area, the number of sites and the proportion of a population affected by an effect
	<b>Context</b> Describe whether the extent, duration or frequency will conform or contrast with established (baseline) conditions (is it the biggest, longest effect ever?)
<b>Describing the Probability of Effects</b> Descriptions of effects should establish how likely it is that the predicted effects will occur so that the Consenting Authority can take a view of the balance of risk over advantage when making a decision	<b>Likely Effects</b> The effects that can reasonably be expected to occur because of the planned project if all mitigation measures are properly implemented
	<b>Unlikely Effects</b> The effects that can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented

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Description of Effects	
<b>Describing the Duration and Frequency of Effects</b> 'Duration' is a concept that can have different meanings for different topics – in the absence of specific definitions for different topics the following definitions may be useful	<b>Momentary Effects</b> Effects lasting from seconds to minutes
	<b>Brief Effects</b> Effects lasting less than a day
	<b>Temporary Effects</b> Effects lasting less than a year
	<b>Short-term Effects</b> Effects lasting one to seven years
	<b>Medium-term Effects</b> Effects lasting seven to fifteen years
	<b>Long-term Effects</b> Effects lasting fifteen to sixty years
	<b>Permanent Effects</b> Effects lasting over sixty years
	<b>Reversible Effects</b> Effects that can be undone, for example through remediation or restoration
	<b>Frequency of Effects</b> Describe how often the effect will occur (once, rarely, occasionally, frequently, constantly – or hourly, daily, weekly, monthly, annually)
<b>Describing the Types of Effects</b>	<b>Indirect Effects (a.k.a. Secondary or Off-site Effects)</b> Effects on the environment, which are not a direct result of the project, often produced away from the project site or because of a complex pathway
	<b>Cumulative Effects</b> The addition of many minor or insignificant effects, including effects of other projects, to create larger, more significant effects
	<b>'Do-nothing Effects'</b> The environment as it would be in the future should the subject project not be carried out
	<b>'Worst-case' Effects</b> The effects arising from a project in the case where mitigation measures substantially fail
	<b>Indeterminable Effects</b> When the full consequences of a change in the environment cannot be described
	<b>Irreversible Effects</b> When the character, distinctiveness, diversity or reproductive capacity of an environment is permanently lost
	<b>Residual Effects</b> The degree of environmental change that would occur after the proposed mitigation measures have taken effect
	<b>Synergistic Effects</b> Where the resultant effect is of greater significance than the sum of its constituents (e.g. combination of SO <sub>x</sub> and NO <sub>x</sub> to produce smog)

23. In addition to the use of these criteria, the most common method employed to determine significance of effects is to compare the magnitude of the predicted effect with the sensitivity of the receiving environment. 'Magnitude' includes the spatial extent of the effect; the time period over which the effect would occur; and whether the effect is permanent or reversible. 'Sensitivity' describes the value or importance placed upon a receptor. A typical matrix is shown in Table 2.2, which is based on the EPA Guidelines (2022) and provides a method of combining magnitude and sensitivity to achieve a decision on significance. The use of this approach improves the transparency and robustness of the professional judgement employed.

**Table 2.2: Significance of Environmental Effect (Adapted from EPA Guidelines 2022)**

Magnitude of Impacts	Sensitivity of Receptor				
	Negligible	Low	Medium	High	Very High
<b>Negligible</b>	Imperceptible	Not significant	Not significant	Not significant	Not significant
<b>Low</b>	Not significant	Slight	Slight	Moderate	Significant
<b>Medium</b>	Not significant	Slight	Moderate	Significant	Very Significant
<b>High</b>	Not significant	Moderate	Significant	Very Significant	Profound

### 2.3 Cumulative Effects

24. The requirements for the assessment of cumulative effects in the EIAR are set out in the EIA Directive:

*'Annex IV(5)(e) includes for a description of the likely significant effects of the project on the environment resulting from inter alia 'the cumulation of effects with other existing and/or approved projects, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources'.*

25. The EPA's EIAR Guidelines advise that cumulative effects relate to 'the addition of many minor or insignificant effects, including effects of other projects, to create larger, more significant effects. While a single activity may itself result in a minor impact, it may, when combined with other impacts (minor or insignificant), result in a cumulative impact that is collectively significant'. The EIAR will consider the cumulative effects of the Proposed Project, both at an intra-project level (i.e. similar types of effects occurring at different locations along the route of the Proposed Project, for example habitat loss), and at inter-project level (i.e. multiple effects occurring on environmental resources, cultural assets, communities, etc. when considering the Proposed Project in combination with other, third party developments). Such developments may include existing and/or approved developments, planning applications which have yet to be determined, known committed future infrastructure development, or the implementation of future land management changes by landowners. Relevant bodies and planning authorities will be consulted to compile a schedule of third-party developments to consider in the cumulative assessment, and these will be tested by each technical lead of the EIAR to establish whether they fall within the zone of influence for a particular topic area. Details of the third-party development sifting exercise will be provided in the EIAR and, where appropriate, topic-specific methodologies will be explained. Mitigation solutions will be proposed in cases where likely significant cumulative effects are predicted.

## 3. Noise and Vibration

### 3.1 Context

26. The EIAR will consider and evaluate noise emissions and vibration arising during the construction, operational and decommissioning phases of the Proposed Project. There has been substantial progress with the Noise and Vibration assessment to date, which has been supported by desk studies, modelling and field measurements.
27. Baseline noise surveys have been conducted at 12 locations representative of the nearest Noise Sensitive Locations (NSL) surrounding the infrastructure sites of the Proposed Project which have the potential to be impacted by construction works and/or those likely to be impacted during the operation of the Proposed Project. Baseline noise surveys were conducted in the receiving environment adjacent to the proposed infrastructure sites, namely the RWI&PS, WTP, BPT, BPS and TPR as well as at representative NSLs in proximity to the proposed 38 kV Uprate Works.
28. The existing noise levels vary from location to location but are typical of the environment commonly experienced in rural/semi-rural areas, in addition to road traffic noise from surrounding local and national roads. Certain locations (i.e. the locations adjacent to busy local/national roads) experienced higher ambient noise levels, whereas other locations surveyed at positions further from the road network experienced lower ambient and background noise levels. The measured noise levels will be used to inform the selection of appropriate construction noise thresholds and operational phase noise criteria for the Proposed Project.
29. In relation to the proposed pipeline works, it is intended to adopt fixed noise limits for the construction phase (i.e. not related to the existing baseline noise in the environment). Nevertheless, the data obtained from the noise surveys is deemed to be indicative of typical rural locations and a comparable noise environment would be anticipated at NSLs along the proposed pipeline works. It is reasonable to adopt a conservative assumption that properties along the proposed pipeline will generally be situated in a quiet rural environment similar to those surveyed around the infrastructure sites.
30. The surveys are intended to provide an informed position on the baseline environment for the Proposed Project. They are not intended to provide a record for every NSL and there will not be survey results for all NSLs. This approach is considered reasonable and in line with relevant good practice guidance (ISO 1996-2:2007 Acoustics - Description, Measurement and Assessment of Environmental Noise - Part 2: Determination of Environmental Noise). Therefore, in order to assess the potential noise and vibration impacts of the construction and operation of the Proposed Project, conservative assumptions, on the basis of professional judgment informed by survey results, will be made in relation to the baseline noise environment.
31. The key phases of construction works that would give rise to likely significant noise effects would involve ground breaking, earthworks and earthworks haulage, tunnelling as well as noise associated with the movement of machinery and materials within, and to and from, the Construction Compounds.
32. A variety of items of plant and machinery would be in use during the Construction Phase. This could include rock breakers, excavators, dump trucks, and generators in addition to other general construction equipment. Due to the nature of the activities undertaken on a construction site, there would be the potential for generation of high levels of noise and vibration in the vicinity of construction activities.
33. The following elements of the Proposed Project will be considered in the Noise and Vibration assessment to be reported in the EIAR:
  - The construction of the five main sites of fixed infrastructure, RWI&PS, WTP, BPT, BPS and TPR;
  - Construction and use of Construction Compounds and Pipe Storage Depots;
  - Construction of permanent and temporary access roads;
  - Construction of the Pressure Pipeline and Gravity Pipeline;

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- Construction traffic on public roads; and
  - Proposed 38 kV Uprate Works and proposed power supply connections.
34. In addition to the above construction impacts, there would also be pumping during the commissioning stage from the Raw Water Intake, High Lift Pumping Station (at the WTP), and BPS, as well as from abstraction from a number of local watercourses for hydrostatic testing of sections of the pipeline, which would generate noise.
35. The potential impacts that could arise from the operation of the Proposed Project and that will be assessed and reported in the EIAR are:
- The infrastructure sites (the RWI&PS, WTP, BPT, BPS and TPR) and FCV, as each of these sites has the potential to generate noise, primarily due to the operation of mechanical plant items; and
  - The impacts associated with additional traffic on public roads.
36. The Noise and Vibration chapter of the EIAR will include an overview of the baseline, the likely significant effects of the Proposed Project and the mitigation measures proposed to avoid or minimise the predicted effects, including monitoring where relevant, and any residual significant effects.
37. The proposed scope and methodology of the Noise and Vibration assessment are set out below.

### 3.2 Study Area

38. The study area for the Noise and Vibration assessment will be defined by the area where there would be the potential for noise and vibration impacts at NSLs due to the construction or operation of the Proposed Project.
39. NSLs include areas where people spend substantial periods of time and where concentration, sleep and amenity are important considerations. Examples of these sensitive locations include residential dwellings, schools and other educational establishments, hospitals and nursing homes, hotels and other short-term accommodation buildings, places of worship, recreational and noise sensitive amenity areas and offices.
40. During the construction of the Proposed Project, noise could potentially be generated at any location within the Proposed Project Boundary. Therefore, this boundary will be used to identify the nearest NSLs in proximity to the Proposed Project, taking into account the typical construction works that are proposed.
41. For the infrastructure sites, the distance considered will vary for each site depending on the location of the main construction works. The largest study area is proposed to be for the RWI&PS as the closest identified NSL is at a distance of approximately 600m from the Proposed Project Boundary.
42. For the pipeline and the 38 kV Uprate Works, the study area will be typically 100m to 150m from the centreline of the pipeline/masts based on the nature of the works to be undertaken and the nearest identified NSLs.
43. The study area for potential noise impacts arising from construction traffic will be defined by the conclusions of the Traffic and Transport assessment. NSLs in proximity to these roads will then be assessed to identify whether the changes in traffic result in a noise effect for those receptors.

### 3.3 Scope of the Assessment

44. The scope of the Noise and Vibration assessment will include all the potential impacts described in Section 3.1, as shown in Table 3.1.
45. Any noise generated by the pipeline during the Operational Phase would be imperceptible in terms of the impact at any NSLs. It is therefore proposed to scope out from further assessment the noise effects from the operation of the Pipeline, including the proposed Line Valves, Washout Valves and Air Valves.

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46. For the vibration assessment, it is proposed that operational vibration is scoped out of the assessment. This is proposed as once operational, there are no sources of vibration associated with the Proposed Project with the potential for likely significant vibration effects at any sensitive receptors.

**Table 3.1: Summary of Scope of Assessment – Noise and Vibration**

Project Phase	Potential Impacts Scoped In	Potential Impacts Scoped Out
Construction	<ul style="list-style-type: none"> <li>The construction of the infrastructure sites (RWI&amp;PS, WTP, BPT, BPS and TPR) will be assessed, along with the Construction Compounds and Pipe Storage Depots</li> <li>Construction of proposed permanent and temporary access roads</li> <li>Construction of the Pressure Pipeline and Gravity Pipeline</li> <li>Construction traffic on public roads</li> <li>Proposed 38 kV Uprate Works and proposed power supply connections</li> </ul>	<ul style="list-style-type: none"> <li>No potential impacts have been scoped out</li> </ul>
Commissioning	<ul style="list-style-type: none"> <li>Pumping during the commissioning phase</li> </ul>	<ul style="list-style-type: none"> <li>All other commissioning activities, as there would be no additional effects beyond those for construction and operation</li> </ul>
Operation	<ul style="list-style-type: none"> <li>Operation of the infrastructure sites and FCV</li> <li>Operations and maintenance traffic</li> </ul>	<ul style="list-style-type: none"> <li>Effects from the operation of the below-ground pipeline and associated valves</li> <li>Vibration effects during operation</li> </ul>

### 3.4 Overview of Assessment Approach

47. There are no statutory standards in Ireland relating to noise and vibration limit values for the construction or operation of the Proposed Project. In the absence of specific statutory Irish guidelines, the assessment will make reference to national guidelines and best-practice standards, where available, in addition to international standards relating to noise and or vibration impact for environmental sources. The assessment will take into account the following policies and guidance, and will be tailored accordingly based on professional judgement and local circumstance:

- EPA Guidelines (2022);
- Transport Infrastructure Ireland (TII) (previously National Roads Authority [NRA]) Guidelines for the Treatment of Noise and Vibration in National Road Schemes (2004);
- TII Good Practice Guidance for the Treatment of Noise during the Planning of National Road Schemes (2014);
- British Standard BS 4142: 2014 +A1 2019 Methods for Rating and Assessing Industrial and Commercial Sound (2019);
- British Standard BS 5228-1:2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites – Noise (2014);
- British Standard BS 5228-2:2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites – Vibration (2014);
- British Standard BS 7385-2: 1993: Evaluation and measurement for vibration in buildings. Part 2: Guide to damage levels from ground borne vibration (1993);
- UK Highways Agency (2020). Design Manual for Roads and Bridges (DMRB), LA 111 Noise and Vibration, revision 2;
- World Health Organization (WHO) Guidelines for Community Noise (1999);
- British Standard BS 8233:2014: Guidance on sound insulation and noise reduction for buildings (BS 8233) (2014);
- British Standard BS 6472-1:2008: Guide to evaluation of human exposure to vibration in buildings (2008);
- Transit noise and vibration impact assessment. FTA-VA-90-1003-06. Washington: US Department of Transportation, Federal Transit Administration, Office of Planning and Environment (2006); and
- EirGrid Evidence Based Environmental Studies Study 8: Literature review and evidence based field study on the noise effects of high voltage transmission development (2016).

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48. The assessment will take account of all NSLs relevant to the Proposed Project and will include the following elements:

- Review of relevant standards and legislation and setting appropriate criteria for noise and vibration;
- Identification of key sources of noise and vibration issues relevant to the components of the Proposed Project;
- Review of baseline noise in the vicinity of the Proposed Project obtained from detailed baseline study work;
- Assessment of likely significant effects associated with the Construction Phase using the guidelines and standards outlined above;
- Assessment of likely significant effects associated with the Operational Phase associated with operational fixed plant items and traffic, using the guidelines and standards outlined above;
- Identification of required mitigation measures required to reduce identified significant effects to within the adopted criteria; and
- Reporting of residual effects following implementation of mitigation.

### 3.5 Assessment Criteria

#### 3.5.1 Construction Phase - Noise

49. There is no published statutory Irish guidance relating to the maximum permissible noise level that may be generated during the Construction Phase of a project. Local Authorities normally control construction activities by imposing limits on the hours of operation and consider noise limits at their discretion. In general, higher noise levels are tolerated during a Construction Phase of a project compared with its long-term Operational Phase, as construction works are temporary to short term and are varied over the course of the work duration. In the absence of specific statutory guidance, reference has been made to the TII Noise Guidelines (2004) and BS 5228-1 (2008) to review and set appropriate noise construction criteria.

#### Linear Infrastructure - TII Guidelines

50. TII Guidelines for the Treatment of Noise and Vibration in National Road Schemes (2004) specifies construction noise limits to be applied to the façade of dwellings. While this document is specifically intended for the purposes of new national road schemes, in the absence of other national guidelines relating to the specific development under consideration, the TII guidelines are considered appropriate to determine the likely significant noise effects of the Proposed Project. This is because both the Proposed Pipeline, the Proposed 38 kV Uprate Works and road constructions consist of a long linear structure through environments similar to those in which new national roads are typically constructed (i.e. rural/semi-rural environments). These maximum noise levels are set out in Table 3.2.

**Table 3.2: Maximum Permissible Noise Levels at the Facade of Dwellings during Construction**

Days and Times	Noise Levels (dB re. $2 \times 10^{-5}$ Pa)	
	$L_{Aeq,1hr}$	$L_{Amax}$
Monday to Friday 07:00hrs to 19:00hrs	70	80
Monday to Friday 19:00hrs to 22:00hrs	60	65
Saturdays 08:00hrs to 16:30hrs	65	75
Sundays and Bank Holidays 08:00hrs to 16:30hrs*	60	65

Source: Guidelines for the Treatment of Noise and Vibration in National Road Schemes (TII 2004)

\* Construction activity at these times, other than that required for emergency works, would normally require the agreement of the relevant local authority.



### Infrastructure Sites, Construction Compounds and Pipe Storage Depots

51. With respect to the infrastructure sites (RWI&PS, WTP, BPT, BPS and TPR), Construction Compounds and Pipe Storage Depots (temporary infrastructure), the 'ABC' method set out in BS 5228 is considered the most appropriate appraisal method. This is because in contrast to the Proposed Pipeline and Proposed 38 kV Uprate Works (which consist of long linear structures), the infrastructure sites would be geographical specific to their proposed location and impacts have the potential to occur for longer periods of time.
52. The ABC methodology requires the designation of a noise sensitive location into a specific category (A, B or C) based on existing ambient noise levels in the absence of construction noise. This then sets a threshold noise value that, if exceeded at this location, indicates a likely significant noise effect is associated with the construction activities, depending on context. Table 3.3 sets out the values which, if exceeded at the facades of residential receptors, identify the potential for a likely significant effect.

**Table 3.3: BS 5228-1 Example Thresholds for Likely Significant Effects**

Assessment Category and Threshold Value Period ( $L_{Aeq}$ )	Threshold Value (dB)		
	Category A	Category B	Category C
Night-time (23:00 to 07:00hrs)	45	50	55
Evenings and Weekends (19:00 – 23:00hrs weekdays) (13:00 - 23:00hrs Saturdays) (07:00 – 23:00hrs Sundays)	55	60	65
Daytime (07:00 – 19:00hrs) and Saturdays (07:00 – 13:00hrs)	65	70	75
Notes	Category A: Threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are less than these values	Category B: Threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are the same as category A values	Category C: Threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are higher than category A values

Source: British Standard BS 5228-1:2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites – Noise (2014)

53. This assessment method is only valid for residential properties. If it is applied to commercial premises without consideration of other factors, it may result in excessively onerous thresholds being set. It may therefore be appropriate to adopt a higher threshold level at commercial premises. However, at this stage no distinction has been made between the various NSLs under consideration. Each commercial receptor will be evaluated for the EIAR to determine whether a different threshold is to be applied.
54. In order to build the Proposed Project, it would be necessary to undertake certain construction activities outside normal working hours. This includes works associated with trenchless crossings which would take place 24 hours a day and works to complete open cut crossings of roads to minimise the length of time for road closures. Therefore, a night time noise threshold is required for the assessment.
55. Based on the results of the baseline noise surveys at the proposed infrastructure sites, Category A thresholds will apply at all sites. Therefore, a daytime significance threshold of 65dB  $L_{Aeq,T}$  will be applied for construction noise emissions from the infrastructure sites at the nearest NSLs. For the evening and night-time thresholds, a level of 45 and 55dB  $L_{Aeq,T}$  will be applied, respectively.

### Criteria for Rating Construction Traffic Noise Impacts

56. To assist with the interpretation of construction traffic noise, Table 3.4 includes guidance as to the likely magnitude of impact associated with changes in construction traffic noise levels along an existing road. This is taken from Table 3.17 of DMRB LA 111 Noise and Vibration.

**Table 3.4: Magnitude of Impact Relating to Changes in Road Traffic Noise Level - Construction Phase**

Magnitude of Impact	Increase in Traffic Noise Level (dB)	Duration	Initial Significance Rating if Duration is Exceeded
Major	Greater than or equal to 5.0	>10 days/nights over 15 consecutive day/nights; or >40 days over 6 consecutive months	Significant
Moderate	Greater than or equal to 3.0 and less than 5.0		Significant
Minor	Greater than or equal to 1.0 and less than 3.0		Not Significant
Negligible	Less than 1.0		Not Significant

Source: United Kingdom Highways Agency DMRB Sustainability and Environment Appraisal LA 111 Noise and Vibration Revision 2 (2020)

57. It is important to consider the overall noise level from construction traffic if the initial significance rating is found to be significant (i.e. at locations where a ‘moderate’ or ‘major’ magnitude of impact rating relating to change in road traffic noise is predicted). Where relevant, the overall noise levels will be calculated and compared to relevant construction noise criteria outlined in Table 3.3.

### 3.5.2 Construction Phase - Vibration

58. There are generally two categories of vibration standard: one dealing with human comfort and one addressing cosmetic or structural damage to buildings. In both instances, it is appropriate to consider the magnitude of vibration in terms of Peak Particle Velocity (PPV).

59. Ground vibration is measured in terms of PPV with units in mm/s or mm/s<sup>-1</sup>. PPV refers to the movement within the ground of molecular particles and not surface movement. The displacement value in millimetres (mm) refers to the movement of particles at the surface.

#### Building Response

60. BS 7385 - 2 (1993) gives guidance regarding acceptable vibration to avoid damage to buildings. BS 5228 – 2 (2014) reproduces the same guidance values.

61. These standards differentiate between transient and continuous vibration. Surface construction activities are transient because they occur for a limited period of time at a given location. Both documents recommend that, for well-constructed residential property and similar light framed structures that are generally in good repair, a threshold for minor or cosmetic damage (i.e. non-structural damage) should be taken as a PPV (in frequency range of predominant pulse) of 15mm/s at 4 Hertz (Hz), increasing to 20mm/s at 15Hz and 50mm/s at 40Hz and above. The standard also notes that below 12.5mm/s PPV, the risk of damage tends to zero. 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 BS 5228 – 2 (2014) might need to be reduced by up to 50%. Therefore, on a precautionary basis, continuous vibration limits have been set as 50% of those for transient vibration across all frequency ranges. The recommended construction vibration thresholds are set out in Table 3.5.

**Table 3.5: Recommended Construction Vibration Thresholds for Buildings**

Vibration Limits for Buildings (PPV) at the Closest Part of Building to the Source of Vibration, at a Frequency of 4Hz		
Building Type	Transient Vibration	Continuous Vibration
Reinforced or framed structures. Industrial and heavy commercial buildings	50mm/s	25mm/s
Unreinforced or light framed structures. Residential or light commercial-type buildings	15mm/s	7.5mm/s

Source: British Standard BS 5228-2:2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites – Vibration (2014)

62. The TII Guidelines (2004) recommend that to avoid vibration damage during construction, vibration from construction activities be limited to the values set out in Table 3.6.

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**Table 3.6: Recommended Construction Vibration Thresholds for Proposed Project**

Allowable Vibration (in terms of PPV) at the Closest Part of Sensitive Property to the Source of Vibration		
Less than 10Hz	10 to 50Hz	50 to 100Hz (and above)
8mm/s	12.5mm/s	20mm/s

Source: Guidelines for the Treatment of Noise and Vibration in National Road Schemes (TII 2004)

63. Following review of the guidance documents set out above, the values in Table 3.6 are considered appropriate for the assessment of the Proposed Project as they provide more stringent vibration criteria.
64. The proposed vibration thresholds are considered appropriate for control of vibration impacts and are set to avoid cosmetic damage to building and therefore should be suitable for all soundly constructed buildings or structures. In relation to constructions, buildings or other assets that may be sensitive to low levels of vibration or where there is existing damage to a building, a civil, structural, or other qualified Engineer may be required to carried out detailed surveys to identify appropriate vibration limits to protect the associated structures and/or operations.

### Human Response to Vibration

65. Humans are sensitive to vibration stimuli, and perception of vibration at high magnitudes may cause concern to building occupants. BS 5228–2 (2014) notes that vibration typically becomes perceptible at around 0.15 to 0.3mm/s and may become disturbing or annoying at higher magnitudes.
66. Higher levels of vibration are typically tolerated for single events or events of short-term duration, particularly during construction projects and when the origin of vibration is known. For example, piling can typically be tolerated at vibration levels up to 2.5mm/s during the daytime and the evening if those affected are aware of the timeframe and origin of the vibration.

### 3.5.3 Operational Phase - Noise

#### Internal Noise Levels

67. BS 8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings (2014) provides guideline values for internal noise levels within residential dwellings. The guideline values for indoor noise levels are presented in Table 3.7.

**Table 3.7: BS 8233:2014 Indoor Noise Levels**

Activity	Location	Daytime	Night-time
Resting	Living room	35dB $L_{Aeq, 16hour}$	-
Dining	Dining room/area	40dB $L_{Aeq, 16hour}$	-
Sleeping (daytime resting)	Bedroom	35dB $L_{Aeq, 16hour}$	30dB $L_{Aeq, 8hour}$
Notes: Daytime assessment period – 07:00 to 23:00 hrs Night-time assessment period – 23:00 to 07:00 hrs			

Source: BS 8233:2014 Guidance on Sound Insulation and Noise Regulation for Buildings (2014)

68. The BS 8233:2014 (2014) values are broadly in line with the values presented in the WHO Guidelines for Community Noise (1999), which are presented in Table 3.8.

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**Table 3.8: WHO Indoor Noise Levels**

Specific Environment	Critical Health Effect(s)	dB $L_{Aeq, T}$	Time Base (House)	dB $L_{Amax, F}$
Dwelling indoors	Speech intelligibility and moderate annoyance, daytime and evening	35	16	-
Inside bedrooms	Sleep disturbance, night-time	30	8	45

Source: Guidelines for Community Noise (WHO 1999)

69. The  $L_{AFmax}$  is the instantaneous fast time weighted maximum sound level, measured during the sample period, and the 45dB  $L_{AFmax}$  criterion applies to 'single sound events' within bedrooms at night. This guideline is generally interpreted as the value that individual noise events should not normally exceed.

### **External Noise Levels**

70. For the Proposed Project, it is appropriate to set operational noise limits for infrastructure sites at external locations so that the noise emissions are controlled to an acceptable level at all NSLs. An equivalent external level outside of the NSL can be derived by factoring in the degree of noise reduction afforded by a partially open window. Annex G in BS 8233:2014 (2014) comments that, '*...If partially open windows were relied upon for background ventilation, the insulation would be reduced to approximately 15 dB...*', although it is also acknowledged that the level difference through a window partially open for ventilation can vary depending on window type and this is nominally deemed to fall in the range of 10 to 15dB.

71. Therefore, to provide a conservative assessment, an inside to outside level difference of 10dB, assuming an open window, will be used. The equivalent external noise at an NSL should not exceed the following so that the internal recommended ambient noise levels are not exceeded:

- Daytime (07:00hrs to 23:00hrs): 45dB  $L_{Aeq, 16hr}$ ; and
- Night-time (23:00hrs to 07:00hrs): 40dB  $L_{Aeq, 8hr}$ .

72. It is anticipated that the plant noise emissions from the Operational Phase of the Proposed Project would be well below these levels at the nearest NSLs when considering the distances from the infrastructure sites to the surrounding NSLs, and that most of the operational plant items would be located internally within buildings or enclosed structures.

73. For the Proposed Project, it is not considered appropriate to set operational noise criteria at the surrounding NSLs. It is therefore proposed that the noise criteria in Table 3.9 should be applied at infrastructure sites so that the operational noise is controlled to an acceptable level at all NSLs.

74. Considering the distances from the infrastructure sites to the surrounding NSLs, it is proposed that the criteria are applied and assessed at specific Proposed Project Boundary locations for all infrastructure sites except for at the TPR. It is proposed that the operational noise criteria at the TPR is assessed at the nearest NSLs due to its proximity to the Proposed Project Boundary.

**Table 3.9: Indicative Operational Noise Criteria for Infrastructure Sites**

Infrastructure Site	Assessment Location	Proposed Operational Noise Criteria	
		Daytime dB $L_{Aeq, 16hr}$	Night Time dB $L_{Aeq, 6hr}$
RWI&PS; RWRMs; WTP; BPT; BPS	Proposed Project Boundary	55	45
TPR	NSL	45	40

75. Noise from operational plant items associated with the Proposed Project will be designed and/or controlled so as not to give rise to likely significant adverse effects at the nearest NSLs. Furthermore, plant items would not emit significant tonal or impulsive characteristics that would be audible at any NSL.

## 4. Traffic and Transport

### 4.1 Context

76. The EIAR will consider and evaluate the impact on the local road network during the construction, operational and decommissioning phases of the Proposed Project. There has been substantial progress with the Traffic and Transport assessment to date, which has been supported by desk studies, modelling and field measurements.
77. Baseline traffic surveys have been carried out along the proposed Haul Roads. These include both junction counts and automatic traffic counts to give a complete overview of the nature of existing traffic using the road network. As would be expected, these show a high variance in the volume of existing traffic depending on the road type proposed to be used as a Haul Road. The baseline surveys will be updated for the EIAR and will be used to predict future traffic levels for the relevant assessment years during construction and operation.
78. Building the Proposed Project would require materials, including the pipe itself, to be delivered to site. This would mainly be done by road vehicles including heavy goods vehicles. In addition to the heavy goods vehicles, there would be a range of smaller vehicles using the designated Haul Roads for the Proposed Project. This would include the staff driving to site. Therefore, there would be an increase in vehicles on the road as a result of the Proposed Project. The potential construction impacts that could arise from the construction of the Proposed Project and that will be assessed and reported in the EIAR are:
- Traffic delays and congestion due to an increase in road traffic levels from construction-related activities supplying and accessing the site using the existing road network; and
  - Increased journey time due to temporary road closures or traffic management (diversion routes).
79. Once the Proposed Project is operational, the level of traffic generated would be very low. There would be maintenance activities and there would be small numbers of staff to run the infrastructure sites. However, the main activity that would generate vehicle movements would be the removal of sludge waste material from the WTP. The potential impact that could arise from operation of the Proposed Project and that will be assessed and reported in the EIAR comprises:
- Traffic delays and congestion due to an increase in road traffic levels from traffic accessing the WTP and TPR site locations and/or maintenance traffic accessing locations including the RWRMs, Pressure Pipeline, BPT, Gravity Pipeline, BPS and RWI&PS.
80. Ongoing discussions with Local Authorities have resulted in proposed Haul Roads being amended to avoid sensitive receptors where practicable, i.e. schools, hospitals, nursing homes and settlements.
81. The Traffic and Transport chapter of the EIAR will include an overview of the baseline, the likely significant effects of the Proposed Project and the mitigation measures proposed to avoid or minimise the predicted effects, including monitoring where relevant, and any residual significant effects.
82. The proposed scope and methodology of the Traffic and Transport assessment are set out below.

### 4.2 Study Area

83. The relevant study area for the Traffic and Transport assessment will be determined according to designated public roads (referred to as 'Haul Roads') to be used by vehicles travelling to and from site during the Construction Phase of the Proposed Project.
84. The Haul Roads pass through the administrative area of seven Local Authorities: Clare County Council, Limerick City and County Council, Tipperary County Council, Offaly County Council, Laois County Council, Kildare County Council and South Dublin County Council.

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85. The scope of the Haul Roads to be assessed will extend from the point at which construction and operational phase vehicles leave the national road network, up to the point they enter the construction area via dedicated access points.
86. The assessment will consider the junctions along the Haul Roads forming the study area. Whether the junctions are assessed will be determined according to thresholds set out in Section 4.5 of this chapter and which have been scoped with each Local Authority. Therefore, not all junctions within the study area will be assessed.

### 4.3 Scope of the Assessment

87. The scope of the assessment has been determined through a scoping exercise undertaken with the Local Authorities. This identified that the following aspects did not need to be considered in the assessment as no significant effects were likely to occur:
- Congestion effects and resulting journey time effects for public transport users and car vehicle occupants due to increases in flows along roads to be used as Haul Roads;
  - Congestion effects and resulting journey time effects for public transport users and car vehicle occupants due to road closures;
  - Severance effects for pedestrians due to increases in flows along roads to be used as Haul Roads;
  - Fear and intimidation for pedestrians due to increased flows alongside roads to be used as Haul Roads; and
  - Journey distance and time effects for pedestrians due to road closures and/or public rights of way diversions.
88. Therefore, it has been agreed with the Local Authorities that the assessment set out in Section 4.1 will focus on likely significant effects arising from junction capacity.
89. Table 4.1 summarises the proposed scope for the Traffic and Transport assessment to be reported in the EIAR.

**Table 4.1: Summary of Scope of Assessment – Traffic and Transport**

Project Phase	Potential Impacts Scoped In	Potential Impacts Scoped Out
Construction	<ul style="list-style-type: none"> <li>• Junction capacity</li> </ul>	<ul style="list-style-type: none"> <li>• Congestion effects and resulting journey time effects for public transport users and car vehicle occupants due to anticipated relatively low increases in flows along roads to be used as Haul Roads</li> <li>• Congestion effects and resulting journey time effects for public transport users and car vehicle occupants due to road closures</li> <li>• Severance effects for pedestrians due to increases in flows along roads to be used as Haul Roads</li> <li>• Fear and intimidation for pedestrians due to anticipated relatively low increases in flows along roads to be used as Haul Roads</li> <li>• Journey distance and time effects for pedestrians due to temporary road closures and/or public rights of way diversions</li> </ul>
Commissioning	<ul style="list-style-type: none"> <li>• No potential impacts have been scoped in as peak traffic effects not expected to occur during commissioning</li> </ul>	<ul style="list-style-type: none"> <li>• The commissioning will be scoped out as it is not the peak construction traffic period</li> </ul>
Operation	<ul style="list-style-type: none"> <li>• Junction capacity</li> </ul>	<ul style="list-style-type: none"> <li>• As per construction</li> </ul>

### 4.4 Overview of Assessment Approach

90. The collation of the baseline data and the preparation of the Traffic and Transport EIAR chapter will have regard to current legislation and current good practice guidance documents, including the EPA Guidelines (2022).

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91. The approach to the assessment will focus on considering the change that arises as a result of the Proposed Project. This will be done by comparing the 'Do Something' traffic level (including those from the Proposed Project) with the 'Do Minimum' traffic (the level of traffic without the Proposed Project) at the relevant junctions.
92. The approach adopted for the 'Do Something' scenario will be to determine the worst-case traffic or 'peak' number of traffic movements generated at any one time throughout the Construction Phase and use this peak as the basis of assessment.
93. The methodology for doing this will be in accordance with the TII Traffic and Transportation Assessment Guidelines – August 2014 (PE-PDV-02045) and will include the following steps:
  - Inclusion of measures to 'avoid' effects within the Proposed Project;
  - Desktop data gathering and field surveys (traffic counts);
  - Development of the proposed Haul Roads;
  - Development of the 'Do Minimum' and 'Do Something' Scenarios;
  - Calculation of vehicle movements and assignment to the road network;
  - Determination of the need for traffic modelling;
  - Junction modelling;
  - Use of criteria for determining significance of effects;
  - Identification of additional mitigation; and
  - Reporting of residual significant effects.
94. For the Operational Phase Assessment the following years will be assessed:
  - Opening year;
  - 5 years after the year of opening; and
  - 15 years beyond the year of opening.

### 4.5 Assessment Criteria

95. The TII Traffic and Transportation Assessment Guidelines 2014, TII Publications (Standards) PE-PDV-02045, Table 2.1 Traffic Management Guidelines Thresholds for Transport Assessments, sets out the following threshold to determine whether the preparation of a Traffic and Transport assessment is recommended:

*"Traffic to and from the development exceeds 10% of the traffic flow on the adjoining road"*

96. Junctions that do not exceed 10% will not be assessed. Currently, 56 junctions, including both existing and future junctions, have been identified as being likely to be above the threshold and therefore likely to require assessment. However, this is based on early indicative traffic movements and so this will be reviewed as the final traffic flows are determined.

#### 4.5.1 Significance of Effects

97. The percentage increase in flows and the predicted delay in journey time (i.e. the size of the increase and the overall flows for the 'Do Something' scenario compared with 'Do Minimum' scenario) will be used to determine whether significant effects would be likely to occur.
98. In the case where a junction would exceed a Ratio Flow Capacity of 0.85, the significance of effect will be determined by reviewing the queue lengths and average delay of the Do Minimum and Do Something scenarios. Where the junction would be below the Ratio Flow Capacity of 0.85, the methodology determines that there would be no likely significant effect i.e. on journey time and delay.

# 5. Biodiversity

## 5.1 Context

99. The EIAR will consider and evaluate biodiversity impacts arising during the construction, operational and decommissioning phases of the Proposed Project. There has been substantial progress with the Biodiversity assessment to date, which has been supported by desk studies and field surveys.
100. Ecological surveys have been undertaken, or are in progress, for terrestrial and freshwater sensitive ecological features which have been identified as key ecological receptors through desk study, the consultation process, and preliminary field surveys. Ecological surveys were/will be undertaken to characterise the baseline condition of the study area, which comprises a Zone of Influence (Zol) extending from the Proposed Project.
101. The majority of the habitats within the Proposed Project consist of improved agricultural grassland and arable crops, bisecting linear hedgerows and treelines, with areas of cutover bog, pockets of forestry (natural and plantation) and smaller pockets of more natural habitats of higher ecological value such as riparian woodland, poor fen and flush or wet grassland. At the infrastructure sites, the habitats consist mainly of improved and wet grassland as well as smaller pockets of broadleaved woodland and conifer plantation. The proposed RWI&PS is located in Parteen Basin (a heavily modified water body). No suitable spawning habitat for salmon or lamprey species have been found to date during aquatic ecological surveys at the RWI&PS site. Sensitive habitats were avoided during the route selection process, and as a result, no Annex I habitats have been recorded to date within the Proposed Project. Invasive non-native species have been recorded within the study area of the Proposed Project and include species listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011 S.I. 477 such as rhododendron (*Rhododendron ponticum*), Japanese knotweed (*Reynoutria japonica*), Himalayan knotweed (*Persicaria wallichii*), and Himalayan balsam (*Impatiens glandulifera*).
102. Evidence of bats (all nine species) were recorded throughout the Proposed Project, particularly along hedgerows and treelines. Common pipistrelle was the most frequently recorded bat species, soprano pipistrelle was the second most frequently encountered bat species, and Leisler's bats was the third most frequently recorded. Daubenton's bat, natterer's bat and brown long-eared bats are less common bat species but are widely distributed across the country. The bat survey results for the Proposed Project are consistent with general bat species distribution records report by Bat Conservation Ireland. Other protected mammal species, including otter and badger, and their breeding habitats were also recorded throughout the Proposed Project. Otter field signs were generally located in riparian zones, close to the Proposed Project watercourse crossing points, as would be expected based on the known habitat preference for this species. Badger numbers are found to be at their highest in areas of high-quality grazing land, a habitat type which is common within the Proposed Project. The badger signs most frequently encountered during the surveys included footprints, trails and evidence of feeding.
103. The Proposed Project crosses numerous small streams and tributaries as well as larger rivers, including the River Blackwater, River Shannon (Lower), Kilmastulla River, Little Brosna River, and the River Liffey, before terminating in the vicinity of Peamount Reservoir in County Dublin. The freshwater ecological value of the watercourses crossed by the Proposed Project ranged from 'unlikely to support important fish stocks' to 'very likely to support important fish stocks'. In general, the larger rivers and streams were found to be of higher ecological value and supported (or had the potential to support) a number of important aquatic species such as Atlantic salmon, lamprey sp., and white-clawed crayfish. The smaller drains and ditches were generally of low freshwater ecological value and were often dry and/or heavily vegetated with limited potential to support protected aquatic species.
104. Several breeding and wintering bird species of conservation significance have been recorded along the Proposed Project. The RWI&PS site at Parteen Basin is situated downstream of the Lough Derg Special Protection Area (SPA) and upstream of the River Shannon and River Fergus Estuaries SPA. These designated sites are 3km and 15.5km from the Proposed Project, respectively. The (breeding) special



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conservation interests of the Lough Derg SPA are cormorant and common tern. Nationally important numbers of both these species breed on the lake. Noteworthy numbers of both tufted duck and great crested-grebe also breed on Lough Derg. There are three SPAs which are designated for hen harrier within 15km of the Proposed Project: Slievefelim to Silvermines Mountains SPA, Slieve Bloom Mountains SPA and Slieve Aughty Mountains SPA. The Slievefelim to Silvermines Mountains SPA is the closest to the Proposed Project, situated approximately 1.5km south-east. These three SPA sites are known to contain hen harrier winter roosts.

105. Currently, there are 74 European sites (Special Areas of Conservation [SACs] and SPAs) located within the potential Zol of the Proposed Project. Of these, 18 are considered to have a source-pathway-receptor link to the Proposed Project. Examples of relevant pathways include, but are not limited to, surface water, groundwater, disturbance (visual, noise, physical presence) and loss of habitat (including supporting habitat). The proposed RWI&PS and 38 kV Uprate Works are partially located within the boundaries of the Lower River Shannon SAC.
106. There are currently 24 Natural Heritage Areas (NHA) and 102 proposed NHAs within 15km of the Proposed Project Boundary. None lie within the Proposed Project Boundary, with the exception of the Grand Canal proposed NHA which is crossed by the Proposed Project at two locations, Kilpatrick, County Kildare and at Colganstown, County Dublin.
107. The potential impacts that could arise from the Proposed Project include:
  - Habitat loss and fragmentation (e.g. needing to clear the site of vegetation for construction activities and permanent above ground infrastructure);
  - Habitat degradation (e.g. as a result of changes in water quality as a result of polluted runoff, or from dust during construction and nitrogen deposition from increased exhaust emissions, which will be covered in the Air Quality assessment);
  - Disturbance/displacement (e.g. from noise and/or lighting pollution);
  - Mortality and injury (e.g. from the disturbance or removal of dwellings or habitat of protected species); and
  - Once operational, the most likely impacts would be associated with the abstraction of water from Parteen Basin and the resulting effect on aquatic habitats or species.
108. The Biodiversity chapter of the EIAR will include an overview of the baseline, the likely significant effects of the Proposed Project and the mitigation measures proposed to avoid or minimise the predicted effects, including monitoring where relevant, and any residual significant effects.
109. The biodiversity assessment will take cognisance of Uisce Éireann's Biodiversity Plan along with respective County Development Plan policies in relation to biodiversity no net loss/net gain.
110. The proposed scope and methodology of the Biodiversity assessment are set out below.

## 5.2 Study Area

111. The Zol is the area over which the Proposed Project could have likely significant effects (both positive and negative) on a given receptor. The Zol over which likely significant effects may occur would differ for different ecological receptors. As recommended by the Chartered Institute of Ecology and Environmental Management (CIEEM) guidelines, professionally accredited or published studies have been used to determine the Zol.
112. Once identified, a receptor-specific Zol is used to inform the study areas (Table 5.1) which will then be used to inform the impact assessment.

Table 5.1: Study Areas Informing the Assessment for the Proposed Project

Ecological Receptor		Zone of Influence	Study Area
<b>Designated Areas of Nature Conservation</b>			
Designated Areas of Nature Conservation		<p>0m for direct impacts (i.e. habitat loss or injury/mortality within the Proposed Project Boundary only).</p> <p>For indirect impacts, Zol varies with species and type of impact: relevant factors include conservation status, sensitivity to disturbance and species core foraging distance. E.g. core foraging distance of hen harrier is 2km, with a maximum range of 10km (Scottish Natural Heritage 2016<sup>1</sup>). Hardey <i>et al.</i> (2013)<sup>2</sup> state that the average hunting range for a male hen harrier during breeding season is 7.3km.</p>	<p>The desktop review study area extends to 15km around the Proposed Project Boundary, as well as other Designated Areas of Nature Conservation with a source-pathway-receptor link with the Proposed Project.</p> <p>The field surveys study area includes the Proposed Project Boundary and a minimum 75m wide buffer around the boundary (with the exception of the 38 kV Uprate Works), that extends from Parteen Basin on the River Shannon directly south of Lough Derg in County Tipperary, through the midland counties of Offaly and Kildare, and terminating in the vicinity of Peamount Reservoir in County Dublin.</p> <p>It also includes the boundary of the 38 kV Uprate Works, and a minimum 30m wide buffer along the length of the existing 38 kV overhead lines and associated infrastructure (occasionally areas up to 50m from the existing lines were surveyed where land access agreements were issued), as well as a 15m wide corridor along the proposed access tracks.</p>
<b>Terrestrial Ecology</b>			
Terrestrial Habitats	Terrestrial habitats or flora	0m for direct impacts (i.e. within the Proposed Project Boundary only).	The Proposed Project Boundary.
	Surface water dependent habitats or flora	<p>0m for direct impacts (i.e. within the Proposed Project Boundary only).</p> <p>For indirect impacts, the Zol will vary with the type of impact, the topography, and the sensitivity of the habitat or flora. The Zol would be expected to be no more than 200m of where significant source-pathway-receptors links occur.</p>	<p>The Proposed Project Boundary and a minimum 75m wide buffer around the boundary (with the exception of the 38 kV Uprate Works), that extends from Parteen Basin on the River Shannon directly south of Lough Derg in County Tipperary, through the midland counties of Offaly and Kildare, and terminating in the vicinity of Peamount Reservoir in County Dublin.</p>
	Groundwater dependent habitats/species	<p>0m for direct impacts (i.e. within the Proposed Project Boundary only).</p> <p>For indirect impacts, the Zol is considered to be 200m of where significant source-pathway-receptors links occur. The Zol will vary with the type of Groundwater Dependent Terrestrial Ecosystem (GWDTE) and type of impact; relevant factors include sensitivity to disturbance and species core foraging distance.</p>	<p>The boundary of the 38 kV Uprate Works, and a minimum 30m wide buffer along the length of the existing 38 kV overhead lines and associated infrastructure (occasionally areas up to 50m from the existing lines were surveyed where land access agreements were issued), as well as a 15m wide corridor along the proposed access tracks.</p> <p>The study area extends beyond the 75m and 30m wide buffers where sensitive surface water and groundwater dependent habitats were identified through the desktop review and field studies.</p>

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Ecological Receptor		Zone of Influence	Study Area
Mammals	Bats	<p>0m for direct impacts (i.e. within the Proposed Project Boundary only).</p> <p>For indirect impacts, the Zol is considered to be up to 1km from the Proposed Project Boundary for commuting and/or foraging habitats. For roosts, the Zol varies with factors such as species and roost type.</p>	<p>The desktop review study area extends to 5km around the Proposed Project Boundary for bats, exceeding Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes (NRA 2006<sup>3</sup>) which recommends a 3km buffer zone.</p> <p>The field surveys study area includes the Proposed Project Boundary and a minimum 75m wide buffer around the boundary (with the exception of the 38 kV Uprate Works), that extended from Parteen Basin on the River Shannon directly south of Lough Derg in County Tipperary, through the midland counties of Offaly and Kildare, and terminating in the vicinity of Peamount Reservoir in County Dublin.</p> <p>It also includes the boundary of the 38 kV Uprate Works, and a minimum 30m wide buffer along the length of the existing 38 kV overhead lines and associated infrastructure (occasionally areas up to 50m from the existing lines were surveyed where land access agreements were issued), as well as a 15m wide corridor along the proposed access tracks.</p> <p>The study area also includes the local road network in the Proposed Project Boundary for driven bat transects.</p>
	Eurasian badger	<p>0m for direct impacts (i.e. within the Proposed Project Boundary only).</p> <p>For indirect impacts the Zol may extend up to 150m from the Proposed Project Boundary.</p>	<p>The desktop review study area extends to the 10km grid squares surrounding the Proposed Project Boundary (i.e. species distribution data recorded within 10km square grid references on a map).</p> <p>The field surveys study area includes the Proposed Project Boundary and a minimum 75m wide buffer around the boundary (with the exception of the 38 kV Uprate Works), that extended from Parteen Basin on the River Shannon directly south of Lough Derg in County Tipperary, through the midland counties of Offaly and Kildare, and terminating in the vicinity of Peamount Reservoir in County Dublin.</p> <p>It also includes the boundary of the 38 kV Uprate Works, and a minimum 30m wide buffer along the length of the existing 38 kV overhead lines and associated infrastructure, as well as a 15m wide corridor along the proposed access tracks.</p> <p>Study areas also extend to 150m upstream and downstream of watercourses crossed by the Proposed Project to check for signs of otter, where suitable habitat exists.</p>
	Otter		
	Other mammal species		
Invertebrates	Lepidoptera	<p>0m for direct impacts (i.e. within the Proposed Project Boundary only).</p>	<p>The boundary of the RWI&amp;PS and WTP sites as well as areas along the route of the Pressure Pipeline and Gravity Pipeline where potentially suitable habitat exists in or within 200m of the Proposed Project Boundary.</p>
	Mollusc		
Other Species Groups	Reptiles and amphibians	<p>For indirect impacts, the Zol will vary with the type of impact, the topography, and the sensitivity of the habitat or species. The Zol would be expected to be no more than 200m of where significant source-pathway-receptors links occur.</p>	<p>The Proposed Project Boundary and a minimum 75m wide buffer around the boundary (with the exception of the 38 kV Uprate Works), that extend from Parteen Basin on the River Shannon directly south of Lough Derg in County Tipperary, through the midland counties of Offaly and Kildare, and terminating in the vicinity of Peamount Reservoir in County Dublin.</p> <p>The boundary of the 38 kV Uprate Works, and a minimum 30m wide buffer along the length of the existing 38 kV overhead lines and associated infrastructure, as well as a 15m wide corridor along the proposed access tracks.</p>

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Ecological Receptor		Zone of Influence	Study Area
<b>Aquatic Ecology</b>			
Habitats and Flora	Rivers, streams, drainage ditches, aquatic plant communities, floating river vegetation	0m for direct impacts (i.e. within the Proposed Project Boundary only). For indirect impacts, the Zol is limited to water bodies to which runoff from the Proposed Project could drain to during construction. Impacts could occur at significant distances downstream depending on the magnitude and duration of any pollution event.	Any watercourse crossed by the Proposed Project, including 150m upstream and downstream of the Proposed Project where suitable habitat existed for protected aquatic fauna.
Aquatic Fauna	Annex II and V European protected species in Ireland: sea, brook and river lamprey, Atlantic salmon, white-clawed crayfish		
<b>Ornithology</b>			
Birds	Breeding birds (key species of conservation concern)	0m for direct impacts (i.e. within the Proposed Project Boundary only) For indirect impacts, the Zol in relation to disturbance from noise and vibration and human presence on breeding and wintering birds may extend for several hundred metres from the Proposed Project Boundary.	The Lower River Shannon, Parteen Basin, Lough Derg, and suitable habitats favoured by target bird species within a 2km buffer of the Proposed Project Boundary, along the route of the Pressure Pipeline and Gravity Pipeline and the 38 kV Uprate Works.
	Breeding birds (other species of lower conservation concern)		
	Wintering birds (key species of conservation concern)		
	Wintering birds (other species of lower conservation concern)		
<p><sup>1</sup> Scottish Natural Heritage (2016). Assessing Connectivity with Special Protection Areas. Scottish Natural Heritage Guidance. Scottish Natural Heritage, Version 3 – June 2016</p> <p><sup>2</sup> Hardey, J., Crick, H., Riley, H., Etheridge, B., Thompson, D., Scottish Raptor Monitoring Group &amp; Scottish Natural Heritage (2013). Raptors: a field guide to survey and monitoring</p> <p><sup>3</sup> National Roads Authority; now known as Transport Infrastructure Ireland) (2006). Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes</p>			

### 5.3 Scope of the Assessment

113. The scope of the Biodiversity assessment will include all the potential impacts described in Section 5.1, as summarised in Table 5.2. No potential impacts are proposed to be scoped out of the assessment. Some receptors may be scoped out if surveys confirm that the Zol of the Proposed Project does not include those species. This can only be determined when field surveys have been completed.

**Table 5.2: Summary of Scope of Assessment – Biodiversity**

Project Phase	Potential Impacts Scoped In	Potential Impacts Scoped Out
Construction	<ul style="list-style-type: none"> <li>Habitat loss and fragmentation</li> <li>Habitat degradation</li> <li>Disturbance/displacement</li> <li>Mortality and injury</li> </ul>	<ul style="list-style-type: none"> <li>No potential impacts have been scoped out</li> </ul>
Commissioning	<ul style="list-style-type: none"> <li>Abstraction of water (testing)</li> <li>Habitat degradation</li> <li>Disturbance/displacement</li> </ul>	<ul style="list-style-type: none"> <li>No potential impacts have been scoped out</li> </ul>
Operation	<ul style="list-style-type: none"> <li>Abstraction of water</li> <li>Habitat degradation</li> <li>Disturbance/displacement</li> </ul>	<ul style="list-style-type: none"> <li>No potential impacts have been scoped out</li> </ul>

### 5.4 Overview of Assessment Approach

114. The Biodiversity assessment will be in accordance with the Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine by CIEEM and will include the general assessment steps set out in Section 2.1. Inputs from other assessments, including Soils, Geology and Hydrogeology, Noise and Vibration, Air Quality, and Water Environment, will inform the Biodiversity assessment.

115. A desktop review has been carried out to inform the initial scope of the ecological surveys required for the EIAR. This will be periodically updated prior to the completion of the EIAR. The desktop review will involve collection and review of relevant published and unpublished sources of data, collation of existing information on the ecological environment and consultation with relevant statutory bodies (e.g. National Parks and Wildlife Service and Inland Fisheries Ireland).

116. A comprehensive range of field surveys has commenced and will continue to be carried out to inform the impact assessment. These have/will include: habitat surveys, surveys for rare and/or protected plant species, mammal surveys (including dedicated surveys for otter, badger and bats), aquatic surveys (including assessment of biological water quality status), molluscan surveys (including *Vertigo* snail species surveys), marsh fritillary butterfly surveys, and breeding and wintering bird surveys (including dedicated lowland wader, woodcock, and hen harrier surveys). Surveys have/will be carried out during the appropriate times of the year and during suitable conditions, following relevant guidance for target receptors.

117. There is a variation in the methodology for breeding and wintering birds; guidance in Birds and Wind Farms in Ireland: A Review of Potential Issues and Impact Assessment (Percival 2003) will be followed.

### 5.5 Assessment Criteria

118. Ecological receptors will be evaluated following NRA (now Transport Infrastructure Ireland) guidelines which set out the importance of the receptors in a geographical context. These guidelines are consistent with the approach recommended in the CIEEM guidelines.

119. The information gathered from desk studies and field surveys will be used to evaluate the likely significant effects of the Proposed Project upon the identified ecological receptors on an importance scale ranging from international (A) - national (B) - county importance (C) - local importance, high value (D) - local importance, low value (E).

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120. Those features identified as being of high local importance or greater will be carried forward in the ecological evaluation as key ecological receptors when considering the likely significant effects. The criteria shown in Table 5.3 have been used in evaluating ecological value within the Proposed Project.

**Table 5.3: Ecological Valuation Criteria at Different Geographical Scales Used in Assessing the Ecological Importance of Sites**

Importance	Ecological Valuation
International Importance (A)	<ul style="list-style-type: none"> <li>• 'European site' including SAC, Site of Community Importance, SPA, proposed SAC or proposed SPA</li> <li>• Features essential to maintaining the coherence of the Natura 2000 Network</li> <li>• Site containing 'best examples' of the habitat types listed in Annex I of the Habitats Directive</li> <li>• Resident or regularly occurring populations (assessed to be important at the national level) of species of animal and plants listed in Annex II and/or IV of the Habitats Directive</li> <li>• Salmonid water designated pursuant to the European Communities (Quality of Salmonid Waters) Regulations, 1988, (S.I. No. 293 of 1988)</li> <li>• Major salmon river fisheries</li> </ul>
National Importance (B)	<ul style="list-style-type: none"> <li>• Site designated or proposed as a NHA</li> <li>• Statutory Nature Reserve</li> <li>• Refuge for Fauna and Flora protected under the Wildlife Acts 1976 to 2012</li> <li>• National Park</li> <li>• Resident or regularly occurring populations (assessed to be important at the national level) of species protected under the Wildlife Acts 1976 to 2012; and/or; species listed on the relevant Red Data list</li> <li>• Site containing 'viable areas' of the habitat types listed in Annex I of the Habitats Directive</li> <li>• Major trout river fisheries</li> <li>• Commercially important coarse fisheries</li> <li>• Water bodies with high amenity value</li> </ul>
County Importance (C)	<ul style="list-style-type: none"> <li>• Area of Special Amenity</li> <li>• Area of High Amenity, or equivalent, designated under a County Development Plan</li> <li>• Resident or regularly occurring populations (assessed to be important at the County level) of: <ul style="list-style-type: none"> <li>- species of animal and plants listed in Annex II and/or IV of the Habitats Directive;</li> <li>- species protected under the Wildlife Acts 1976 to 2012; and/or,</li> <li>- species listed on the relevant Red Data list</li> </ul> </li> <li>• Site containing area or areas of the habitat types listed in Annex I of the Habitats Directive that do not fulfil the criteria for valuation as of International or National importance</li> </ul>
Local Importance (Higher Value) (D)	<ul style="list-style-type: none"> <li>• Locally important populations of priority species or habitats or natural heritage features identified in the Local Biodiversity Action Plan, if this has been prepared</li> <li>• Resident or regularly occurring populations (assessed to be important at the Local level) of: <ul style="list-style-type: none"> <li>- species of animal and plants listed in Annex II and/or IV of the Habitats Directive;</li> <li>- species protected under the Wildlife Acts 1976 to 2012; and/or,</li> <li>- species listed on the relevant Red Data list</li> </ul> </li> <li>• Sites containing semi-natural habitat types with high biodiversity in a local context and a high degree of naturalness, or populations of species that are uncommon in the locality</li> <li>• Sites or features containing common or lower value habitats, including naturalised species that are nevertheless essential in maintaining links and ecological corridors between features of higher ecological value</li> <li>• Sites of 'High' water quality status (Q4-5, Q5)</li> <li>• Water bodies with some fisheries value and potential salmonid habitat</li> </ul>
Local Importance (Lower Value) (E)	<ul style="list-style-type: none"> <li>• Sites containing small areas of semi-natural habitat that are of some local importance for wildlife</li> <li>• Sites or features containing non-native species that are of some importance in maintaining habitat links</li> <li>• Water bodies with no fisheries value and poor fisheries habitat</li> </ul>

Note: Source of information: Adapted from NRA Guidelines for Assessment of Ecological Impacts of National Road Schemes

121. Potential impacts will be assessed against parameters as set out within the NRA guidance and take cognisance of guidance produced by the EPA (2022) and CIEEM. This approach applies a scientific and repeatable method that considers all aspects of the potential impacts on biodiversity.

122. The following characteristics will be referenced when describing ecological effect (following NRA, CIEEM and EPA guidance):

- Extent: the area over which the impact occurs;
- Magnitude: the size, amount, intensity and volume, e.g. the amount of habitat lost, percentage change to habitat area, percentage decline in a species population;
- Duration: as described in Table 2.1, Chapter 2;
- Frequency and timing: e.g. once, rarely, occasionally, frequently, constantly. The timing of impacts in relation to important seasonal and/or life-cycle constraints; and
- Reversibility: an irreversible effect is one from which recovery is not possible within a reasonable timescale or there is no reasonable chance of action being taken to reverse it. A reversible effect is one from which spontaneous recovery is possible or which may be counteracted by mitigation.

### 5.5.1 Significance of Effects

123. A determination on whether the effects of the Proposed Project are significant will be based on the EPA Guidelines (2022). The criteria used for assessing the significance of effects is included in Table 2.1. Professional judgement will be used to determine the overall significance of the effect on each receptor.

## 5.6 Appropriate Assessment

124. In addition to preparation of the EIAR, Appropriate Assessment reporting to comply with Article 6, paragraphs 3 and 4 of the European Union Habitats Directive Council Directive (92/43/EEC) on the conservation of natural habitats and wild fauna and flora, will be undertaken. Article 6(3) of the EU Habitats Directive requires an 'Appropriate Assessment' to be carried out by a competent authority to assess whether or not a plan or project either alone and/or in-combination with other plans or projects, is likely to result in a significant effect on a European site(s). In Ireland, European sites include SACs and SPAs (collectively referred to as the Natura 2000 network).

125. The Proposed Project ecologists will undertake an Appropriate Assessment Screening and will produce a Stage One Screening Report. This report will detail the examination of the potential effects of the Proposed Project (alone and/or in-combination) using the source-receptor-pathway model to identify what European sites, and which of their qualifying interests, special conservation interest species, or conservation objectives, may potentially be at risk. This is required to determine the ZoI of the Proposed Project. This process will identify the likely effects upon European site(s) within the ZoI as a result of the Proposed Project, either alone and/or in-combination with other projects or plans, and will consider whether these effects are likely to be significant.

126. As per EU Guidance and relevant case law, the Appropriate Assessment Screening will be carried out in the absence of any consideration of protective mitigation measures that form part of the Proposed Project and are designed to avoid or reduce the impact of the Proposed Project on a European site. The threshold at this first stage is a very low one and operates as a trigger in order to determine whether a Stage Two Appropriate Assessment must be undertaken by the competent authority. Therefore, where significant effects are likely, uncertain or unknown at the screening stage, a second stage Appropriate Assessment will be required and a Natura Impact Statement will be completed. This will consider any identified impacts as a result of the Proposed Project on the integrity of the European site, either alone or in-combination with other projects or plans, with respect to the site's structure and function and its conservation objectives. Where potential adverse effects are identified, mitigation of the potential impacts will be required, and detailed, to reduce the effects to a not significant level. The Natura Impact Statement will inform the Appropriate Assessment process which is conducted by the competent authority. The Natura Impact Statement will be submitted to An Bord Pleanála as the competent authority and as a separate document to the EIAR.

## 6. Water Environment

### 6.1 Context

127. The EIAR will consider and evaluate impacts on surface water features arising during the construction, operational and decommissioning phases of the Proposed Project. There has been substantial progress with the Water Environment assessment to date, which has been supported by desk studies, abstraction modelling and water quality modelling.
128. The Proposed Project crosses seven catchments, including four Lower Shannon catchments; the northernmost part of the Barrow catchment; the southeast tip of the Boyne catchment and the western edge of the Liffey and Dublin Bay catchments.
129. There are currently 70 Water Framework Directive (WFD) water bodies that could be potentially impacted by the Proposed Project. There are many unnamed watercourses which could also be impacted, in particular as a result of being crossed by the 38 kV Uprate Works and Proposed Gravity and Pressure Pipelines. These include field ditches and drains which have a hydrological connection to a WFD water body.
130. Currently, the Proposed Project would include 465 crossings of watercourses along the length of the RWRMs, Pressure Pipeline, and Gravity Pipeline, 11 of which are currently proposed to be trenchless and 454 open-cut. Of these, 68 are WFD water bodies; the remaining 386 crossings would be crossings of drains and ditches, of varying sizes.
131. In the absence of control measures or mitigation, there are a number of potential impacts which could occur during the Construction Phase of the Proposed Project. These would include:
- Disruption to surface water flows, across land and in water bodies;
  - Abstraction and discharge of water during construction and commissioning;
  - Mobilisation of sediment and changes to the hydromorphology of watercourses; and
  - Potential for the mobilisation of polluting substances.
132. During operation, potential impacts could include:
- Potential impacts related to the level of water in the Parteen Basin and onward flows (which could impact on water quality, hydromorphology and aquatic habitats); and
  - Discharge from wash out valves at temporary discharge points and permanent outfalls during planned maintenance (which could impact water quality, scouring of water body beds and the remobilisation of silt).
133. A Flood Risk Assessment will be undertaken to consider the risks of flooding to and from infrastructure which forms part of the Proposed Project.
134. The Proposed Project will be subject to a WFD Assessment.
135. The Water Environment chapter of the EIAR will include an overview of the baseline, the likely significant effects of the Proposed Project and the mitigation measures proposed to avoid or minimise the predicted effects, including monitoring where relevant, and any residual significant effects.
136. The proposed scope and methodology of the Water Environment assessment are set out below.



## 6.2 Study Area

137. The study area for the Water Environment assessment encompasses all areas within the Proposed Project Boundary with some extensions beyond, where appropriate. Given the potential for different impacts from each of the elements being considered, separate study areas have been identified for each element. These are set out in Table 6.1. The study areas have been defined using relevant guidance and professional judgement to identify potential source-pathway-receptor linkages and likely significant effects associated with the construction and operation of the Proposed Project.

138. The nature of the Proposed Project is such that direct impacts, in relation to the pipeline and infrastructure sites, are likely to be limited to those water bodies being crossed, in very close proximity to a crossing point, or that have been identified as permanent washout locations, requiring the installation of a new outfall.

139. Indirect impacts, in relation to the pipeline and infrastructure sites, can occur as a result of hydrological connections to downstream water bodies and national or international designated sites. A wider study area is considered for these and used in the determination of sensitivity for the directly impacted water body.

**Table 6.1: Summary of Study Areas - Water**

Assessment	Study Area
Abstraction	<ul style="list-style-type: none"> <li>The extent of hydraulic connectivity</li> <li>The upstream limit of the study area proposed is Meelick Weir which is located on the Shannon (Lower)_030, approximately 15km upstream of Derg TN</li> <li>The downstream limit of the study area is the confluence of the Shannon (Limerick Dock) and the Ardnacrusha Tailrace</li> </ul>
Pipeline	<ul style="list-style-type: none"> <li>Proposed Project Boundary</li> <li>Direct impacts: Water bodies within 50m of the construction working width and any water body crossed by the RWRMs, Pressure Pipeline and Gravity Pipeline; and a 50m buffer from any Construction Compound/Pipe Storage Depot/roads crossed by the RWRMs, Pressure Pipeline and Gravity Pipeline, Construction Compounds, Pipe Storage Depots or associated access tracks</li> <li>Indirect impacts: on designated sites up to 5km; and on WFD water bodies (where direct impact is a non WFD water body) up to 2km</li> </ul>
Infrastructure sites	<ul style="list-style-type: none"> <li>Direct impacts: 50m buffer from the site boundary of any infrastructure site/other permanent infrastructure</li> <li>Indirect impacts: on designated sites up to 5km; and on WFD water bodies (where direct impact is a non WFD water body) up to 2km</li> </ul>

## 6.3 Scope of the Assessment

140. The scope of the Water Environment assessment will include all the potential impacts described in Section 6.1 and will focus on the assessment of the abstraction, the pipeline and the infrastructure sites, as summarised in Table 6.2. No potential impacts are proposed to be scoped out of the Water Environment assessment of the Proposed Project.

141. Groundwater will be covered separately within the Soils, Geology and Hydrogeology assessment. Groundwater is also relevant to the surface water assessment, for example changes in groundwater levels (such as from dewatering) could impact recharge to rivers and streams, which could have an indirect effect on the hydrology of waterbodies. The Water Environment EIAR chapter will cross refer to the conclusions of the Soils, Geology and Hydrogeology assessment where appropriate.

**Table 6.2: Summary of Scope of Assessment – Water Environment**

Project Phase	Potential Impacts Scoped In	Potential Impacts Scoped Out
Construction Commissioning Operation	<ul style="list-style-type: none"> <li>Surface water quality and hydrology</li> <li>Hydromorphology</li> <li>Surface water supply</li> </ul>	<ul style="list-style-type: none"> <li>No potential impacts have been scoped out</li> </ul>

### 6.4 Overview of Assessment Approach

142. The methodology for the Water Environment assessment will be in accordance with guidance on hydrology assessment from the NRA (now Transport Infrastructure Ireland) and the EPA. It will also draw on guidance from TII publication DN-DNG-03065, the Environment Agency in the UK, and the DMRB (LA 113) in the UK. The assessment will include the general assessment steps set out in Section 2.1 of this report.
143. A WFD Assessment will be undertaken, the findings of which will be summarised in the EIAR Water Environment chapter. The WFD Assessment will also be appended to the EIAR.

### 6.5 Assessment Criteria

#### 6.5.1 Sensitivity of Receptor

144. The sensitivity of surface water 'attributes' to changes as a result of the Proposed Project will be determined by a set of criteria including their relative importance or 'value' (e.g. whether features are of national, regional or local value). Table 6.3 outlines the criteria for estimating the sensitivity of receptors and their attributes. In assigning sensitivity, whichever criteria affords the highest level of sensitivity will be used first. For example, a SAC would be very high even if the WFD is moderate. A good WFD status would result in high sensitivity even if there was no hydrological connection to a designated protected area.
145. The criteria used to evaluate the sensitivity of receptors are based upon the criteria outlined in the NRA Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes, however the typical examples have been developed further taking consideration of other relevant guidance, such as guidance from TII (DN-DNG-03065) and DMRB (LA 113), and professional judgment.
146. In the absence of Irish guidance on the assessment of WFD water bodies, UK WFD Guidance for WFD assessment recommends that the scope of assessments and impacts on designated sites is limited to a 2km stretch downstream of where the modification or activity is taking place. Therefore, this will be used within the sensitivity criteria. If the designated site is <2km downstream, then a sensitivity of high or above is applied, depending on other criteria. 'Limited' connection is identified as being where a designated site is between 2km and 5km downstream of the modification or activity taking place. This is not set out in the UK WFD Guidance but will be included following application of professional judgement regarding the potential impacts on protected areas.
147. For surface water supply receptors, a sensitivity of high or above will be applied.
148. In October 2022, the EPA updated the WFD status of all water bodies in Ireland. Following this update, there are no Unassigned water bodies within the study area.
149. Each receptor will be allocated a sensitivity for three separate water environment attributes:
- Surface water quality and hydrology;
  - Hydromorphology; and
  - Surface water supply.

Table 6.3: Criteria Used to Evaluate the Sensitivity of Surface Water Receptors

Sensitivity	Criteria	Typical Examples
Very High	Receptor (or receptor attribute) has a high quality or value on an international scale	<b>Surface Water Quality and Hydrology</b> <ul style="list-style-type: none"> <li>Water body protected by EU legislation e.g. 'European sites' designated under the Planning and Development Acts 2000-2017 as amended (SAC and SPA) and/or European Communities (Birds and Natural Habitats) Regulations 2011, 'Salmonid Waters' designated pursuant to the European Communities (Quality of Salmonid Waters) Regulations, 1988 or nutrient sensitive areas (designated under the UWWT Regulations 1999 as amended)</li> <li>A WFD water body of High status</li> <li>Water body is a designated drinking water protected river or lake</li> <li>Non-WFD classified water bodies may be applicable if part of a protected site or designated drinking water protected river</li> <li>An internationally important amenity site(s) for wide range of leisure activities</li> </ul>
		<b>Hydromorphology</b> <ul style="list-style-type: none"> <li>A water body that shows a natural planform and appears to be in natural equilibrium exhibiting a natural range of morphological features (such as pools, riffles, bars). There is a diverse range of fluvial processes present, free from any modification or anthropogenic influence</li> </ul>
		<b>Surface Water Supply</b> <ul style="list-style-type: none"> <li>Known surface water abstraction location within 50m from any proposed works</li> <li>Designated drinking water protected river or lake or part of source protection scheme</li> </ul>
High	Receptor (or receptor attribute) has a high quality or value on a regional or national scale	<b>Surface Water Quality and Hydrology</b> <ul style="list-style-type: none"> <li>A WFD water body which has a direct hydrological connection of &lt;2km to European Sites or protected ecosystems of international and/or national status (SAC/SPA or Salmonid Waters) including nutrient sensitive areas, NHA or drinking water protected areas</li> <li>A WFD water body of Good status or below</li> <li>A non-WFD water body which has a direct hydrological connection of &lt;2km to European Sites or protected ecosystems of international status (SAC/SPA or Salmonid Waters) including nutrient sensitive areas</li> <li>Salmonid fishery or contains known populations of salmonids</li> <li>A nationally important amenity site(s) for wide range of leisure activities</li> </ul>
		<b>Hydromorphology</b> <ul style="list-style-type: none"> <li>A water body that appears to show a mostly natural planform free from historical straightening or realignment. Water body appears to be in some natural equilibrium and exhibits morphological features (such as pools, riffles and bars). There is a diverse range of fluvial processes present, with very limited signs of modification or other anthropogenic influences</li> </ul>
		<b>Surface Water Supply</b> <ul style="list-style-type: none"> <li>Water body with direct hydrological connection (within 2km) to a downstream drinking water protected area or group source protection scheme</li> </ul>
Medium	Receptor (or receptor attribute) has a high quality or value on a local scale	<b>Surface Water Quality and Hydrology</b> <ul style="list-style-type: none"> <li>A non-WFD water body with &lt;2km hydrological connection to a Good to High status WFD water body</li> <li>Contains coarse fish species</li> <li>A regionally important amenity site(s) for wide range of leisure activities</li> </ul>
		<b>Hydromorphology</b> <ul style="list-style-type: none"> <li>A water body showing a low sinuosity planform and signs of historical modification or culverting but attempting to recover to a natural equilibrium. Water body may show a limited range of diverse hydromorphological features (small bars and riffles)). The water body is one with a limited range of fluvial processes and is affected by modification or other anthropogenic influences</li> <li>For standing water bodies: Exhibits modification to natural planform and fluctuating water levels during dry periods</li> </ul>
Low	Receptor (or receptor attribute) has a medium quality or value on a local scale	<b>Surface Water Quality and Hydrology</b> <ul style="list-style-type: none"> <li>A non-WFD water body with minimal economic and social uses &gt;2km from a Good to High status WFD water body and &gt;5km from a European or nationally designated site</li> <li>A non-WFD water body with &lt;2km hydrological connection to a Moderate status or below WFD water body</li> <li>A locally important amenity for a wide range of leisure activities</li> </ul>

Sensitivity	Criteria	Typical Examples
		<p><b>Hydromorphology</b></p> <ul style="list-style-type: none"> <li>A highly straight and/or modified water body that has been changed by channel modification, culverting or other anthropogenic pressures. Only a limited range of fluvial processes. Evidence of historical channel change through artificial channel straightening and re-profiling</li> <li>For standing water bodies: Do not appear to be naturally formed. Features with very limited or no recreational uses, No fish species or other ecological receptors present. May be ephemeral during period of dry weather</li> </ul>
Negligible	Receptor (or receptor attribute) has a low quality or value on a local scale	<p><b>Surface Water Quality and Hydrology</b></p> <ul style="list-style-type: none"> <li>A non-WFD water body with &gt;2km hydrological connection to a Moderate status or below WFD water body</li> <li>Locally important amenity site for a limited range of leisure activities</li> <li>Many existing pressures which are adversely affecting biodiversity</li> </ul>
		<p><b>Hydromorphology</b></p> <ul style="list-style-type: none"> <li>The watercourse exhibits no morphological diversity and has a uniform channel, showing no evidence of active fluvial processes and likely to be artificial or affected by extensive modification. Highly likely to be affected by anthropogenic factors and could dry up during summer months</li> </ul>

**6.5.2 Magnitude of Impact**

150. The criteria used to evaluate the magnitude of impacts (Table 6.4) are based upon the criteria outlined in the NRA Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes, however the typical examples have been developed further taking consideration of other relevant guidance, such as guidance from TII (DN-DNG-03065) and DMRB (LA 113), and professional judgment. The magnitude of impacts will also be determined in accordance with the EPA Guidelines (2022) and is described in terms of:

- Scale; e.g. the size of the area, the number of sites, the proportion of a receptor;
- Duration: as described in Table 2.1;
- Frequency, e.g. once, rarely, occasionally, frequently, constantly; and
- Probability of occurrence of impact: negligible, low, medium and high, taking into account:
  - The proximity of the activity to a water body; and
  - The potential for a hydrological pathway from source to receptor.

**Table 6.4: Criteria for Determining Nature of Impact on Surface Water Receptors**

Magnitude of Impact	Description	Typical examples
Major Adverse	Results in loss of attribute and/or quality and integrity of the attribute	<p><b>Surface Water Quality and Hydrology</b></p> <ul style="list-style-type: none"> <li>Construction works in-channel and/or extensive construction works adjacent to a watercourse which are therefore likely to risk a major, measurable shift from baseline water quality</li> <li>For WFD classified water bodies, water quality impacts have the potential to impact the water body at the water body scale and cause deterioration in WFD status and/or prevent the water body from achieving its objectives under the WFD and River Basin Management Plan</li> <li>Loss or extensive change to a fishery and/or designated nature conservation site</li> </ul>
		<p><b>Hydromorphology</b></p> <ul style="list-style-type: none"> <li>Loss of, or extensive adverse changes to the watercourse bed, banks and vegetated riparian corridor resulting in changes to existing morphological features and/or channel planform and cross section and/or natural fluvial processes. Impacts would be at the water body scale</li> <li>For WFD classified water bodies, impacts have the potential to cause deterioration on morphology status or prevent the achievement of 'Good' morphology status due to an increase in the extent of morphological pressures on the water body</li> </ul>
		<p><b>Surface Water Supply</b></p> <ul style="list-style-type: none"> <li>Loss or change to regionally important public water supply</li> <li>Extensive deterioration to designated drinking water protected areas or group scheme source protection areas</li> </ul>

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Magnitude of Impact	Description	Typical examples
Moderate Adverse	Results in effect on attribute and/or quality and integrity of the attribute	<b>Surface Water Quality and Hydrology</b> <ul style="list-style-type: none"> <li>Construction works adjacent to a watercourse which are therefore likely to risk a moderate, measurable shift away from baseline water quality</li> <li>Partial loss in productivity of a fishery</li> <li>Degradation of regionally important public water supply or loss of major commercial/industrial/agricultural supplies</li> <li>Contribution to reduction in water body WFD classification</li> </ul>
		<b>Hydromorphology</b> <ul style="list-style-type: none"> <li>Adverse changes to on the water feature bed, banks and vegetated riparian corridor resulting in changes to existing morphological features and/or channel planform and cross section and/or natural fluvial processes. Impacts would be at the reach scale</li> <li>For WFD classified water bodies, impacts may increase the extent of morphological pressures. May contribute to, but not cause a deterioration of morphology status</li> </ul>
		<b>Surface Water Supply</b> <ul style="list-style-type: none"> <li>Temporary disruption or deterioration in a water supply or designated drinking water protected area or group scheme source protection areas</li> </ul>
Minor Adverse	Results in some measurable change in attributes, quality or vulnerability	<b>Surface Water Quality and Hydrology</b> <ul style="list-style-type: none"> <li>Construction works within the watercourse catchment that may result in a risk of a minor, measurable shift from baseline water quality but with no change in overall WFD classification</li> <li>Measurable impact but with no change in overall WFD classification or the status of supporting quality elements</li> </ul>
		<b>Hydromorphology</b> <ul style="list-style-type: none"> <li>Slight adverse changes to/impacts on the water feature bed, banks and vegetated riparian corridor resulting in changes to existing morphological features and/or channel planform and cross section and/or natural fluvial processes. Impacts would be at the local scale and results in minor impact on integrity of receptor or loss of small part of receptor</li> <li>For WFD classified water bodies, impacts may result in a slight increase the extent of morphological pressures or occur where there are existing morphological pressures. Morphology status unaffected</li> </ul>
		<b>Surface Water Supply</b> <ul style="list-style-type: none"> <li>Minor impacts on water supplies and/or drinking water protected areas and/or group source protection schemes</li> </ul>
Negligible	Results in effect on attribute, but of insufficient magnitude to affect the use or integrity	<b>Surface Water Quality and Hydrology</b> <ul style="list-style-type: none"> <li>Construction works within the watercourse catchment that are not anticipated to result in a risk of a measurable change in water quality</li> <li>Minimal or no measurable change from baseline conditions in terms of water quality</li> </ul>
		<b>Hydromorphology</b> <ul style="list-style-type: none"> <li>Minimal or no measurable change from baseline conditions in terms of sediment transport, channel morphology and natural fluvial processes. Any impacts are likely to be highly localised</li> </ul>
Minor Beneficial	Results in some beneficial effect on attribute or a reduced risk of negative effect occurring	<ul style="list-style-type: none"> <li>Potential to result in minor improvement WFD quality element(s)</li> </ul>
Moderate Beneficial	Results in moderate improvement of attribute quality	<ul style="list-style-type: none"> <li>Contribution to improvement in water body WFD classification</li> </ul>
Major Beneficial	Results in major improvement of attribute quality	<ul style="list-style-type: none"> <li>Improvement in water body WFD classification</li> </ul>

### 6.5.3 Significance of Effects

151. The significance of an effect is determined by combining the sensitivity of the receptor with the predicted magnitude of impact, as shown in Table 2.2. Descriptions of the significance categories from the EPA Guidelines (2022) are given in Table 2.1. Professional judgement will be used to determine the overall significance of effect on each receptor after considering the impacts on each of surface water quality and hydrology, hydromorphology, and surface water supply.

### 6.6 WFD Assessment

152. The Water Policy Regulations, which transposed the WFD into Irish law, require the assessment of permanent impacts of a project on WFD water bodies (rivers, lakes, estuaries, coastal waters and groundwater). Typically, the permanent impacts include all operational impacts, but can also include impacts from construction depending on the programme (i.e. length and/or nature of the works) as some potential construction impacts could be considered permanent in the absence of mitigation.

153. The Water Policy Regulations outline the water protection and water management measures required to maintain high status of waters where it exists, prevent any deterioration in existing water status and achieve at least Good status for all waters.

154. To be compliant with the requirements of the WFD, any activity which has the potential to have an impact on WFD water bodies must be assessed to determine whether such impacts would be non-compliant with the requirements and objectives of the WFD.

#### 6.6.1 Appraisal Method

155. In the absence of WFD assessment guidance in Ireland, the assessment will be carried out using the UK Environment Agency's Water Framework Directive Assessment: Estuarine and Coastal waters (Clearing the Waters for All) (2016, updated 2017). No specific guidance exists for fresh water bodies, however this guidance is used as the basis of the UK's Planning Inspectorate Advice Note 18 Water Framework Directive (2017) in which it sets out the stages of an assessment. This is considered appropriate to use for the assessment of the Proposed Project. In line with this guidance, a 2km buffer will be applied for assessing protected areas. The 2km buffer and the full-list of identified protected sites (including those which are considered coastal water specific) will be maintained for all assessments.

156. The assessment will use four stages:

- Stage 1 - Screening: this identifies activities that do not need to go through the scoping or impact assessment stages. This considers activities during construction and operation and whether there is potential for that activity to impact upon a water body. If not, it is screened out of further assessment.
- Stage 2 - Scoping: this identifies the specific water bodies that are potentially at risk from the activities which have been screened in. This includes quality elements: biological (fish, benthic species and macrophytes); hydromorphology (sediment, channel form, water flow etc.); and physico-chemical (clarity, temperature, chemistry etc.). In addition, there is a review of the potential to impact upon protected areas (as defined in the WFD) (nature conservation, bathing water etc.).
- Stage 3 - Impact assessment:
  - Step 1 - Quality elements: considers the potential impacts of an activity, identifies ways to avoid or minimise impacts, and indicates if an activity may cause deterioration or jeopardise the water body achieving Good Ecological Status or Good Ecological Potential. This step also considers the potential impacts on protected areas;
  - Step 2 - Proposed measures: assessment of the Proposed Project against the River Basin Management Plan Programme of Measures; and
  - Step 3 - Cumulative assessment within the Proposed Project (across different principal elements) and against other proposed developments.
- Stage 4 - Assessment against other EU Directives, Article 4.8 and 4.9 of the WFD and other EU legislation.

157. The WFD assessment will use the findings of the EIAR water assessment and apply these to the requirements of the WFD objectives for the relevant, scoped-in, water bodies to determine whether the Proposed Project is in compliance with the WFD objectives.

## **6.7 Flood Risk Assessment**

158. The Flood Risk Assessment will be prepared in accordance with Section 28 of the Planning and Development Act 2000 and the Guidelines on the Planning System and Flood Risk Management (2009).
159. It will consider flood risk to and from the Proposed Project from all potential sources, including coastal, artificial drainage, fluvial, pluvial and groundwater. It will consider flood risk to and from all of the key infrastructure sites; it will also consider the potential for the pipeline to interfere with overland flows of surface water; and flood risk during the construction phase of the Proposed Project.

## 7. Soils, Geology and Hydrogeology

### 7.1 Context

160. The EIAR will consider and evaluate impacts on soils, geological features and groundwater arising during the construction, operational and decommissioning phases of the Proposed Project. There has been substantial progress with the Soils, Geology and Hydrogeology assessment to date, which has been supported by desk studies and ground investigations.
161. The Proposed Project is predominantly located on greenfield sites. Based on information to date, there are no historically contaminated sites at the RWI&PS, WTP, BPT, BPS, TPR, Construction Compounds and Pipe Storage Depots.
162. A number of groundwater bodies could potentially be impacted by the Proposed Project. All groundwater bodies underlying the RWI&PS, WTP, BPT, BPS, TPR, Construction Compounds, Pipe Storage Depots, RWRMs and Gravity Pipeline are classified as being at good status. The RWI&PS, WTP and BPT are underlain by the Nenagh Groundwater Body, which is comprised of generally low transmissivity and storativity rocks. All groundwater bodies underlying the Proposed Project Boundary of the 38 kV Uprate Works are at good status.
163. The Proposed Project, including the 38 kV Uprate Works, RWI&PS, WTP, BPT, BPS and TPR locations, is primarily underlain by Dinantian Limestones and classified as locally important aquifers, which is moderately productive in local zones.
164. There are two geological heritage sites identified by the GSI located along the proposed route of the Pressure Pipeline. Two further sites were identified by the GSI located along the Gravity Pipeline and one additional County Geological Site within 200m of the Gravity Pipeline. These will be assessed as part of the EIAR.
165. The potential impacts that could arise from the construction of the Proposed Project and the likely significant effects of which will be assessed and reported in the EIAR are:
- Loss of soil cover, soil erosion and compaction;
  - Environmental effects arising from excavation, handling, on-site processing, transport and off-site disposal or recovery;
  - Risk of contamination of existing soils by construction activities;
  - Potential to sterilise mineral reserves (meaning that existing mineral reserves may not be commercially exploitable at a later date);
  - Hydrogeological effects on groundwater supplies; and
  - Effects on any features of geological or geomorphological interest and importance.
166. The potential impacts that could arise from the operation of the Proposed Project and the likely significant effects of which will be assessed and reported in the EIAR are:
- Spills and/or leaks of pollutants including those from RWI&PS, WTP, BPT and TPR infrastructure into groundwater;
  - Pollution risk from spills (during cleaning and maintenance and repair works) from machinery and associated infrastructure into groundwater;
  - Pollution risk from leaks and emergency or non-emergency discharges of treated water from the pipeline into groundwater;
  - Alteration of flow regime at temporary and permanent discharge locations during repair and maintenance (including discharge to land from washout valves); and
  - Where land drainage pipes are intercepted and not replaced, there is potential for groundwater level to increase or localised ponding due to disconnection of the land drainage.
167. The Soils, Geology and Hydrogeology chapter of the EIAR will include an overview of the baseline, the likely significant effects of the Proposed Project and the mitigation measures proposed to avoid or minimise the predicted effects, including monitoring where relevant, and any residual significant effects.



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168. The proposed scope and methodology of the Soils, Geology and Hydrogeology assessment are set out below.

### 7.2 Study Area

169. The proposed study area for Soils, Geology and Hydrogeology has been defined using relevant guidance and professional judgement to identify potential source-pathway-receptor linkages and likely significant effects associated with the construction and operation of the Proposed Project.

170. A minimum 500m wide buffer will be used as the study area around the infrastructure sites and along either side of the length of the RWRM, Pressure and Gravity Pipelines.

171. A smaller study area is proposed for the 38 kV Uprate Works because the extent of potential impacts from these types of works would not be as large compared with the construction and operation of the pipeline. This will be a minimum 30m wide buffer along either side of the length of the existing lines and structures and 15m wide corridor along the proposed access tracks.

172. For potential groundwater impacts, the study area will also take account of the delineated Groundwater Zones of Contributions. A Zone of Contributions is defined as the area required to support an abstraction from long-term groundwater recharge. Zones of Contributions and Source Protection Zones are carried out within the source–pathway–receptor framework, where the source means the pressures or the sources of contamination; the pathway is dictated by the groundwater travel times to the receptor and the capacity of the geological materials to attenuate contaminants along the way; and the receptor is the spring/borehole abstraction point. For indirect impacts on groundwater dependent habitats, a typical zone of influence of 200m will be considered where significant source-pathway-receptors occur. This will vary with the type of Groundwater Dependent Terrestrial Ecosystem (GWDTE) and type of impact. Likely significant effects on GWDTE will be reported in the Biodiversity chapter in the EIAR.

### 7.3 Scope of the Assessment

173. The scope of the Soils, Geology and Hydrogeology assessment will include all the potential impacts described in Section 7.1, as summarised in Table 7.1.

174. Surface water will be covered separately within the Water Environment assessment. Surface water is also relevant to the soils, geology and hydrogeology, for example there could be source-pathway-receptor links between contaminated land and watercourses. The Soils, Geology and Hydrogeology EIAR chapter will cross refer to the conclusions of the Water Environment assessment where appropriate.

**Table 7.1: Summary of Scope of Assessment – Soils, geology and hydrogeology**

Project Phase	Potential Impacts Scoped In	Potential Impacts Scoped Out
Construction	<ul style="list-style-type: none"> <li>Soils: Loss or damage of soils due to compaction, excavation and disposal</li> <li>Soils: Loss or damage to peat due to destabilisation, erosion, compaction, excavation and disposal</li> <li>Soils: Contamination of soils</li> <li>Groundwater: Contamination of groundwater or disturbance of groundwater supply</li> <li>Geology: Loss or disturbance of geological heritage</li> <li>Geology: Loss of economic reserves</li> </ul>	<ul style="list-style-type: none"> <li>No potential impacts have been scoped out</li> </ul>
Commissioning	<ul style="list-style-type: none"> <li>No additional effects beyond the construction operational assessment</li> </ul>	
Operation	<ul style="list-style-type: none"> <li>Contamination of soils/groundwater</li> <li>Alteration of flow regime</li> </ul>	<ul style="list-style-type: none"> <li>No potential impacts have been scoped out</li> </ul>

## 7.4 Overview of Assessment Approach

175. The collation of the baseline data and the preparation of the Soils, Geology and Hydrogeology assessment will have regard to current legislation relating to current good practice guidance documents, including the EPA Guidelines 2022.
176. A desktop review has been undertaken and will be updated alongside finalisation of the design. This initial review has informed the initial scope of the surveys required for the EIAR. The desktop review involves collection and review of relevant published and unpublished sources of data, collation of existing information on the geological environment and consultation with relevant statutory bodies (e.g. GSI).
177. A comprehensive range of field surveys has commenced and will continue to inform the EIAR. These include ground investigations, water level monitoring and well surveys. Where ground investigations were undertaken, subsoil deposits and selected exposures/sections were logged according to BS 5930:2015. Approximately 180 boreholes were undertaken in 2018 with approximately 570 boreholes, 1000 trial pits and 2300 peat probes/augers completed in 2022. Geophysical surveys along the pipeline consisted of ground conductivity, 2D-Resistivity and seismic refraction (p-wave) surveying at river locations and in areas of potential karst. Groundwater monitoring is ongoing to assess the baseline groundwater levels at sensitive receptors. The assessment will take account of sensitive receptors relevant to the Proposed Project, such as GWDTE, farmlands through which the Proposed Project will pass, and homes and businesses which abstract groundwater.
178. Geological receptors will be evaluated following NRA Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (2009), which set out the importance of receptors in a geographical context. Likely significant effects will be assessed against parameters as set out within the NRA guidance and will take cognisance of the EPA Guidelines (2022).

## 7.5 Assessment Criteria

### 7.5.1 Sensitivity of Receptors

179. Criteria for determining the sensitivity of receptors are set out in Table 7.2 and are based on the NRA Guidelines (2009).

**Table 7.2: Sensitivity of Receptors**

Sensitivity of receptor	Examples
Very High	<ul style="list-style-type: none"> <li>Geological feature rare on a regional or national scale (NHA)</li> <li>Large existing quarry or pit</li> <li>Proven economically extractable mineral resource</li> <li>Groundwater which supports river, wetland or surface water body ecosystem protected by EU legislation e.g. SAC or SPA status</li> <li>Intact peatland</li> </ul>
High	<ul style="list-style-type: none"> <li>Contaminated soil on-site with previous heavy industrial usage</li> <li>Large recent landfill site for mixed wastes</li> <li>Geological feature of high value on a local scale (County Geological Site)</li> <li>Moderately sized existing quarry or pit</li> <li>Regionally important aquifer with multiple wellfields</li> <li>Groundwater which supports river, wetland or surface water body ecosystem protected by national legislation – NHA status</li> <li>Peatland – NHA status</li> <li>Regionally important potable water source supplying &gt;2,500 homes</li> <li>Inner source protection area for regionally important water source</li> </ul>
Moderate	<ul style="list-style-type: none"> <li>Contaminated soil on-site with previous light industrial usage</li> <li>Small recent landfill site for mixed wastes</li> <li>Small existing quarry or pit sub-economic extractable mineral resource</li> <li>Regionally Important Aquifer Groundwater which provides large proportion of baseflow to local rivers</li> </ul>

Sensitivity of receptor	Examples
	<ul style="list-style-type: none"> <li>Locally important potable water source supplying &gt;1000 homes</li> <li>Outer source protection area for regionally important water source</li> <li>Inner source protection area for locally important water source</li> <li>Peatland – remnant high bog</li> <li>Locally important aquifer potable water source supplying &gt;50 homes</li> <li>Outer source protection area for locally important water source</li> </ul>
Low	<ul style="list-style-type: none"> <li>Large historical and/or recent site for construction and demolition wastes</li> <li>Small historical and/or recent landfill site for construction and demolition wastes</li> <li>Cutover Peatlands</li> </ul>

### 7.5.2 Magnitude of Impact

180. The magnitude of impact will consider the likely scale of the predicted change to the baseline conditions resulting from the predicted impact and takes into account the duration of the impact, i.e. temporary or permanent. The definition of the magnitude of impact criteria are provided in Table 7.3 and are based on the NRA Guidelines (2009).

Table 7.3: Magnitude of Impact

Magnitude	Criteria	Examples
Very High/High adverse	An impact, which obliterates sensitive characteristics of the soil or geology environment	<ul style="list-style-type: none"> <li>Loss of high proportion of future quarry or pit reserves</li> <li>Removal of entirety of geological heritage feature</li> <li>Requirement to excavate/remediate entire waste site</li> <li>Removal of large proportion of aquifer</li> <li>Changes to aquifer or unsaturated zone resulting in extensive change to existing water supply springs and wells, river baseflow or ecosystems</li> <li>Potential high risk of pollution to groundwater from routine run-off</li> <li>Calculated risk of serious pollution incident &gt;2% annually</li> </ul>
Moderate adverse	Fundamental change to ground conditions, groundwater quality or flow regime	<ul style="list-style-type: none"> <li>Loss of moderate proportion of future quarry or pit reserves</li> <li>Removal of part of geological heritage feature</li> <li>Requirement to excavate/remediate significant proportion of waste site</li> <li>Removal of moderate proportion of aquifer</li> <li>Changes to aquifer or unsaturated zone resulting in moderate change to existing water supply springs and wells, river baseflow or ecosystems</li> <li>Potential medium risk of pollution to groundwater from routine run-off</li> <li>Calculated risk of serious pollution incident &gt;1% annually</li> </ul>
Low adverse	Measurable change to ground conditions, groundwater quality or flow regime	<ul style="list-style-type: none"> <li>Loss of small proportion of future quarry or pit reserves</li> <li>Removal of small part of geological heritage feature</li> <li>Removal of small proportion of aquifer</li> <li>Changes to aquifer or unsaturated zone resulting in slight change to water supply springs and wells, river baseflow or ecosystems</li> <li>Potential low risk of pollution to groundwater from routine run-off</li> <li>Calculated risk of serious pollution incident &gt;0.5% annually</li> </ul>
Negligible	No measurable effects on ground conditions, groundwater quality or flow	<ul style="list-style-type: none"> <li>No measurable changes in attributes</li> </ul>
Low beneficial	Minor change to ground conditions, groundwater quality or flow regime	<ul style="list-style-type: none"> <li>Slight enhancement of geological heritage feature</li> </ul>
Moderate beneficial	Measurable change to ground conditions, groundwater quality or flow regime	<ul style="list-style-type: none"> <li>Moderate enhancement of geological heritage feature or new geological heritage site</li> <li>Remediation of small contaminated site</li> </ul>
High beneficial	Fundamental change to ground conditions, groundwater quality or flow regime	<ul style="list-style-type: none"> <li>Major enhancement of geological heritage feature or new geological heritage site</li> <li>Remediation of large contaminated site</li> </ul>

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181. The duration of impacts will be as described in accordance with the EPA Guidelines (2022) – see Table 2.1 in Chapter 2.
182. A degree of confidence will be assigned to assess the likelihood of an impact occurring. The likelihood will be as described in accordance with the EPA Guidelines (2022).

### **7.5.3 Significance of Effects**

183. The assessment approach will consider the sensitivity of the receptors and the magnitude of the potential impact to determine the likely significant effects on soils, geology and hydrogeology. A determination on whether the effects of the Proposed Project are significant will be based on the EPA Guidelines (2022) set out in Table 2.2. Professional judgement will be used to determine the overall significance of the effect on each receptor.

# 8. Agriculture

## 8.1 Context

184. The EIAR will consider and evaluate impacts on farm holdings arising during the construction, operational and decommissioning phases of the Proposed Project. There has been substantial progress with the Agriculture assessment to date, which has been supported by desk studies, field surveys, and discussions with landowners.

185. There are in the region of 400 individual farm holdings within the defined study area for the Agriculture assessment, ranging in size from small extensively managed (i.e. low input/workforce) farms to large intensive (i.e. large input/workforce) farms. As would be expected within this number, there is a large variety of farm types and enterprises with a substantial variance in the level of agricultural intensification. This includes a range of enterprises which include, beef, dairy, equine, suckler, sheep, tillage, mixed livestock, arable (predominantly cereals) and horticulture.

186. In the absence of control measures or mitigation, there are a number of potential impacts on agriculture which could occur during the Construction Phase of the Proposed Project, and which will be assessed and reported in the EIAR. These would include:

- Temporary loss of use and or access to land adjacent to the construction site;
- Temporary loss of services (for example water, power, etc);
- Disruption caused by increased traffic volumes due to construction;
- Disruption caused by noise emanating from the construction site;
- Impact on shelter;
- Disturbance to farm operations;
- Interruption to drainage systems; and
- Restriction on the potential use of retained land e.g. for specialist crop production or animal husbandry adjacent to construction site.

187. The assessment of the operation of the Proposed Project to be reported in the Agriculture chapter of the EIAR will include the following potential impacts:

- Permanent loss of land with a consequent increase in fixed overheads on retained lands;
- Possible severance of land with an interruption of access to possible severed lands; and
- Restrictions on the potential use of retained land e.g. restrictions on the permanent wayleave above the pipeline.

188. The Agriculture chapter of the EIAR will include an overview of the baseline, the likely significant effects of the Proposed Project and the mitigation measures proposed to avoid or minimise the predicted effects, including monitoring where relevant, and any residual significant effects.

189. The proposed scope and methodology of the Agriculture assessment are set out below.

## 8.2 Study Area

190. The study area for the Agricultural assessment will include all the land within the Proposed Project Boundary.

191. The Agricultural assessment reported in the EIAR will consider the likely significant effects of the Proposed Project on the agricultural environment at the following spatial scales:

- National level;
- Regional level;
- Local level; and
- Farm/holding level.

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192. Effects that would be considered of national significance would have an impact on agricultural production or production within major sections of agriculture at a national scale. Such effects would unlikely arise from a single infrastructure project and would more likely occur through policy decisions for example, the imposition of controls on fertiliser usage or the imposition of controls on greenhouse gas emissions.
193. Effects that would be considered to be of regional significance would have an impact on regional agricultural production or production within a section of agriculture at a regional scale. Effects might be described as regionally significant where, for example, a large area of land devoted to specialist crop production was required for a development, the absence of which land would have a regional impact on production levels.
194. Locally significant effects would occur where an enterprise is of local importance perhaps because of the employment consequences if the operation is interrupted or has to cease production.
195. Individual farm effects will be considered and could include loss of land; impairment of use of retained land; or disturbance during the Construction Phase of the project or ongoing negative effects on the enterprise.
196. Based on the work already undertaken on the Agricultural assessment, including establishing a baseline, embedded mitigation to reduce potential impacts, and identification of measures for the Construction Environment Management Plan, it is considered unlikely that national, regional or locally significant effects would arise as a result of the Proposed Project. Therefore, although national, regional and locally-significant effects are not proposed to be scoped out at this stage, it is expected that the assessment reported in the EIAR will focus on effects at individual farm/holding level.

### 8.3 Scope of the Assessment

197. The scope of the Agricultural assessment will include all the potential impacts described in Section 8.1, as set out in Table 8.1.

**Table 8.1: Summary of Scope of Assessment – Agriculture**

Project Phase	Potential Impacts Scoped In	Potential Impacts Scoped Out
Construction	<ul style="list-style-type: none"> <li>• Temporary loss of use and or access to land adjacent to the construction site</li> <li>• Temporary loss of services (for example water, power, etc)</li> <li>• Nuisance caused by increased traffic volumes due to construction</li> <li>• Nuisance caused by noise emanating from the construction site</li> <li>• Impact on shelter</li> <li>• Disturbance to farm operations</li> <li>• Interruption to drainage systems</li> <li>• Restriction on use of land for specialist crop production or animal husbandry adjacent to construction site</li> </ul>	<ul style="list-style-type: none"> <li>• No potential impacts have been scoped out</li> </ul>
Commissioning	<ul style="list-style-type: none"> <li>• Temporary discharge of water to land from pipe draindown</li> </ul>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>
Operation	<ul style="list-style-type: none"> <li>• Permanent loss of land with a consequent increase in fixed overheads on retained lands (including implication of use of washout valves under operational conditions)</li> <li>• Possible severance of land with an interruption of access to possible severed lands</li> <li>• Restrictions on the potential use of retained land</li> </ul>	<ul style="list-style-type: none"> <li>• No potential impacts have been scoped out</li> </ul>

### 8.4 Overview of Assessment Approach

198. It is proposed that an assessment of agriculture will be carried out in accordance with the EPA Guidelines (2022) and established good practice and will be tailored specifically to the Proposed Project based on professional judgement and local circumstances.
199. The assessment will cover potential impacts on agriculture and will describe the existing conditions and the likely significant effects associated with the construction and operation of the Proposed Project. The assessment process will involve the general assessment steps set out in Section 2.1 of this report.

200. An assessment of the existing agricultural environment has already commenced and includes a desktop survey of available land plot mapping. This mapping will be updated for the EIAR and this will include a review of each land parcel, orthophotography mapping and indicative landownership information. The baseline has also been informed by inspections of the relevant lands by a suitably qualified Agricultural Consultant, together with interviews with the owners/occupiers and the completion of a detailed questionnaire.

## 8.5 Assessment Criteria

201. The assessment approach will consider the sensitivity of the receptors and the magnitude of the potential impact to determine the likely significant effects on agriculture.

### 8.5.1 Assigning the Farm Sensitivity

202. Each affected land holding will be evaluated to determine the sensitivity and any site-specific factors. The main criteria in determining the farm sensitivity will be the enterprise type and intensity. This information has been obtained from the farm surveys and farm visits. Table 8.2 describes the criteria to be used for the categorisation of sensitivity. Site-specific factors such as soil quality, the access type to the farm and the location of the farm will be assessed on a farm-by-farm basis.

**Table 8.2: Criteria for Categorisation of Sensitivity**

Farm Enterprise Type	Intensity of the Farm Enterprise (assessed by site evaluation)	Sensitivity
Stud farm	High	Very High
	Medium	High
	Low	Medium
Dairy farm, Intensive Equine enterprise	High	High
	Medium	High
	Low	Medium
Non-dairy grazing livestock enterprises (Includes beef, sheep and non-intensive equine) and grass cropping enterprise	High	Medium
	Medium	Low
	Low	Very Low
Tillage (which includes arable)	High	Medium
	Medium	Low
	Low	Very Low
Rough grazing, bog, forestry, woodland	Low	Very Low

### 8.5.2 Magnitude of the Impacts

203. The magnitude of the impact will consider the severity of impact as well as the duration of the impact. The criteria for the assessment of impact magnitude are set out in Table 8.3.

**Table 8.3: Indicative Criteria for Assessment of Impact Magnitude**

Indicative Criteria	Impact Magnitude
<ul style="list-style-type: none"> <li>A very high proportion of the land affected (e.g. &gt;15% of the farm)</li> <li>A very high proportion of the affected farm separated by the Proposed Project (e.g. &gt;25% of the farm)</li> <li>Permanent loss of farm buildings or water sources</li> <li>Impact would cause a change in farming enterprise or dramatic reduction in farming intensity</li> </ul>	Very High
<ul style="list-style-type: none"> <li>A high proportion of the land affected (e.g. 10%-15% of the farm)</li> <li>A high proportion of land separated (e.g. 15%-25% of the farm)</li> <li>Farm buildings or water sources may be affected but can be replaced</li> <li>Impact would not cause a change in farming enterprise but would require a high degree of operational changes</li> </ul>	High

Indicative Criteria	Impact Magnitude
<ul style="list-style-type: none"> <li>• A medium proportion of the land affected (e.g. 5%-10% of the farm)</li> <li>• A medium proportion of land separated (e.g. 7%-15% of the farm)</li> <li>• Farm buildings or water sources may be affected but can be replaced</li> <li>• Impact would not cause a change in farming enterprise but would require operational changes</li> </ul>	Medium
<ul style="list-style-type: none"> <li>• A small proportion of the land affected (e.g. 2.5%-5% of the farm)</li> <li>• A small proportion of land separated (e.g. 3%-7% of the farm)</li> <li>• Farm buildings or water sources generally not affected but if affected can be replaced</li> <li>• Impact would cause a minor change in the day to day operation of the farm</li> </ul>	Low
<ul style="list-style-type: none"> <li>• A very small proportion of the land affected (e.g. &lt; 2.5% of the farm)</li> <li>• A very small proportion of land separated or no separation (e.g. &lt;3% of the farm)</li> <li>• No significant impact on operation of the farm</li> </ul>	Very Low

204. The significance of effect will be determined by evaluating the magnitude and duration of the impact and the sensitivity of the affected farms. The duration of impact is as defined in Table 2.1 in Chapter 2.

### 8.5.3 Significance of Effects

205. A determination on whether the effects of the Proposed Project are significant will be based on the EPA Guidelines (2022), with minor adjustments that are appropriate to use for agricultural impact assessment (as per Table 8.4). Professional judgement will be used to determine the overall significance of the effect on each receptor.

**Table 8.4: Describing the Significance of Effects for Agriculture**

Significance of Effects	Definition of Significance from EPA Guidelines	Level of Effect for Agronomy
Imperceptible	An effect capable of measurement but without significant consequences	An effect so small it is imperceptible or capable of measurement but without noticeable consequences
Not Significant	An effect which causes noticeable changes in the character of the environment but without significant consequences	An effect is Not Significant where the farm enterprise suffers a slight inconvenience such as relocation of access or loss of shelter or other temporary disturbance
Slight Effects	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities	An effect which causes noticeable changes in the character and management of the farm. The farm enterprise experiences inconvenience as a result of the Proposed Project
Moderate Effects	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends	A Moderate effect occurs where the farm enterprise can be continued as before but with increased management or operational difficulties. While portions of the land might be sub-divided, the enterprise mix would be such that the farming system could continue perhaps with reduced stock numbers or additional labour, contractor or other charges
Significant Effects	An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment	A Significant effect occurs where the farm enterprise suffers significant inconvenience as a result of the Proposed Project. Sub-division would occur but access could be achieved
Very Significant	An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment	A Very Significant effect occurs where the farm enterprise cannot be continued without considerable management or operational changes. There would be significant sub-division on the affected parcel(s). The Proposed Project may affect farm buildings and/or facilities. Access to the sub-divided land can only be achieved through the use of non-farm roads to access sub-divided land. Where the effect is Very Significant an enterprise change may be necessitated e.g. from dairy to dry stock
Profound Effects	An effect which obliterates sensitive characteristics	A Profound effect occurs where the farm enterprise cannot be continued as a result of the Proposed Project. This would occur where the land-take was of such a nature to make the holding unworkable and/or where important farm buildings and facilities were removed. An effect of this degree would be rare and would most likely occur on a dairy/horticultural or stud farm



## 9. Air Quality

### 9.1 Context

206. The EIAR will consider and evaluate air quality emissions arising during the construction, operational and decommissioning phases of the Proposed Project. There has been substantial progress with the Air Quality assessment to date, which has been supported by desk studies, modelling and field measurements.

207. Background air pollutant levels in the region of the Proposed Project are considered to be well below the air quality limit values for the main pollutants of concern which are nitrogen oxides (NO<sub>x</sub>), nitrogen dioxide (NO<sub>2</sub>), particulate matter with a diameter of 10 microns or less (PM<sub>10</sub>) and particulate matter with a diameter of 2.5 microns or less (PM<sub>2.5</sub>).

208. The potential impacts that could arise from the construction of the Proposed Project and that will be assessed and reported in the Air Quality chapter of the EIAR are:

- Construction dust emissions;
- PM<sub>10</sub>/PM<sub>2.5</sub> construction emissions; and
- NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> vehicle exhaust emissions during the Construction Phase.

209. The potential impacts that could arise from the operation of the Proposed Project and that will be assessed and reported in the Air Quality chapter of the EIAR are:

- Traffic-related air emissions from maintenance and operational vehicles (such as those removing sludge waste material at the WTP) may generate quantities of air pollutants such as NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub>.

210. The Air Quality chapter of the EIAR will include an overview of the baseline, the likely significant effects of the Proposed Project and the mitigation measures proposed to avoid or minimise the predicted effects, including monitoring where relevant, and any residual significant effects.

211. The proposed scope and methodology of the Air Quality assessment are set out below.

### 9.2 Study Area

212. The proposed study area for Air Quality has been defined based on the potential impacts that could arise from the Proposed Project. Different study areas have been defined for the different types of emission to air. These are summarised in Table 9.1.

**Table 9.1: Summary of Study Area for Air Quality**

	Traffic Emissions - Human Health/Ecology	Dust - Human Health/Nuisance	Dust - Ecology
Study Area	200m from an 'affected' road link (human health receptors) 200m from an 'affected' road link (ecological receptors)	250m from Proposed Project Boundary or up to 500m from site exit along public roads	50m from Proposed Project Boundary

213. The extent of the dust study area will be typically up to a maximum of 250m from a specific area of construction work, as per the Institute of Air Quality Management (IAQM) Guidance on the Assessment of Dust from Demolition and Construction (hereafter referred to as the IAQM Guidance) (2023). The exception to this will be with respect to the trackout of dust on vehicle wheels that are leaving the site and travelling along a public road. In this circumstance, dust has the potential to impact receptors within 50m of the public road for up to 500m from a construction site entrance according to the IAQM Guidance.

214. In addition to the study area considered with respect to construction dust, additional areas will also be considered with respect to emissions from vehicles on impacted public roads during construction and operation. The extent of elements outside the direct proximity of the Proposed Project Boundary will be determined using the output from the traffic models in combination with the assessment criteria for impacted road links as set out in PE-ENV-01106: Air Quality Assessment of Specified Infrastructure Projects (TII 2022) and PE-ENV-01107: Air Quality Assessment Standard for Proposed National Roads (TII 2022). The study area will be up to 200m from roads that experience a significant change in traffic numbers, road alignment or speed band, as per PE-ENV-01106.

### 9.3 Scope of the Assessment

215. The scope of the Air Quality assessment will include all the potential impacts described in Section 9.1, as set out in Table 9.2.

216. IAQM Guidance (2023) states that exhaust emissions from on-site plant are unlikely to have a significant impact on local air quality. This, in combination with the background air quality, which is well below limit values, means that there would be no likely significant effect from on-site plant and machinery for the Proposed Project, and therefore this has been scoped out of the assessment. However, mitigation would still be put in place so that emissions are minimised through regular maintenance and prevention of vehicles idling on site.

217. The Operational Phase has been scoped out (with the exception of emissions from operational traffic) on the basis that there would be no likely significant sources of emissions to air from the infrastructure sites or pipeline during operation. There would be no scheduled operational emissions of potentially hazardous contaminants from the infrastructure sites.

**Table 9.2: Summary of Scope of Assessment – Air Quality**

Project Phase	Potential Impacts Scoped In	Potential Impacts Scoped Out
Construction	<ul style="list-style-type: none"> <li>Dust deposition in respect of nuisance, human health and ecological impacts</li> <li>Effects from construction traffic</li> </ul>	<ul style="list-style-type: none"> <li>Gaseous pollutant emissions from construction activities/plant and machinery</li> </ul>
Commissioning	<ul style="list-style-type: none"> <li>No additional effects beyond construction and operation</li> </ul>	
Operation	<ul style="list-style-type: none"> <li>Effects from operational traffic</li> </ul>	<ul style="list-style-type: none"> <li>All other operational activities</li> </ul>

### 9.4 Overview of Assessment Approach

218. The Air Quality assessment will be undertaken in line with the latest legislation and guidance. At present, this will be carried out with regard to the Clean Air Strategy for Ireland (2023), Air Quality Standard Regulations (S.I. No. 739 of 2022), and EPA Guidelines (2022) and using the methodology outlined in PE-ENV-01106 (TII 2022) and IAQM Assessment of Dust from Demolition and Construction (2023) guidance. While the Proposed Project is not a transport project, the TII PE-ENV-01106 guidance can be applied to any project that causes a change in traffic.

219. In line with the guidance outlined above, the impact assessment process will involve the general assessment steps set out in Section 2.1 of this report.

220. In addition to human health receptors, the assessment will consider the impact on designated ecological receptors. The impact of NO<sub>x</sub>, ammonia (NH<sub>3</sub>), nitrogen deposition and acid deposition due to traffic emissions will be considered for receiving designated habitats.

### 9.5 Assessment Criteria

221. The assessment approach will consider the sensitivity of the receptors and use significance criteria to determine the likely significant effects on air quality.

9.5.1 Sensitivity of Receptors

222. For the purpose of the Air Quality assessment, highly sensitive air quality receptors include residential properties, hospitals, schools and residential care homes, while commercial and workplace properties are generally viewed as being of medium sensitivity (IAQM, 2023). Ecological designated areas of conservation (either national or European designation) are also considered highly sensitive air quality receptors (TII, 2022).

223. For the purposes of the dust risk assessment, the sensitivity of receptors (both human and ecological) will be based on the IAQM Guidance which sets out criteria for combining the sensitive receptors and their distances from the construction Proposed Project Boundary as set out in Tables 9.3 and 9.4.

Table 9.3: Sensitivity of the Area to Dust Soiling Effects on People and Property (IAQM 2023)

Receptor Sensitivity	Number of Receptors	Distance from Source (m)			
		<20	<50	<100	<350
High	>100	High	High	Medium	Low
	10 – 100	High	Medium	Low	Low
	1 – 10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

Table 9.4: Sensitivity of the Area to Human Health Impacts (IAQM 2023)

Receptor Sensitivity	Annual Mean PM <sub>10</sub> Concentration	Number of Receptors	Distance from Source (m)				
			<20	<50	<100	<200	<350
High	>32µg/m <sup>3</sup>	>100	High	High	High	Medium	Low
		10 – 100	High	High	Medium	Low	Low
		1 – 10	High	Medium	Low	Low	Low
	28µg/m <sup>3</sup> – 32µg/m <sup>3</sup>	>100	High	High	Medium	Low	Low
		10 – 100	High	Medium	Low	Low	Low
		1 – 10	High	Medium	Low	Low	Low
	24µg/m <sup>3</sup> – 28µg/m <sup>3</sup>	>100	High	Medium	Low	Low	Low
		10 – 100	High	Medium	Low	Low	Low
		1 – 10	Medium	Low	Low	Low	Low
	<24µg/m <sup>3</sup>	>100	Medium	Low	Low	Low	Low
		10 – 100	Low	Low	Low	Low	Low
		1 – 10	Low	Low	Low	Low	Low
Medium	>32µg/m <sup>3</sup>	>10	High	Medium	Low	Low	Low
		1 – 10	Medium	Low	Low	Low	Low
	28µg/m <sup>3</sup> – 32µg/m <sup>3</sup>	>10	Medium	Low	Low	Low	Low
		1 – 10	Low	Low	Low	Low	Low
	24µg/m <sup>3</sup> – 28µg/m <sup>3</sup>	>10	Low	Low	Low	Low	Low
		1 – 10	Low	Low	Low	Low	Low
	<24µg/m <sup>3</sup>	>10	Low	Low	Low	Low	Low
		1 – 10	Low	Low	Low	Low	Low
Low	-	1+	Low	Low	Low	Low	Low

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224. The Proposed Project is in proximity to the Lower River Shannon SAC, which is classed as a highly sensitive receptor. In addition, the Proposed Project would cross the Grand Canal potential NHA, a highly sensitive receptor located on the eastern end of the Proposed Project. As shown in Table 9.5, the worst-case sensitivity of these areas to ecological impacts is considered high under the IAQM Guidance without adequate mitigation.

**Table 9.5: Sensitivity of the Area to Ecological Impacts (IAQM 2023)**

Receptor Sensitivity	Distance from Source (m)	
	<20	<50
High	High	Medium
Medium	Medium	Low
Low	Low	Low

### 9.5.2 Magnitude of Impact

#### Traffic Impacts

225. It is proposed that PE-ENV-01106 (TII 2022) will be used for the assessment of air quality effects arising from traffic impacts. As per PE-ENV-01106, the following scoping criteria will be used to determine whether the air quality impacts of a project can be scoped out or require an assessment based on the changes between the 'Do Something' traffic (with the Proposed Project) compared to the 'Do Minimum' traffic (without the Proposed Project):

- Road alignment would change by 5m or more;
- Annual average daily traffic flows would change by 1000 or more;
- Heavy duty vehicle (vehicles greater than 3.5 tonnes, including buses and coaches) flows would change by 200 annual average daily traffic or more;
- Daily average speed change by 10kph or more; or
- Peak hour speed will change by 20kph or more.

226. These screening criteria will be used in the assessment to determine the road links required for inclusion in the modelling assessment.

227. Sensitive human receptors within 200m and designated ecological receptors within 200m of impacted road links will be included within the modelling assessment.

#### Air Quality Effect Significance Criteria – Human Receptors

228. PE-ENV-01106 (TII 2022) sets out a methodology for determining air quality effect significance criteria for road schemes when considering impacts on sensitive receptors due to vehicle emissions. The degree of effect is determined based on both the absolute and relative impact of the Proposed Project. The TII significance criteria are detailed in Tables 9.6 and 9.7 and are based on a two stepped approach:

- Step 1 - Description of the effect at individual receptors; and
- Step 2 - Determination of overall significance in terms of air quality of the Proposed Project.

229. This approach will be adopted for the Air Quality assessment of the Proposed Project. Effects are considered positive where there is a decrease in annual mean concentration at a receptor which does not constitute a neutral effect, and negative where there is an increase in annual mean concentration at a receptor which does not constitute a neutral effect. An effect is considered to be neutral if there is a change in concentration at a receptor of:

- 5% or less where the opening year, without the Proposed Project, annual mean concentration is 75% or less of the standard; or
- 1% or less where the opening year, without the Proposed Project, annual mean concentration is 94% or less of the standard.

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230. The significance criteria are based on NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> as these pollutants are most likely to contribute to breaches of the EU annual mean limit values (40µg/m<sup>3</sup> for NO<sub>2</sub> and PM<sub>10</sub>, and 20 µg/m<sup>3</sup> for PM<sub>2.5</sub>).

**Table 9.6: Step 1 – Effect Descriptors**

Long Term Average Concentration Change at Receptor in Assessment Year	% Change in Concentration Relative to Air Quality Standard 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	Moderate
103 – 109% or more of AQLV	Moderate	Moderate	Substantial	Substantial
110% or more of AQLV	Moderate	Substantial	Substantial	Substantial

Note: Impacts which are described as neutral or slight i.e. of local importance only, are considered 'not significant'.

Source: PE-ENV-01106 (TII 2022)

231. Effects described as moderate or substantial within Table 9.6 will be considered in the overall evaluation of significance of the Proposed Project (Step 2, Table 9.7).

**Table 9.7: Step 2 – Factors to Consider when Determining the Overall Significance of the Proposed Project**

Factors
Number of people affected by increases and/or decreases in concentrations and a judgement on the overall balance
The number of people exposed to levels above the standard
Whether or not the exceedance of a standard is predicted to arise in the study area where none existed before, or if the size of an exceedance area is substantially increased
Whether or not the study area exceeds a standard and this exceedance is removed, or the size of the exceedance area is reduced
Uncertainty, including the extent to which worse-case assumptions have been made
The extent to which a standard is exceeded e.g. an annual mean NO <sub>2</sub> of 41µg/m <sup>3</sup> shall attract less weight in the determination of significance than an annual mean of 51µg/m <sup>3</sup>

Source: PE-ENV-01106 (TII 2022)

### **Air Quality Effect Significance Criteria – Ecological Receptors**

232. The Air Quality Regulations outline an annual critical level for NO<sub>x</sub> for the protection of vegetation and natural ecosystems in general. 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 defines 'Critical Levels' as '*a level fixed on the basis of scientific knowledge, above which direct adverse effects may occur on some receptors, such as trees, other plants or natural ecosystems but not on humans*'.

233. PE-ENV-01106 (TII 2022) states that the results of the assessment for NO<sub>x</sub>, ammonia, nitrogen deposition and acid deposition will be discussed with the competent practitioner for biodiversity who will determine the significance of the results.

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234. PE-ENV-01106 (TII 2022) states that if the total nitrogen deposition and acid deposition are greater than 1% of the relevant critical load, the information should be reviewed further with project biodiversity practitioners. Where the total nitrogen deposition and acid deposition are less than 1% of the critical load, the effect is considered 'not significant'.

### **Dust Impact Assessment**

235. It is anticipated that the greatest potential impact on air quality during the Construction Phase would be from construction dust emissions, PM<sub>10</sub>/PM<sub>2.5</sub> emissions from vehicles and the potential for nuisance dust.

236. Sensitivity to dust depends on the duration of the dust deposition, the dust-generating activity and the nature of the deposit. Therefore, a higher tolerance of dust deposition is likely to be shown if only short periods of dust deposition are expected and the dust-generating activity is either expected to stop or move on. Due to the scale of the Proposed Project, construction sites would be required for extended periods and therefore detailed consideration of potential dust impacts, and how to mitigate them, is appropriate.

237. To determine the level of dust mitigation required during the Construction Phase, the potential dust emission magnitude for each dust-generating activity will be identified and considered, along with the sensitivity of the potential receptors. The major dust-generating activities will be divided into the following four types (where relevant) to reflect their different potential impacts:

- Demolition – any activity involved with the removal of an existing structure (or structures);
- Earthworks – the processes of soil-stripping, ground-levelling, excavation and landscaping;
- Construction – any activity involved with the provision of a new structure (or structures), its modification or refurbishment; and
- Trackout – the transport of dust and dirt from the construction/demolition site onto the public road network, where it may be deposited and then re-suspended by vehicles using the network.

238. An appraisal will be carried out to assess the risk to sensitive receptors as a result of dust soiling, health impacts and ecological impacts due to the Construction Phase in accordance with the IAQM Guidance.

239. To determine the likely significant effects from dust, the appraisal will review the sensitivity of the site's location (with respect to dust nuisance, human health and ecological impacts) and then calculate a risk of impact using the magnitude of site activities.

# 10. Climate

## 10.1 Context

240. The EIAR will consider and evaluate greenhouse gas emissions (GHG) and the impact of a changing climate arising during the construction, operational and decommissioning phases of the Proposed Project. There has been substantial progress with the Climate assessment to date, which has been supported by desk studies and modelling.
241. During the Construction Phase, the potential impacts would be associated with embedded and activity-based GHG emissions from the Proposed Project including from the infrastructure sites, pipeline materials, utility diversions, land use change, excavation works, road reconfiguration, water usage, and waste. The potential for traffic related emissions from the delivery of materials, site workers and removal of waste will also be considered as potential construction impacts. The fuel or electricity used to power construction vehicles and plant also have the potential to give rise to GHG emissions which need to be included in the carbon calculation. The overall effect of these emissions depends on the cumulative quantity.
242. During the Operational Phase, the impact assessment will focus on GHG emissions associated with the Proposed Project, including GHG emissions associated with the operational power required to run the infrastructure sites, the potential reduction of renewable power from Ardnacrusha generating station, land use change, road traffic emissions and maintenance associated with the Proposed Project.
243. The assessment of the Operational Phase will also examine the vulnerability of the Proposed Project to climate change, including the risk of flooding and the potential increased frequency of storms.
244. The Climate chapter of the EIAR will include an overview of the baseline, the likely significant effects of the Proposed Project and the mitigation measures proposed to avoid or minimise the predicted effects, including monitoring where relevant, and any residual significant effects.
245. The proposed scope and methodology of the Climate assessment are set out below.

## 10.2 Study Area

246. The study area for the Climate assessment differs from other topics of the EIAR, as emissions from the Proposed Project will be compared to sectoral GHG emissions and the relevant sectoral emission budgets. The calculation will include changes that would occur within the Proposed Project Boundary and impacts that extend beyond it. For example, the study area will include the new infrastructure that is built but will also include Construction Phase and Operational Phase traffic impacts as determined by the Traffic and Transport assessment. In accordance with the recently published Institute of Environmental Management and Assessment (IEMA) GHG Guidance (2022), the approach to assessing the cumulative effects of GHG emissions differs from that for other environmental topics, as GHG emission impacts and the resulting effects cannot be evaluated within a geographically bounded study area. Therefore, all global cumulative GHG sources are relevant to the effect on climate change which needs to be factored when defining the study area and receptor.
247. The study area for the effects of future climate change on the Proposed Project covers the area within the Proposed Project Boundary. The study area will be influenced by current and future baselines, and by the input of other topic experts within the EIAR team. It will extend beyond the Proposed Project Boundary where appropriate to include areas that are sensitive to future climate change impacts, such as changes in flood risk.

## 10.3 Scope of the Assessment

248. The Climate assessment will consider all sources of GHGs arising from the Proposed Project (Table 10.1) and compare the total GHG emissions with sector targets and the national budgets for achieving Net Zero Carbon in Ireland by 2050 (at the latest).

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249. Activities that do not significantly change the result of the assessment may be excluded from the scope where expected emissions are less than 1% of total project emissions. All such exclusions will be clearly stated and not exceed a maximum total of 5% of total project emissions as per IEMA guidance on Assessing GHG Emissions and Evaluating their Significance (2022).

250. The assessment will consider the impact of future climate change on the Proposed Project for the moderate (RCP4.5) and high risk (RCP8.5) future scenarios (2041-2060) and identify how the Proposed Project has designed out such vulnerabilities.

**Table 10.1: Summary of Scope of Assessment – Climate**

Project Phase	Potential Impacts Scoped In	Potential Impacts Scoped Out
Construction	<ul style="list-style-type: none"> <li>Embedded carbon due to construction</li> <li>Land use change (including tree loss and planting, and peat extraction and rewetting)</li> <li>Traffic emissions during construction stage<sup>3</sup></li> </ul>	<ul style="list-style-type: none"> <li>No potential impacts have been scoped out</li> </ul>
Commissioning	<ul style="list-style-type: none"> <li>No additional effects beyond construction and operation</li> </ul>	
Operation	<ul style="list-style-type: none"> <li>Operational power requirements</li> <li>Embedded carbon within the operational maintenance regime of the Proposed Project</li> <li>Vulnerability of Proposed Project to future climate change impacts</li> <li>Traffic emissions during operational stage</li> <li>Sludge generation</li> <li>Land use change</li> </ul>	<ul style="list-style-type: none"> <li>No potential impacts have been scoped out</li> </ul>

### 10.4 Overview of Assessment Approach

251. The Climate assessment will be carried out in line with the latest legislation and guidance, and will be tailored accordingly based on professional judgement and local circumstance:

- EPA Guidelines 2022;
- Climate Action Plan 2023;
- IEMA Climate Change Resilience and Adaptation (2020);
- IEMA Greenhouse Gas Management Hierarchy (2020);
- IEMA Assessing Greenhouse Gas Emissions and Evaluating their Significance 2<sup>nd</sup> Edition (2022);
- IEMA Climate Change Adaption (2022);
- Technical Guidance on the Climate Proofing of Infrastructure in the Period 2021-2027 (European Commission 2021);
- TII PE-ENV-01104: Climate Guidance for National Roads, Light Rail and Rural Cycleways (Offline & Greenways) – Overarching Technical Document (2022); and
- TII PE-ENV-01105: Climate Assessment Standard for Proposed National Roads (2022).

252. The Climate assessment will quantify the GHG emissions associated with the Proposed Project by calculating the whole life net GHG emissions. The IEMA assessing GHG Guidance (2022) does not recommend a particular approach for this due to variations of situations; instead, it sets out advice for the key common components necessary for undertaking a GHG emissions assessment. IEMA recommend use of a reasonable worst-case scenario.

253. The TII guidance document PE-ENV-01104 (2022) outlines a recommended approach for determining the significance of both the construction and operational phases of a development. While the Proposed Project is not a roads project, the broad approach set out in PE-ENV-01104 is applicable. The approach is based on comparing the net project GHG emissions to the relevant carbon budgets (Department of the Taoiseach, 2022). With the publication of the Climate Action Act in 2021, sectoral carbon budgets have been published for comparison with the net CO<sub>2</sub> project GHG emissions from the Proposed Project.

<sup>3</sup> Traffic emissions are not incorporated into the embedded carbon calculations of the materials to avoid double counting.



254. In line with the IEMA assessing GHG Guidance (2022), PE-ENV-01104 (TII 2022) reiterates that the crux of significance regarding the effect on climate is not whether a project emits GHG emissions, nor even the magnitude of GHG emissions alone, but whether it contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero by 2050. Mitigation has taken a leading role within the Guidance. Therefore, the assessment will include proposed mitigation and discuss 'designed in' mitigation to reduce the effect of the Proposed Project on climate.

255. Technical guidance on the climate proofing of infrastructure in the period 2021-2027 (European Commission, 2021) outlines an approach for undertaking a climate change risk assessment where there is a potentially significant effect on the Proposed Project due to climate change. The risk assessment assesses the likelihood and consequence of the impact occurring, leading to the evaluation of the significance of the effect. The role of the climate consultant in assessing the likelihood and impact is to facilitate the climate change risk assessment process with input from the design team or specific topic specialists, such as hydrology. The climate screening risk assessment or vulnerability assessment is carried out by determining the sensitivity and exposure of the Proposed Project to climate change hazards.

### 10.5 Assessment Criteria

#### 10.5.1 Proposed Project's Effect on Climate Change

256. Significance, in relation to the GHG assessment, is determined using the criteria outlined in Table 10.2 (derived from Table 6.7 of PE-ENV-01104 (TII, 2022)) along with consideration of the following two factors:

- The extent to which the trajectory of GHG emissions from the project aligns with Ireland's GHG trajectory to net zero by 2050; and
- The level of mitigation taking place.

**Table 10.2: TII GHG Assessment Significance Criteria**

Effects	Significance Level Description	Description
Significant adverse	Major adverse	<ul style="list-style-type: none"> <li>• The project's GHG impacts are not mitigated</li> <li>• The project has not complied with do-minimum standards set through regulation, nor provided reductions required by local or national policies</li> <li>• No meaningful absolute contribution to Ireland's trajectory towards net zero</li> </ul>
	Moderate adverse	<ul style="list-style-type: none"> <li>• The project's GHG impacts are partially mitigated</li> <li>• The project has partially complied with do-minimum standards set through regulation and have not fully complied with local or national policies</li> <li>• Falls short of full contribution to Ireland's trajectory towards net zero</li> </ul>
Not significant	Minor adverse	<ul style="list-style-type: none"> <li>• The project's GHG impacts are mitigated through 'good practice' measures</li> <li>• The project has complied with existing and emerging policy requirements</li> <li>• Fully in line to achieve Ireland's trajectory towards net zero</li> </ul>
	Negligible	<ul style="list-style-type: none"> <li>• The project's GHG impacts are mitigated beyond design standards</li> <li>• The project has gone well beyond existing and emerging policy requirements</li> <li>• Well 'ahead of the curve' for Ireland's trajectory towards net zero</li> </ul>
Beneficial	Beneficial	<ul style="list-style-type: none"> <li>• The project's net GHG impacts are below zero and it causes a reduction in atmosphere GHG concentration</li> <li>• The project has gone well beyond existing and emerging policy requirements</li> <li>• Well 'ahead of the curve' for Ireland's trajectory towards net zero, provides a positive climate impact</li> </ul>

#### 10.5.2 Vulnerability of the Proposed Project to Climate Change

257. The climate screening risk assessment or vulnerability assessment comprises of two stages:

- Climate screening; and if required; and
- A detailed climate assessment.

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258. Examples of climate hazards which are considered in the risk assessment include:

- Flooding (fluvial, pluvial and sea level rise);
- Storms (increased frequency or severity); and
- Extreme temperatures (droughts, frosts/ice, snow, wildfire).

259. If a detailed assessment is required, the likelihood of an impact and impact consequence are combined in the form of a matrix to identify the significance (extreme, high, medium or low risk) of each effect, as outlined in Table 10.3. The significance conclusions for each effect will be based on the confirmed design and mitigation measures. A risk that is low or medium is classed as non-significant, while a high or extreme risk is classed as a significant risk. The intention of the assessment is to increase the resilience of the asset and reduce the number of risks classified as significant. Any risks that remain significant (i.e. a high or extreme risk) should be prioritised in detailed design, monitoring and reviews of the risk assessment.

**Table 10.3: Overall Effect of the Essential Climate Variables and Hazards**

<b>Term</b>	<b>Insignificant</b>	<b>Minor</b>	<b>Moderate</b>	<b>Major</b>	<b>Catastrophic</b>
<b>Rare</b>	Low Risk	Low Risk	Medium Risk	High Risk	Extreme Risk
<b>Unlikely</b>	Low Risk	Low Risk	Medium Risk	High Risk	Extreme Risk
<b>Moderate</b>	Low Risk	Medium Risk	High Risk	Extreme Risk	Extreme Risk
<b>Likely</b>	Medium Risk	High Risk	High Risk	Extreme Risk	Extreme Risk
<b>Almost Certain</b>	High Risk	High Risk	Extreme Risk	Extreme Risk	Extreme Risk

## 11. Population

### 11.1 Context

260. The EIAR will consider and evaluate impacts on employment, the economy, communities, tourism, and land use arising during the construction, operational and decommissioning phases of the Proposed Project. There has been substantial progress with the Population assessment to date, which has been supported by desk studies.

261. The Proposed Project is routed across the country from Ardnacrusha, County Clare to Peamount, County Dublin. The Proposed Project passes through a largely rural environment, avoiding for the most part (where engineering constraints allow) local housing and settlements, with settlements mainly comprising dispersed rural communities and the rural catchment of larger towns.

262. The following potential impacts associated with the construction and operation of the Proposed Project will be assessed and reported in the EIAR:

- Employment: Direct employment opportunities for construction works and operational activities, including maintenance. Employment opportunities through indirect and induced employment at both local and regional level as a result of the Proposed Project;
- Economy: Investment in the Proposed Project would provide economic benefits at both local and regional level;
- Community amenity: Increased levels of traffic, noise, air pollution and visual effects during the Construction and Operation Phases may cause disruption to communities;
- Community accessibility and Severance: Community severance and issues of access for local people, communities, businesses and other community activities as a result of construction activities and permanent above ground infrastructure;
- Tourism: Potential for effects on visitor perception of the local and regional area, which may have negative effects on the tourism sector more widely; and
- Land use and land-take: Temporary and permanent land take for the Proposed Project could affect residential, commercial and community properties/facilities.

263. The Population chapter of the EIAR will include an overview of the baseline, the likely significant effects of the Proposed Project and the mitigation measures proposed to avoid or minimise the predicted effects, including monitoring where relevant, and any residual significant effects.

264. The proposed scope and methodology of the Population assessment are set out below.

### 11.2 Study Area

265. Due to the different characteristics of the topics and the potential impacts described in Section 11.1, it is appropriate to consider different study areas for each. For example, potential impacts on land use and land-take are limited to the Proposed Project Boundary, while the potential impacts on employment could be experienced on a county-wide spatial scale. The proposed study area for each of the assessment topics are outlined in Table 11.1.

266. No formal national guidance is available on the appropriate study area to focus the assessment of population arising from water abstraction, treatment and associated pipeline infrastructure. As such, professional judgement has been applied in determining the appropriate study areas.

**Table 11.1: Study Area of Each Population Assessment Topic**

Assessment Topic	Study Area	Phase of Proposed Project under consideration
Employment	<ul style="list-style-type: none"> <li>Labour Market within the counties in which the Proposed Project will be located - Clare, Limerick, Tipperary, Offaly, Kildare and Dublin (within the administrative area of South Dublin County Council)</li> </ul>	Construction Phase and Operational Phase
Economy	<ul style="list-style-type: none"> <li>National economy</li> </ul>	Construction Phase and Operational Phase
Community amenity	<ul style="list-style-type: none"> <li>Area within 500m from the Proposed Project Boundary</li> </ul>	Construction Phase and Operational Phase
Community accessibility and severance	<ul style="list-style-type: none"> <li>Area within 500m from the Proposed Project Boundary</li> </ul>	Construction Phase and Operational Phase
Tourism	<ul style="list-style-type: none"> <li>Within 500m of the Proposed Project Boundary (amenity and severance effects)</li> <li>Nationally (visitor perception effects)</li> </ul>	Construction Phase and Operational Phase
Land use and land-take	<ul style="list-style-type: none"> <li>Land within the Proposed Project Boundary where not considered as part of the agricultural land use assessment</li> </ul>	Construction Phase and Operational Phase

### 11.3 Scope of the Assessment

267. The scope of the assessment will include all the potential impacts defined in Section 11.1, as set out in Table 11.2. No matters are proposed to be scoped out of the assessment.

**Table 11.2: Summary of Scope of Assessment – Population**

Project Phase	Potential Impacts Scoped In	Potential Impacts Scoped Out
Construction, Commissioning and Operation	<ul style="list-style-type: none"> <li>Employment</li> <li>Economy</li> <li>Community amenity</li> <li>Community accessibility and severance</li> <li>Tourism</li> <li>Land use and land-take</li> </ul>	<ul style="list-style-type: none"> <li>No potential impacts have been scoped out</li> </ul>

### 11.4 Overview of Assessment Approach

268. The assessment will be carried out in accordance with the relevant national and EU legislation and guidance, including the EPA Guidelines (2022), and will include the general assessment steps set out in Section 2.1 of this report.

269. There is no definitive guidance on the assessment of potential impacts on people and communities, and no prescribed method for determining the sensitivity of people and community receptors or the significance of effects on those receptors.

270. Therefore, in respect to all assessment topics (with the exception of community ‘amenity’), the extent of likely significant effects on receptors will be determined by a combined consideration of sensitivity and magnitude criteria. The quality, significance and duration of such likely significant effects of the Construction Phase and Operational Phase (where applicable) of the Proposed Project will be characterised as per the EPA Guidelines (2022).

271. Likely significant effects on community amenity will be determined by considering the residual effect reported for each of the environmental topics in the EIAR (i.e. traffic, noise, air quality and visual) in-combination with one another. This in-combination consideration will determine the significance of effect on the community amenity of relevant receptors overall, in accordance with the EPA Guidelines (2022). As such, specific sensitivity and magnitude criteria are not required for the assessment of community amenity given the reliance on reported residual effects from other topics.

272. The assessment approach will use professional judgement to determine the likely significant effects. Inputs from other assessments, including Traffic and Transport, Noise and Vibration, Air Quality and Landscape and Visual, will be used to inform the Population assessment.

### 11.5 Assessment Criteria

273. The different assessment topics for Population are proposed to use different sensitivity and magnitude criteria where required, as defined in this section.

#### 11.5.1 Employment

274. The appraisal method for the assessment of likely significant effects on employment will be determined through a combination of the magnitude of impact and the sensitivity of the receptors (in this case the combined labour market across the counties within the study area, as well as, but separately, the national construction labour market).

275. Employment is a key population consideration, and has an important role in the health, well-being and wider livelihoods of individuals and populations more generally. As such, a 'high' sensitivity categorisation has been applied to the labour market under assessment.

276. Table 11.3 shows the magnitude criteria to be used for the assessment of impacts on employment within the study area as a result of the Proposed Project. These thresholds are based on professional judgement using evidence of county-level and national statistical data.

**Table 11.3: Magnitude of Impacts for the Employment Assessment**

Changes in Level of Employment as a Result of the Proposed Project	
Magnitude	Description
<b>High</b>	Greater than 1% change, representing a large and noticeable change to the level of employment within the study area
<b>Medium</b>	0.5% - 1% change, representing a moderate change to the level of employment within the study area
<b>Low</b>	0.2% – 0.5% change, representing a noticeable change to the level of employment within the study area
<b>Negligible</b>	Less than 0.2% change, representing a negligible change to the level of employment within the study area

#### 11.5.2 Economy

277. The likely significant effects on the national economy will be determined through a combination of the magnitude of impact and the sensitivity of the receptor. In the absence of relevant county/regional-level data, the national economy will be assessed.

278. The national economy provides the foundation for the health and well-being of a society and the people within that depend on it. As such, a 'high' sensitivity categorisation has been assigned to the national economy as the receptor being assessed.

279. Table 11.4 shows the magnitude criteria to be used for the assessment of impacts on the economy within the study area. These thresholds are based on professional judgement using evidence of national statistics for economic sectors in the absence of more appropriate representative regional or county-level statistical data.

**Table 11.4: Magnitude of Impacts for the Economic Impact Assessment**

Changes in Economic Activity Across the Study Area as a Result of the Proposed Project	
Magnitude	Description
<b>High</b>	Greater than 1% change, representing a large and noticeable change to the economy across the study area
<b>Medium</b>	0.5% - 1% change, representing a moderate change to the economy across the study area
<b>Low</b>	0.2% – 0.5% change, representing a noticeable change to the economy across the study area
<b>Negligible</b>	Less than 0.2% change, representing a negligible change to the economy across the study area

**11.5.3 Community Amenity**

280. No sensitivity or magnitude criteria have been defined for the assessment of likely significant effects on community amenity, as the assessment will be informed by the residual effects reported under each of the contributing environmental topics (i.e. Air Quality, Landscape and Visual, Traffic and Transport, and Noise and Vibration). The level of significance from each contributing environmental effect will be determined by the individual environmental topic assessments.

281. Likely significant effects on community amenity will be determined by considering the contributing environmental effects in-combination with one another and assigning an overall significance in accordance with the EPA Guidelines (2022). To do this, the approach set out in Table 11.5 will be used to determine the overall significance of effect on amenity. Table 11.5 is closely aligned with the EPA Guidelines (2022); however it has amalgamated the term ‘Significant’ to encompass the EPA terms ‘Profound’, ‘Very Significant’ and ‘Significant’ while the term ‘Not Significant’ encompasses the EPA terms ‘Not Significant’ and ‘Imperceptible’. The criteria in Table 11.5 will be applied for either negative or positive effects, but not a combination of both. Where the nature of two or more contributing environmental effects alternates between positive and negative, professional judgement will be used to assign the overall significance of the effect on amenity.

282. While the community amenity assessment imposes no duration criteria of its own, where a ‘Significant’ effect on amenity is identified, the temporal aspects from the environmental effects will be examined to determine whether the effects would be likely to occur simultaneously and result in a ‘Significant’ indirect effect.

**Table 11.5: In-combination Amenity Impact Significance Matrix**

Environmental Effect 1	Environmental Effect 2	Environmental Effect 3	Environmental Effect 4	Combined Effect
Significant	Significant	Significant	Significant	Significant
Significant	Significant	Significant	Moderate	Significant
Significant	Significant	Significant	Slight	Significant
Significant	Significant	Significant	Not Significant	Significant
Significant	Significant	Moderate	Moderate	Significant
Significant	Significant	Moderate	Slight	Moderate/Significant
Significant	Significant	Moderate	Not Significant	Moderate/Significant
Significant	Significant	Slight	Slight	Moderate
Significant	Significant	Slight	Not Significant	Moderate
Significant	Significant	Not Significant	Not Significant	Moderate
Significant	Moderate	Moderate	Moderate	Moderate/Significant
Significant	Moderate	Moderate	Slight	Moderate
Significant	Moderate	Moderate	Not Significant	Moderate
Significant	Moderate	Slight	Slight	Moderate
Significant	Moderate	Slight	Not Significant	Moderate
Significant	Moderate	Not Significant	Not Significant	Moderate
Significant	Slight	Slight	Slight	Slight/Moderate
Significant	Slight	Slight	Not Significant	Slight/Moderate
Significant	Slight	Not Significant	Not Significant	Slight
Significant	Not Significant	Not Significant	Not Significant	Not Significant/Potential direct impact on amenity
Moderate	Moderate	Moderate	Moderate	Moderate/Significant
Moderate	Moderate	Moderate	Slight	Moderate/Significant
Moderate	Moderate	Moderate	Not Significant	Moderate
Moderate	Moderate	Slight	Slight	Moderate

Environmental Effect 1	Environmental Effect 2	Environmental Effect 3	Environmental Effect 4	Combined Effect
Moderate	Moderate	Slight	Not Significant	Moderate
Moderate	Moderate	Not Significant	Not Significant	Moderate
Moderate	Slight	Slight	Slight	Slight/Moderate
Moderate	Slight	Slight	Not Significant	Slight/Moderate
Moderate	Slight	Not Significant	Not Significant	Slight
Moderate	Not Significant	Not Significant	Not Significant	Not Significant
Slight	Slight	Slight	Slight	Slight/Moderate
Slight	Slight	Slight	Not Significant	Slight/Moderate
Slight	Slight	Not Significant	Not Significant	Slight
Slight	Not Significant	Not Significant	Not Significant	Not Significant
Not Significant	Not Significant	Not Significant	Not Significant	Not Significant

#### 11.5.4 Community Accessibility and Severance

283. Likely significant effects on community accessibility and severance will be determined through a combination of the magnitude of impact and the sensitivity of the receptors impacted.

284. The sensitivity of residential, commercial and community land will be based on the criteria set out in Table 11.6.

**Table 11.6: Sensitivity Assessment for Community Accessibility and Severance (and Land Use and Land-take)**

Sensitivity	Description
<b>High</b>	<ul style="list-style-type: none"> <li>Residential or commercial buildings</li> <li>Buildings used by the community (e.g. schools, community halls, medical centre)</li> <li>Community land that is widely used or for which there is no available or accessible alternative</li> <li>Religious sites and places of worship</li> </ul>
<b>Medium</b>	<ul style="list-style-type: none"> <li>Residential or commercial land without structures (e.g. gardens or car parks)</li> <li>Community land without structures that are not widely used</li> </ul>
<b>Low</b>	<ul style="list-style-type: none"> <li>Derelict or unoccupied buildings or land</li> <li>Land without structures not widely used for which equivalent, available and accessible alternatives are available</li> </ul>

285. Table 11.7 outlines the criteria proposed to determine the magnitude of impact for community and severance impacts. These are based upon applied good practice from other major Irish and UK infrastructure projects, such as: Kildare County Council’s Kerdiffstown Landfill Remediation Project approved in May 2018, the National Grid’s Peak District East (Visual Improvement Provision) Project approved in June 2020, and Esso Petroleum Company Limited’s Southampton to London Pipeline approved in October 2020.

**Table 11.7: Magnitude of Impacts for Community Accessibility and Severance (and Land Use and Land-Take)**

Magnitude	Description
<b>High</b>	Severances of access due to temporary road closure or land-take for more than 8 weeks (i.e. >2 months)
<b>Medium</b>	Severances of access due to temporary road closure or land-take lasting between 4 - 8 weeks
<b>Low</b>	Severances of access due to temporary road closure or land-take lasting between 2 - 4 weeks
<b>Negligible</b>	Severances of access due to temporary road closure or land-take lasting up to 2 weeks

### 11.5.5 Tourism

286. The assessment of likely significant effects on the amenity of tourism receptors will follow the same process as outlined for community accessibility and severance.

287. In the absence of appropriate guidance, the assessment of likely significant effects on visitor perception as a result of the construction and/or operation of the Proposed Project will be determined using professional judgement and past experience of working on other major infrastructure projects.

288. The assessment of likely significant effects of accessibility and severance on tourism receptors will follow the same process as that outlined in Table 11.6 and Table 11.7 for the assessment of community accessibility and severance.

### 11.5.6 Land Use and Land-take

289. The appraisal method for the assessment of likely significant effects on land use and land-take will be determined through a combination of the magnitude of impact and the sensitivity of the receptors impacted. Table 11.6 will be used to establish the sensitivity of receptors under consideration, while Table 11.7 outlines the criteria proposed to be used to determine the magnitude of the impact as a result of the Proposed Project.



## 12. Human Health

### 12.1 Context

290. The EIAR will consider and evaluate the impacts on human health arising during the construction, operational and decommissioning phases of the Proposed Project. There has been substantial progress with the Human Health assessment to date, which has been supported by desk studies.

291. A community profile will be used to determine the average baseline health. This profile will be used to identify unequal distributions in existing factors such as deprivation or burden of poor health, to understand potentially more sensitive groups and to assess any changes in community exposure to certain health pathways and their degree of impact on the population or community.

292. The Health Service Executive, Lenus and Irish Health Repository have published health profiles for all the Local Authority areas in Ireland. The most recent profiles published relate to 2015 and have been used to establish a community health profile for the Proposed Project. As might be expected with a development as geographically diverse as the Proposed Project, there is a considerable variation in health profiles, which broadly represents the population of Ireland.

293. The greatest potential for an impact on human health as a result of the Construction Phase would be emissions from the construction activity itself and any increase to traffic. Construction activity can be defined as all activity related to construction. This will include for example, construction of facilities or structures, excavation, tunnelling, removal of trees as well as ancillary activity such as an increase to traffic related to the movement of construction equipment, materials being brought on site and waste materials being moved away from the construction sites as well as other construction related activities. Preliminary scoping has identified the following potential impacts on human health associated with the construction of the Proposed Project:

- Air quality – dust emissions from construction activities and construction vehicles;
- Noise and vibration – impacts to sensitive receptors during construction works;
- Water – potential impacts to water quality (including groundwater) during construction;
- Land and soils – impact to soils, particularly contaminated soils; and
- Psychological impacts – anxiety and stress due to construction works.

294. While the impacts associated with the provision of a clean drinking water supply are mainly positive, there would be the potential for the Operational Phase to have impacts on human health. Potential human health impacts include:

- Air quality – emissions to air from operational and maintenance vehicles;
- Noise and vibration – impacts to sensitive receptors from operation and maintenance activities;
- Psychological impacts; operational health improvements;
- General amenity; community wellbeing and social sustainability from access to improved water supplies;
- Water security; and
- Food security.

295. The Human Health chapter of the EIAR will include an overview of the baseline, the likely significant effects of the Proposed Project and the mitigation measures proposed to avoid or minimise the predicted effects, including monitoring where relevant, and any residual significant effects.

296. The proposed scope and methodology of the Human Health assessment are set out below.

### 12.2 Study Area

297. The Proposed Project will cross the counties of Tipperary, Offaly, Kildare and Dublin and the assessment will focus on whether there could be health affects within these areas.

298. Individuals residing near the Proposed Project would have the potential to be exposed to various emissions such as noise and vibration and emissions to air during both the Construction and Operational Phases. It is important to note that not everybody within the study area would be equally exposed. It is most likely that those who are in close vicinity to the Proposed Project have the potential to be exposed more than those located at a farther distance from the Proposed Project.

299. It is very unlikely that individuals living more than 500m from the Proposed Project would be significantly exposed, given the way noise and vibration and air emissions attenuate with distance. Therefore, it is proposed that the study area for human health will be within 500m of the Proposed Project, particularly in relation to emissions from both the Construction and Operational Phases. However, it is recognised that those individuals living within 50m or 100m of the Proposed Project have the most potential to experience significant effects during the Construction Phase from, for example, construction noise and dust.

300. It is predicted that those most likely to be affected during the Operational Phase would be the population using the drinking water supplied as a result of the Proposed Project. Potential impacts may also occur due to the limited emissions resulting from the Operational Phase. However, the provision of a new drinking water supply is predicted to result in a positive impact on human health as the Proposed Project would cater for a growing demand for water supply due to growing populations. The proposed pipeline would cross through a largely agricultural environment, much of which is used for food production. The potential impacts on food production during the Construction and Operational Phases will also need to be considered. In addition, vulnerable individuals, including those in healthcare facilities, will be considered.

### 12.3 Scope of the Assessment

301. The scope of the assessment will include all the potential impacts defined in Section 12.1, as per Table 12.1.

302. The assessment of the likely significant health effects on the population that may arise from the impacts of the Proposed Project will consider:

- Risk assessment - to identify the potential risk to human health in response to identified hazards;
- Socioeconomic impacts on human health;
- Impacts on amenity resources and subsequent effects on human health; and
- Potential for psychological effects.

**Table 12.1: Summary of Scope of Assessment – Human Health**

Project Phase	Potential Impacts Scoped In	Potential Impacts Scoped Out
Construction	<ul style="list-style-type: none"> <li>• Impacts on air quality from dust</li> <li>• Impacts associated with noise and vibration</li> <li>• Impacts on groundwater</li> <li>• Impacts to soils</li> <li>• Psychological impacts</li> </ul>	<ul style="list-style-type: none"> <li>• Gaseous pollutant emissions from construction activities/plant and machinery (as scoped out of the Air Quality assessment)</li> </ul>
Commissioning	<ul style="list-style-type: none"> <li>• No additional effects beyond construction and operation</li> </ul>	
Operation	<ul style="list-style-type: none"> <li>• Air quality effects from operational traffic</li> <li>• Noise impacts from operation of the infrastructure sites and operational traffic</li> <li>• Psychological impacts</li> <li>• General amenity impacts</li> <li>• Food security</li> <li>• Water security</li> </ul>	<ul style="list-style-type: none"> <li>• Air quality impacts from all operational activities except operational traffic</li> <li>• Effects from the operation of the pipeline and associated valves</li> <li>• Vibration impacts during operation</li> </ul>

### 12.4 Overview of Assessment Approach

303. It is difficult to assign levels of significance to human health effects. In medicine, as in all science, the concept of statistical significance is used. This involves attaching a value to significance, often expressed as a percentage level of confidence in the data. Confidence measures of 95% or 99% are often used to measure levels of certainty or changes that are not due to chance alone.

304. This is considered to be a valid approach for the study of the likely significant effects on a population but does not absolutely exclude a response of an individual. However, it is difficult to assign levels of significance to individual human health effects without detailed information about that individual. Thus, the significance of health effects is proposed to be assessed on a group or community basis rather than on an individual basis. There is such a variability in human response that it would not be possible to identify all potential individual effects. Therefore, in accordance with relevant guidance, including the EPA Guidelines (2022), associated EPA Advice Notes (2015), and IEMA Health in Environmental Impact Assessment – A Primer for a Proportionate Approach (2017), it is considered more appropriate to assess the significance of health effects at a population level.

### 12.5 Assessment Criteria

#### 12.5.1 Sensitivity of Receptors

305. The sensitive or vulnerable receptors are looked at in terms of their importance and sensitivity.

306. In terms of Human Health, all human beings are considered to be equally important. The use of the term 'importance' in this context refers to areas or buildings occupied by people. Their importance is considered to increase as the number of receptors or occupancy increases and the duration of time spent there increases.

307. The EPA Advice Notes for Preparing Environmental Impact Statements (2015) indicates that neighbouring occupied premises and land uses that should be considered include the following:

- Homes;
- Hospitals;
- Healthcare facilities;
- Hotels and hotel accommodation;
- Schools and rehabilitation workshops;
- Tourism and recreational facilities; and
- Visitor attractions.

308. Residential areas, public and private health facilities, workplaces, hotels and educational facilities are considered to be 'very important' areas because a number of persons usually spend a substantial amount of time at these locations.

309. Places of worship and recreational areas will be considered to be 'important areas' of the baseline environment because they are used in a more transient way and people usually spend less time in these places.

310. The sensitivity of an area or building in this context refers to the vulnerability of the population. Reasons for this include inherent vulnerability, such as is the case for the very young or old. Locations where there are higher numbers of vulnerable individuals, such as hospitals and nursing homes, will be considered to be 'very highly sensitive' and require special consideration where likely significant effects are possible.

311. Where it is clear, however, that very highly sensitive receptors have negligible effects, perhaps because of their distance from the Proposed Project, these will be scoped out of the assessment.

312. Residences, schools, workplaces, commercial areas and places of worship will be considered 'highly sensitive'. This is because these areas will include populations of elderly, young people and people with health conditions. However, the majority of the population in these locations are likely to be less vulnerable than those in the very highly sensitive locations.

313. Areas where recreational activities are carried out will be considered to be 'sensitive' as these locations are typically only occupied during the day, and not necessarily continually. They will be used by children and the elderly but usually only for limited periods of time.

314. Sensitivity is also considered to increase with increased duration of exposure to emissions. It is true that those indoors, for example, are less sensitive to emissions than those outdoors, as potential exposures are less. However, this is balanced by the fact that people tend to spend much more time indoors. Therefore, no major distinction is proposed to be made between indoors and outdoors.

### 12.5.2 Significance Criteria

315. The proposed significance criteria for the assessment of the health of communities are outlined in Table 12.2. These are based on the EPA Guidelines (2022), adapted with professional judgement to be applicable to the Human Health assessment.

**Table 12.2: Criteria Used in the Assessment of Community Human Health Protection Effects**

Effect Level	Significance Criteria
Imperceptible	No significant human health effects are apparent
Slight	A small effect on individual reported symptoms but no change in health status can be attributed to the Proposed Project
Moderate	A moderate effect on health status of an individual but no change in morbidity or mortality can be attributed to the Proposed Project
Significant	The Proposed Project has the potential to effect on individual health status with an associated change in morbidity
Very Significant	The Proposed Project has the potential to effect on the health status of groups of people
Profound	The Proposed Project has the potential to effect on the health status of communities

## 12.6 Risk Assessment

316. The main tool used to assess the likely significant effects on human health will be the risk assessment process. This process identifies a hazard and assesses the potential effects on human health. A hazard is something that has the potential to cause harm and the risk is the likelihood that harm would occur. A risk assessment therefore determines the likelihood of harm occurring. The likelihood of harm occurring is, in most instances, related to the amount or dose to which a human being may be exposed.

317. A dose response relationship will inform the risk assessment. The dose response indicates that the higher the dose the more likely a response is to occur, and in many instances the more severe a response. Even psychological risks show this dose response relationship, as the more stress and annoyance people experience, the more likely there is to be an actual impact on psychological health. This knowledge that the risk to health is usually associated with the magnitude of the exposure to the hazard allows an assessment of likely significant effects on human health to be determined given the likely exposure. That is, risk can be assessed if the likely exposure is predicted. The first step is therefore to identify the hazards, then the magnitude of exposure and then to assess the likely health effects. Therefore, the potential impacts which could affect human health will be identified (hazard identification) and the scale of these potential impacts (dose-response assessment) and their duration (exposure assessment) will be assessed. This will be used to determine the significance of the effect on human health (risk characterisation).

318. This is based on US EPA Guidance and is the same approach as outlined by the Irish EPA. When using a recognised health-based standard for a particular hazard, the dose response assessment is included in the standard. This means that the authorities or expert committees which recommended the level of the standard will have taken into account the health problems at the different exposure levels and set the level within the standard to prevent these problems from occurring.

## 13. Landscape and Visual

### 13.1 Context

319. The EIAR will consider and evaluate impacts on the landscape and views arising during the construction, operational and decommissioning phases of the Proposed Project. There has been substantial progress with the Landscape and Visual assessment to date, which has been supported by desk studies and field surveys.

320. A desktop review of available data regarding landscape and visual impacts has been undertaken and will be supplemented with additional information to support the development of the EIAR. A wide range of landscape and visual constraints, such as designated views and routes, plus views from settlements, roads and national walking routes have been identified.

321. The vast majority of the Proposed Project runs through typical lowland farmland, peat bogs and the transitional scrubby landscape that lies between them. This is not a coincidence, as the proposed alignment of the pipeline corridor was chosen following numerous iterations to avoid sensitive landscape features and areas in conjunction with other environmental constraints identified during the site selection process. Key features include:

- At the Parteen Basin, the twin settlements of Killaloe and Ballina are important tourist and amenity areas. There are landscape and visual constraints/elements in the northern part of the Parteen Basin, but comparatively fewer in the southern reaches. There is considerable naturalistic landscape and scenic value in the area immediately north-east of the Parteen Basin, which is heavily wooded and forms part of the former Fort Henry demesne landscape in the townland of Garrynatineel.
- At the TPR, in the vicinity of Peamount Reservoir, the existing environment is generally rural in terms of landscape zoning and no distinctive landscape elements have been identified other than the Grand Canal corridor, which is relatively enclosed along this section.

322. The desk study also reviewed landscape designations and designated scenic viewpoint locations, topographical mapping, aerial photography and prominent tourism and walking route data sources. This informed the field work stage and the selection of representative viewpoints in relation to each of the infrastructure sites, in consultation with the respective Local Authorities, from which to undertake the visual impact assessment. Collaboration with the project heritage specialist will be undertaken to identify a register of national monuments and historic parks and gardens, particularly those that also represent relevant landscape and visual receptors. Collaboration with the authors of the EIAR Population chapter will mean that tourist assets are appropriately considered in the Landscape and Visual assessment.

323. The following potential impacts associated with the construction of the Proposed Project will be assessed and reported in the EIAR:

- Landscape and visual impacts from construction of the main infrastructure sites
- Visual impacts from the movement of traffic and machinery along site access points and Haul Roads;
- Landscape and visual impacts arising from vegetation removal, earthworks, and excavation during the construction of the RWRM, Pressure Pipeline and Gravity Pipeline;
- Landscape and visual impacts arising from the Construction Compounds and Pipe Storage Depots; and
- Landscape and visual impacts arising from ancillary construction requirements (for example, water drainage, power and lighting, site facilities, etc).

324. The following potential impacts associated with the operation of the Proposed Project will be assessed and reported in the EIAR:

- Landscape and visual impacts arising from permanent buildings/structures;
- Visual impacts arising from ancillary site utilities such as lighting, signage, and car parking;
- Landscape and visual impacts – both positive and negative – arising from the implementation of any landscaping screening proposals; and

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- Visual impacts arising from operational stage activities, such as the requirements for maintenance.

325. The Landscape and Visual chapter of the EIAR will include an overview of the baseline, the likely significant effects of the Proposed Project and the mitigation measures proposed to avoid or minimise the predicted effects, including monitoring where relevant, and any residual significant effects.

326. The proposed scope and methodology of the Landscape and Visual assessment are set out below.

### 13.2 Study Area

327. From a landscape and visual perspective, there are likely to be different effects associated with the infrastructure sites as compared with the pipeline itself. This is due to the nature of works to be undertaken, and in particular, the pipeline has very few permanent above ground works and during installation most of the activities would be low level. Therefore, it is considered appropriate to define a different starting point for the study areas. It is proposed that the desk based assessment for the Landscape and Visual assessment will encompass a 10km study area for the WTP, a 5km radius area from the location of the other infrastructure sites and a 1km buffer from the pipelines. The reasons for the extended study area for the WTP are the size of the buildings and the area of new development.

328. For the visual assessment, this study area will then be refined using the Zone of Theoretical Visibility (ZTV). The ZTV will be produced using a combination of terrain data supplied by Ordnance Survey Ireland and a detailed topographical survey of areas relevant to the Proposed Project. These will show from where in the surrounding landscape the main above ground infrastructure sites would be potentially visible. A ZTV map is 'theoretical' because it is based on a 'bare-ground' visibility scenario and not one involving screening by vegetation or buildings. The ZTV will ultimately determine the extent of likely significant visual effects and the visual assessment will consider sensitive views from within the ZTV.

### 13.3 Scope of the Assessment

329. The scope of the Landscape and Visual assessment will include all the potential impacts described in Section 13.1, as shown in Table 13.1.

**Table 13.1: Summary of Scope of Assessment – Landscape and Visual**

Project Phase	Potential Impacts Scoped In	Potential Impacts Scoped Out
Construction	<ul style="list-style-type: none"> <li>• Landscape and visual impacts of moving traffic, plant and machinery</li> <li>• Landscape and visual impacts from Construction Compounds, Pipe Storage Depots and material stockpiling</li> <li>• Landscape and visual impacts from ancillary construction requirements, e.g. power, lighting, site facilities</li> <li>• Landscape and visual impacts from vegetation removal, earthworks, and excavation</li> <li>• Landscape and visual impacts of the Proposed Project infrastructure mid-construction</li> </ul>	<ul style="list-style-type: none"> <li>• None identified</li> </ul>
Commissioning	<ul style="list-style-type: none"> <li>• No additional effects beyond construction and operation</li> </ul>	
Operation	<ul style="list-style-type: none"> <li>• Impact of the infrastructure sites and above ground, permanent structures along the pipelines</li> </ul>	<ul style="list-style-type: none"> <li>• The majority of the pipeline route where the structure is buried below ground level</li> </ul>

### 13.4 Overview of Assessment Approach

330. The Landscape and Visual assessment will be based on the EPA Guidelines (2022) and the Landscape Institute and the Institute of Environmental Management and Assessment publication entitled Guidelines for Landscape and Visual Impact Assessment (GLVIA 2013).

331. In line with the above guidance, the assessment will cover potential impacts from a landscape and visual perspective and will describe the existing conditions and the likely significant effects associated with the construction and operation of the Proposed Project. The impact assessment process will involve the general assessment steps set out in Section 2.1 of this report.

### 13.5 Assessment Criteria

#### 13.5.1 Landscape Impact Assessment

332. The sensitivity of the landscape to change is the degree to which a particular Landscape Character Area receptor or feature can accommodate changes or new features without unacceptable detrimental effects to its essential characteristics. Landscape sensitivity will be classified using the criteria set out in Table 13.2, which have been derived from a combination of the GLVIA 2013 guidelines and professional judgement.

**Table 13.2: Landscape Sensitivity Categories**

Landscape Sensitivity	Description
<b>Very high</b>	Areas where the landscape character exhibits a very low capacity for change in the form of development. Examples of which are high-value landscapes, protected at an international or national level (e.g. World Heritage Site/National Park), where the principal management objectives are likely to be protection of the existing character
<b>High</b>	Areas where the landscape character exhibits a low capacity for change in the form of development. Examples of which are high-value landscapes, protected at a national or regional level where the principal management objectives are likely to be considered conservation of the existing character
<b>Medium</b>	Areas where the landscape character exhibits some capacity and scope for development (e.g. landscapes which have a designation of protection at a county level or at non-designated local level) where there is evidence of local value and use
<b>Low</b>	Areas where the landscape character exhibits a higher capacity for change from development. Typically, this would include lower-value, non-designated landscapes that may also have some elements or features of recognisable quality, where landscape management objectives include enhancement, repair and restoration
<b>Negligible</b>	Areas of landscape character that include derelict, mining, industrial land or are part of the urban fringe where there would be a reasonable capacity to embrace change or the capacity to include the development proposals. Management objectives in such areas could be focused on change, creation of landscape improvements and/or restoration to realise a higher landscape value

333. The magnitude of a predicted landscape impact is a product of multiple factors including the timing, the duration, the scale/size, extent or degree of change that would be likely to be experienced as a result of the Proposed Project. This is set out in Table 13.3. The magnitude takes into account whether there would be a direct physical impact resulting from the loss of landscape components and/or a change that extends beyond the Proposed Project Boundary that may have an effect on the landscape character of the area.

**Table 13.3: Magnitude of Landscape Impacts**

Magnitude of Landscape Impact	Description
<b>Very high</b>	Change that would be large in extent and scale with the loss of critically important landscape elements and features that may also involve the introduction of new uncharacteristic elements or features that contribute to an overall change of the landscape in terms of character, value and quality
<b>High</b>	Change that would be more limited in extent and scale with the loss of important landscape elements and features that may also involve the introduction of new uncharacteristic elements or features that contribute to an overall change of the landscape in terms of character, value and quality
<b>Medium</b>	Changes that are modest in extent and scale involving the loss of landscape characteristics or elements that may also involve the introduction of new uncharacteristic elements or features that would lead to changes in landscape character and quality
<b>Low</b>	Changes affecting small areas of landscape character and quality, together with the loss of some less characteristic landscape elements or the addition of new features or elements
<b>Negligible</b>	Changes affecting small or very restricted areas of landscape character. This may include the limited loss of some elements or the addition of some new features or elements that are characteristic of the existing landscape or are hardly perceivable

334. The significance of a landscape effect will be based on a combination of the sensitivity of the landscape receptor and the magnitude of the impact. The significance of landscape effects will be determined using the matrix set out in Table 13.4.

**Table 13.4: Significance Matrix for Landscape Effects**

Magnitude	Sensitivity of Receptor				
	Very High	High	Medium	Low	Negligible
Very High	Profound	Profound – substantial	Substantial	Moderate	Slight
High	Profound – substantial	Substantial	Substantial – moderate	Moderate – slight	Slight – imperceptible
Medium	Substantial	Substantial – moderate	Moderate	Slight	Imperceptible
Low	Moderate	Moderate – slight	Slight	Slight – imperceptible	Imperceptible
Negligible	Slight	Slight – imperceptible	Imperceptible	Imperceptible	Imperceptible

**13.5.2 Visual Impact Assessment**

335. Unlike landscape sensitivity, visual sensitivity has an anthropocentric (or human-centric) basis. Visual sensitivity is a two-sided analysis of receptor susceptibility (people or groups of people) versus the value of the view on offer at a particular location.

336. In accordance with the GLVIA 2013, visual receptors most susceptible to changes in views and visual amenity are considered to be:

- Residents at home;
- People, whether residents or visitors, who are engaged in outdoor recreation, including use of public rights of way, whose attention or interest is likely to be focused on the landscape and on particular views;
- Visitors to heritage assets, or to other attractions, where views of the surroundings are an important contributor to the experience;
- Communities where views contribute to the landscape setting enjoyed by residents in the area; and
- Travellers on road, rail, or other transport routes where such travel involves recognised scenic routes, and awareness of views is likely to be heightened.

337. Visual receptors that would be less susceptible to changes in views and visual amenity include:

- People engaged in outdoor sport or recreation, which does not involve or depend upon appreciation of views of the landscape; and
- People at their place of work whose attention may be focused on their work or activity, not their surroundings, and where the setting is not important to the quality of working life.

338. To assess the amenity value of views, a range of criteria that might typically be related to high amenity value will be used including, but not limited to, scenic designations. These include:

- Recognised scenic value of the view (County Development Plan designations, guidebooks, touring maps, postcards etc.) – these represent a consensus in terms of which scenic views and routes within an area are strongly valued by the population because, in the case of County Development Plans at least, a public consultation process is required;
- Views from within highly sensitive landscape areas – highly sensitive landscape designations are usually part of a county’s Landscape Character Assessment, which is then incorporated with the County Development Plan and is therefore subject to the public consultation process. Viewers within such areas are likely to be highly attuned to the landscape around them;



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- Intensity of use, popularity – while not reflective of the amenity value of a view, this criterion relates to the number of viewers likely to experience a view on a regular basis and whether this is significant at county or regional scale;
- Provision of elevated panoramic views – this relates to the extent of the view on offer and the tendency for receptors to become more attuned to the surrounding landscape at locations that afford broad vistas;
- Sense of remoteness and/or tranquillity – remote and tranquil viewing locations are more likely to heighten the amenity value of a view and have a lower intensity of development in comparison to dynamic viewing locations such as a busy street scene, for example;
- Degree of perceived naturalness – where a view is valued for the sense of naturalness of the surrounding landscape it is likely to be highly sensitive to visual intrusion by obvious human interventions;
- Presence of striking or noteworthy features – a view might be strongly valued because it contains a distinctive and memorable landscape feature such as a promontory headland, lough or castle;
- Historical, cultural or spiritual value – such attributes may be evident or sensed at certain viewing locations that attract visitors for the purposes of contemplation or reflection heightening the sense of their surroundings;
- Rarity or uniqueness of the view – this might include the noteworthy representativeness of a certain landscape type and considers whether other similar views might be afforded in the local or the national context;
- Integrity of the landscape character in view – the condition and intactness of the landscape in view and whether the landscape pattern is a regular one of few strongly related components or an irregular one containing a variety of disparate components;
- Sense of place – whether there is special sense of wholeness and harmony at the viewing location; and
- Sense of awe – whether the view inspires an overwhelming sense of scale or the power of nature.

339. Those locations where highly susceptible receptors or receptor groups are present and which are deemed to satisfy many of the view value criteria listed above are likely to be judged to have a high visual sensitivity.

340. The magnitude of visual impacts will be determined on the basis of two factors: the visual presence of the Proposed Project; and its effect on visual amenity.

341. Visual presence is a somewhat quantitative measure relating to how noticeable or visually dominant the Proposed Project is within a particular view. This will be based on a number of aspects beyond simply scale in relation to distance. Some of these include the extent of the view as well as its complexity and the degree of existing contextual movement experienced such as might be obtained where the Proposed Project would be viewed as part of/beyond an existing infrastructure corridor or agricultural environment. The backdrop against which the Proposed Project will be presented and its relationship with other focal points or prominent features within the view will also be considered. Visual presence is essentially a measure of the relative visual dominance of the Proposed Project within the available vista and expressed as such, i.e. minimal, sub-dominant, co-dominant, dominant, highly dominant.

342. The visual amenity aspect of assessing impact magnitude is qualitative and will consider such factors as the spatial arrangement of the Proposed Project within the site and in relation to surrounding terrain and land cover. It will also examine whether the Proposed Project contributes positively to the existing qualities of the vista or results in distracting visual effects and disharmony.

343. As a result of this approach, a high order visual presence can be moderated by a low level of effect on visual amenity and vice versa. Table 13.5 provides the classification that will be used to determine the magnitude of visual impacts.

**Table 13.5: Magnitude of Visual Impacts**

Magnitude of Visual Impact	Description
<b>Very high</b>	The proposal intrudes into a large proportion or critical part of the available vista and is without question the most noticeable element. A high degree of visual disorder or disharmony is also generated, strongly reducing the visual amenity of the scene
<b>High</b>	The proposal intrudes into a significant proportion or important part of the available vista and is one of the most noticeable elements. A considerable degree of visual disorder or disharmony is also likely to be generated, appreciably reducing the visual amenity of the scene
<b>Medium</b>	The proposal represents a moderate intrusion into the available vista, is a readily noticeable element and/or it may generate a degree of visual disorder or disharmony, thereby reducing the visual amenity of the scene. Alternatively, it may represent a balance of higher and lower order estimates in relation to visual presence and visual amenity
<b>Low</b>	The proposal intrudes to a minor extent into the available vista and may not be noticed by a casual observer and/or the proposal would not have a marked effect on the visual amenity of the scene
<b>Negligible</b>	The proposal would be barely discernible within the available vista and/or it would not detract from, and may even enhance, the visual amenity of the scene

344. The significance of visual effects is a function of visual receptor sensitivity and visual impact magnitude. This relationship will be approached using the same significance matrix that is provided in respect of landscape effects in Table 13.4.

# 14. Cultural Heritage

## 14.1 Context

345. The EIAR will consider and evaluate impacts on the historic environment arising during the construction, operational and decommissioning phases of the Proposed Project. There has been substantial progress with the Cultural Heritage assessment to date, which has been supported by desk studies and archaeological field investigations.
346. A desktop review of all available data regarding the archaeology, cultural heritage and architectural heritage impacts over the study area has been carried out to identify all national monuments, recorded monuments and protected structures, which are subject to statutory protection. In addition, all National Inventory of Architectural Heritage structures were identified as there is the potential that these structures may be added to the record of protected structures in the future. Designed landscapes were identified as areas of cultural heritage significance. Information was also obtained from Bord na Mona as approximately 8-10% of the overall project length is located through peatland.
347. Extensive work has been completed to identify the location of the proposed infrastructure sites and preferred pipeline corridor. As a result of the options assessment, there are no sites or structures subject to statutory protection located within the proposed RWI&PS works at Parteen, the WTP works, the BPT location, the BPS location or the proposed TPR at Peamount. Some smaller recorded archaeological sites are located along the path of the treated water pipeline, but direct impacts will be mitigated by detailed design where possible.
348. Archaeological geophysical surveys have been carried out at three locations of archaeological potential along the route of the treated water pipeline and within the area proposed to contain the TPR at Peamount. No significant previously unrecorded archaeological remains were identified within the Proposed Project Boundary during the course of these surveys.
349. It is envisaged that there would be some direct and indirect effects on archaeological, architectural and cultural heritage resources as a result of the construction of the Proposed Project. Direct negative effects may occur where unknown sites of archaeological, architectural and cultural heritage significance are located within the Proposed Project Boundary, which would potentially be impacted upon by ground disturbances. Indirect negative effects may occur where sites of archaeological, architectural and cultural heritage significance are located within the immediate vicinity of the Proposed Project, which are visually impacted upon during the construction of the Proposed Project.
350. There is not expected to be any significant direct or indirect effects on archaeological, architectural or cultural heritage resources as a result of the Operational Phase of the Proposed Project. This is due to the fact that the proposed WTP would not affect the setting of recorded cultural heritage sites in the study area, and the BPT, BPS and TPR at Peamount would possess low surface expression and would not result in significant visual effects on recorded cultural heritage sites. The pipeline would operate below the current ground level and as such would not affect the cultural heritage resource at operation.
351. The Cultural Heritage chapter of the EIAR will include an overview of the baseline, the likely significant effects of the Proposed Project and the mitigation measures proposed to avoid or minimise the predicted effects, including monitoring where relevant, and any residual significant effects.
352. The proposed scope and methodology of the Cultural Heritage assessment are set out below.

## 14.2 Study Area

353. The main study area, from an archaeology, cultural heritage and architectural heritage perspective, will be within the surrounding areas of the infrastructure sites. This is, namely, at the RWI&PS site and the WTP in the vicinity of the Parteen Basin, the location of the BPT in the Midlands, a BPS east of Birr, and at the TPR in the vicinity of Peamount Reservoir and environs in South County Dublin. It also includes all areas along the proposed RWRMs, Pressure and Gravity Pipelines.

354. It is anticipated that the archaeology, cultural heritage and architectural heritage assessment will encompass a distance up to 250m from the Proposed Project Boundary. Any sites of particular significance that may exist outside of this area will also be included within the assessment where there is the potential for likely significant effects from the Proposed Project.

### 14.3 Scope of the Assessment

355. The scope of the Cultural Heritage assessment will include the potential construction impacts described in Section 14.1, as summarised in Table 14.1. Based on the nature of the operation of the Proposed Project, there is not expected to be any significant direct or indirect effects on archaeological, architectural and cultural heritage resources. Therefore, it is proposed that the whole of the operational phase is scoped out of the assessment.

**Table 14.1: Summary of Scope of Assessment – Cultural Heritage**

Project Phase	Potential Impacts Scoped In	Potential Impacts Scoped Out
Construction	<ul style="list-style-type: none"> <li>It is envisaged that there would be some direct or indirect negative impacts on archaeological, architectural and cultural heritage resources as a result of the construction of the Proposed Project</li> <li>Indirect negative impacts may occur where sites of archaeological, architectural and cultural heritage significance are located within the immediate vicinity of the Proposed Project, which are visually impacted upon during the construction of the Proposed Project</li> </ul>	<ul style="list-style-type: none"> <li>Potential impacts upon large river crossings (and their potential archaeological contents) have been scoped out as these would be crossed by means of directional drilling</li> <li>Potential impacts upon the underwater archaeological resource at the abstraction site have been scoped out as water would be abstracted from a man-made body (Parteen Basin)</li> </ul>
Commissioning	<ul style="list-style-type: none"> <li>No additional effects compared with construction and operational assessment</li> </ul>	
Operation	<ul style="list-style-type: none"> <li>None</li> </ul>	<ul style="list-style-type: none"> <li>There is not expected to be direct or indirect impacts on archaeological, architectural and cultural heritage resources as a result of the operational stage of the Proposed Project. Therefore, the operational phase is scoped out of the assessment</li> </ul>

### 14.4 Overview of Assessment Approach

356. It is proposed that the assessment of the archaeological, architectural and cultural heritage resource will be carried out in accordance with the EPA Guidelines (2022), established good practice and will be tailored accordingly based on professional judgement and local circumstance. The assessment will cover likely significant effects on archaeology, cultural heritage and architectural heritage and will describe the existing conditions and the likely significant effects associated with the construction and operation of the Proposed Project. The impact assessment process will involve the general assessment steps set out in Section 2.1.

357. The assessment will consist of an evaluation of the likely significant effects of the Proposed Project by considering a comprehensive study of the potential direct, indirect, residual and cumulative effects of the Proposed Project on the surrounding environment. This will include, where applicable, visual effects on cultural heritage assets.

358. The quality and type of an impact can vary to include the following:

- Negative impact: a change which reduces the quality of the environment. For example, a change that would detract from or permanently remove an archaeological/architectural monument/structure from the landscape.
- Neutral impact: no effects, or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.
- Positive impact: a change which improves the quality of the environment. For example, a change that improves or enhances the setting of an archaeological/architectural monument/structure.
- Direct impact: where an archaeological/architectural feature or site is physically located within the Proposed Project Boundary and entails the removal of part, or all of the monument or feature.
- Indirect impact: where a feature or site of archaeological/architectural heritage merit or its setting is in close proximity to the footprint of proposed works.

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359. While impact levels and definitions are applied consistently to the cultural heritage resource, direct impacts on sites that are subject to statutory protection are considered to be more significant than sites/structures not subject to statutory protection.

360. It is noted that the Historic and Archaeological Heritage Bill 2023 is currently before Dáil Éireann and may be enacted by the end of 2023. The EIAR will take into consideration the new Bill so that it reflects any changes in the law that relate to archaeological heritage.

### 14.5 Assessment Criteria

361. Tables 14.2 and 14.3 contain the criteria that will be used to assign the sensitivity of baseline receptors and the magnitude of impacts for the Cultural Heritage assessment. A determination on whether the effects of the Proposed Project are significant will be based on the EPA Guidelines (2022), as set out in Tables 2.1 and 2.2. Professional judgement will be used to determine the overall significance of the effect on each receptor.

**Table 14.2: Baseline Environment Sensitivity Criteria**

Baseline Rating	Criteria
<b>Very High</b>	<ul style="list-style-type: none"> <li>National Monuments</li> <li>Monuments subject to Preservation Orders</li> </ul>
<b>High</b>	<ul style="list-style-type: none"> <li>Record of Monuments and Places</li> <li>Record of Protected Structures</li> <li>Areas of Archaeological Potential identified through investigations and/or documentary or cartographic research. This includes potential specific archaeological sites, such as previously unrecorded enclosures</li> </ul>
<b>Medium</b>	<ul style="list-style-type: none"> <li>National Inventory of Architectural Heritage</li> <li>Areas of Archaeological Potential identified through investigations and/or documentary or cartographic research. This includes watercourse crossings or topographical features in the landscape that may have been attractive for settlement in the past</li> <li>Designed landscapes associated with country houses in good state of preservation</li> <li>Greenfield land and worked peat landscapes</li> <li>Extant townland boundaries</li> </ul>
<b>Low</b>	<ul style="list-style-type: none"> <li>Designed landscapes associated with country houses in poor state of preservation</li> </ul>
<b>Very Low</b>	<ul style="list-style-type: none"> <li>Modified landscapes where disturbance is known</li> <li>Townland boundary (with low potential of associated sub-surface stratigraphy)</li> </ul>
<b>Neutral</b>	<ul style="list-style-type: none"> <li>Townland boundary where there is little to no potential for associated sub-surface stratigraphy</li> </ul>

**Table 14.3: Impact Magnitude Assessment Criteria**

Impact Magnitude	Description
<b>Very High</b>	<ul style="list-style-type: none"> <li>These impacts arise where an archaeological, architectural or cultural heritage site, either below ground or upstanding, is completely and irreversibly destroyed</li> </ul>
<b>High</b>	<ul style="list-style-type: none"> <li>An impact which, by its magnitude, duration or intensity, alters an important aspect of the archaeological, architectural and cultural heritage environment, including the setting of upstanding monuments/structures. An impact like this would be where part of a site would be permanently impacted upon, leading to a loss of character, integrity and data about an archaeological, architectural or cultural heritage feature/site</li> <li>A beneficial or positive impact that permanently enhances or restores the character and/or setting of a feature of archaeological, architectural or cultural heritage significance in a clearly noticeable manner</li> </ul>
<b>Medium</b>	<ul style="list-style-type: none"> <li>A medium impact arises where a change to a site/monument/structure is proposed which though noticeable, is not such that the archaeological, architectural or cultural heritage integrity of the site is compromised. The change is likely to be consistent with existing and emerging trends. Impacts are probably reversible and may be of relatively short duration</li> <li>A beneficial or positive impact that results in partial or temporary enhancement of the character and/or setting of a feature of archaeological, architectural or cultural heritage significance in a clearly noticeable manner</li> </ul>

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Impact Magnitude	Description
<b>Low</b>	<ul style="list-style-type: none"><li>• An impact which causes changes in the character of the environment, such as a visual impact, which are not high or very high and do not directly impact or affect an archaeological, architectural or cultural heritage feature or monument</li><li>• A beneficial or positive impact that causes some minor or temporary enhancement of the character of an upstanding archaeological, architectural or cultural heritage structure or feature which, although positive, is unlikely to be readily noticeable</li></ul>
<b>Very Low</b>	<ul style="list-style-type: none"><li>• An impact on an archaeological, architectural or cultural heritage feature or monument capable of measurement but without noticeable consequences</li><li>• A beneficial or positive impact on an upstanding archaeological, architectural or cultural heritage structure or feature that is capable of measurement but without noticeable consequences</li></ul>
<b>Neutral</b>	<ul style="list-style-type: none"><li>• No predicted impact, either negative or positive, to an archaeological, architectural or cultural heritage site</li></ul>

## 15. Material Assets

### 15.1 Context

362. The EIAR will consider and evaluate impacts on material assets arising during the construction, operational and decommissioning phases of the Proposed Project. There has been substantial progress with the Material Assets assessment to date, which has been supported by desk studies and field surveys.

363. Material assets are resources of both natural and human origin that have intrinsic value, including built services and infrastructure. Major infrastructure includes items such as canals, railway lines and power lines being crossed by or interacting with the Proposed Project. Existing utility information has been collated from the utility services providers. In addition, as part of the design development, the diversions or changes required to existing utilities have been considered.

364. Material assets of human origin considered as part of this assessment include:

- Existing properties;
- Industrial land use;
- Electricity transmission infrastructure;
- Gas transmission infrastructure;
- Telecommunications and other communications infrastructure;
- Surface drainage and foul drainage network;
- Water supply infrastructure; and
- Transport infrastructure (road, railways and canals).

365. Land resource material assets considered as part of this assessment include:

- Forestry lands; and
- Peatlands.

366. Although care has been taken to align the pipeline route and select sites away from material assets of natural and human origin, there would be potential direct and indirect impacts arising from the Construction Phase and Operational Phase of the Proposed Project.

367. The potential impacts arising during construction include:

- Demolition of non-residential buildings specifically within the WTP and WTP access road area;
- Temporary closures and/or disruption where the Proposed Project crosses transport infrastructure;
- Diversion or disruption to electricity, gas, communications, drainage, water supply and transport infrastructure;
- Disruption to planned forestry management; and
- Disruption to management of peatlands.

368. During the Operational Phase, there could be permanent impacts related to the alteration of surface water drainage features and restrictions on lands used for forestry and peatlands related to the need for permanent wayleaves.

369. The Material Assets chapter of the EIAR will include an overview of the baseline, the likely significant effects of the Proposed Project and the mitigation measures proposed to avoid or minimise the predicted effects, including monitoring where relevant, and any residual significant effects.

370. The proposed scope and methodology of the Material Assets assessment are set out below.

## 15.2 Study Area

371. The Proposed Project Boundary encompasses all areas where works (infrastructure and utilities) would be required to construct the Proposed Project including permanent and temporary land take. The study area varies depending on the type of material asset being considered.

## 15.3 Scope of the Assessment

372. Table 15.1 summarises the proposed scope for the Material Assets assessment.

**Table 15.1: Summary of Scope of Assessment – Material Assets**

Project Phase	Potential Impacts Scoped In	Potential Impacts Scoped Out
Construction	<ul style="list-style-type: none"> <li>Impacts on material assets of human origin including existing properties, industrial use lands, electricity transmission infrastructure, gas transmission infrastructure, communications infrastructure, foul drainage, water supply infrastructure or transport infrastructure</li> <li>Impacts on land resource material assets including forestry and peatlands</li> </ul>	<ul style="list-style-type: none"> <li>Impacts on ecological habitats – these are addressed within the Biodiversity assessment</li> <li>Impacts on geological heritage features, quarries and gravel pits – these are addressed within the Soils, Geology and Hydrogeology assessment</li> <li>Agricultural lands – these are addressed within the Agriculture assessment</li> </ul>
Commissioning	<ul style="list-style-type: none"> <li>No additional effects beyond construction and operation</li> </ul>	
Operation	<ul style="list-style-type: none"> <li>Impacts on material assets of human origin including existing properties, industrial use lands, electricity transmission infrastructure, gas transmission infrastructure, communications infrastructure, foul drainage, water supply infrastructure or transport infrastructure</li> <li>Impacts on land resource material assets including forestry and peatlands</li> </ul>	<ul style="list-style-type: none"> <li>Impacts on ecological habitats – these are addressed within the Biodiversity assessment</li> <li>Impacts on geological heritage features, quarries and gravel pits – these are addressed within the Soils, Geology and Hydrogeology assessment</li> <li>Agricultural lands – these are addressed within the Agriculture assessment</li> </ul>

## 15.4 Overview of Assessment Approach

373. The likely significant effects of the Construction and Operational Phases of the Proposed Project on material assets will be assessed using the EPA Guidelines (2022). The following will be considered as part of the assessment of effects:

- The potential for impacts on major infrastructure and public utilities and the need to adequately protect them during the Construction Phase;
- The requirement for connections to public utilities by the Proposed Project during both the Construction and Operational Phases; and
- The use of imported materials required for the construction of the Proposed Project.

374. Likely significant effects will be categorised based on:

- The quality of the effect arising from the impact;
- The significance of the effect; and
- The duration of the effects.

## 15.5 Assessment Criteria

375. The assessment of effects on material assets will be undertaken in accordance with the EPA Guidelines (2022) as presented in Table 2.1 in Chapter 2. These will be used to determine whether the effects would be positive, negative, or neutral and whether they would be significant or not.



## 16. Resources and Waste Management

### 16.1 Context

376. The EIAR will consider and evaluate the use of materials and generation of waste during the construction, operational and decommissioning phases of the Proposed Project. There has been substantial progress with the Resources and Waste Management assessment to date, which has been supported by desk studies.

377. A baseline has been established via a desk-based assessment, which considered current materials availability and waste management capacity, where available. Baseline data have also been collected at national and regional level, including: availability of construction aggregates; construction, demolition and excavated waste arisings; as well as information on regional and national waste transfer and treatment and disposal facilities capacity. This data will continue to be updated for the EIAR.

378. Significant quantities of materials would be required to construct the Proposed Project. Such construction materials include aggregates, asphalt, concrete, steel, plant, fuel, oils, material finishes, glass and wood. The consumption of primary materials carries potential impacts through the use of finite resources. The use of recycled materials in place of primary materials will be considered during the Proposed Project design development in line with circular economy principles.

379. Potential waste impacts during the construction of the Proposed Project and the likely significant effects of which will be assessed and reported in the EIAR include:

- Production of large quantities of excavated material arisings (estimated at approximately 5 million cubic metres (m<sup>3</sup>). These would be primarily soil or stone and where practicable would be re-used within the Proposed Project design. Mechanisms such as the Waste Directive Article 27 'by-product', or Article 28 end-of-waste would be used to avoid material ultimately being defined as and managed as 'waste', but a proportion could potentially be unsuitable for re-use or surplus to demand;
- Excavation of possible contaminated soils and materials, which would require disposal off site at a suitably licensed facility;
- Generation of demolition wastes potentially resulting in non-hazardous or hazardous waste streams, although the Proposed Project does not currently include any major demolition and is located predominantly within greenfield land; and
- It is estimated that approximately 100,000m<sup>3</sup> of peat would be displaced by the Proposed Project, which would be classified as a waste product under the worst-case scenario if re-use options cannot be identified in consultation with Bord na Mona.

380. Waste generation from construction may cause a number of effects, for example where disposed of resources may be lost and it may cause depletion of waste management capacity, and indirect effects on other environmental topics such as air quality (dust, odours), traffic, noise, water, health, etc.

381. Once the Proposed Project is operational, the majority of waste arising as a result of the operation of the Proposed Project would be residuals from the treatment processes (solid and liquid residuals which would be managed as non-hazardous wastes), as well as small (not significant) quantities of mixed municipal and hazardous waste associated with the day-to-day operations and maintenance activities of the Proposed Project. The use and consumption of materials during operation is considered not to be significant and are therefore proposed to be scoped out of this assessment.

382. The Resource and Waste Management chapter of the EIAR will include an overview of the baseline, the likely significant effects of the Proposed Project and the mitigation measures proposed to avoid or minimise the predicted effects, including monitoring where relevant, and any residual significant effects.

383. The proposed scope and methodology of the Resource and Waste Management assessment are set out below.

## 16.2 Study Area

384. In accordance with the IEMA Guide to Materials and Waste in Environmental Impact Assessment (2020), two study areas are proposed to examine the use of materials and the generation and management of waste. These study areas are as follows:

- The first study area is encompassed by the Proposed Project Boundary and any areas required for temporary access, site compounds, working platforms and other enabling activities. This is the area where materials would be consumed, and waste would be generated.
- The second study area extends to the availability of construction materials and capacity of waste management licenced infrastructure and remaining landfill void likely to be suitable (permitted for waste volume and type) to accept arisings and/or waste generated by the Proposed Project. This will initially be assessed on a regional basis, but based on professional judgement may be expanded to national to capture potential impacts of recovering, recycling or disposal of the waste generated from the Proposed Project at landfills located throughout the country.

## 16.3 Scope of the Assessment

385. The scope of the Resource and Waste Management assessment will include the potential impacts described in Section 16.1, as per Table 16.1. The only matters proposed to be scoped out of the assessment is the quantity of materials used, and hazardous waste generated, during the operation of the Proposed Project.

**Table 16.1: Summary of Scope of Assessment – Resource and Waste Management**

Project Phase	Potential Impacts Scoped In	Potential Impacts Scoped Out
Construction	<ul style="list-style-type: none"> <li>• Waste management capacity (inert and non-hazardous waste)</li> <li>• Waste management capacity (hazardous waste)</li> <li>• Materials (resource) supply</li> </ul>	<ul style="list-style-type: none"> <li>• No potential impacts have been scoped out</li> </ul>
Commissioning	<ul style="list-style-type: none"> <li>• No additional effects beyond construction and operation</li> </ul>	
Operation	<ul style="list-style-type: none"> <li>• Waste management capacity (inert and non-hazardous waste)</li> </ul>	<ul style="list-style-type: none"> <li>• Materials (resource) supply (treatment materials routinely required during the Operational Phase)</li> <li>• Waste management capacity (hazardous waste)</li> </ul>

## 16.4 Overview of Assessment Approach

386. The methodology for the Resource and Waste Management assessment will be in accordance with the IEMA Guide to Materials and Waste in Environmental Impact Assessment (2020) and will include the general assessment steps set out in Section 2.1 of this report.

## 16.5 Assessment Criteria

387. The IEMA Guidance will be used to assess the likely significant effects of constructing the Proposed Project on the environment resulting from the consumption of materials and the generation of waste.

388. The IEMA Guidance sets out how to assess the significance of environmental effect based on the consideration of the sensitivity of the receptor in combination with the magnitude of the impact. It should be noted that the IEMA Guidance assesses landfill void capacity for inert and non-hazardous landfills collated together, and hazardous landfills.

### 16.5.1 Sensitivity of Receptors

389. The sensitivity of the receptor relates to the availability and type of materials to be consumed by the Proposed Project. The sensitivity of materials will be determined by identifying where one or more of the criteria from the thresholds detailed in Table 16.2 are met. Materials are considered to be a receptor as well as a source of effect.

Table 16.2: Sensitivity Criteria for Materials (IEMA 2020)

Value	Description
	On balance, the key materials required for construction of a development...
Very High	<ul style="list-style-type: none"> <li>Are known to be insufficient in terms of production, supply and/or stock; and/or</li> <li>Comprise no sustainable features and benefits compared to industry-standard materials.*</li> </ul>
High	<ul style="list-style-type: none"> <li>Are forecast (through trend analysis and other information) to suffer from known issues regarding supply and stock; and/or</li> <li>Comprise little or no sustainable features and benefits compared to industry-standard materials.*</li> </ul>
Medium	<ul style="list-style-type: none"> <li>Are forecast (through trend analysis and other information) to suffer from some potential issues regarding supply and stock; and/or</li> <li>Are available comprising some sustainable features and benefits compared to industry-standard materials.*</li> </ul>
Low	<ul style="list-style-type: none"> <li>Are forecast (through trend analysis and other information) to be generally free from known issues regarding supply and stock; and/or</li> <li>Are available comprising a high proportion of sustainable features and benefits compared to industry-standard materials.*</li> </ul>
Negligible	<ul style="list-style-type: none"> <li>Are forecast (through trend analysis and other information) to be free from known issues regarding supply and stock; and/or</li> <li>Are available comprising a very high proportion of sustainable features and benefits compared to industry-standard materials.*</li> </ul>

\*Subject to supporting evidence, sustainable features and benefits could include, for example, materials or products that: comprise reused, secondary or recycled content (including excavated and other arisings); support the drive to a circular economy; or in some other way reduce lifetime environmental impacts.

390. The sensitivity of waste relates to the availability of regional (and where appropriate national) landfill void capacity in the absence of the Proposed Project. Within the IEMA Guidance, landfill capacity is identified as unsustainable and increasingly scarce option for managing waste. The sensitivity of landfill void capacity will be assessed by applying the following two step process:

- The volume of waste for disposal that is predicted to be generated within the defined first study area is calculated by analysing the available data and by providing justified forecasts over the Construction Phase of the Proposed Project; and
- The volume of forecast waste for disposal within the defined study area is then compared to the remaining landfill void capacity to identify predicted losses in that capacity over the Construction Phase of the Proposed Project.

391. The sensitivity of landfill void capacity will be determined through the criteria thresholds detailed in Table 16.3.

Table 16.3: Sensitivity Criteria for Regional Inert, Non-Hazardous and Hazardous Landfill Void Capacity (IEMA 2020)

Value	Description	
	Inert and Non-Hazardous Landfill	Hazardous Landfill
	Across construction, the baseline/future baseline (i.e. without Proposed Project) of regional (or where justified, national) inert, non-hazardous and hazardous landfill void is expected to...	
Very High	Reduce very considerably (by >10%); end during construction or operation; is already known to be unavailable; or, would require new capacity or infrastructure to be put in place to meet forecast demand	Reduce very considerably (by >1%); end during construction or operation; is already known to be unavailable; or, would require new capacity or infrastructure to be put in place to meet forecast demand
High	Reduce considerably: by 6-10% as a result of wastes forecast	Reduce considerably: by 0.5-1% as a result of wastes forecast
Medium	Reduce noticeably: by 1-5% as a result of wastes forecast	Reduce noticeably: by 0.1-0.5% as a result of wastes forecast
Low	Reduce minimally: by <1% as a result of wastes forecast	Reduce minimally: by <0.1% as a result of wastes forecast
Negligible	Remain unchanged, or is expected to increase through a committed change in capacity	Remain unchanged or is expected to increase through a committed change in capacity

**16.5.2 Magnitude of Impacts**

392. The IEMA Guidance for assessing the magnitude of impact from materials comprises a percentage-based approach that determines the influence of materials consumption on the baseline market capacity (production, stocks or sales), in construction. The approach for assessing the magnitude of an impact for materials is detailed in Table 16.4.

**Table 16.4: Assessing Magnitude for Materials (IEMA 2020)**

Value	Description
	The assessment is made by determining whether through a development, the consumption of...
Major	One or more materials is >10% by volume of the regional* baseline availability
Moderate	One or more materials is between 6-10% by volume of the regional* baseline availability
Minor	One or more materials is between 1-5% by volume of the regional* baseline availability
Negligible	No individual material type is equal to or greater than 1% by volume of the regional* baseline availability
No change	No materials are required
* or where justified, national	

393. The magnitude of impact from waste will be assessed by determining the percentage of the remaining landfill void capacity that would be depleted by waste produced during the construction of the Proposed Project. This is the method that best suits the scale and nature of the Proposed Project. The magnitude criteria for assessing the inert, non-hazardous and hazardous landfill capacity void are detailed in Table 16.5.

**Table 16.5: Magnitude Criteria for Inert, Non-Hazardous and Hazardous Landfill Void Capacity (IEMA 2020)**

Value	Description	
	Inert and Non-Hazardous Landfill	Hazardous Landfill
Major	Waste generated by the development would reduce national landfill void capacity baseline* by >10%	Waste generated by the development would reduce national landfill void capacity baseline* by >1%
Moderate	Waste generated by the development would reduce national landfill void capacity baseline* by 6-10%	Waste generated by the development would reduce national landfill void capacity baseline* by <0.5-1%
Minor	Waste generated by the development would reduce national landfill void capacity baseline* by 1-5%	Waste generated by the development would reduce national landfill void capacity baseline* by <0.1-0.5%
Negligible	Waste generated by the development would reduce national landfill void capacity baseline* by <1%	Waste generated by the development would reduce national landfill void capacity baseline* by <0.1%
No change	Zero waste generation and disposal from the development	Zero waste generation and disposal from the development
* Forecast as the worst-case scenario, during a defined construction and/or Operational Phase		

**16.5.3 Significant Effects**

394. The significance of environmental effects is determined by considering the magnitude of impacts within the context of the sensitivity of receptors affected, as shown in Table 16.6. This is a similar approach to that outlined in the EPA Guidelines (2022), shown in Table 2.2, however there is a slight difference in terminology for the significance categories in Table 16.6 compared to the EPA Guidelines in order to match the IEMA Guidance.

395. For an environmental effect to be considered significant for both materials and waste, it must fall within the moderate, large or very large category. For an environmental effect to be considered not significant, it must fall within either the neutral or slight category.

Table 16.6: Determining Significance for Materials and Waste

Sensitivity (or Value) of Receptor	Magnitude of Impact				
	No change	Negligible	Minor	Moderate	Major
Very High	Neutral	Slight	Moderate or Large	Large or Very Large	Very Large
High	Neutral	Slight	Sight or Moderate	Moderate or Large	Large or Very Large
Medium	Neutral	Neutral or Slight	Slight	Moderate	Moderate or Large
Low	Neutral	Neutral or Slight	Neutral or Slight	Slight	Sight or Moderate
Negligible	Neutral	Neutral	Neutral or Slight	Neutral or Slight	Slight

## 17. Risk of Major Accidents and Disasters

### 17.1 Context

396. The EIAR will consider and evaluate the risk of major accidents and/or natural disasters (MAND) arising during the construction, operational and decommissioning phases of the Proposed Project. There has been substantial progress with the MAND assessment to date, which has been supported by desk studies.

397. In general, MANDs should be considered as part of an assessment where the development has the potential to cause the loss of life, permanent injury and/or temporary or permanent destruction of an environmental receptor which cannot be restored through minor clean-up and restoration (IEMA Major Accidents and Disasters in EIA: A Primer, 2020).

398. The following is a list of potential Construction Phase impacts relevant to the assessment of MANDs to be reported in the EIAR:

- Impacts of power failure and/or damage to power infrastructure;
- Impacts of accidental release to surface water;
- Impacts of ground instability;
- Impacts of invasive species and biosecurity risks; and
- Impacts if unknown contaminated land is encountered.

399. The following is a list of potential Operational Phase impacts relevant to the assessment of MANDs to be reported in the EIAR:

- Impacts of power failure and/or damage to power infrastructure;
- Impacts of pipe failure releasing water;
- Impacts of fire or storm damage to infrastructure;
- Impact of interruption to water supply services as a result of cyber-attack; and
- Impact of extreme weather conditions, including prolonged drought or prolonged flooding.

400. The Risk of Major Accidents and Disasters chapter of the EIAR will include an overview of the potential risks to and from the Proposed Project and the mitigation measures proposed to avoid or minimise the predicted effects, including monitoring where relevant, and any residual significant effects.

401. The proposed scope and methodology of the Risk of Major Accidents and Disasters assessment are set out below.

### 17.2 Study Area

402. The study area for the assessment of MANDs will be based on the potential risks identified that the Proposed Project may be vulnerable to and the spatial extent of the impact on the environment that may arise. This will use the 'Source-Pathway-Receptor' approach to identify whether a linkage exists and the extent of the impact which could result from a major accident and/or natural disaster. This is specific to the type of risk identified and location specific to where that risk could occur. Therefore, there is no pre-defined study area to be used for the MANDs assessment. However, the whole of the construction, commissioning and operation of the Proposed Project will be evaluated to consider the potential for MANDs.

### 17.3 Scope of the Assessment

403. The scope of the assessment of MANDs will include the potential impacts described above, as per Table 17.1. Additional MANDs may be scoped in or out of the assessment following a process of risk identification and screening (see Section 17.4).

**Table 17.1: Summary of Scope of Assessment – Major Accidents and Natural Disasters**

Project Phase	Potential Impacts Scoped In	Potential Impacts Scoped Out
Construction	<ul style="list-style-type: none"> <li>Impacts of power failure and/or damage to power infrastructure</li> <li>Impacts of accidental release to surface water</li> <li>Impacts of ground instability</li> <li>Impacts of invasive species and biosecurity risks</li> <li>Impacts if unknown contaminated land is encountered</li> </ul>	<ul style="list-style-type: none"> <li>MANDs where no 'source-pathway-receptor' linkage exists</li> <li>MANDs where risk events are not applicable to that particular geographic location (e.g. volcanic activity in Ireland)</li> <li>MANDs which have been assessed in other areas of the EIAR, for example flood risk</li> <li>MANDs addressed in the design risk assessment for the design and planning phase of the Proposed Project</li> <li>MANDs associated with Construction Phase and Operational Phase activities that fall within the scope of health and safety legislation and associated obligations</li> <li>MANDs that possess low likelihood/low consequence, as they do not meet the criteria to be brought forward for further consideration (i.e. they do not meet the definition of a major accident and/or disaster)</li> </ul>
Commissioning	<ul style="list-style-type: none"> <li>No additional effects beyond those specified for construction and operation</li> </ul>	
Operation	<ul style="list-style-type: none"> <li>Impacts of power failure and/or damage to power infrastructure</li> <li>Impacts of pipe failure releasing water</li> <li>Impacts of fire or storm damage to infrastructure</li> <li>Impact of interruption to water supply services as a result of cyber-attack</li> <li>Impact of extreme weather conditions, including prolonged drought or prolonged flooding</li> </ul>	

## 17.4 Overview of Assessment Approach

404. The EPA Guidelines (2022) state, in Section 3.7.3, that the purpose of the MANDs assessment is '*To address unforeseen or unplanned effects the Directive further requires that the EIAR takes account of the vulnerability of the project to risk of major accidents and/or disasters relevant to the project concerned and that the EIAR therefore explicitly addresses this issue. The extent to which the effects of major accidents and/or disasters are examined in the EIAR should be guided by an assessment of the likelihood of their occurrence (risk).*'

405. The methodology for the assessment is:

- Identify potential for MANDs (i.e. unplanned incidents) that the Proposed Project may be vulnerable to or which the Proposed Project could cause; and
- Assess the consequent effects and significance of such potential incidents in relation to the environmental, social and economic receptors that may be affected.

406. Such risks may be present at the Construction Phase and/or Operational Phase of the Proposed Project. The assessment is set out in three stages:

- Risk Identification and Screening - to identify potential unplanned risks that the Proposed Project may be vulnerable to, and to identify if the potential risks meet the criteria for further consideration. Where appropriate, risk events will be screened out according to the following criteria:
  - MANDs where no 'source-pathway-receptor' linkage exists to result in a major accident and/or disaster;
  - MANDs where risk events are not applicable to that particular geographic location (e.g. volcanic activity, earthquakes and risk of nuclear accidents in Ireland);
  - MANDs that have already been assessed in other areas of the EIAR, for example flood risk;
  - MANDs addressed in the design risk assessment for the design and planning phase of the Proposed Project;
  - MANDs associated with Construction Phase and Operational Phase activities that fall within the scope of health and safety legislation and associated obligations; and
  - MANDs that possess low likelihood/low consequence, as they do not meet the criteria to be brought forward for further consideration (i.e. they do not meet the definition of a major accident and/or disaster).

- Risk classification - Following the initial identification and screening process, remaining MAND events will be evaluated with regard to the likelihood of occurrence and the potential impact. The rating criteria adopted for the assessment follows that used in A Guide to Risk Assessment in Major Emergency Management (Department of Environment, Heritage and Local Government (DoEHLG) 2010); and
- Risk evaluation - In accordance with the DoEHLG's (2010) guidelines, the evaluated MANDs will be compared to a risk matrix to determine the level of significance of each risk for each scenario.

### 17.5 Assessment Criteria

407. Following the initial identification and screening process, any remaining potential MAND events will be evaluated with regard to the likelihood of occurrence and the potential impact. The rating criteria to be adopted for the assessment will follow that used in the DoEHLG's (2010) guidelines. The EPA Guidelines (2022) state that the risk assessment must be based on a 'worst case' approach. Therefore, the consequent rating assumes that all proposed mitigation measures and safety procedures have failed to prevent the MAND.

408. The classification and rating of likelihood and consequence, as taken from the DoEHLG's (2010) guidelines, are provided in Table 17.2 and Table 17.3.

**Table 17.2: Classification of Likelihood**

Rating	Classification	Impact Description
1	Extremely Unlikely	<ul style="list-style-type: none"> <li>• May occur only in exceptional circumstances; once every 500 or more years</li> </ul>
2	Very Unlikely	<ul style="list-style-type: none"> <li>• Is not expected to occur; no recorded incidents or anecdotal evidence; and/or very few incidents in associated organisations, facilities or communities; and/or little opportunity, reason or means to occur</li> <li>• May occur once every 100 to 500 years</li> </ul>
3	Unlikely	<ul style="list-style-type: none"> <li>• May occur at some time; and/or few, infrequent, random recorded incidents or little anecdotal evidence; some incidents in associated or comparable organisations worldwide; some opportunity, reason or means to occur</li> <li>• May occur once every 10 to 100 years</li> </ul>
4	Likely	<ul style="list-style-type: none"> <li>• Likely to or may occur; regular recorded incidents and/or strong anecdotal evidence</li> <li>• Would probably occur once every 1 to 10 years</li> </ul>
5	Very Likely	<ul style="list-style-type: none"> <li>• Very likely to occur; high level of recorded incidents and/or strong anecdotal evidence</li> <li>• Would probably occur more than once a year</li> </ul>

**Table 17.3: Classification of Consequence**

Rating	Classification	Impact	Description
1	Minor	Life, Health, Welfare, Environment, Infrastructure, Social	<ul style="list-style-type: none"> <li>• Small number of people affected; no fatalities and small number of minor injuries with first aid treatment</li> <li>• No contamination, localised effects</li> <li>• &lt;0.5M Euro</li> <li>• Minor localised disruption to community services or infrastructure (&lt;6 hours)</li> </ul>
2	Limited	Life, Health, Welfare, Environment, Infrastructure, Social	<ul style="list-style-type: none"> <li>• Single fatality; limited number of people affected; a few serious injuries with hospitalisation and medical treatment required. Localised displacement of a small number of people for 6-24 hours. Personal support satisfied through local arrangements</li> <li>• Simple contamination, localised effects of short duration</li> <li>• 0.5M-3M Euro</li> <li>• Normal community functioning with some inconvenience</li> </ul>
3	Serious	Life, Health, Welfare, Environment, Infrastructure, Social	<ul style="list-style-type: none"> <li>• Significant number of people in affected area impacted with multiple fatalities (&lt;5), multiple serious or extensive injuries (20), significant hospitalisation. Large number of people displaced for 6-24 hours or possibly beyond; up to 500 evacuated. External resources required for personal support</li> <li>• Simple contamination, widespread effects or extended duration</li> <li>• 3M-10M Euro</li> <li>• Community only partially functioning, some services available</li> </ul>



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Rating	Classification	Impact	Description
4	Very Serious	Life, Health, Welfare, Environment, Infrastructure, Social	<ul style="list-style-type: none"> <li>5 to 50 fatalities, up to 100 serious injuries, up to 2,000 evacuated</li> <li>Heavy contamination, localised effects or extended duration</li> <li>10M-25M Euro</li> <li>Community functioning poorly, minimal services available</li> </ul>
5	Catastrophic	Life, Health, Welfare, Environment, Infrastructure, Social	<ul style="list-style-type: none"> <li>Large numbers of people impacted with a significant number of fatalities (&gt;50), injuries in the hundreds, more than 2,000 evacuated</li> <li>Very heavy contamination, widespread effects of extended duration</li> <li>&gt;25M Euros</li> <li>Serious damage to infrastructure causing significant disruption to, or loss of, key services for prolonged period. Community unable to function without significant support</li> </ul>

409. In accordance with the DoEHLG's (2010) guidelines, the evaluated MANDs will be compared to a risk matrix to determine the level of significance of each risk for each scenario. These will be grouped according to three categories, described below, and presented visually in Table 17.4.

- High Risk – Scenarios that have an evaluation score of 15 to 25;
- Medium Risk – Scenarios that have an evaluation score of 8 to 12; and
- Low Risk – Scenarios that have an evaluation score 1 to 6.

**Table 17.4: Levels of Significance**

Likelihood	5 – Very Likely	Low	Medium	High	High	High
	4 – Likely	Low	Medium	Medium	High	High
	3 – Unlikely	Low	Low	Medium	Medium	High
	2 – Very Unlikely	Low	Low	Low	Medium	Medium
	1 – Extremely Unlikely	Low	Low	Low	Low	Low
		1 – Minor	2 – Limited	3 – Serious	4 – V. Serious	5 – Catastrophic
Consequence of Impact						

410. Significant effects resulting from MANDs are adverse impacts that are described as 'Significant', 'Very Significant' or 'Profound' under the EPA Guidelines (2022). Consequently, MANDs that fall within the 'Medium' or 'High' risk scenarios, prior to the implementation of mitigation measures, will be brought forward for further consideration and then assessed with mitigation measures being applied. This process will then be repeated until it is considered that the risk has been reduced to a level as low as reasonably practicable. The EIAR will report on the level of residual risk once the risk of all MANDs have been reduce to a level as low as reasonably practicable.

## 18. Summary

### 18.1 Proposed Scope of EIA

411. This EIA Scoping Methodology Report sets out the scope of work and the methods to be applied in the identification and assessment of environmental impacts. Therefore, this EIA Scoping Methodology Report is proposed as the basis for the EIAR of the Proposed Project moving forward. Table 19.1 provides a summary of the proposed scope as set out in this report, by environmental topic.

**Table 19.1: Summary of Scoping by Environmental Topic**

Topic	Construction Effects Scoped In?	Operational Effects Scoped In?	Any Matters Proposed to be Scoped Out?
Noise and Vibration	✓	✓	<ul style="list-style-type: none"> <li>Operational Phase effects from the operation of the below-ground pipeline and associated valves</li> <li>Operational Phase vibration effects</li> </ul>
Traffic and Transport	✓	✓	<ul style="list-style-type: none"> <li>Construction Phase and Operational Phase congestion effects and resulting journey time effects for public transport users and car vehicle occupants due to road closures and anticipated relatively low increases in flows along roads to be used as Haul Roads</li> <li>Construction Phase and Operational Phase severance and related effects for pedestrians due to anticipated relatively low increases in flows along roads to be used as Haul Roads</li> <li>Construction Phase and Operational Phase journey distance and time effects for pedestrians due to temporary road closures and/or public rights of way diversions</li> </ul>
Biodiversity	✓	✓	-
Water Environment	✓	✓	-
Soils, Geology and Hydrogeology	✓	✓	-
Agriculture	✓	✓	-
Air Quality	✓	✓	<ul style="list-style-type: none"> <li>Gaseous pollutant emissions from construction activities/plant and machinery during the Construction Phase</li> <li>All operational activities due to low potential for effects, except for operational traffic movements</li> </ul>
Climate	✓	✓	-
Population	✓	✓	-
Human Health	✓	✓	<ul style="list-style-type: none"> <li>Gaseous pollutant emissions from construction activities/plant and machinery (as scoped out of the Air Quality assessment)</li> <li>Air quality from all operational activities due to low potential for effects, except for operational traffic movements</li> <li>Operational Phase effects from the operation of the pipeline and associated valves</li> <li>Operational Phase vibration effects</li> </ul>
Landscape and Visual	✓	✓	<ul style="list-style-type: none"> <li>The majority of the pipeline route where the structure is buried below ground level</li> </ul>
Cultural Heritage	✓	×	<ul style="list-style-type: none"> <li>Construction Phase impacts upon large river crossings (and their potential archaeological contents) have been scoped out as these would be crossed by means of directional drilling</li> <li>Construction Phase impacts upon the underwater archaeological resource at the abstraction site have been scoped out as water would be abstracted from a man-made body (Parteen Basin)</li> <li>There is not expected to be direct or indirect impacts on archaeological, architectural and cultural heritage resources as a result of the operational stage of the Proposed Project. Therefore, the operational phase is scoped out of the assessment</li> </ul>
Material Assets	✓	✓	<ul style="list-style-type: none"> <li>Impacts on ecological habitats – these are addressed within the Biodiversity assessment</li> <li>Impacts on geological heritage features, quarries and gravel pits – these are addressed within the Soils, Geology and Hydrogeology assessment</li> <li>Agricultural lands – these are addressed within the Agriculture assessment</li> </ul>

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Topic	Construction Effects Scoped In?	Operational Effects Scoped In?	Any Matters Proposed to be Scoped Out?
Resource and Waste Management	✓	✓	<ul style="list-style-type: none"> <li>Treatment materials routinely required during the Operational Phase</li> <li>Operational Phase hazardous waste</li> </ul>
Risk of Major Accidents and Disasters	✓	✓	<ul style="list-style-type: none"> <li>MANDs where no 'source-pathway-receptor' linkage exists</li> <li>MANDs where risk events are not applicable to that particular geographic location (e.g. volcanic activity in Ireland)</li> <li>MANDs which have been assessed in other areas of the EIAR, for example flood risk</li> <li>MANDs addressed in the design risk assessment for the design and planning phase of the Proposed Project</li> <li>MANDs associated with Construction Phase and Operational Phase activities that fall within the scope of health and safety legislation and associated obligations</li> <li>MANDs that possess low likelihood/low consequence, as they do not meet the criteria to be brought forward for further consideration (i.e. they do not meet the definition of a major accident and/or disaster)</li> </ul>
Cumulative Effects	✓	✓	-

## 18.2 Content of the EIAR

412. The EIAR will be presented in six main volumes as outlined in Table 19.2.

**Table 19.2: Content of the EIAR**

EIAR Chapter	Description
<b>Volume 1: Non-Technical Summary</b>	
NTS	Summary of the EIAR in non-technical language
<b>Volume 2: EIAR Main Report</b>	
<i>Glossary of Terms</i>	
<i>List of Abbreviations</i>	
Chapter 1	Introduction
Chapter 2	The Environmental Impact Assessment Process
Chapter 3	Consideration of Reasonable Alternatives
Chapter 4	Proposed Project Description
Chapter 5	Construction and Commissioning
<b>Volume 3: Environmental Assessment</b>	
Chapter 6	Noise and Vibration
Chapter 7	Traffic and Transport
Chapter 8	Biodiversity
Chapter 9	Water Environment
Chapter 10	Soils, Geology and Hydrogeology
Chapter 11	Agriculture
Chapter 12	Air Quality
Chapter 13	Climate
Chapter 14	Population*
Chapter 15	Human Health
Chapter 16	Landscape and Visual
Chapter 17	Cultural Heritage
Chapter 18	Material Assets

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EIAR Chapter	Description
Chapter 19	Resource and Waste Management
Chapter 20	Risk of Major Accidents and Disasters
<b>Volume 4: Summary</b>	
Chapter 21	Cumulative Effects
Chapter 22	Summary of Mitigation and Monitoring Measures
Chapter 23	Summary of Significant Residual Effects
Chapter 24	References
<b>Volume 5: Figures</b>	
Figures	Graphics and plans supporting the EIAR chapters, illustrating the Proposed Project and environmental information
<b>Volume 6: Appendices</b>	
Appendices and Annexes	Technical reference information supporting the EIAR chapters, such as calculations and detailed background data
<p>Notes:</p> <p>* The EIA Directive requires that the EIAR should include an assessment of 'land' resources. Effects on land-use from the Proposed Project will be reported in Chapter 14: Population</p>	