ENVIRONMENTAL IMPACT ASSESSMENT REPORT

for

Kilshane Power Generation Station Project – Phase Two

at

Kilshane, Co. Dublin

Kilshane Energy Limited

October 2024

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1 INTRODUCTION

1.1 INTRODUCTION AND TERMS OF REFERENCE

1.1.1 GENERAL

Kilshane Energy Ltd, (hereafter referred to as Kilshane Energy) has prepared this Environmental Impact Assessment Report (EIAR) for a proposed development of new Gas Turbine Power Generation Station at Kilshane Road, Kilshane, Finglas, Dublin 11.

Kilshane Energy Ltd. provides Fast Start Peaking Plants to support Ireland's National transition to sustainable renewable energy sources in line with the targets set for 2030 and beyond.

The site is 14.5 ha in area, located at Kilshane, Dublin 11, just west of the N2 Primary Road as shown in Figure 1.1 and approximately 2 km north-west of the M50 Motorway.

The site is located directly adjacent to a permitted Gas Turbine Power Generation Station with an output of up to 293 MW (FW22A/0204 and ABP-317480-23) and a substation and grid connection (ABP-314894-22). The applicant in each case was Kilshane Energy Ltd and in both cases, the sites or part of the sites, lie immediately to the northeast of the subject development.

The proposed development provides for a 600MW peaking plant power generation station and all necessary components and infrastructure to facilitate the development and further contribute to the area. The overall development is considered to be in compliance with the site's HI – *Heavy Industry* land use zoning, an objective of which is to accommodate Utility Installations.

The proposed development is designed to be a Fast Start Peaking Power Plant, balancing fluctuating electricity demand in the grid by operating in times of high electricity demand or electricity supply shortages. The balancing power generated by the proposed development will be crucial for avoidance of power outages and for ensuring security of electricity supply when renewable power generation capacity is limited.

Chapter 4 of this EIAR *Project Description* and the Planning Report which also accompanies the planning application contain further details of the proposal.

Figure 1.1 Site location[1]

1.1.2 OBJECTIVES OF THIS EIAR

The core objectives of this EIAR are to predict any significant environmental impacts that are likely to occur due to the proposed development and, where applicable, propose measures to avoid, reduce or remedy them.

It reports on the findings of the EIA process to date and informs the Planning Authority, statutory consultees, other interested parties and the public in general about the likely effects of the project on the environment.

In doing this, the EIAR has been prepared in compliance with the EU Directive on EIA and the relevant domestic regulations. Chapter 2, *Screening & Scoping* provides details of the legislation that has been followed and the guidelines that have been taken into account. It also discusses the relationship between this EIAR and separate assessments prepared under other legislation.

1.2 FORMAT

This EIAR follows what is referred to as a grouped format structure. Using this structure, the EIAR examines each specialist environmental topic in a separate chapter. The chapters generally follow this format:

[1] Approximate site boundary is outlined in red

Table 1.1 Typical structure of specialist chapters

Section	Notes
Introduction/methodology	
The proposed development	including measures incorporated in the design to avoid, prevent or reduce environmental effects (design stage mitigation)
The receiving environment	the likely evolution of the environmental baseline in the absence of the proposed development
Predicted impacts	focussing on impacts that are likely and significant
Mitigation measures	measures proposed as a result of the EIA process to reduce, remedy or offset predicted impacts, where required
Residual impacts	where relevant

Interactions between issues that arise in separate chapters are assessed as they occur in each chapter. Cumulative effects are similarly assessed as appropriate in the relevant chapters. The final chapter, *Interactions & Cumulative Effects*, shows where these interactions and cumulative effects have been identified and how they have been addressed.

Separate reports prepared in accordance with other (non-EIA) requirements include:

- Appropriate Assessment (AA) Screening Report
- Planning Application Report

Some of these reports are also relevant in the consideration of the prescribed EIA topics and these are referred to in the EIAR as and where appropriate. For example, the Biodiversity chapter refers to the AA Screening report while avoiding duplication of its content.

1.3 IMPACT PREDICTIONS

Rating of potential environmental impacts in the specialist chapters generally follows the Glossary of Impacts contained in the EPA Guidelines[2] as shown in Table 1.3 below. This takes account of the quality, significance, duration and type of impact characteristic identified.

Table 1.2 Impact predictions[1]

Impact Characteristic	Term	Description
Quality	Positive	A change which improves the quality of the environment
	Neutral	A change which does not affect the quality of the environment
	Negative	A change which reduces the quality of the environment
Significance	Imperceptible	An impact capable of measurement but without noticeable consequences
	Slight	An impact which causes noticeable changes in the character of the environment without affecting its sensitivities
	Moderate	An impact that alters the character of the environment in a manner consistent with existing and emerging trends
	Significant	An impact, which by its character, magnitude, duration or intensity alters a sensitive aspect of the environment
	Profound	An impact which obliterates sensitive characteristics
Duration	Short-term	Impact lasting one to seven years
	Medium-term	Impact lasting seven to fifteen years
	Long-term	Impact lasting fifteen to sixty years
	Permanent	Impact lasting over sixty years
	Temporary	Impact lasting for one year or less
Type	Cumulative	The addition of many small impacts to create one larger, more significant impact
	'Do Nothing'	The environment as it would be in the future should no development of any kind be carried out
	Indeterminable	When the full consequences of a change in the environment cannot be described
	Irreversible	When the character, distinctiveness, diversity, or reproductive capacity of an environment is permanently lost
	Residual	Degree of environmental change that will occur after the proposed mitigation measures have taken effect
	Synergistic	Where the resultant impact is of greater significance than the sum of its constituents
	'Worst Case'	The impacts arising from a development in the case where the mitigation measures may substantially fail

[2] Guidelines on the information to be contained in Environmental Impact Statements, EPA, 2022 (Section 3.7.3 *Descriptions of Effects*). The 1992 Environmental Protection Agency Act (Section 72) provides for the preparation by the Environmental Protection Agency of guidelines on the information to be contained in an Environmental Impact Assessment Report. The Act further provides that those preparing and evaluating Environmental Impact Statements shall have regard to such guidelines.

1.4 DIFFICULTIES ENCOUNTERED

The EIA Regulations require that difficulties such as technical deficiencies, lack of information or knowledge encountered in compiling any specified information for the EIAR be described. In general, there were no significant difficulties encountered in the production of this EIAR. Any issues encountered during assessment of individual factors are noted within the specialist chapters.

1.5 LEVEL OF DETAIL IN PROJECT DESCRIPTION

Some of the information provided in Chapter 4 *Project Description* will be subject to slight changes for these reasons:

- All descriptions of proposed developments are approximations compared to the finished development. The nature of the construction process limits the amount of detail that is available at this planning consent stage to documentation that may be described as 'General Arrangement Illustrations'.

- The detail required for later more specific consents – such as an IED licence from the EPA – will be within the ranges and tolerances referred to herein or as otherwise agreed.

The project description details provided in Chapter 4 and in the specialist Chapters 5 to 16 are generally the outermost ('not to exceed') characteristics of the proposed development, that is maximum dimensions and emissions that could arise from the range of technologies and processes that could be employed. These are the characteristics that have potential to cause the biggest environmental effects. This facilitates an evaluation of 'worst case' environmental effects which is in keeping with the Guidelines and with best practice. Actual effects will not exceed the predicted effects.

1.6 A NOTE ON QUOTATIONS

By their nature, EIARs contain statements about the proposed development, some of which are positive, and some less than positive. Selective quotation or quotations out of context can give a misleading impression of the findings of the study. Therefore, the study team urge that quotations should, where reasonably possible, be taken from the conclusions of specialists' chapters or from the non-technical summary and not taken selectively or out of context.

2 SCREENING & SCOPING

2.1 LEGISLATION AND GUIDANCE

EIAs are carried out in response to the requirements of the European Directive on the assessment of the effects of certain public and private projects on the environment, particularly as codified in Directive 2011/92/EU and amended by Directive 2014/52/EU.

The enabling statutory instruments (S.I.s) which transpose the Directive into law in Ireland are the European Communities (Environmental Impact Assessment) Regulations, 1989, as updated by the Planning and Development Acts 2000 to 2006 (the EIA Regulations), with the key legislation being the Planning and Development Regulations 2001 (S.I. 600/2001), as amended. These regulations prescribe the classes of projects subject to Environmental Impact Assessment (EIA).

Amendments introduced by Directive 2014/52/EU were transposed into Irish planning law by the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (SI 296/18). These set out the statutory format and content for an EIAR.

This EIAR has been prepared in accordance with the above and has due regard to other relevant regulations and guidance including *Guidelines on information to be contained in Environmental Impact Statements*, EPA, 2022, *Advice Notes on Current Practice in preparation of Environmental Impact Statements*, EPA, 2003 and relevant European Commission guidance documents[2], as relevant.

2.2 SCREENING

The legislation[3] specifies classes of development and thresholds for determining which projects should be subject to EIA. Projects that fall into any of the specified classes or exceed the thresholds automatically require EIA. The legislation also sets out criteria for deciding whether 'sub-threshold' projects should be subject to EIA.

Part 1 of Schedule 5 to the Regulations include this project class:-

2. (a) A thermal power station or other combustion installation with a heat output of 300 megawatts or more.

The proposed development will involve the production of electricity through a gas turbine powered generation station with an output of 600 MW.

Heat output will mainly come from stack emissions. This heat output is not specifically quantified. However it is considered that it will be well above the 300 MW threshold given for class 2(a). On this basis it is considered that EIA is a mandatory requirement.

2.3 SCOPING

2.3.1 BASIS OF SCOPING FOR THIS EIAR

Scoping is the process of identifying potential concerns that need to be examined in an EIAR. The determination of potential concerns to be addressed in this case was based on:

- the requirements of the EIA Regulations;
- the requirements of the EIA Directive;

[3] ref. s2.1

- the Environmental Protection Agency's *Guidelines on the information to be contained in Environmental Impact Statements* (EPA, 2022) and *Advice Notes on Current Practice (in the preparation of EISs*) (EPA, 2003);
- experience of preparing and submitting previous EIARs.

2.3.2 RELATED PROJECTS

Planning permission was granted by An Bord Pleanála for a 293MW gas-powered electricity generation station in May 2024 (FW22A/0204 and ABP-317480-23). The board also granted permission for a substation and grid connection in August 2023 (ABP-314894-22). The applicant in each case was Kilshane Energy Ltd and in both cases, the sites or part of the sites, lie immediately to the northeast of this subject development. The environmental effects of these permitted developments form part of the scope of this EIAR.

2.3.3 RELATIONSHIP BETWEEN THE EIAR AND ASSESSMENTS UNDER OTHER EU DIRECTIVES AND LEGISLATION

This EIAR takes account of available results from other relevant assessments while avoiding duplication of those assessments, particularly the following:

2.3.3.1 The Industrial Emissions Directive (2010/75/EU)[4]

The development will be subject to an Industrial Emissions (IE) licence from the EPA. The licence will be applied for after the planning application stage and in time for the licensing process to be completed prior to commencement of the proposed process operations.

Chapters 11 to 14 of this EIAR (*Land, Soils, Geology & Hydrogeology*, *Water & Hydrology*, *Air Quality & Climate*, *Noise & Vibration* and *Waste Management*) refer to those aspects that will be covered in more detail in the IE licence application.

2.3.3.2 The Greenhouse Gas Emissions Directive (2003/87/EC)[4]

The development will be subject to a Greenhouse Gas Emission permit where appropriate. Chapter 9 of this EIAR considers the relevant aspects under the heading of Air Quality & Climate.

2.3.3.3 The Habitats and Birds Directives (92/43/EEC and 79/409/EEC)[4]

The proposal to affect the integrity of the Natura 2000 network, as required under these Directives, is referred to as Appropriate Assessment (AA). A Stage 1 AA (AA Screening) has been carried out to screen the proposal and has determined that a Natura Impact Statement (NIS) (a.k.a. a Stage 2 Appropriate Assessment (AA)) is not required.

The AA Screening report is included as a separately bound document within the planning application document set. It is referred to in the biodiversity chapter of this EIAR as relevant while avoiding duplication of its contents.

2.3.3.4 The Waste Framework Directive (2009/98/EC)[4]

Chapter 14, *Waste Management*, considers aspects which fall under this Directive, as appropriate.

2.3.3.5 The Floods and Water Framework Directives (2007/60/EC and 2000/60/EC)[4]

The policies and objectives of the Development Plan promote water conservation and SuDS in all developments to reduce the level of surface water run-off, improve water quality and contribute to adaptation to climate change through natural solutions.

[4] as amended

A Storm Water Management Plan will be implemented through the use of various SuDS techniques to treat and minimise surface water runoff from the site. The methodology involved in developing the Storm Water Management Plan for the subject site will be based on recommendations set out in the Greater Dublin Strategic Drainage Study (GDSDS) and in the SuDS Manual. Chapter 8, *Water & Hydrology*, has regard to requirements arising from these Directives as relevant.

3 ALTERNATIVES

3.1 INTRODUCTION

Before looking at the impacts of any development on the environment, the 2018 regulations[3] require an EIAR to include:

> *A description of the reasonable alternatives studied by the person or persons who prepared the EIAR, which are relevant to the proposed development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the proposed development on the environment.*

3.1.1 GUIDELINES

The EPA Guidelines[4] give considerable coverage to alternatives, partly because the consultation about The EPA Guidelines[5] give considerable coverage to alternatives, partly because the consultation about the effectiveness of EIA practice found that "the acceptability and credibility of EIA findings can be significantly affected by the extent to which this issue is addressed."

The Guidelines deal with the issue of alternatives under three key headings.

> *The consideration of alternative routes, sites, alignments, layouts, processes, designs or strategies, is the single most effective means of avoiding environmental impacts. The acceptability and credibility of EIA findings can be significantly affected by the extent to which this issue is addressed.*
>
> *However, it is important, from the outset, to acknowledge the existence of difficulties and limitations when considering alternatives. These include:*
> - *Hierarchy*
> - *Non Environmental Factors*
> - *Site Specific Issues*
>
> ***Hierarchy***
> *Many projects, especially in the area of public infrastructure, arise on account of plans, strategies and policies which have previously been decided upon. It is important to acknowledge that in some instances neither the applicant nor the competent authority can be realistically expected to examine options which have already been previously determined by a higher authority (such as a national plan or regional programme for infrastructure or a spatial plan).*
>
> ***Non-environmental Issues***
> *EIA is confined to the environmental effects which influence the consideration of alternatives. It is important to acknowledge that other non-environmental factors may have equal or overriding importance to the developer, e.g., project economics, land availability, engineering feasibility, planning considerations.*
>
> ***Site Specific Issues***
> *The consideration of alternatives also needs to be set within the parameters of the availability of land (it may be the only suitable land available to the developer) or the need for the project to accommodate demands or opportunities which are site specific. Such considerations should be on the basis of alternatives within a site e.g., design, layout.*

For the purposes of the Regulations, alternatives may be described at three levels:

1. *Alternative Locations*
2. *Alternative Designs*
3. *Alternative Processes*

3.2 THE DESIGN HYPOTHESIS

The applicant proposes to develop a 600MW peaking plant power generation station. It will comprise 2 no. open cycle gas turbines (OCGT), each with an output of up to 300MW, along with backup fuel storage, ancillary structures, and services.

3.3 ALTERNATIVE LOCATIONS

3.3.1 ALTERNATIVE SITES

An extensive desktop feasibility analysis was carried out on the preferred site location for the power station. The first criterion was identifying where in Ireland was the need greatest for new electricity generation. Within the Dublin constrained area was chosen as the preferred geographic location for the project due to the forecasted demand growth in the area identified by EirGrid, the System Operator in their annual reporting.

For a project of this scale, the main criteria were proximity to both the gas and electrical transmission connection points. This is important commercially and environmentally as it both reduces capital expenditure for the project and reduces the amount of disturbance to the local environment. Typically connecting to the gas network and electricity network involves burying cable and pipes underground between the power station and the connection point.

The site is also located directly adjacent to the approved Gas Turbine Power Generation Station with an output of up to 293 MW (FW22A/0204 and ABP-317480-23) and a substation and grid connection (ABP-314894-22).

Once locations within Dublin were identified close to connection points for both gas supply and electrical output, the next layer of criteria revolved around the surrounding area and zoning of the potential sites.

Environmental Considerations
Taking account of environmental considerations especially noise and visual impacts - there were very few places amenable to build such an installation.

This quickly ruled out other sites that were close to large residential areas or not appropriately zoned for a large scale power station installation.

Below shows a map of the Heavy Industry zoned lands (coloured blue) within Fingal County Council area that was identified as a good location for such an installation close to the required service connection points.

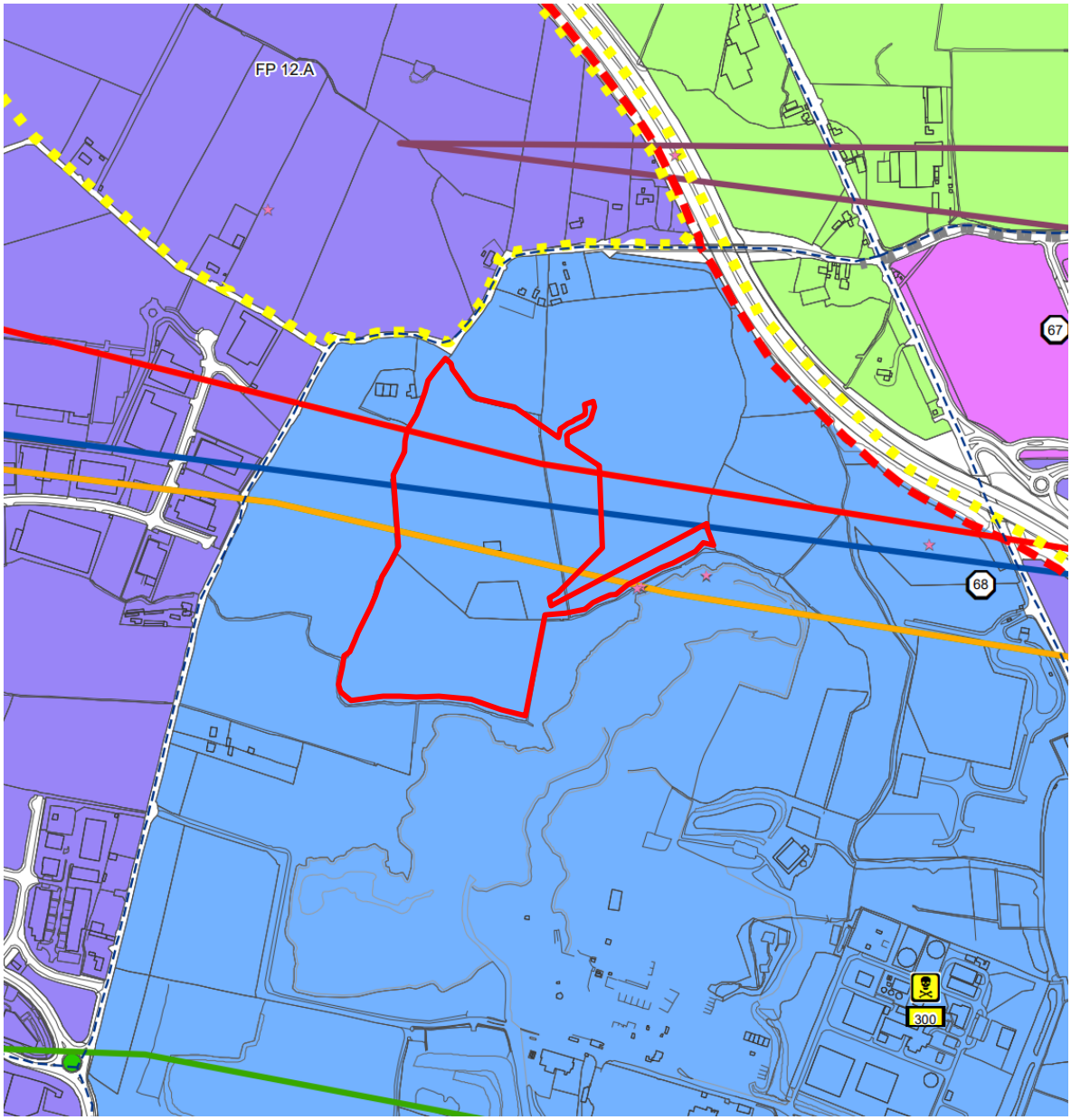

Figure 3.1 Heavy Industry zoned lands (coloured blue) mapping from Fingal County Development Plan showing selected site

3.4 SITE SELECTION PROCESS

Property consultants were engaged to enquire on the commercial availability of lands within this zoned area. One area was identified that was willing to engage in the timelines we required.

3.5 ALTERNATIVE SITE LAYOUTS

Within the selected site alternatives were prepared and considered, having regard to the following factors;

3.5.1 GENERAL CONSIDERATIONS

- DAA restrictions on stack height dictates location of stack.
- As stack location is fixed, the main power island (including all auxiliary equipment) flows from it. The other two main pieces of infrastructure are the substation and the AGI.

- Rationale for substation is that EirGrid like to have the GIS adjacent to the generator transformer compound
- Rationale for the AGI;
    - GNI advised capex for pipe from transmission line to AGI is more expensive than pipe from AGI to turbine
    - GNI advised that having a longer pipeline between AGI and turbine can be advantageous as it can act as a buffer in the event of short term disruption.

A number of alternative layouts were examined and gradually refined until an agreed final layout was selected.

At no stage was there a straightforward comparison between alternatives. Instead, a process of design refinement led to a gradual modification and improvement of layout until a final Layout emerged that satisfied as many criteria as fully as possible.

The alternative layouts attempted to reconcile a range of technical, economic and environmental considerations

Environmental Considerations
Environmental considerations when considering alternative layouts included, but were not limited to the following:

- To maximise the location of potentially noise-producing plant from nearby sensitive residential receptors by moving further to the south.

- To reduce amount of disturbance to the local environment, the site footprint was kept as compact as possible.

- To maximise the retention of mature screening vegetation at site boundaries

- To reduce exposure of nearby residential properties the layout were gradually altered to maximise space for screening mounds and associated vegetation

- To ensure sustainable and orderly development by employing a compact layout to maximise the potential future utilisation of zoned and serviced lands.

3.5.2 ALTERNATIVE PROCESS & TECHNOLOGIES

During the desktop feasibility stage, when determining the chosen technology, the applicant considered several other technologies including reciprocating engines and aero derivative OCGTs. The criteria used in this decision included;

- Environmental impact
- Grid Code compliance
- Emissions compliance
- Dual fuel capability
- Required site footprint
- €/MW installed cost

Regardless of the technology, any large-scale thermal generation project will have common infrastructure, such as substation and grid route for electrical connection, an Above Ground Installation (AGI) for gas connection and secondary fuel storage.

Environmental Considerations
The proposed OCGT was chosen as it is compliant with all necessary regulations, minimises the environmental impact and offered the best chance of success in the capacity market auctions.

4 PROJECT DESCRIPTION

4.1 INTRODUCTION

This Chapter provides a description of the nature and scale of the proposed development. It also provides a context for the proposed development in terms of its wider catchment area and its local environment.

4.2 GENERAL DESCRIPTION OF SITE AND SURROUNDINGS

The subject site is located at Kilshane, Dublin 11, west of the N2 Primary Road and is located approx. 2 km north-west of the M50, as shown in Figure 1.1 above. It is mostly greenfield, with a farmhouse and associated structures clustered in the northwest. It is 14.5 ha in area. The site is mostly in the northern part of lands owned by Kilshane Energy which cover a total area of 28.56 ha.

The site is bound to the north by the site of the permitted 293 MW Gas Turbine Power Generation Station (FW22A/0204 and ABP-317480-23), to the west and southwest by a light industrial site and agricultural lands, to the south and southeast by Huntstown Quarry, and mostly agricultural lands to the east with the N2 road to the north east.

4.3 DESCRIPTION OF THE PROPOSED DEVELOPMENT

4.3.1 GENERAL DESCRIPTION

The proposed development involves the construction of a peaking power generation station comprising two Open Cycle Gas-Fired Turbines (OCGT), each with a capacity of 300 MW (600 MW in total), along with backup fuel storage, supporting structures, and services.

The development is divided into two distinct areas, comprising an energy generation compound and an ancillary compound.

The Energy Generation Compound will house two open cycle gas turbine (OCGT) sets and associated flues, with a maximum height of 44 m. To the west of the turbine sets two Air Insulated Substations (AIS) compounds are proposed to house transformers and electrical equipment within fenced compounds (with a fence height of 3m, along with lightening protection masts 18m in height). Between the turbine sets it is proposed to provide a single storey PEECC (Power, Electrical, and Electronic Control Centre), with a gross floor area (GFA) of 72 m^2. and an overall height of c. 2.7 m. A CEMS (Continuous Emissions Modelling Shelter) is proposed to the southeast of the PEECC, with a GFA of 13 m^2. and an overall height of 2.7m. To the west of the turbine sets, 6 no. fan cooler systems are proposed, each with an overall height of 4m. The Energy Generation Compound will be bound to its northern and part of its eastern boundary by acoustic fencing c.12m in height.

The Ancillary Compound, located to the west of the Energy Generation Compound, will accommodate a backup fuel tank (with height of 16.2m), a demineralised water tank (with a height of 16.2m), a raw / fire water tank (with a height of 15.3m), a single storey fire pump house building (with a GFA of 34 m^2 and an overall height of 2.7m). 2 no. demineralised water treatment trailers (with an internal area of 82 m^2. and an overall height of c. 4m) will be accommodated to the southeast of the Ancillary Compound.

The development includes access arrangements (connecting with the permitted development permitted under FCC Reg. Ref.: FW22A/0204 and ABP Ref.: 317480-23 to the north), surface treatments, services, landscaping, attenuation areas, internal circulation roads, and all associated and ancillary works.

The site layout also denotes two areas which are not intended to form part of any SID application, namely a gas AGI compound and a high voltage substation compound. These elements will be subject to separate future consenting processes

Figure 4.1 Overall proposed site plan
(See drawing set for full resolution version)

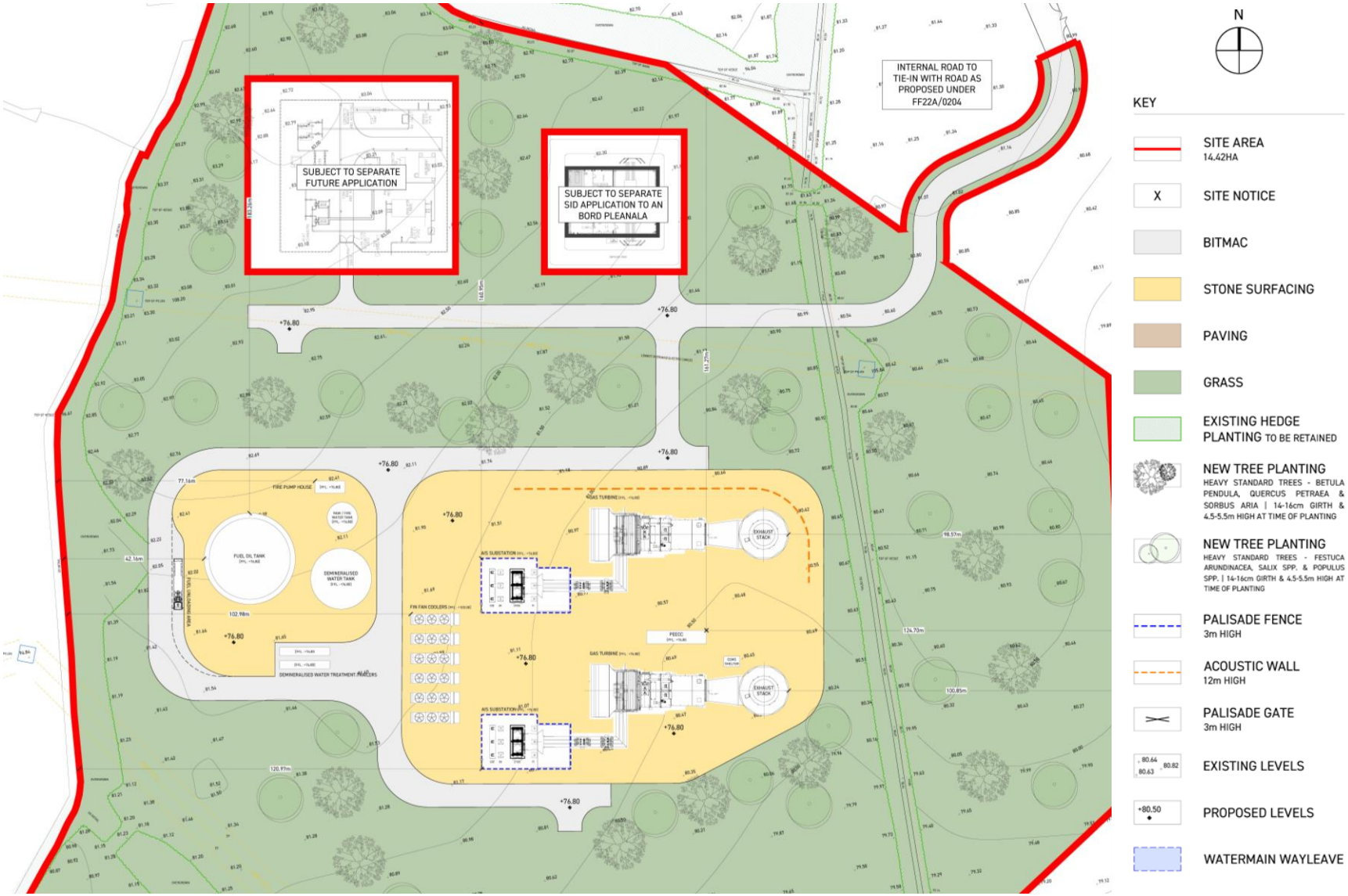

Figure 4.2 Proposed site plan
(See drawing set for full resolution version)

4.4 OVERALL PROCESS DESCRIPTION

The proposed power plant facility will be connected to the EirGrid transmission network and will export power when dispatched by EirGrid up to the specified Maximum Export Capacity (MEC) in the EirGrid Connection Agreement. When the power plant is exporting power, it will simultaneously power facility loads. When the power plant is offline, it will import power from the EirGrid transmission system for facility load.

The power plant consists of two single shaft outdoor gas turbines (General Electric 9FA.04 or equivalent) with six fin fan coolers. The turbine is designed for dual fuel operation, with natural gas as the primary fuel source and ultra-low sulphur diesel fuel oil as emergency backup. Fuel oil operation is limited to less than 500 hours per year.

The natural gas is to be supplied from a gas yard enclosed by the power plant site. No fuel gas compression is required. The gas yard filters, meters, heats, and pressure-regulates the gas to meet the turbine requirements. The gas yard will have a perimeter security fence and an access gate.

Fuel oil will be delivered via tanker trucks and manually pumped at an unloading station to a permanent onsite double wall storage tank. Fuel oil forwarding pumps will supply oil to the turbine, where air extracted from the gas turbine compressor will be used to atomize the fuel oil prior to combustion. When operating on fuel oil, demineralized water will be injected into the fuel nozzles to control NOx emissions. The demineralized water will be generated using onsite mobile mixed bed trailers, which do not produce wastewater during operation and are taken offsite for regeneration.

The gas turbine will draw air through the inlet filter house and into the compressor, where it will be pressurised and heated before combustion. Compressed air will be mixed with fuel and ignited in the combustion chambers. The hot pressurized gas will enter the turbine, where it will expand and produce mechanical energy by spinning the shaft. The exhaust gas will exit the turbine through ducting and a horizontal silencer before being discharged out of the vertical stack.

The mechanical energy will be converted in the generator to three-phase, 50Hz power at 21kV. The power will be transmitted in isophase bus duct to the generator circuit breaker. Taps off of the isophase bus duct after the generator circuit breaker will supply power to the gas turbine generator static start system and excitation system, and to the unit auxiliary transformer (UAT) to power facility loads. The UAT will lower the voltage and supply power to the facility switchgear and MCC's. The facility switchgear and MCC's will distribute power to the facility loads. These will be located in the outdoor power distribution centre enclosure and in the control/warehouse building electrical room. The isophase bus will transmit the remaining power to the generator step-up transformer (GSUT). The GSUT will increase voltage from 21kV to 220kV transmission line voltage. The high voltage system will include a disconnect switch, underground cables, and a gas insulated switchgear (GIS) building. The GIS building will have a perimeter security fence and an access gate. The transmission line will continue underground offsite into the EirGrid transmission system (Ref Chapter 12 for further details).

Like the AGI, the GIS building also is enclosed by the power station site and is subject to a separate consent process.

4.5 OPERATING HOURS

The plant is forecast to operate for between 22 and 95 hours in a year with an annual average of 46 hours. It is required to be available to follow dispatch instructions from EirGrid, the Transmission System Operator (TSO). The TSO will decide the actual operating hours of the unit depending on system needs at any point in time.

4.6 CONSTRUCTION

The proposed development is likely to be constructed in six phases over an anticipated 20-month timeline.

The proposed development is likely to be constructed in six phases, in broad terms, the following: -

Phase 1 (0-3 months) Site set up
- Construction of perimeter / security fencing and access gates around the site
- Construction of contractor's compound / staff parking area
- Construction of plant storage area
- Construction of wheel wash facilities
- Site clearance works including tree felling and building demolition
- Provision of temporary silt fences

Phase 2 (1-4 months) Site access construction & Mass Excavation
- Site (topsoil) stripping
- Bulk excavation / level reduction to formation level (road and structural formation)
- Stockpiling / removal off site of bulk excavated material as appropriate
- Kerbing, sub-base and base course construction of new roundabout at site access

Phase 3 (3-12 months) Road, services and building works
- Underground services construction - foul, surface water and water supply, including underground attenuation tank and foul pumping station
- Underground services construction – utilities
- Construction of sub-structure foundations
- Construction of ground floor slab / service yard slabs
- Commencement of above ground works

Phase 4 (12-18 months) Sub-station
- Installation of gas turbine
- Construction of exhaust air stack
- Construction of acoustic wall
- Construction of fuel / water tanks
- Testing and commissioning

Phase 5 (12 – 18 months) Site works
- Construction of site lighting, CCTV and security structures
- Hard landscaping works including car parking and bicycle parking areas
- Construction of site boundary

Phase 6 (18-20 months) Completion of road and landscaping works
- Completion of hard and soft landscaping works including site access road and permanent security fencing
- Decommissioning of Contractor's compound etc. and reinstatement of same.

It is currently envisaged that the construction of the project will commence in 2025 for completion in 2027.

The above high-level phasing and sequencing will be reviewed in greater detail during the preparation of the construction stage Construction Environmental Plan.

It is anticipated that the project headcount will peak at 200-250 persons on site including construction, supervision, construction management and commissioning personnel. The peak will be achieved at the midpoint of the project timeline.

4.7 DECOMMISSIONING

The design lifespan of the plant is approximately 25 years. At the end of its lifetime, given the industrial zoning of the area, the site is likely to be repurposed. All above ground equipment is likely to be decommissioned and removed from site. All decommissioning will be subject to EPA licence compliance. A Decommissioning Plan including a Decommissioning Environmental Management Plan will have to be agreed with the EPA prior to surrender of the sites IED licence. Demolition of the plant will also be subject to planning consent requirements including EIA and AA as applicable.

Because the demolition and decommissioning details will be developed and assessed prior to the end of the life of the facility, in compliance with all of the above requirements, including EIA requirements, they are outside the scope of the consent and EIA processes for the subject development.

4.8 EMISSIONS AND EPA LICENSING

Emissions from industrial facilities are regulated by the Environmental Protection Agency (EPA). The Industrial Emissions Directive[6] (IED) was transposed into Irish legislation through the EPA Act 1992[7], the EPA (Industrial Emissions) (Licensing) Regulations 2013[8] and its subsequent amendments[9] and the European Union (Industrial Emissions) Regulations 2013[10]. The proposed development will be subject to licensing under these Regulations.

Emissions data are provided within specialist chapters of this EIAR and their appendices where required for assessment purposes, particularly Chapter 10 *Noise & Vibration* and Chapter 9 *Air Quality and Climate*.

5 POPULATION & HUMAN HEALTH

5.1 INTRODUCTION

The Proposed Development is located in the Townland of The Ward, Co. Dublin. This chapter evaluates the impacts of the Proposed Development on demographic profile and human health.

In accordance with the Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, 2022), Draft Advice Notes for Preparing Environmental Impact Statements (EPA, 2015), and European Commission (EC), Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report (EU, 2017), this chapter has considered the *"existence, activities and health of people"* with respect to *"topics which are manifested in the environment such as employment and housing areas, amenities, extended infrastructure or resource utilisation and associated emissions".*

In accordance with the EPA EIAR Report Guidelines (2022), this chapter has considered that in an EIAR the assessment of impacts on population and human health should refer to the assessment of those factors under which human health effects might occur, as addressed elsewhere in the EIAR e.g. under environmental factors of air, water soil etc.

The Guidelines also note:

"The legislation does not generally require assessment of land-use planning, demographic issues, or details socio-economic analysis. Coverage of these can be provided in a separated Planning Application Report to accompany an application for planning permission"

The environmental aspects examined in this Chapter include the following:

- Chapter 7: Land, Soils, Geology & Hydrogeology,
- Chapter 8 Water & Hydrology,
- Chapter 9: Air Quality & Climate,
- Chapter 10: Noise & Vibration

Where these environmental aspects have been assessed Issues examined in this chapter include:

- Population and Demographics.
- Employment.
- Education
- Deprivation
- Health and Safety
- Social Infrastructure
- Air Quality & Climate.
- Noise & Vibration.
- Traffic.

Where these topics are dealt with in further detail elsewhere in this EIAR chapter, the relevant chapters have been cross referenced.

5.2 ASSESSMENT METHODOLOGY

At the time of writing there is no specific guidance from the EU Commission on the 2014 EIA Directive to indicate how the new term 'Human Health' should be addressed. Therefore, this chapter of the EIAR document has primarily been prepared with reference to national publications which provide guidance on the 2014 Directive including the Guidelines for Planning Authorities and An Bord Pleanála on. Carrying out Environmental Impact Assessment (2018) and the EPA Guidelines (2022 Guidelines)

on the information to be contained in environmental impact assessment reports, published by the EPA in May 2022.

The preparation of this chapter has also had regard to the guidance published by the European Commission in 2017 on the preparation of EIARs (taking account of the changes introduced under the 2014 directive). The European Commission guidance states the following in relation to the assessment of Human Health:

'*Human health is a very broad factor that would be highly Project dependent. The notion of human health should be considered in the context of the other factors in Article 3(1) of the EIA Directive and thus environmentally related health issues (such as health effects caused by the release of toxic substances to the environment, health risks arising from major hazards associated with the Project, effects caused by groups, exposure to traffic noise or air pollutants) are obvious aspects to study. In addition, these would concern the commissioning, operation and decommissioning of a Project in relation to workers on the Project and surrounding population.'*

In accordance with this approach to Human Health espoused in the Commission Guidance, this chapter addresses human health in the context of other factors addressed elsewhere in further detail within this EIAR where relevant. Relevant factors identified include inter alia water, air quality, noise and the risk of major accidents and disasters.

The insight provided by the IEMA high level primer document (2017) has also been considered in the preparation of this chapter. The IEMA document posits that human health spans environmental, social and economic aspects and does not merely represent an absence of disease. A broad conception of human health is put forward, that should encompass factors such as local economy and community, rather than relying on a narrower focus on biophysical health factors and determinants. In this regard, this chapter seeks to address population and human health in a wholistic manner, including consideration of economic factors, settlement patterns, landscape and visual impact, and land-use.

The 2018 EIA Guidelines published by the DHPLG state that there is a close interrelationship between the SEA Directive and the 2014 Directive. The Guidelines state that the term 'Human Health' is contained within both of these Directives, and that a common interpretation of this term should therefore be applied.

To establish the existing receiving/ baseline, several site visits were undertaken to appraise the location and likely and significant potential impact upon human receptors of this proposed development. A desk-based study of published reference documents such as Central Statistics Office Census Data, the ESRI Quarterly Economic Commentary, the Regional and Economic Strategy for the Eastern and Midlands Regional Assembly and the Fingal Development Plan 2017 – 2023 was also carried out in preparing this EIAR and completed in December 2022.

It should be noted that there are numerous inter-related environmental topics described throughout this EIAR document which are also of relevance to Population and Human Health. Issues such as the potential likely and significant impacts of the proposed development on townscape and visual impact, daylight and sunlight, archaeology, and cultural heritage, air quality and climate, noise and vibration, water, land and soils, microclimate, material assets including traffic and transport impacts, are of intrinsic direct and indirect consequences to human health. For detailed reference to particular environmental topics please refer to the corresponding chapter of the EIAR and other accompanying application reports.

The 2022 Guidelines on the information to be contained in environmental impact assessment reports, published by the EPA states that '*in an EIAR, the assessment of impacts on Population & Human Health should refer to the assessments of those factors under which human health effects might occur, as addressed elsewhere in the EIAR e.g. under the environmental factors of air, water, soil, etc.'*

This chapter of the EIAR document focuses primarily on the potential likely and significantly impact on Population, which includes Human Beings and Human Health in relation to health effects/issues

and environmental hazards arising from the other environmental factors. Where there are identified associated and inter-related potential likely and significant impacts which are more comprehensively addressed elsewhere in this EIAR document for a more detailed assessment.

5.2.1 ASSESSMENT OF SIGNIFICANCE & SENSITIVITY

The assessment of significance is a professional appraisal based on the sensitivity/significance of the existing environment of the receptor and the Description of effect which may depend upon the Character, Magnitude, Duration, Probability or Consequence. Within any area, the sensitivity of individuals in a population will vary. As such, it would be neither representative of the population, nor a fair representation of the range of sensitivities in a population, were an overall sensitivity classification assigned to the population in question. As such, the precautionary principle has been adopted for this assessment, which assumes that the population within the study area is of a uniformly high sensitivity.

5.2.2 DETERMINING SIGNIFICANCE

Figure 5.1 demonstrates how the significance of an impact may be determined by comparing the magnitude of an effect to the sensitivity of the receiving environment.

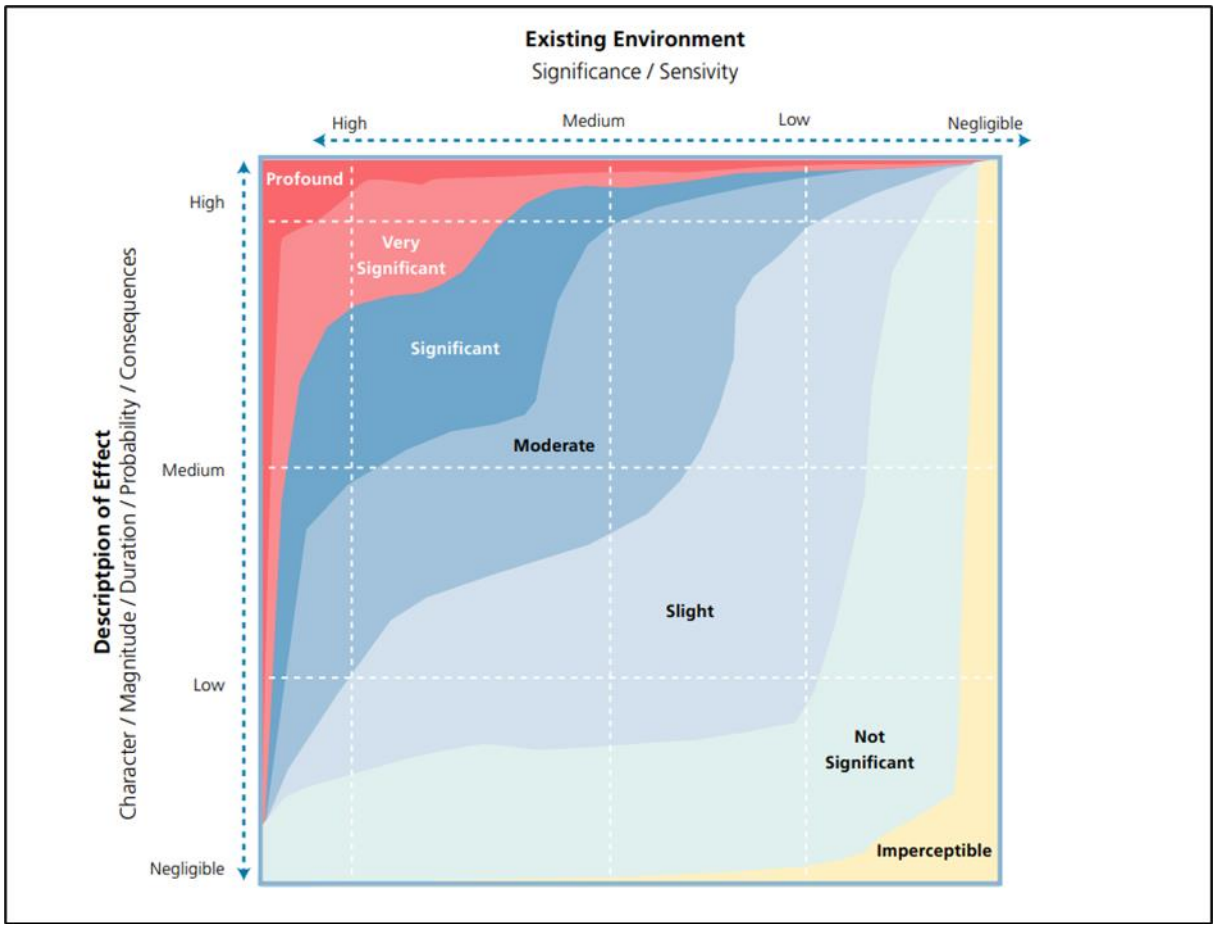

Figure 5.1 Significance Determining Scale (EPA EIAR Guidelines 2022).

There are seven generalised degrees of effect significance that are commonly used in EIA: **Imperceptible, Not Significant, Slight, Moderate, Significant, Very Significant and Profound.**

5.3 RECEIVING ENVIRONMENT

The subject site is located on lands at Kilshane Road, Kilshane, Finglas, Dublin 11. The area of the subject site within the designated red line boundary extends to c. 14.5 Ha. The overall landholding within the designated blue line boundary extends to c. 28.56 Ha. The subject site is located north-west of the M50 and on the western side of the N2 and the R135. The subject site is currently accessed via Kilshane Road which forms part of the north and northwest boundary of the site.

The site is located directly adjacent to a permitted Gas Turbine Power Generation Station with an output of up to 293 MW (FW22A/0204 and ABP-317480-23) and a substation and grid connection (ABP-314894-22). The applicant in each case was Kilshane Energy Ltd and in both cases, the sites or part of the sites, lie immediately to the northeast of this subject development.The surrounding area is characterised by agricultural fields and Industrial uses such as logistics, power stations, and additional business park operations. Roadstone Huntstown Quarry and Huntstown Power Station are located on lands to the immediate south and the subject site and the site is located to the east and north of Ballycoolin and Rosemount Industrial Estates.

The subject site consists mostly of green fields which are bounded by established hedgerows and trees, most of which are to be preserved and augmented with additional planting as part of this planning application. A small portion of the subject lands currently accommodate 1 no. dwelling with associated farming outbuildings in the north-west corner of the site which are to be demolished to facilitate the development. These lands are accessed via Kilshane Road through a residential entrance.

5.3.1 STUDY AREA

The 'Study Area' selected for the assessment of the impact on the demographic profile and human health as a result of the Proposed Development was defined as the Electoral Divisions (ED) of The Ward (ED 4041), Dubber (ED 4020), Finglas North A (ED 2051), Finglas North B (ED 2052), Finglas North C (ED 2053), Ballymun A (ED 2015) and Blanchardstown-Abbotstown (ED 4008.

5.4 THE EXISTING ENVIRONMENT

5.4.1 POPULATION & DEMOGRAPHICS

The most recent Census of population was carried out by the CSO on the 3rd of April, 2022. At the time writing, Census 2022 Preliminary Results, published in June 2022 were available. The previous Census was completed on the 24th of April, 2016 and before that on 10th of April, 2011. The census compiles data for the whole state as well as smaller individual areas including counties, cities, towns, and electoral divisions. Taking into consideration the location of the proposed development, the census information on population, age profile, employment, and social class, has been analysed in relation to the development site.

Table 5.1 denotes the population change for the State, Fingal and Electoral Districts for the census years 2011 and 2016 and from 2016-2022. The 2011 and 2016 census data showed that the population surrounding the development site grew by 16.5% between the years 2011 and 2016 compared with only 3.8% nationally and 8% in the County Fingal area. The average rate of population growth across the study area was 14.4 %.
The 2022 preliminary census data results show a more significant increase in population nationally of 7.6% since 2016. This is also the highest population recorded in a census since 1841. This was also consistent with the population growth experienced in the County Fingal area between 2016 – 2022 at 8 %. The 2016 – 2022 census data showed that the population surrounding the development site grew by 37.9% between these years. The average rate of population growth across the study area was 11.8%

Table 5.1 Population change at national, primary, and secondary hinterland level.

Area	2011	2016	% Change 2011-2016.	2022	% Change 2016-2022.
State	4,588,252	4,761,865	**+3.8 %**	5,123,536	**+ 7.6 %**
Fingal	273,991	296,020	**+ 8%**	329,218	**+8 %**
The Ward	8,241	9,602	**16.5 %**	13,242	**+ 37.9 %**
Dubber	6,359	7,372	**15.9 %**	8,812	**+ 19.5 %**
Finglas North A	3,227	3,319	**2.9 %**	3,124	**-5.9 %**
Fingal North B	2,809	2,874	**2.3 %**	2,893	**+ 0.7 %**
Finglas North C	3,247	3,464	**6.7 %**	3,670	**+ 5.9 %**
Ballymun A	3,678	4,765	**29.6 %**	5,649	**+ 18.6 %**
Blanchardstown-Abbotstown	4,870	6,195	**27.2 %**	6,573	**+ 6.1 %**

5.4.2 AGE PROFILES

The age profile of the population in the area is an important parameter as it provides a good insight into the potential labour force, the demand for schools, amenities, other facilities, and the future housing demand. The 2022 Census preliminary results do not yet provide a breakdown of age profile and as such the age profile of population surrounding the development was assessed using 2016 census data.
Table 5.2 shows the age profiles Nationally for 2016.

Table 5.2 Age profile at National and County level 2016[5]

Area	0-12	13-18	19-24	25-44	45-64	65+	Total Persons
State	18 %	8 %	7%	30%	24%	13%	4,761,865
The Ward	30 %	7%	5%	43 %	13%	2%	9,602
Dubber	25 %	6%	6%	48%	13%	3%	7,372
Finglas North A	17 %	9%	10%	27%	25%	12%	3,319
Fingal North B	16 %	9%	9%	24%	28%	15%	2,874
Finglas North C	17 %	6%	7%	30%	26%	15%	3,464
Ballymun A	21 %	8%	7%	42%	16%	6%	4,765
Blanchardstown-Abbotstown	22 %	6%	5%	45%	14%	9%	6,195

The age profile of the population in the area is an important parameter as it provides a good insight into the potential labour force, the demand for schools, amenities, other facilities, and the future housing demand. The 2022 Census preliminary results do not yet provide a breakdown of age profile and as such the age profile of population surrounding the development was assessed using 2016 census data. Table 5.2 shows the age profiles Nationally for 2016.

5.4.3 EMPLOYMENT

The 2022 Census preliminary results do not yet provide information on employment and as such relevant the area has been assessed using 2016 Census data. Table 5.3 presents the employment statistics in 2016 compared with 2011. The data shows that unemployment decreased significantly in the County, as well as nationally, reflecting the economic recovery in recent years.

[5] Source: www.cso.ie)

Table 5.3 Employment statistics Nationally and at County level in 2011 and 2016[6]

	At Work	Seeking First Regular Job	Unemployed Lost/given up previous job	Total Labour Force	% Unemployment
2011 LABOUR FORCE					
State	1,807,360	34,166	390,677	2,232,203	19.03
Fingal County	184944	2224	20416	207584	9.8
The Ward	3,781	76	675	4,532	16.57
Dubber	3,207	40	581	3,828	16.22
Finglas North A	942	39	483	1,464	35.66
Fingal North B	839	30	343	1,212	30.78
Finglas North C	1,318	24	382	1,624	18.84
Ballymun A	1,493	47	489	2,029	17.71
Blanchardstown-Abbotstown	2,225	62	417	2,704	17.71
2016 LABOUR FORCE					
State	2,006,641	31,434	365,962	2,304,037	12.91
Fingal County	207992	1850	13565	223407	6.07
The Ward	4,418	70	508	4,996	11.57
Dubber	1,168	36	484	4,279	12.25
Finglas North A	1,168	36	439	1,643	28.91
Fingal North B	1,024	34	271	1,329	22.95
Finglas North C	1,539	18	205	1,762	12.66
Ballymun A	2,059	53	449	2,561	19.60
Blanchardstown-Abbotstown	2,956	51	381	3,388	12.75

Statistic	Age Group	County and City	Socio Economic Group	Labour Force	Census Year	VALUE
Population Aged 15 Years and Over 2011 to 2016	All ages	Fingal	All socio-economic groups	Persons at work	2016	133971
Population Aged 15 Years and Over 2011 to 2016	All ages	Fingal	A. Employers and managers	Persons at work	2016	25170
Population Aged 15 Years and Over 2011 to 2016	All ages	Fingal	B. Higher professional	Persons at work	2016	11336
Population Aged 15 Years and Over 2011 to 2016	All ages	Fingal	C. Lower professional	Persons at work	2016	21430
Population Aged 15 Years and	All ages	Fingal	D. Non-manual	Persons at work	2016	35962

[6] Source: www.cso.ie)

Statistic	Age Group	County and City	Socio Economic Group	Labour Force	Census Year	VALUE
Over 2011 to 2016						
Population Aged 15 Years and Over 2011 to 2016	All ages	Fingal	E. Manual skilled	Persons at work	2016	9293
Population Aged 15 Years and Over 2011 to 2016	All ages	Fingal	F. Semi-skilled	Persons at work	2016	10194
Population Aged 15 Years and Over 2011 to 2016	All ages	Fingal	G. Unskilled	Persons at work	2016	3949
Population Aged 15 Years and Over 2011 to 2016	All ages	Fingal	H. Own account workers	Persons at work	2016	6278
Population Aged 15 Years and Over 2011 to 2016	All ages	Fingal	I. Farmers	Persons at work	2016	680
Population Aged 15 Years and Over 2011 to 2016	All ages	Fingal	J. Agricultural workers	Persons at work	2016	516
Population Aged 15 Years and Over 2011 to 2016	All ages	Fingal	Z. All others gainfully occupied and unknown	Persons at work	2016	9163

The 2016 census data shows that the majority of people in employment in the Fingal County Council (FCC) area are in *'Non-Manual'* employment (27%) with the least represented social class being *'Agricultural Workers'* at (0.38%). At a local level, the dominant social class in the Ward Electoral Division is 'Employers and Managers' labour (28%) with *'Agricultural Workers'* being the lowest representative (0.5%).

5.4.4 LABOUR FORCE SURVEY

The Labour Force Survey (LFS) is a large-scale, nationwide survey of households in Ireland carried out every three months. It generates labour force estimates which include the official measure of employment and unemployment for the state. The results Nationally for Q2 2022 showed that there were 2,554,600 no. people employed (figure estimate adjusted for Covid-19) in the State with the monthly figures showing 233,100 no. people registered as unemployed. This represents a c. 5.2% increase in employment between Q1 2022 and Q2 2022 (figure estimate also adjusted for Covid-19).

5.4.5 EMPLOYMENT

The 2022 Census preliminary results do not yet provide information regarding education and as such the area was assessed using 2016 census data. Census data presenting the highest level of education completed by people living in the Study Area community and Fingal County is presented in Table 5.4. The data show that there are higher levels of educational attainment in the Study Area than in Fingal County.

Table 5.4 Highest level of education completed locally and at County level in 2016 for key educational levels.
(Source: www.cso.ie)

area	no formal education	primary education	secondary[7]	higher education[8]	undergraduate degree[9]	postgraduate degree[10]	total persons
highest level of education in 2011							
Fingal	1,697	13,548	59,450	34,426	34,625	17,504	161,250
the ward	28	174	1,315	1,050	1,018	440	4,025
dubber	25	233	1,197	988	770	341	3,564
finglas north a	64	609	893	229	68	22	1,885
finglas north b	49	536	775	205	89	24	1,678
finglas north c	33	467	880	437	252	97	2,166
ballymun a	47	388	889	344	321	100	2,089
blanchardstown -abbotstown	63	239	728	501	780	367	2,678
highest level of education in 2016							
Fingal	1,996	11,961	56,037	36,890	39,094	22,024	168,002
the ward	42	157	1,243	1,043	1,050	483	4,018
dubber	28	201	1,097	958	771	324	3,379
finglas north a	69	549	901	330	102	38	1,989
finglas north b	58	422	799	299	112	33	1,723
finglas north c	40	381	867	480	340	414	2,249
ballymun a	60	338	910	466	349	161	2,284
blanchardstown -abbotstown	79	282	774	581	899	558	3,173

Note: the table presents key milestone education levels and excludes lower secondary, technical, or vocational qualification, advanced certificate/completed apprenticeship, higher certificate, ordinary bachelor's degree / national diploma, Ph.D./higher or where information was not stated.

5.4.6 DEPRIVATION

Deprivation in small areas is mapped using the Pobal HP Deprivation Index. This Index draws on data from censuses and combines three dimensions of relative affluence and deprivation: Demographic Profile, Social Class Composition and Labour Market Situation. The 2022 Census preliminary results do not yet provide information regarding deprivation and as such the area was assessed using 2016 census data. Figure 5.2 below shows graphical representation of how the concepts of Demographic Growth, Social Class Composition and Labour Market Situation are measured by ten key socio-economic indicators from the Census of Population.
In this EIAR, the Relative Index Score is considered as the measure for deprivation, as these Relative Index Scores are rescaled such that the mean is 0 and standard deviation is 10 at each census wave. This allows for the provision of descriptive labels with the scores, which are grouped by standard deviation as seen in Table 5.5 below.

[7] Lower secondary and Upper secondary
[8] Higher Certificate, Advanced certificate/completed apprenticeship, or Technical/vocational training
[9] Ordinary Bachelor Degree, Honours bachelor degree/professional qualification
[10] Postgraduate degree or PhD

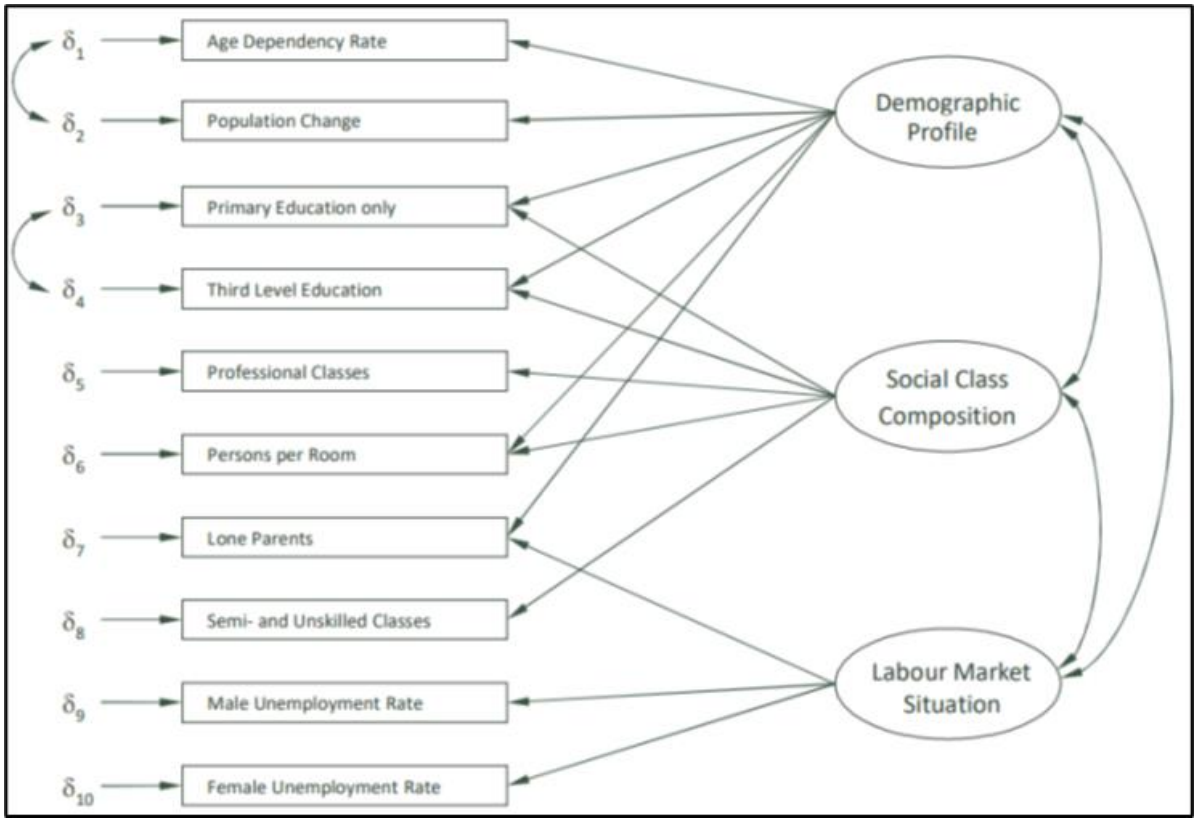

Figure 5.2 Growth, Social Class Composition, and Labour Market Situation are measured by ten key socio-economic indicators from the Census of Population.

Table 5.5 Pobal HP Index Relevant Index Score labels[11]

Relative Index Score	Standard Deviation	Label
> 30	> 3	Extremely affluent
20 – 30	2 – 3	Very affluent
10 – 20	1 – 2	Affluent
0 – 10	0 – 1	Marginally above average
0 – -10	0 – -1	Marginally below average
-10 – -20	-1 – -2	Disadvantaged
-20 – -30	-2 – -3	Very disadvantaged
< -30	< -3	Extremely disadvantaged

The data in Table 5.6 shows the Pobal HP Index Relevant Index Score Figures for Co. Dublin and the Electoral Divisions across the study area (Source: Pobal HP Deprivation Index).
The area surrounding the development site (The Ward) is classified as *"Marginally Above Average"* which is consistent with Co. Dublin and the adjoining *"Dubber"* Electoral Division. However, remaining areas across the study area are mostly classified as either *"Disadvantaged"* or *"Marginally Below Average",* including Finglas North A, Finglas North B, Finglas North C, Ballymun A and Blanchardstown-Abbottstown.

Table 5.6 Pobal HP Index Relevant Index Score -+s at a Local and County level[12]

[11] Source: Pobal HP Deprivation Index
[12] Source: Pobal HP Deprivation Index)

Area	Relative Index Score	Pobal HP Description 2016
County Dublin (including Fingal)	4.12	Marginally above average
The Ward	7.81	Marginally above average
Dubber	5.11	Marginally above average
Finglas North A	-16.64	Disadvantaged
Finglas North B	-14.40	Disadvantaged
Finglas North C	-2.48	Marginally Below Average
Ballymun A	-2.49	Marginally Below Average
Blanchardstown-Abbotstown	7.25	Marginally Below Average

5.4.7 HEALTH

The *'Irish Health Survey 2019'* was carried out by the Health Service Executive (HSE) as part of an EU wide health survey. A summary of the main findings included: -

- *Affluent people are more likely to feel their health status is Very good or good than people who are disadvantaged - 92% of Very affluent persons compared to 78% of persons who are Very disadvantaged.*
- *Over a quarter of persons aged 15 years and over report having a long lasting condition, with older persons reporting higher levels.*
- *Majority of persons (82%) report no limitations in everyday activities due to a health problem.*
- *Over a fifth (21%) of Unemployed persons report some form of mental ill-health compared to 9% of those In employment.*
- *Prevalence of hospital in-patient admissions rises with age and disadvantage level.*
- *In general, females and older people more likely to use a preventive health service.*
- *Physical activity declines with age and relative disadvantage level.*
- *Younger persons more likely to drink 6 or more units of alcohol in one sitting.*
- *Over half of persons aged 15 years and over in the State are overweight or obese.* [13]

5.4.8 MAJOR ACCIDENTS & HAZARDS

The Seveso Directive (Directive 82/501/EEC, Directive 96/82/EC, Directive 2012/18/EU) was developed by the EU after a series of catastrophic accidents involving major industrial sites and dangerous substances. Such accidents can give rise to serious injury to people or serious damage to the environment, both on and off the site of the accident.

The Chemicals Act (Control of Major Accident Hazards involving Dangerous Substances) Regulations 2015 (S.I. No. 209 of 2015) (the "COMAH Regulations"), implement the latest Seveso III Directive (2012/18/EU).

The Chemicals Act (Control of Major Accident Hazards Involving Dangerous Substances) Regulations 2015 (S.I. 209 of 2015) (COMAH Regulations 2015) sets out quantities of dangerous substances for which lower and upper tier COMAH status apply. For gas oils (including diesel fuels, home heating oils and gas oil blending streams) the qualifying quantity for the application of lower tier requirements is 2,500 tonnes and for upper tier requirements it is 25,000 tonnes. Therefore, the proposed power plant will be classified as a lower tier COMAH establishment.

[13] Irish Health Survey 2019, Summary of Key Findings.

The purpose of the COMAH Regulations is to transpose the Seveso Directive into Irish law and lay down rules for the prevention of major accidents involving dangerous substances, and to seek to limit as far as possible the consequences for human health and the environment of such accidents, with the overall objective of providing a high level of protection in a consistent and effective manner.

- *Huntstown Quarry is a licensed inert waste recovery facility operating under license number W0277-03 issued in 2015.(1.2km)*
- *The Huntstown Power Station campus these are; Viridian Power Limited (P077-02) Licence issued in 2006, and Huntstown Power Company (P0483-04) Licence issued in 2006. (1.4km)*
- *Lagan Material Limited, Rosemount Business Park, Ballycoolin Road, Blanchardstown, Dublin 11 (P0081-2). (2.5km).*

5.4.9 SOCIAL INFRASTRUCTURE

In respect of social infrastructure the following areas have been assessed in the preparation of this chapter;

- Local Businesses.
- Residential Areas.
- Educational Facilities.
- Health Services. Emergency Services.

5.4.10 BUSINESSES

The surrounding area is characterised by a variety of energy, industrial, commercial, quarrying, agricultural and residential uses. Huntstown Quarry is located in the vicinity of the subject site (c. 2.9 km) together with Huntstown Power Station (c. 2.4 km) and an Anaerobic Digestion Plant (c. 2.2 km). The Dublin Airport's Logistics Park is located to the southeast of the subject site (c.1.2 Km). In addition, Beech Vista M50 Garden and Paving Centre, MCD Home and Garden, Gardenrooms.ie, Woodkraft and NPP Group are located within the vicinity of the subject site.

5.4.11 RESIDENTIAL DWELLINGS

The nearest noise sensitive locations are located to the North of the site in the form of several private residences (c. 165 m).

5.4.12 EDUCATION FACILITIES

There is 1 no. educational facility within 2km of the proposed development as follows;
• St. Margaret's National School– c. 1.5km northeast of the subject site.

5.4.13 HEALTH SERVICES

National Orthopaedic hospital Cappagh is located c. 5.2km south of the site. Connolly Hospital Blanchardstown is located c. 7.8 km southwest of the site.

5.4.14 EMERGENCY SERVICES

The Finglas Garda Station and Finglas Fire Station are both located c. 4.6 km from the subject site

5.5 POTENTIAL IMPACT OF THE PROPOSED DEVELOPMENT

5.5.1 LAND, SOILS, GEOLOGY, HYDROGEOLOGY

A full assessment of Land, Soils, Geology & Hydrogeology has been undertaken in Chapter 7 of this EIAR.

5.5.1.1 Construction phase

The risk of impact from land, soils, geology and hydrogeology upon the local and regional environment during the construction phase in terms of excavation and infilling in addition to accidental spills and leaks is likely to be short-term, slight and negative. The effect is considered to be 'slight' due to the fact that there will not be intervention on the geological and hydrological regime on a local or regional scale. Moreover, the effects during the construction stage on the loss of agricultural land is recognised as a local loss of agricultural soil. However, the area of development is small in the context of the overall agricultural land available in the region. The majority of the land is zoned for development. Within the overall context of Ireland's available farmland, the loss is negligible. There will be no impact to mineral resources in the area as a result of the proposed development. Please refer to section 7.4.1 for more details.

5.5.1.2 Operational Phase

In terms of land, soils, geology and hydrogeology associated with the proposed development, it has been identified in Chapter 7 section 7.4.2 that in the absence of mitigation the effect on the geological and hydrogeological environments is likely to be long-term, slight and negative. The effect is considered to be 'slight' because there will not be intervention on the geological and hydrological regime on a local or regional scale.

5.5.2 WATER & HYDROLOGY

A full assessment of Water and Hydrology has been undertaken in Chapter 8 of this EIAR

5.5.2.1 Construction Phase

The risk of increased sediments loading in the run off and accidental spills and leaks may potentially occur. Chapter 8 has set out the assessment of potential impacts of the proposed development during the construction phase related to water and hydrology. As such, the potential for increased sediments, loading and run off is short-term, moderate and negative in the absence of a mitigation plan. Moreover, during the construction stage there is a risk of accidental spills and leaks. However, as determined within chapter 8, Section 8.4.1.2 of this EIAR, in the absence of mitigation, the effect on the local and regional hydrological environment is likely to be short-term, significant and negative. It is considered significant due to the potential for accidental leakage to affect the receiving waters (Huntstown Stream and River Ward) and degrade the current water body status (chemically, ecological and quantity) or its potential to meet the requirements and/or objectives in the second RBMP 2018 – 2021 (River Basin Management Plan) and draft third RBMP 2022 - 2027

5.5.2.2 Operational Phase

During the operational stage, it is considered that any effects of direct or indirect discharges in the absence of mitigation, is likely to be long-term, imperceptible and neutral. The effect is considered to be 'imperceptible' because there will not be intervention on the hydrological regime on a local or regional scale due to the design measures included in the surface water and foul water drainage as set out in the appropriate sections of this EIAR. Furthermore, operational phase accidental spillage or leaks are determined to be; in the absence of mitigation, likely to be long-term, imperceptible and neutral. The effect is considered to be 'imperceptible' because there will not be intervention on the hydrological regime on a local or regional scale due to the design measures outlined in the relevant sections of chapter 8.

5.5.3 AIR QUALITY & CLIMATE

In relation to Air Quality, the likely impacts to Human Health as a result of the proposed development are detailed in Chapter 9 of this EIAR

5.5.3.1 Construction Phase

The risk of impact from dust and particulates upon human receptors during the construction phase has been classed as negligible - low for the following activities: Demolition, Earthworks, Construction

and Track Out as a result of proposed activities. Furthermore, Chapter 9, Section 9.4.2.1 of this EIAR has determined that *'the construction stage traffic will have an imperceptible neutral and short-term impact on air quality'.*

5.5.3.2 Operational Phase

The impact from NO_2, CO, SO_2 and PM_{10} from the proposed development emissions has been assessed through a modelling assessment based on the proposed development. The impacts have found that ambient concentrations of the NO_2, CO, SO_2 and PM_{10} due to emissions from the gas turbine, scheduled testing of the turbine in liquid fuel mode and emergency operations of the turbine on liquid fuel are below the air quality limit values. In accordance with the EPA Guidelines the impacts of the proposed development are predicted to be long-term, negative and imperceptible.

5.5.4 NOISE & VIBRATION

A full assessment of Noise and Vibrations has been undertaken in Chapter 10 of this EIAR.

5.5.4.1 Construction Phase

The risk of impact from noise and vibrations upon human receptors during the construction phase has been investigated in chapter 10 of this EIAR. Construction Noise, vibration and traffic has been assessed in this chapter. Arising in the findings, we can confirm that the effects of construction noise and vibration are negative, not significant, and short-term. In addition, traffic noise levels on the local road network, due to the construction phase, will not result in a significant noise impact

5.5.4.2 Operational Phase

In terms of noise associated with the operation of the site, the associated effect is stated to be negative, imperceptible to slight and long-term.
Moreover, there are no sources of vibration associated with the operation of the development will give rise to impacts at nearby noise sensitive locations. In terms of these the operational phase of the development the associated vibration effect is stated to be neutral, imperceptible and long-term.

5.5.5 EMPLOYMENT

There is an opportunity to employ local people and contractors during the construction stage of this project. There will be no direct employment opportunities created as a result of the operational phase of the project

5.5.5.1 Construction Phase

With regard to the construction phase, levels of employment will vary throughout the construction period. Local Businesses will also benefit from the opportunity to supply materials and plant equipment during the construction phase which will represent a significant capital investment. The impact would therefore, likely to be moderate Beneficial during construction.

5.5.5.2 Operational Phase

There will be a high level of automation in the proposed development with all processes controlled from a central control room. During the operational phase, the proposed development will be operated, maintained and managed by a suitably qualified and trained personnel. The impact would therefore, like to be minor beneficial during operation.

5.5.6 POPULATION

5.5.6.1 Construction Phase

The proposed development would negligible impact upon the regional population of Fingal and Dublin City. However, a temporary increase in the number of workers during the construction may require employees to stay within the vicinity of the subject site, it is not expected this would have adverse impact, rather it may have a beneficial impact of goods and services providers.

5.5.6.2 Operational Phase

The proposed development would not have an impact upon the local or regional population during the operation of the proposed development. Due to a projected increase in population, the proposed development would likely bring beneficial impacts in terms of a reliable power supply when required in the future. This is pertinent due to the RSES Plan for compact growth in urbanised areas of Dublin City and Suburbs, Regional Centres and Key Towns in the Eastern and Midlands Region

5.5.7 HEALTH & SAFETY

The proposed development will be implemented in accordance with the Safety, Health and Welfare at Work Act 2005 (No. 10 of 2005) as amended and the Safety, Health and Welfare at Work (General Application) Regulations 2007 (S.I. 299 of 2007) as amended and associated regulations.

The proposed development has the potential for an impact on the health and safety of workers employed on the site, particularly during the construction phase. The activities of contractors during the construction phase will be carried out in accordance with the Safety, Health and Welfare at Work (Construction) Regulations 2013 (S.I. No. 291 of 2013) as amended to minimise the likelihood of any impacts on worker's health and safety.
The Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, 2022), require that the vulnerability of the project to major accidents and/or natural disasters (such as earthquakes, landslides, flooding, sea level rise etc.) is considered in the EIA Report.

In addition, the subject lands have been analysed for risks from tidal flooding from the Irish Sea and local ditch systems, pluvial flooding, ground water and failures of mechanical systems. The various sources of flooding have been reviewed, and the risk of flooding from each source has been assessed. Where necessary, mitigation measures have been proposed. As a result of the proposed mitigation measures, the residual risk of flooding from any source is low.

There is limited potential for effects on the receiving environment as a result of minor accidents/leaks of fuel/oils during the construction phase as no bulk fuel storage required. However, the implementation of mitigation measures for management of localised construction equipment leaks set out in Chapters 7 and 8 of this EIA Report will ensure the risk of an accident is low and that the residual effect on the environment is imperceptible.

Once operational, the proposed development will form part of ESB Networks' infrastructure. ESB Networks are the licensed operators of the electricity distribution system in the Republic of Ireland. ESB Networks is responsible for building, operating, maintaining and developing the electricity network and serving all electricity customers across the country. EirGrid is a state-owned body responsible for operating the flow of power on the transmission grid. Both bodies are experienced in the management and operation of the national electricity grid, with appropriate environmental, health and safety management systems in place.

5.6 PROPOSED MITIGATION MEASURES

Mitigation measures are set out in the relevant technical chapters of this EIAR. No additional mitigation has been identified in this chapter. Those technical chapters which include information may affect population of the area are detailed below, with specific reference to mitigation and enhancement sections.

- Chapter 7: Land, Soils, Geology & Hydrogeology, Section 7.5
- Chapter 8 Water & Hydrology, Section8.5
- Chapter 9: Air Quality & Climate, Section 9.5
- Chapter 10: Noise & Vibration, Section 10.5

5.6.1 LAND, SOILS, GEOLOGY & HYDROGEOLOGY

In order to reduce the impacts on the soil, geological and hydrogeological environment, a number of mitigation measures will be adopted as part of the construction phase and operational phase on site. Some of which have been summarised below, however, please refer to Chapter 7, section 7.5 herein this EIAR for more details.

5.6.1.1 Construction Phase

Site preparation, excavations and levelling works will be required on site to facilitate the foundations of access roads and the installation of services. There is no evidence of historical contamination in the proposed development area, all excavated material will be visually assessed for signs of possible contamination such as staining or strong odours. Should any unusual staining or odour be noticed, samples of the soil will be analysed for the presence of possible contaminants. Moreover, the effects of stripping and stockpiling will be mitigated against through the implementation of appropriate earthworks handling protocol during construction.

To minimise any impact on the underlying subsurface strata from material spillages, all oils, solvents and paints used during construction will be stored within temporary bunded areas. Refuelling of construction vehicles and the addition of hydraulic oils or lubricants to vehicles will take place in a designated area (or where possible off site) which will be away from surface water gulley's in a mobile or double skinned tanks. Moreover, there will be an adequate supply of spill kits and hydrocarbon adsorbent packs will be stored in this area. In addition, where feasible all ready-mixed concrete will be brought to the site by trucks and a suitable risk assessment for wet concreting will be completed prior to works being carried out. In this case of drummed fuel or other chemicals which may be used during construction, containers will be stored in a dedicated internally bunded chemical storage cabinet and labelled clearly to allow appropriate remedial action in the event of spillage.

All exposed soil surfaces will be within the main excavation site which limits the potential for any offsite impacts. Pre-treatment and silt reduction measures on site will include a combination of silt fencing, settlement measures on site including a combination of silt fencing, settlement measures and hydrocarbon interceptors. All water runoff from designated refuelling areas will be channelled to an oil interceptor or an alternative treatment system prior to discharge. it is proposed that any minor ingress of groundwater and collected rainfall in the excavation will be pumped and discharged via the existing stormwater sewer network.

5.6.1.2 Operational Phase

The kerbed unloading area has been designed to contain leaks from the tanker truck and unloading station during tank fill operations and unloading station maintenance activities. This area will be monitored visually. Moreover, rainwater collecting in the kerbed area will also be visually monitored. The unloading station will include local tank level indication and alarms with automatic shutdown of the unloading station pumps on high level to avoid overfilling the tanks.

The oil storage system tanks will be installed on a concrete foundation and will include a secondary nominal 27.4m diameter wall for leak containment. The tanks will be accessible via a spiral stairway to facilitate visual inspection and maintenance. A hard stand cover and permeable paving across the site prior to discharge into the attenuation system has been included in the design and therefore the risk of accidental discharge has been adequately addressed through design. For more information on this please refer to Section 7.5.2 of this EIAR.

Lastly, petrol interceptors will be installed as part of the SuDS measures to capture any potential oil or hydrocarbon contamination prior to discharge into the attenuation system on site. This together with the proposed hardstand cover and permeable paving will minimise the potential for any impact to the hydrological environment. For further details on this please refer to Chapter 7.

5.6.2 WATER & HYDROLOGY

Due to the inter-relationship between soils, geology, hydrogeology and hydrology, the following mitigation measures discussed will be considered applicable to all. Waste Management is also considered in interaction in some sections contained within Chapter 8 (Section 8.5) of this EIAR.

5.6.2.1 Construction Phase

During the construction phase, particular mitigation measures to manage the surface water run-off, fuel and chemical handling and soil removal and compaction on site. Please refer to the appropriate technical chapters for more information mitigation measures to be implemented on this project.

As there is potential for run-off to enter stormwater systems and indirectly discharge to a watercourse, mitigations will be put in place to manage run-off during the construction phase. As discussed above within Section 5.6.1, should any discharge be required during the construction phase, discharge will be to the local drainage ditches. Pre-treatment and silt reduction measures on site will include a combination of silt fencing, attenuation, settlement measures and hydrocarbon interceptors. There may be localised pumping of surface run-off from the excavations during and after heavy rainfall events to ensure that the excavations are kept relatively dry. It is not intended that an underlying aquifer will be required due to the very low permeability of the Dublin Boulder Clay and the relative shallow nature for excavations. Run-off water containing silt will be contained on site via settlement tanks and treated to ensure adequate silt removal. These measures will include a combination of silt fencing and settlement measures i.e. silt traps, silt sacks and settlement tanks/ponds.

The temporary storage of soil will be carefully managed and stockpiles will bet tightly compacted to reduce runoff and graded to aid in runoff collection. The movement of material will be minimised to reduce the degradation of soil structure and generation of dust. Excavations will remain open for as little time as possible before the placement of fill. This will help to minimise the potential for water ingress into excavations. Furthermore, soil from works will be stored away from existing drainage features to remove any potential impact.
Operational P To minimise any impact on the underlying subsurface strata from material spillages, all oils, solvents and paints used during construction will be stored within temporary bunded areas. Refuelling of construction vehicles and the addition of hydraulic oils or lubricants to vehicles will take place in a designated area (or where possible off site) which will be away from surface water gulley's in a mobile or double skinned tanks. Moreover, there will be an adequate supply of spill kits and hydrocarbon adsorbent packs will be stored in this area. In addition, where feasible all ready-mixed concrete will be brought to the site by trucks and a suitable risk assessment for wet concreting will be completed prior to works being carried out. In this case of drummed fuel or other chemicals which may be used during construction, containers will be stored in a dedicated internally bunded chemical storage cabinet and labelled clearly to allow appropriate remedial action in the event of spillage.

All exposed soil surfaces will be within the main excavation site which limits the potential for any offsite impacts. Pre-treatment and silt reduction measures on site will include a combination of silt fencing, settlement measures on site including a combination of silt fencing, settlement measures and hydrocarbon interceptors. All water runoff from designated refuelling areas will be channelled to an oil interceptor or an alternative treatment system prior to discharge. it is proposed that any minor ingress of groundwater and collected rainfall in the excavation will be pumped and discharged via the existing stormwater sewer network.

5.6.2.2 Operational Phase

The kerbed unloading area has been designed to contain leaks from the tanker truck and unloading station during tank fill operations and unloading station maintenance activities. This area will be monitored visually. Moreover, rainwater collecting in the kerbed area will also be visually monitored. The unloading station will include local tank level indication and alarms with automatic shutdown of the unloading station pumps on high level to avoid overfilling the tanks.
The oil storage system tanks will be installed on a concrete foundation and will include a secondary nominal 27.4m diameter wall for leak containment. The tanks will be accessible via a spiral stairway

to facilitate visual inspection and maintenance. A hard stand cover and permeable paving across the site prior to discharge into the attenuation system has been included in the design and therefore the risk of accidental discharge has been adequately addressed through design. For more information on this please refer to Section 7.5 of this EIAR.

Petrol interceptors will be installed as part of the SuDS measures to capture any potential oil or hydrocarbon contamination prior to discharge into the attenuation system on site. This together with the proposed hardstand cover and permeable paving will minimise the potential for any impact to the hydrological environment. For further details on this please refer to Chapter 8.

An Environmental safety and health management system (EMS) will be implemented at the proposed development during operations. Moreover, there will be comprehensive emergency response procedures and standard operating procedures to respond to an onsite fuel spillage. All employees will be provided with such equipment, information, training and supervision as is necessary to implement the emergency response procedures and standard operating procedures. For further information on the mitigation measures to be implemented during the operational stage please refer to Section 8.5 of this EAIR.

5.6.3 AIR QUALITY & CLIMATE

5.6.3.1 Construction Phase

In summary the measures which will be implemented include:

- Hard surface roads will be swept to remove mud and aggregate materials from their surface while any un-surfaced roads will be restricted to essential site traffic;
- Any road that has the potential to give rise to fugitive dust shall be regularly watered, as appropriate, during dry and/or windy conditions;
- Vehicles using site roads will have their speed restricted, and this speed restriction must be enforced rigidly. On any un-surfaced site road, this will be 20kph, and on hard surfaced roads as site management dictates;
- Public roads outside the site will be regularly inspected for cleanliness and cleaned as necessary;
- Material handling systems and site stockpiling of materials will be designed and laid out to minimise exposure to wind. Water misting or sprays will be used as required if particularly dusty activities are necessary during dry or windy periods; and
- During movement of materials both on and off-site, trucks will be stringently covered with tarpaulin at all times. Before entrance onto public roads, trucks will be adequately inspected to ensure no potential for dust emissions.

At all times, these procedures will be strictly monitored and assessed. In the event of dust nuisance occurring outside the site boundary, movements of materials likely to raise dust would be curtailed and satisfactory procedures implemented to rectify the problem before the resumption of construction operations.

5.6.3.2 Operational Phase

The stack height of the gas fired power generation facility has been designed to ensure that an adequate height has been selected to aid dispersion of the emissions and achieve compliance with the EU ambient air quality standards beyond the site boundary (including background concentrations). No additional mitigation measures are proposed for the operational phase of the Proposed Development.

5.6.4 NOISE & VIBRATION

5.6.4.1 Construction Phase

The following mitigation measures will be applied during the construction of the proposed development:

- Limiting the hours during which site activities likely to create high levels of noise or vibration are permitted;
- Establishing channels of communication between the contractor/developer, Local Authority and residents;
- Appointing a site representative responsible for matters relating to noise and vibration;
- Monitoring levels of noise and/or vibration during critical periods and at sensitive locations; and
- All site access roads will be kept even so as to mitigate the potential for vibration from lorries.

Furthermore, a variety of practicable noise control measures will be employed, including:

- Selection of plant with low inherent potential for generation of noise and/ or vibration;
- Erection of barriers as necessary around items such as generators or high duty compressors; and
- Situate any noisy plant as far away from sensitive properties as permitted by site constraints and the use of vibration isolated support structures where necessary.

Vibration from construction activities to off-site residences be limited to the values set out in Table 10.7. It should be noted that these limits are not absolute, but provide guidance as to magnitudes of vibration that are very unlikely to cause cosmetic damage. Magnitudes of vibration slightly greater than those in the table are normally unlikely to cause cosmetic damage, but construction work creating such magnitudes will proceed with caution. Where there is existing damage, these limits may need to be reduced by up to 50%.

5.6.4.2 Operational Phase

Noise from external plant will be minimised by purchasing low noise generating equipment and incorporating appropriately specified in line attenuators for stacks and exhausts where necessary. With due consideration as part of the detailed design process, this approach will result in the site operating well within the constraints of the best practice guidance noise limits that have been adopted as part of this detailed assessment.

5.7 DO NOTHING SCENARIO

If the Proposed Development were not to proceed, no construction would take place on the site, and there would be no potential for the positive impacts of increased energy supply. If the Proposed Development were not to proceed it is likely that the lands would be developed in time for another development in line with the 'HT' – High Technology Land Use Zoning Objective of the subject site. The Zoning Objective, Vision and Permissible Uses under the HT Zoning Objective are set out below in Table 5.7.

The **Objective** of the Land Use Zoning Heavy Industry – HI is to '*provide for heavy industry'*
The **Vision** for this Land Use Zoning states: '*Facilitate opportunities for industrial uses, activities and processes which may give rise to land use conflict if located within other zonings. Such uses, activities and processes would be likely to produce adverse impacts, for example by way of noise, dust or visual impacts. Hi areas provide suitable and accessible locations specifically for heavy industry and shall be reserved solely for such uses.*
Industry – High Impact, Utility Installations, Fuel Depot/ Fuel Storage, Plant Storage are all classes of use that are permissible as denoted in the Fingal Development Plan 2017 – 2023, Chapter 11, 'Land Use Zoning Objectives'.

Table 5.7 Zoning Objective and Permissible Uses

Zoning Objective 'HI' – Heavy Industry
Permissible Uses
Abattoir; Concrete/Asphalt; Extractive Industry/ Quarrying; Fuel Depot/ Fuel Storage; Heavy Vehicle Park; Industry – High Impact; Office Ancillary to Permitted Use; Open Space; Plant Storage; Restaurant/ Café; Retail – Local <150 sqm nfa; Sustainable Energy Installation; Telecommunications Structures; Utility Installations; Waste Disposal and Recovery Facility (High Impact).

5.7.1 CUMULATIVE

The cumulative effect of the Proposed Development on Population and Human Health alongside other development due to take place in the area will be long term, significant and positive.

5.8 RESIDUAL IMPACT OF THE PROPOSED DEVELOPMENT

5.8.1 CONSTRUCTION PHASE

Effects on population and health during the Construction Phase are expected under different environmental topics and will be mitigated as described in the other relevant chapters throughout this EIAR. Once mitigation measures have been implemented the residual effects are expected to be limited to minor or insignificant levels as described in other associated residual impacts sections relating to the Construction Phase.

5.8.2 DIFFICULTIES ENCOUNTERED

There were no difficulties encountered during the production of this chapter of the EIAR.

5.9 REFERENCES

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- Environmental Protection Agency (2021) Licenced Sites Accessed March 2021, http://www.epa.ie/licensing/).
- Environmental Protection Agency (EPA). Draft Advice Notes for Preparing Environmental Impact Statements (EPA, 2015).
- Environmental Protection Agency (EPA). Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, 2022),
- European Commission (EC). Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report (EU, 2017).
- Fingal County Council. Fingal County Council Development Plan 2017-2023.
- Pobal HP Deprivation Index (Accessed August 2022,https://data.gov.ie/dataset/pobalhp-deprivation-index).
- Seveso Directive (Directive 82/501/EEC, Directive 96/82/EC, Directive 2012/18/EU).

6 BIODIVERSITY

6.1 INTRODUCTION

6.1.1 OVERVIEW & AIMS

This report assesses potential impacts that may arise from the proposed power plant at Kilshane on biodiversity within the receiving environment, in accordance with the following guidance documents:

- Guidelines on Information to be contained in Environmental Impact Statement Reports. (2022) Environmental Protection Agency.
- Guidelines for Ecological Impact Assessment in the UK and Ireland. Terrestrial, Freshwater, Coastal and Marine (2018). Chartered Institute of Ecology and Environmental Management (CIEEM), Ver. 1.1 Updated September 2019.
- Guidelines for Preliminary Ecological Appraisal. (2017) Chartered Institute of Ecological and Environmental Management (CIEEM), Second Edition.
- A Guide to Habitats in Ireland (2000), Fossitt JA.
- Best Practice Guidance for Habitat Survey and Mapping. (2011) The Heritage Council.

It aims to discuss the existing ecological environment, the potential impacts of the proposed development and avoidance and mitigation measures in relation to habitats, flora and fauna in the zone of influence (ZOI) of the proposed development area. A separate stand-alone AA Screening Report is also included in the planning application documentation.

6.1.2 LEGISLATIVE CONTEXT

Ireland's National Biodiversity Action Plan 2017–2021[14], in accordance with the Convention on Biological Diversity, is a framework for the conservation and protection of Ireland's biodiversity, with an overall objective to secure the conservation, including, where possible, the enhancement and sustainable use of biological diversity in Ireland and to contribute to collective efforts for conservation of biodiversity globally. The plan is implemented through legislation and statutory instruments concerned with nature conservation. The Planning and Development Acts, 2000 (revised September 2020) and the European Communities (Environmental Impact Assessment) (Amendment) Regulations, 1989 to 1999 are particularly important in that regard and include a number of provisions directly concerned with the protection of natural heritage and biodiversity.

The Wildlife Acts, 1976–2012 are the principal mechanism for the legislative protection of wildlife in Ireland. They outline strict protection for species that have significant conservation value. In summary, the Wildlife Acts protect species from injury, disturbance and damage to breeding and resting sites. All species listed in the Wildlife Acts must, therefore, be a material consideration in the planning process. The Flora (Protection) Order, (2015) gives legal protection to certain species of wild flora, i.e., vascular plants, mosses, liverworts, lichens and stoneworts. Under the Order, it is an offence to uproot, damage, alter, or interfere with any species listed species listed within the Order, or to damage or alter their supporting habitats.

The European Communities (Birds and Natural Habitats) Regulations, 2011–2015 transpose into Irish law Directive 2009/147/EC (the Birds Directive) and the Habitats Directive, which list habitats and species of Community, i.e., European Union (EU), importance for conservation and that require protection. This protection is afforded in part through the designation of areas that represent significant populations of listed species within a European context, i.e., Natura 2000 sites. An area designated for bird species is classed as a Special Protection Area (SPA), and an area designated for other protected species and habitats is classed as a Special Area of Conservation (SAC). Birds listed in Annex I of the Birds Directive in SPAs and habitats and species listed in Annexes I and II, respectively, of the Habitats Directive in SACs in which they are designated features have full European protection. Species listed on Annex IV of the Habitats Directive are strictly protected wherever they occur, whether inside or outside European sites. Annex I habitats outside of SACs are still considered to be of national and international importance and, under Article 27(4)(b) of the European

[14] NPWS: https://www.npws.ie/sites/default/files/publications/pdf/National%20Biodiversity%20Action%20Plan%20English.pdf

Communities (Birds and Natural Habitats) Regulations, 2011, public authorities have a duty to strive to avoid the pollution or deterioration of Annex I habitats and habitats integral to the functioning of SPAs.

Sites of national importance for nature conservation are afforded protection under planning policy and the Wildlife Acts, 1976–2012. NHAs are sites that are designated under statute for the protection of flora, fauna, habitats and geological interest. proposed NHAs (pNHAs) are published sites identified as of similar conservation interest but have not been statutorily proposed or designated.

The International Union for the Conservation of Nature and Natural Resources (IUCN) provides a global approach for evaluating the conservation status of species to inform and catalyse action for biodiversity conservation through the Red List of Threatened Species.

6.1.3 APPROACH TO ECOLOGICAL EVALUATION & IMPACT ASSESSMENT

Assessing impact significance is a combined function of the value of the affected feature (its ecological importance), the type of impact and the magnitude of the impact. It is necessary to identify the value of ecological features within the study area in order to evaluate the significance and magnitude of possible impacts.

The following parameters are described when characterising impacts (following CIEEM (2018), EPA (2017) and TII (2009, Rev. 2)):

Direct and Indirect Impacts: An impact can be caused either as a direct or as an indirect consequence of a Plan/Project.
Magnitude: Magnitude measures the size of an impact, which is described as high, medium, low, very low or negligible.
Extent: The area over that the impact occurs – this should be predicted in a quantified manner.
Duration: The time that the effect is expected to last prior to recovery or replacement of the resource or feature.

- Temporary: Up to 1 Year;
- Short Term: The effects would take 1-7 years to be mitigated;
- Medium Term: The effects would take 7-15 years to be mitigated;
- Long Term: The effects would take 15-60 years to be mitigated; and
- Permanent: The effects would take 60+ years to be mitigated.

Likelihood: The probability of the effect occurring taking into account all available information.

- Certain/Near Certain: >95% chance of occurring as predicted;
- Probable: 50-95% chance as occurring as predicted;
- Unlikely: 5-50% chance as occurring as predicted; and
- Extremely Unlikely: <5% chance as occurring as predicted.

The CIEEM Guidelines define an ecologically significant impact as an impact (negative or positive) on the integrity of a defined site or ecosystem and/or the conservation status of habitats or species within a given geographic area. The integrity of a site is the coherence of its ecological structure and function, across its whole area, which enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which it was classified (CIEEM, 2018).

The results of the ecological survey were evaluated to determine the significance of identified features located in the study area on an importance scale ranging from international-national-county-local. The local scale is approximately equivalent to one 10km square but can be operationally defined to reflect the character of the area of interest. Because most sites will fall within the local scale, this is sub-divided into three categories: high local importance, local importance, and local value. The criteria used for assessing the importance of ecological features are shown in Table 6.1.

Table 6.1 Criteria used in Assessing the Importance of Ecological Features

Importance	Criteria
International	An internationally designated site or candidate site (SPA, cSPA, SAC, cSAC, Ramsar Site, Biogenetic Reserve). Also, sites which qualify for designation as SACs or SPAs, this includes sites on the NGO shadow list of SACs.
National	A nationally designated site or candidate site (NHA, pNHA). Sites which hold Red Data Book (Curtis and McGough, 1988) plant species.
County	Sites which hold nationally scarce plant species (recorded from less than 65 of the national 10km grid squares); unless they are locally abundant. Sites which hold semi-natural habitats likely to be of rare occurrence within the county. Sites which hold the best examples of a semi-natural habitat type within the county.
High Local Importance	Sites which hold semi-natural habitats and/or species likely to be of rare occurrence within the local area. Sites which hold the best examples of a high quality semi-natural habitat type within the local area.
Local Importance	Sites which hold high quality semi-natural habitats.
Local Value	Any semi-natural habitat.

6.2 METHODOLOGY

6.2.1 DESK STUDY

A desktop review was carried out to identify features of ecological importance within the proposed development area and the wider environment. Ecological impact assessment is conducted following a standard source-pathway-receptor model, where, in order for an impact to be established all three elements of this mechanism must be in place. The absence or removal of one of the elements of the mechanism is sufficient to conclude that a potential effect is not of any relevance or significance.

- Source(s) – e.g., pollutant run-off from proposed works.
- Pathway(s) – e.g., groundwater connecting to nearby qualifying wetland habitats.
- Receptor(s) – qualifying aquatic habitats and species of European sites.

Specific focus was put into the assessment of sensitive receptors of protected species/habitat features; as well as those of local or national importance. A source is any identifiable element of the proposal which is known to have interactions with ecological processes. Pathways are any connections or links between the source and the receptor. This report determines if direct, indirect or cumulative adverse effects will arise from the proposed development.

6.2.2 FIELD SURVEY

Data was collected during surveys conducted on the 3rd February and 5th May 2022. The data represents a multidisciplinary ecological walkover survey of the proposed site in Kilshane Cross, Dublin. A habitat survey of the site was conducted following standard guidelines set out in 'Best Practice Guidance for Habitat Survey and Mapping' developed by the Heritage Council of Ireland[15]. Habitats were classified using habitat descriptions and codes published by the Heritage Council in 'A Guide to Habitat Types in Ireland'[16]. Plant species nomenclature follows Rose's 'The Wild Flower Key: How to identify wild flowers, trees and shrubs in Britain and Ireland[17]. A list of the dominant and notable plant species was taken for each habitat type. Particular emphasis was given to the possible occurrence of rare or legally protected plant species (as listed in Flora Protection Order 1999) or Red-listed plant species (Curtis & McGough 1985, Wyse Jackson *et al*. 2016).

[15] Smith, George F., et al. "Best practice guidance for habitat survey and mapping." The Heritage Council: Ireland (2011)
[16] Fossitt, J.A., 2000. A guide to habitats in Ireland. Heritage Council/ Chomhairle Oidhreacht
[17] Rose, F., O'Reilly, C., Smith, D.P. and Collings, M., 2006. The wild flower key: how to identify wild flowers, trees and shrubs in Britain and Ireland. Frederick Warne.

Observations were made for fauna species present or likely to occur on site. Emphasis was placed on mammals and birds, and especially for species listed in the respective Red lists, namely; Gilbert *et al*. 2021[18] (birds), and Marnell *et al*. 2019[19] (mammals). For mammals, the survey was focused on signs of their presence/activity, such as tracks, feeding marks and droppings, as well as any direct observations. Regarding bats, the main focus was on evaluation of suitable habitats to support roosting individuals or communities; however, an ecological assessment of habitat suitability was undertaken throughout the site. The assessment process undertaken for bats followed the BCT Guidelines[20]. Chapter 4 of these guidelines identify the approach to assess 'preliminary ecological appraisal for bats'. This chapter sets out methods for identifying habitat suitability which do not constitute assumptions. Based on the information from the assessment the survey effort requirements are identified.

Bird species were recorded by sight and sound during a bird point count conducted during the ecological walk over, following the Birdwatch Ireland Country Breeding Bird survey methods. In addition, all linear hedgerows were walked, and species were recorded. Particular attention was focused on areas within the site of high ecological value that interact or overlap with parts of the proposed site in Kilshane Cross, Dublin.

During all surveys, particular attention was given to assessing the presence of rare or protected species. Each species identified was assessed in term of the EU Habitat Directive (92/43/EEC), Bird Directive (2009/147/EC), the Wildlife Act (1976), the Wildlife Amendment Act (2000) and the Red Data Lists for threatened and protected species, published on the NPWS website[21].

6.2.3 LIMITATIONS

The survey effort and assessment were deemed sufficient for the proposed site context and character and the proposed project therein. Therefore, overall, it is considered that there are no significant limitations to the present assessment of the ecological importance of the site.

6.3 THE PROPOSED DEVELOPMENT

The proposed development is to construct a 600 Megawatt power station as described in Chapter 4 *Project Description*.

6.4 RECEIVING ENVIRONMENT

6.4.1 OVERVIEW

The proposed site is located in an area that is composed of a majority of intensively managed crop systems, framed by hedgerows and treelines, in north-west Dublin County. The proposed site is partly bordered by the N2 dual carriageway on the eastern boundary, by the Huntstown Quarry on the southern boundary, and various industrial estates to the west. In a wider landscape context, the site is located just west of Dublin airport, at approximately 1.6km from the proposed site, it is surrounded by other areas of intensively managed agricultural grassland to the north and areas of commercial and industrial developments to the west and east.

The proposed site contains intensively managed crop systems which are of low value for biodiversity. However, there are areas of hedgerows, treelines and scrub which can provide refuge to local flora and fauna in the intensively managed agricultural landscape and sub-urban expanse of the immediate and surrounding areas.

[18] RGilbert, G., et al. 2021. Birds of Conservation Concern in Ireland 4: 2020–2026. Irish Birds, 43, pp.1-22.
[19] Marnell, F., Looney, D. & Lawton, C. (2019) Ireland Red List No. 12: Terrestrial Mammals. National Parks and Wildlife Service, Department of the Culture, Heritage and the Gaeltacht, Dublin, Ireland.
[20] Collins, J. (ed.) 2016. Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn). The Bat Conservation Trust, London.
[21] NPWS website for protected species and habitats data accessed at: https://www.npws.ie/maps-and-data

6.4.2 ZONE OF INFLUENCE

The operational phase works are not anticipated to have any impacts beyond the plan boundary due to the proposed characteristics of the project and the character and context of the proposed site itself – i.e., mainly intensively managed crop systems with no direct surface hydrological connectivity with the surrounding area. The construction phase works have potential to have impacts beyond the boundary due mainly to noise, dust and artificial lighting. The operational phase has potential to cause impacts to the surrounding area due mainly to noise and air quality effects. Following the source-pathway-receptor model identifying the potential likely sources, a Zone of Influence (ZOI) was established taking in a 2km radius around the proposed site. Given the nature of the proposed works, effects are not foreseen to be significant beyond this distance.

6.4.3 HYDROLOGY

Surface water drainage and rainfall, is generally currently percolated through the site via grass and soil. The topographic survey has confirmed that the internal and boundary hedgerows does contain an old agricultural drainage ditch, which could convey flow to the Huntstown Stream to the east of the site (s8.3). This drain is dry for most of the year (confirmed by vegetation that has colonised the banks and base of the drain (such as Common Ivy and Male Ferns) will only have flow during heavy rainfall events, and it will only be surface run off. Additional drainage ditches occur to the west of the site, and are outside of the project boundary. These ditches only serve the subject site and the agricultural fields immediately to the west, located between the subject site and the Kilshane Road, and are also dry for most of each year, and do not convey any permanent, established watercourse on site, upstream of the Huntstown Stream.

The Huntstown Stream generally flows in a north-easterly direction to join the River Ward at St. Margaret's Golf and Country Club, and the River Ward is a tributary of the Broadmeadow River, which in turn outfalls to the Irish Sea at the Malahide Estuary. Section 8.3.1 of this EIAR contains more details and mapping of the local hydrological environment.

6.4.4 DESIGNATED AREAS

In accordance with the European Commission Methodological Guidance (EC, 2001), a list of European Designated Sites that can be potentially affected by the works has been compiled. A dedicated Appropriate Assessment Screening, reviewing all European sites within an appropriate pathway consideration zone[22] of the project, was undertaken. A review of the conservation objectives and qualifying interests of these sites was undertaken in order to identify what habitats and/or species could be vulnerable to risk of impact from the proposed project. This was done by assessing whether any source receptor links existed between the qualifying interests of the proposed development site.

When assessing ecological impacts, the CIEEM Guideline recommend a 15km pathway consideration zone as an adequate assessor for potential effects. Due to the characteristics and scale of the proposed project, all other Natura 2000 sites and pNHA/NHA sites beyond threshold distances of 15km are considered to be of sufficient distance from the proposed site, that no significant effects could be caused either directly or indirectly or in combination with other plans or projects to their interest features. Any impacts caused by the proposed development have no valid impact pathway to transfer along to reach any of the receptor interest features. These sites are thus 'screened out' and not considered further.

A stand-alone Appropriate Assessment Screening Report is submitted separately to this assessment and expands on the potentially affected designated sites and their conservation objectives in more detail. Appendix 6.1 provides a list of all of the designated sites considered within the assessment arranged by distance from the proposed development - which are assessed as part of this report. Figure 6.1 displays the Natura 2000 sites within a 15km pathway consideration zone of the proposed project; hydrological pathways were considered beyond 15km also.

[22] A pathway consideration zone is the area which was used to identify sites in the receiving area which might have ecological pathways connected to the zone of influence. Any ecological pathways beyond 15km are anticipated to be landscape scale interactions and therefore significant impacts are not likely given the availability of alternate resources.

In addition to examining European sites, NHAs and pNHAs have been considered. Figure 6.2 displays the National sites within a 15km pathway consideration zone of proposed site. Although NHAs and pNHAs do not form part of the Natura 2000 Network, they often provide an important supporting role to the network, particularly when it comes to fauna species which often do not obey site boundaries. There are however, NHAs and pNHAs that are designated for features that are not important at an international level and thus may not interact with the Natura 2000 network.

The Malahide Estuary is a Special Protection Area (SPA), a candidate Special Area of Conservation (cSAC), a proposed National Heritage Area (pNHA) and a RAMSAR site.

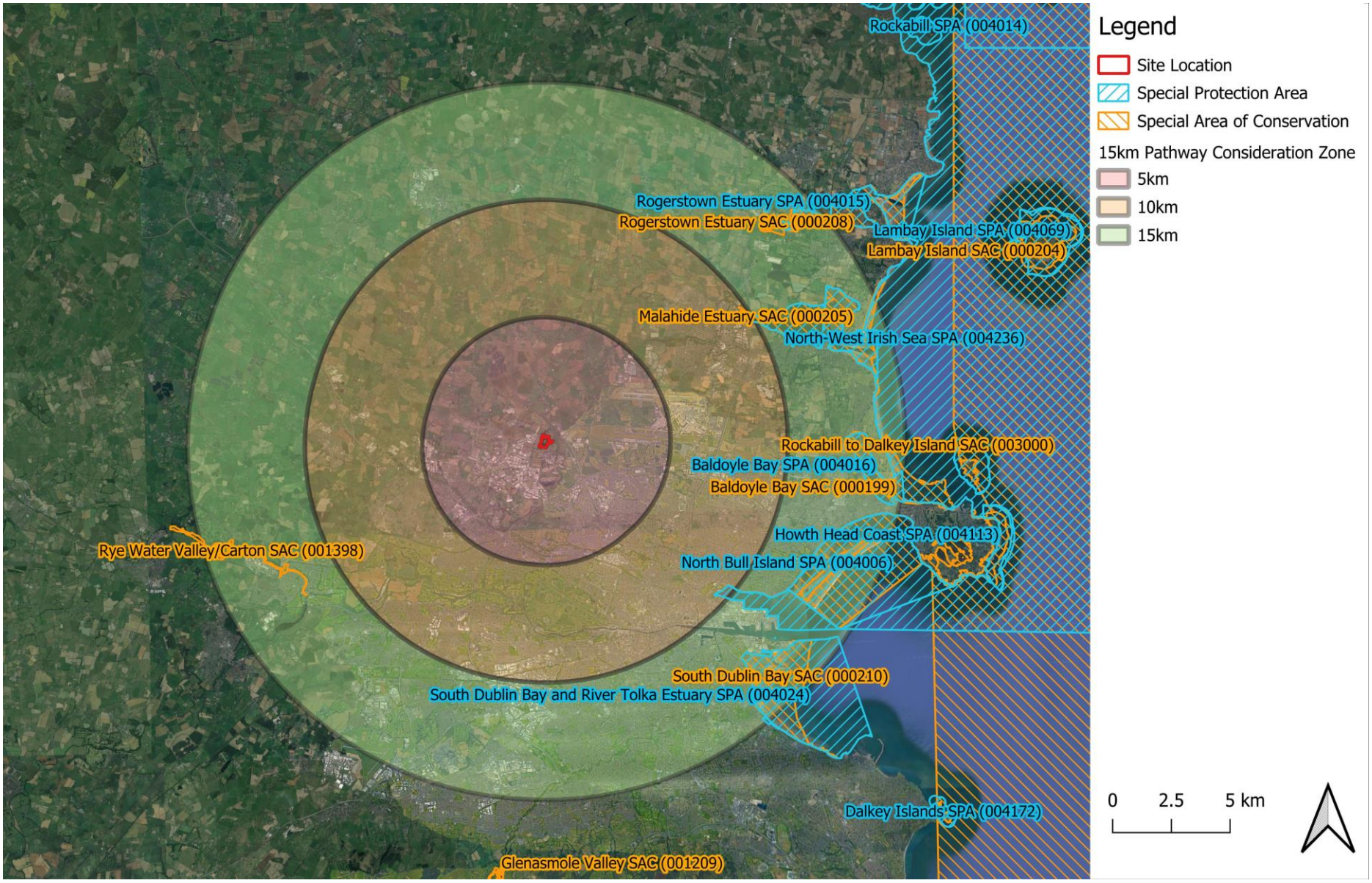

Figure 6.1 Natura 2000 sites within a 15km pathway consideration zone of the proposed development area

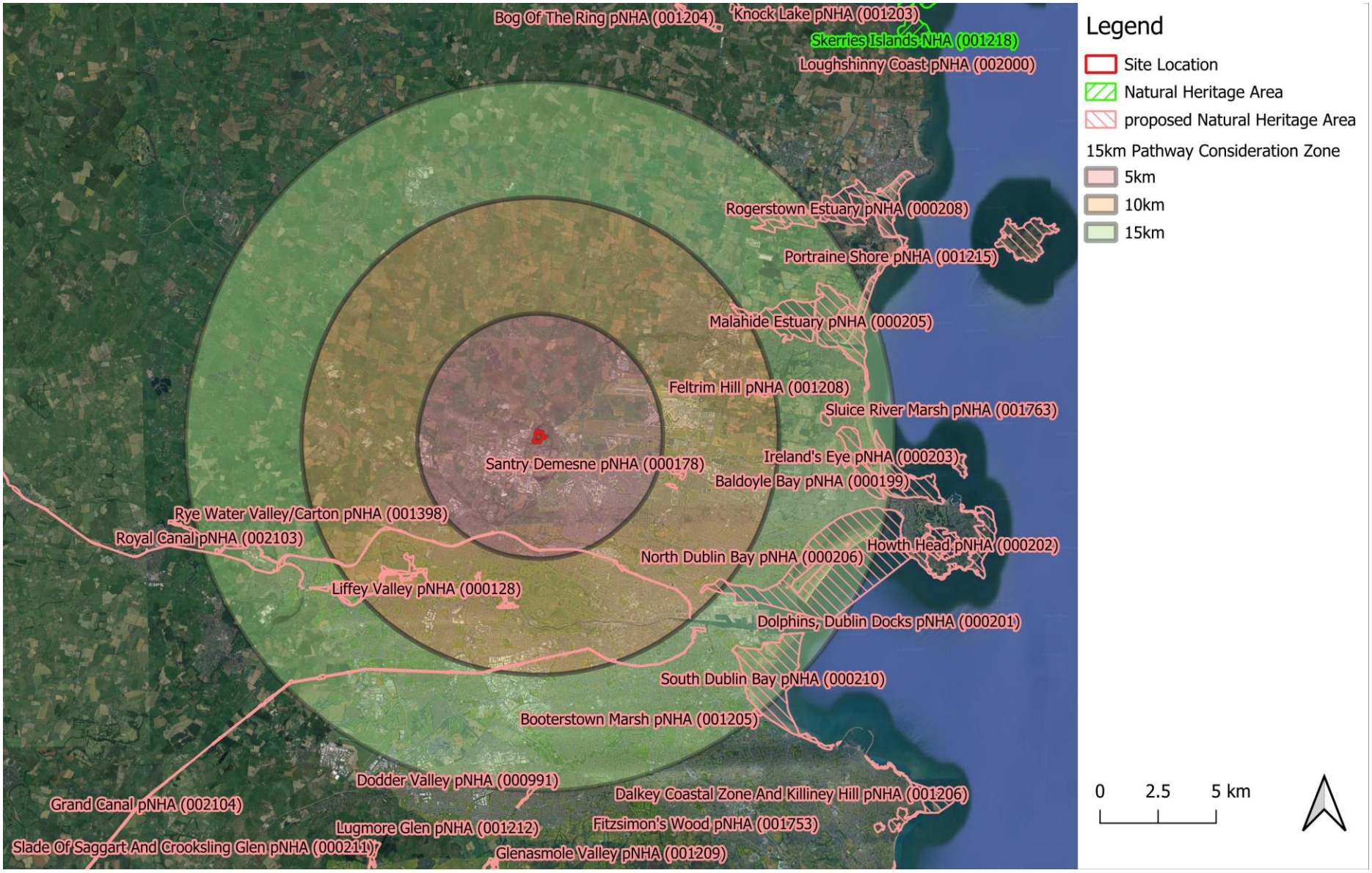

Figure 6.2 Natural Heritage Sites within a 15km pathway consideration zone of the proposed development area

6.4.5 RECORDS OF PROTECTED, RARE OR OTHER NOTABLE FLORA & FAUNA SPECIES

The digital database of the National Biodiversity Data Centre (NBDC) was consulted to assess known records of rare, protected and invasive species that occur in the surrounding landscape. The collation of this information, as well as examination of aerial photographs allowed areas of potential ecological importance to be highlighted prior to field survey work. A search was undertaken of records of Red Data Book and Protected species held by the National Biological Data Centre (NBDC) database. A list of the rare and/or protected species recorded by the NBDC within the 10km x 10km grid square (O14) which contains the study area of this assessment, is provided in Appendix 6.2[23].

6.4.6 INVASIVE FLORA SPECIES

Publicly available NBDC data was accessed to identify invasive species in the 10km x 10km grid square which contains the study area (O14). 3 Of the flora species and 3 of the fauna species listed in Appendix 6.2, that have been recorded in the NBDC hectad O14 which contain the proposed development site, are subject to restrictions (Third Schedule) under Regulation 49 of the European Communities (Birds and Natural Habitats) Regulations, 2011.

6.4.7 FIELD SURVEY RESULTS

The findings of the ecological site visits on 3 February and 5 May 2022 are discussed below.

6.4.7.1 Habitats & Flora

No Annex I habitats were found on site. The habitats present on the proposed site are of relatively low local importance in terms of support for local biodiversity and resource availability. But the habitats at the proposed site such as hedgerows can provide ecological connectivity for species in the surrounding area. There are multiple commercial and industrial developments in the surrounding area - which are of low to negligible ecological significance.

The habitats found on site, and their relative ratios, are typical of areas in which the proposed site is located; with the vast majority of habitats in the area consisting of arable crop systems (BC1), and agricultural grassland which has overgrown ((GA1). The remaining habitats in the area consist of hedgerows (WL1), treelines (WL2), spoiled and bare ground (ED2) and pockets of buildings and artificial surfaces (BL3).

As mentioned above, the habitats in the proposed site are mainly composed of agricultural crop systems. Most of this is maintained and used for crop sowing and harvesting, and left as bare over turned soil in the winter months and is not suitable foraging habitat for SCI wintering species. The other agricultural grasslands in the area have been left overgrown and are dominated by perennial ryegrass monoculture swards. The mature treeline composed of cypress to the northwest of the proposed site, along with an area of scrub dominated by brambles, may offer a small amount of ecological value. The majority of hedgerows which border the agricultural grasslands are thin and patchy and more are immature individuals, therefore these fragments do not offer and significant value for the surrounding area in terms of ecological connectivity. They can however offer value for breeding birds in terms of foraging and roosting habitat, and nesting habitat in places. Similarly, the crop systems in the proposed site can offer value in terms of foraging habitat for breeding birds. The majority of hedgerows and treelines are being retained as part of the landscape plan for the proposed development. The habitats towards the south of the proposed site are currently impacted by disturbance from the quarry to the south of the proposed site in terms of significant levels of dust and noise disturbance – with noticeable layers of residue occurring on the foliage of treelines and hedgerows along the quarry, bordering the southern end of the proposed site.

6.4.7.2 Invasive Species

No invasive species were recorded during the ecological walkover in February or additional site visit in May 5th 2022. It is noted there are 6 of the invasive species recorded for the 10x10 km area within which the site is

[23] National Biodiversity Centre data. Accessed: 15th February 2022

located by the National Biodiversity Data Centre which are subject to restrictions. Due to the majority of intensively managed agricultural grassland on the site, terrestrial invasive flora is not currently a threat to the site.

6.4.7.3 Fauna

Non-volant Mammals

No evidence of badger setts was found on site. There were also not any feeding or other signs of badger found along corridors and potential avenues for commuting within the site (i.e., hedgerows, treelines, and ditches). This indicates low use of the site by badger, especially given the optimum season for signs during which the survey was conducted. This finding is in keeping with the low ecological value of the site given the lack of suitable habitat and significant anthropogenic disturbance in the surrounding area from various forms of industry and development. It is likely that badger do not use the site as there are more favourable habitats in the surrounding area with more defined and mature treelines in less disturbed areas. No evidence of any other non-volant mammals was found on the site.

Bats

Bat activity transects were conducted after along hedgerows of the site on May 5th 2022. The site was found to have very low levels of bat activity in terms of feeding and commuting. This is in keeping with the low ecological value of the site and the fragmented and thin nature of the hedgerows and treelines within the site, combined with high levels of disturbance and night time lighting from the N2 dual carriageway on the eastern boundary and the Huntstown Quarry on the southern boundary of the proposed site – and wider context of multiple industrial estates surrounding the southern landscape of the proposed site.

All trees within the site boundary were inspected for potential bat roost features and only two features with potential to have bat roosting habitat were identified on site. Buildings on the site which will be subject to demolition as a result of the proposed project were also inspected for potential bat roost features and signs of previous or current use by bats as a roosting site, and found to have no bat roost potential or evidence of use.

A bat emergence survey was carried out at the potential roost features identified in May 5th 2022, and no bat activity was recorded at either potential bat roost feature that would indicate use as a roost. As there very low levels of activity in general recorded at the site during bat activity surveys, and the lack of evidence of previous use of these features as a roost, it is highly unlikely that these potential roosts could be utilised at other parts of the year as roosts by local populations. However, the results of the roost emergence surveys could be seasonal, as bat populations can utilise bat roosts over different seasons. Therefore, as a precautionary measure, mitigation is proposed for these potential bat roost features in s.6.5.1 below.

Birds

The scrub and hedgerow habitats to the north east of the site provides high local value for birds (Table 6.2). In addition to these areas in the north of the site, there are hedgerows bordering the agricultural crop systems and remnant agricultural grassland which may hold some ecological value for local birds, however, the majority of these hedgerows are thin and sparse and are not likely to hold much ecological value.

A bird point count focused on passerines was conducted on site, for a duration of 15 minutes – in addition to any treeline walks and opportunistic records of species during surveying. The bird species seen and heard were recorded and the results are provided in Table 6.2 below. 10 Species, in total, were recorded. 8 Of these species are on the green list, 2 on the amber list and none on the red list of the Birds of Conservation Concern in Ireland[24].

[24] Gilbert, G., et al. 2021. Birds of Conservation Concern in Ireland 4: 2020–2026. Irish Birds, 43, pp.1-22.

Table 6.2 Bird Survey Results

Scientific name	Common name	List status
Pica pica	Magpie	Green
Turdus merula	Blackbird	Green
Erithacus rubecula	Robin	Green
Columba palumbus	Woodpigeon	Green
Corvus monedula	Jackdaw	Green
Corvus frugilegus	Rook	Green
Passer domesticus	House Sparrow	Amber
Fringilla coelebs	Chaffinch	Green
Parus major	Great Tit	Green
Larus canus	Common Gull	Amber

A wintering bird assessment was deemed unnecessary for this site after the multidisciplinary ecological site, visit for multiple reasons, as outlined below:

1. Lack of habitat suitability for SCI species due to a combination of significant continual disturbance from multiple intensive anthropogenic sources close to the proposed site – i.e., the active Huntstown Quarry directly south of the proposed site, the N2 duel carriageway directly to the east of the proposed site, and the low flying aircraft above the proposed site which are continually (approximately every 10-15 minutes) passing at low altitudes after taking off from Dublin airport which lies nearby, approximately 1.6km to the east.
2. The site is composed mainly of agricultural land that is intensively managed for the production of crop system monocultures, which are left as rotated open soil over the winter period – which is not suitable grazing habitat for SCI species in the growth, harvest or winter period. There are an additional two patches of remanet agricultural grassland within the proposed site, however these are minor in relative size to the site overall, and are overgrown dense grass/scrub mosaics, which are also unsuitable for ex-situ foraging SCI species. The only other habitat types within the proposed site are dry, disused agricultural ditches, and hedgerows / treelines – the majority of which are preserved in the proposed project's landscape plan and Green Infrastructure Plan.
3. Finally, in addition to the combination of significant noise and visual disturbance, and the lack of appropriate foraging habitat; there is also an abundance of suitable foraging habitat for ex-situ SCI species in the surrounding grassland dominated agricultural landscape to the north west and north east of the proposed site.

Therefore, as a result of ground truthing from a multidisciplinary ecological survey carried out on site in February 3rd, and an additional site visit carried out on May 5th 2022, the proposed site was deemed unsuitable for supporting ex-situ foraging habitat for wintering bird populations or Special Conservation Interest species to any degree that would require wintering bird surveys to be carried out for – or to have the potential to provide foraging habitat that would support SCI species populations to any degree that would be significant in terms of contributing to the conservation objectives for Special Conservation Interest species for the SPAs in Dublin Bay and the Malahide Estuary.

In summary, the site is of very low value as an ex-situ foraging resource for wintering bird populations or SCI species due to: 1. multiple neighbouring significant anthropogenic disturbances, 2. combined with the lack of suitable foraging habitat for these groups present on site, and 3. the abundant availability of suitable ex-situ foraging habitat for SCI species in the wider landscape to the north of the site and east of Dublin airport. This assessment is also reflected in and detailed in the AA screening accompanying this application.

Amphibians
No frogs were observed on site. No suitable habitat of any permanent significance for amphibians was recorded within the proposed site during the multidisciplinary survey of February 3rd. This is deemed significant survey effort as this survey was conducted during the winter period of high rainfall and flooding and thus I the optimum period for identify semi-permanent freshwater habitat on site. Therefore a dedicated amphibian survey was deemed unnecessary for this assessment.

Invertebrates
There were no habitats or food plants of potential significance to support invertebrate species assemblages of any local ecological significance, or to support any protected species. Therefore, a dedicated invertebrate survey was deemed unnecessary for this assessment.

6.5 POTENTAL IMPACTS

Based on the baseline ecological environment of the proposed site, and the extent and characteristics of the proposed development, the following potential impact sources have been identified:

1. Augmentation of existing habitats, as well as the removal of some small areas of hedgerow/treeline
2. Construction and Earthworks
3. Lighting during construction
4. Noise/vibration
5. Emissions/Air pollution
6. Hydrology via surface water run-off
7. Climate

These potential impacts are discussed below:

6.5.1 AUGMENTATION OF EXISTING HABITATS, AS WELL AS THE REMOVAL OF HEDGEROWS

- The removal of any vegetation on site has potential to negatively impact breeding bird populations via reduction of available foraging, roosting or breeding habitat.
- Removal of vegetation could also result in a reduction in insect life, also indirectly affecting mammal and bird populations.

6.5.2 CONSTRUCTION & EARTHWORKS

- The proposed development could interact with local habitats via dust, soil removal, and construction disturbance.
- The demolition of existing buildings on site as part of the proposed development only has potential to interact with ecological features in terms of potential bat roost features for this site. As stated in s. s. 6.4.7.3 above, an inspection of these buildings marked for demolition for potential bat roost features, or evidence of current of previous use as a bat roost, was carried out and no evidence of any of the buildings on site was found for having potential as bat roost features.

6.5.3 LIGHTING DURING CONSTRUCTION & OPERATION

- Even though the site did not record any use of bat roosts, and had very low levels of foraging and commuting activity by bats, it is still prudent to assume that any strong lighting in the area of the proposed project implemented as a result of the project could impact species that use the site itself but also surrounding habitats for foraging and commuting, if not implemented with the appropriate ecological considerations.
- Bats, non-volant mammals, and birds are sensitive to any significant changes in lighting within semi-natural habitat in which they reside.

6.5.4 NOISE & VIBRATION

- The construction phase and movement of machinery could cause localised disturbance of breeding birds and wading birds that may use the habitats within the site area. However, there is likely to be an existing degree of habituation to human activity in the local areas due to the occurrence of Dublin airport nearby, the N2 dual carriageway, and the Huntstown quarry.
- Disturbance due to operational phase noise from the plant itself.

6.5.5 EMISSIONS & AIR POLLUTION

- Air pollution effects have potential to affect flora and fauna. However as shown in Chapter 9 of this EIAR, changes in air quality are predicted to be imperceptible as a result of the proposed development.

6.5.6 HYDROLOGY

- A minor agricultural drainage ditch which is now dry runs along the eastern boundary of the site and leads to the Huntstown Stream (6.4). Even though this drain is mostly dry through the year (indicated by the vegetation which has colonised the drain banks and base), it must be considered as a potential hydrological link nonetheless; as the Huntstown Stream (which connects to the Ward River downstream), is linked to the drain (Apart from the aforementioned dry drainage ditch, there is no direct active surface hydrological connection between the proposed site and European sites.)
- This drain is characterised as dry most of the year due to the vegetation recorded to be colonising its banks and base during the ecological site visit (such as Common Ivy and Male Ferns).
- In the event of heavy rainfall, and considering the nature and activity of the proposed project and the distance of European sites, it is considered that heavy rainfall into this drain will still have negligible potential effects on the quality of downstream riverine habitats that are part of and connected to the Huntstown Stream (ref Chapters 7 and 8 also) due to the distances involved and the infrequent occurrence of flooding to a degree that would rewet the drainage ditch and connect to the Huntstown stream for a significant period of time.

6.5.7 CLIMATE

- Climate change has the potential to alter weather patterns and increase the frequency of rainfall in future years and considering various national and international Climate agreements and targets that the Irish Government is bound to, the proposed development has potential source for emissions in the context of current emissions and climate targets, that can inadvertently contribute to negative effects on biodiversity brought by climate change.
- Thus, considering the nature of the proposed development as a power station, this project has potential to contribute to the elements that establish and alter climate change, which can have varied effects on biodiversity - though their connection to a singular project can be difficult to establish, they must be considered.

6.5.8 POTENTIAL IMPACTS ON DESIGNATED SITES

The AA Screening Report accompanying this report sets out the likelihood and significance of any potential effects to European designated sites as a result of the proposed development in Kilshane Cross, Dublin. It finds that no significant adverse effects are foreseen to be likely to affect the ecological integrity of any European sites.

6.6 MITIGATION & MONITORING MEASURES

Considering the ecological characters and quality of habitats and features of the proposed site, the surrounding landscape context, and the nature and design of the proposed project, it is assessed that the implementation of the proposed development will have a short-term duration, and low magnitude impact (i.e., in terms of the habitat lost as a result of the proposed development - relative to the proposed landscape plan for the operational phase, and the proposed native habitat mosaics and species diversity therein, which are of higher biodiversity value than the current baseline of the site). However, the following mitigation measures

are nonetheless proposed in order to ensure that the short-term, low magnitude impacts are avoided and/or minimised.

6.6.1 AUGMENTATION OF EXISTING HABITATS, AS WELL AS THE REMOVAL OF HEDGEROWS

- Vegetation removal during the breeding bird season (1st March to the 31st of August) will be avoided. Where this is unavoidable it will be subject to advice and supervision by a suitably qualified ecologist consulted prior to and during the work.
- No vegetation will be removed beyond the minimum required to complete the task.
- Timing of works affecting vegetation will be as brief as possible to minimise potential disturbance effects.
- The removal or management of trees on site as a result of the proposed development shall be carried out in accordance with the recommendations provided in the Arboricultural Impact Statement accompanying the application.
- Although the potential bat roost features identified on site recorded no activity during an emergence survey – this could be a seasonal effect as bats can use different roosts in different seasons. Therefore, as a precautionary measure, the areas identified as having potential for bat roost features shall be surveyed again, prior to any construction work being carried out on site, by an appropriately qualitied ecologist, to ascertain if there is any roosts activity within the features. The potential roost feature on the eastern boundary of the proposed site is a large tree that is being retained as part of the proposed development, and had a suitable lighting plan associated with the area. The roost feature that is in the centre north of the proposed site, is part of three non-native trees to be removed as part of the proposed landscaping plan and resulting from the arborist assessment and report. Therefore, in the unlikely event that a bat roost is identified at this centre north potential roost feature; the ecologist shall follow procedure as set out in the Bat Mitigation Guidelines for Ireland[25], and contact the NPWS as required.
- The operational phase of the proposed development will have a Landscaping Plan and a Green Infrastructure Plan which will outline a permanent diverse planting scheme and habitat mosaics mix composed of native species for the proposed site. Aspects of the landscaping plan which detail the planting of diverse native species and habitat matrixes are anticipated to mitigate against the permanent loss of foraging habitat for breeding birds which will occur due to the loss of the crop system habitat within the proposed site, along with scrub patches, and two areas of overgrown agricultural grassland. The planting scheme shall provide areas of native floral species planting, combined with mixed native grassland species planting, and native understory canopy planting.

6.6.2 CONSTRUCTION & EARTHWORKS

- During construction, dust controls will be implemented in accordance with the mitigation measures set out in Chapter 9.

6.6.3 LIGHTING DURING CONSTRUCTION & OPERATION

The below lighting measures will be put in place during both the construction and operational phases to ensure that there are no short to long-term effects on local bat populations as a result of the proposed development. The proposed site itself is of low value for local bat populations as evidenced by the activity survey, and potential roost features emergence survey. However, the below measures will ensure there is not significant increase in lighting that would potentially significantly impact the value of local bat commuter and foraging habitats as a result of the proposed development.

- Construction phase lighting will be controlled to minimise light pollution as a matter of good practice. Construction phase lighting controls will include the implementation of lights out hours when construction is not active on site (evening and night hours) (see section 6.6.3.1 below for lighting types).

[25] Marnell, F., Kelleher, C. & Mullen, E. (2022) Bat mitigation guidelines for Ireland v2. Irish Wildlife Manuals, No. 134. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Ireland

- Operational phase lighting at night will be only be used where necessary and will be directional/cowled and at a low level where possible (see section 6.6.3.1 below for lighting types). Illumination of surrounding tree canopies will be avoided.
- Motion sensor activated lighting will be used where possible.
- Low height columns will be used where possible
- All lighting will be cowled / directional away from hedgerows and away from any gaps in hedgerows (bat commuting routes)
- Lighting fixtures will be kept at least 5 m from hedgerows (from the outer edge of hedgerow spread and tree crowns)
- Lux levels at edges of retained hedgerows and hedgerow gaps (bat commuting routes) will be no more than 1.5 lux or no more than existing levels if lighting already exists[26] (See Table 6.3 below providing context for typical lux levels).
- Pre and post construction monitoring of lux levels will be carried out by lighting professional and compliance demonstrated in report form.
- New planting will be located to buffer light spill where motion sensor and low height columns recommended above are not possible.

6.6.3.1 Lighting Types

- Light emitting diodes (LEDs) will be used where possible[27].

Also possible for implementation are compact fluorescent lights, but only variants with a low UV output. These lower UV versions can similarly can be used at a low wattage with a lower impact on invertebrate populations and bats populations.

Table 6.3 Typical light lux levels

Typical light lux levels	
Lighting type	Lux level
Typical road side lighting	~ 5
Minimum security lighting	~ 2
Twilight	~ 1
Clear full moon	~ 0.25 - < 1

6.6.4 NOISE & VIBRATION

- Best practice measures for minimising and reducing noise and vibration from construction will be followed.

6.6.5 HYDROLOGY

- The implementation of best practice regarding SUDS and surface water drainage systems on site as part of the construction and operational phases, are deemed adequate to ensure that there are no potential impacts to the hydrological quality of the Huntstown River or connecting rivers downstream.

6.6.6 CLIMATE

Chapter 9, "Air Quality and Climate", of this EIAR addresses the emissions from the proposed development in detail. Those parts of Chapter 9's emissions assessment which are relevant for this chapter are outlined below:

[26] 2018, Bat Conservation Trust. Guidance Note 08/18: Bats and artificial lighting in the UK. In particular Section 2 "Artificial Lighting". Available at: https://www.bats.org.uk/news/2018/09/new-guidance-on-bats-and-lighting

[27] 2010, Bat Conservation Ireland. Bats & Lighting, Guidance Notes for Planners, engineers, architects and developers. Available at: https://www.batconservationireland.org/wp-content/uploads/2013/09/BCIrelandGuidelines_Lighting.pdf.
LEDs are easily directed and research indicates that their lower UV component than most other commonly used lighting attracts fewer invertebrates and thus reduces the effect on bat foraging, and the warmer white colour versions (preferably <2700 Kelvin) has peak wavelengths which cause less impacts on bat commuting while having little reduction in lumen output (preferably peak wavelengths higher than 550nm).

- Overall, the impact on climate associated with the operational phase of the power generation facility is considered direct, long-term, positive and slight.

See Chapter 9 "Air Quality and Climate", for full detail on the assessment carried out of the potential climate impacts as a result of the proposed development.

6.7 RESIDUAL IMPACTS

There will be no net decrease in terms of the ecological integrity of the site due to supplemental planting of native understory woody species and native floral species as part of the landscaping plan for the proposed project – which will increase the biodiversity of the proposed site relative to the current receiving environment – and increase the ecological complexity and value of the site. These measures, in addition to the retention of the majority of hedgerows and treelines on site, and the implementation of a Green Infrastructure Plan in accordance with objectives of the County Development Plan, are predicted here to ensure that the potential impacts on flora and fauna during construction and operational phases of the proposed development will be of low magnitude (i.e., in terms of the habitat lost as a result of the proposed development - relative to the proposed landscape plan for the operational phase, and the proposed native habitat mosaics and species diversity therein, which are of higher biodiversity value than the current baseline of the site), and of a short-term duration.

The operational phase will be in keeping with the current function and usage of the surrounding landscape. Climate and the impact on emissions on air were also considered in this assessment (see Chapter 9 "Air Quality and Climate"), and it is deemed that there will be no residual impacts from emissions as a result of the construction or operational phases of the proposed development.

Therefore, considering the nature of the proposed development, the site context, the low magnitude, and short-term duration of the potential impacts of the proposed development assessed herein, in combination with suitable, site specific, tailored mitigation to address the potential impacts, residual medium to long-term impacts on the biodiversity and ecological integrity of the site are anticipated to be of negligible magnitude.

6.8 CUMULATIVE IMPACTS

6.8.1 PLANS OF RELEVANCE TO THIS PROPOSAL

Key plan of relevance in the context of this proposal:

- Fingal County Development Plan 2017-2023:

The proposed development site lies within a relatively industrialised area in Dublin, and is contained within lands zoned for industrial development within the Fingal County Development Plan. This plan has also undergone SEA and AA processes – and any in-combination effects identified therein will have been addressed by appropriate mitigation measures. Therefore, as there are no significant impacts associated with the proposed project to biodiversity, there are no cumulative impacts foreseen between the proposed development and the Fingal County Development Plan.

There are several proposed projects in the vicinity which are at planning stage or underway on various sites. A review of Fingal County Council's planning database for recent projects within the project area identified that, in addition to the neighbouring permitted 293 MW power station, the projects within the area are large scale works predominantly relating to the construction of warehouses and industrial structures, and some medium scale projects relating to extensions and alterations of already existing structures (a list of recent planning applications is provided in Appendix 17.1 of this EIAR)

6.8.2 ADDITIONAL PROJECTS OF RELEVANCE TO THIS DEVELOPMENT

Projects in the immediate area that are of relevance to this project assessment in terms of cumulative impacts are listed below. These developments, will also be subject to EIA and AA assessments as required.

6.8.2.1 FW22A/0204 and ABP-317480-23

Permission granted for gas power turbine generation station to the northeast of site. In summary, the proposed development will consist of the following;

- The construction of a new Gas Turbine Power Generation Station with an output of up to 293 Megawatts
- The demolition of a detached residential dwelling and associated farm buildings
- Road improvement works to 493.34 m Kilshane Road (L3120), including the realignment of a portion of the road (293.86 m) within the subject site boundary and the provision of new footpaths, off-road cycle ways, together with the construction of a new roundabout

An EIAR was prepared and submitted with this application and predicted that, taking account of mitigation proposals, the development would have no significant impact on the environment.

6.8.2.2 ABP-314894-22

A. GIS and Grid Connection

The GIS substation will be located within the site that is the subject of this EIAR and will cause no significant additional or cumulative impacts on biodiversity. The Grid connection will Utilise the existing connection under the FW22A/0204 and ABP-317480-23 permission. The connection will cause no significant impacts on biodiversity.

B. AGI and Gas Pipeline

An Above Ground Installation (AGI) will regulate delivery of gas supply to the power station. This, and its associated gas supply pipeline, will be the subject of a separate consent process regulated by the Commission for Regulation of Utilities.

Similar to the GIS substation, the AGI will be located within the site that is the subject of this EIAR and will cause no significant additional or cumulative effects on biodiversity. The gas pipeline connecting it to the nearby gas main

Therefore considering the nature of the proposed development, the site context, the low magnitude, and short-term duration of the potential impacts of the proposed development assessed herein, in combination with suitable site specific, tailored mitigation to address the potential impacts, no significant cumulative effects are anticipated during the construction or operational phases in-combination with the above plans or projects as a result of the proposed development.

7 LAND, SOILS, GEOLOGY & HYDROGEOLOGY

7.1 INTRODUCTION/ METHODOLOGY

This chapter assesses and evaluates the potential impacts of the Proposed Development on the land, soil, geological and hydrogeological aspects of the site and surrounding area, in accordance with the requirements of Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment (i.e. the EIA Directive) (European Union, 2014a). This Chapter also provides a characterisation of the receiving hydrogeological environment within the subject lands and within a wider study area in the vicinity of the proposed development. In assessing likely potential and predicted effects, account is taken of both the importance of the attributes and the predicted scale and duration of the likely effects.

7.1.1 RELEVANT GUIDANCE

The hydrogeological baseline assessment has been carried out in accordance with the following guidance and established best practice:

- Environmental Protection Agency (EPA) Advice notes on current practice in the preparation of Environmental Impact Statement, Draft (EPA, 2015) and Guidelines on the Information to be contained in Environmental Impact Statements (EPA, 2022).
- TII/National Roads Authority Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (TII/formerly NRA, 2009).
- Water Framework Directive (WFD) - Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy. This relates to the improvement of water quality across Ireland including rivers and groundwater bodies.
- River Basin Management Plan 2018-2021 (including regional plans by Local Authority Waters Programme (Waters and Communities 2020)). Draft River Basin Management Plan 2022-2027.
- Institute of Geologists Ireland (IGI) -Geology in Environmental Impact Statements, a guide (IGI, 2002) and Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements (IGI, 2013).

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

- European Communities Environmental Objectives (Groundwater) Regulations 2010 (S.I. No. 9 of 2010).
- European Communities Environmental Objectives (Groundwater) Amendment Regulations 2016 (S.I. No. 366 of 2016); European Communities Environmental Objectives (Groundwater) (Amendment) Regulations 2022 S.I. No. 287 of 2022.
- Part IV of the First Schedule of the Planning and Development Act 2000, as amended.
- European Communities (Water Policy) Regulations 2003 (S.I. No. 722 of 2003)
- Environmental Protection Agency 'Towards Setting Guideline Values for the Protection of Groundwater in Ireland Interim Report', (EPA 2003).
- European Union (Drinking Water) Regulations 2014 (S.I. No. 122/2014).
- European Union (Drinking Water) (Amendment) Regulations (S.I. No. 464 of 2017).

7.1.2 CRITERIA FOR RATING OF EFFECTS

This chapter evaluates the effects, if any, which the Proposed Development will have on Land, Soils, Geology and Hydrogeology as defined in the Environmental Protection Agency (EPA) 'Guidelines on the Information to be contained in Environmental Impact Assessment Reports' (EPA, 2022).

The Draft EPA document entitled 'Advice Notes for Preparing Environmental Impact Statements' (EPA, 2015) is also followed in this geological and hydrogeological assessment and classification of environmental effects.

Due consideration is also given to the guidelines provided by the Institute of Geologists of Ireland (IGI) in the document entitled Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements' (IGI, 2013).

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

The rating of potential environmental effects on the land, soil, geological and hydrogeological environment is based on the standard EIAR impact predictions table included in Chapter 1 which takes account of the quality, significance, duration, and type of effect characteristic identified (in accordance with impact assessment criteria provided in the EPA Guidelines (2022) publication).

The duration of each effect is considered to be either momentary, brief, temporary, short-term, medium term, long-term, or permanent. Momentary effects are considered to be those that last from seconds to minutes. Brief effects are those that last less than a day. Temporary effects are considered to be those which are construction related and last less than one year. Short term effects are seen as effects lasting one to seven years; medium-term effects lasting seven to fifteen years; long-term effects lasting fifteen to sixty years; and permanent effects lasting over sixty years.

The TII criteria for rating the magnitude and significance of impacts on the geological related attributes and the importance of hydrogeological attributes at the site during the EIA stage are also relevant in assessing the impact and are presented in Tables 1-5 in Appendix 7.1.

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

- Geological heritage sites in the vicinity of the perimeter of the development site;
- Landfills, industrial sites in the vicinity of the subject site and the potential risk of encountering contaminated ground;
- The quality, drainage characteristics and range of agricultural uses of soil around the site;
- Quarries or mines in the vicinity, the potential implications (if any) for existing activities and extractable reserves;
- The extent of topsoil and subsoil cover and the potential use of this material on site as well or requirement to remove it off-site as waste for disposal or recovery;
- High-yielding water supply springs/ wells in the vicinity of the subject site to within a 2km radius and the potential for increased risk presented by the Proposed Development;
- Classification (regionally important, locally important etc.) and the extent of aquifers underlying the site perimeter area and increased risks presented to them by the Proposed Development associated with aspects such as for example removal of subsoil cover, removal of aquifer (in whole or part), drawdown in water levels, alteration in established flow regimes, change in groundwater quality;
- Natural hydrogeological/karst features in the area and potential for increased risk presented by the activities at the site; and
- Groundwater-fed ecosystems and the increased risk presented by operations both spatially and temporally.

7.1.3 SOURCES OF INFORMATION

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

- Geological Survey of Ireland (GSI) - on-line mapping, Geo-hazard Database, Geological Heritage Sites & Sites of Special Scientific Interest, Bedrock Memoirs and 1: 100,000 mapping;

- Teagasc soil and subsoil database;
- Ordnance Survey Ireland - aerial photographs and historical mapping;
- Environmental Protection Agency (EPA) – website mapping and database information;
- National Parks and Wildlife Services (NPWS) – Protected Site Register.

Site specific data was derived from the following sources:

- Site Investigation Report. Kilshane, Ballycoolin, Dublin 15. Site Investigation Ltd., December 2021;
- Various design site plans and drawings; and
- Consultation with site engineers.

7.2 THE PROPOSED DEVELOPMENT

The proposed development is described in in Chapter 4 *Project Description*. The details of the construction and operation of the development in terms of Land, Soils Geology and Hydrogeology are given in Table 7.1 below.

Table 7.1 Summary of site activities

Phase	Activity	Description
Construction	Discharge to Ground	Run-off percolating to ground at the construction site.
	Earthworks: Excavation of Superficial Deposits	Ground works will be required to clear the site and levelling. All structures will require foundations to the structural engineers' specifications. The removal of localised overburden material will be required during preparation of the foundations and platform for the proposed structures. The planned foundation works foresee the excavations of up to depths of c. 9.05 mbgl. Excavations into the bedrock is foreseen as it was encountered at c. 1.5-3.7 mbgl. It is predicted that all the spoil generated during site preparation/levelling will be used in landscaped of berms. There will not be a requirement for disposal off site.
	Storage of soils/aggregates	Aggregate materials such as sands and gravels will be stored in clearly marked receptacles within a secure compound area to prevent contamination and to ensure this resource is reused on-site for the purpose of landscaping where possible. Temporary storage of spoil will be managed to prevent accidental release of dust and uncontrolled surface water run-off which may contain sediment and solid matter. Materials will be sent off site for recycling where possible and, if not suitable for recycling, materials will be disposed of to an appropriate permitted/licensed waste disposal facility.
	Storage of hazardous Material	Temporary storage of fuel required for on site for construction traffic. Liquid materials i.e. fuel storage will be located within temporary bunded areas, doubled skinned tanks or bunded containers (all bunds will conform to standard bunding specifications - BS8007-1987) to prevent spillage.
	Import/Export of Materials	It has been estimated that 64,500m^3 of excavated subsoil and topsoil will be generated and it is currently anticipated that the totality of this will be reused for landscaping of the berms. There will not be a requirement for disposal off site. Importation of fill will also not be required. Material removed from site may be re-used offsite for beneficial use on other sites with appropriate planning/waste permissions/derogations (e.g., in accordance with Article 27 of the European Communities (Waste Directive) Regulations 2011) as amended or will be reused, recovered and/or disposed off-site at appropriately authorised waste facilities. The removal of waste from the site will be carried out in accordance with Waste Regulations, Regional Waste Plan (Eastern Midland Region) and Waste Hierarchy/Circular Economy Principals. Refer to Chapter 14 Waste Management for further detail.
	Dewatering	The deepest excavation is c. 9.05 mbgl. Therefore, localised dewatering can be expected during the excavation works, mainly related with perched groundwater within the subsoil which will require to be drained.
Operation	Increase in hard standing area	The proposed surface water networks for the development collect runoff from roofs, roads and other hard standing areas through a filter drainage system and gullies. The proposed development

Phase	Activity	Description
		represents an overall increase in hardstanding surfaces of c. 28,720 m^2. Storm water from the site will discharge at a controlled rate, limited to the greenfield equivalent runoff, to the existing ditches forming the site boundary. These local ditches serve to drain the subject site and adjacent agricultural lands and convey surface water flow from rainfall in a north easterly direction to subsequently merge and flow north east to join the River Ward (at St. Margarets Golf and Country Club), a tributary of Broadmeadow River which ultimately flows into the Malahide Estuary SPA, SAC pNHA site.
	Storage and management of hazardous Material (oil)	The General Electric 9FA.04 combustion turbine is dual fuel capable, with emergency operation < 500 hours per year on EN590 ultra low sulphur diesel fuel oil (<10ppmw). The facility will include a fuel oil tank, unloading station, forwarding pumps, and piping system to convey the fuel oil to the combustion turbine. The fuel oil will be delivered in tanker trucks. The unloading station will consist of a kerbed concrete tanker truck unloading pad adjacent to the facility road sized to contain 110% of a tanker truck volume (33.4 m3), a pumped tanker truck unloading station within the kerbed unloading area, and single wall piping routed to the fuel oil tank. Combustion turbine fuel oil will be stored in a nominal 6,246 m^3 capacity field erected welded steel tank. The tank nominal sidewall height is 14 m, with maximum height at top of tank roof structure not to exceed 16.2m. Nominal tank diameter is 24.4m. The tank will be installed on a concrete foundation, and will include a secondary nominal 27.4m diameter wall for leak containment. A spiral stairway will provide access to the top of the tank and to the annular containment area for inspection and maintenance activities. The secondary containment wall height will be sized for at least 110% tank capacity, and will be high enough to avoid issues with spigot/jetting flow from a leak. A shed roof (or equivalent) will be provided to minimize rainwater ingress into the containment area. The fuel oil forwarding system consists of a fuel oil forwarding pump skid and piping to the combustion turbine skid. The forwarding pump skid, complete with piping, equipment, valves, and fittings will be located in the same kerbed unloading area described above to contain leaks during operation and maintenance. A section of piping may be routed underground. Underground piping will be double wall and welded with a leak detection system. Above ground piping is connected to the turbine liquid fuel/atomizing air module located to the south of the combustion turbine, and is single wall welded, with Type A connections and fittings. The above ground discharge piping from this module is connected to the turbine and is single wall welded, with Type A connections and fittings. The risk to the aquifer is considered low due to the mitigation in place for containment, delivery and distribution and use of oil interceptors on the stormwater system downgradient of the offloading area and prior to discharge from the site.

As outlined in Table 7.1 above, the activities required for the construction phase of the proposed development represent the greatest risk of potential impact on the geological and hydrogeological environment. These activities primarily pertain to the site preparation, excavation, levelling and infilling activities required to facilitate construction of the proposed development.

7.3 THE RECEIVING ENVIRONMENT

The receiving environment is discussed in terms of land geology, soils, hydrogeology and site history including potential for existing and historical contamination.

7.3.1 GENERAL DESCRIPTION OF THE SITE

The site is located to north west of Dublin city centre, adjacent to the N2 national carriageway and to the north east of Ballycoolin industrial estates. The proposed development site is c. 14.5hectares of partly developed and partly greenfield land located south west of the N2 flyover intersection of Kilshane road and Kilshane Cross in the townland Kilshane/Piperstown, Dublin 11.

The subject site is currently a greenfield site, used for agricultural purposes. There is no existing surface water drainage network adjacent to or on-site. The site is comprised of multiple fields separated by hedgerows, and generally slopes from west to east. Surface water, rainfall, is generally percolated through the site via grass and soil. The topographic survey has confirmed that the internal and boundary hedgerows contain ditches which convey flow to an unnamed ditch system to the east of the site, during heavier rainfall events. These ditches only serve the subject site and the agricultural fields immediately to the west, located between the subject site and the Kilshane Road, and does not convey any upstream watercourse.

This ditch generally flows in a north-easterly direction to join the River Ward at St. Margaret's Golf and Country Club. The River Ward is a tributary of the Broadmeadow River, which in turn outfalls to the Irish Sea at the Malahide Estuary.

7.3.2 LAND USE

The majority of the site is currently in use for arable agricultural activities. Access / entrance is found in the north portion of the site via a driveway off Kilshane road. The northwest of the site is occupied with building structures characterised by a residential and associated agricultural function. The south of the site is bounded by agricultural land, directly adjacent to Huntstown Quarry and Huntstown Powerplant. The site is bounded to the east by the N2 national carriageway, to the north by Kilshane Road, and to the west by agricultural land.

Land use in the vicinity of the site is characterised by a mixture of primarily agricultural and an industrial function. Land to the north and north east is dominated by farmland and scattered residential dwellings with an associated agricultural function with the exception of Bay Lane Quarry. Dublin Airport is approximately 3.1 km to the north east. Huntstown Quarry and adjacent Huntstown Powerplant are located directly to the south, while Dublin Airport Logistics Park and Northwest Business Park are found to the east and west of the site, respectively. Further south are more greenfield lands and the M50

According to the EPA (2022) there are 3 no. licensed activities currently active in the vicinity of the subject site (between 550 and 1 km to the south of the southern boundary of the development site). These are:

- Energia Power Limited (P0077-02);
- Huntstown Power Company (P0483-04);
- Huntstwon Bioenergy Limited (P0993-02)

Huntstown quarry is a licensed inert waste recovery facility operating under license number W0277-03 issued in 2015. From a review of the Annual Environmental Reports and Licensee Reports related to the activities at the Huntstown Power Station and Huntstown Quarry on the EPA website a number of noncompliance issue were noted. However, there is no indication that these would result in adverse environmental impact on the subject site as it is located downgradient and therefore there would no effects on soils or groundwater underlying the subject site due to its operation (refer to Section 7.3.8 below).

Consultation with Fingal County Council have confirmed that there are no known illegal/historic landfills within 500 metres of the site. Historical Ordnance Survey maps were examined for the purpose of this assessment. O.S. maps were available from 1830 (the historic 6" maps) and 1900 from the historic 25" maps. The historic maps indicate that the subject site was greenfield up to the present. No evidence was noted to indicate commercial or industrial processes have been undertaken on the subject site. The subject site appears to be used for agricultural purposes possibly grazing, cropping, storing cattle.

According to historical maps and aerial photographs this land use has not changed from 1830 to present. However, the associated building structures currently occupying the northwest corner of the site are absent from the 1830 and 1900 historical maps, suggesting these structures were established sometimes between then and when they are first displayed in the 1995 aerial photograph.

7.3.3 SITE INVESTIGATION WORKS

investigations included the following:

- Excavation of sixteen trial pits with dynamic probes across the large site area to examine soil conditions and if any infill or foreign material is present across the land (TP; depths up to 3.1 mbgl);
- Drilling of four Cable Percussion Boreholes followed by rotary coreholes (depths up to 6.7 mbgl).
- Environmental testing was completed for a Waste Classification.

Trial pit and borehole logs are included in Appendix 7.2, which include a description of the lithologies observed in each excavation, depth to bedrock, type of bedrock and any water strikes encountered during the excavations.

Samples were collected from the arisings from all of the trial pits, which were considered representative of the material observed at the selected sampling location and were transferred directly into laboratory-supplied containers. The containers were then clearly labelled to identify the sample location and depth. Standard sampling techniques were used to collect the samples, which are designed to reduce the risk of cross contamination between sampling events. Appendix 7.3 presents tables with the soil analytical test results.

7.3.4 SOILS

The GSI/ Tegasc mapping shows that the soil type beneath the local area is composed predominantly of BminPD mainly basic poorly drained soils coupled with BMinDW mainly basic deep well-drained mineral soils. BminSW mainly basic shallow well drained soils is found in lesser abundance in the vicinity of the subject site.

A ground investigation undertaken by Site Investigation Ltd. (2021) reported the ground conditions to be consistent with cohesive brown and brown grey slightly sandy slightly gravelly silty CLAY with occasional black CLAYs encountered.

7.3.5 SUBSOILS

The Quaternary geological period extends from about 1.5 million years ago to the present day and can be sub-divided into the Pleistocene Epoch, which covers the Ice Age period, and which extended up to 10,000 years ago and the Holocene Epoch, which extends from that time to the present day. The GSI/ Teagasc mapping database of the subsoils in the area of the subject site indicates one principal soil type. The quaternary subsoil type present across the site is:

- LIMESTONE till Carboniferous (TLs). The north portion of the subject site is composed primarily of TILL derived from limestone. This till is made up of glacial CLAYs which are less permeable than alluvium subsoils.

- Bedrock OUTCROP or shallow underlying SUBCROP. The southern portion of the site is dominated by a combination of bedrock outcrop and shallow buried subcrop according to the GSI mapping.

The EPA soil mapping indicates that the soils comprise primarily of Carboniferous limestone diamictons (tills). The EPA have classed this area as non-irrigated agricultural land with arable farming function while the east portion of the site is characterised by a complex cultivation patterns. The southern end of the site lies within the boundary of previous mineral extraction sites.

As mentioned above, site investigations were undertaken in 2021 within the site boundary and adjacent lands to establish the shallow soil and water conditions. Five trial pits were excavated within the site boundary (referenced TP04, TP05, TP06, TP08, TP10, TP11, TP12 and TP13). Four boreholes (referenced BH01 to BH04) were drilled using a rotary rig to a depth between 20.0 mbgl and 21.7 mbgl. Water strikes are detailed in the trial pit and borehole logs. The soil profile encountered can be summarised accordingly as follows:

- Topsoil: From ground level up to 0.2-0.3 mbgl.
- Subsoil: Cohesive Deposits (sandy gravelly Clay) underlie topsoil up to depths of 1.5-3.7 mbgl.
- Weathered Limestone Bedrock/ Bedrock was encountered below subsoil.

This profile encountered at the site is considered to be representative for characterising the site in question. Trial pit and borehole logs from the above investigation can be viewed in Appendix 7.2.

7.3.6 BEDROCK GEOLOGY

Inspection of the available GSI (2020) records (Data Sheet 16 and on-line mapping database) shows that the bedrock geology of the site and the surrounding area is dominated by Calcareous shale and limestone conglomerates referred to as part of the Tober Colleen Formation (Rock Unit code: CDTOBE). Massive unbedded lime mudstone associated with the Waulsortian Limestones Formation (CDWAUL) are found underlying immediately southeast/east of the site.

The regional area is highly geologically variable. GSI maps do show the site as overlying the Tober Colleen formation which is bordered to the south east by Waulsortian Limestones (which have been noted to underly the Tober Colleen), further to the south and east by the Boston Hill Formation, to the north east by the Rush Conglomerate Formation. Due to this variability the GSI (2022) bedrock geology map (100K structural database) indicates a number of faults in the study area, one of which passing/transverse through the site with a north-south orientation.

According to the rotary cores drilled in the subject site, the encountered bedrock can be classified as weak to moderately strong Calcareous Mudstone interbedded with moderately strong argillaceous limestone characterised by slight weathering.

Site investigations indicate bedrock depth immediately south of the site (while within the same agricultural plot of land) was recorded at 3.6, 3.3, 3.7 and 3.5 mbgl at BH01, BH02, BH03 and BH04 respectively, while intrusive investigations within the site boundary were terminated at shallower depths subsequently encountering no bedrock, with the exception of the following trial pits which encountered obstructions (possible bedrock) at the following depths:

- TP05: 2.7 mbgl;
- TP06: 2.4 mbgl;
- TP08: 2.0 mbgl;
- TP11: 1.5 mbgl;
- TP13: 2.7 mbgl.

7.3.7 REGIONAL HYDROGEOLOGY

The GSI has devised a system for classifying the bedrock aquifers in Ireland. The aquifer classification for bedrock depends on a number of parameters including, the area extent of the aquifer (km^2), well

yield (m3/d), specific capacity (m3/d/m) and groundwater transmissivity (mm3/d). There are three main classifications: regionally important, locally important and poor aquifers. Where an aquifer has been classified as regionally important, it is further subdivided according to the main groundwater flow regime within it. This sub-division includes regionally important fissured aquifers (Rf) and regionally important karstified aquifers (Rk). Locally important aquifers are sub-divided into those that are generally moderately productive (Lm) and those that are generally moderately productive only in local zones (Ll). Similarly, poor aquifers are classed as either generally unproductive except for local zones (Pl) or generally unproductive (Pu).

From analysis of GSI National data the bedrock aquifer underlying the study site is classified as Poor which is characterised as Generally Unproductive except for Local Zones. GSI mapping has shown a Locally Important Aquifer (LI) which is moderately productive only in Local Zones located in close proximity immediately south of the site.

7.3.8 AQUIFER VULNERABILITY

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

The GSI currently displays/shows varied aquifer vulnerability across in the region. The approximate northwest half of the site overlies a 'Moderate' vulnerable aquifer, while moving south east the vulnerability progresses to 'High' and 'Extreme' in the southeast portion of the site. As can be seen from Table 7.2 below an 'Extreme' vulnerability with clayey subsoil denotes a depth to bedrock of 0-3 mbgl with 'High' vulnerability categorised as 3-5 mbgl.

Table 7.2 Vulnerability Mapping Guidelines (Source: GSI, 2022)

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

Notes: (1) n/a: Not applicable

(2) Precise permeability values cannot be given at present

(2) Release point of contaminants is assumed to be 1-2 below ground surface

The site investigations carried out by Site Investigations Ltd. in 2021 confirmed that the depth to bedrock to the east in the study area ranges between 1.5-3.7 mbgl which is representative of an 'Extreme' groundwater vulnerability.

7.3.9 GROUNDWATER LEVELS AND FLOW DIRECTION

The GSI Well Card Index is a record of wells drilled in Ireland, water supply and site investigation boreholes. It is noted that this record is not comprehensive as licensing of all wells is not currently a requirement in the Republic of Ireland. This current index does not show any wells drilled or springs at the site or in the immediate vicinity. The well in closest proximity to the site is located approximately 1.3 km to the south (Church Well). None of the wells is the surrounding area listed are categorised as domestic use. The area is serviced by Local Authority mains therefore it is unlikely that any wells are used for potable supply. The site is not located near any public groundwater supplies or

group schemes. There are no groundwater source protection zones in the immediate vicinity of the site. The closest is approximately 10 km to the west (Dunboyne PWS) and the proposed site is outside of the zone of contribution of this supply.

Regional groundwater flow would most likely be to the south – southeast towards the River Tolka and Dublin Bay. However, it is understood that dewatering activates are taking place at Huntstown quarry and these will likely have a local influence on the groundwater flow at the subject site. In particular they will control any potential migration pathway from the quarry towards the subject site.

7.3.10 SOIL QUALITY

There are no legislated threshold values for soils in Ireland. As such soil samples were compared to a Generic Assessment Criteria (GAC) derived to be protective of human health, water bodies (including groundwater) and also ecology for a resident and commercial/industrial end use.

GAC in the UK has been derived using the Contaminated Land Exposure Assessment (CLEA) model to be protective of human health for a number of different land uses. LQM (Land Quality Management) and the CIEH (Chartered Institute of Environmental Health) developed a document in July 2009 detailing their own research and derivation of their own 'LQM GACs'. A total of 82 substances including many organic substances had LQM GACs derived, for the standard land uses of residential, commercial/industrial and allotments. This was updated in 2015 following further research and the derived results are now called LQM/CIEH Suitable 4 Use Level (S4UL). The LQM/CIEH S4ULs are intended for use in assessing the potential risks posed to human health by contaminants in soil and as transparently derived and cautious "trigger values" above which further assessment of the risks or remedial action may be needed. For each contaminant S4ULs have been derived for six land use scenarios based on assessing exposure pathways in each planning scenario. In this instance the commercial scenario has been considered. Soil type and soil organic matter (SOM) has an influence on the behaviour of contaminants. S4ULs have been derived for three SOM contents (1%, 2.5% and 6%) to cover the likely range in soils. A prudent approach has been taken by considering the lower 1% SOM content.

The UK values do not have any legal standing within the Republic of Ireland and no statutory guidance for assessing the significance of soil contamination currently exists. However, the values do provide a means of placing the data within context when considering magnitude of risk and have been used in that capacity for this assessment.

In total, 11 no. soil samples were collected throughout the trial pitting exercise at the data centre site and analysed for a range of parameters to examine the soil quality and to investigate any present and/or past contamination occurred across the site.

The soil samples were analysed by ALS Life Sciences LTD, UK for the following parameters:

- Metals (As, Cd, Cr, Pb, Se, Cu, Ni, and Zn);
- Polychlorinated Biphenyls (PCB);
- Total Petroleum Hydrocarbons Criteria Working Group (TPH CWG);
- Polycyclic Aromatic Hydrocarbons (PAHs);
- Waste Acceptance Criteria (WAC) for inert waste landfills in accordance with the 2002 European Landfill Directive (2002/33/EC). This suite of parameters includes the following (carried out on 5 samples including 2 from onsite stockpiles);
- Mineral oil;
- Polycyclic aromatic hydrocarbons (PAHs);
- Polychlorinated biphenyls (PCBs);
- BTEX compounds (benzene, toluene, ethylbenzene and xylenes) and methyl tert-butyl ether (MTBE);
- Total organic carbon (TOC); and
- Leachable component of a range of organic and inorganic parameters.

For this EIAR the soil results were compared to the GAC concentrations. GACs are soil concentrations that have been derived for a defined set of generic assumptions and are used as trigger values in determining whether further risk management action is required in cases where detailed quantitative risk assessment is not being undertaken.

7.3.10.1 Metals

All metal parameter concentrations recorded values below the most conservative threshold value for the LQM/CIEH for HHRA (Human Health Risk Assessment) Residential Threshold at 1% SOM.

7.3.10.2 Total Petroleum Hydrocarbon Criteria Working Group (TPH CWG)

All parameters recorded below the laboratory's limit of detection (LOD) for all soil samples collected across the site. Therefore, there are no exceedances recorded when these concentrations were compared to the most conservative threshold i.e. LQM/CIEH for HHRA Residential Threshold at 1% SOM.

7.3.10.3 PCBs

All parameters recorded below the laboratory's LOD for all samples collected across the site.

7.3.10.4 PAHs

All parameters recorded below the laboratory's LOD for all samples collected across the site. Therefore, there are no exceedances recorded when these concentrations were compared to the most conservative threshold i.e. LQM/CIEH for HHRA Residential Threshold at 1% SOM.

7.3.10.5 Waste Acceptance Criteria (WAC) Analysis

Of the 11 no. samples taken, 8 no. samples were analysed and compared against Waste Acceptance Criteria (WAC) set out by the adopted EU Council Decision 2003/33/EC which established criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 and Annex II of Directive 1999/31/EC (2002). There was no fill material noted during trial pit excavations with all samples being recorded as original clay subsoil.

The WAC analysis identifies that the representative sample is suitable for classification as Category A – Inert. Based on the laboratory results and parametric concentrations obtained from the site investigation, material from the sample locations would be acceptable at inert waste facilities (Category A). It should be noted that waste facilities develop facility specific criteria also and this should be considered should any soil/ material to be removed from site in the future.

7.3.11 GROUNDWATER QUALITY

The Water Framework Directive (WFD) Directive 2000/60/EC, was adopted in 2000 as a single piece of legislation covering rivers, lakes, groundwater and transitional (estuarine) and coastal waters. In addition to protecting said waters, its objectives include the attainment of 'Good Status' in water bodies that are of lesser status at present and retaining 'Good Status' or better where such status exists at present. 'Good Status' was to be achieved in all waters by 2015, as well as maintaining 'high status' where the status already exists. The EPA co-ordinates the activities of the River Basin Districts, local authorities and state agencies in implementing the directive, and operates a groundwater quality monitoring programme undertaking surveys and studies across the Republic of Ireland.

Presently, the groundwater body in the region of the site (Dublin GWB) is classified under the WFD Risk Score system (EPA, 2020) as 'Under Review'. The Dublin GWB was given a classification of "Good" for the last WFD cycle (2013-2018).

7.3.12 ECONOMIC GEOLOGY

The GSI (2022) mineral database was consulted to determine whether there were any mineral sites in the area of the subject site. As stated, the Huntstown Quarry is adjacent to the subject site (c. 200 m to the south) and is an active limestone quarry.

7.3.13 GEOLOGIC HERITAGE

The Geological Survey of Ireland (GSI) Public Viewer (www.gsi.ie/mapping) was reviewed to identify sites of geological heritage for the site and surrounding area. The Huntstown Quarry (Site Code DF022) to the south is the closest audited site. The Phoenix Park and Glasnevin Cemetery are located approximately 5.5 and 6.1 km to the south and south east of the site respectively. to the east and south of the site respectively.

7.3.14 RADON

According to the EPA pre May 2022 (now incorporating the Radiological Protection Institute of Ireland) the site location in Kilshane is a Low Radon Area where is it estimated that less than 1% of dwellings within the given 10 km grid square will exceed the Reference Level of 200 Bq/m3. This is the lowest of the five radon categories which are assessed by the EPA.

7.3.15 GEOHAZARDS

Much of the Earth's surface is covered by unconsolidated sediments which can be especially prone to instability. Water often plays a key role in lubricating slope failure. Instability is often significantly increased by man's activities in building houses, roads, drainage and agricultural changes. Landslides, mud flows, bog bursts (in Ireland) and debris flows are a result. In general, Ireland suffers few landslides. Landslides are more common in unconsolidated material than in bedrock, and where the sea constantly erodes the material at the base of a cliff and leads to recession of the cliffs. Landslides have also occurred in Ireland in recent years in upland peat areas due to disturbance of peat associated with construction activities. The GSI landslide database was consulted and the landslide in closest proximity to the proposed development was approximately 2 km to the south west of the site, referred to as the M3 J4 Clonee 2014 which occurred on 3rd February 2014. There have been no recorded landslide events at the site. Due to the generally flat/level local topography and the underlying strata there is a negligible risk of a landslide event occurring at the site.

In Ireland, seismic activity is recorded by the Irish National Seismic Network. The Geophysics Section of the School of Cosmic Physics at the Dublin Institute for Advanced Studies (DIAS) has been recording seismic events in Ireland since 1978. The station configuration has varied over the years. Currently there are five permanent broadband seismic recording stations in Ireland and operated by DIAS. The seismic data from the stations comes into DIAS in real-time and are studied for local and regional events. Records since 1980 show that the nearest seismic activity to the proposed location was in the Irish sea (1.0 – 2.0 Ml magnitude) and ~55 km to the south in the Wicklow Mountains. There is a very low risk of seismic activity to the proposed development site.

There are no active volcanoes in Ireland so there is no risk from volcanic activity.

7.3.16 AREAS OF CONSERVATION

According to the NPWS (2022) on-line database there are no special protected area on or in the vicinity of the subject site. The closest European listed sites are as follows:

- The Royal Canal (002103) pNHA - circa. 5.1 km to the south of the site.
- The Santry Demesne (00178) pNHA – circa 4.8 km to the east of the site

The site would have an indirect hydrological pathway or connection with the Malahide Estuary SPA/SAC/pNHA through the local drainage network, the Huntstown Stream and the Ward River.

7.3.17 CONCEPTUAL SITE MODEL

The subsoil underlying the site is classified as glacial Tills (generally low permeable) by the GSI and the underlying limestone aquifer (Poor aquifer) has an 'Extreme' vulnerability based on site investigations carried out in 2021.

The soil profile encountered can be summarised as follows (based on location RC04):

- Topsoil: From ground level up to 0.2-0.3 mbgl.
- Subsoil: Cohesive Deposits (sandy gravelly Clay) underlie topsoil up to depths of 1.5-3.7 mbgl.
- Weathered Limestone Bedrock/ Bedrock was encountered below subsoil.

The site investigations carried out by Site Investigations Ltd. in 2021 confirmed that the depth to bedrock to the east in the study area ranges between 1.5-3.7 mbgl which is representative of an 'Extreme' groundwater vulnerability.

Review of the hydrogeology and geology in the surrounding region indicates that there are no sensitive receptors such as groundwater-fed wetlands, Council Water Supplies/ Group Water Schemes or geological heritage sites which could be impacted by this development. No evidence of disposal of waste material was identified the location area proposed for excavation. Collection and analysis of representative soil and groundwater samples for a wide range of parameters shows no evidence of contamination. The review of the groundwater quality data collected on site found that the groundwater beneath the site is of good quality.

7.3.18 RATING OF SITE IMPORTANCE OF GEOLOGICAL/HYDROGEOLOGICAL ATTRIBUTES

Based on the TII methodology (2009) (See Appendix 7.1), criteria for rating site importance of geological features, the importance of the bedrock and soil features at this site is rated as 'High importance' with high significance or value on a local scale. This is due to the existence of an existing quarry in the immediate vicinity of the subject site (Huntstown Quarry) which is located c. 0.2 km to the south of the site.

Based on the TII methodology (2009) (See Appendix 7.1) the importance of the hydrogeological features at this site is rated as 'Low importance' based on the assessment that the attribute has a medium quality significance or value on a local scale. The aquifer is a Poor Aquifer but is not widely used for public water supply or generally for potable use. In addition, there would not be direct or indirect hydrogeological connection between the site and any protected sites (SAC, SPA, NHA).

7.4 PREDICTED IMPACTS

An analysis of the potential effects of the Proposed Development on the land, soils, geology and hydrogeological environment during the construction and operation phases is outlined below. Due to the inter-relationship between soils, geology and hydrogeology and surface water (Hydrology), the following impacts are also applicable to Chapter 8 (Hydrology). Mitigation measures included in the design of this project to address these potential impacts are presented in Section 7.5 below.

7.4.1 CONSTRUCTION PHASE

In the absence of mitigation, the following potential effects to land, soil and groundwater (hydrogeology) have been considered for the construction phase.

7.4.1.1 Excavation and Infilling

Due to the lack of previous development at the site and the historical residential and agricultural use at the site, the risk of contaminated soils being present onsite is low and this was confirmed by onsite soil sampling and analysis. Nonetheless material, which is exported from site, if not correctly

managed or handled, could impact negatively on human beings (onsite and offsite) as well as water and soil environments.

The levelling of ground and excavation for foundations will require the excavation of topsoil, subsoil and bedrock, as the depth of bedrock ranges 1.5-3.7 mbgl. The maximum excavation level would be c. 9.05 mbgl.

It has been estimated that 64,500m^3 of excavated subsoil and topsoil will be generated. All this excavated material will be reused on site for landscaping of the berms. Import of fill will not be required.
Site investigation and laboratory analysis has not identified any existing contamination. However, if contaminated soil/water is encountered, it will be required to be removed by a licensed waste contractor.

As it was described in Section 7.1, it is noted that the deepest proposed excavation is c. 9.05 mbgl. Therefore, groundwater ingress can be expected. However, this groundwater volume would be minor given the ground condition of relatively impermeable clay overlying rock. As inflow rates are expected to be low, there will be a localised zone of contribution which will not likely extend beyond the site boundary.

It is expected during the excavation works that localised dewatering of the subsoils will be required to address perched groundwater. It can be expected minor ingress of rainfall in the excavation to occur during construction phase.

In the absence of mitigation, the effect on the local and regional environment is likely to be ***short-term, slight*** and ***negative***. The effect is considered to be 'slight' due to the fact that there will not be intervention on the geological and hydrological regime on a local or regional scale.

7.4.1.2 Accidental Spills and Leaks

As with all construction projects there is potential for water (rainfall and/or groundwater) to become contaminated with pollutants associated with construction activity. Contaminated water which arises from construction sites can pose a significant temporary risk to groundwater quality for the duration of the construction if contaminated water is allowed percolate to the aquifer.

During construction of the development, there is a risk of accidental pollution incidences from the following sources:

- Suspended solids (muddy water with increase turbidity) – arising from excavation and ground disturbance;
- Cement/concrete (increase turbidity and pH) – arising from construction materials;
- Hydrocarbons (ecotoxic) – accidental spillages from construction plant or onsite storage;
- Wastewater (nutrient and microbial rich) – arising from accidental discharge from on-site toilets and washrooms.

Accidental spillages which are not mitigated may result in localised contamination of soils and groundwater underlying the site should contaminants migrate through the subsoils and impact the underlying groundwater. Groundwater vulnerability at the site is currently classified as extreme, high, and moderate in the south, central portion, and north of the site respectively. Any soil stripping will also further reduce the thickness of subsoil and the natural protection they provide to the underlying aquifer.

In the absence of mitigation, the effect on the local and regional environment is likely to be ***short-term, slight*** and ***negative***. The effect is considered to be 'slight' due to the fact that there will not be intervention on the geological and hydrological regime on a local or regional scale.

7.4.1.3 Loss of Agricultural Land

There will be local loss of agricultural soil however the area of development is small in the context of the overall agricultural land available in the region. The majority of the land is zoned for development. Within the overall context of Ireland's available farmland, the loss is negligible. There will be no impact to mineral resources in the area as a result of the Proposed Development.

7.4.2 OPERATIONAL PHASE

The development includes the storage and use of fuel oil. The reserve fuel for the turbine will be diesel fuel oil which will be stored in a dual-containment tank with a capacity of 6,246 m^3.

Any accidental spills of chemicals during storage, transfer, or delivery or leakage in the car parks could cause localised contamination if the emissions enter the soil and groundwater environment without adequate mitigation. However, it is noted that any accidental discharge will more likely impact stormwater drainage due to the hardstand and drainage infrastructure proposed and any releases to drainage will be mitigated through a Class 1 Petrol interceptor which is proposed to be installed before surface water outfalls to the existing ditch system (refer to Chapter 8 for further details).

There will be an increase in hardstand as a result of the development of the facilities of c. 28,720m^2. Incorporation of hard stand area on previous greenfield area and the use of SUDs techniques will have a minor effect on local recharge to ground; however, the impact on the overall groundwater regime will be insignificant considering the proportion of the site area in relation to the total aquifer.

In the absence of mitigation, the effect on the geological and hydrogeological environment is likely to be ***long-term, slight*** and ***negative***. The effect is considered to be 'slight' because there will not be intervention on the geological and hydrological regime on a local or regional scale.

7.4.3 DO NOTHING SCENARIO

If the proposed development was not to go ahead (i.e. in the Do-Nothing scenario) there would be no, excavation or construction at this site. There would, therefore, be a neutral effect on the geological and hydrogeological environment in terms of waste.

The site is zoned for development, and it is likely that in the absence of this subject proposal that a development of a similar nature would be progressed on the site that accords with national and regional policies and therefore the likely significant effects would be similar to this proposal. A potential increase in hardstanding areas would result in local changes to recharge and hydrological flow patterns.

7.5 MITIGATION AND MONITORING MEASURES

The design has taken account of the potential impacts of the development on the soils, geology and hydrogeology environment local to the area where construction is taking place and containment of contaminant sources during operation. Measures have been incorporated in the design to mitigate the potential effects on the surrounding soils, geology and hydrogeology. These are described below.

Due to the inter-relationship between soils, geology, hydrogeology and hydrology, the following mitigation measures discussed will be considered applicable to all. Waste Management is also considered an interaction in some sections.

7.5.1 CONSTRUCTION PHASE

7.5.1.1 Construction Environment Management Plan

In advance of work starting on site, the works Contractor will prepare a detailed Construction Environmental Management Plan (CEMP). The detailed CEMP will set out the overarching vision of

how the construction of the Proposed Development will be managed in a safe and organised manner by the Contractor. The CEMP will be a live document and it will go through a number of iterations before works commence and during the works. It will set out requirements and standards which must be met during the construction stage and will include the relevant mitigation measures outlined in the EIA Report and any subsequent planning conditions relevant to the Proposed Development.

As a minimum, the CEMP will be formulated in accordance with best international practice including but not limited to:

- CIRIA, (2001), Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors, (C532) Construction Industry Research and Information Association;
- CIRIA (2002) Control of water pollution from construction sites: guidance for consultants and contractors (SPI56) Construction Industry Research and Information Association
- CIRIA (2005), Environmental Good Practice on Site (C650); Construction Industry Research and Information Association
- BPGCS005, Oil Storage Guidelines;
- Eastern Regional Fisheries Board, (2006), Fisheries Protection Guidelines: Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites;
- CIRIA 697, The SUDS Manual, 2007; and
- UK Pollution Prevention Guidelines (PPG) UK Environment Agency, 2004.

In order to reduce impacts on the soil, geological and hydrogeological environment, a number of mitigation measures will be adopted as part of the construction works on site as outlined below.

7.5.1.2 Control of Soil Excavation

Site preparation, excavations and levelling works required to facilitate construction of foundations, access roads and the installation of services will require imported material. Suitable soils will be reused on site as backfill in the grassed areas, where possible. Contractors shall be required to submit and adhere to a method statement indicating the extent of areas likely to be affected and demonstrating that this is the minimum disturbance necessary to achieve the required works.

According to onsite investigations, the bedrock vulnerability is 'Extreme'. However, removal and reinstatement of subsoil cover will not alter the vulnerability category of the underlying bedrock. The deposition of infill soil would increase the overburden thickness and thus may even decrease the groundwater vulnerability.

Temporary storage of soil will be carefully managed in such a way as to prevent any potential negative impact on the receiving environment and the material will be stored away from any open surface water drains. Movement of material will be minimised in order to reduce degradation of soil structure and generation of dust.
Although there is no evidence of historical contamination in the proposed development area, all excavated materials will be visually assessed for signs of possible contamination such as staining or strong odours. Site investigations classified the subsoils as 'inert'. Should any unusual staining or odour be noticed, samples of this soil will be analysed for the presence of possible contaminants in order to ensure that historical pollution of the soil has not occurred. Should it be determined that any of the soil excavated is contaminated, this will be disposed of by a licensed waste disposal contractor.

Stockpiles have the potential to cause negative impacts on air and water quality. The effects of soil stripping and stockpiling will be mitigated against through the implementation of appropriate earthworks handling protocol during construction. It is anticipated that any stockpiles will be formed within the boundary of the site and there will be no direct link or pathway from this area to any surface water body. Overburden material will be protected from exposure to wind by storing the material in sheltered parts of the site, where possible.

7.5.1.3 Fuel & Chemical Handling

To minimise any impact on the underlying subsurface strata from material spillages, all oils, solvents and paints used during construction will be stored within temporary bunded areas. Oil and fuel storage tanks shall be stored in designated areas, and these areas shall be bunded to a volume of 110% of the capacity of the largest tank/container within the bunded area(s) (plus an allowance of 30 mm for rainwater ingress). Drainage from the bunded area(s) shall be diverted for collection and safe disposal.

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

Where feasible all ready-mixed concrete will be brought to site by truck. A suitable risk assessment for wet concreting will be completed prior to works being carried out which will include measures to prevent discharge of alkaline wastewaters or contaminated storm water to the underlying subsoil. Wash down and washout of concrete transporting vehicles will take place at an appropriate facility offsite.

In the case of drummed fuel or other chemical which may be used during construction, containers will be stored in a dedicated internally bunded chemical storage cabinet and labelled clearly to allow appropriate remedial action in the event of a spillage.

7.5.1.4 Control of Water During Construction

Care will be taken to ensure that exposed soil surfaces are stable to minimise erosion. All exposed soil surfaces will be within the main excavation site which limits the potential for any offsite impacts.

Should any discharge of construction water be required during the construction phase, discharge will be to the local drainage ditches. Pre-treatment and silt reduction measures on site will include a combination of silt fencing, settlement measures (silt or sediment traps, 20 m buffer zone between machinery and watercourses, refuelling of machinery off site) and hydrocarbon interceptors. All water runoff from designated refuelling areas will be channelled to an oil interceptor or an alternative treatment system prior to discharge.

Any minor ingress of groundwater and collected rainfall in the excavation will be pumped out during construction. It is estimated that the inflow rate of groundwater will be low and limited to the northeast of the site. It is therefore proposed that the water be discharged via the existing stormwater sewer network. Extensive monitoring will be adopted to ensure that the water is of sufficient quality to discharge to the local drainage ditch. The use of slit traps and an oil interceptor (if required) will be adopted if the monitoring indicates the requirements for the same with no silt or contaminated water permitted to discharge to the sewer. There may be localised pumping of surface run-off from the excavations during and after heavy rainfall events to ensure that the excavations are kept relatively dry. Due to the very low permeability of the Dublin Boulder Clay and the relative shallow nature for excavations, infiltration to the underlying aquifer is not anticipated.

7.5.1.5 Monitoring Measures

Daily visual inspection will be undertaken by the contractor at the silt trap/ settlement tank to ensure adequate internal settlement is occurring. Where the visual assessment highlights elevated suspended sediments higher than expected, the water will be re-circulated for further settlement.

Weekly checks will be carried out to ensure surface water drains are not blocked by silt, or other items, and that all storage is located at least 10 m from surface water receptors. Regular inspection

of surface water run-off and any sediment control measures (will be carried out during the construction phase.

Regular auditing of construction / mitigation measures will be undertaken, e.g. concrete pouring, refuelling in designated areas, etc. A log the regular inspections will be maintained, and any significant blockage or spill incidents will be recorded for root cause investigation purposes and updating procedures to ensure incidents do not occur.

7.5.2 OPERATIONAL PHASE

The kerbed unloading area is designed to contain leaks from the tanker truck and unloading station during tank fill operations and unloading station maintenance activities. The kerbed area will be monitored visually during the temporary manual operations. Rainwater collecting in the curbed area will be visually inspected before manual discharge to grade. The operator will connect the tanker truck hose to the unloading station and will manually operate the unloading station pumps to fill the site fuel oil tank. The unloading station will include local tank level indication and alarms with automatic shutdown of the unloading station pumps on high level to avoid overfilling the tanks. The pumps will incorporate a recirculation valve from pump discharge to pump suction, which will avoid an overpressure event without discharging fluid to grade. The fill connection piping will be routed above the tank secondary containment wall and connect to the top of the tank. The fill line between the pump containment area and the tank containment area will be single wall welded, with Type A connections and fittings.

With regard to the oil storage system, the tank will be installed on a concrete foundation, and will include a secondary nominal 27.4m diameter wall for leak containment. A spiral stairway will provide access to the top of the tank and to the annular containment area for inspection and maintenance activities. The secondary containment wall height will be sized for at least 110% tank capacity, and will be high enough to avoid issues with spigot/jetting flow from a leak. A shed roof (or equivalent) will be provided to minimize rainwater ingress into the containment area. The containment area will include redundant level switches to alarm if fluid is detected. Piping penetrations through the secondary containment wall will be limited to necessary low level connections for fuel forwarding pump suction, manual tank and containment drainage, and level switches to alarm on fluid level within the containment area. The penetrations will be sealed to avoid leaks. The balance of the tank connections will be routed above the secondary containment wall. Connections and fittings outside of the containment area will be designed as Type A.

The design includes hardstand cover and permeable paving across the site prior to discharge into the attenuation system. Therefore, the risk of accidental discharge has been adequately addressed through design.

Petrol interceptors will be installed as part of the SuDS measures to capture any potential oil or hydrocarbon contamination prior to discharge into the attenuation system on site (refer to Chapter 7 for further details). This together with hardstand cover and permeable paving will minimise the potential for any impact to the hydrological environment.
An Environmental Safety and Health Management System (EMS) will be implemented at the proposed development during operations. An environmental management plan will apply to the overall development during the operational phase incorporating mitigation measures and emergency response measures. An Emergency Response Plan has been developed for the proposed facility and has been included in the planning application. Section 7 and 8 of the ERP outline the procedures to be followed in response to a fire or spill.

There will be comprehensive emergency response procedures and standard operating procedures to respond to an onsite fuel spillage. All employees will be provided with such equipment, information, training and supervision as is necessary to implement the emergency response procedures and standard operating procedures. Section 6 of the Emergency Response Plan outlines the training plan to be provided to site personnel. The Emergency Response Plan will be updated based on final as built design and layout prior to the operational phase.

7.6 RESIDUAL IMPACTS

7.6.1 CONSTRUCTION PHASE

The implementation of mitigation measures outlined above will ensure that the predicted impacts on the geological and hydrogeological environment do not occur during the construction phase and that the residual impact will be ***short-term-imperceptible-neutral***. Following the TII criteria (refer to Appendix 7.1) for rating the magnitude and significance of impacts on the geological and hydrogeological related attributes, the magnitude of impact is considered ***negligible***.

7.6.2 OPERATIONAL PHASE

The implementation of mitigation measures outlined above will ensure that the predicted impacts on the geological and hydrogeological environment do not occur during the operational phase and that the residual impact will be ***long-term-imperceptible-neutral***. Following the TII criteria (refer to Appendix 7.1) for rating the magnitude and significance of impacts on the geological and hydrogeological related attributes, the magnitude of impact is considered ***negligible***.

7.7 CUMULATIVE ASSESSMENT

The following considers the cumulative impacts of the proposed development and proposed and permitted and operating facilities in the surrounding area in relation to Land, Soils, Geology and Hydrogeology. This considers the proposed development and other surrounding proposed and permitted developments listed in Appendix 17.1.

As has been identified in the receiving environment section all cumulative developments that are already built and in operation contribute to our characterisation of the baseline environment. As such any further environmental impacts that the proposed development may have in addition to these already constructed and operational cumulative developments has been assessed in the preceding sections of this chapter.

There are two (2no.) main potentially cumulative developments which have been granted in the recent past whose impact (either in construction phase or operational phase) are not yet wholly realised within the existing land soils, geology and hydrogeological baseline environment. These cumulative developments are:

7.7.1 FW22A/0204 & ABP-317480-23

Permission granted for gas power turbine generation station to the northeast of site. In summary, the proposed development will consist of the following;

- The construction of a new Gas Turbine Power Generation Station with an output of up to 293 Megawatts
- The demolition of a detached residential dwelling and associated farm buildings
- Road improvement works to 493.34 m Kilshane Road (L3120), including the realignment of a portion of the road (293.86 m) within the subject site boundary and the provision of new footpaths, off-road cycle ways, together with the construction of a new roundabout

Applying the precautionary principle this future related project has the potential to act cumulatively with the proposed development for the construction phase only with respect to the land soils, geology and hydrogeological environment.

7.7.2 ABP-314894-22

7.7.2.1 GIS and Grid Connection

It will be located within the subject lands and it will be connected to an existing nearby gas main by means of a new underground pipe. The pipe route has not yet been confirmed however Gas Networks Ireland have indicated a range of options. Depending on the route taken this will be approximately 600-700 m in length. Applying the precautionary principle this future related project has the potential to act cumulatively with the proposed development for the construction phase only with respect to the land soils, geology and hydrogeological environment.

7.7.2.2 AGI and Gas Pipeline

The location of the GIS electrical substation, which is required to convey generated electricity to the grid connection, is within the subject lands. The GIS will be connected to the national grid at Cruiserath substation to the west. The connection will be by means of a buried cable c. 4.69 km in length, generally laid under public roads. Applying the precautionary principle this future related project has the potential to act cumulatively with the proposed development for the construction phase only with respect to the land soils, geology and hydrogeological environment.

The remainder of the planning permissions identified in Appendix 17.1 have no potential for cumulative effects with the proposed development in terms of the land soils, geology and hydrogeological environment, and or are already operational and as such are reflected in the current environmental baseline.

7.7.3 CONSTRUCTION PHASE

Applying the precautionary principle a number of granted permissions that may well have completed their construction phase by the time the proposed development is undergoing construction have been included within this assessment of cumulative effects. In this regard it is assumed that there is potential for the construction phases of FW22A/0204 & ABP-317480-23 and ABP-314894-22, the AGI installation and the GIS installation to occur at the same time.

Based upon the information available within the planning files for these developments, there is sufficient information available to determine the likelihood of cumulative effects.

Contractors for the both the Proposed Development and FW22A/0204 & ABP-317480-23 and ABP-314894-22 will be contractually required to operate in compliance with their CEMPs which includes the mitigation measures outlined in their respective EIA reports.

Taking into account the relatively contained nature of the identified cumulative developments, the short-term aspect of their occurrence, the contractual controls, and the unlikelihood of them occurring in tandem, there will be minimal cumulative potential for change in soil quality or the natural groundwater regime.

The cumulative impact for the construction phase is considered to be ***neutral*** and ***imperceptible***.

7.7.4 OPERATIONAL PHASE

With respect to the operational phase the following developments have the potential to act cumulatively with the proposed development with respect to the land, soils, geology and hydrogeological environment; FW22A/0204 & ABP-317480-23 and ABP-314894-22.

Based upon the information available within the planning files there is sufficient information available to determine the likelihood of cumulative effects for the operational phase.

Operators for FW22A/0204 & ABP-317480-23 and ABP-314894-22 will be legally required to operate according to the conditions of their planning permission and in accordance with S.I. 272 of 2009 and S.I. 77 of 2019.

Taking into account the SUDS control measures within the cumulative developments, along with the design measures to compensate from impacts to recharge rates to the underlying aquifer due to additional hardstanding there will be minimal cumulative potential for change in ground water quality during the operational phase.

There are no other large projects proposed within this area of the aquifer so no cumulative impact on recharge to the aquifer. All developments are required to manage groundwater discharges in accordance with S.I. 9 of 2010 and S.I. 266 of 2016 amendments. As such there will be no cumulative impact to groundwater quality and therefore there will be no cumulative impact on the Groundwater Body Status.

The operation of the proposed development during the operational phase is concluded to have a ***long-term***, ***imperceptible*** significance with a ***neutral*** impact on soil and water quality.

7.8 INTERACTIONS

Due to the inter-relationship between soils, geology, hydrogeology and hydrology, there is a strong overlap between the assessed impacts and mitigation in both chapters. There is also an interaction between this chapter and Waste topics due to the generation of excavated soil and stones (c. 64,650m^3 of subsoil and 14,400m^3 of topsoil) required to facilitate site levelling, construction of new foundations and installations of site services. It is estimated that all of excavated material will need to be removed off-site . Where material has deemed unsuitable or is unable to be reused onsite it will be taken off-site, it will be taken for reuse or recovery, where practical, with disposal as a last resort.

8 WATER & HYDROLOGY

8.1 INTRODUCTION/METHODOLOGY

This chapter assesses and evaluates the potential impacts of the Proposed Development on the hydrological aspects of the site and surrounding area, in accordance with the requirements of Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment (i.e. the EIA Directive) (European Union, 2014a). This Chapter also provides a characterisation of the receiving hydrological environment within the proposed Project and within a wider study area in the vicinity of the proposed Project. In assessing likely potential and predicted effects, account is taken of both the importance of the attributes and the predicted scale and duration of the likely effects.

8.1.1 REVENANT GUIDANCE

The hydrological baseline assessment has been carried out in accordance with the following guidance and established best practice:

- Environmental Protection Agency (EPA) Advice notes on current practice in the preparation of Environmental Impact Statement (EPA, 2015) and Guidelines on the Information to be contained in Environmental Impact Statements (EPA, 2022).
- Environmental Impact Assessment of Projects, Guidance on the preparation of the Environmental Impact Assessment Report (European Commission, 2017).
- Transport Infrastructure Ireland - Road Drainage and Water Environment (TII, 2015).
- Transport Infrastructure Ireland (previously National Road Authority) - Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (TII, 2009).
- Water Framework Directive (WFD) - Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy. This relates to the improvement of water quality across Ireland including rivers and groundwater bodies.
- The Planning System and Flood Risk Management, Guidelines for Planning Authorities (Department of the Environment, Heritage and Local Government (DoEHLG) and the Office of Public Works (OPW)).
- Guidelines on protection of fisheries during construction works in and adjacent to waters (Inland Fisheries Ireland, 2016).
- Guidelines for the Crossing of Watercourses during Construction of National Road Schemes, (TII, 2008).

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

- European Communities Environmental Objectives (Surface Waters); Regulations, 2009 (S.I. No. 272 of 2009 as amended by SI No. 77 of 2019).
- Part IV of the First Schedule of the Planning and Development Act 2000, as amended.
- European Communities (Water Policy) Regulations 2003 (S.I. No. 722 of 2003).
- Environmental Protection Agency 'Towards Setting Guideline Values for the Protection of Groundwater in Ireland Interim Report', (EPA 2003).
- European Union (Drinking Water) Regulations 2014 (S.I. No. 122/2014).
- European Union (Drinking Water) (Amendment) Regulations (S.I. No. 464 of 2017).

8.1.2 CRITERIA FOR RATING OF EFFECTS

This chapter evaluates the effects, if any, which the development has had or will have on Hydrology as defined in the Environmental Protection Agency (EPA) 'Guidelines on the Information to be

contained in Environmental Impact Assessment Reports' (EPA, 2022). The Draft EPA document entitled 'Advice Notes for Preparing Environmental Impact Statements' (EPA, 2015) is also followed in this hydrological assessment and classification of environmental effects. In addition, the document entitled 'Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes' by the National Roads Authority (NRA, 2009) is referenced where the methodology for assessment of impact is appropriate.

The rating of potential environmental effects on the hydrological environment is based on the standard EIAR impact predictions table included in Chapter 1 which takes account of the quality, significance, duration, and type of effect characteristic identified (in accordance with impact assessment criteria provided in the EPA Guidelines (2022) publication).

The duration of each effect is considered to be either momentary, brief, temporary, short-term, medium term, long-term, or permanent. Momentary effects are considered to be those that last from seconds to minutes. Brief effects are those that last less than a day. Temporary effects are considered to be those which are construction related and last less than one year. Short term effects are seen as effects lasting one to seven years; medium-term effects lasting seven to fifteen years; long-term effects lasting fifteen to sixty years; and permanent effects lasting over sixty years.

The NRA criteria for rating the magnitude and significance of impacts and the importance of hydrological attributes at the site during the EIA stage are also relevant in assessing the impact and are presented in Tables 1-3 in Appendix 7.1.

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

- River and stream water quality in the vicinity of the site (where available);
- Surface watercourses near the site and potential impact on surface water quality arising from proposed development related works including any discharge of surface water run-off;
- Localised flooding (potential increase or reduction) and floodplains including benefitting lands and drainage districts (if any); and
- Surface water features within the area of the site.

8.1.3 SOURCES OF INFORMATION

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

- Environmental Protection Agency (EPA) – website mapping and database information. Envision water quality monitoring data for watercourses in the area;
- River Basin Management Plan for Ireland 2018-2021.
- The Planning System and Flood Risk Management, Guidelines for Planning Authorities (Department of the Environment, Heritage and Local Government (DoEHLG) and the Office of Public Works (OPW));
- Office of Public Works (OPW) flood mapping data (www.floodmaps.ie)
- Fingal County Council (2005), Greater Dublin Strategic Drainage Study: Final Strategy Report.
- 'Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors' (CIRIA 532, 2001);
- National Parks and Wildlife Services (NPWS) – Protected Site Register.

Site specific data was derived from the following sources:

- Site Investigation Report. Kilshane, Ballycoolin, Dublin 15. Site Investigation Ltd., December 2021;
- Various design site plans and drawings; and
- Consultation with site engineers.

8.2 THE PROPOSED DEVELOPMENT

The proposed development is described in further detail in Chapter 4 *Project Description*. The details of the construction and operation of the development in terms of Hydrology are detailed in the subsections below.

8.2.1 CONSTRUCTION PHASE

The key civil engineering works which will have a potential impact on the water and hydrological environment during construction of the proposed development are summarised below.

- Excavations are required for foundations of installation of associated services included within the development.
- Possible discharge of collected rainwater/ dewatering during excavation works and groundworks (the extent of which is dependent on the time of year development works are carried out); and
- Construction activities will necessitate storage of cement and concrete materials, temporary oils, and fuels on site. Small localised accidental releases of contaminating substances including hydrocarbons have the potential to occur from construction traffic and vehicles operating on site.

8.2.2 OPERATIONAL PHASE

The key activities which will have a potential impact on the hydrological environment during operation of the proposed development are summarised below.

8.2.2.1 Increase in Hard Standing Area

The proposed development represents an overall increase in hardstanding surfaces of c. 28,720 m^2.

8.2.2.2 Storage of Hazardous Materials

Combustion Turbine Fuel Oil System

The General Electric 9FA.04 combustion turbine is dual fuel capable, with emergency operation < 500 hours per year on EN590 ultra low sulphur diesel fuel oil (<10ppmw). The facility will include a fuel oil tank, unloading station, forwarding pumps, and piping system to convey the fuel oil to the combustion turbine.

Fuel Oil Unloading System

The fuel oil will be delivered in tanker trucks. The unloading station will consist of a kerbed concrete tanker truck unloading pad adjacent to the facility road sized to contain 110% of a tanker truck volume (33.4 m3), a pumped tanker truck unloading station within the curbed unloading area, and single wall piping routed to the fuel oil tank.

Fuel Oil Storage System

Combustion turbine fuel oil will be stored in a nominal 6,246m^3 capacity field erected welded steel tank. The tank nominal sidewall height is 14 m, with maximum height at top of tank roof structure not to exceed 16.2m. Nominal tank diameter is 24.4m. The tank will be installed on a concrete foundation, and will include a secondary nominal 27.4m diameter wall for leak containment. A spiral stairway will provide access to the top of the tank and to the annular containment area for inspection and maintenance activities. The secondary containment wall height will be sized for at least 110% tank capacity, and will be high enough to avoid issues with spigot/jetting flow from a leak. A shed roof (or equivalent) will be provided to minimize rainwater ingress into the containment area.

Fuel Oil Forwarding System

The fuel oil forwarding system consists of a fuel oil forwarding pump skid and piping to the combustion turbine skid. The forwarding pump skid, complete with piping, equipment, valves, and fittings will be located in the same curbed unloading area described above to contain leaks during operation and maintenance. A section of piping may be routed underground. Underground piping will be double wall and welded with a leak detection system. Above ground piping is connected to the turbine liquid fuel/atomizing air module located to the south of the combustion turbine, and is single wall welded, with Type A connections and fittings. The above ground discharge piping from this module is connected to the turbine and is single wall welded, with Type A connections and fittings.

The risk to the aquifer is considered low due to the mitigation in place for containment, delivery and distribution and use of oil interceptors on the stormwater system downgradient of the offloading area and prior to discharge from the site.

8.2.2.3 Surface Water Management

A Storm Water Management Plan will be implemented through the use of various SuDS techniques to treat and minimise surface water runoff from the site. The methodology involved in developing the Storm Water Management Plan for the subject site will be based on recommendations set out in the Greater Dublin Strategic Drainage Study (GDSDS) and in the SuDS Manual.

Storm water from the site will discharge at a controlled rate, limited to the greenfield equivalent runoff, to the existing ditches forming the site boundary, which are connected to the Huntstown Stream. Rainfall in excess of this will be attenuated in the underground tanks for each catchment The proposed development will be designed to incorporate best drainage practice.

The proposed development includes the provision of permeable paving at parking areas serving the development. Swales will be connected to the surface water network so that any excess flows can be directed to the mains rather than overspilling to open spaces on the site. An underground attenuation system is proposed to be utilised for the development site. These underground tanks are modular systems, which will provide sufficient attenuation volume. These tanks allow suspended particles to settle out of suspension by reducing the velocity of the surface water as it flows through the system.

The system also allows for the percolation of water back to the water table. A flow control device (Hydrobrake) is proposed between the attenuation tank and the outfall headwall. This will limit flow volumes exiting the site to the greenfield equivalent runoff rate.

A Class 1 Petrol interceptor will be installed before surface water outfalls to the existing ditch system. The Interceptor will remove hydrocarbons from surface flows before they outfall to natural watercourses.

8.2.2.4 Foul water

It proposed, due to site topography, to serve the subject application and Outline lands by a pumping station to be agreed with Irish Water, which is to remain under private management. The location, depth, and dimensions of the pumping station, has been designed in anticipation of the future connection of the Outline lands.

The proposed pumping station will be sized to accommodate the fully developed Outline lands and subject application and will provide a storage capacity for 24 hours of foul flow.

8.2.2.5 Water Supply

It is proposed to connect to the 110mm Ø MOPVC watermain located to the southwest of the site on Kilshane Road to the 50.8 uPVC watermain adjacent to the site via a new 150mm Ø watermain.

8.3 THE RECEIVING ENVIRONMENT

The proposed development site extends to over 14.5 ha. on lands adjacent to Kilshane road, N2 national carriageway, and Huntstown Quarry Dublin 11. The site is bounded to the north by Kilshane road, to the east by the N2 national carriageway, to the south and west by agricultural fields, while land further south (c. 0.2 km) is occupied by Huntstown Quarry.

8.3.1 HYDROLOGY

The subject site is located in the River Tolka WMU (Water Management Unit) within the former Eastern River Basin District (ERBD) (now the Irish River Basin District), as defined under the European Communities Directive 2000/60/EC, establishing a framework for community action in the field of water policy – this is commonly known as the Water Framework Directive (WFD).

According to the EPA maps, the proposed development site lies within the Nanny-Delvin Catchment (Hydrometric Area 08) and the Broadmeadow sub-catchment. The current EPA watercourse mapping does not include any existing streams within the subject site boundaries, a review of the historical mapping records provided within the GeoHive website do not indicate any watercourses within the site.

The subject site is currently a greenfield site, used for agricultural purposes. There is no existing surface water drainage network adjacent to or on-site.

The site is comprised of multiple fields separated by hedgerows, and generally slopes from west to east. Surface water, rainfall, is generally percolated through the site via grass and soil. The topographic survey has confirmed that the internal and boundary hedgerows contain ditches which convey flow to the Huntstown Stream to the east of the site, during heavier rainfall events. These ditches only serve the subject site and the agricultural fields immediately to the west, located between the subject site and the Kilshane Road, and does not convey any upstream watercourse.

The Huntstown Stream generally flows in a north-easterly direction to join the River Ward at St. Margaret's Golf and Country Club. The River Ward is a tributary of the Broadmeadow River, which in turn outfalls to the Irish Sea at the Malahide Estuary. The Malahide Estuary is a Special Protection Area (SPA), a candidate Special Area of Conservation (cSAC), a proposed National heritage Area (pNHA) and a RAMSAR site.

The Huntstown Stream generally flows in a north-easterly direction to join the River Ward to join the Ward River c. 4.4 km to the northeast of the site (at Saint Margaret Golf and Country Club). The Ward River flows towards Malahide Estuary, a Natura 2000 Site (SPA/SAC/pNHA) located approximately 9.8 km to the northeast of the site after joining the Broadmeadow River.

Therefore, the subject site belongs to the Broadmeadow sub-catchment (WFD name: Broadmeadow_SC_010, Id 08_3) and would have an indirect hydrological connection with the Malahide Estuary (SPA/SAC/pNHA) through the local drainage network, the Huntstown Stream and the Ward River.

8.3.2 SURFACE WATER QUALITY

The proposed development is located within the former ERBD (now the Irish River Basin District), as defined under the European Communities Directive 2000/60/EC, establishing a framework for

community action in the field of water policy – this is commonly known as the Water Framework Directive (WFD). It is situated in Hydrometric Area No. 08 of the Irish River Network and is located within the Nanny-Delvin Catchment.

The WFD requires 'Good Water Status' for all European waters to be achieved through a system of river basin management planning and extensive monitoring by 2015 or, at the least, by 2027. 'Good status' means both 'Good Ecological Status' and 'Good Chemical Status'. In 2009 the ERBD River Basin Management Plan (RBMP) 2009-2015 was published. In the ERBD RBMP, the impacts of a range of pressures were assessed including diffuse and point pollution, water abstraction and morphological pressures (e.g. water regulation structures). The purpose of this exercise was to identify water bodies at risk of failing to meet the objectives of the WFD by 2015 and include a programme of measures to address and alleviate these pressures by 2015. This was the first River Basin Management planning cycle (2010-2015). The second cycle river basin management plan for Ireland is currently in place and will run between 2018-2021 with the previous management districts now merged into one Ireland River Basin District (Ireland RBD).

This second-cycle RBMP aims to build on the progress made during the first cycle. Key measures during the first cycle included the licensing of urban waste-water discharges (with an associated investment in urban waste-water treatment) and the implementation of the Nitrates Action Programme (Good Agricultural Practice Regulations). In more general terms, three key lessons have emerged from the first cycle and the public consultation processes. These lessons have been firmly integrated into the development of the second cycle RBMP. Firstly, the structure of multiple RBDs did not prove effective, either in terms of developing the plans efficiently or in terms of implementing those plans. Secondly, the governance and delivery structures in place for the first cycle were not as effective as expected.
Thirdly, the targets set were too ambitious and were not grounded on a sufficiently developed evidence base. The second cycle RBMP has been developed to address these points.

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

- European Communities (Water Policy) Regulations, 2003 (S.I. No. 722 of 2003);
- European Communities (Drinking Water) Regulations 2014 (S.I. 122 of 2014);
- European Communities Environmental Objectives (Surface Waters); Regulations, 2009 (S.I. No. 272 of 2009 as amended SI No. 77 of 2019);
- European Communities Environmental Objectives (Groundwater) Regulations, 2010 (S.I. No. 9 of 2010 S.I. No. 366 of 2016);
- European Communities (Good Agricultural Practice for Protection of Waters) Regulations, 2010 (S.I. No. 610 of 2010); and
- European Communities (Technical Specifications for the Chemical Analysis and Monitoring of Water Status) Regulations, 2011 (S.I. No. 489 of 2011);
- Statutory Instrument (SI) No. 293 of 1988 European Communities (Quality of Salmonid Waters) Regulations 1988;
- Local Government (Water Pollution) Acts 1977-1990;
- SI No. 258 of 1988 Water Quality Standards for Phosphorus Regulations 1998.

Surface water quality is monitored periodically by the EPA at various regional locations along with principal and other smaller watercourses. The EPA assess the water quality of rivers and streams across Ireland using a biological assessment method, which is regarded as a representative indicator of the status of such waters and reflects the overall trend in conditions of the watercourse. The biological indicators range from Q5 - Q1. Level Q5 denotes a watercourse with good water quality and high community diversity, whereas Level Q1 denotes very low community diversity and bad water quality.
According to EPA data, there are two historic inactive monitoring stations in close proximity to the subject site which have been previously decommissioned:

- Huntstown Stream Kilshane Br Ashbourne Rd' (EPA Code: RS08H020200): located immediately south of Kilshane Cross adjacent to the east boundary of North road.
- 'Huntstown Stream- d/s Roadstone' (EPA Code: RS08H020100): located adjacent to the north boundary of Huntstown Quarry c. 0.2 km south of the site.

In relation to the subject site, the nearest active EPA monitoring stations located in the Ward River catchment are:

- 'Coolatrath Br' (EPA Code: RS08W010070): located in the Ward River c. 3.3km upstream of the Huntstown Stream. The most recent status recorded by the EPA (2020) is classified as Q3-4/Moderate.
- 'Br N of Killeek' (EPA Code: RS08W010300): located in the Ward River c. 1.2km downstream from its join with the Huntstown Stream. The most recent status recorded by the EPA (2020) is classified as Q3-4/Moderate.

Refer to Figure 8.1 below for locations of these EPA quality monitoring points in the context of the site.

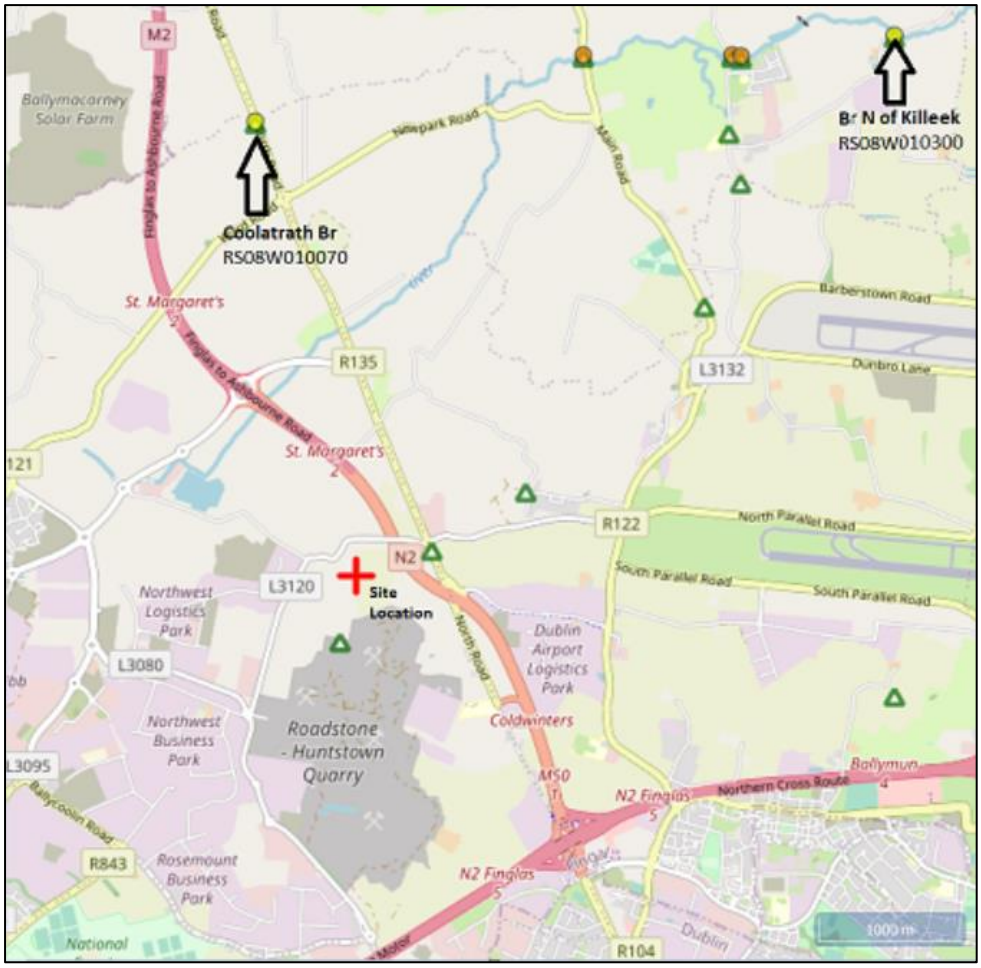

Figure 8.1 EPA Surface Water Quality Stations (Source: EPA, 2022)

The Water Framework Directive (WFD) Directive 2000/60/EC was adopted in 2000 as a single piece of legislation covering rivers, lakes, groundwater and transitional (estuarine) and coastal waters. In addition to protecting said waters, its objectives include the attainment of 'Good Status' in water bodies that are of lesser status at present and retaining 'Good Status' or better where such status exists at present. The WFD requires 'Good Water Status' for all European waters to be achieved through a system of river basin management planning and extensive monitoring. 'Good status' means both 'good ecological status' and 'good chemical status'.

The Huntstown Stream belongs to the Ward_030 WFD surface water body, which currently, the EPA classifies as having 'Moderate' and is 'At risk of not achieving good status'. This moderate status is related to the nitrogen (nitrate, specifically) and orthophosphate conditions measured in the Ward River.

8.3.3 FOUL WATER & WATER SUPPLY NETWORK

The nearest Irish Water foul water network, is located approx. 670m away on the R135 to the east of the N2 and is shown as the Kilshane Pump Station. Another foul network to the southwest of the subject site on the Mitchelstown Road has been identified. This network is a distance of 1.5km away from where the site boundary meets the Kilshane Road, at the entrance to Flaherty Logistics.

With regard to water supply, a 50.8 uPVC watermain is located to the north of the site on the Kilshane Road. The south of the site is traversed by a 914.4mm (36") concrete watermain. This distribution main is fenced-off as a protective measure.

In addition, there is an existing 110mm Ø MOPVC to the southwest of the site.

8.3.4 AREAS OF CONSERVATION

According to the NPWS (2024) on-line database there are no special protected area on or in the vicinity of the subject site. The closest European listed sites are as follows;

- The Royal Canal (002103) pNHA - circa. 5.1 km to the south of the site.
- The Santry Demesne (00178) pNHA – circa 4.8 km to the east of the site

The site would have an indirect hydrological pathway or connection with the Malahide Estuary SPA/SAC/pNHA through the local drainage network, the Huntstown Stream and the Ward River..

8.3.5 RATING OF IMPORTANCE OF HYDROLOGICAL ATTRIBUTES

As this site is rated as 'Low importance' based on the assessment that the attribute has a low quality significance or value on a local scale.

Although there would be an indirect hydrological connection or pathway between the site and Malahide Estuary protected sites (SAC, SPA, NHA), this is considered to be of negligible significance due to the lack of surface water drainage at or adjacent to the site and the significant distance from the site (5 km).

8.4 PREDICTED IMPACTS

8.4.1 CONSTRUCTION PHASE

An analysis of the potential impacts of the proposed development on the hydrological environment during the construction and operation phases is outlined below. Due to the inter-relationship between soils, geology and hydrogeology and surface water the following impacts discussed will be considered applicable to both Chapter 7 and 8 of the EIAR. Mitigation measures included in the design of this project to address these potential impacts are presented in Section 8.5 below.

It should be noted that no impacts are expected on Malahide Estuary SAC/SPA. Given the potential loading and the distance from source to the Natura site (c. 9.8 Km), this risk would be imperceptible as any accidental discharge of potential contaminant would be attenuated, diluted and dispersed below statutory guidelines (i.e., S.I. European Communities Environmental Objectives Regulations, 2009 [S.I. No. 272 of 2009 as amended by SI No. 77 of 2019]).

8.4.1.1 Increased Sediments Loading in Run-off

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

During the construction phase at this site there is potential for an increase in run-off due to the compaction of soils. This will reduce the infiltration capacity and increase the rate and volume of direct surface run-off. The potential impact of this is a possible increase in surface water run-off and sediment loading which could potentially impact local drainage. Site investigations classified the subsoils as 'inert' (refer to Chapter 7).

The local drainage ultimately flows towards the Huntstown Stream.

In the absence of mitigation, the effect on the local and regional hydrological environment is likely to be ***short-term, moderate*** and ***negative***. The effect is considered to be 'moderate' due to the lack of evidence of contamination observed in the subsoils during the ground investigations carried out in 2021 (refer to Chapter 7 for further details); therefore it is not expected to be a significant effect on local or regional hydrology.

8.4.1.2 Accidental Spills and Leaks

As with all construction projects there is potential for water (rainfall and/or groundwater) to become contaminated with pollutants associated with construction activity. Contaminated water which arises from construction sites can pose a significant short-term risk to groundwater quality for the duration of the construction if contaminated water is allowed percolate to the aquifer. The potential main contaminants include:

During construction of the development, there is a risk of accidental pollution incidences from the following sources:

- Suspended solids (muddy water with increase turbidity) – arising from excavation and ground disturbance;
- Cement/concrete (increase turbidity and pH) – arising from construction materials;
- Hydrocarbons (ecotoxic) – accidental spillages from construction plant or onsite storage;
- Wastewater (nutrient and microbial rich) – arising from accidental discharge from on-site toilets and washrooms.

Machinery activities on site during the construction phase may result in contamination of runoff/surface water. Potential impacts could arise from accidental spillage of fuels, oils, paints etc. which could impact surface water if allowed to infiltrate to runoff to surface water systems and/or receiving watercourses. However, implementation of the mitigation measures detailed below will ensure that this does not occur.

Concreting operations carried out near surface water drainage points during construction activities could lead to discharges to a watercourse. Concrete (specifically, the cement component) is highly alkaline and any spillage to a local watercourse would be detrimental to water quality and local fauna and flora. However, employment of the mitigation measures highlighted below will ensure that any impact will be mitigated.

In the absence of mitigation, the effect on the local and regional hydrological environment is likely to be ***short-term, significant*** and ***negative***. It is considered significant due to the potential for accidental leakage to affect the receiving waters (Huntstown Stream and River Ward) and degrade the current water body status (chemically, ecological and quantity) or its potential to meet the requirements and/or objectives in the second RBMP 2018-2021 (River Basin Management Plan) and draft third RBMP 2022-2027.

8.4.2 OPERATION PHASE

8.4.2.1 Direct or Indirect Discharges

Surface water drainage will discharge directly into an existing ditch network which ultimately outfalls into the Huntstown Stream. The surface water network has been designed to provide sufficient capacity to contain and convey all surface water runoff associated with the 1 in 100 year event to the attenuation basins without any overland flooding including an additional allowance of 20% in rainfall intensities due to climate change. Discharge flow will be restricted to the greenfield equivalent runoff for the catchment area.

The development will be fully serviced with separate foul and stormwater sewers which will have adequate capacity for the facility and discharge limits as required by Irish Water licencing requirements. Discharge from the site to the public foul sewer will be sewage and grey water only due to the nature of the proposed development. The foul discharge from the site will join the public sewer and will be treated at the Irish Water Ringsend Wastewater Treatment Plant (WWTP) prior to subsequent discharge to Dublin Bay. This WWTP is required to operate under an EPA licence and meet environmental legislative requirements as set out its licence.

In the absence of mitigation, the effect on the hydrological environment is likely to be ***long-term, imperceptible*** and ***neutral***. The effect is considered to be 'imperceptible' because there will not be intervention on the hydrological regime on a local or regional scale due to the aforementioned design measures included in the surface water and foul water drainage.

8.4.2.2 Accidental Spill and Leaks

The development includes the storage and use of fuel oil..

Any accidental emissions of oil, petrol or diesel could cause contamination if the emissions enter the water environment unmitigated. However, any accidental discharge will be mitigated through petrol interceptors.

In the event of an accidental leakage of transformer oil or a spill from the emergency generator, this will be intercepted by the drainage infrastructure; drainage from the generator yard passes through petrol interceptor prior to connection to the onsite drainage networks.

In the absence of mitigation, the effect on the hydrological environment is likely to be ***long-term, imperceptible*** and ***neutral***. The effect is considered to be 'imperceptible' because there will not be intervention on the hydrological regime on a local or regional scale due to the aforementioned design measures.

8.4.3 DO NOTHING SCENARIO

If the proposed development was not to go ahead (i.e. in the Do-Nothing scenario) there would be no, excavation or construction at this site. There would, therefore, be a neutral effect on the hydrological environment in terms of hydrological environment.

The site is zoned for development, and it is likely that in the absence of this subject proposal that a development of a similar nature would be progressed on the site that accords with national and regional policies and therefore the likely significant effects would be similar to this proposal. A potential increase in hardstanding areas would be mitigated by requiring developers to maintain green field runoff rates as a result there would be no overall change to flooding but the trend in change of land use will result in local changes to recharge and hydrological flow patterns.

The temporal evolution of the current baseline in terms of water and hydrological environment involves climate change and its effects on the quantity or quality of the surface water. This can potentially affect the surrounding projected flooding.

8.5 MITIGATION AND MONITORING MEASURES

The design has taken account of the potential impacts of the development on the hydrology environment local to the area where construction is taking place and containment of contaminant sources during operation. Measures have been incorporated in the design to mitigate the potential effects on the hydrology.

The site is drained by a local network which is composed of ditches bordering the site. This network ultimately flows in a northerly direction towards the Huntstown Stream, which in turn joins the Ward River. The Ward River flows towards Malahide Estuary, a Natura Site (SPA/SAC/pNHA) located c. 9.8 km to the northeast of the site after joining the Broadmeadow River.

Thus, the site would have an indirect hydrological connection with the Malahide Estuary through the local drainage network, the Huntstown Stream and the Ward River.

As stated above, no impacts are expected on Malahide Estuary SAC/SPA, given the potential loading, tenuous hydrological connectivity and the distance from source to the Natura site. The potential risk is considered to be imperceptible as potential contaminant would be attenuated, diluted and dispersed below statutory guidelines (i.e., S.I. European Communities Environmental Objectives Regulations, 2009 [S.I. No. 272 of 2009 as amended by SI No. 77 of 2019]).

Due to the inter-relationship between soils, geology, hydrogeology and hydrology, the following mitigation measures discussed will be considered applicable to all. Waste Management is also considered an interaction in some sections.

8.5.1 CONSTRUCTION PHASE

8.5.1.1 Construction Environmental Management Plan

In advance of work starting on site, the works Contractor will prepare a detailed Construction Environmental Management Plan (CEMP). The detailed CEMP will set out the overarching vision of how the construction of the proposed development will be managed in a safe and organised manner by the Contractor. The CEMP will be a live document and it will go through a number of iterations before works commence and during the works. It will set out requirements and standards which must be met during the construction stage and will include the relevant mitigation measures outlined in the EIA Report and any subsequent planning conditions relevant to the proposed development.

As a minimum, the CEMP will be formulated in accordance with best international practice including but not limited to:

- CIRIA, (2001), Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors, (C532) Construction Industry Research and Information Association;
- CIRIA (2002) Control of water pollution from construction sites: guidance for consultants and contractors (SPI56) Construction Industry Research and Information Association
- CIRIA (2005), Environmental Good Practice on Site (C650); Construction Industry Research and Information Association
- BPGCS005, Oil Storage Guidelines;
- Eastern Regional Fisheries Board, (2006), Fisheries Protection Guidelines: Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites;
- CIRIA 697, The SUDS Manual, 2007; and
- UK Pollution Prevention Guidelines (PPG) UK Environment Agency, 2004.

In order to reduce impacts on the soil, geological and hydrogeological environment, a number of mitigation measures will be adopted as part of the construction works on site as outlined below.

8.5.1.2 Surface Water Run-Off

As there is potential for run-off to enter current stormwater systems and indirectly discharge to a watercourse, mitigations will be put in place to manage run-off during the construction phase.

Care will be taken to ensure that exposed soil surfaces are stable to minimise erosion. All exposed soil surfaces will be within the main excavation site which limits the potential for any offsite impacts.

Should any discharge of construction water be required during the construction phase, discharge will be to the local drainage ditches. Pre-treatment and silt reduction measures on site will include a combination of silt fencing, attenuation, settlement measures (silt or sediment traps, 20 m buffer zone between machinery and watercourses, refuelling of machinery off site) and hydrocarbon interceptors.

Any minor ingress of groundwater and collected rainfall in the excavation will be pumped out during construction. It is estimated that the inflow rate of groundwater will be low and limited to the northeast of the site. It is therefore proposed that the water be discharged via the existing drainage ditch network. Extensive monitoring will be adopted to ensure that the water is of sufficient quality to discharge to the drainage ditches. The use of slit traps and an oil interceptor (if required) will be adopted if the monitoring indicates the requirements for the same with no silt or contaminated water permitted to discharge to the drainage ditch. There may be localised pumping of surface run-off from the excavations during and after heavy rainfall events to ensure that the excavations are kept relatively dry. Due to the very low permeability of the Dublin Boulder Clay and the relative shallow nature for excavations, infiltration to the underlying aquifer is not anticipated.

Run-off water containing silt will be contained on site via settlement tanks and treated to ensure adequate silt removal. Silt reduction measures on site will include a combination of silt fencing and settlement measures (silt traps, silt sacks and settlement tanks/ponds).

The temporary storage of soil will be carefully managed. Stockpiles will be tightly compacted to reduce runoff and graded to aid in runoff collection. This will prevent any potential negative impact on the stormwater drainage and the material will be stored away from any surface water drains. Movement of material will be minimised to reduce the degradation of soil structure and generation of dust.

Excavations will remain open for as little time as possible before the placement of fill. This will help to minimise the potential for water ingress into excavations. Soil from works will be stored away from existing drainage features to remove any potential impact.

Weather conditions will be considered when planning construction activities to minimise the risk of run-off from the site and the suitable distance of topsoil piles from drainage ditches and constructed surface water drains will be maintained.

8.5.1.3 Fuel and Chemical Handling

To minimise any impact on the underlying subsurface strata from material spillages, all oils, solvents and paints used during construction will be stored within temporary bunded areas. Oil and fuel storage tanks shall be stored in designated areas, and these areas shall be bunded to a volume of 110% of the capacity of the largest tank/container within the bunded area(s) (plus an allowance of 30 mm for rainwater ingress). Drainage from the bunded area(s) shall be diverted for collection and safe disposal.

Refuelling of construction vehicles and the addition of hydraulic oils or lubricants to vehicles will take place in a designated area (or where possible off the site) which will be away from surface water gulleys or drains. In the event of a machine requiring refuelling outside of this area, fuel will be transported in a mobile double skinned tank. An adequate supply of spill kits and hydrocarbon adsorbent packs will be stored in this area. All relevant personnel will be fully trained in the use of

this equipment. Guidelines such as "Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors" (CIRIA 532, 2001) will be complied with.

Where feasible all ready-mixed concrete will be brought to site by truck. A suitable risk assessment for wet concreting will be completed prior to works being carried out which will include measures to prevent discharge of alkaline wastewaters or contaminated storm water to the underlying subsoil. Wash down and washout of concrete transporting vehicles will take place at an appropriate facility offsite.

In the case of drummed fuel or other chemical which may be used during construction, containers should be stored in a dedicated internally bunded chemical storage cabinet and labelled clearly to allow appropriate remedial action in the event of a spillage.

8.5.1.4 Soil Removal and Compaction

Temporary storage of soil will be carefully managed in such a way as to prevent any potential negative impact on the receiving environment. The material will be stored away from any surface water drains (see Surface Water Run-off section above). Movement of material will be minimised to reduce degradation of soil structure and generation of dust.

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

Site investigations carried out at the site in 2021 (Refer to Chapter 6) found no residual contamination on site. Nonetheless, all excavated materials will be visually assessed for signs of possible contamination such as staining or strong odours. Should any unusual staining or odour be noticed, samples of this soil will be analysed for the presence of potential contaminants to ensure that historical pollution of the soil has not occurred. Should it be determined that any of the soil excavated is contaminated, this will be segregated and appropriately disposed of by a suitably permitted/licensed waste disposal contractor.

8.5.1.5 Monitoring Measures

Daily visual inspection will be undertaken by the contractor at the silt trap/ settlement tank to ensure adequate internal settlement is occurring. Where the visual assessment highlights elevated suspended sediments higher than expected, the water will be re-circulated for further settlement.

Weekly checks will be carried out to ensure surface water drains (once constructed) are not blocked by silt, or other items, and that all storage is located at least 10 m from surface water receptors. Regular inspection of surface water run-off and any sediment control measures will be carried out during the construction phase.

Regular auditing of construction / mitigation measures will be undertaken, e.g. concrete pouring, refuelling in designated areas, etc. A log of the regular inspections will be maintained, and any significant blockage or spill incidents will be recorded for root cause investigation purposes and updating procedures to ensure incidents do not occur.

8.5.2 OPERATIONAL PHASE

8.5.2.1 Oil System

The curbed unloading area is designed to contain leaks from the tanker truck and unloading station during tank fill operations and unloading station maintenance activities. The curbed area will be monitored visually during the temporary manual operations. Rainwater collecting in the curbed area will be visually inspected before manual discharge to grade. The operator will connect the tanker truck hose to the unloading station and will manually operate the unloading station pumps to fill the

site fuel oil tank. The unloading station will include local tank level indication and alarms with automatic shutdown of the unloading station pumps on high level to avoid overfilling the tanks. The pumps will incorporate a recirculation valve from pump discharge to pump suction, which will avoid an overpressure event without discharging fluid to grade. The fill connection piping will be routed above the tank secondary containment wall and connect to the top of the tank. The fill line between the pump containment area and the tank containment area will be single wall welded, with Type A connections and fittings.

With regard to the oil storage system, the tank will be installed on a concrete foundation, and will include a secondary nominal wall for leak containment. A spiral stairway will provide access to the top of the tank and to the annular containment area for inspection and maintenance activities. The secondary containment wall height will be sized for at least 110% tank capacity, and will be high enough to avoid issues with spigot/jetting flow from a leak. A shed roof (or equivalent) will be provided to minimize rainwater ingress into the containment area. The containment area will include redundant level switches to alarm if fluid is detected. Piping penetrations through the secondary containment wall will be limited to necessary low level connections for fuel forwarding pump suction, manual tank and containment drainage, and level switches to alarm on fluid level within the containment area. The penetrations will be sealed to avoid leaks. The balance of the tank connections will be routed above the secondary containment wall. Connections and fittings outside of the containment area will be designed as Type A

The design includes hardstand cover and permeable paving across the site prior to discharge into the attenuation system. Therefore, the risk of accidental discharge has been adequately addressed through design.

Petrol interceptors will be installed as part of the SuDS measures to capture any potential oil or hydrocarbon contamination prior to discharge into the attenuation system on site. This together with hardstand cover and permeable paving will minimise the potential for any impact to the hydrological environment.

8.5.2.2 Emergency Response Procedures

An Environmental Safety and Health Management System (EMS) will be implemented at the proposed development during operations. An environmental management plan will apply to the overall development during the operational phase incorporating mitigation measures and emergency response measures. An Emergency Response Plan has been developed for the proposed facility and has been included in the planning application. Section 7 and 8 of the ERP outline the procedures to be followed in response to a fire or spill.

There will be comprehensive emergency response procedures and standard operating procedures to respond to an onsite fuel spillage. All employees will be provided with such equipment, information, training and supervision as is necessary to implement the emergency response procedures and standard operating procedures. Section 6 of the Emergency Response Plan outlines the training plan to be provided to site personnel. The Emergency Response Plan will be updated based on final as built design and layout prior to the operational phase.

8.5.2.3 Environmental Procedures

During operation the site will operate in compliance with the requirements of an Irish Water (IW) licence for discharge to sewer. The following containment measures are included within the design to reduce potential for environmental impact. There will be comprehensive emergency response procedures and standard operating procedures to respond to chemical spillage all types. All employees will be provided with such equipment, information, training and supervision as is necessary to implement the emergency response procedures and standard operating procedures as outlined in the Emergency Response Plan.

8.5.2.4 Spill Kit Facilities

The provision of spill kit facilities and training of site operatives in use of same; should be undertaken at the operational stage in line with the Emergency Response Plan in order to manage any leaks from fuel storage and vehicles resulting in surface water quality impacts.

8.5.2.5 Storm Water & Foul Sewer Drainage

The proposed development will provide full attenuation for increase in hardstand area in compliance with the requirements of the Greater Dublin Strategic Drainage Study. A number of measures will be put in place to minimise the likelihood of any spills entering the water environment to include the design of the car park, fitting of refuelling areas with hydrocarbon interceptors and on-site speed restrictions.

It is proposed to ultimately discharge surface water from the proposed development, post attenuation and outflow restrictions into the existing local drainage.

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

8.6 RESIDUAL IMPACTS

8.6.1 CONSTRUCTION PHASE

The implementation of mitigation measures outlined above will ensure that the predicted impacts on the hydrological environment do not occur during the construction phase and that the residual impact will be ***short-term-imperceptible-neutral***. Following the TII criteria (refer to Appendix 8.1) for rating the magnitude and significance of impacts on the geological and hydrogeological related attributes, the magnitude of impact is considered ***negligible***.

8.6.2 OPERATIONAL PHASE

The implementation of mitigation measures highlighted above will ensure that the predicted impacts on the hydrological environment do not occur during the operational phase and that the residual impact will be ***long-term-imperceptible-neutral***. Following the TII criteria (refer to Appendix 8.1) for rating the magnitude and significance of impacts on the hydrogeological related attributes, the magnitude of impact is considered ***negligible***.

8.7 CUMULATIVE IMPACT ASSESSMENT

The following considers the cumulative impacts of the proposed development and proposed and permitted and operating facilities in the surrounding area in relation to Hydrology. This considers the proposed development and other surrounding proposed and permitted developments considered in Chapter 4.

As has been identified in the receiving environment section all cumulative developments that are already built and in operation contribute to our characterisation of the baseline environment. As such any further environmental impacts that the proposed development may have in addition to these already constructed and operational cumulative developments has been assessed in the preceding sections of this chapter.

There are two (2no.) main developments which have been granted in the recent past with potential to contribute to cumulative impacts (either in construction phase or operational phase). These developments are described below.

8.7.1 FW22A/0204 & ABP-317480-23

Permission granted for gas power turbine generation station to the northeast of site. In summary, the proposed development will consist of the following;

- The construction of a new Gas Turbine Power Generation Station with an output of up to 293 Megawatts
- The demolition of a detached residential dwelling and associated farm buildings
- Road improvement works to 493.34 m Kilshane Road (L3120), including the realignment of a portion of the road (293.86 m) within the subject site boundary and the provision of new footpaths, off-road cycle ways, together with the construction of a new roundabout

Applying the precautionary principle this future related project has the potential to act cumulatively with the proposed development for the construction phase only with respect to the land soils, geology and hydrogeological environment.

8.7.2 ABP-314894-22

8.7.2.1 GIS and Grid Connection

It will be located within the subject lands and it will be connected to an existing nearby gas main by means of a new underground pipe. The pipe route has not yet been confirmed however Gas Networks Ireland have indicated a range of options. Depending on the route taken this will be approximately 600-700 m in length. Applying the precautionary principle this future related project has the potential to act cumulatively with the proposed development for the construction phase only with respect to the hydrological environment.

8.7.2.2 AGI and Gas Pipeline

The location of the GIS electrical substation, which is required to convey generated electricity to the grid connection, is within the subject lands. The GIS will be connected to the national grid at Cruiserath substation to the west. The connection will be by means of a buried cable c. 4.69 km in length, generally laid under public roads. Applying the precautionary principle this future related project has the potential to act cumulatively with the proposed development for the construction phase only with respect to the hydrological environment.

The remainder of the planning permissions identified in Appendix 17.1 have no potential for cumulative effects with the proposed development in terms of the land soils, geology and hydrogeological environment, and or are already operational and as such are reflected in the current environmental baseline.

8.7.3 CONSTRUCTION PHASE

Applying the precautionary principle a number of granted permissions that may well have completed their construction phase by the time the proposed development is undergoing construction have been included within this assessment of cumulative effects. In this regard it is assumed that there is potential for the construction phases of FW22A/0204 & ABP-317480-23 and ABP-314894-22.

Based upon the information available within the planning files for FW22A/0204 & ABP-317480-23 and ABP-314894-22 there is sufficient information available to determine the likelihood of cumulative effects.

Contractors for both the Proposed Development and FW22A/0204 & ABP-317480-23 and ABP-314894-22, will be contractually required to operate in compliance with their CEMPs which will be required by law to incorporate measures to protect surface water quality in compliance with legislative standards for receiving water quality (European Communities Environmental Objectives (Surface Water) Regulations (S.I. 272 of 2009 and S.I. 77 of 2019 amendments).

Taking into account the relatively contained nature of the identified cumulative developments, the short-term aspect of their occurrence, the contractual controls, and the unlikelihood of them occurring in tandem, there will be minimal cumulative potential for change in surface water quality or the natural hydrological regime.

The cumulative impact for the construction phase is considered to be ***neutral*** and ***imperceptible***.

8.7.4 OPERATIONAL PHASE

With respect to the operational phase the following developments have the potential to act cumulatively with the proposed development with respect to the hydrological environment; FW22A/0204 & ABP-317480-23 and ABP-314894-22.

Based upon the information available within the planning files there is sufficient information available to determine the likelihood of cumulative effects for the operational phase.

Operators for FW22A/0204 & ABP-317480-23 and ABP-314894-22 will be legally required to operate according to the conditions of their planning permission and in accordance with S.I. 272 of 2009 and S.I. 77 of 2019.

Taking into account the SUDS control measures within the cumulative developments, along with the design measures to compensate from impacts to recharge rates to the underlying aquifer due to additional hardstanding there will be minimal cumulative potential for change in surface water quality or the natural hydrological regime during the operational phase.

There are no other large projects proposed within this area of the aquifer so no cumulative impact on recharge to the aquifer. All developments are required to manage groundwater discharges in accordance with S.I. 272 of 2009 and S.I. 77 of 2019. As such there will be no cumulative impact to groundwater quality and therefore there will be no cumulative impact on the Surface Waterbody Status.

The cumulative impact during the operational phase is considered to be ***neutral*** and ***imperceptible***.

8.8 INTERACTIONS

Due to the inter-relationship between land, soils, geology, hydrogeology and hydrology, - there is a strong overlap between the assessed impacts and mitigation measures in both chapters.

9 AIR QUALITY & CLIMATE

9.1 INTRODUCTION/METHODOLOGY

9.1.1 CRITERIA FOR RATING OF IMPACTS

9.1.1.1 Ambient Air Quality Standards

In order to reduce the risk to health from poor air quality, the Department of the Environment, Heritage and Local Government in Ireland and the European Parliament and Council of the European Union have set limit values in ambient air for a range of air pollutants. These limit values or "Air Quality Standards" are health or environmental-based levels for which additional factors may be considered. For example, natural background levels, environmental conditions and socio-economic factors may all play a part in the limit value which is set (see Table 9.1).

Air quality significance criteria are assessed on the basis of compliance with the appropriate standards or limit values. The applicable standards in Ireland include the Air Quality Standards Regulations 2011, which give effect to European Commission Directive 2008/50/EC which has set limit values for the pollutants NO2, PM10, and PM2.5 relevant to this assessment. Council Directive 2008/50/EC combines the previous Air Quality Framework Directive (96/62/EC) and its subsequent daughter directives (including 1999/30/EC and 2000/69/EC) and also includes ambient limit values relating to PM2.5.

Table 9.1 Air Quality Standards Regulations 2011 (based on EU Council Directive 2008/50/EC)

Pollutant	Regulation (Note 1)	Limit Type	Value
Nitrogen Dioxide (NO2)			
	2008/50/EC	Hourly limit for protection of human health - not to be exceeded more than 18 times/year	200 µg/m3
	2008/50/EC	Annual limit for protection of human health	40 µg/m3
Nitrogen Oxides (NO + NO2)			
	2008/50/EC	Critical limit for the protection of vegetation and natural ecosystems	30 µg/m3
Particulate Matter			
(as PM10)	2008/50/EC	24-hour limit for protection of human health - not to be exceeded more than 35 times/year	50 µg/m3
	2008/50/EC	Annual limit for protection of human health	40 µg/m3
Particulate Matter (as PM2.5)	2008/50/EC	Annual limit for protection of human health	25 µg/m3
Dust Deposition	TA Luft (German VDI 2002)	Annual average limit for nuisance dust	350 mg/m2/day
Carbon Monoxide (CO)	2008/50/EC	8-hour limit (on a rolling basis) for protection of human health	10 mg/m3

Note 1 EU 2008/50/EC – Clean Air For Europe (CAFÉ) Directive replaces the previous Air Framework Directive (1996/30/EC) and daughter directives 1999/30/EC and 2000/69/EC

9.1.1.2 Dust Deposition Guidelines

The concern from a health perspective is focused on particles of dust which are less than 10 microns and the EU ambient air quality standards outlined in the previous section have set ambient air quality limit values for PM10 and PM2.5.

With regard to larger dust particles that can give rise to nuisance dust, there are no statutory guidelines regarding the maximum dust deposition levels that may be generated during the construction and decommissioning phases of a development in Ireland.

With regard to dust deposition, the German TA-Luft standard for dust deposition (non-hazardous dust) (5) sets a maximum permissible emission level for dust deposition of 350 mg/m2/day averaged over a one-year period at any receptors outside the site boundary. The TA-Luft standard has been applied for the purpose of this assessment based on recommendations from the EPA in Ireland in the document titled '*Environmental Management Guidelines - Environmental Management in the Extractive Industry (Non-Scheduled Minerals*)' (6). The document recommends that the Bergerhoff limit of 350 mg/m^2/day be applied to the site boundary of quarries. This limit value shall be implemented with regard to dust impacts from construction of the Proposed Development.

9.1.1.3 Gothenburg Protocol

In 1999, Ireland signed the Gothenburg Protocol to the 1979 UN Convention on Long Range Transboundary Air Pollution. In 2012, the Gothenburg Protocol was revised to include national emission reduction commitments for the main air pollutants to be achieved in 2020 and beyond and to include emission reduction commitments for PM2.5. In relation to Ireland, 2020 emission targets are 25 kt for SO2 (65% below 2005 levels), 65 kt for NOX (49% reduction), 43 kt for volatile organic carbons (VOCs) (25% reduction), 108 kt for ammonia (NH3) (1% reduction) and 10 kt for PM2.5 (18% reduction).

European Commission Directive 2001/81/EC and the National Emissions Ceiling Directive (NECD), prescribes the same emission limits as the 1999 Gothenburg Protocol. A National EPA Programme for the progressive reduction of emissions of these four transboundary pollutants has been in place since April 2005. The data available from the EPA in 2021 indicated that Ireland complied with the emissions ceiling for SO2 in recent years but failed to comply with the ceilings for NH3, NOX and non-methane volatile organic carbons (NMVOCs). Directive (EU) 2016/2284 "On the Reduction of National Emissions of Certain Atmospheric Pollutants and Amending Directive 2003/35/EC and Repealing Directive 2001/81/EC" was published in December 2016. The Directive will apply the 2010 NECD limits until 2020 and establish new national emission reduction commitments which will be applicable from 2020 and 2030 for SO2, NOX, NMVOC, NH3, PM2.5 and methane (CH4). In relation to Ireland, 2020-29 emission targets are 25 kt for SO2 (65% on 2005 levels), 65 kt for NOX (49% reduction on 2005 levels), 43 kt for VOCs (25% reduction on 2005 levels), 108 kt for NH3 (1% reduction on 2005 levels) and 10 kt for PM2.5 (18% reduction on 2005 levels). In relation to 2030, Ireland's emission targets are 10.9 kt (85% below 2005 levels) for SO2, 40.7 kt (69% reduction) for NOX, 51.6 kt (32% reduction) for NMVOCs, 107.5 kt (5% reduction) for NH3 and 11.2 kt (41% reduction) for PM2.5

9.1.1.4 Climate Agreements

Ireland is party to both the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol. The Paris Agreement, which entered into force in 2016, is an important milestone in terms of international climate change agreements and includes an aim of limiting global temperature increases to no more than 2°C above pre-industrial levels with efforts to limit this rise to 1.5°C. The aim is to limit global GHG emissions to 40 gigatonnes as soon as possible whilst acknowledging that peaking of GHG emissions will take longer for developing countries. Contributions to GHG emissions will be based on Intended Nationally Determined Contributions (INDCs) which will form the foundation for climate action post 2020. Significant progress was also made in the Paris Agreement on elevating adaption onto the same level as action to cut and curb emissions.

In order to meet the commitments under the Paris Agreement, the EU enacted Regulation (EU) 2018/842 on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030 contributing to climate action to meet commitments under the Paris Agreement and amending Regulation (EU) No. 525/2013 (the Regulation). The Regulation aims to deliver, collectively by the EU in the most cost-effective manner possible, reductions in GHG emissions from the Emission Trading Scheme (ETS) and non-ETS sectors amounting to 43% and 30%, respectively, by 2030 compared to

2005. Ireland's obligation under the Regulation is a 30% reduction in non-ETS greenhouse gas emissions by 2030 relative to its 2005 levels.

Following on from the recently published European Climate Law Regulation (EU) 2021/1119, and as part of the EU's "Fit for 55" legislative package where the EU has recently committed to a domestic reduction of net greenhouse gas emissions by at least 55% compared to 1990 levels by 2020, the Effort Sharing Regulation is proposed to be strengthened with increased ambition by the year 2030. The proposal for Ireland is to increase the GHG emission reduction target from 30% to 42% relative to 2005 levels whilst the ETS market will also have more stringent reductions from the currently proposed reduction of 43% by 2030 compared to 2005 to a 61% reduction by 2030 based on annual reductions of 4.2% compared to the previous annual reduction level of 2.2% per year (EU, 2021). In terms of the current operation of the ETS, the European Commission reported that the ETS Carbon Market reported a fall of 9% in emissions in 2019 relative to 2018 levels.

The ETS is an EU-wide scheme which regulates the GHG emissions of larger industrial emitters including electricity generation, cement manufacturing, heavy industry and facilities which have greater than 20MW thermal input capacity (which is applicable to the Kilshane facility). Under the ETS scheme, there are no country-specific targets. The non-ETS sector includes all domestic GHG emitters which do not fall under the ETS scheme and thus includes GHG emissions from transport, residential and commercial buildings and agriculture. In contrast to the ETS scheme, Ireland has a country-specific obligation under the Regulation of a 42% reduction in non-ETS GHG emissions by 2030 relative to its 2005 levels.

In 2015, the Climate Action and Low Carbon Development Act 2015 (No. 46 of 2015)(7) was enacted (the 2015 Act). The purpose of the Act was to enable Ireland 'to pursue, and achieve, the transition to a low carbon, climate resilient and environmentally sustainable economy by the end of the year 2050' (3.(1) of No. 46 of 2015). This is referred to in the Act as the 'national transition objective'.

The Climate Action Plan (CAP)[8], outlines the current status across key sectors including Electricity, Transport, Built Environment, Industry and Agriculture and outlines the various broadscale measures required for each sector to achieve ambitious decarbonisation targets. The CAP also details the required governance arrangements for implementation including carbon-proofing of policies, establishment of carbon budgets, a strengthened Climate Change Advisory Council and greater accountability to the Oireachtas. The CAP has set a built environment sector reduction target of 40 - 45% relative to 2030 pre-NDP (National Development Plan) projections.

In June 2020, the Government published the Programme for Government – Our Shared Future[9] . In relation to climate, there is a commitment to an average 7% per annum reduction in overall greenhouse gas emissions from 2021 to 2030 (51% reduction over the decade) with an ultimate aim to achieve net zero emissions by 2050. Policy changes include the acceleration of the electrification of the transport system, including electric bikes, electric vehicles and electric public transport, alongside a ban on new registrations of petrol and diesel cars from 2030. In addition, there is a policy to ensure an unprecedented model shift in all areas by a reorientation of investment to walking, cycling and public transport.

Climate Action and Low Carbon Development (Amendment) Act 2021 (the 2021 Climate Act) (No. 32 of 2021) was published in July 2021. The purpose of the 2021 Climate Act is to provide for the approval of plans 'for the purpose of pursuing the transition to a climate resilient, biodiversity rich and climate neutral economy by no later than the end of the year 2050'. The 2021 Climate Act will also 'provide for carbon budgets and a sectoral emissions ceiling to apply to different sectors of the economy'. The 2021 Climate Act removes any reference to a national mitigation plan and instead refers to both the Climate Action Plan, as published in 2019, and a series of National Long Term Climate Action Strategies. In addition, the Environment Minister shall request each local authority to make a 'local authority climate action plan' lasting five years and to specify the mitigation measures and the adaptation measures to be adopted by the local authority. The Act has set a target of a 51% reduction in the total amount of greenhouse gases over the course of the first two carbon periods ending 31 December 2030 relative to 2018 annual emissions. The 2021 Climate Act defines the

carbon budget as 'the total amount of greenhouse gas emissions that are permitted during the budget period'.

The Climate Action and Low Carbon Development (Amendment) Act 2021 (No. 32 of 2021) outlines a series of specific actions including:

- To make a strategy to be known as the 'National Long Term Climate Strategy' not less than once in every five-year period with the first to be published for the period 2021 to 2035 and with each subsequent Strategy covering the next three five-year carbon budgets and also include a longer-term perspective of at least 30 years;
- To adopt a system of carbon budgets which will be determined as part of a grouping of three five-year periods calculated on an economy-wide basis, starting with the periods 2021 to 2025, 2026 to 2030, and 2031 to 2035;
- To introduce a requirement for Government to adopt "sectoral emission ceilings" for each relevant sector within the limits of each carbon budget;
- To request all local authorities to prepare climate action plans for the purpose of contributing to the national climate objective. These plans should contain mitigation and adaptation measures that the local authority intends to adopt;
- Increasing the power of the Advisory Council to recommend the appropriate climate budget and policies;
- Requiring the Minister to set out a roadmap of actions to include sector specific actions that are required to comply with the carbon budget and sectoral emissions ceiling for the period to which the plan relates; and
- Reporting progress with the CAP on an annual basis with progress including policies, mitigation measures and adaptation measures that have been adopted.

In terms of wider energy policy, as outlined in the EPA publication "Ireland's Greenhouse Gas Projections 2021-2040"[(10)] under the With Additional Measures scenario, emissions from the energy industries sector are projected to decrease by 48.9% to 4.5 Mt CO2eq over the period 2020 to 2030 including the proposed increase in renewable energy generation to approximately 80% of electricity consumption:

- In this scenario it is estimated that renewable energy generation increases to approximately 80% of electricity consumption. This is mainly a result of further expansion in wind energy (comprising 5.0 GW offshore). Expansion of other renewables (e.g. solar photovoltaics) also occurs under this scenario.
- Under the With Additional Measures, one power station operates to the end of 2023 with 30% co-firing.
- In this scenario the Moneypoint power station is assumed to operate in the market up to end 2025 at which point it no longer generates electricity from coal.
- In terms of inter-connection, it is assumed that the Greenlink 500MW interconnector to the UK to come on stream in 2025 and the Celtic 700MW interconnector to France to come on stream in 2027.

The 202 Climate Action Plan (CAP)(12) provides a detailed plan for taking decisive action to achieve a 51% reduction in overall greenhouse gas emissions by 2030 and setting us on a path to reach net-zero emissions by no later than 2050, as committed to in the Programme for Government and set out in the Climate Act 2021. The plan outlines the current status across key sectors including Electricity, Transport, Built Environment, Industry and Agriculture and outlined the various broadscale measures required for each sector to achieve ambitious decarbonisation targets. The CAP 2021 also detailed the required governance arrangements for implementation including carbon-proofing of policies and establishment of sectoral emission ceilings and carbon budgets. The CAP 2021 provides that emissions from industry sectors covered by the ETS are subject to EU-wide rather than national targets set out under EU Effort Sharing Decision. Box 2.1 states:

"Emissions from electricity generation and large industry in the ETS are subject to EU-wide targets which require that emissions from these sectors be reduced by 43% by 2030, relative to 2005 levels".

As part of the preparation of a 'local authority climate action plan', each local authority shall consult and co-operate with an adjoining local authority in making a local authority climate action plan and co-ordinate the mitigation measures and adaptation measures to be adopted, where appropriate. Each local authority is also required to consider any significant effects the implementation of the local authority climate action plan may have on the adjoining local authority.

Individual county councils in Ireland have also published their own Climate Change Strategies which outline the specific climate objectives for that local authority and associated actions to achieve the objectives. The Fingal County Council (FCC) Climate Action Plan[13] outlines FCC's goals to mitigate GHG emissions and plans to prepare for and adapt to climate change. The FCC Climate Action Plan highlights the risks that climate change poses to transportation network with risks mainly associated with extreme weather events and sea level rise. The FCC Climate Action Plan, in relation to energy and built environment, has a target of a 33% improvement in energy efficiency by 2020 and a 40% reduction in council's GHG emissions by 2030. Additional measures include an energy master plan for the Dublin region and upgrades in buildings using Energy Performance Contracts.

9.1.2 CONSTRUCTION PHASE METHODOLOGY

9.1.2.1 Air Quality

The current assessment focuses on identifying the existing baseline levels of PM_{10} and $PM_{2.5}$ in the region of the Proposed Development by an assessment of EPA monitoring data. Thereafter, the impact of the construction phase of the development on air quality was determined by a qualitative assessment of the nature and scale of dust generating construction activities associated with the Proposed Development.

The Institute of Air Quality Management in the UK (IAQM) guidelines[14] outline an assessment method for predicting the impact of dust emissions from demolition, earthworks, construction and haulage activities based on the scale and nature of the works and the sensitivity of the area to dust impacts. The IAQM methodology has been applied to the construction phase of this development in order to predict the likely magnitude of the dust impacts in the absence of mitigation measures.

Construction phase traffic also has the potential to impact air quality and climate. The UK Highways Agency Design Manual for Roads and Bridges (DMRB) guidance[15] , states that road links meeting one or more of the following criteria can be defined as being 'affected' by a proposed development and should be included in the local air quality assessment. The use of the UK guidance is recommended by Transport Infrastructure Ireland (TII)[16] in the absence of specific Irish guidance, this approach is considered best practice and can be applied to any development that causes a change in traffic.

- Annual average daily traffic (AADT) changes by 1,000 or more;
- Heavy duty vehicle (HDV) AADT changes by 200 or more;
- A change in speed band; or
- A change in carriageway alignment by 5m or greater.

The construction stage traffic does not meet the above scoping criteria. Therefore, a detailed air quality modelling assessment has been scoped out as there is no potential for significant impacts to air quality during construction as a result of traffic emissions.

9.1.2.2 Climate

The impact of the construction phase of the Proposed Development on climate was determined by a qualitative assessment of the nature and scale of greenhouse gas generating construction activities associated with the Proposed Development.

9.1.3 OPERATIONAL PHASE METHODOLOGY

9.1.3.1 Climate

The impact of the operational phase of the development on climate was determined by a qualitative assessment of the nature and scale of greenhouse gas generating operational activities associated with the Proposed Development.

9.2 THE PROPOSED DEVELOPMENT

The Proposed Development is described in Chapter 4 (Project Description). The details of the construction and operation of the development in terms of air quality and climate are further discussed below.

9.2.1 CONSTRUCTION PHASE

During the construction stage the main source of air quality impacts will be as a result of fugitive dust emissions from site activities. Emissions from construction vehicles and machinery have the potential to impact climate.

9.2.2 OPERATIONAL PHASE

Information on the gas turbine as used in this assessment was provided by the engine supplier.

9.3 THE RECEIVING ENVIRONMENT

9.3.1 BASELINE AIR QUALITY

Air quality monitoring programmes have been undertaken in recent years by the EPA and Local Authorities[27]. The most recent annual report on air quality "*Air Quality in Ireland 2020*"[27], details the range and scope of monitoring undertaken throughout Ireland. As part of the implementation of the Framework Directive on Air Quality (1996/62/EC), four air quality zones have been defined in Ireland for air quality management and assessment purposes[27]. Dublin is defined as Zone A and Cork as Zone B. Zone C is composed of 23 towns with a population of greater than 15,000. The remainder of the country, which represents rural Ireland but also includes all towns with a population of less than 15,000 is defined as Zone D. In terms of air monitoring, Ballycoolin, Co. Dublin is categorised as Zone A[27].

In 2020 the EPA reported[27] that Ireland was compliant with EU legal limits at all locations, however this was largely due to the reduction in traffic due to Covid-19 restrictions. The EPA report details the effect that the Covid-19 restrictions had on stations, which included reductions of up to 50% at some monitoring stations which have traffic as a dominant source. The report also notes that CSO figures show that while traffic volumes are still slightly below 2019 levels, they have significantly increased since 2020 levels. 2020 concentrations are therefore predicted to be an exceptional year and not consistent with long-term trends. For this reason, they have not been included in the baseline section.

9.3.1.1 NO_2

With regard to NO_2, continuous monitoring data from the EPA[27] at suburban Zone A background locations in Rathmines, Swords and Ballyfermot show that current levels of NO_2 are below both the annual and 1-hour limit values, with annual average levels ranging from 15 - 22 µg/m^3 in 2019. Sufficient data is available for the station in Ballyfermot to observe long-term trends over the period 2015 – 2019[27], with annual average results ranging from 16 – 20 µg/m^3. Based on these results, an estimate of the current background NO_2 concentration in the region of the facility is 17 µg/m^3.

Table 9.2 Annual Mean and 99.8th Percentile 1-Hour NO_2 Concentrations In Zone A Locations (µg/m³)

Station	Averaging Period	Year				
		2015	2016	2017	2018	2019
Ballyfermot	Annual Mean NO_2 (µg/m³)	16	17	17	17	20
	99.8th%ile 1-hr NO_2 (µg/m³)	127	90	112	101	101
Rathmines	Annual Mean NO_2 (µg/m³)	18	20	17	20	22
	99.8th%ile 1-hr NO_2 (µg/m³)	105	88	86	87	102
Swords	Annual Mean NO_2 (µg/m³)	13	16	14	16	15
	99.8th%ile 1-hr NO_2 (µg/m³)	93	96	79	85	80

Note 1 Annual average limit value of 40 µg/m³ and hourly limit value of 200 µg/m³ (EU Council Directive 2008/50/EC & S.I. No. 180 of 2011)

The Ozone Limiting Method (OLM) was used to model NO_2 concentrations. The OLM is a regulatory option in AERMOD which calculates ambient NO_2 concentrations by applying a background ozone concentration and an in-stack NO_2/NO_X ratio to predicted NO_X concentrations. An in-stack NO_2/NO_X ratio of 0.1 and a conservative ozone value of 54 µg/m³ was used in the assessment based on the maximum annual average levels recorded over a 5-year period (2015 – 2019) at EPA Zone A locations[27].

In relation to the annual average background, the ambient background concentration was added directly to the process concentration with the short-term peaks assumed to have an ambient background concentration of twice the annual mean background concentration.

9.3.1.2 PM_{10}

Continuous PM_{10} monitoring carried out at the suburban background locations of Ballyfermot, Dún Laoghaire, Rathmines and Tallaght showed annual mean concentrations ranging from 11–15 µg/m³ in 2019 (see Table 9.3), with at most 9 exceedances (in Rathmines) of the daily limit value of 50 µg/m³ (35 exceedances are permitted per year)[27]. Sufficient data is available for all stations to observe trends over the period 2015 – 2019. Average annual mean PM_{10} concentrations ranged from 9– 16 µg/m³ over the period of 2015–2019, suggesting an upper average concentration of no more than 12.9 µg/m³. PM_{10} results from the urban background location in the Phoenix Park show similarly low levels over the period of 2015–2019 with concentrations ranging from 9 – 12 µg/m³. Based on these results, a conservative estimate of the background PM_{10} concentration in the region of the proposed development is 15 µg/m³.

Table 9.3 Annual Mean and 24-Hour Mean PM_{10} Concentrations In Zone A Locations ($\mu g/m^3$)

Station	Averaging Period	Year				
		2015	2016	2017	2018	2019
Ballyfermot	Annual Mean PM_{10} ($\mu g/m^3$)	12	11	12	16	14
	24-hr Mean > 50 $\mu g/m^3$ (days)	3	0	1	0	7
Dun Laoghaire	Annual Mean PM_{10} ($\mu g/m^3$)	13	13	12	13	12
	24-hr Mean > 50 $\mu g/m^3$ (days)	3	0	2	0	2
Phoenix Park	Annual Mean PM_{10} ($\mu g/m^3$)	12	11	9	11	11
	24-hr Mean > 50 $\mu g/m^3$ (days)	2	0	1	0	2
Rathmines	Annual Mean PM_{10} ($\mu g/m^3$)	15	15	13	15	15
	24-hr Mean > 50 $\mu g/m^3$ (days)	5	3	5	2	9
Tallaght	Annual Mean PM_{10} ($\mu g/m^3$)	14	14	12	15	12
	24-hr Mean > 50 $\mu g/m^3$ (days)	4	0	2	1	3

Note 1 Annual average limit value of 40 $\mu g/m^3$ and hourly limit value of 50 $\mu g/m^3$ (EU Council Directive 2008/50/EC & S.I. No. 180 of 2011)

9.3.1.3 $PM_{2.5}$

Continuous $PM_{2.5}$ monitoring carried out at the Zone A location of Rathmines[27] showed an average concentration ranging from 9 – 10 $\mu g/m^3$ over the 2017 – 2021 period, with a $PM_{2.5}/PM_{10}$ ratio ranging from 0.60 – 0.75. Based on this information, a conservative ratio of 0.75 was used to generate a background $PM_{2.5}$ concentration in the region of the development of 9 $\mu g/m^3$.

9.3.1.4 CO

Continuous CO monitoring carried out at one Zone A location at Winetavern St in 2019[27] showed an annual mean concentration of 0.4 $\mu g/m^3$. Long-term data for the period 2017 – 2021 for Winetavern St and Coleraine St shows that concentrations range from 0.1 – 0.4 $\mu g/m^3$. Based on this EPA data, an estimate of the background PM_{10} concentration in the region of the facility is 0.5 $\mu g/m^3$.

9.3.1.5 SO_2

Long-term SO_2 monitoring was carried out at the Zone A urban traffic location of Winetavern Street and the suburban background locations of Rathmines, Tallaght and Ringsend in 2019[27]. The SO_2 annual average measured 1.5 $\mu g/m^3$ in 2019. Long-term monitoring from 2015 – 2019 at Winetavern Street, Coleraine Street, Rathmines, Tallaght and Ringsend indicated annual averages ranging from 0.1 – 4.3 $\mu g/m^3$ (see Table 9.4). Based on the above information a conservative estimate of the background SO_2 concentration in the region of the facility is 5 $\mu g/m^3$. The average 99.7th%ile of 1-hour means for Winetavern Street, Rathmines, Tallaght and Ringsend in 2019 was 32 $\mu g/m^3$ whilst the average 99.2th%ile of 24-hour means in 2019 was 6.9 $\mu g/m^3$.

Table 9.4 Annual Mean, 99.7th Percentile 1-Hour and 99.2nd 24-Hour SO_2 Concentrations In Zone A Locations (µg/m³)

Station	Averaging Period	Year				
		2015	2016	2017	2018	2019
Winetavern Street	Annual Mean SO_2 (µg/m³)[Note 1]	1.0	0.2	-	0.7	0.8
	99.7th%ile of 1-hour mean SO_2 (µg/m³)[Note 2]	20.0	10.2	5.8	21.0	37.2
	99.2th%ile of 24-hour mean SO_2 (µg/m³)[Note 3]	6.0	3.9	1.4	7.0	6.1
Coleraine Street	Annual Mean SO_2 (µg/m³)	0.3	0.6	0.1	-	-
	99.7th%ile of 1-hour mean SO_2 (µg/m³)	17.0	13.8	34.2	-	-
	99.2th%ile of 24-hour mean SO_2 (µg/m³)	7.0	4.0	9.2	-	-
Rathmines	Annual Mean SO_2 (µg/m³)	2.0	1.7	1.7	2.3	1.3
	99.7th%ile of 1-hour mean SO_2 (µg/m³)	27.0	26.6	29.5	25.0	29.3
	99.2th%ile of 24-hour mean SO_2 (µg/m³)	10.0	7.6	12.1	8.0	4.3
Tallaght	Annual Mean SO_2 (µg/m³)	3.0	2.4	2.2	2.2	2.5
	99.7th%ile of 1-hour mean SO_2 (µg/m³)	30.0	20.7	47.6	22.0	18.6
	99.2th%ile of 24-hour mean SO_2 (µg/m³)	17.0	10.0	16.0	9.0	10.4
Ringsend	Annual Mean SO_2 (µg/m³)	-	-	4.3	3.3	1.4
	99.7th%ile of 1-hour mean SO_2 (µg/m³)	-	-	50.0	51.0	42.8
	99.2th%ile of 24-hour mean SO_2 (µg/m³)	-	-	14.0	20.0	6.9

Note 1 Annual average limit value of 20 µg/m³ (EU Council Directive 2008/50/EC & S.I. No. 180 of 2011)

Note 2 24 hour limit value of 125 µg/m³ not to be exceeded more than 3 times per year (EU Council Directive 2008/50/EC & S.I. No. 180 of 2011)

Note 3 Hourly limit value of 350 µg/m³ not to be exceeded more than 24 times per year (EU Council Directive 2008/50/EC & S.I. No. 180 of 2011)

When calculating the short-term peak results, concentrations due to emissions from stacks cannot be combined by directly adding the annual background level to the modelling results. Guidance from the UK DEFRA(26) and EPA(4) advises that for SO_2 an estimate of the maximum combined pollutant concentrations can be obtained as shown below:

SO_2 - The 99.2th%ile of total 24-hour SO_2 is equal to the maximum of either A or B below:

a) 99.2th%ile of 24-hour mean background SO_2 + (2 x annual mean process contribution SO_2)
b) 99.2th%ile 24-hour mean process contribution SO_2 + (2 x annual mean background contribution SO_2)

SO_2 - The 99.7th%ile of total 1-hour SO_2 is equal to the maximum of either A or B below:

a) 99.7th%ile hourly background SO_2 + (2 x annual mean process contribution SO_2)
b) 99.7th%ile hourly process contribution SO_2 + (2 x annual mean background contribution SO_2)

9.3.2 SENSITIVITY OF THE RECEIVING ENVIRONMENT

In line with the UK Institute of Air Quality Management (IAQM) guidance document '*Guidance on the Assessment of Dust from Demolition and Construction'*[14]prior to assessing the impact of dust from a Proposed Development the sensitivity of the area must first be assessed as outlined below. Both receptor sensitivity and proximity to proposed works areas are taken into consideration. For the purposes of this assessment, high sensitivity receptors are regarded as residential properties where people are likely to spend the majority of their time. Commercial properties and places of work are regarded as medium sensitivity while low sensitivity receptors are places where people are present for short periods or do not expect a high level of amenity.

In terms of receptor sensitivity to dust soiling, there are between 1 and 10 residential properties within 20m of the Proposed Development site. These are considered high sensitivity receptors in terms of dust soiling. Therefore, the overall sensitivity of the area to dust soiling impacts is considered medium based on the IAQM criteria outlined in Table 9.5.

Table 9.5 Sensitivity of the Area to Dust Soiling Effects on People and Property

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

In addition to sensitivity to dust soiling, the IAQM guidelines also outline the assessment criteria for determining the sensitivity of the area to human health impacts. The criteria take into consideration the current annual mean PM_{10} concentration, receptor sensitivity based on type (residential receptors are classified as high sensitivity) and the number of receptors affected within various distance bands from the construction works. A conservative estimate of the current annual mean PM_{10} concentration in the vicinity of the Proposed Development 15 µg/m^3 and there are between 1 and 10 number of high sensitivity residential properties within 20 m of the proposed site area. Based on the IAQM criteria outlined in Table 9.6, the worst case sensitivity of the area to human health is considered to be low.

Table 9.6 Sensitivity of the Area to Human Health Impacts

Receptor Sensitivity	Annual Mean PM_{10} Concentration	Number of Receptors	Distance from source (m)			
			<20	<50	<100	<350
High	< 24 µg/m^3	>100	Medium	Low	Low	Low
		10-100	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
Medium	< 24 µg/m^3	>10	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
Low	< 24 µg/m^3	>1	Low	Low	Low	Low

Consideration has also been given to the IAQM document 'A guide to the assessment of air quality on designated conservation sites 2020'[28] with respect to ecologically sensitive receptors.

Dust deposition impacts on ecology can occur due to chemical or physical effects. This includes reduction in photosynthesis due to smothering from dust on the plants and chemical changes such as acidity to soils. Often impacts will be reversible once the works are completed, and dust deposition ceases. Designated sites within 50m of the boundary of the site or within 50m of the route used by construction vehicles on public highways up to a distance of 500m from a construction site entrance can be affected according to the IAQM guidance(14). There are no ecologically sensitive sites within 50m of the site boundary, therefore no significant impacts are predicted.

9.3.3 CLIMATE BASELINE

Anthropogenic emissions of greenhouse gases in Ireland included in the EU 2020 strategy are outlined in the most recent review by the EPA which details final emissions up to 2019. The data published in 2021 states that Ireland has exceeded its 2019 annual limit set under the EU's Effort Sharing Decision (ESD), 406/2009/EC1 by an estimated 6.85 Mt. For 2019, total national greenhouse gas emissions are 59.78 million tonnes carbon dioxide equivalent (Mt CO_2eq) with 45.58 MtCO_2eq of emissions associated with the ESD sectors for which compliance with the EU targets must be met. Agriculture is the largest contributor in 2019 at 35.3% of the total, with the transport sector accounting for 20.3% of emissions of CO_2.

GHG emissions for 2020 are estimated to be 9.7% lower than those recorded in 2019. Emission reductions have been recorded in 7 of the last 11 years. However, compliance with the annual EU targets has not been met for five years in a row. Emissions from 2016 – 2020 exceeded the annual EU targets by 0.29 MtCO_2eq, 2.94 MtCO_2eq, 5.57 MtCO_2eq, 6.98 MtCO_2eq and 6.73 MtCO_2eq respectively. Agriculture is consistently the largest contributor to emissions with emissions from the transport and energy sectors being the second and third largest contributors respectively in recent years.

The EPA 2021 GHG Emissions Projections Report for 2020 – 2040(10) notes that there is a long-term projected decrease in greenhouse gas emissions as a result of inclusion of new climate mitigation policies and measures that formed part of the National Development Plan (NDP) which was published in 2018 and the Climate Action Plan published in 20. Implementation of these are classed as a "*With Additional Measures scenario*" for future scenarios. A change from generating electricity using coal and peat to wind power and diesel vehicle engines to electric vehicle engines are envisaged under this scenario. While emissions are projected to decrease in these areas, emissions from agriculture are projected to grow steadily due to an increase in animal numbers. However, over the period 2013 to 2020 Ireland is projected to cumulatively exceed its compliance obligations with the EU's Effort Sharing Decision (Decision No. 406/2009/EC) 2020 targets by approximately 12.2MtCO_2eq under the "With Existing Measures" scenario and under the "With Additional Measures" scenario(10). The projections indicate that Ireland can meet its non-ETS EU targets over the period 2021 – 2030 assuming full implementation of the 2024 Climate Action Plan and the use of the flexibilities available.

9.4 PREDICTED IMPACTS

9.4.1 DO NOTHING SCENARIO

Under the Do Nothing Scenario no construction works will take place and the identified impacts of fugitive dust and particulate matter emissions and emissions from equipment and machinery will not occur. Impacts from increased traffic volumes and associated air emissions will also not occur.

The ambient air quality at the site will remain as per the baseline and will change in accordance with trends within the wider area (including influences from new developments on the site and in the surrounding area, changes in road traffic, etc.).

9.4.2 CONSTRUCTION PHASE

9.4.2.1 Air Quality

The greatest potential impact on air quality during the construction phase of the Proposed Development is from construction dust emissions and the potential for nuisance dust. While construction dust tends to be deposited within 350 m of a construction site, the majority of the deposition occurs within the first 50 m. The extent of any dust generation depends on the nature of the dust (soils, peat, sands, gravels, silts etc.) and the nature of the construction activity. In addition, the potential for dust dispersion and deposition depends on local meteorological factors such as rainfall, wind speed and wind direction. Sensitive receptors include residential properties within 20 m of the site boundary on the L3120 Kilshane Road. A review of Dublin Airport meteorological data indicates that the prevailing wind direction is westerly to southerly and wind speeds are generally moderate in nature. In addition, dust generation is considered negligible on days where rainfall is greater than 0.2 mm[18]. A review of historical 30 year average data for Dublin Airport indicates that on average 191 days per year have rainfall over 0.2 mm and therefore it can be determined that over 50% of the time dust generation will be reduced.

In order to determine the level of dust mitigation required during the proposed works, the potential dust emission magnitude for each dust generating activity needs to be taken into account, in conjunction with the previously established sensitivity of the area (see Section 9.4.1). The major dust generating activities are divided into four types within the IAQM guidance to reflect their different potential impacts. These are:

- Demolition;
- Earthworks;
- Construction; and
- Trackout (movement of heavy vehicles).

Demolition

There is no demolition required as part of the Proposed Development therefore this category is not relevant to the assessment.

Earthworks

Earthworks primarily involve excavating material, loading and unloading of materials, tipping and stockpiling activities. Activities such as levelling the site and landscaping works are also considered under this category. The dust emission magnitude from earthworks can be classified as small, medium or large based on the definitions from the IAQM guidance as transcribed below:

- **Large:** Total site area > 10,000 m^2, potentially dusty soil type (e.g. clay which will be prone to suspension when dry due to small particle size), >10 heavy earth moving vehicles active at any one time, formation of bunds > 8 m in height, total material moved >100,000 tonnes;
- **Medium:** Total site area 2,500 m^2 – 10,000 m^2, moderately dusty soil type (e.g. silt), 5 - 10 heavy earth moving vehicles active at any one time, formation of bunds 4 – 8 m in height, total material moved 20,000 – 100,000 tonnes;
- **Small:** Total site area < 2,500 m^2, soil type with large grain size (e.g. sand), < 5 heavy earth moving vehicles active at any one time, formation of bunds < 4 m in height, total material moved < 20,000 tonnes, earthworks during wetter months.

The site area of proposed works will be greater than 10,000 m^2. Therefore the dust emission magnitude for the proposed earthwork activities can be classified as large.

The sensitivity of the area, as determined in Section 9.3, is combined with the dust emission magnitude for each dust generating activity to define the risk of dust impacts in the absence of mitigation. As outlined in Table 9.7, this results in an overall medium risk of short-term dust soiling impacts and a low risk of short-term human health impacts as a result of the proposed earthworks activities.

Table 9.7 Risk of Dust Impacts – Demolition

Sensitivity of Area	Dust Emission Magnitude		
	Large	**Medium**	**Small**
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Construction

Dust emission magnitude from construction can be classified as small, medium or large based on the definitions from the IAQM guidance as transcribed below:

- **Large**: Total building volume > 100,000 m^3, on-site concrete batching, sandblasting;
- **Medium**: Total building volume 25,000 m^3 – 100,000 m^3, potentially dusty construction material (e.g. concrete), on-site concrete batching;
- **Small**: Total building volume < 25,000 m^3, construction material with low potential for dust release (e.g. metal cladding or timber).

The dust emission magnitude for the proposed construction activities can be classified as small as the total building volume will be between 25,000 m^3 and 100,000 m^3.

The sensitivity of the area is combined with the dust emission magnitude for each dust generating activity. As outlined in Table 9.8, this results in an overall medium risk of short-term dust soiling impacts and low risk of short-term human health impacts as a result of the proposed construction activities

Table 9.8 Risk of Dust Impacts – Construction

Sensitivity of Area	Dust Emission Magnitude		
	Large	**Medium**	**Small**
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Trackout

Factors which determine the dust emission magnitude are vehicle size, vehicle speed, number of vehicles, road surface material and duration of movement. Dust emission magnitude from trackout can be classified as small, medium or large based on the definitions from the IAQM guidance as transcribed below:

- **Large**: > 50 HDV (> 3.5 t) outward movements in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length > 100 m;
- **Medium**: 10 - 50 HDV (> 3.5 t) outward movements in any one day, moderately dusty surface material (e.g. high clay content), unpaved road length 50 - 100 m;
- **Small**: < 10 HDV (> 3.5 t) outward movements in any one day, surface material with low potential for dust release, unpaved road length < 50 m.

The dust emission magnitude for the proposed trackout can be classified as medium, as at worst-case peak periods there will be between 10 and 50 outward HGV movements per day and there will be unpaved site roads 10 – 50 m long. As outlined in Table 9.9, this results in an overall medium risk of short-term dust soiling and low risk of short-term human health impacts as a result of the proposed trackout activities.

Table 9.9 Risk of Dust Impacts – Trackout

Sensitivity of Area	Dust Emission Magnitude		
	Large	**Medium**	**Small**
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Summary of Dust Emission Risk

The risk of dust impacts as a result of the Proposed Development are summarised in Table 9.10 for each activity. The magnitude of risk determined is used to prescribe the level of site specific mitigation required for each activity in order to prevent significant impacts occurring.

While there is an overall low to medium risk of dust soiling or human health impacts associated with the Proposed Development, nevertheless best practice dust mitigation measures will be implemented on site in order to ensure that no dust nuisance occurs during the earthworks, construction and trackout activities.

Table 9.10 Summary of Dust Impact Risk used to Define Site-Specific Mitigation

Potential Impact	Dust Emission Risk			
	Demolition	**Earthworks**	**Construction**	**Trackout**
Dust Soiling	n/a	Medium Risk	Medium Risk	Medium Risk
Human Health	n/a	Low Risk	Low Risk	Low Risk

When the dust mitigation measures detailed in the mitigation section (Section 9.5.1) of this report are implemented, fugitive emissions of dust and particulate matter from the site will be negative, short-term and imperceptible in nature, posing no nuisance at nearby receptors.

There is also the potential for traffic emissions to impact air quality in the short-term over the construction phase. Particularly due to the increase in HGVs accessing the site. The construction stage traffic has been reviewed and a detailed air quality assessment has been scoped out as none of the road links impacted by the Proposed Development satisfy the DMRB assessment criteria in Section 9.1.2.1. It can therefore be determined that the construction stage traffic will have an imperceptible, neutral and short-term impact on air quality.

9.4.2.2 Climate

There is the potential for a number of greenhouse gas emissions to atmosphere during the construction of the development. Construction vehicles, generators etc., may give rise to CO_2 and N_2O emissions. The Institute of Air Quality Management document *Guidance on the Assessment of Dust from Demolition and Construction* (IAQM, 2014) states that site traffic and plant is unlikely to make a significant impact on climate. Therefore, in accordance with the EPA Guidelines(1), the impact will be short-term, neutral and imperceptible.

9.4.2.3 Human Health

Dust emissions from the construction phase of the Proposed Development have the potential to impact human health through the release of PM_{10} and $PM_{2.5}$ emissions. As per Table 9.6 the surrounding area is considered of medium sensitivity to dust related human health impacts. There is an overall worst-case medium risk of dust related human health impacts as a result of the construction of the Proposed Development (Table 9.10). Best practice mitigation measures are proposed for the construction phase of the Proposed Development which will focus on the pro-active control of dust and other air pollutants to minimise generation of emissions at source. The mitigation measures that will be put in place during construction of the Proposed Development will ensure that the impact of the development complies with all EU ambient air quality legislative limit values which

are based on the protection of human health. Therefore, in accordance with the EPA Guidelines[1], the impact of construction of the Proposed Development is likely to be neutral, short-term and imperceptible with respect to human health.

9.4.2.4 Sensitive Ecosystems

There are no sensitive ecosystems within 50m of the Proposed Development during the construction phase. Therefore, there is no potential for significant impacts to sensitive ecosystems as a result of the Proposed Development.

9.4.3 OPERATIONAL PHASE

9.4.3.1 Air Quality

Operational phase traffic also has the potential to impact air quality and climate. The UK Highways Agency Design Manual for Roads and Bridges (DMRB) guidance[15], states that road links meeting one or more of the following criteria can be defined as being 'affected' by a proposed development and should be included in the local air quality assessment. The use of the UK guidance is recommended by the TII[16] in the absence of specific Irish guidance, this approach is considered best practice and can be applied to any development that causes a change in traffic.

- Annual average daily traffic (AADT) changes by 1,000 or more;
- Heavy duty vehicle (HDV) AADT changes by 200 or more;
- A change in speed band; or
- A change in carriageway alignment by 5m or greater.

The L3120 Kilshane Rd will be realigned as part of the proposed development – this new alignment increases the distance between existing adjacent residential receptors and the road and is therefore a slight beneficial impact. However, there is no additional operational phase traffic associated with the Proposed Development. Therefore, a detailed air quality modelling assessment has been scoped out as there is no potential for significant impacts to air quality during operation as a result of traffic emissions.

The potential impact to air quality during the operational phase of the Proposed Development is a breach of the ambient air quality standards as a result of air emissions from the existing and proposed emission points. However, the given stack heights ensure an adequate release height for all emission points to aid dispersion of the plume and ensure compliance with the ambient air quality limit values beyond the site boundary.

9.4.3.2 Climate

Climate change has the potential to alter weather patterns and increase the frequency of rainfall in future years. As a result of this there is the potential for flooding related impacts on site in future years. However, adequate attenuation and drainage have been provided for to account for increased rainfall in future years as part of the design of this development.

The UK Highways Agency has published an updated DMRB guidance document in relation to climate impact assessments *LA 114 Climate*[36]. The following scoping criteria are used to determine whether a detailed climate assessment is required for a proposed project during the operational stage. If any of the road links impacted by the Proposed Development meet or exceed the below criteria, then further assessment is required.

- A change of more than 10% in AADT;
- A change of more than 10% to the number of heavy duty vehicles; and
- A change in daily average speed of more than 20 km/hr.

The Proposed Development will not increase traffic by more than 10% AADT on any nearby road links, therefore, none of the above scoping criteria are met and a detailed climate assessment is not required as there is no potential for significant impacts to climate as a result of traffic emissions.

Electricity providers form part of the EU-wide Emission Trading Scheme (ETS) and thus greenhouse gas emissions from these electricity generators are not included when determining compliance with the targeted 42% reduction in the non-ETS sector i.e. electricity associated greenhouse gas emissions will not count towards the Effort Sharing Decision target. Thus, any necessary increase in electricity generation will have no impact on Ireland's obligation to meet the EU Effort Sharing Decision. Under this scenario, as outlined in the Regulation, the new electricity provider will be treated as a "new entrant" under Phase IV of the ETS (i.e. an electricity generator obtaining a greenhouse gas emissions permit for the first time after 30th June 2018). The new electricity provider will be required to purchase allocations in the same manner as existing players in the market using the European Energy Exchange. EU leaders have also decided that during Phase IV (2021-2030) 90% of the revenue from the auctions will be allocated to the Member States on the basis of their share of verified emissions with 10% allocated to the least wealthy EU member states. The revised EU ETS Directive has enshrined in law the requirement that at least 50% of the auctioning revenues or the equivalent in financial value should be used for climate and energy related purposes.

In 2018, the market reported a fall of 4.1% (73 million tonnes CO_2eq) from 2017, the EU noted that much of the revenue raised by the cap and trade scheme is going towards climate and energy objectives (European Commission, 2019):

> *"In 2018, a strengthened carbon price signal led to a record amount of revenues for Member States from the selling of ETS allowances. The generated amount equalled some EUR 14 billion - more than doubling the revenues generated in 2017. Member States spent or planned to spend close to 70% of these revenues on advancing climate and energy objectives - well above the 50% required in the legislation"*

In terms of the current project, as the facility is over 20 MW, a greenhouse gas emission permit will be required which will be regulated under the ETS scheme also. Thus the emissions are not included when determining compliance with the targeted 42% reduction in the non-ETS sector. In addition, on an EU-wide basis, where the ETS market in 2021 was approximately 1,355 million tonnes CO_2eq, the impact of the emissions associated with the maximum running hours or "baseload" of the proposed development will be less than 0.04% of the total EU-wide ETS market.

In terms of wider energy policy, as outlined in the EPA publication "Ireland's Greenhouse Gas Projections 2020-2040"[10] under the With Additional Measures scenario, emissions from the energy industries sector are projected to decrease by 25% to 6.3 Mt CO_2eq over the period 2020 to 2030 including the proposed increase in renewable energy generation to approximately 70% of electricity consumption:

- "In this scenario it is assumed that for 2020 there is a 40% share of renewable energy in electricity generation. In 2030 it is estimated that renewable energy generation increases to approximately 70% of electricity consumption. This is mainly a result of further expansion in wind energy (comprising 3.5 GW offshore and approximately 8.2 GW onshore). Expansion of other renewables (e.g. solar photovoltaics) also occurs under this scenario;
- Under the With Additional Measures scenario The operation of three peat plants used for electricity generation until the end of 2020 only are included in the assumptions underpinning the energy projections following which just one plant continues to operate. One peat station continues to operate until planning permission expires in 2023, cofiring with 30% biomass;
- In this scenario the Moneypoint power station is assumed to operate in the market up to end 2024 at which point it no longer generates electricity from coal as set out in the 2024 Climate Action Plan; and
- In terms of inter-connection, it is assumed that the Greenlink 500MW interconnector to the UK to come on stream in 2025 and the Celtic 700MW interconnector to France to come on stream in 2026".

As emissions from the proposed power generation facility will form part of the EU-wide ETS scheme, the relevant cumulative impact would be the EU as a whole rather than Ireland. However, as

highlighted above, the facility's impact will be less than 0.04% of the total EU-wide ETS market which is not significant and thus an EU-wide cumulative assessment is not merited.

Overall, the emissions associated with the proposed development will have a direct, long-term, positive and slight impact on climate.

9.4.3.3 Regional Air Quality

Directive (EU) 2016/2284 *"On The Reduction Of National Emissions Of Certain Atmospheric Pollutants And Amending Directive 2003/35/EC And Repealing Directive 2001/81/EC"* was published in December 2016. The Directive will apply the 2010 National Emission Ceiling Directive limits until 2020 and establish new national emission reduction commitments which will be applicable from 2020 and 2030 for SO_2, NO_X, NMVOC, NH_3 and $PM_{2.5}$ as detailed in Section 9.1.1.3.

9.4.3.4 Human Health

Traffic related air emissions have the potential to impact human health if they do not comply with the ambient Air Quality Standards detailed in Table 9.1. However, there is no additional traffic generated by the Proposed Development during the operational phase and therefore there is no potential for significant impacts. The air dispersion modelling was undertaken to assess the impact of the development with reference to EU ambient air quality standards which are based on the protection of human health. As demonstrated by the dispersion modelling results, emissions from the site assuming scheduled testing as well as emergency operation of the standby generators are compliant with all National and EU ambient air quality limit values and, therefore, will not result in a significant impact on human health. Conservative assumptions were made when determining the input data for the air modelling assessment and the approach used in the study leads to an over-estimation of the actual levels that will arise. In relation to the spatial extent of air quality impacts from the site, ambient concentrations will decrease significantly with distance from the site boundary.

9.5 MITIGATION AND MONITORING MEASURES

9.5.1 CONSTRUCTION PHASE

The objective of dust control at the site is to ensure that no significant nuisance occurs at nearby sensitive receptors. In order to ensure that no dust nuisance occurs a series of measures drawing on will be implemented, drawing on best practice guidance from Ireland, the UK and the USA based on the following publications:

- 'Guidance on the Assessment of Dust from Demolition and Construction'[14];
- 'Planning Advice Note PAN50 Annex B: Controlling The Environmental Effects Of Surface Mineral Workings Annex B: The Control of Dust at Surface Mineral Workings'[30];
- 'Controlling the Environmental Effects of Recycled and Secondary Aggregates Production Good Practice Guidance'[31];
- 'Controlling Particles, Vapours & Noise Pollution From Construction Sites'[32];
- 'Fugitive Dust Technical Information Document for the Best Available Control Measures[33]; and
- 'Compilation of Air Pollutant Emission Factors, AP-42, Fifth Edition' (periodically updated)[34]

In summary the measures which will be implemented include:

- Hard surface roads will be swept to remove mud and aggregate materials from their surface while any un-surfaced roads will be restricted to essential site traffic;
- Any road that has the potential to give rise to fugitive dust shall be regularly watered, as appropriate, during dry and/or windy conditions;
- Vehicles using site roads will have their speed restricted, and this speed restriction must be enforced rigidly. On any un-surfaced site road, this will be 20kph, and on hard surfaced roads as site management dictates;
- Public roads outside the site will be regularly inspected for cleanliness and cleaned as necessary;

- Material handling systems and site stockpiling of materials will be designed and laid out to minimise exposure to wind. Water misting or sprays will be used as required if particularly dusty activities are necessary during dry or windy periods; and
- During movement of materials both on and off-site, trucks will be stringently covered with tarpaulin at all times. Before entrance onto public roads, trucks will be adequately inspected to ensure no potential for dust emissions.

At all times, these procedures will be strictly monitored and assessed. In the event of dust nuisance occurring outside the site boundary, movements of materials likely to raise dust would be curtailed and satisfactory procedures implemented to rectify the problem before the resumption of construction operations.

9.5.2 OPERATIONAL PHASE

The stack height of the gas fired power generation facility has been designed to ensure that an adequate height has been selected to aid dispersion of the emissions and achieve compliance with the EU ambient air quality standards beyond the site boundary (including background concentrations). No additional mitigation measures are proposed for the operational phase of the Proposed Development.

9.6 RESIDUAL IMPACTS

Once the mitigation measures outlined in Section 9.5 are implemented, the residual impacts on air quality or climate from the construction of the proposed development will be short-term and imperceptible. The residual impacts on air quality for the operational phases of the proposed development will be long-term, negative and range from imperceptible to slight, while the impacts on climate will be long-term, positive and slight.

9.7 CUMULATIVE IMPACTS

9.7.1 CONSTRUCTION PHASE

According to the IAQM guidance[14] should the construction phase of the Proposed Development coincide with the construction phase of any other development within 350m then there is the potential for cumulative construction dust impacts. However, best practice dust mitigation measures will be implemented across the site which will avoid significant dust emissions. Provided these mitigation measures are in place for the duration of the construction phase cumulative dust related impacts to nearby sensitive receptors are not predicted to be significant. Cumulative impacts to air quality will be short-term, localised, negative and imperceptible.

9.7.2 OPERATIONAL PHASE

9.7.2.1 Climate

As discussed in Section 9.4.3.2, the cumulative impact of carbon emissions from the proposed power generation facility will form part of the EU-wide ETS scheme. The facility's impact will be less than 0.04% of the total EU-wide ETS market which is not significant and thus an EU-wide cumulative assessment is not merited.

9.8 INTERACTIONS

Air quality does not have a significant number of interactions with other topics. The most significant interactions are between population and human health and air quality. An adverse impact due to air quality in either the construction or operational phase has the potential to cause health and dust nuisance issues. The mitigation measures that will be put in place at the proposed development will ensure that the impact of the proposed development complies with all ambient air quality legislative

limits and therefore the predicted impact is short-term, negative and imperceptible with respect to the construction phase and long-term, neutral and imperceptible with respect to the operational phase in terms of human health impacts.

Interactions between air quality and traffic can be significant. With increased traffic movements and reduced engine efficiency, i.e. due to congestion, the emissions of vehicles increase. The impacts of the proposed development on air quality are assessed by reviewing the change in annual average daily traffic on roads close to the site. In this assessment, the impact of the interactions between traffic and air quality are considered to be imperceptible.

Construction phase activities such as land clearing, excavations, stockpiling of materials etc. have the potential for interactions between air quality and land and soils and the water environment (hydrology) in the form of dust emissions. With the appropriate mitigation measures to prevent fugitive dust emissions, it is predicted that interactions between air quality and land and soils and hydrology will be short-term and imperceptible.

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

9.9 REFERENCES

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10 NOISE & VIBRATION

10.1 INTRODUCTION/METHODOLOGY

As detailed in Chapter 1 Introduction, this EIAR has been prepared to accompany an application for the development of a gas-fired power plant including ancillary equipment and associated ancillary development on lands at Kilshane, Co. Dublin. The Proposed Development is on lands to the south of the Kilshane Road at to the west of the N2. The subject site is illustrated in Figures 4.1 to 4.2. (See accompanying document set for more detailed drawings)

The nearest noise-sensitive locations (NSLs) are located to the west, north and east of the development lands on sections of the Kilshane Road; the majority of the NSLs are residential dwellings, and the remainder are commercial buildings.

10.1.1.1 Proposed Approach

The following methodology has been adopted for this assessment:

- Review appropriate guidance, typical local authority planning conditions, etc. in order to identify appropriate noise criteria for the site operations;
- Carry out noise monitoring (e.g. in the vicinity of nearest sensitive properties/boundaries) to identify existing levels of noise in the vicinity of the development;
- Development of a detailed 3D noise model to consider the proposed development; and
- Comment on predicted levels against the appropriate criteria and existing noise levels and outline required mitigation measures (if any).

Appendix 10.1 of this document presents a glossary of the acoustic terminology used throughout this document. In the first instance it is considered appropriate to review some basic fundamentals of acoustics.

10.1.1.2 Fundamentals of Acoustics

In order to provide a broader understanding of some of the technical discussion in this report, this section provides a brief overview of the fundamentals of acoustics and the basis for the preparation of this noise assessment.

A sound wave travelling through the air is a regular disturbance of the atmospheric pressure. These pressure fluctuations are detected by the human ear, producing the sensation of hearing. In order to take account of the vast range of pressure levels that can be detected by the ear, it is convenient to measure sound in terms of a logarithmic ratio of sound pressures. These values are expressed as Sound Pressure Levels (SPL) in decibels (dB).

The audible range of sounds expressed in terms of Sound Pressure Levels is 0dB (for the threshold of hearing) to 120dB (for the threshold of pain). In general, a subjective impression of doubling of loudness corresponds to a tenfold increase in sound energy which conveniently equates to a 10dB increase in SPL. It should be noted that a doubling in sound energy (such as may be caused by a doubling of traffic flows) increases the SPL by 3dB.

The frequency of sound is the rate at which a sound wave oscillates, and is expressed in Hertz (Hz). The sensitivity of the human ear to different frequencies in the audible range is not uniform. For example, hearing sensitivity decreases markedly as frequency falls below 250Hz. In order to rank the SPL of various noise sources, the measured level has to be adjusted to give comparatively more weight to the frequencies that are readily detected by the human ear. Several weighting mechanisms have been proposed but the 'A-weighting' system has been found to provide one of the best correlations with perceived loudness. SPL's measured using 'A-weighting' are expressed in terms of

dB(A). An indication of the level of some common sounds on the dB(A) scale is presented in Figure 10.1.

The 'A' subscript denotes that the sound levels have been A-weighted. The established prediction and measurement techniques for this parameter are well developed and widely applied. For a more detailed introduction to the basic principles of acoustics, reference should be made to an appropriate standard text.

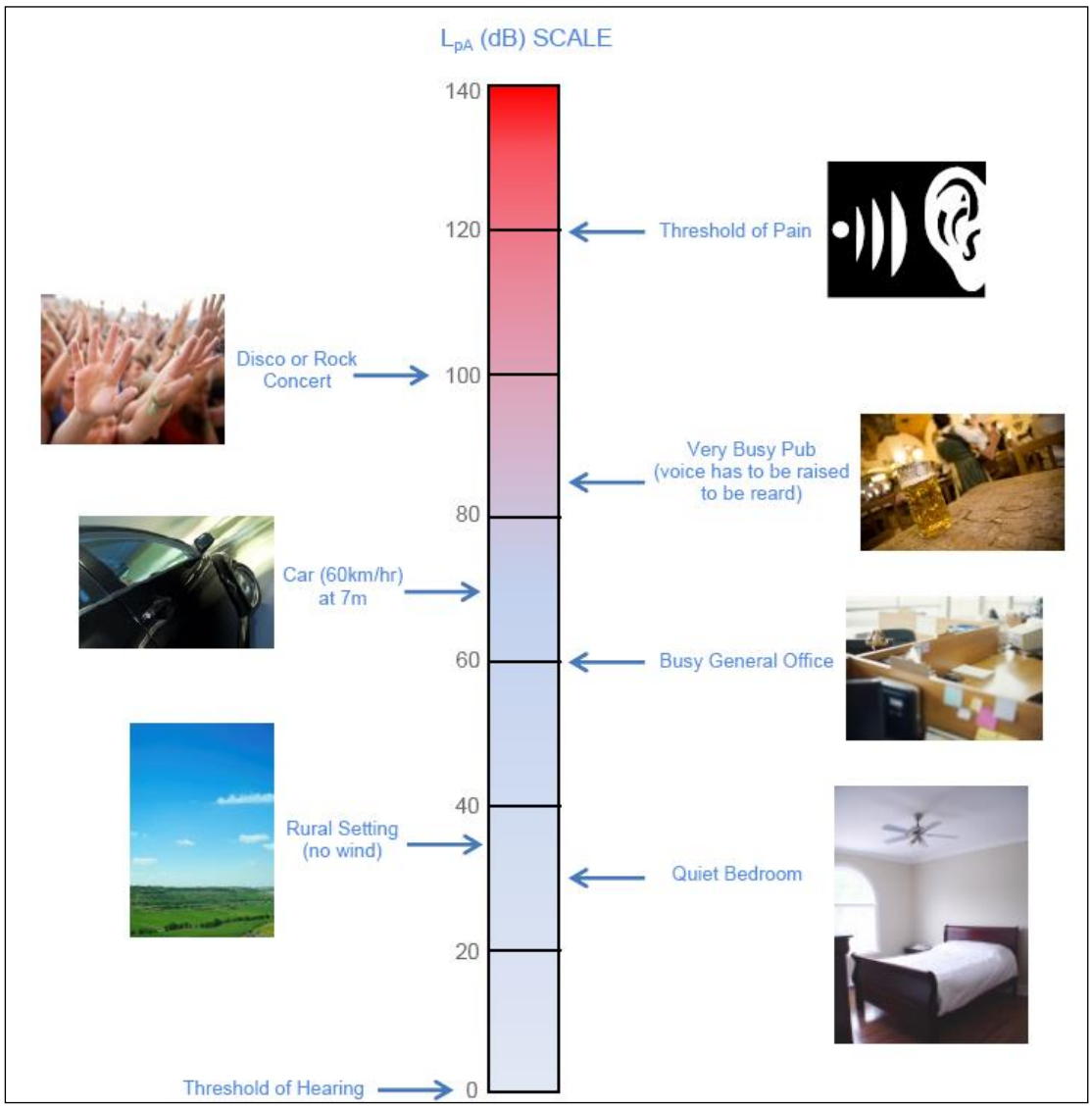


Figure 10.1 dB(A) Scale & Indicative Noise Levels – (EPA: Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4 – 2012))

10.1.1.3 Significance of Impacts

The significance of noise and vibration impacts has been assessed in accordance with the EPA Guidelines on the preparation of EIARs (2022); see Tables 10.1 to 10.3. As these guidelines do not quantify the impacts in decibel terms further reference has been made to the draft 'Guidelines for Noise Impact Assessment' produced by the Institute of Acoustics/Institute of Environmental Management and Assessment Working Party.

With regard to the quality of the impact, ratings may have positive, neutral or negative applications where:

Table 10.1 Quality of Potential Effects

Quality of Impact	Definition
Negative	A change which reduces the quality of the environment (e.g. by causing a nuisance).
Neutral	No effects or effects that are imperceptible, within the normal bounds of variation or within the margin of forecasting error.
Positive	A change that improves the quality of the environment (e.g. by removing a nuisance).

The significance of an impact on the receiving environment are described as follows:

Table 10.2 Significance of Effects

Significance of Impact on the Receiving Environment	Description of Potential Effect
Imperceptible	An effect capable of measurement but without significant consequences.
Not Significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.
Slight	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Moderate	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
Significant	An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
Very Significant	An effect which, by its character, magnitude, duration or intensity significantly alters a sensitive aspect of the environment.

The duration of effects as described in the EPA Guidelines are:

Table 10.3 Duration of Effects

Duration	Definition
Momentary	Effects lasting from seconds to minutes
Brief	Effects lasting less than a day
Temporary	Effects lasting one year or less
Short-term	Effects lasting one to seven years
Medium-term	Effects lasting seven to fifteen years
Long-term	Effects lasting fifteen to sixty years
Permanent	Effects lasting over sixty years
Reversible	Effects that can be undone, for example through remediation or restoration

10.1.1.4 Construction Phase Guidance

Criteria for Rating Noise Impacts

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 the absence of specific noise limits, appropriate criteria relating to permissible construction noise levels for a development of this scale may be found in the British Standard BS 5228 – 1: 2009+A1:2014: Code of practice for noise and vibration control on construction and open sites – Noise.

The approach adopted here calls for 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 significant noise impact is associated with the construction activities.

The BS 5228 document sets out guidance on permissible noise levels relative to the existing noise environment. Table 10.4 sets out the values which, when exceeded, signify a significant effect at the facades of residential receptors as recommended by BS 5228 – 1.

Table 10.4 Example Threshold of Significant Effect at Dwellings

Assessment category and threshold value period (LAeq)	Threshold value, in decibels (dB)		
	Category A Note A	Category B Note B	Category C Note C
Night-time (23:00 to 07:00hrs)	45	50	55
Evenings and weekends Note D	55	60	65
Daytime (07:00 – 19:00) and Saturdays (07:00 – 13:00)	65	70	75

Note A) Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are less than these values.
Note B) Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are the same as category A values.
Note C) Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are higher than category A values.
Note D) 19:00 – 23:00 weekdays, 13:00 – 23:00 Saturdays and 07:00 – 23:00 Sundays.

It should be noted that this assessment method is only valid for residential properties.
For the appropriate periods (i.e. daytime, evening and night time) the ambient noise level is determined and rounded to the nearest 5dB. Baseline monitoring carried out at the nearest noise sensitive locations (See Section 10.3) and considered in this assessment indicate that Category A applies based on the measured levels at UN1 and Category B applies based on the measured levels at UN2, as detailed in Table 10.5 is appropriate in this instance.

Table 10.5 Rounded Baseline Noise Levels and Associated Categories

Period	Baseline Noise Category	Construction Noise Threshold Value $L_{Aeq,1hr}$ (dB)
Daytime (07:00 – 19:00) and Saturdays (07:00 – 13:00)	A-B	65-70

See Section 10.4.1 for the assessment in relation to the proposed development. If the construction noise level exceeds the appropriate category value, then a potential significant effect is deemed to occur.

This assessment process determines if a significant construction noise impact is likely.

Notwithstanding the outcome of this assessment, the overall acceptable levels of construction noise set out in the Transport Infrastructure Ireland (TII) publication Guidelines for the Treatment of Noise and Vibration in National Road Schemes. The noise levels in Table 10.6 should not be exceeded at noise sensitive locations during the construction phase of the proposed development.

Table 10.6 Maximum Permissible Noise Levels at the Facade of Dwellings during Construction

Days and Times	**Noise Levels (dB re. $2x10^{-5}$ Pa)**	
	$L_{Aeq(1hr)}$	**L_{Amax}**
Monday to Friday 07:00 to 19:00hrs	70	80
Monday to Friday 19:00 to 23:00hrs	60*	65*
Saturdays 07:00 to 13:00hrs	65	75
Sundays & Bank Holidays 08:00 to 16:30hrs	60*	65*

Based on the above the following construction noise criteria are proposed for the site:

70dB $L_{Aeq,1hr}$ at noise sensitive locations
75dB $L_{Aeq,1hr}$ at commercial locations

It will be required that noise-generating external construction activities associated with development shall take place between the hours of:

- Mondays to Fridays – 7am to 7pm
- Saturday – 7am to 2pm
- On Sundays and Public Holidays; no activity on the site.

If it is deemed necessary to conduct works outside these times, prior written approval will be sought from the relevant local authority.

Criteria for Rating Vibration Impacts

There are two aspects to the issue of vibration that are addressed in the standards and guidelines: the risk of cosmetic or structural damage to buildings; and human perception of vibration. In the case of this development, vibration levels used for the purposes of evaluating building protection and human comfort are expressed in terms of Peak Particle Velocity (PPV) in mm/s.
There is no published statutory Irish guidance relating to the maximum permissible vibration level. The following standards are the most widely accepted in this context and are referenced here in relation to cosmetic or structural damage to buildings:

British Standard BS 5228-2 Code of Practice for noise and vibration control of construction and open sites - Part 2: Vibration (BSI 2014); and
British Standard BS 7385-2 Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from ground borne vibration (BSI 1993)

BS 5228-2 and BS 7385-2 define the following thresholds for cosmetic damage to residential or light commercial buildings: PPV should be below 15 mm/s at 4 Hz to avoid cosmetic damage. This increases to 20 mm/s at 15 Hz and to 50 mm/s at 40 Hz and above. At frequencies below 4 Hz, a maximum displacement of 0.6 mm (zero to peak) is not to be exceeded. This is summarised in Table 10.7.

Table 10.7 Allowable Vibration during Construction Phase

Type of building	Peak component particle velocity in frequency range of predominant pulse	
	4 Hz to 15 Hz	15 Hz and above
Unreinforced or light framed structures. Residential or light commercial buildings.	15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz	20 mm/s at 15 Hz increasing to 50 mm/s at 40 Hz and above

Note 1: Values referred to are at the base of the building.
Note 2: At frequencies below 4 Hz, a maximum displacement of 0.6 mm (zero to peak) is not to be exceeded.

Furthermore, BS 5228-2 and BS 7385-2 state that minor structural damage can occur at vibration magnitudes greater than twice those in Table 10.7 and major structural damage can occur at vibration magnitudes greater than four times those in Table 10.7.

BS 5228-2 also provides guidance relating to the human response to vibration. Guidance is again provided in terms of PPV in mm/s since this parameter is routinely measured when monitoring the structural effects of vibration. The potential human response at different vibration levels, as set out in BS 5228-2, is summarised in Table 10.8.

Table 10.8 Guidance on human response to vibration levels

Vibration level Note A) B) C) (mm/s)	Effect
0.14	Vibration might be just perceptible in the most sensitive situations for most vibration frequencies associated with construction. At lower frequencies, people are less sensitive to vibration.
0.3	Vibration might be just perceptible in residential environments.
1.0	It is likely that vibration of this level in residential environments will cause complaint, but can be tolerated if prior warning and explanation has been given to residents.
10	Vibration is likely to be intolerable for any more than a very brief exposure to this level in most building environments.

Note A The magnitudes of the values presented apply to a measurement position that is representative of the point of entry into the recipient.
Note B A transfer function (which relates an external level to an internal level) needs to be applied if only external measurements are available.
Note C Single or infrequent occurrences of these levels do not necessarily correspond to the stated effect in every case. The values are provided to give an initial indication of potential effects, and where these values are routinely measured or expected then an assessment in accordance with BS 6472-1 or -2, and/or other available guidance, might be appropriate to determine whether the time varying exposure is likely to give rise to any degree of adverse comment.

Construction Phase Traffic

Vehicular movement to and from the construction site for the Proposed Development will make use of the existing road network. In order to assess the potential impact of additional traffic on the human perception of noise, the following two guidelines are referenced DMRB Noise and Vibration (UKHA 2020) and the EPA Guidelines (EPA, 2022). For construction traffic, due to the short-term period over which this impact occurs, the magnitude of impacts is assessed against the 'short term' period in accordance with the DMRB Noise and Vibration (UKHA 2020) document.

Table 10.9 sets out the classification of changes in noise level to impact on human perception based on the guidance contained in these documents.

Table 10.9 Classification of magnitude of traffic noise changes in the short-term

Change in Sound Level (dB)	Subjective Reaction	DMRB Magnitude of Impact (Short-term)	EPA Significance of Effect
Less than 1 dB	Inaudible	Negligible	Imperceptible
1 – 2.9	Barely Perceptible	Minor	Not Significant
3 – 4.9	Perceptible	Moderate	Slight, Moderate
≥ 5	Clearly perceptible	Major	Significant

10.1.1.5 Operational Phase - Noise Guidance

EPA NG4

It is understood that the development will operate under the provisions of an Environmental Protection Agency (EPA) Industrial Emissions (IE) license. The discussion of appropriate IE License noise emission criteria for the overall facility will be conducted in accordance with the NG4 document. This approach is summarized below in accordance with guidance detailed in Section 4 of the (EPA) document Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4) 2016.

Quiet Area Screening

The proposed development is not considered a quiet area in this instance as it fails to meet any of the criteria outlined in EPA's Guidance. The most stringent of these criteria are noted in bullet point and commented on below.

At least 3km from urban area with a population >1,000 people;

- The site within the Dublin agglomeration and is therefore located less than 3km from a population significantly greater than 1,000.

At least 3km away from any local industry;

- Other industrial sites operate within 3km of the site.

At least 5km away from any National Primary Route;

- A section of the N2 national road is located along the western boundary of the site.

Low Background Noise Area Screening

In order to establish whether the noise sensitive locations in the vicinity of the site would be considered 'low background noise' areas, the noise levels measured during the environmental noise survey need to satisfy all three of the following criteria:

- Arithmetic Average of L_{A90} During Daytime Period ≤40 dB L_{A90}, and;
- Arithmetic Average of L_{A90} During Evening Period ≤35 dB L_{A90}, and;
- Arithmetic Average of L_{A90} During Night-time Period ≤30 dB L_{A90}.

Table 10.10 Comparison of Measurement Results with NG4 Low Background Noise Area Criteria

Location	Period	$L_{A90,T}$, dB	NG4 Screening (dB $L_{A90,T}$)	Satisfies All Criteria for Low Background Noise Area?
UN1	Daytime	60	≤40	No
	Evening	57	≤35	
	Night-time	50	≤30	
UN2	Daytime	65	≤40	No
	Evening	61	≤35	
	Night-time	52	≤30	

The arithmetic average L_{A90} results at the monitoring location considered here (see Section 10.3) are compared against the criteria in Table 10.10. The locations UN1 and UN2 would not be considered a 'Areas of Low Background Noise' as the measured noise levels do not satisfy the criteria.

Determining Appropriate Noise Criteria

Based on the EPA NG4 guidance, the following noise criteria are appropriate at the nearest NSL's to the facility:

- Daytime (07:00 to 19:00hrs) 55dB $L_{Ar,15min}$
- Evening (19:00 to 23:00hrs) 50dB $L_{Ar,15min}$
- Night time (23:00 to 07:00hrs) 45dB $L_{Aeq,15min}$

During the night period, no tonal or impulsive noise from the facility should be clearly audible or measurable at any NSL. The applicable noise criteria identified are in line with the typical limit values for noise from licensed sites.

Assessment of Significance

The 'Guidelines for Environmental Noise Impact Assessment' produced by the Institute of Environmental Management and Assessment (IEMA) (2014) have been referenced in order to categorise the potential effect of changes in the ambient noise levels during the operational phases of the proposed development.

The guidelines state that for any assessment, the potential significance should be determined by the assessor, based upon the specific evidence and likely subjective response to noise. Due to varying factors which effect human response to environmental noise (prevailing environment, noise characteristics, time periods, duration and level etc.) assigning a subjective response must take account of these factors.

The scale adopted in this assessment is shown in Table 10.11 below and is based on an example scale within the IEMA guidelines. The corresponding significance of effect presented in the EPA EIA Report Guidelines (2022) is also presented.

Table 10.11 Noise Effect Scale

Noise Level Change dB(A)	Subjective Response	Long Term Impact Classification (IEMA, 2014)	Impact Guidelines on the Information to be contained in EIA Report's (EPA)
≥ 0	No change	Negligible	Imperceptible
≥ 0 and < 3	Barely perceptible	Not Significant	Not Significant
≥ 3 and < 5	Noticeable	Minor	Slight Impact
≥ 5 and < 10	Clearly perceptible	Moderate	Moderate Impact
≥10	More than a doubling or halving of loudness	Major	Significant Impact

The significance table reflects the key benchmarks that relate to human perception of sound. A change of 3dB(A) is generally considered to be the smallest change in environmental noise that is perceptible to the human ear. A 10dB(A) change in noise represents a doubling or halving of the noise level. The difference between the minimum perceptible change and the doubling or halving of the noise level is split to provide greater definition to the assessment of changes in noise level.

It is considered that the ratings specified in the above table provide a good indication as to the likely significance of changes on noise levels in this case and have been used to assess the impact of operational noise.

The night-time conditions will dictate the design of the development from an acoustic perspective so this will be focused on in this assessment as compliance with the night-time criterion infers compliance with the daytime one.

Recommended Criteria

Following review of relevant guidance, the following noise criteria are proposed for the proposed development:

Daytime Periods (Residential) – 55 dB $L_{Aeq,15min}$
Daytime Periods (Commercial) – 55 dB $L_{Aeq,15min}$
Evening Periods (Residential) – 50 dB $L_{Aeq,15min}$
Night-time Periods (Residential) – 45 dB $L_{Aeq,15min}$

These criteria apply at the façades of the locations.

Note plant noise emissions are to be designed such that they are not tonal and do not have impulsive characteristics or excessive low frequency noise at the nearest noise sensitive locations.

10.1.1.6 Operational Phase – Vibration Guidance

Guidance as to an acceptable magnitude of vibration during the operational phase of the development is best taken from British Standard BS 6472 (1992): *Guide to Evaluation of human exposure to vibration in buildings (1Hz to 80Hz)*. The Standard contains recommendations that continuous vibration in residential buildings should not exceed nominally 0.3mm/s by daytime and 0.2mm/s by night-time.

It should be noted that the proposed development will not give rise to any significant levels of vibration off site and therefore the associated impact is not significant.

10.1.1.7 Forecasting Methods

Construction noise calculations have been conducted generally in accordance with BS 5228: 2009+A1:2014: *Code of practice for noise control on construction and open sites - Noise*.

Prediction calculations for building services noise, car park activity and vehicle movements on site have been conducted generally in accordance with ISO 9613 (1996): Acoustics – *Attenuation of sound outdoors – Part 2: General method of calculation*.

Changes in road traffic noise on the local road network have been considered using prediction guidance contained within *Calculation of Road Traffic Noise (CRTN)* issued by the UK Department of Transport in 1988.

10.2 THE PROPOSED DEVELOPMENT

The Proposed Development is described in Chapter 4 (Project Description). The details of the construction and operation of the development in terms of noise and vibration are discussed below.

10.3 THE RECEIVING ENVIRONMENT

An environmental noise survey has been conducted in order to quantify the existing noise environment. The survey was conducted in general accordance with ISO 1996: 2007: Acoustics – Description, measurement and assessment of environmental noise. Specific details are set out below.

10.3.1 DATES AND TIMES OF NOISE SURVEYS

Noise measurements were conducted using unattended noise monitoring over five days that encompassed typical day, evening and night-time periods. The night survey represents the time of night that provides a measure of existing background noise levels during a period where people are attempting to go to sleep or are sleeping. As the development will have capacity to operate at any time of day or night, the potential impact during night time periods is the critical issue. The survey was conducted during the following periods:

- UN1: 16:20 hrs on Wednesday 20 April 2022 to 10:50 hrs on Monday 25 April 2022, and
- UN2: 16:10 hrs on Thursday 21 April to 10:50 hrs on Monday 25 April 2022

10.3.2 PERSONNEL AND INSTRUMENTATION

The noise measurements were performed using a Rion NL-52 Sound Level Analyzer (S/Ns 164427 and 186671). Before and after the survey the measurement apparatus was check calibrated using a Brüel & Kjær Type 4231 Sound Level Calibrator

10.3.3 MEASUREMENT LOCATIONS

Figure 10.2 details the approximate location of the measurement positions identified above.

Figure 10.2 Noise Survey Locations

10.3.4 METHODOLOGY

Sample periods for the noise measurements were 15 minutes. Results were saved to the instrument memory for later analysis. Survey personnel noted the primary noise sources contributing to noise build-up during installation and removal of the equipment form site.

10.3.5 SURVEY RESULTS

10.3.5.1 Location UN1

The survey results for Location UN1 are summarised in Table 10.12 below.

Table 10.12 Review of Typical Noise Levels

Date	Day	Period	Ambient Noise dB $L_{Aeq,T}$	Background Noise dB $L_{A90,T}$
20/4/2022	Wednesday	Day	64	60
		Evening	64	56
		Night	60	50
21/4/2022	Thursday	Day	65	61
		Evening	64	58
		Night	61	52
22/4/2022	Friday	Day	66	62
		Evening	64	58
		Night	60	51
23/4/2022	Saturday	Day	65	61
		Evening	62	56
		Night	60	49
24/4/2022	Sunday	Day	65	59
		Evening	63	57
		Night	61	50
25/4/2022	Monday	Day	66	62
Overall		Day	65	60
		Evening	63	57
		Night	60	50

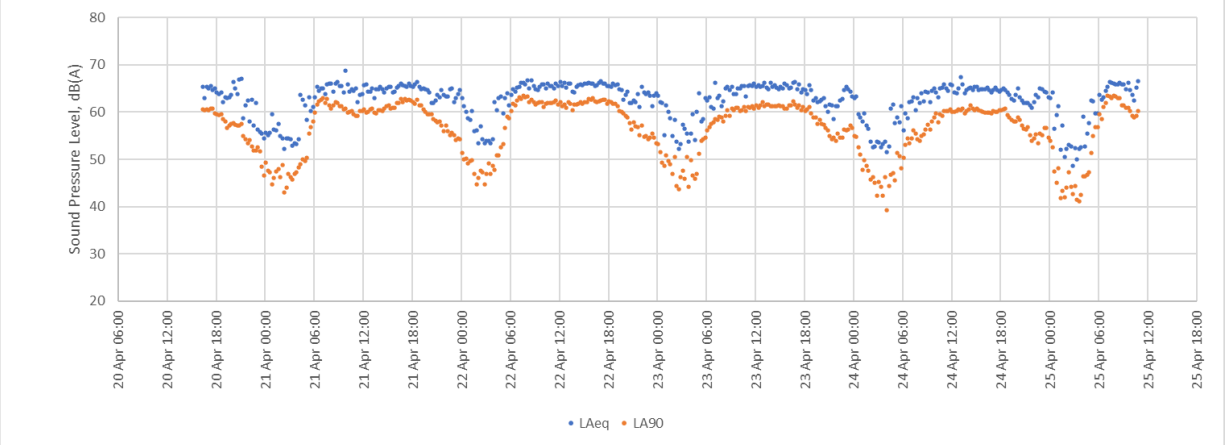


Figure 10.3 Time History of Measured Noise Levels at UN1

10.3.5.2 Location UN2

The survey results for Location UN2 are summarised in Table 10.13 below.

Table 10.13 Review of Noise Levels at UN2

Date	Day	Period	Ambient Noise dB $L_{Aeq,T}$	Background Noise dB L_{A90}
21/4/2022	Thursday	Day	69	67
		Evening	66	62
		Night	63	53
22/4/2022	Friday	Day	69	66
		Evening	66	61
		Night	62	53
23/4/2022	Saturday	Day	68	65
		Evening	65	60
		Night	61	51
24/4/2022	Sunday	Day	67	63
		Evening	65	60
		Night	63	52
25/4/2022	Monday	Day	69	66
Overall		Day	68	65
		Evening	65	61
		Night	62	52

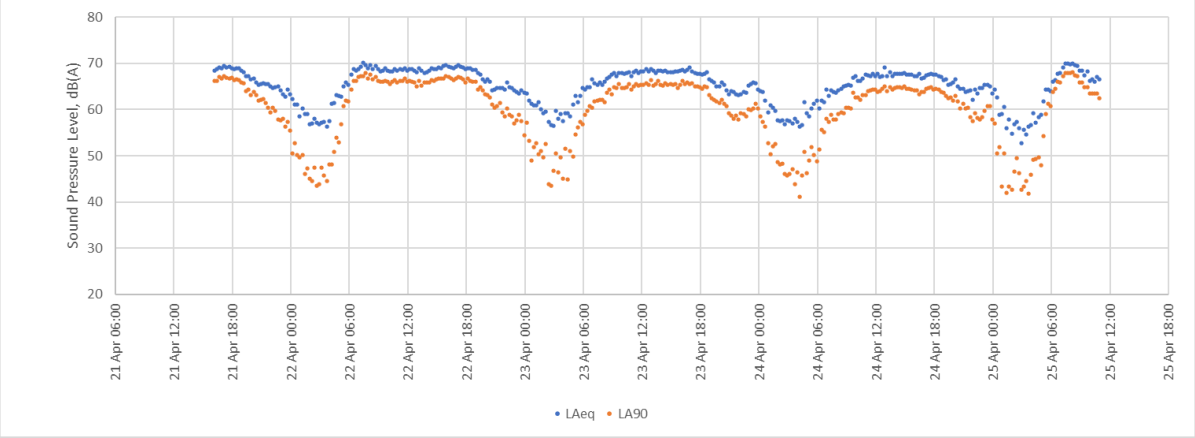


Figure 10.4 Time History of Measured Noise Levels at UN2

These typical noise levels have been considered when discussing appropriate noise criteria in relation to the development (see Section 10.1.1.5).

10.3.5.3 Nearest Noise-Sensitive Locations

In the first instance it is considered appropriate to define a noise sensitive location (NSL). In this context, it is considered prudent to give consideration to the definition supplied by the Environmental Protection Agency (EPA) which states the following:

"NSL – any dwelling house, hotel or hostel, health building, educational establishment, place of worship or entertainment, or any other facility or other area of high amenity which for its proper enjoyment requires the absence of noise at nuisance levels."

Figure 10.5 highlights the nearest noise sensitive locations for which noise predictions have been carried out. Descriptions of the locations are presented in Table 10.14

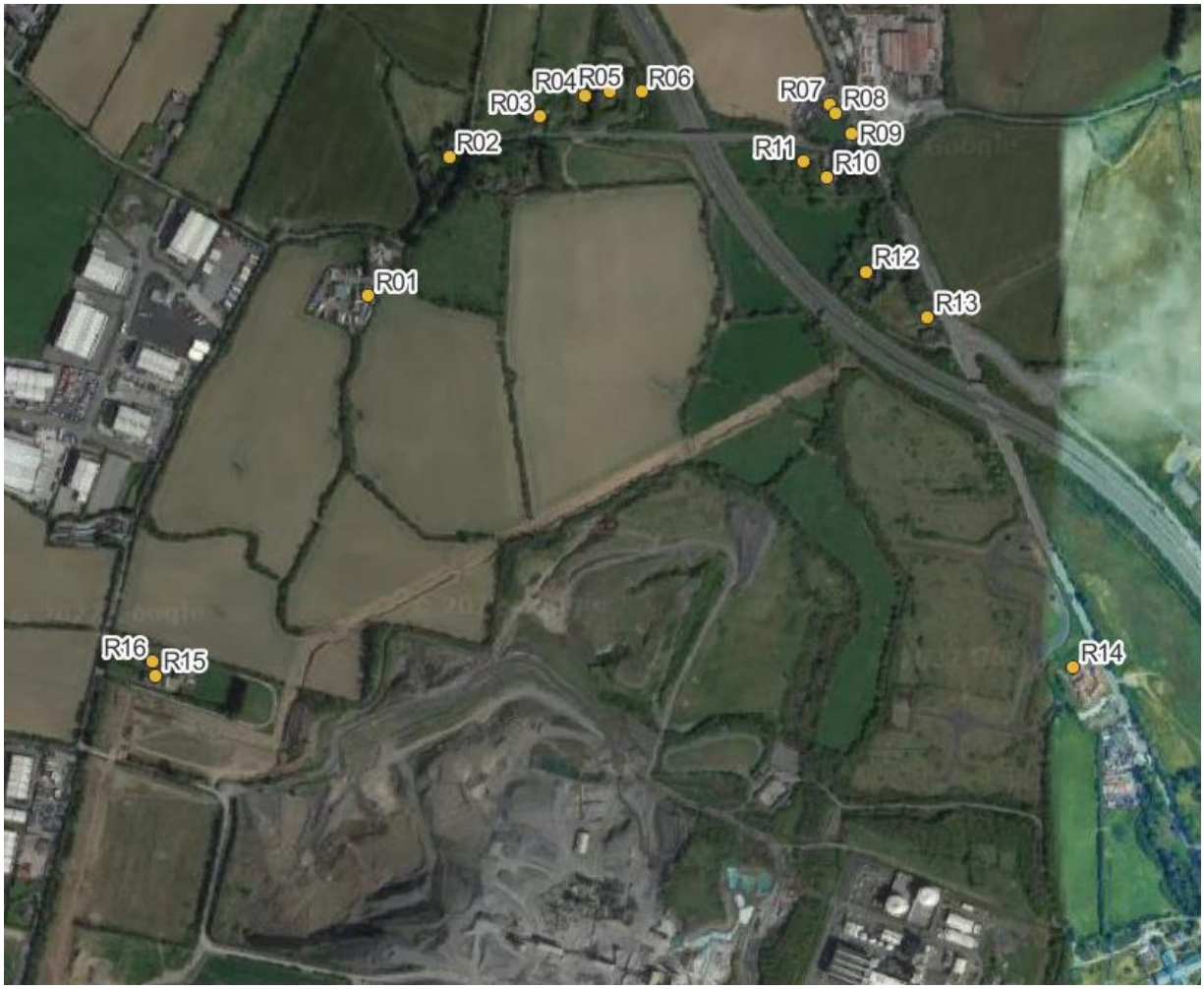


Figure 10.5 Noise-Sensitive Locations

Table 10.14 Noise-sensitive Locations

Location Ref	Description
R01	Commercial property on Kilshane Road
R02	Residential properties on Kilshane Road
R03	
R04	
R05	
R06	
R07	Residential properties on North of Kilshane Cross / on R135
R08	
R09	
R10	Residential properties on Kilshane Road
R11	
R12	Residential properties south of Kilshane Cross
R13	
R14	Residential properties at Ravenswood
R15	Residential properties on Kilshane Road to southwest of site
R16	

10.4 PREDICTED IMPACTS

The proposed development will involve the construction of gas-fired power plant and associated ancillary buildings and equipment, including the re-alignment of part of Kilshane Road, over an anticipated construction period of approximately 29 months.

When considering a development of this nature, the potential noise and vibration impact on the surroundings must be considered for each of two distinct stages:

- construction phase, and;
- operational phase.

The construction phase will involve extensive excavation, rock breaking, general site preparation over the development site and the erection of new buildings over a phased construction period. Comment will also be presented in the following sections in relation to construction traffic on local roads in terms of noise and vibration.

The primary sources of outward noise in the operational context are deemed long term and will involve:

- building services noise;
- emergency site operations, and;
- additional vehicular traffic on public roads.

These issues are discussed in detailed in the following sections.

10.4.1 CONSTRUCTION PHASE

The largest noise and vibration impact of the proposed development will occur during the construction phase due to the operation of various plant machinery and HGV movement to, from and around the site. However, the construction phase can be classed as a short-term phase.

The nearest residential NSLs to the site are at distances of approximately 50m from the nearest substantial construction works (i.e. the re-aligned road) and at more than 100m from the gas generator compound.

BS 5228-1 contains noise level data for various construction machinery. The noise levels relating to site clearance, ground excavation and loading lorries (dozers, tracked excavators and wheeled loaders) reach a maximum of 81 dB $L_{Aeq,T}$ at a distance of 10 m. For this assessment, a worst-case scenario is assumed of 3 no. such items with a sound pressure level (SPL) of 81 dB at 10 m operating simultaneously along the closest works boundary. This would result in a total noise level of 86 dB at 10 m and an equivalent combined sound power level of 114 dB L_{WA}. This worst-case scenario is the typical assumption made for developments of this size, on the basis that it is unlikely that more than 3 no. items of such plant/equipment would be operating simultaneously in such close proximity to each other.

Table 10.15 Predicted Construction Noise Levels

Description of Noise Source	Calculated noise levels at varying distances (dB $L_{Aeq,1hr}$)				
	50 m	60 m	70 m	80 m	100 m
3 no. items each with SPL of 81 dB at 10 m operating simultaneously	70	68	67	66	64

The calculated noise levels in Table 10.15 show that there is predicted noise levels are within the adopted construction noise criteria of 70 dB $L_{Aeq,1hr}$. This indicates that construction noise effects are negative, not significant and short-term.

10.4.1.1 Construction Vibration

Potential for vibration impacts during the construction phase programme are likely to be limited to excavations and piling works to be used for foundations. For the purposes of this assessment the expected vibration levels during piling assuming augured or bored piles have been determined through reference to published empirical data. The British Standard BS 5228 – Part 2: Vibration, publishes the measured magnitude of vibration of rotary bored piling using a 600mm pile diameter for bored piling into soft ground over rock, (Table D.6, Ref. No. 106):

0.54mm/s at a distance of 5m, for auguring;
0.22mm/s at a distance of 5m, for twisting in casing;
0.42mm/s at a distance of 5m, for spinning off, and;
0.43mm/s at a distance of 5m, for boring with rock auger.

Considering the low vibration levels at very close distances to the piling rigs, vibration levels at the nearest buildings are not expected to pose any significance in terms of cosmetic or structural damage. In addition the range of vibration levels is typically below a level which would cause any disturbance to occupants of nearby buildings. This indicates that construction vibration effects are negative, not significant and short-term.

10.4.1.2 Construction Traffic

In terms of the construction traffic on local roads that will be generated as a result of the proposed development the following comment is presented: Considering that, according to the calculation methods in Calculation of Road Traffic Noise (CRTN), in order to increase traffic noise levels by 1dB traffic volumes would need to increase by the order of 25%. With reference to Table 10.9 is considered that a 1dB increase in traffic noise levels on the local road network, due to the construction phase, will not result in a significant noise impact.

10.4.2 OPERATIONAL PHASE

The primary sources of outward noise in the operational context are deemed medium term and will involve:

- power plant noise, and
- additional vehicular traffic on public roads.

These issues are discussed in following sections.

10.4.2.1 Power Station Noise

In relation to the power plant noise there are two modes in which the dual-fuel power plant can operate:

- Gas fuel operation, and
- Liquid fuel operation.

Certain items of plant are relevant to only one mode: in gas fuel operation, the demineralised water pump, fuel oil pump and liquid fuel module do not operate; in liquid fuel operation, the fuel gas heater skid and separator skid do not operate. Both scenarios are evaluated in this assessment.

The predicted levels are based on a situation where the receiver is downwind of all noise sources. For the purposes of the assessment against the adopted criteria this is a robust worst-case assumption.

Review of the predicted increases in noise level for gas fuel operation at the nearest noise sensitive locations conclude that the associated effect ranges from 'imperceptible' at the R15 and R16 to the southwest, to 'not significant' and 'slight' at the locations closest to the proposed development.

Review of the predicted increases in noise level for gas fuel operation at the nearest noise sensitive locations conclude that the associated effect ranges from 'not significant' and 'slight'.

10.4.2.2 Additional Vehicular Traffic on Public Roads

In terms of the additional traffic on local roads that will be generated as a result of this development, the following comment is presented. With reference to Chapter 4, the proposed development will not add a significant amount of additional traffic to the surrounding road network during operation. Considering that in order to increase traffic noise levels by 1dB, traffic volumes would need to increase by the order of 25% it is considered that additional traffic introduced onto the local road network due to the proposed development will not result in a significant noise impact.

10.4.2.3 Summary of Operational Impacts

In terms of noise associated with the operation of the site, the associated effect is stated to be negative, imperceptible to slight and long-term.

There are no sources of vibration associated with the operation of the development will give rise to impacts at nearby noise sensitive locations. In terms of these the operational phase of the development the associated vibration effect is stated to be neutral, imperceptible and long-term

10.5 MITIGATION MEASURES

10.5.1 CONSTRUCTION PHASE

With regard to construction activities, reference will be made to BS5228 Parts 1 and 2, which offer detailed guidance on the control of noise and vibration from demolition and construction activities. The following mitigation measures will be applied during the construction of the proposed development:

- Limiting the hours during which site activities likely to create high levels of noise or vibration are permitted;
- Establishing channels of communication between the contractor/developer, Local Authority and residents;
- Appointing a site representative responsible for matters relating to noise and vibration;
- Monitoring levels of noise and/or vibration during critical periods and at sensitive locations; and
- All site access roads will be kept even so as to mitigate the potential for vibration from lorries.

Furthermore, a variety of practicable noise control measures will be employed including:

- Selection of plant with low inherent potential for generation of noise and/ or vibration;
- Erection of barriers as necessary around items such as generators or high duty compressors; and
- Situate any noisy plant as far away from sensitive properties as permitted by site constraints and the use of vibration isolated support structures where necessary.

Vibration from construction activities to off-site residences be limited to the values set out in Table 10.7. It should be noted that these limits are not absolute, but provide guidance as to magnitudes of vibration that are very unlikely to cause cosmetic damage. Magnitudes of vibration slightly greater than those in the table are normally unlikely to cause cosmetic damage, but construction work creating such magnitudes will proceed with caution. Where there is existing damage these limits may need to be reduced by up to 50%.

10.5.2 OPERATIONAL PHASE

10.5.2.1 Power Station Noise

Noise from external plant will be minimised by purchasing low noise generating equipment and incorporating appropriately specified in line attenuators for stacks and exhausts where necessary. With due consideration as part of the detailed design process, this approach will result in the site operating well within the constraints of the best practice guidance noise limits that have been adopted as part of this detailed assessment.

10.5.2.2 Additional Vehicular Traffic on Public Roads

The noise impact assessment outlined previously has demonstrated that mitigation measures are not required

10.6 RESIDUAL IMPACTS

This section summarises the likely noise and vibration impact associated with the proposed development, taking into account the mitigation measures.

10.6.1 CONSTRUCTION PHASE

During the construction phase of proposed development there will be some impact on nearby noise sensitive properties due to noise emissions from site traffic and other activities. The application of noise limits and hours of operation. along with implementation of appropriate noise and vibration control measures (as summarised in Section 10.6.1), will ensure that noise and vibration impact is kept to a minimum. Also it is reiterated that any construction noise effects will be not significant, negative and short term in nature.

10.6.2 OPERATIONAL PHASE

10.6.2.1 Power Station Noise

Proprietary noise and vibration control measures have been employed including plant selection and acoustic screening, in order to ensure that noise emissions from building services plant do not exceed the adopted criterion at the façade of any nearby noise sensitive locations. In addition, noise emissions will be broadband in nature and will not contain any tonal or impulsive elements. The resultant noise effect is negative, not significant to slight and long-term.

10.6.2.2 Additional Vehicular Traffic on Public Roads

Any change in noise levels associated with vehicles at road junctions in the vicinity of the proposed development is expected to be imperceptible. The resultant noise effect is neutral, imperceptible and long term.

10.7 CUMULATIVE IMPACTS

10.7.1 EXISTING DEVELOPMENTS

The environmental noise surveys (Section 10.3) take account of any noise emissions from existing developments. It was noted that the existing ambient noise levels in the area were dominated by aircraft and road traffic noise from the local road network.

At certain locations during night-time periods where existing background noise levels were measured in the range of 45 to 50 dB $L_{A90,15min}$, low levels of plant noise from the proposed development may be audible during lulls in other sources (e.g. aircraft). Notwithstanding this, the resulting cumulative background noise levels will be within the adopted night-time noise criteria outlined in relevant EPA noise criteria that are applicable to the development.

10.7.2 RELATED DEVELOPMENTS

There are two closely related projects that are not part of the subject proposal but are integral to its operation:

- FW22A/0204 & ABP-317480-23
- ABP-314894-22

Neither of these projects likely to give rise to significant noise or vibration effects in their own right, during either the construction phase or the operational phase. Therefore, there is accordingly no likely significant noise or vibration effect when considered cumulatively with the proposed power station development.

10.7.2.1 Other Developments

The Fingal County Council planning file has been reviewed and a number of developments in the local area have been identified, as listed in the accompanying Planning Application Report. These specific developments have been reviewed for any likelihood of a significant cumulative noise impact.

In respect of noise, taking into account the additional distance from these developments to noise-sensitive locations assessed here, and that the low number of operations hours per year of the proposed Kilshane Energy Centre, it is not considered that a significant cumulative noise or vibration impact is likely.

10.8 COMMENT ON AIRPORT NOISE ZONE

As a final comment it is noted that the development lands in question fall within the adopted Noise Zone A as outlined in Variation No. 1 of the Fingal Development Plan 2017-2023.

Figure 10.6 Airport Noise Zones

The members of Fingal County Council resolved to adopt Variation No. 1 of the Fingal Development Plan 2017-2023 at a Council meeting on 9 December 2019. Variation No. 1 outlines revised Noise Zones and policy objectives in relation to aircraft noise from Dublin Airport.

Four noise zones (Zone A to D) are now indicated representing potential site exposure to aircraft exposure. Table 10.16 below outlines the objectives to be adhered to by applicants for developments in each zone. In the first instance the following comment in relation to the aim of Zone A should be noted:

"To resist new provision for residential development and other noise sensitive uses."

Table 10.16 Airport Noise Zones

Zone	Indication of Potential Noise Exposure during Airport Operations	Objective
A	≥ 63 dB $L_{Aeq, 16hr}$ and/or ≥ 55 dB L_{night}	To resist new provision for residential development and other noise sensitive uses. "All noise sensitive developments within this zone may potentially be exposed to high levels of aircraft noise, which may be harmful to health or otherwise unacceptable. The provision of new noise sensitive developments will be resisted."

On the basis the development will operate primarily during the daytime period, the worst-case daytime aircraft noise level incident to the façade would fall in the region of 63 dB $L_{Aeq,16\ hour}$.

10.8.1 GUIDANCE ON INTRUSIVE NOISE LEVELS

The Dublin Noise Action Plan and relevant guidance referenced therein call for developments to have a good level of sound insulation in accordance with best Irish practice. There is no Irish standard guidance that is directly applicable to this scenario, hence it is proposed to make reference to BS8233 for the purposes of arriving at appropriate design goals.

The British Standard BS 8233: 2014: Guidance on sound insulation and noise reduction for buildings sets out recommended internal noise levels for several different building types from external noise sources such as road and air traffic. The guidance is primarily for use by designers, hence BS8233 may be used as the basis for the development of an appropriate schedule of noise control measures.

The recommended indoor ambient noise levels in a commercial building are shown in Table 10.17.

Table 10.17 Airport Noise Zones

Activity	Location	Design range dB $L_{Aeq,T}$
Speech or telephone communications	Department Store, Canteen, Kitchen	50 – 55
Typical noise levels for acoustic privacy in shared spaces	Open Plan Office	45 – 50
Study and work requiring concentration	Meeting Room	35 – 45

10.8.2 CALCULATION OF FUTURE INTRUSIVE AIRCRAFT NOISE LEVELS

10.8.2.1 Proposed Façade Elements

Calculation of noise break-in from the outside environment to the control room, meeting room and office spaces in the development have been carried out in order to select a minimum sound reduction performance for the glazing and vents in order to provide a good internal noise environment in accordance with the criteria in Table 10.18.

The specification of glazing elements including lab or estimated sound insulation performance values have been presented in Table 1018. Values are also provided for fresh air vents, for the case where they are to be incorporated at detailed design stage.

Table 10.18 Façade Element Specification

Element	Sound Reduction Index (dB) at Octave Band Centre Frequency (Hz)					
	125	250	500	1k	2k	4k
Glazing	23	17	27	39	44	38
Vents (2 per room)	36	28	26	28	30	30

10.8.2.2 Predicted Internal Noise Levels

Using the noise levels relevant to Noise Zone A and the sound reduction performances of the building elements in Table 10.18, the predicted intrusive noise levels for office space within the open plan office areas of the development has been calculated in accordance with BS EN ISO 12354-3:2017 Building acoustics - Estimation of acoustic performance of buildings from the performance of elements - Airborne sound insulation against outdoor sound.

Based on the expected external noise level and the constructions detailed above the predicted internal noise levels within the building arising from future aircraft noise levels are of the order of 45 dB $L_{Aeq,T}$. It is important to note that this falls within the recommended values as outlined in 10.20 above. It is concluded that no further mitigation measures are required in respect of inward impact of environmental noise.

10.9 INTERACTIONS

Chapter 12, Material Assets, Traffic and Transport was reviewed in the preparation of this chapter.

10.10 REFERENCES

- EPA Guidelines on Information to be contained in Environmental Impact Statements (2002).
- Draft 'Guidelines for Noise Impact Assessment' produced by the Institute of Acoustics/Institute of Environmental Management and Assessment Working Party.
- British Standard BS 5228 – 1: 2009+A1:2014: Code of practice for noise and vibration control on construction and open sites – Noise.
- Transport Infrastructure Ireland (TII) publication Good Practice Guidelines for the Treatment of Noise and Vibration in National Road Schemes.
- British Standard BS 7385: 1993: Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from ground borne vibration.
- British Standard BS 5228-2: 2009+A1:2014: Code of practice for noise and vibration control on construction and open sites – Vibration.
- BS 4142:2014: Methods for rating and assessing industrial and commercial sound.
- Environmental Protection Agencies Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4) (January 2016).
- ISO 1996-2:2017 Acoustics - Description, measurement and assessment of environmental noise – Part 2: Determination of environmental noise levels.
- British Standard BS 6472 (1992): Guide to Evaluation of human exposure to vibration in buildings (1Hz to 80Hz).
- ISO 9613 (1996): Acoustics – Attenuation of sound outdoors – Part 2: General method of calculation.
- Calculation of Road Traffic Noise (CRTN) issued by the Department of Transport in 1988.
- BS EN 1793-1:1998: Road traffic noise reducing devices – Test method for determining the acoustic performance – Part 1: Intrinsic characteristics of sound absorption
- BS EN 1793-2:1998: Road traffic noise reducing devices – Test method for determining the acoustic performance – Part 2: Intrinsic characteristics of airborne sound insulation.
- BS EN 1794-1:2003: Road traffic noise reducing devices. Non-acoustic performance. Mechanical performance and stability requirements
- BS EN 1794-2:2003: Road traffic noise reducing devices. Non-acoustic performance. General safety and environmental requirements.

11 LANDSCAPE & VISUAL IMPACT

11.1 INTRODUCTION

This landscape and visual impact assessment has been prepared to identify and assess the effects on the appearance and character on the local environs arising from the proposed development.

This chapter analyses the existing landscape character and significance, and provides an evaluation of the potential for landscape and visual impacts of the development. The assessment is made having regard to the vulnerability of the landscape to change and to the location of visual receptors relative to the proposed development.

Visual Impacts are a combination of effects on visibility and on the overall character of the area. The main landscape features and landscape character areas were identified through a combination of site visit and documentation surveys.

Landscape impacts were analysed based on:

- The capacity of the existing landscape to absorb the proposed development;
- Effects on landscape character and features (e.g., removal or alteration);
- Proximity of sensitive viewpoints (e.g., routes) and visual receptors (dwellings)
- The details of the development.

Visual impacts are evaluated taking account of:

- The potential level of visual intrusion (i.e., effect impinged upon a view);
- The potential for visual impact dependant on the proximity and elevation of structures to a sensitive viewpoint/visual receptor.

The County Development Plan was consulted to identify Landscape Character Areas and significant landscape features. Related provisions of the Plan – such as the proximity of Protected Structures to the site, were also considered.

11.2 THE PROPOSED DEVELOPMENT

A description of the project is included in Chapter 4 - *Project Description* of the EIAR.).

11.3 THE RECEIVING ENVIRONMENT

This section provides a description of the existing appearance and character of the area which establishes a reference - or 'baseline' against which to assess the likely effects of the project.

The northern urban fringe of Dublin City provides the overall receiving landscape environment for this project. These areas, occurring along the major roads that radiate outward into the commuter towns, and controlled by successive County Development Plans, are now beginning to radiate less by growing in parallel to the orbital M50 motorway.

Dublin has a relatively compact form with relatively high levels of land-use homogeneity that creates landscape zones of internally consistent character and appearance.

The immediate environs of the proposed development are one such area where medium-to-large-scale commercial, retail and light industrial developments occur adjacent to rural areas that consist of medium-large pasture fields. These rural areas are relatively level in the immediate vicinity resulting in a pattern of relatively regularly shaped fields – that are usually enclosed by mature field boundaries that contain many mature trees. Roads in the area contain related concentrations of individual dwellings – with larger plots on older major roads and smaller plots on side roads.

Throughout most of this area the older rural roads are lined with tall hedgerows that typically restrict visibility of the surrounding countryside. Modern roads and motorways in the area generally have landscaped edges that consist of shrub and tree planting that screen views of the surrounding area.

These developments together with a general restructuring of agriculture means that this is a dynamic landscape that is continuing to experience development.

11.3.1 CONTEXT

The project will take place within the Kilshane adjacent to Northwest Business Park. The site is currently a greenfield site and is surrounded by the N2 to the east and industrial units to the west. Figure 11.1 below shows the site in the context of the local landscape.

The area also contains urban fringe land uses, that in the immediate environs include:

- Dublin Airport
- Industrial and commercial large-medium-scaled buildings of an industrial/commercial character
- Northwest Business Park to the west
- The N2 National Road – to the east

Beyond the immediate environs lie pasture lands to the west and continuous urban fabric to the east.

Figure 11.1 Local landscape context

11.3.2 CHARACTER

The established character of the area arises from the mixture of land-uses and structures. The landscape character is of a type that is abundant in County Dublin and other cities in Ireland. The landscape character of the area is also robust – on account of the quantum of recent development.

The County Development Plan[28] identifies that the proposed Kilshane energy site is located in an area classified as "*Low Lying Agriculture".*

The local character comprises '*urban and urban fringe'* because it is now largely surrounded by industrial, infrastructural and commercial development. This is reflected in the zoning of these lands as **HI - Heavy Industry - Provide for heavy industry.**

11.3.3 SENSITIVITY

Landscape Sensitivity can be defined as the extent to which a landscape can accommodate change without unacceptable loss of existing character or interference with values.

11.3.3.1 General Sensitivities

The location has a low sensitivity to significant change of character arising from new development based on the Figure 11.1 and the County Development Plan. The land context and setting are not within or adjacent to any key scenic views or prospects as listed in Section 5 of the County Development Plan.

11.3.3.2 Landscape classification areas in County Dublin

The County Development Plan identifies that the proposed Kilshane energy site is located in an area classified as "Medium Sensitivity" in the County Development Plan 2017 - 2023. This is defined as area of *"existing development and infrastructure. New development reinforces existing desirable land use patterns*

11.3.3.3 Local Sensitivities

The environs have relatively low sensitivity to change for two reasons.

1. The established pattern of urban fringe development is well-established and pervasive. New developments of the same type and scale in this context have a very low potential to become conspicuous or the significantly alter the established appearance and character of the area.

2. The relatively flat topography and the heights of the ubiquitous 20 – 25m height of trees in field boundaries mean that visual impacts are generally confined unless new structures significantly exceed the height of a 5 – 7 storey building.

11.3.4 SIGNIFICANCE

The urban fringe occurs within the Lowland Farming Landscape of Dublin. These are the relatively flat areas of well drained, good quality soils.

These landscapes are of general significance because throughout history, they support most of the more intense agriculture of the county. As a result, these landscapes have significantly higher concentration of historic and archaeological remains – including large 18th C demesne landscapes. Today these working landscapes are more densely occupied than all other parts of the county – except coastal and urbanizing areas with associated concentrations of hedges, smaller settlements and associated roads and utilities.

While the local landscapes are of considerable significance as contexts for local communities and individual sites and structures, the do not have an overall significance arising out of scarcity or sensitivity.

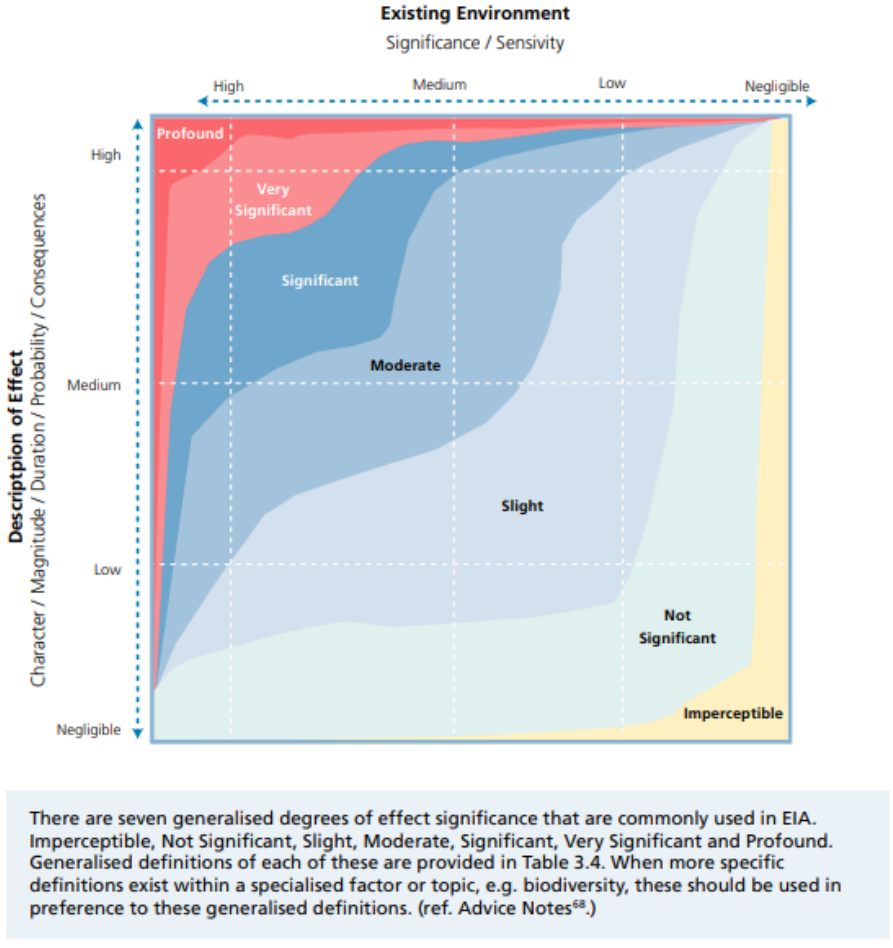
11.4 PREDICTED IMPACTS

There is no single definitive visual impact of a project. Instead, there are a series of effects - each different in appearance and degree - that occur throughout the area from which the project is visible.

Impacts on the character of an area combine the potential visual effects with those of additional sound, smells, traffic as well as knowledge of effects on local ecology and cultural heritage. These matters have been described in detail in other sections and find that there are no significant such effects that would be discernible beyond the site perimeter. For this reason, further evaluation of effects on the landscape are confined to visual impacts.

The impact of the Proposed Development will be limited and localised partial visibility of upper portions of some buildings and roof-mounted plant and exhaust structure. Aircraft warning lights and general building environs partially and locally visible at night with increased visibility through winter foliage. This is of local residential significance and low general significance.

Very low visibility of the proposed development or of any associated development – such as the GIS will be not Significant because of very low impact on the appearance and character of the landscape.



There are seven generalised degrees of effect significance that are commonly used in EIA. Imperceptible, Not Significant, Slight, Moderate, Significant, Very Significant and Profound. Generalised definitions of each of these are provided in Table 3.4. When more specific definitions exist within a specialised factor or topic, e.g. biodiversity, these should be used in preference to these generalised definitions. (ref. Advice Notes[68].)

Figure 11.2 Calibration of impact significance against EPA guidelines[29]

[29] Information to be contained in Environmental impact Assessment Reports, 2022, EPA

11.5 MITIGATION AND MONITORING MEASURES

The layout avoids locations near the more sensitive northern and western parts of the site. It also retains much of the existing perimeter vegetation that provides good visual screening. The proposed development includes extensive re-use of excavated material to form screening berms while a comprehensive site planting plan will augment the screening that is already provided by the existing perimeter vegetation that has been retained.

11.6 RESIDUAL IMPACTS

The assessment of landscape impacts provides the evidence for a more holistic description of the overall residual impacts on the appearance and character of the area. The project will have visual impacts that will be largely confined to the immediate vicinity of the development. The main areas of such visibility will be confined to a short length of L3120 Kilshane Rd. beside site boundary as well as areas of the existing and realigned public road in the immediate vicinity of the site entrance.

The impacts on the character will be confined to a similar area. These will consist of an extension and intensification of the pattern of development that changes old agricultural land into areas of development that principally consist of areas of industry and infrastructure. These are the changes in character that are envisaged by the zoning of these lands for these purposes. According such change in appearance and character constitutes. orderly development because of this compliance with zoning

11.7 CUMULATIVE ASSESSMENT

The cumulative impact of the proposed development with any/all relevant other planned or permitted developments including the proposed GIS (as outlined in Chapter 17 - *Interactions & Cumulative Effects*) are discussed below.

The proposed development, in combination with all other developments in the area that consist primarily of a concentration existing and emerging commercial, industrial and infrastructural development represents a continuation and consolidation of the established land-use patterns of the area as envisioned by the zoning of the Fingal County Development Plan.

12 MATERIAL ASSETS

12.1 INTRODUCTION

The prescribed environmental factor of Material Assets is described in the 2022 EPA Guidelines as including built services and infrastructure.

The related topics of water (supply and waste water) and roads and traffic are separately addressed in other chapters of this EIAR, principally:

- Chapter 8 *Water & Hydrology*
- Chapter 13 *Traffic & Transportation*
- Chapter 14 *Waste Management*

This chapter covers the proposals for built services (except traffic) – comprising, energy demand and supply (electrical and gas) and water services.

12.2 ENERGY DEMAND

During the operational phase there will be energy resource requirements for operation of the proposed development in the form of natural gas and electricity.

During construction, resources consumed will mainly include use of fuels for construction related machinery, electricity to light the site and power tools.

12.2.1 ELECTRICAL SUPPLY

The proposed development will connect to a 220kV transmission system. The high voltage transmission line will supply back feed (import) power for facility loads when the combustion turbine is offline, and will serve as the transmission line for the combustion turbine when it is generating and exporting power to the grid.Maximum import and export capacity are defined in the EirGrid Transmission Connection Agreement. Export power will meet EirGrid Grid Code requirements for voltage, frequency, and power factor.

When operational the plant will supply 600 MW of electricity to the National Grid via a GIS and grid connection which is subject to a separate SID consent approval by An Bord Pleanála..

12.2.2 GAS CONNECTION

Gas will be provided from the proposed gas yard (AGI) to be owned and operated by Gas Networks Ireland (GNI). This has been sized to accommodate the demand from this proposal.

12.3 WATER

12.3.1 FOUL WATER

There is no existing foul water connection on the site for the proposed development. It is proposed that an 80mm diameter rising main will be constructed from the on-site pumping station.

12.3.2 WATER SUPPLY

The levels of the changes in demand for these services relative to available network capacities are further discussed in Chapter 8 *Water & Hydrology*.

The detailed design for these water services is described in the separately submitted engineering reports. Due to the nature and scale of this work, significant environmental effects can be considered to be unlikely to occur.

13 TRAFFIC & TRANSPORTATION

13.1 INTRODUCTION/METHODOLOGY

This chapter of the EIAR assesses the likely traffic and transportation impacts on the receiving environment during the construction and operational phases of the Proposed Development. The existing and proposed transport infrastructure in the area is described, and an assessment of the current and the future traffic environment is made. The impact of the development in terms of public transportation, pedestrian and cycle is also assessed.

The chapter describes: the methodology; the receiving environment at the application site and surroundings; the characteristics of the proposal in terms of physical infrastructure; the potential impacts that proposals of this kind are likely to produce; the predicted impact of the proposal examining the effects of the Proposed Development on the local road network; the remedial or reductive measures required to prevent, reduce, or offset any significant adverse effects; and the monitoring.

The following methodology has been adopted for this assessment:

- Review of relevant available information including, current Fingal County Development Plan 2017-2023, existing traffic information and other relevant studies;
- Site visit to gain an understanding of the site access and observe the existing traffic situation.
- Consultations with Fingal County Council Roads Department to agree the site access arrangements and determine the scope of the traffic analysis required to accompany a planning application.
- Detailed estimation of the transport demand that will be generated by the Proposed Development. The morning and evening peak times will be addressed as well as an estimation of under-construction and potential future developments in the surrounding area.
- Assessment of the impact of traffic on local junctions, car parking requirements and accessibility of the site by sustainable modes including walking, cycling and public transport.

13.2 RECEIVING ENVIRONMENT

This section reviews the baseline conditions, providing backing information for the site in order to determine the significance of any traffic implications. It also considers the existing accessibility of the site by sustainable modes of transport.

13.2.1 SITE LOCATION

The site is located at Kilshane, Dublin 11, just west of the N2 Primary Road and is located approximately 2 km northwest of the M50.

remainder of the southern boundary is with the Roadstone quarry, Huntstown. The eastern and north-eastern boundary are again with agricultural land.

13.2.2 LOCAL ROAD NETWORK

There are three site access points to the subject site lands. The primary access point is current from Kilshane Road. The Kilshane Road at this location is a 2-lane carriageway with a posted speed limit of 80 km/hr. There are no dedicated cycle facilities at this location.

13.2.3 PUBLIC TRANSPORT FACILITIES

There are currently no public transport facilities to avail of on the Kilshane Road. The nearest public bus stops are located on the R135 and on the Mitchelstown Road at Northwest Business Park, to the east and southwest of the site, respectively. Details on current bus services and walking routes to/from the site are provided below.

- **Suncourt (Stop 101121)** on the R135. This is 650m (approx. 7 min walk) away from the existing site entrance. This stop is served by bus routes 103 & 105X in a southbound direction only.
- **Kilshane Cross (Stop 134321)** on the R135. This is 840m (approx. 9 min walk) away from the existing site entrance. This stop is served by bus routes 103 & 105X in a northbound direction only.
- **Northwest bus (Stops 7680 & 7676)** on the Mitchelstown Road at Northwest Business Park, serve route 40E in both directions and are 1.9km (approx. 23 min walk) away from the existing site entrance.

A summary of the Monday to Friday operational services of the abovementioned routes is provided in Table 13.1.

Table 13.1 Bus services

Route No.	Direction	Weekday Frequencies	
		AM (07:00 to 09:00)	PM (17:00 to 19:00)
103	Dublin City Centre to Ratoath	Every 20 minutes (5 services)	Every 20 minutes (6 services)
	Ratoath to Dublin City Centre	Every 20 minutes (6 services)	Every 20 minutes (6 services)
105X	Dublin City Centre to Fairyhouse Cross	-	Every 30 minutes (3 services)
	Fairyhouse Cross to Dublin City Centre	Every 30 minutes (3 services)	-
40E	Tyrrelstown to Broombridge Luas	Every 30 minutes (4 services)	Every 30 minutes (4 services)
	Broombridge Luas to Tyrrelstown	Every 30 minutes (4 services)	Every 30 minutes (4 services)

It should be noted that a continuous pedestrian footpath to all the closest bus stops from the subject site is currently not available and therefore would not be a very attractive mode of transportation for those traveling to/from the proposed development due to distance and safety concerns for pedestrians on sections of these roads.

13.3 PROPOSED DEVELOPMENT

The Proposed Development is described in further detail in Chapter 4 (Project Description). The details of the construction and operation of the development in terms of traffic and transport are discussed below.

13.4 PREDICTED IMPACTS

The potential impacts of the Proposed Development from a traffic and transport perspective at both construction and operational stage are outlined in the following sections.

13.4.1 CONSTRUCTION PHASE

13.4.1.1 Construction Traffic Impact

During the construction period for the proposed development, there will be a number of high activity periods where construction related traffic will be highest.

The nature of the construction process is such that the traffic generated will comprise short periods of high activity interspersed with longer periods with relatively low level of truck movements into and out of the site over the 3-year construction period

13.4.1.2 Car Parking During Construction

Due to the location of the proposed site and lack of access from public transport and pedestrian cycling car parking will be provided during the construction stage.

13.4.1.3 Trip Generation – Construction Traffic

A preliminary construction programme was created in order to determine the maximum peak hour for the site. The construction traffic there will be combination of cars, light goods vehicles (LGVs) and heavy goods vehicles (HGVs).

13.4.1.4 Trip Assignment – Construction Traffic

It is anticipated that the construction traffic access to the site will be provided via the existing entrance only once for the site clearance phase. Construction traffic is then proposed to access the site from the west via a priority-controlled junction just west of where the proposed roundabout is projected. At that stage, the proposed roundabout and the realigned section of the Kilshane Road are likely to be under construction and the baseline flows/construction traffic will use the existing alignment of the Kilshane Road

13.4.2 OPERATIONAL PHASE

13.4.2.1 Operational Traffic Impact

The Proposed Development will generate a number of trips by vehicles. These trips may have an impact on the surrounding road network and could contribute to increased congestion. The operational trips generated here are for all three development proposals.

Traffic count data was obtained for the purposes of the planning application. The data surveyed is expected to reflect the peak traffic conditions on the local road network. An estimation of the traffic generation and distribution of the Proposed Development has been set out below. This will be compared to the background traffic counts in order to ascertain the impact the Proposed Development will have on the local road network.

13.4.2.2 Trip Generation – Operational Traffic

Below is the information for the operational phase provided by the developer which was used to estimate the operational traffic to/from the development.

- **Average and maximum number of staff**: 1-2 people increasing to 50 during outage (only every few years).
- **Average and maximum number of daily HGV deliveries**: average of 1 per week.

Again, based on the provision of public transport in the area and the access routes to the closest bus stops, it has been assumed that staff trips to/from the site will be made by car.

To carry out a conservative appraisal of the proposed roundabout and the surrounding road network during the operational stage, for the purpose of this assessment, it has been assumed that the proposed development will generate the following trips during the busiest operational day (during an outage with an HGV delivery):

a) attract 25 inbound car trips in the AM peak hour and generate 25 outbound car trips in the PM peak hour, conservatively assuming that every 2 staff will share a car to travel to/from the site and these will occur during the morning and evening peak hours.
b) attract/generate 1 inbound and 1 outbound HGV trip in the AM peak hour. No HGV delivery trip was assumed in the PM peak hour for the operational phase.

The same unit conversion exercise carried out for the HGV construction traffic has been undertaken for the HGV operational traffic. The HGV trips as summarised above were expanded by a 2.3 factor. The operational traffic in the figure below includes cars and HGVs and accounts for this expansion.

13.4.2.3 Trip assignment – Operational Traffic

During the operational phase, the proposed roundabout and the realignment of the Kilshane Road will be in place. The access road to the proposed development will form the eastern approach of the roundabout whilst the Kilshane Road will form the northern and western approaches.

It is estimated that the development proposals will be operational by 2025. Therefore, in accordance with the Traffic and Transport Assessment Guidelines (TII / NRA) published in May 2014, the +15-year scenario for junction assessment is 2040.

The background traffic growth rates used to factor up the 2022 flows are in accordance with the *'Table 6.1: Link-Based Growth Rates: Metropolitan Area Annual Growth Rates'* within the TII Publications – Project Appraisal Guidelines for National Roads Unit 5.3 – Travel Demand Projections (May 2019).

This is:

- **1.210** (Central Growth) growth factor from 2022 to 2040.

13.4.2.4 Outline – Operational Traffic

In order to have a more robust assessment of the local road network and junctions. Additional junction analysis was completed for both junctions with the inclusion of the Outline Development. The Outline is expected to have at least 500+ employees with a car being the primary method of transport to the site. A conservative 450 trips inbound during the AM peak hour and 450 trips outbound in the PM peak hour is estimated by the Outline. This is based on the number of car parking spaces provided.

The outline will use the same Trip Distribution as the proposed site as shown in above. The figure below shows the trip assignment for the overall Outline and 2040 operational forecast with the Outline included.

13.4.2.5 Do-Nothing Scenario

Should the Proposed Developments not take place, the access roads and infrastructure will remain in their current state and there will be no change. Background traffic would be expected to grow over time.

13.5 MITIGATION AND MONITORING MEASURES

13.5.1 INTRODUCTION

This section of the report discusses mitigation measures to reduce the impact of the Proposed Developments on the surrounding area during the construction and operational phases.

13.5.2 CONSTRUCTION PHASE

It is proposed that a Construction Environmental Management Plan (CEMP) will be prepared by the appointed contractor in order to reduce or prevent any potential impacts of the construction phase of the Proposed Developments on the safety and amenity of other users of the public road.

- Dust and dirt control measures.
- Noise assessment and control measures
- Routes to be used by vehicles
- Working hours of the site
- Details of construction traffic forecasts
- Time when vehicle movements and deliveries will be made to the site
- Facilities for loading and unloading
- Facilities for parking cars and other vehicles

In addition to the above, a detailed Construction Traffic Management Plan (CTMP) will be prepared by the main contractor. This document will outline proposals in relation to construction traffic and associated construction activities that impact the surrounding roads network. The document will be prepared in coordination and agreed with the local authority.

Care will be taken to ensure temporary car parking is provided within the site for contractor's vehicles. It is likely that construction will have an imperceptible impact on pedestrian and cycle infrastructure.

Through the implementation of the CEMP and CTMP, it is anticipated that the effect of traffic during the construction phase will have a slight effect on the surrounding road network for short-term period.

To reduce the volume of construction traffic movements during the construction phase, the excavated material will be entirely used for landscaping and regrading.

The construction compound and temporary facilities will be decommissioned, and any affected areas will be reinstated. Reinstatement will begin as construction work is entering into its final phase and the facility is placed into operation.

13.5.3 OPERATIONAL PHASE

A key barrier to modal shift towards sustainable modes of travel is often a lack of information about potential alternatives to the car. As such, it is proposed that employees will be made aware of potential alternatives including information on walking, cycle routes and public transport.

Staff will be encouraged to avail of these facilities for travel to and from work. Provision of this information will be made during the commissioning process as permanent staff are introduced to the site and the plant starts to become operational and will be included in the new worker's pack upon the sale of each unit, as this represents the best opportunity to make residents aware and to secure travel behaviour change. Daily operational traffic will be only 1 or 2 staff per day and will have an insignificant impact on the road network.

13.6 RESIDUAL IMPACTS

13.6.1 INTRODUCTION

The residual impacts outlined below show the impact of the proposed development with the above mitigation measures in place.

13.6.2 CONSTRUCTION PHASE

Provided the above mitigation measures, the residual impact upon the local receiving environment is predicted to be short-term in the nature and slight in terms of effect.

13.6.2.1 Worst-case' Scenario

The 'worst-case' scenario for the construction phase is for the mitigation measures to fail and cause significant and long term effects to the area. These impacts would include long traffic delays and possible detours along Kilshane Road. The 'worst-case' scenario would also affect the construction timeline and increase the construction programme.

13.6.3 OPERATIONAL PHASE

Provided the above mitigation measures and procedures outlined in the Travel Plan provided under a separate cover are incorporated into the operational phase of the proposed development, the residual impact upon the local receiving environment is predicted have permanent effects but not significant in terms of effect.

13.6.3.1 Worst-case' Scenario

The 'worst-case' scenario for the operational phase is for slight, permanent effects to the local road network. These would include long delays at nearby junctions due to the impact of the proposed development operational traffic should mitigation measures fail.

13.7 CUMULATIVE IMPACT

This section assesses any indirect and cumulative impacts of the proposed development with relevant developments or projects in the vicinity of the site.

The cumulative impact of both the GIS compound and 220Kv underground cabling and the AGI Gas Connection was taken into account when assessing the impact of the development on the surrounding road and traffic environment.

13.8 MONITORING & REINSTATEMENT

13.8.1 CONSTRUCTION PHASE

During the Construction Phase the following monitoring is advised. The specific compliance exercises to be undertaken in relation to the range of measures detailed in the final construction management plan will be agreed with the planning authority.

- Construction vehicles routes and parking
- Internal and external road conditions
- Construction activities hours of work

13.8.2 OPERATIONAL PHASE

A Mobility Management Plan for the proposed development will be prepared, monitored and updated at regular intervals. This will enable tracking in terms of a reduction in the dependence on private car journeys and a shift towards sustainable transport options such as walking, cycling and the use of public transport such as buses and trains.

The Co-ordinator, in consultation with the Developer, the Occupiers, and the Local Authority or its agents, will agree annual targets, following completion and analysis of the travel survey, for increasing the percentage of non-car modes.
The Co-ordinator will:

- Meet with officers of the Local Authorities or its agents within a period of 6 months following occupation of the building(s) and thereafter every 12 months to assess and review progress of the Plan and agree objectives for the next 12 months, and
- Prepare and submit to senior management of the Developer, the Occupier(s) and the Local Authorities or its agents, an annual Monitoring Report.

13.9 REFERENCES

- Dublin BusConnects Website: New Dublin Area Bus Network - BusConnects
- Design Manual for Urban Roads and Streets (DMURS), Department of Transport, Tourism and Sport
- Fingal Council Development Plan 2017 – 2023.
- Fingal City Council Draft Development Plan 2023 - 2029
- NRA Guidelines, Traffic and Transportation Assessment Guidelines (2014), National Roads Authority
- Project Appraisal Guidelines for National Roads Unit 5.3 – Travel Demand Projections, (May 2019), Transport Infrastructure Ireland Publications
- Project Appraisal Guidelines for National Roads Unit 16.1 – Expansion Factors for Short Period Traffic Counts, (2016), Transport Infrastructure Ireland Publications
- Sustainable Urban Housing: Design Standards for New Apartments, (2020), Department of Housing, Planning and Local Government
- Transport for Ireland (TFI): www.transportforireland.ie

14 WASTE MANAGEMENT

14.1 INTRODUCTION/METHODOLOGY

This chapter evaluates the impacts, if any, which the proposed development may have on Material Assets as defined in Directive 2014/52/EU, the EPA Guidelines on the Information to be contained in EIAR 2022 and EPA Draft Advice Notes for EIS 2015.

This chapter has also been prepared to address the issues associated with material assets during the construction and operational phases of the proposed development as described in Chapter 4.
The Chapter has been prepared in accordance with European Commissions Guidelines, Guidance on the preparation of the Environmental Impact Assessment Report (2017), the EPA Guidelines on the Information to be contained in EIAR (2022) and the EU Commission Notice on changes and extensions to projects, 2021.

14.1.1 METHODOLOGY

The assessment of the impacts of the proposed development, arising from the consumption of resources and the generation of waste materials, was carried out taking into account the methodology specified in relevant guidance documents, along with an extensive document review to assist in identifying current and future requirements for waste management; including national and regional waste policy, waste strategies, management plans, legislative requirements and relevant reports.

This Chapter is based on the proposed development, as described in Chapter 2 (Description of the Proposed Development) and considers the following aspects:

- Legislative context;
- Construction phase (including site preparation, demolition, excavation and construction);
- Operational phase; and
- Decommissioning Phase

A desktop study was carried out which included the following:

- Review of applicable policy and legislation which creates the legal framework for resource and waste management in Ireland;
- Description of the typical waste materials that will be generated during the Construction and Operational phases; and
- Identification of mitigation measures to prevent waste generation and promote management of waste in accordance with the waste hierarchy.

Estimates of waste generation during the construction and operational phases of the proposed development have been calculated and are included in section 14.3 of this chapter. The waste types and estimated quantities are based on published data by the EPA in the National Waste Reports and National Waste Statistics, data recorded from similar previous developments, Irish and US EPA waste generation research as well as other available research sources.

Mitigation measures are proposed to minimise the effect of the proposed development on the environment during the construction and operational phases, to promote efficient waste segregation and to reduce the quantity of waste requiring disposal. This information is presented in Section 14.5

A detailed review of the existing ground conditions on a regional, local and site-specific scale are presented in Chapter 6 of this EIAR (Soils and Geology).

14.1.2 LEGISLATION AND GUIDANCE

Waste management in Ireland is subject to EU, national and regional waste legislation and control, which defines how waste materials must be managed, transported and treated. The overarching EU legislation is the Waste Framework Directive (2008/98/EC) which is transposed into national legislation in Ireland. The cornerstone of Irish waste legislation is the Waste Management Act 1996 (as amended). European and national waste management policy is based on the concept of 'waste hierarchy', which sets out an order of preference for managing waste (prevention > preparing for reuse > recycling > recovery > disposal) (Figure 14.1).

Figure 14.1 Waste Hierarchy (Source: European Commission)

EU and Irish National waste policy also aims to contribute to the circular economy by extracting high-quality resources from waste as much as possible. Circular Economy (CE) is a sustainable alternative to the traditional linear (take-make-dispose) economic model, reducing waste to a minimum by reusing, repairing, refurbishing and recycling existing materials and products. (Figure 14.2).

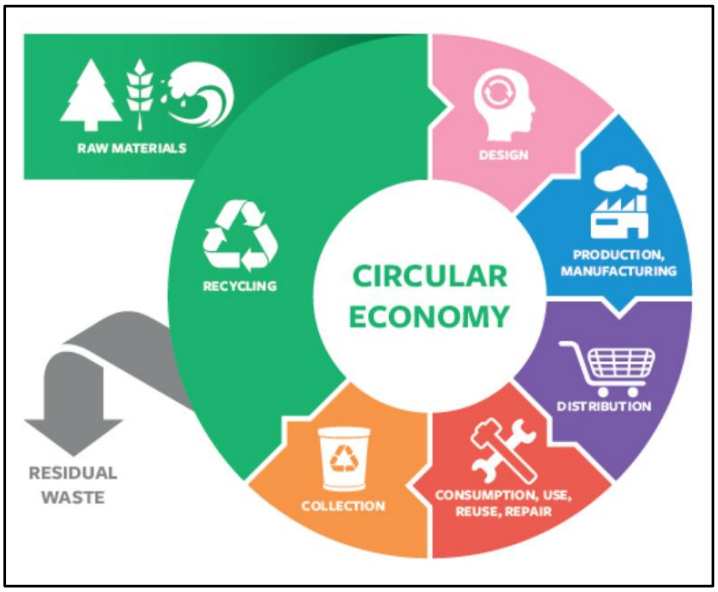


Figure 14.2 Circular Economy (Source: Repak)

The Irish government issues policy documents which outline measures to improve waste management practices in Ireland and help the country to achieve EU targets in respect of recycling and disposal of waste. The most recent policy document, Waste Action Plan for a Circular Economy – Waste Management Policy in Ireland, was published in 2020 and shifts focus away from waste disposal and moves it back up the production chain. The move away from targeting national waste targets is due to the Irish and international waste context changing in the years since the launch of the previous waste management plan, A Resource Opportunity, in 2015.

One of the first actions to be taken from the WAPCE was the development of the Whole of Government Circular Economy Strategy 2022-2023 'Living More, using Less' (2021) to set a course for Ireland to transition across all sectors and at all levels of Government toward circularity and was issued in December 2021.

The Circular Economy and Miscellaneous Provisions Act 2022 was signed into law in July 2022. The Act underpins Ireland's shift from a "take-make-waste" linear model to a more sustainable pattern of production and consumption, that retains the value of resources in our economy for as long as possible and that will to significantly reduce our greenhouse gas emissions. The Act defines Circular Economy for the first time in Irish law, incentivises the use of recycled and reusable alternatives to wasteful, single-use disposable packaging, introduces a mandatory segregation and incentivised charging regime for commercial waste, streamlines the national processes for End-of-Waste and By-Products decisions.

The strategy for the management of waste from the construction phase is in line with the requirements of the EPA's 'Best Practice Guidelines for the Preparation of Resource and Waste Management Plans for Construction & Demolition Projects' (2021). The guidance documents, Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects and Construction and Demolition Waste Management: A Handbook for Contractors and Site Managers (FÁS & Construction Industry Federation, 2002), were also consulted in the preparation of this assessment.

There are currently no Irish guidelines on the assessment of operational waste generation, and guidance is taken from industry guidelines, plans and reports including the Eastern Midlands Region (EMR) Waste Management Plan 2015 – 2021, BS 5906:2005 Waste Management in Buildings – Code of Practice, the Fingal County Council (FCC) (Segregation Storage, Presentation and of Household and Commercial Waste) Bye-Laws (2020), the EPA National Waste Database Reports 1998 – 2018 and the EPA National Waste Statistics Web Resource.

14.1.3 TERMINOLOGY

Note that the terminology used herein is consistent with the definitions set out in Article 3 of the Waste Framework Directive. Key terms are defined as follows:

Waste - Any substance or object which the holder discards or intends or is required to discard.

Prevention - Measures taken before a substance, material or product has become waste, that reduce:

- the quantity of waste, including through the re-use of products or the extension of the life span of products;
- the adverse impacts of the generated waste on the environment and human health; or
- the content of harmful substances in materials and products.

Reuse - Any operation by which products or components that are not waste are used again for the same purpose for which they were conceived.

Preparing for Reuse - Checking, cleaning or repairing recovery operations, by which products or components of products that have become waste are prepared so that they can be re-used without any other pre-processing.

Treatment - Recovery or disposal operations, including preparation prior to recovery or disposal.

Recovery - Any operation the principal result of which is waste serving a useful purpose by replacing other materials which would otherwise have been used to fulfil a particular function, or waste being prepared to fulfil that function, in the plant or in the wider economy. Annex II of the Waste Framework Directive sets out a non-exhaustive list of recovery operations.

Recycling - Any recovery operation by which waste materials are reprocessed into products, materials or substances whether for the original or other purposes. It includes the reprocessing of organic material but does not include energy recovery and the reprocessing into materials that are to be used as fuels or for backfilling operations.

Disposal - Any operation which is not recovery even where the operation has as a secondary consequence the reclamation of substances or energy. Annex I of the Waste Framework Directive sets out a non-exhaustive list of disposal operations.

14.2 THE PROPOSED DEVELOPMENT

A full description of the proposed development can be found in Chapter 4). The characteristics of the proposed development that are relevant in terms of waste management are summarised below.

14.2.1 CONSTRUCTION PHASE

During the construction phase, waste will be produced from surplus materials such as broken or off-cuts of timber, plasterboard, concrete, tiles, bricks, etc. Waste from packaging (cardboard, plastic, timber) and oversupply of materials may also be generated. The appointed Contractor will be required to ensure that oversupply of materials is kept to a minimum and opportunities for reuse of suitable materials is maximised.

There will be topsoil and subsoil generated from site clearance and excavations required to facilitate the construction of foundations, the installation of services and roads for the development. Excavated material will be reused on site where possible with the remainder made available for re-use off-site.. It is anticipated that all of this material will be reused onsite for infilling and landscaping works where possible. If material is deemed unsuitable and has to be removed offsite it will be removed from site for appropriate offsite reuse, recovery, recycling and / or disposal.

If the material that requires removal from the site is deemed to be a waste, removal and reuse / recycling / recovery / disposal of the material will be carried out in accordance with the Waste Management Act 1996 (as amended), the Waste Management (Collection Permit) Regulations 2007 (as amended) and the Waste Management (Facility Permit & Registration) Regulations 2007 (as amended). The volume of waste requiring recovery / disposal will dictate whether a Certificate of Registration (COR), permit or licence is required for the receiving facility. Alternatively, the material may be classed as by-product under regulation 15 (By-products) (Previously Article 27 of the European Communities (Waste Directive) Regulations 2011) of S.I. No. 323/2020 - European Union (Waste Directive) Regulations 2020.).

In order to establish the appropriate reuse, recovery and / or disposal route for the soils and stones to be removed off-site, it will first need to be classified. Waste material will initially need to be classified as hazardous or non-hazardous in accordance with the EPA publication Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous (2019). Environmental soil analysis will be carried out prior to removal of the material on a number of the soil samples in accordance with the requirements for acceptance of waste at landfills (Council Decision 2003/33/EC Waste Acceptance Criteria). This legislation sets limit values on landfills for acceptance of waste material based on properties of the waste, including potential pollutant concentrations and leachability. It is anticipated that the surplus material will be suitable for acceptance at either inert or non-hazardous soil recovery facilities / landfills in Ireland or, in the unlikely event of hazardous material being encountered, be transported for treatment / recovery or exported abroad for disposal in suitable facilities.

Waste will also be generated from construction phase workers e.g. organic / food waste, dry mixed recyclables (wastepaper, newspaper, plastic bottles, packaging, aluminium cans, tins and Tetra Pak cartons), mixed non-recyclables and, potentially, sewage sludge from temporary welfare facilities provided on-site during the Construction phase. Waste printer / toner cartridges, waste electrical and electronic equipment (WEEE) and waste batteries may also be generated in small volumes from site offices.

14.2.2 OPERATIONAL PHASE

The new development will give rise to a wide variety of waste streams during the operational phase, i.e. when the project is completed, open and occupied. Operational waste will be generated on a daily basis by the operator

14.2.2.1 Segregation of Waste Materials Onsite

All waste materials will be segregated into appropriate categories and will be stored in appropriate bins or other suitable receptacles in a designated, easily accessible areas of the site. It is envisaged that waste types will be generated by staff employed at the facility and from office administration work.

Dedicated waste storage areas (WSA) along with a facility operational waste management system for the sorting, storing and collection of waste is already in place for the existing development. It has been designed to maximise recycling rates and minimise waste across the entire centre.

All waste receptacles stored on site are collected from the service yard or waste storage rooms by the permitted waste contractor and taken to registered, permitted and/or licensed facilities.

14.3 THE RECEIVING ENVIRONMENT

In terms of waste management, the receiving environment is largely defined by Fingal FCC as the local authority responsible for setting and administering waste management activities in the area. This is governed by the requirements set out in the *Eastern Midlands Region Waste Management Plan 2015 – 2021*, which sets out the following targets for waste management in the region:

- A 1% reduction per annum in the quantity of household waste generated per capita over the period of the plan;
- Achieve a recycling rate of 55% of managed municipal waste by 2025; and
- Reduce to 0% the direct disposal of unprocessed residual municipal waste to landfill (from 2016 onwards) in favour of higher value pre-treatment processes and indigenous recovery practices.

The Plan sets out the strategic targets for waste management in the region and sets a specific target for C&D waste of "70% preparing for reuse, recycling and other recovery of construction and demolition waste" (excluding natural soils and stones and hazardous wastes) to be achieved by 2020.

Ireland achieved 84 per cent material recovery of such waste in 2019, and therefore surpassed the 2020 target and is currently surpassing the 2025 target. The National Waste Statistics update published by the EPA in November 2021 identifies that Ireland's current against "Preparing for reuse and recycling of 50% by weight of household derived paper, metal, plastic & glass (includes metal and plastic estimates from household WEEE)" was met for 2020 at 51% however they are currently not in line with the 2025 target (55%).

The Fingal County Development Plan 2017 – 2023 (2017) and the Draft Fingal County Development plan 2023-2029 (2022) set out objectives for the FCC area which reflect those sets out in the regional waste management plan.

In terms of physical waste infrastructure, FCC no longer operates any municipal waste landfill in the area. There are a number of waste permitted and licensed facilities located in the EMR Waste Region

for management of waste from the construction industry as well as municipal sources. These include soil recovery facilities, inert C&D waste facilities, municipal waste landfills, material recovery facilities and waste transfer stations.

14.4 PREDICTED IMPACTS

This section details the potential waste effects associated with the proposed development.

14.4.1 CONSTRUCTION PHASE

The proposed Development will generate a range of non-hazardous and hazardous waste materials during site excavation and construction. General housekeeping and packaging will also generate waste materials, as well as typical municipal wastes generated by construction employees, including food waste. Waste materials will be required to be temporarily stored in the construction site compound or adjacent to it, on-site pending collection by a waste contractor. If waste material is not managed and stored correctly, it is likely to lead to litter or pollution issues at the Development Site and in adjacent areas. The indirect effect of litter issues is the presence of vermin in areas affected. In the absence of mitigation, the effect on the local and regional environment is likely to be **short-term, significant** and **negative**.

The use of non-permitted waste contractors or unauthorised waste facilities could give rise to inappropriate management of waste, resulting in indirect negative environmental impacts, including pollution. It is essential that all waste materials are dealt with in accordance with regional and national legislation, as outlined previously, and that time and resources are dedicated to ensuring efficient waste management practices. In the absence of mitigation, the effect on the local and regional environment is likely to be **long-term, significant** and **negative**.

Wastes arising will need to be taken to suitably registered / permitted / licenced waste facilities for processing and segregation, reuse, recycling, recovery, and / or disposal, as appropriate. There are numerous licensed waste facilities in the EMR which can accept hazardous and non-hazardous waste materials, and acceptance of waste from the Development Site would be in line with daily activities at these facilities. At present, there is sufficient capacity for the acceptance of the likely C&D waste arisings at facilities in the region. The majority of construction materials are either recyclable or recoverable. However, in the absence of mitigation, the effect on the local and regional environment is likely to be **short-term, significant** and **negative.**

There is a quantity of excavated material which will need to be excavated to facilitate the proposed Development. A detailed review of the existing ground conditions on a regional, local site-specific scale are presented in Chapter 6. It is anticipated that none of excavated material will need to be removed off-site. If material has to be removed correct classification and segregation of the excavated material is required to ensure that any potentially contaminated materials are identified and handled in a way that will not impact negatively on workers as well as on water and soil environments, both on and off-site. However, in the absence of mitigation, the effect on the local and regional environment is likely to be **short-term, significant** and **negative***.*

14.4.2 OPERATIONAL PHASE

The potential impacts on the environment of improper, or a lack of, waste management during the operational phase would be a diversion from the priorities of the waste hierarchy which would lead to small volumes of waste being sent unnecessarily to landfill. In the absence of mitigation, the effect on the local and regional environment is likely to be ***long-term, significant*** and ***negative****.*

The nature of the development means the generation of waste materials during the operational phase is unavoidable. Networks of waste collection, treatment, recovery and disposal infrastructure are in place in the region to manage waste efficiently from this type of development. Waste which is not suitable for recycling is typically sent for energy recovery. There are also facilities in the region for

segregation of municipal recyclables which is typically exported for conversion in recycled products (e.g. paper mills and glass recycling).

If waste material is not managed and stored correctly, it is likely to lead to litter or pollution issues at the development site and in adjacent areas. The knock-on effect of litter issues is the presence of vermin in affected areas. However, in the absence of mitigation, the effect on the local and regional environment is likely to be ***short-term, significant*** and ***negative***.

Waste contractors will be required to service the proposed development on a regular basis to remove waste. The use of non-permitted waste contractors or unauthorised facilities could give rise to inappropriate management of waste and result in negative environmental impacts or pollution. It is essential that all waste materials are dealt with in accordance with regional and national legislation, as outlined previously, and that time and resources are dedicated to ensuring efficient waste management practices. However, in the absence of mitigation, the effect on the local and regional environment is likely to be ***long-term, significant*** and ***negative***.

14.4.3 DO NOTHING SCENARIO

If the proposed development was not to go ahead (i.e. in the Do-Nothing scenario) there would be no demolition, excavation, construction or operational at this site. There would, therefore, be a neutral effect on the environment in terms of waste.

14.5 MITIGATION MEASURES

This section outlines the measures that will be employed in order to reduce the amount of waste produced, manage the wastes generated responsibly and handle the waste in such a manner as to minimise the effects on the environment.

The concept of the 'waste hierarchy' is employed when considering all mitigation measures. The waste hierarchy states that the preferred option for waste management is prevention and minimisation of waste, followed by preparing for reuse and recycling / recovery, energy recovery (i.e. incineration) and, least favoured of all, disposal.

14.5.1 CONSTRUCTION PHASE

The following mitigation measures will be implemented during the construction phase of the proposed development:

A site-specific Resource Waste Management Plan (RWMP) will be been prepared to deal with waste generation during the excavation and construction phases of the Proposed Development. The RWMP was prepared in accordance with the Environmental Protection Agency's (EPA) document 'Best Practice Guidelines for the Preparation of Resource and Waste Management Plans for Construction & Demolition Projects' (2021) and 'Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects' document produced by the National Construction and Demolition Waste Council (NCDWC) in conjunction with the Department of the Environment, Heritage and Local Government (DoEHLG)(2006).

- Prior to commencement, the appointed Contractor(s) will be required to produce the RWMP in agreement with FCC and in compliance with any planning conditions, or submit an addendum to the RWMP to FCC, detailing specific measures to minimise waste generation and resource consumption, and provide details of the proposed waste contractors and destinations of each waste stream.
- The Contractor will implement the RWMP throughout the duration of the proposed excavation and construction phases.

Is have been calculated by the project design team that none of excavated material will need to be removed off-site. If material has to be removed offsite then correct classification and segregation of

the excavated material is required to ensure that any potentially contaminated materials are identified and handled in a way that will not impact negatively on workers as well as on water and soil environments, both on and off-site.

In addition, the following mitigation measures will be implemented:

- Building materials will be chosen to 'design out waste';
- On-site segregation of waste materials will be carried out to increase opportunities for off-site reuse, recycling and recovery. The following waste types, at a minimum, will be segregated:
  - Concrete rubble (including ceramics, tiles and bricks);
  - Metals;
  - Glass;
  - Hazardous material; and
  - Timber.
- Left over materials (e.g. timber off-cuts, broken concrete blocks / bricks) and any suitable construction materials shall be re-used on-site, where possible; (alternatively, the waste will be sorted for recycling, recovery or disposal);
- All waste materials will be stored in skips or other suitable receptacles in designated areas of the site;
- Any hazardous wastes generated (such as chemicals, solvents, glues, fuels, oils) will also be segregated and will be stored in appropriate receptacles (in suitably bunded areas, where required);
- A Resource Manager will be appointed by the main Contractor(s) to ensure effective management of waste during the excavation and construction works;
- All construction staff will be provided with training regarding the waste management procedures;
- All waste leaving site will be reused, recycled or recovered, where possible, to avoid material designated for disposal;
- All waste leaving the site will be transported by suitably permitted contractors and taken to suitably registered, permitted or licenced facilities; and
- All waste leaving the site will be recorded and copies of relevant documentation maintained.

Nearby sites requiring clean fill material will be contacted to investigate reuse opportunities for clean and inert material, if required. If any of the material is to be reused on another site as by-product (and not as a waste), this will be done in accordance with regulation 15 (By-products) (Previously Article 27 of the European Communities (Waste Directive) Regulations 2011) of S.I. No. 323/2020 - European Union (Waste Directive) Regulations 2020. EPA approval will be obtained prior to moving material as a by-product.

These mitigation measures will ensure that the waste arising from the construction phase of the proposed development is dealt with in compliance with the provisions of the Waste Management Act 1996, as amended, associated Regulations and the Litter Pollution Act 1997, and the EMR Waste Management Plan 2015 – 2021. It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved and will promote more sustainable consumption of resources.

14.5.2 OPERATIONAL PHASE

The following mitigation measures will be implemented during the operational phase of the proposed development:

All waste materials will be segregated into appropriate categories and will be temporarily stored in appropriate bins, skips or other suitable receptacles in a designated, easily accessible areas of the site.

- The Operator / Buildings Manager of the Site during the operational phase will be responsible for ensuring – allocating personnel and resources, as needed – the ongoing implementation of this sites current Operational Waste Strategy, ensuring a high level of recycling, reuse and recovery at the Site of the proposed Development.

- The Operator / Buildings Manager will regularly audits the onsite waste storage facilities and infrastructure, and maintain a full paper trail of waste documentation for all waste movements from the site.

The following mitigation measures will be implemented:

- The Operator will ensure on-site segregation of all waste materials into appropriate categories, including (but not limited to):
  - Organic waste;
  - Dry Mixed Recyclables;
  - Mixed Non-Recyclable Waste;
  - Glass;
  - Waste electrical and electronic equipment (WEEE) including computers, printers and other ICT equipment;
  - Waste Electrical and Electronic Equipment
  - Hazardous waste; and
  - Cleaning chemicals (paints, adhesives, resins, detergents, etc.).
- The Operator will ensure that all waste materials will be stored in colour coded bins or other suitable receptacles in designated, easily accessible locations. Bins will be clearly identified with the approved waste type to ensure there is no cross contamination of waste materials;
- The Operator will ensure that all waste collected from the Site of the proposed development will be reused, recycled or recovered, where possible, with the exception of those waste streams where appropriate facilities are currently not available; and
- The Operator will ensure that all waste leaving the Site will be transported by suitable permitted contractors and taken to suitably registered, permitted or licensed facilities.

These mitigation measures will ensure the waste arising from the proposed Project is dealt with in compliance with the provisions of the *Waste Management Act 1996*, as amended, associated Regulations, the *Litter Pollution Act 1997*, the *EMR Waste Management Plan (2015 - 2021)* and the FCC waste bye-laws. It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved.

14.6 RESIDUAL IMPACTS

The implementation of the mitigation measures outlined in Section 14.5 will ensure that high rates of reuse, recovery and recycling are achieved at the Site of the proposed development during the construction and operational phases. It will also ensure that European, National and Regional legislative waste requirements with regard to waste are met and that associated targets for the management of waste are achieved.

14.6.1 CONSTRUCTION PHASE

A carefully planned approach to waste management as set out in Section 14.5.1 during the construction phase will ensure that the predicted effect on the environment will be **short-term, imperceptible and neutral.**

14.6.2 OPERATIONAL PHASE

During the operational phase, a structured approach to waste management as set out in Section 14.5.2 will promote resource efficiency and waste minimisation. When the mitigation measures are implemented and a high rate of reuse, recycling and recovery is achieved, the predicted impact of the operational phase on the environment will be **long-term, imperceptible** and **neutral.**

14.6.3 CONCLUSION

The full and proper implementation of the mitigation measures set out herein no likely significant negative effects are predicted to occur as a result of the construction or operational of the proposed development.

14.7 CUMULATIVE IMPACTS

The following considers the cumulative impacts of the proposed development and proposed and permitted and operating facilities in the surrounding area in relation to Material Assets – Waste Management. This considers the proposed development and other surrounding proposed and permitted developments considered in Chapter 4.

As has been identified in the receiving environment section all cumulative developments that are already built and in operation contribute to our characterisation of the baseline environment. As such any further environmental impacts that the proposed development may have in addition to these already constructed and operational cumulative developments has been assessed in the preceding sections of this chapter.

14.7.1 CONSTRUCTION PHASE

There are existing residential and commercial developments close by, along with the multiple permissions remaining in place in the area. In a worst-case scenario, multiple developments in the area could be developed concurrently or overlap in the construction phase.

Developments that potentially could overlap during the construction phase of note:

- FW22A/0204 & ABP-317480-23
- ABP-314894-
- FW22A/0108

Due to the high number of waste contractors in the Kildare region as provided from the National Waste Collection Permit Office and the Environmental Protection Agency there would be sufficient contractors available to handle waste generated from a large number of these sites simultaneously, if required. Similar waste materials would be generated by all the developments.

Other developments in the area will be required to manage waste in compliance with national and local legislation, policies and plans which will mitigate against any potential cumulative effects associated with waste generation and waste management. As such the effect will be **short-term, imperceptible and neutral**.

14.7.2 OPERATIONAL PHASE

There are existing residential and commercial developments close by, along with the multiple permissions remaining in place. All of the current and potential developments will generate similar waste types during their operational phases. Authorised waste contractors will be required to collect waste materials segregated, at a minimum, into recyclables, organic waste and non-recyclables. An increased density of development in the area is likely improve the efficiencies of waste collections in the area.

Other developments in the area, and the indicative future outline development, will be required to manage waste in compliance with national and local legislation, policies and plans which will minimise/mitigate any potential cumulative impacts associated with waste generation and waste management. As such the effect will be a **long-term, imperceptible and neutral**.

14.8 INTERACTIONS

This section discusses interactions between this Chapter and other specialist environmental topics considered in this EIAR.

14.8.1 LAND, SOILS, GEOLOGY & HYDROGEOLOGY

During the construction phase, excavated soil, stone, gravel and clay will be generated from the excavations required to facilitate site levelling and construction of new foundations. It is estimated that none of the excavated material will need to be removed off-site. If material has deemed unsuitable or is unable to be reused onsite it will be taken off-site, it will be taken for reuse or recovery, where practical, with disposal as a last resort. Adherence to the mitigation measures in Chapter 15 will ensure the effect is ***long-term, imperceptible*** and ***neutral.***

14.8.2 TRAFFIC & TRANSPORT

Local traffic and transportation will be impacted by the additional vehicle movements generated by removal of waste from the Site during the construction phase of the proposed Development. The increase in vehicle movements as a result of waste generated during the construction phase will be *temporary* in duration. There will be an increase in vehicle movements in the area a during the operational phase. Traffic-related impacts during the construction phase and operational phase are addressed in Chapter 13 (Traffic and Transportation). Provided the mitigation measures are adhered to, the predicted effects are ***short to long-term, imperceptible*** and ***neutral.***

14.8.3 POPULATION & HUMAN HEALTH

The potential impacts on human beings are in relation to incorrect management of waste during construction phase, which could result in littering and presence of vermin – with associated potential for negative impacts on human health and residential amenity. A carefully planned approach to waste management and adherence to the project specific RWMPand the mitigation measures in Chapter 13, will ensure appropriate management of waste and avoid any negative impacts on the local population. The effects should be ***long-term, imperceptible*** **and** ***neutral.***

14.9 REFERENCES

- Dublin BusConnects Website: New Dublin Area Bus Network - BusConnects
- Design Manual for Urban Roads and Streets (DMURS), Department of Transport, Tourism and Sport
- Fingal Council Development Plan 2017 – 2023.
- Fingal City Council Draft Development Plan 2023 - 2029
- NRA Guidelines, Traffic and Transportation Assessment Guidelines (2014), National Roads Authority
- Project Appraisal Guidelines for National Roads Unit 5.3 – Travel Demand Projections, (May 2019), Transport Infrastructure Ireland Publications
- Project Appraisal Guidelines for National Roads Unit 16.1 – Expansion Factors for Short Period Traffic Counts, (2016), Transport Infrastructure Ireland Publications
- Sustainable Urban Housing: Design Standards for New Apartments, (2020), Department of Housing, Planning and Local Government
- Transport for Ireland (TFI): www.transportforireland.ie

15 ARCHAEOLOGY & CULTURAL HERITAGE

15.1 INTRODUCTION

This chapter presents the findings of an archaeological and cultural heritage impact assessment on the site of the proposed development located in Kilshane townland, Finglas, Co. Dublin (ITM 710777, 742666). The site is located c. 9km northwest of Dublin City Centre and is partially adjacent to and west of the M2 Motorway, south of Kilshane Rd., and to the north of Huntstown Quarry, close to the Huntstown Power Station.

The site lies within an area that was subject to a geophysical survey carried out under licence no. 22R0092[xi], and subsequently, the site was subject to test trenching under licence no. 22E0348[xii]. The proposals for the site comprise the construction of a new Gas Turbine Power Generation Station A full project description is presented in Chapter 4 of this EIAR.

15.2 METHODOLOGY

This chapter's methodology is guided by a legislative framework that governs how aspects of archaeological, cultural and architectural heritage are protected. It has been prepared in compliance with all relevant EIAR legislation and guidance, including the recently published guidelines by the Environmental Protection Agency (EPA, 2022)[xiii].

15.2.1 DOCUMENTARY SOURCES

For the purposes of this report, archaeology, architectural & cultural heritage is considered to include the following elements:

- Sites listed in the Sites & Monuments Record (SMR)
- Record of Monuments & Places (RMP)
- National Monuments
- Archaeological sites listed on the National Monuments Service website
- Sites reported in the Excavations Database
- Any previously unrecorded sites
- A list of protected monuments
- A list of architectural heritage structures (NIAH)
- A list of protected structures (Fingal County Development Plan 2017-2023)

The following sources were consulted in order to identify and map archaeological sites within and adjacent to the proposed development site:

15.2.1.1 Sites and Monuments Record (SMR) and Record of Monuments & Places (RMP) [xiv]

A primary cartographic source and base-line data for the assessment was the consultation of the Sites and Monuments Record (SMR) and Record of Monuments and Places (RMP) for County Dublin[xv]. All known recorded archaeological monuments are indicated on 6-inch Ordnance Survey (OS) maps and are listed in this record[xvi]. The SMR/RMP is not a complete record of all monuments as newly discovered sites may not appear in the list or accompanying maps. In conjunction with the consultation of the SMR and RMP, the electronic database of recorded monuments that may be accessed on their website[xvii] was also consulted.

15.2.1.2 National Monuments[18]

A List of Monuments covered by Preservation Orders and a List of National Monuments in the ownership/guardianship of the Minister for Housing, Local Government & Heritage. National Monuments in the ownership/guardianship of the Minister for Housing, Local Government & Heritage are listed on the Department's website[19].

15.2.1.3 Excavations Database[20]

The excavations database is an annual account of all excavations carried out under license. The database includes excavations from 1970 to present. This database was consulted as part of the desktop research for this assessment to establish if any archaeological excavations had been carried out on or near to the proposed development area.

15.2.1.4 Topographical Files, National Museum of Ireland

The topographical files of the National Museum of Ireland contain information pertaining to archaeological finds (mainly artefactual) and excavations in numerous townlands throughout the country, which were reported to the museum from the 1920s. While many of these findspots are not recorded monuments, they can provide an indication of archaeological activity in a townland and consequently add to the archaeological potential of an area.

15.2.1.5 Cartographic Sources

A number of cartographic sources were also consulted as part of the desktop assessment, namely the Down Survey maps of the area (1656-8), the first edition 6-inch (1836) and the 25-inch edition (1906) OS maps and available aerial photography.

15.2.1.6 Tangible Cultural Heritage Area

Cultural heritage is a broad term encompassing aspects of archaeology as well as architecture. Both elements can be expressed in landscape and can relate to designated landscapes, historic places, monuments, settlements, including buildings and structures.
Tangible cultural heritage areas within the site were identified via examination of Ordnance Survey mapping and as a result of the site visit.

15.2.1.7 Protected Structures (RPS)[21]

The Fingal County Development Plan 2017-2023[22] was consulted. These contain a list of Architectural Conservation Areas and a Record of Protected Structures for the County. The latter lists cultural heritage sites, buildings of historic, architectural, -cultural, scientific and/or artistic interest. These are protected by the Local Government (Planning and Development) Act 1999 and the Planning and Development Act 2000 (Part IV Architectural Heritage).

15.2.1.8 Architectural Heritage (NIAH)[23]

The National Inventory of Architectural Heritage for County Dublin was consulted to determine if any architectural heritage sites were present within the proposed development site. It contains a record and evaluation of the post-1700 architectural heritage of Ireland, as an aid in the protection and conservation of the built heritage. It provides the basis for recommendations of the Minister for Housing, Local Government and Heritage to the planning authorities for the inclusion of particular structures in their Record of Protected Structures (RPS).

15.2.1.9 Additional Sources

The following additional sources were also consulted in order to inform the assessment of all aspects of the archaeological resource within and adjacent to the proposed development site and that the assessment is cognisant of all relevant policies and objectives.

- Report on Geophysical Survey at Kilshane, County Dublin (22R0092), Leigh, J.M. 2022.

- Report on Archaeological Test Excavation, Kilshane Energy, Co. Dublin (22E0348) Lynn C., Long C., 2022)

Geophysical Survey, in the form of magnetic gradiometry, is a non-intrusive method that is used in Irish Archaeology. It is a method for rapidly mapping archaeological objects, structures, deposits and other features, including geological anomalies, that survive beneath the ground surface. The results are presented as a grey-scale map of anomalies detected that are interpreted by an experienced archaeologist. A licence to carry out work is required and is granted by the Department of Housing Local Government and Heritage following submission of a licence application for the site in question. (in this case Licence Number 22R0092 was granted to Joanna Leigh). Upon completion of the survey, a report detailing the results of the work carried out is submitted to the Department and the National Museum of Ireland.

Archaeological test trenching is carried out in advance of construction and is undertaken across the footprint of development. Test trenches are excavated to facilitate the early identification of archaeological deposits and features. In this case, test trenching was carried out following a geophysical survey. In such instances, the trenches are placed to target anomalies detected in order to assess their significance, extent and depth. The results allow for an informed decision on how best to deal with any discovered archaeological finds or features prior to works on site commencing. A licence to carry out work is required and is granted by the Department of Housing Local Government and Heritage following submission of the licence application for the site in question (in this case, Licence Number 22E0348 was granted to Chris Lynn). Upon completion of the survey, a report detailing the results of the work carried out is submitted to the Department and the National Museum of Ireland.

15.2.2 SITE INSPECTION

A site inspection was conducted on Tuesday, the 9th of August, 2022. The site is located partially adjacent to and west of the M2 Motorway, south of Kilshane Rd. and to the north of Huntstown Quarry and Power Station, to the north of Dublin City. It consists of four distinct areas; south, northwest, northeast and north..

The south part of the site consists of a majority of a large field up until recently under crop, bounded by mature hedges and trees from north, south and west, with a wet ditch forming the west boundary of the field. Electric pylons run east to west within the central portion of the field.. The water-mains infrastructure bound the site from the south. The access to the field is from the north. At the time of the visit, the area of the enclosure was being stripped under archaeological supervision.

The northeast area consists of a portion of an overgrown field with two farmer access lanes off Kilshane Rd.; one leading to the southern field and the other southeast one to fields adjacent to and east of the site.

The northwest area consists of a field with tall grasses, bounded by mature hedges and trees. Kilshane Rd. bounds the site from the west; adjacent and to the north is the area consisting of a modern house, farmyard and a number of ancillary structures.

15.3 THE PROPOSED DEVELOPMENT

The proposed development area is located in the townland of Kilshane, and lies to the west of the M2 Motorway, south of Kilshane Rd., and to the north of Huntstown Quarry.

A full project description is presented in Chapter 4 of this EIAR.

15.4 THE RECEIVING ENVIRONMENT

Archaeology is considered here to include all recorded monuments listed in the Record of Monuments and Places (RMP) and in the Sites and Monuments Record (SMR), National Monuments (i.e. those in the ownership/guardianship of the state), previously unrecorded sites, sites reported in the Excavations Database if not included in the RMP and find spots or sites listed in the Topographical Files.

15.4.1 NATIONAL MONUMENTS

The term 'National Monument' is defined by the National Monuments Act (1930) as being 'a monument or the remains of a monument the preservation of which is a matter of national importance by reason of the historical, architectural, traditional, artistic, or archaeological interest attaching thereto'. The aforementioned Act states that the consent of the Minister is required for archaeological works at or near a national monument in the ownership or guardianship of the Minister or a local authority or to which a preservation order applies. The Minister is required to consult with the Director of the National Museum of Ireland in relation to such an application for consent.
No National Monuments are located on or within close proximity to the proposed development site. Dunsoghly Castle (DU014-005001-) is a National Monument No. 230 in state ownership that is located c. 0.9 kilometres (km) to the northeast.

15.4.2 RECORDED MONUMENTS

There are no monuments as listed in the Record of Monuments and Places nor in the Sites and Monuments Record located within the site boundary. There are three monuments located within a field to the south of the site; these consist of Church DU014-012001- with associated Burial ground DU014-012002- and Ritual site – holy well DU014-012003-, however these are not scheduled for inclusion in the next revision of the Record of Monuments and Places, are located within an area that was extensively quarried and a part of the Hunstown Quarry. Furthermore, the monuments are not visible on ground level and monitoring of the water-mains infrastructure of an area adjacent to and south of the current site (21E0090) did not identify any features of archaeological interest. The nearest monument to the site, scheduled for inclusion in the next revision of the Record of Monuments and Places is an enclosure DU014-093---- located c. 140m to the north. These are one of the most common field monuments in Ireland. This type of monument is defined by an enclosing element such as a bank, wall, fosse, scarp. Some enclosures have no surface expression, the upstanding elements were usually removed in the past as a result of land reclamation/farming; some can be indicated on cartographical sources or manifest as a cropmark on aerial imagery, while others remain unknown; such as the monument located within the current site. These are identified as a result of archaeological investigations. The enclosures can be of various shapes and sizes and date from prehistory onwards. Enclosure DU014-093---- was identified during investigations (03E1359) in advance of the N2 Finglas-Ashbourne Road Scheme in 2004. The enclosure was dated to the Neolithic period, with later activity dating to Bronze Age and expressed in a series of deposits and features, including hearth and cremation pits. The enclosure consisted of an irregular ditch measuring between 1.9m to 3.8m was recorded surrounding an egg shaped area measuring 38.5m by 27.5m.

The following is a list of 18 monuments (Table 15.1) located within a 1km radius of the site. The entry below is derived from the National Monuments Service Archaeological Survey Database.

Table 15.1 Recorded monuments within 1 km of the centre of the development site

RMP/SMR	Classification	Townland	ITM E	ITM N
DU014-001----	Castle - motte	KILSHANE	710410	743822
DU014-005001-	Castle - tower house	DUNSOGHLY	711764	743185
DU014-005002-	Chapel	DUNSOGHLY	711765	743172
DU014-005003-	Castle - motte and bailey	DUNSOGHLY	711656	743051
DU014-005004-	House - indeterminate date	DUNSOGHLY	711806	743202
DU014-005005-	Crucifixion plaque	DUNSOGHLY	711762	743175
DU014-005006-	House - 16th/17th century	DUNSOGHLY	711748	743211
DU014-006001-	Ringfort - unclassified	NEWTOWN (Coolock By., Finglas ED)	711962	742457
DU014-006002-	Ringfort - unclassified	NEWTOWN (Coolock By., Finglas ED)	711827	742447
DU014-012001-	Church	KILSHANE	710876	742260
DU014-012002-	Burial ground	KILSHANE	710975	742277
DU014-012003-	Ritual site - holy well	KILSHANE	710869	742258
DU014-013----	Castle - motte and bailey	NEWTOWN (Coolock By., Finglas ED)	711319	742325
DU014-048----	Burial ground	KILSHANE	710300	742841
DU014-093----	Enclosure	KILSHANE	710927	742924
DU014-100----	Ring-ditch	NEWTOWN (Coolock By., Finglas ED)	711913	742603
DU014-134----	Ring-ditch	NEWTOWN (Coolock By., Finglas ED)	711929	742619
DU014-135----	Ring-ditch	NEWTOWN (Coolock By., Finglas ED)	711916	742790

15.4.3 PREVIOUSLY UNRECORDED SITES

An irregular-shaped enclosure with an outer ditch delimiting an area measuring 88m by 66m and a number of responses suggesting habitation activity were identified during the geophysical survey (22R0092) of the site. The enclosure had no surface expression and was not visible on any examined cartographic or aerial sources. Subsequent test trenching (22E0348) confirmed the presence of an enclosure complex with associated internal and external features, provisionally dated to the Medieval Period. In addition, a pit with charcoal and pyrolithic material was identified during test trenching. These features are currently being preserved by record through full archaeological excavation under licence from the National Monuments Service.

15.4.4 PREVIOUS ARCHAEOLOGICAL INVESTIGATIONS

The site was subject to archaeological assessments on two occasions in the first half of 2022. One of the fields within the site was subject to a geophysical survey under licence no. 22R0092[24] and was a part of a bigger area subject to survey. This identified the presence of archaeological remains on site in the form of an enclosure and other archaeological activity (see 15.4.4.1 for details). Subsequent, test trenching of the current site was undertaken under licence no. 22E0348[25], confirming the presence of the enclosure and additional features of archaeological significance (see 15.4.4.2 for details).
Furthermore, the area adjacent to and south of the site was subject to investigations in 2021. This was in relation to an upgrading of the water-mains infrastructure between Ballycoolen and Kingstown townlands (21E0090). No features were exposed during the monitoring.

The area is rich in previously unknown monuments that were identified as a result of archaeological investigations. These include enclosure DU014-093 (03E1359); unenclosed cemetery, now Burial

Ground DU014-048----(99E0220); investigations of Castle - motte and bailey DU014-013---- that identified additional features (01E1214, 04E0807); excavation of a burnt spread (03E1450), and a number of enclosures identified via geophysical survey 21R0134 and subsequently subject to investigations (21E0398, 21E0580, and 22E0045).

The details of these investigations (Table 15.2), where available, are derived from the Summary Accounts of Archaeological Excavations in Ireland (www.excavations.ie).

Table 15.2 Previous excavations carried out

Excavations.ie reference	Licence No.	Site Type	Investigation Type
2021:237 - Ballycoolen/Cloghran/Grange/Huntstown/			
Kilshane/Newtown/St. Margaret's/Millhead/Kingstown, Dublin			
21E0090	Small pit	Monitoring	
2004:0612 - KILSHANE, Dublin	03E1359	Neolithic segmented enclosure, Early Bronze Age activity	Excavation
1999:253 - KILSHANE, Dublin	99E0220	Unenclosed cemetery	Monitoring
2001:456 - Newtown, Dublin			
2002:0636 - Newtown, Dublin	01E1214	Site of motte and bailey	Test trenching

No features were exposed during the monitoring in 2021 (21E0090) of an area adjacent to and south of the site; however, a single sherd of medieval Leinster Cooking Ware was recovered from topsoil.

A Prehistoric enclosure DU014-093---- located c. 140m to the north of the site, was identified and partially excavated (03E1359) in advance of the N2 road scheme. The site was identified as a neolithic segmented enclosure and included cremation pits and a single crouched inhumation in the centre of the enclosure as well as Early Bronze Age activity.

An unenclosed cemetery, now Burial Ground DU014-048, was identified during gas pipeline monitoring in 1988. The site is located c. 360m northwest of the current site. The area to be impacted upon by the pipeline was excavated, revealing the remains of 123 individuals. Subsequent test trenching was carried out under licence 99E0220, suggesting the burials did not extend eastwards.

Investigations of the Castle - motte and bailey DU014-013---- located c. 325m to the southeast of the site included archaeological monitoring of engineering test pits and boreholes (01E1214). Subsequently, the site was subject to a geophysical survey, and test trenching (04E0807) was carried out in order to define an appropriate buffer zone. Archaeological deposits associated with enclosing elements of the motte were identified (ditches C3, C4 and C5) as well as a burnt mound (C15). Preservation in situ was recommended.

A Burnt spread was excavated as a part of the N2 road scheme, c. 0.5km to the east of the site. Two areas were excavated, a spread measuring 3.5m by 10m, two pits and a sub-circular trough were preserved by record (excavated).

A large area measuring 12 hectares located c. 430m to the west of the site was subject to a geophysical survey (21R0134); indications of several enclosures were recorded. The area was subject to subsequent investigations (21E0398, 21E0580, and 22E0045), confirming the presence of features of archaeological significance. Test trenching under licence 21E0398 confirmed the presence of a rectilinear enclosure (Site A), a D shaped enclosure, a sub-circular enclosure (Site B), a second larger rectilinear enclosure (Site C), two additional sites; a ditch with charcoal-rich fill, burnt pit and former field system, a linear ditch, two possible curvilinear ditches, a pit and a post-hole (Site E). Sites C, D and E were excavated under licence 21E0580. The enclosure in Site C measured 44m by 37m, with a

ditch ranging from 2.5 to 4m in width and 0.8 to 2.4m in depth. The entrance was recorded at the southern side. The ditch at its deepest was just to the west of the entrance; it was suggested that this area also functioned as well. Pits, gullies and disturbed areas of burning were also preserved by record. Finds included a fragment of lignite bracelet, a fragment of a polished stone axe and several flint artefacts. The site was provisionally dated to the Early Medieval Period, and is awaiting a radiocarbon date. Site D comprised of two pits, a shallow ditch and a large and deep pit. The pit was interpreted as a waterhole and measured 6.05 by 7.62m and was 1.68m deep. Both smaller pits contained charred cereal, one interpreted as a cereal drying kiln. These were provisionally dated to the later Iron Age/Early Medieval Period. Site E was relatively modern in date and consisted of linear ditches, gullies and drains forming part of a field system. The remaining sites are being excavated under a separate licence (22E0045).

15.4.4.1 Geophysical Survey (22R0092)

The geophysical survey of the present site was conducted April/May 2022 by Joanna Leigh of J.M. Leigh Surveys Ltd. under licence 22R0092[26] issued by the Department of Housing, Local Government and Heritage. A detailed gradiometer survey was undertaken of an area measuring c. 18 hectares. One of the fields subject to survey is a part of the current site while the northeast and northwest fields were found not to be suitable for the survey. The survey was undertaken using a Bartington GRAD 601-2 instrument.

Anomalies recorded within the site consist of Anomalies 1-11. See the extract below from the survey report:

Area A

5.1 In the north there are a series of responses and trends (1) which form an irregular oval pattern. These are indicative of an archaeological enclosure. The probable enclosure measures 86m x 66m and comprises of numerous linear responses, indicative of activity. A curvilinear response (2) within the enclosure may represent an internal sub-circular enclosure, measuring c. 17m in diameter.

5.2 To the east of the enclosure (1) there is an area of increased response (3) which comprises of isolated responses. Although it is possible that this results from more recent ground disturbance, an archaeological interpretation must be considered. It is possible that a spread of burnt material and isolated pit-type features is represented here.

5.3 Linear trends and responses (4) appear to extend from the enclosure (1). These may represent associated ditched features. Linear trends (5) appear to extend from the enclosure to the east and lead to a series of responses (6) of interest.

5.4 Along the eastern extent of the area surveyed, a parallel series of responses (6) are indicative of ditched features. It is likely that these continue to the east, and perhaps represent the western extent of a double ditched enclosure feature. This is speculative but must be considered.

5.5 The responses (6) appear to continue to the south as faint linear trends (7). This may suggest some plough damage may have occurred.

5.6 A linear response (8) extends north to south, through the southern half of the survey area. The association of this with the enclosure is unclear, and it may represent a separate phase of activity.

5.7 Further linear responses and trends (9) appear to be parallel and perpendicular with (8), suggesting they may be associated. The responses (9) are somewhat overshadowed by magnetic disturbance from an electricity pylon, and interpretation is hindered. However, the responses form clear rectilinear patterns and are indicative of archaeological ditched features. These may represent former field divisions of archaeological interest.

5.8 Distinct small areas of increased response (10) are recorded in the south of the survey area. Interpretation is tentative as these may result from more recent ground disturbance. However, it is possible that broad pit-type features are represented here.

5.9 Numerous isolated responses are located throughout the area. Although some of these may represent more deeply buried ferrous debris, they may equally represent archaeological isolated pit-type features. The responses (11) are considered to be of clear archaeological potential.

15.4.4.2 Test Trenching (22E0348)

Following the geophysical survey (22R0092), the site was subject to a programme of archaeological testing (22E0348[27]). The area tested included the northwest and northeast field that were not subject to the geophysical survey. Test trenching confirmed the presence of the enclosure complex with associated features and additional deposits. Preservation by record of features identified and monitoring was recommended and agreed upon with the Department of Housing, Local Government & Heritage; the excavation is ongoing. Monitoring will be carried out in due course.

See the extract below detailing the findings taken from the testing report:

A total of 33 test trenches were excavated across the site. The majority of trenches, trenches 1-14, 22-24 and 26-33, did not contain archaeology. Where these trenches overlay potential features identified in the geophysical survey they were revealed to be modern drains, plough furrows, farming "tramlines" or were simply not present. The remaining Trenches 15-21 produced features which corresponded with the enclosure complex recorded in the Geophysical Survey. The exception was trench 25 which contained a shallow pit [3] filled with charcoal and pyrolithic material which does not correspond to any geophysical anomaly. A probable Palaeochannel was present in trenches 15, 17, 22 and 23. The enclosure ditch [7] was cut into this geological feature. At the eastern extent of trench 17 a curvilinear gully [58], which lay outside the enclosure, also does not correspond to any geophysical anomaly.

The enclosure ditch [7] was uncovered in trenches 15-21. Four box sections were put into the ditch to confirm its north, south, east, and west extent. These sections revealed that the ditch generally had an inconsistent width of 1.22m (box 1 trench 16) to 2.5m (box 4 trench 20) and depth of 0.25m (box 1 trench 16) to 0.9m (box 4 trench 20). The ditch seems to be wider and correspondingly deeper at its southern and eastern extent. However, each feature generally had consistent fills, a top fill of a compact grey, brown sandy clay [8] and a basal fill of a compact grey sticky clay [28]. Box 3 in trench 17 had a different top fill [44] which was a compact dark grey clay with frequent charcoal inclusions. The middle fill varied in each section. It was not present in box 1 trench 16, in box 2 trench 15 the middle fill was [77], a grey clay with frequent stones representing a wall, in trench 17 box 3 the middle fill was [45] a light grey silty clay with frequent charcoal inclusions and in box 4 trench 20 the middle fill was [27] a mottled grey, brown clay. All four of the sections reveal that the base of the ditch contains a channel or groove, flanked either side by a row of postholes. The ditch may have represented the foundations of a wall or stockade, which would explain the variable width and depth of the feature and the large number of postholes contained within it. Animal bone inclusions were uncovered from all box sections through the feature.

The interior of the enclosure contained a number of features. Trench 15 contained an oval pit [93] with a width of 0.85m and a depth of 0.23m, extending beyond the limits of excavation to the south. Its fill [94] was a dark brown clay with occasional flat stone inclusions. Bone was recovered from the feature. Feature [78], also in trench 15, was a linear sub-oval feature that extends north-east beyond the limits of the trench. It had a width of 0.66m and a depth of 0.31m. Its top fill [79] was a light orange, brown clay, its basal fill [80] was a lens of charcoal and burnt clay. This feature may have been a kiln. Trench 17 contained a curvilinear slot trench [29], probably representing a structure. It had a width of 0.64m and a depth of 0.35m. It had an internal diameter of 5m. It contained two fills, the top fill [30] was a brown sticky clay with occasional charcoal inclusions. The basal fill [31] was a loose grey silty clay. Two postholes had been cut into the base of the slot trench, [32] and [34]. Both had a diameter and depth of 0.1m. No features were identified within the structure, but animal bone was recovered from the surface of the interior. 1.1m to the west of [29] was a posthole or shallow pit [36]. It had a diameter of 0.23m and a depth of 0.17m and a single fill [37] which was a brown sandy clay. A second curvilinear slot trench, [72] was then present within the trench 3.35m to the west of [36]. It had a width of 0.12m and a depth of 0.1m and had an internal diameter of 5.6m. Its single fill [73] was a brown, grey clay with occasional stone inclusions. The interior of [72] contained a number of small shallow pits [66], [68], [70] and postholes [38], [40] and [42]. All six features had a similar fill of a brown, grey clay. A potential metalled surface was present in both trenches 15 and 17. In trench 15 it had a width of 13m and in trench 17 16m.

Outside the enclosure a further 4 features were identified. In trench 15 a shallow pit [74] was uncovered at its north-western end which may have formed part of anomaly 14 from the geophysical report. The pit extends beyond the trench to the north and has a width of 1.55m and a depth of 0.23m. Its top fill [76] was a brown clay, its basal fill [75] was a dark grey charcoal rich clay. Animal bone was recovered from [75]. Trench 17 a curvilinear slot trench [58] is present 10.5m to the southeast of the enclosure ditch [7]. It extends to the northeast for 5m beyond the limit of excavation. It had a width of 0.5m and a depth of 0.2m. It contained a single fill [59] which was a brown sandy clay. At the excavated terminus of [58] three stakeholes were uncovered, [60], [62] and [64]. [58] may represent a windbreak for activity beyond trench 17 to the north. In trenches 19 and 20 a linear gully [5] extending northwest to southeast through both trenches was uncovered. It did not appear in trenches 18 or 20. A box section was inserted into it in trench 20. This showed the gully had a width of 0.62m and a depth of 0.21m. It contained a single fill [6] which was a grey, brown sandy clay with frequent charcoal inclusions. Animal bone was uncovered from this feature. Feature [3] was uncovered in trench 25, 4.4m from the north end of the trench. It was sub-oval in shape with a length of 1.5m, a width of 0.7m and a depth of 0.08m. It contained a single fill [4] which was a compact dark grey clay with frequent charcoal inclusions and small burnt stones.

Figure 15.1 Enclosure ditch C7; to the left, southeast facing section in Trench 20; to the right, southwest facing section in Trench 15

Figure 15.2 Sub-oval pit C3 in Trench 25

15.4.5 SITES REPORTED IN THE EXCAVATIONS DATABASE

Several sites were reported in the excavations database, including enclosure DU014-093 (03E1359); cemetery, now Burial Ground DU014-048----(99E0220); investigations of Castle - motte and bailey DU014-013---- that identified additional features (01E1214, 04E0807); burnt spread (03E1450), and a

number of enclosures identified via geophysical survey 21R0134 and subsequently subject to investigations (21E0398, 21E0580, and 22E0045).

15.4.6 TOPOGRAPHICAL FILES

The topographical files of the National Museum of Ireland were consulted. No find spots are recorded in the files for Kilshane townland.

15.4.7 PLACENAME EVIDENCE

The database of Irish placenames, www.logainm.ie was consulted for the meaning of the placenames within and surrounding the proposed development site.

The site is fully located within the townland of Kilshane. Kilshane townland is located in the parish of Finglas in the barony of Castleknock. The townland name *Cill Sheáin* means 'John's Church'. The townland is referred to as 'Kilshaane' in 1326 in a Calendar of Archbishop Alen's Register (ed. McNeill, 1950). The townlands with a name containing Cill suggest a church located within the townland boundaries. To the south of the site, on the 1836 map, an area depicted as '*Old Burying Ground'* and *Church Well*, representing monuments recorded as church DU014-012001-; Burial ground DU014-012002- and Ritual site - holy well DU014-012003-. At present, no surface remains of the ecclesiastical complex are present, as the site is located within the Hunstown Quarry.

15.4.8 RECORD OF PROTECTED STRUCTURES

The Fingal County Development Plan 2017-2023 was consulted to determine if any protected structures were present within the proposed development site. No such structures were listed within the site boundary.
Three such sites are located in the environs of the site, including:

- Motte and Bailey (RPS 865; DU014-005003-); Dunsoghly, St. Margaret's, Co. Dublin' Archaeological site of man-made mound, forming part of an Anglo-Norman defended residence known as a motte and bailey castle (excludes modern house and outbuildings on the motte).
- Dunsoghly Castle (RPS No. 623; DU014-005001-; National Monument No. 230 (State Ownership)); Dunsoghly, St. Margaret's, Co. Dublin' Intact four-storey 15th century square Tower House with large square corner towers. It has retained a substantial amount of its original roof timbers. Adjoining the tower house is a small single-storey chapel with inscribed stone with 1573 date.
- Cloghran Church (in ruins) & Graveyard (RPS 674, DU013-008002-; DU013-008001-); Cloghran Church (in ruins) Blanchardstown Corporate Park 2, Cloghran, Blanchardstown, Dublin 15. Remains of footings of medieval church in ruins within square graveyard that is now sited on the edge of a Business Park.

15.4.9 NATIONAL INVENTORY OF ARCHITECTURAL HERITAGE SITES

In addition, the database of the National Inventory of Architectural Heritage was also consulted. The nearest site listed is Gate Lodge (NIAH Reg. No. 11347003), located c. 2.44km to the northwest. It is associated with Hollywoodrath House (NIAH Reg. No. 11347001), located c. 2.42km to the northwest.

15.4.10 CARTOGRAPHICAL SOURCES & AERIAL IMAGERY

Cartographical sources and aerial imagery were examined.
Potential archaeological or cultural heritage features are marked on maps and provide a useful resource in identifying sites particularly if they no longer have any above-ground remains.
A review of the available aerial photography for the area was also undertaken as part of this assessment. Unrecorded archaeological sites can often be identified in aerial photographs as cropmarks or differential growth in a field.

15.4.10.1 Cartographical Sources

A review of available historic mapping for the area was carried out to include the 6-inch 1836 and the 25-inch 1906 and Cassini 6-inch 1935-38 editions of the Ordnance Survey maps, in addition to *An actual survey of the county of Dublin* of 1760 by John Rocque - southwest sheet.

The 1760 map shows the site as pasture land consisting of two fields to the south of the road that runs within the footprint of the current Kilshane Rd. Two settlements are depicted to the south of the site; HuntsTown and Newtown. There is no indication of the ecclesiastical enclosure.
The Ordnance Survey maps of 1836 and 1906 do not depict any buildings within the site. The 1836 map shows the site within three fields, located adjacent and to the south of the east to west aligned road in the southeast portion of the townland. The boundaries are depicted as lined with trees, and to the west stands *Kilshane House*.

An area to the south of the site is labelled as *Church Field*, with *Church Well*, and *Old Burying Ground*. To the southeast, a monument representing a Moat is shown and labelled in the adjacent townland of Newtown. In the townland of Huntstown, further south, Huntown House is shown and labelled.

There were no major changes to the field system within the site by the time of the 1906 map; a minor portion of the west boundary of the southern field is now shown as a wet ditch. It appears that Kilshane House was moved to the east and is depicted on a plot adjacent to the junction with a turnpike road connecting Finglas to Ashbourne. The area of the former Kilshane House is now shown with only two rectangular buildings and what appears to be the foundations of the former house. This suggests the house was perhaps destroyed and moved to the east of the site.

The Cassini map of 1935-38 shows the site divided into seven fields, with the northwest portion occupied by buildings labelled as Woodlands and Bungalow Farm with associated accesses and ancillary structures. Furthermore, what appears to be wells, modern in origin, are depicted within the northeast and northwest field.

15.4.10.2 Aerial Imagery

Aerial photographs dating between 1995 and 2013 from the Ordnance Survey of Ireland and in addition, Google Earth imagery dating between 2008 and 2022 were also reviewed.

The site has remained unchanged since the 1935-38 map with the field boundary layout as on the 1836 map. The area to the south of the site is shown as a large, well-established quarry by 1995. A minor north portion of the northwest field appears to be used as a paddock or perhaps vegetable garden. By 2008 the M2 motorway to Ashbourne, located to the east of the site, and road improvements associated with Kilshane Rd. adjacent and to the north of the site were complete. The northern field is occupied by a house and ancillary structures associated with the farmyard.

In 2021 earthworks from a linear scheme can be seen running roughly northeast-southwest, outside and along the south boundary of the field. These were associated with the upgrading of the water mains, were archaeologically monitored, and no features were identified. Furthermore, LiDAR imagery, including multihillshade) and PCA , were examined. The anomalies visible appear ephemeral, and as the site was since subject to archaeological assessment, these are not of archaeological significance.

15.4.11 TANGIBLE CULTURAL HERITAGE ASSETS

Ordnance Survey maps of the area were examined, and a walk-over survey was carried out in order to identify any features of cultural heritage and any features of interest. A Tangible Cultural Heritage Area might include boundaries/field divisions, any structures, buildings, features of archaeological, cultural or heritage significance.

It appears that the north to south aligned boundary between the south and northwest field was depicted since the 1760 map. However, this portion of the boundary appears to be already compromised during drainage works and is shown as a wet ditch by the time of the 1907 map.

15.5 PREDICTED IMPACTS

15.5.1 DIRECT IMPACTS ON RECORDED ARCHAEOLOGICAL MONUMENTS

There will be no effects, indirect or otherwise, on recorded archaeological monuments as no recorded monuments are located within the proposed development site. There are three monuments located within a field to the south of the site; these consist of Church DU014-012001- with associated Burial ground DU014-012002- and Ritual site – holy well DU014-012003-. These are located within an area that was extensively quarried and a part of the Huntstown Quarry, not visible on ground level and monitoring of the water-mains (21E0090) did not identify any features of archaeological interest. Furthermore, these are not scheduled for inclusion in the next revision of the Record of Monuments and Places. The nearest monument to the site scheduled for inclusion in the next revision of the Record of Monuments and Places for County Dublin is enclosure DU014-093---- located c. 140m to the north. The site was identified in advance of the N2 Finglas-Ashbourne Road Scheme in 2004, and was subject to investigations (03E1359).

15.5.2 EFFECTS ON KNOWN AND POTENTIAL ARCHAEOLOGICAL FEATURES

The proposed development will have a negative, permanent, profound effect on known archaeological features identified as a result of geophysical survey and test trenching consisting of an enclosure complex and associated features and pit. A potential effect on the archaeological resource that may be located between excavated test trenches lies in the uncovering of sub-surface archaeological features during groundworks associated with the construction of the proposed buildings, associated infrastructure and landscaping within the site. Should any additional, at present unknown archaeological features be present within the site, the proposed development will have a negative permanent and profound effect on such remains.

15.5.3 EFFECTS ON PROTECTED STRUCTURES & ARCHITECTURAL HERITAGE SITES

There will be no effects on architectural heritage as no Protected Structures or sites listed within the National Inventory of Architectural Heritage (NIAH) are located within the proposed development site. The upstanding buildings proposed for demolition are modern and have no architectural or cultural heritage merit.

15.5.4 INDIRECT EFFECTS

Indirect effects are those which the proposed development may have a negative (or positive) effect on the wider archaeological landscape or surrounding architectural heritage. Indirect effects may include a visual impact on the surrounding archaeological landscape.

The introduction of the proposed development to the area will not result in a change to the general setting of any of the monuments or protected structures, as none are present within or in the immediate environs of the site. Furthermore, the site is well screened by mature hedges and trees that will be retained. The proposed development will therefore have no indirect effects either temporary or permanent, on the wider cultural heritage of the area.

15.6 MITIGATION MEASURES

The predicted effect on known and unknown archaeological monuments and features is regarded as negative, permanent, and profound. The predicted effects on recorded archaeological and architectural heritage are regarded as being none. No effects on the recorded archaeological resource

(RMPs) were identified, and no indirect or visual effects on the nearest recorded monument outside the proposed development site boundary were noted.

The following mitigation measures will be carried out subject to the approval of the National Monuments Service (NMS) of the Department of Housing, Local Government and Heritage (DHLGH), and further mitigation may be sought by the NMS.

- A previously unknown monument; an enclosure and features of archaeological significance were exposed as a result of pre-construction assessments (22R0092[28]; 22E0348[29]) within the site. Following consultation with the National Monuments Service it was decided that the features identified and any associated features exposed will be preserved by record through full archaeological excavation; these archaeological investigations were undertaken by Gahan and Long, with on-site works completed in late 2022.

- Monitoring of all groundworks associated with the proposed development will be carried out, should additional features or deposits of archaeological significance be exposed during monitoring, then further mitigation measures will be implemented. This will be carried out by experienced, licence eligible archaeologists working under licence from the Department of Housing, Local Government and Heritage.

- Adequate time and resources will be provided by the developer for the resolution of any archaeology identified within the development site, which will be directly impacted by groundworks. Time and resources will also be allowed for any post-excavation work and specialist analysis necessary following any archaeological excavation that takes place.

- A report is required to be compiled on completion of any archaeological excavation required and will be submitted to the relevant authorities.

15.7 RESIDUAL IMPACTS

The residual effects are likely to be neutral and none to imperceptible on implementation of the proposed mitigation measures. Table 15.3 below summarises the residual effects of the proposed development on the archaeological landscape. Residual impacts are defined as the overall effect of the development on archaeology on the basis of implementing the mitigation measures recommended in this report.

Table 15.3 Summary of Residual Impacts

Potential Effects	Mitigation strategy	Residual impacts
Construction Effects		
Topsoil removal associated with development. Excavation of subsoil for foundations and service trenches, etc. Ground disturbance related to building demolition, landscaping and planting.	Archaeological Excavation and Monitoring of all groundworks associated with the development. Archaeological excavation of features and deposits identified during geophysical survey and test trenching within the proposed development at the pre-construction phase was completed in late 2022. Monitoring to be carried out of all groundworks associated with the proposed development. Consultation with Licensing Section of the National Monuments Service should additional archaeological sites or features be uncovered. Excavation and recording of any archaeological features identified thus preserving them by record.	None
Effects to recorded monuments - none	No mitigation required.	None
Operational Effects		
Nearby Recorded Monuments and Protected Structures are screened from view.	No mitigation required.	None

15.8 CUMULATIVE EFFECTS

A number of previous developments have taken place in the overall environs of the site, and permission for others has been granted by the local authority. The site lies within a sensitive landscape with a number of monuments present. These are mostly represented by remains that were previously unknown, with no surface expression and identified as a result of archaeological investigations. In such cases, if preservation in situ is not possible, preservation by record (full excavation) mitigates the impact of the development on archaeological remains and is carried out in consultation with the Department of Housing, Local Government and Heritage.

The site is located directly adjacent to a Gas Turbine Power Generation Station with an output of up to 293 MW (FW22A/0204 and ABP-317480-23) and a substation and grid connection (ABP-314894-22). The applicant in each case was Kilshane Energy Ltd and in both cases, the sites or part of the sites, lie immediately to the northeast of this subject development.
An Archaeological Impact Assessment) was carried out for these developments. The assessments concluded that
in order to mitigate the potential impact on archaeological remains, archaeological monitoring of groundworks was recommended to be carried out at this location.

As a result of these measures, there will be no residual impact as a result and therefore no additional cumulative impact when taken into account with the present development.

15.9 INTERACTIONS

There are no interactions between the Archaeological and Cultural Heritage Resource and other disciplines in relation to the proposed development.

15.10 REFERENCES

[1] Leigh, J. M. 2022 Geophysical Survey Report. Kilshane, County Dublin (22R0092), unpublished report by J.M. Leigh Surveys.
[1] Lynn, C., Long, C. 2022 Archaeological Test Excavation Report: Kilshane Energy, Co. Dublin (22E0348), unpublished report by Gahan and Long.
[1] https://www.epa.ie/publications/monitoring--assessment/assessment/EIAR_Guidelines_2022_Web.pdf
[1] www.maps.archaeology.ie/historicenvironment
[1] https://www.archaeology.ie/sites/default/files/media/pdf/Archaeology-RMP-Dublin-Manual-(1998)-0013.pdf
[1] https://www.archaeology.ie/sites/default/files/media/pdf/Archaeology-RMP-Dublin-Map-(1998)-0014.pdf
[1] www.maps.archaeology.ie/historicenvironment
[1] https://www.archaeology.ie/sites/default/files/media/pdf/monuments-in-state-care-dublin.pdf
[1] www.archaeology.ie
[1] www.excavations.ie
[1] https://consult.fingal.ie/system/files/materials/2018/App%202-Record%20of%20Protected%20Structures.pdf
[1] https://www.fingal.ie/sites/default/files/2019-03/Fingal%20Development%20Plan%202017-2023%20-%20Written%20Statement_compressed_compressed.pdf
[1] https://www.buildingsofireland.ie/
[1] Leigh, J. M. 2022 Geophysical Survey Report. Kilshane, County Dublin (22R0092), unpublished report by J.M. Leigh Surveys.
[1] Lynn, C., Long, C. 2022 Archaeological Test Excavation Report: Kilshane Energy, Co. Dublin (22E0348), unpublished report by Gahan and Long.
[1] Leigh, J. M. 2022 Geophysical Survey Report. Kilshane, County Dublin (22R0092), unpublished report by J.M. Leigh Surveys.
[1] Lynn, C., Long, C. 2022 Archaeological Test Excavation Report: Kilshane Energy, Co. Dublin (22E0348), unpublished report by Gahan and Long.
[1] Leigh, J. M. 2022 Geophysical Survey Report. Kilshane, County Dublin (22R0092), unpublished report by J.M. Leigh Surveys.
[1] Lynn, C., Long, C. 2022 Archaeological Test Excavation Report: Kilshane Energy, Co. Dublin (22E0348), unpublished report by Gahan and Long.
[1] https://www.epa.ie/publications/monitoring--assessment/assessment/EIAR_Guidelines_2022_Web.pdf

16 ACCIDENT & DISASTER RISKS

16.1 INTRODUCTION

The proposed development is a Gas Turbine Power Generation Station with an output of up to 600 MW at Kilshane, Co. Dublin. The gas supply will be backed up by emergency generators fuelled by bulk gas oil storage on site capable of providing for 3 days' supply.

The Chemicals Act (Control of Major Accident Hazards Involving Dangerous Substances) Regulations 2015 (S.I. 209 of 2015) (COMAH Regulations 2015) sets out quantities of dangerous substances for which lower and upper tier COMAH status apply. For gas oils (including diesel fuels, home heating oils and gas oil blending streams) the qualifying quantity for the application of lower tier requirements is 2,500 tonnes and for upper tier requirements it is 25,000 tonnes. Therefore, the proposed power plant will be classified as a lower tier COMAH establishment.

In order to ensure a comprehensive assessment of potential environmental effects due to risks of major accidents and/or disasters as relevant to the development, this chapter presents an additional review of the characteristics of the proposed development and of the project location to consider potential for accident scenarios that are outside the scope of the COMAH Regulations.

In assessing likely potential and predicted impacts, account has been taken of both the importance of the attributes and the predicted scale and duration of the likely impacts.

16.1.1 METHODOLOGY

The assessment has been carried out generally in accordance with the following guidelines:

- EPA 'Guidelines on the Information to be contained in Environmental Impact Assessment Reports' (2022);
- EPA 'Draft Advice Notes on Current Practice in the Preparation of Environmental Impact Statements' (2015);
- National Roads Authority (NRA) 'Guidelines on Procedures for the Assessment and Treatment of Hydrology for National Road Schemes' (2009).

In the EIA assessment, consideration is given to both the importance of an attribute and the magnitude of the potential environmental impacts of the proposed activities on that attribute. The principal attributes (and impacts) to be assessed include the following:

- Potential hazard arising from risk of major accident.
- Localised flooding (potential increase or reduction) and floodplains including benefitting lands and drainage districts (if any)
- Loss of containment of fuel/chemical materials

Sources of Information

The collection of baseline regional data was undertaken by reviewing the following sources:

- Office of Public Works (OPW) flood mapping data (www.floodmaps.ie).

Site specific data was derived from the following sources:

- Various site plans and drawings (ref. accompanying planning document set)
- COMAH Land Use Planning Assessment report including Assessment of Major Accidents to the Environment (MATTEs)

16.2 THE PROPOSED DEVELOPMENT

The proposed development is described in Chapter 4 *Project Description*. It has been designed to adhere to strict safety standards covering all aspects of fit-out and operation. These standards ensure that potential for major accidents is comprehensively addressed in full compliance with legislation and best practice and that safeguards are put in place where appropriate. These standards cover all aspects of construction, industrial design, operation and fire safety.

The proposed development will be subject to an Industrial Emissions (IE) Licence prior to operation. This will include measure to address potential accident sources in the proposed facility. Operation of the proposed facility will be subject to continued compliance with EPA approved accident prevention measures. These measures will ensure that accident risks arising from the operation of the proposed development are comprehensively addressed so that potential for major accidents is adequately controlled in full compliance with all applicable standards and best practice including EU Best Available Technology (BAT) standards.

An Emergency Response Plan has been provided in response to a Council request for further information on the planning application. This provides details of the site's emergency preparedness and includes a Standard Operating Procedure in event of an oil spillage at the site.

16.3 THE RECEIVING ENVIRONMENT

16.3.1 SITE DESCRIPTION

The site is comprised of agricultural fields (mostly tillage), a farmhouse and associated structures. It is 14.5 ha in area..

The nearest dwellings are located outside the northern boundary of the site.

16.3.2 WATER BODIES AND FLOOD RISK

The subject site is currently a greenfield site, used for agricultural purposes. There is no existing surface water drainage network adjacent to or on-site.

The site is comprised of multiple fields separated by hedgerows. Surface water, falling as rainfall, is generally percolated through the site via grass and soil. The topographic survey has confirmed that the internal and boundary hedgerows contain ditches which convey flow to the Huntstown Stream to the east of the site during heavier rainfall events. These ditches only serve the subject site and the agricultural fields immediately to the west, located between the subject site and the Kilshane Road, and do not convey any upstream watercourse.

As described in detail in the accompanying Flood Risk Assessment screening report, there is no risk of flooding affecting the site from fluvial or coastal sources, since the site lies within Flood Zone C (i.e., where the probability of flooding from rivers is less than 0.1% or 1 in 1000). This takes full account of historical flood risk data and of standard allowances to take account of climate change effects.

16.3.3 SEISMIC ACTIVITY

Much of the Earth's surface is covered by unconsolidated sediments which can be especially prone to instability. Water often plays a key role in lubricating the slope failure. Instability is often significantly increased by man's activities in building houses, roads, drainage and agricultural changes. Landslides, mud flows, bog bursts (in Ireland) and debris flows are a result.

In general, Ireland suffers few landslides. Landslides are more common in unconsolidated material than in bedrock, and where the sea constantly erodes the material at the base of a cliff landslides and falls lead to recession of the cliffs. Landslides have also occurred in Ireland in recent years in upland peat areas due to disturbance of peat associated with construction activities.

There are no active volcanoes in Ireland.

In Ireland, seismic activity is recorded by the Irish National Seismic Network. The Geophysics Section of the School of Cosmic Physics, Dublin Institute for Advanced Studies (DIAS) has been recording seismic events in Ireland since 1978. The station configuration has varied over the years. However, currently there are five permanent broadband seismic recording stations in Ireland including IWEX on Carrickbyrne Hill, Co. Wexford, running from 01/01/2011 and operated by DIAS. The seismic data from the stations comes into DIAS in real-time and are studied for local and regional events.

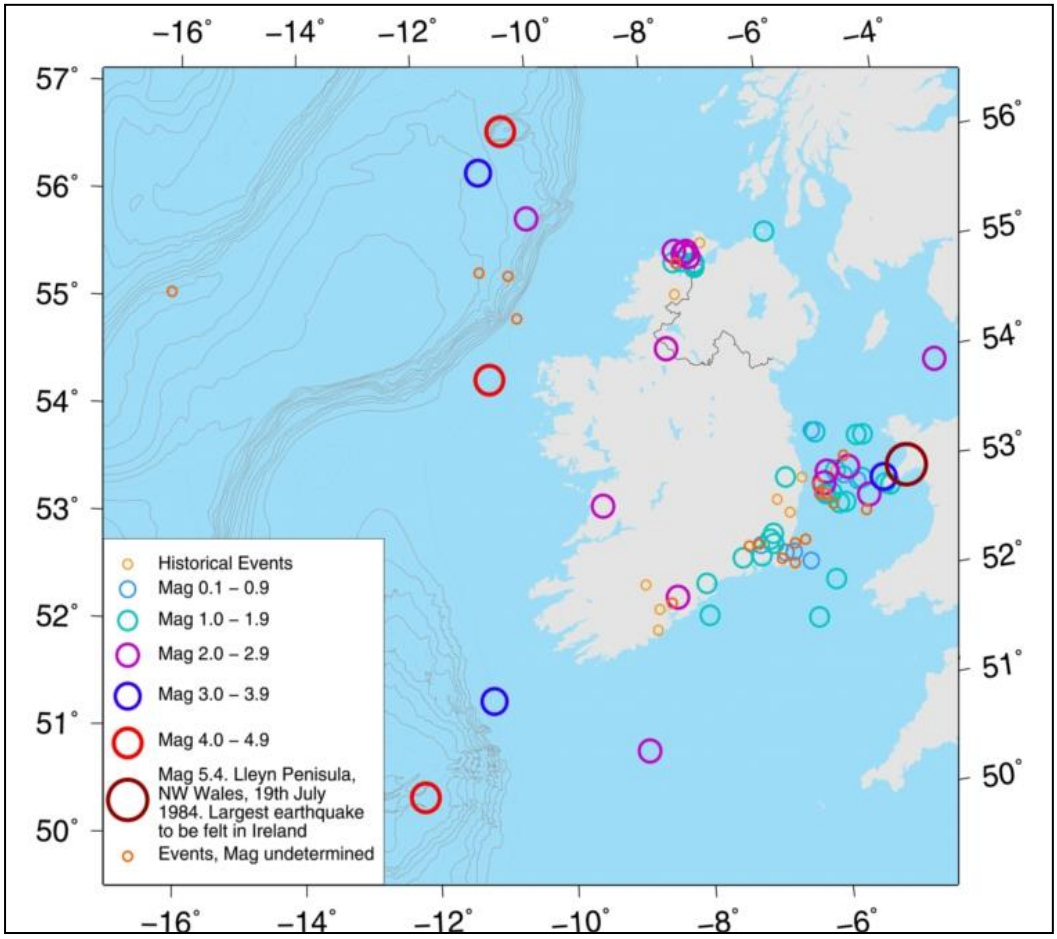


Figure 16.1 Seismic movements

Figure 16.1 above indicates the principal events have occurred along/ beyond the east, south-east and south of Ireland with seismic movements generally up to 1.9 magnitude recorded on land with no seismic events recorded in the vicinity of the Kilshane Energy site.

Records since 1980 show that the nearest seismic activity to the proposed location was in the Irish sea (1.0 – 2.0 Ml magnitude) and ~55 km to the south in the Wicklow Mountains. There is a very low risk of seismic activity to the proposed development site.

There are no active volcanoes in Ireland so there is no risk from volcanic activity.

16.4 PREDICTED IMPACTS

Due to the comprehensive controls and design standards that have been followed during initial design and that will be followed during detailed design there is no significant potential for the proposed development to give rise to significant adverse effects on the environment due to accidents or disasters. This applies to accidents/disasters arising from external factors as well as accidents arising from activities at the site. All risks can be considered to be negligible.

As such the potential for environmental effects due to accident and disaster risks is considered to be **long term**, **imperceptible** and **neutral**.

16.5 MITIGATION AND MONITORING MEASURES

No specific measures are required or proposed as part of the EIA process.

16.6 MONITORING

No specific monitoring is required or proposed as part of the EIA process.

16.7 RESIDUAL IMPACT

The residual impact is considered to be ***imperceptible*** and ***neutral***.

17 INTERACTIONS & CUMULATIVE EFFECTS

17.1 INTRODUCTION

Interactions between environmental effects addressed under the different environmental factors addressed in the EIAR are an important consideration in the evaluation of the environmental effects of with the proposed development. Cumulative effects are described in the EPA Guidelines as 'The addition of many minor or insignificant effects, including effects of other projects, to create larger, more significant effects.'

This chapter outlines where and how such interactions and cumulative effects have been addressed in the specialist chapters this EIAR. This covers both the construction and operational phases of the proposed development.

Interactions and cumulative effects have been considered and addressed within each specialist chapter of this EIAR. Following the EPA Guidance, this chapter presents an overview, showing where these types of effects have been addressed, as relevant, throughout the EIAR. It does not present additional assessment of interactions or cumulative effects.

Section 17.2 below identifies areas of significant potential for interactions and outlines where different types of interactions have been addressed within the specialist chapters. Section 17.4 outlines how cumulative effects have been addressed.

17.2 INTERACTIONS

Following the EPA Guidance, this section of the EIAR provides a simple matrix identifying environmental components and showing where interactions between effects on different factors have been identified. The identified interactions are then expanded upon in the text that follows, explaining where each type of interaction has been addressed in the specialist chapters of the EIAR.

Table 17.1 Matrix of Interactions

Interaction	Population & Human Health		Biodiversity		Land, Soils, Geology & Hydrogeology		Water & Hydrology		Air Quality & Climate		Noise & Vibration		Landscape & Visual		Material Assets		Traffic & Transport		Waste Management		Archaeology & Cultural Heritage	
	Con.	Op.	Con.	Op.	Con.	Op.	Con.	Op.	Con.	Op.	Con.	Op.	Con.	Op.	Con.	Op.	Con.	Op.	Con.	Op.	Con.	Op.
Population & Human Health			×	×	×	×	×	×	✓	✓	✓✓	✓✓	✓	✓	×	×	✓	×	×	×	×	×
Biodiversity					✓	×	✓	✓	✓	×	✓	×	×	×	×	×	×	×	✓	×	×	×
Land, Soils, Geology & Hydrogeology							✓	✓	✓	×	×	×	×	×	×	×	×	×	✓	×	✓	×
Water & Hydrology									×	×	×	×	×	×	×	×	×	×	×	×	×	×
Air Quality & Climate											×	×	×	×	×	×	✓	×	×	×	×	×
Noise & Vibration													×	×	×	×	✓	×	×	×	×	×
Landscape & Visual															×	×	×	×	×	×	×	×
Material Assets																	×	×	×	×	×	×
Traffic & Transport																			✓	×	×	×
Waste Management																					×	×
Archaeology & Cultural Heritage																						

Key

×	No Interaction
✓	Weak Interaction
✓	Some Interaction
✓✓	Strong Interaction

Con. → construction phase

Op. → operational phase

See following pages for descriptions of interactions that correspond to grid boxes marked with a 'tick'.

Boxes with a 'x' indicate that no interactions are likely to occur.

17.2.1 POPULATION & HUMAN BEINGS

Noise & Vibration

The increase in industrial activity due to the proposed development has the potential to increase ambient noise levels at nearby sensitive receptors for people – dwellings. The assessment of operational noise in this EIAR has identified that the proposed development sound emissions are unlikely to result in exceedances standard noise level limits at nearby residences or commercial premises.

The assessment of construction noise finds that the implementation of standard noise control protocols, which are set out as mitigation measures will ensure that significant construction noise effects will not be caused by the proposed development. The predicted construction traffic noise effects are anticipated to be not significant.

The Noise & Vibration effects of the proposed development are addressed in detail in Chapter 10.

Landscape & Visual Impacts

Increasing industrial development has the potential to reduce visual amenity for sensitive receptors. The Landscape & Visual impacts of the proposed development are addressed in Chapter 11. It predicts that effects on external views will ranger from *not significant* to *negligible*, except for views from a local stretch of the N2 dual carriageway which are predicted to be *moderate - significant*.

Traffic & Transportation

There will be increased traffic on local road networks particularly during the construction period – which has potential to affect the perception of local amenity. The assessment contained in Chapter 13 finds that construction traffic effects will be temporary and acceptable. Operational traffic effects are anticipated to be acceptable. As noted above, noise effects associated with predicted changes in traffic flows are found in Chapter 10 to be not significant.

The Traffic & Transportation impacts of the proposed development are addressed in Chapter 143.

17.2.2 BIODIVERSITY

Land, Soils, Geology & Hydrogeology

The assessment of effects on Land, Soils, Geology & Hydrogeology in Chapter 7 finds that there will be no significant effects on these topics during construction or operation. The Land, Soils, Geology & Hydrogeology impacts of the proposed development are addressed in Chapter 7. The assessment of effects on biodiversity within Chapter 6 makes reference to Chapter 7 in these respects, as relevant.

Water and Hydrology

Without careful preparation and safeguards such as construction surface water controls, there could be threats to biodiversity. The main contaminants arising from construction activities may include suspended solids, hydrocarbons and concrete/cement products. Measures included in Chapter 8 will ensure there is no impact as a result of this. Water and hydrology impacts of the proposed development are addressed in Chapter 8 and referred to as relevant in Chapter 6 *Biodiversity.*

Air Quality & Climate

Sensitive species of flora and fauna could be affected by changes in air quality. During the construction phase measures to control fugitive emissions of dust will ensure there will be no significant effects on air quality beyond the construction site boundary. When operational, there will be no significant effects at any sensitive receptors. The Air Quality & Climate impacts of the proposed development are addressed in Chapter 9 and referred to in Chapter 6 *Biodiversity*, as relevant.

Noise & Vibration

Construction activities and increasing industrial activity has the potential to increase ambient noise levels at sensitive habitats. No specifically sensitive ecological habitats or species are present at the site. The assessment of operational noise has identified that the proposed development sound emissions are unlikely to result significant effects at sensitive habitats during operation.

During construction the implementation of best practicable means will ensure no significant effects are caused by the proposed development. The predicted construction traffic noise impacts are anticipated to be negligible. The Noise & Vibration impacts of the proposed development are addressed in Chapter 10 and referred to in Chapter 6 *Biodiversity*, as relevant.

Waste Management

Construction waste removal has potential to spread invasive species. No species listed in Schedule 3 of the *Birds and Natural Habitats Regulations* have been identified on sites. Therefore, it has been determined that there is no likelihood that invasive species will be spread as result of the proposed development. The Waste Management impacts of the proposed development are addressed in Chapter 14. This includes reference to information on invasive species as presented in Chapter 6 *Biodiversity*.

17.2.3 LAND, SOILS, GEOLOGY & HYDROGEOLOGY

Water and Hydrology

Land, soils, geology & hydrogeology can affect surface water through a number of means which have potential to interact with surface water, particularly during construction activity – e.g. surface water management in excavations and construction dust. Measures included in Chapter 8 will ensure that no significant effect occur as a result of this. Water and Hydrology impacts of the proposed development are addressed in Chapter 8*,* with cross referencing to Chapter 7 as relevant.

Air Quality & Climate

Excavation and removal of soil and stone has the potential to impact on air quality through the generation of dust. Due to the small scale of these activities, it is considered that as a result of the good practice mitigation measures proposed, fugitive dust emissions will be negligible. The Air Quality & Climate impacts of the proposed development are addressed in Chapter 9 with cross referencing to Chapter 7 as relevant.

Waste Management

The proposed development has been designed to minimise the quantity of material to be excavated, maximise reuse onsite and subsequently minimise the quantity of material requiring removal off-site as waste management. Chapter 14 Water Management refers to Chapter 7 as relevant.

Archaeology

Excavation on a greenfiled site presents a potential effect on buried archaeology. Pre-construction archaeological resolution of the site combined with appropriate licences archaeological monitoring of all subsequent topsoil removal associated with site preparation will ensure the full recognition and recording of any potential subsurface finds or features. It is not anticipated therefore that there will be any residual impact on the archaeological heritage of the area. The Land, Soils, Geology and Hydrogeology impacts of the proposed development are addressed in Chapter 7 and Archaeology is addressed in Chapter 15.

17.2.4 AIR QUALITY & CLIMATE

Traffic and Transportation

Increase in traffic volumes can affect air quality through increased emissions. Traffic impacts of the proposed development are addressed in Chapter 13 *Traffic and Transportation* and these are taken account of in Chapter 9 *Air Quality & Climate* as relevant.

17.2.5 NOISE & VIBRATION

Traffic and Transportation

Increase in traffic volumes can affect noise levels. Traffic impacts of the proposed development as addressed in Chapter 13 *Traffic and Transportation* are taken account of in the assessment of noise effects in Chapter 10.

17.2.6 TRAFFIC & TRANSPORTATION

Air Quality & Climate

Increase in traffic volumes can affect air quality through increased emissions. Traffic impacts of the proposed development as addressed in Chapter 13 *Traffic and Transportation* are taken account of in the assessment of effects on *Air Quality & Climate* as set out in Chapter 9*.*

17.3 CUMULATIVE EFFECTS

Cumulative effects are addressed within each of the specialist chapters of this EIAR, Chapters 5 to 16, as relevant. A number of chapters present this under a distinct heading. In others it is addressed within the baseline and impacts sections where planned or permitted development is taken account of where relevant and significant.

A list of other projects that have been permitted or are currently at consent stage is contained as Appendix 17.1 of this EIAR. This list and specific projects within it are taken account of as relevant in individual chapters, as discussed within the chapters.

LIST OF SOURCES

This list contains most of the sources used for the descriptions and assessments included in this EIAR. Other sources are given in the body of the report

[1] Adapted from *Glossary of Impacts* contained in, draft revised *Guidelines on the information to be contained in Environmental Impact Assessment Reports*, EPA, 2017.
[2] Including *EIA Guidance - Screening*, *EIA Guidance - Scoping* and *EIA Guidance - EIA Report*, all EC, 2017.
[3] Schedule 6, 1 (d) of S.I. No. 296/2018, as transposed from Article 5, 1 (d) of Council Directive 2011/92/EC (as amended by Directive 2014/52/EU)
[4] *Guidelines on the Information to be contained in Environmental Impact Assessment Reports*, EPA, 2022.
[5] *Guidelines on the Information to be contained in Environmental Impact Assessment Reports*, EPA, 2022.
[6] *Directive 2010/75/EU Industrial Emissions Directive* (2010), European Commission
[7] *Environmental Protection Agency Act 1992, as amended* (1992), Government of Ireland
[8] *EPA (Industrial Emissions) (Licensing) Regulations, 2013, S.I. No. 137 of 2013* (2013), Government of Ireland
[9] *EPA (Industrial Emissions) (Licensing)(Amendment) Regulations 2020, S.I. No. 190 of 2020* (2020), Government of Ireland
[10] *European Union (Industrial Emissions) Regulations 2013, S.I. 138 of 2013* (2013), Government of Ireland
[xi] Leigh, J. M. 2022 Geophysical Survey Report. Kilshane, County Dublin (22R0092), unpublished report by J.M. Leigh Surveys.
[xii] Lynn, C., Long, C. 2022 Archaeological Test Excavation Report: Kilshane Energy, Co. Dublin (22E0348), unpublished report by Gahan and Long.
[xiii] https://www.epa.ie/publications/monitoring--assessment/assessment/EIAR_Guidelines_2022_Web.pdf
[xiv] www.maps.archaeology.ie/historicenvironment
[xv] https://www.archaeology.ie/sites/default/files/media/pdf/Archaeology-RMP-Dublin-Manual-(1998)-0013.pdf
[xvi] https://www.archaeology.ie/sites/default/files/media/pdf/Archaeology-RMP-Dublin-Map-(1998)-0014.pdf
[xvii] www.maps.archaeology.ie/historicenvironment
[18] https://www.archaeology.ie/sites/default/files/media/pdf/monuments-in-state-care-dublin.pdf
[19] www.archaeology.ie
[20] www.excavations.ie
[21] https://consult.fingal.ie/system/files/materials/2018/App%202-Record%20of%20Protected%20Structures.pdf
[22] https://www.fingal.ie/sites/default/files/2019-03/Fingal%20Development%20Plan%202017-2023%20-%20Written%20Statement_compressed_compressed.pdf
[23] https://www.buildingsofireland.ie/
[24] Leigh, J. M. 2022 Geophysical Survey Report. Kilshane, County Dublin (22R0092), unpublished report by J.M. Leigh Surveys.
[25] Lynn, C., Long, C. 2022 Archaeological Test Excavation Report: Kilshane Energy, Co. Dublin (22E0348), unpublished report by Gahan and Long.
[26] Leigh, J. M. 2022 Geophysical Survey Report. Kilshane, County Dublin (22R0092), unpublished report by J.M. Leigh Surveys.
[27] Lynn, C., Long, C. 2022 Archaeological Test Excavation Report: Kilshane Energy, Co. Dublin (22E0348), unpublished report by Gahan and Long.
[28] Leigh, J. M. 2022 Geophysical Survey Report. Kilshane, County Dublin (22R0092), unpublished report by J.M. Leigh Surveys.

[29] Lynn, C., Long, C. 2022 Archaeological Test Excavation Report: Kilshane Energy, Co. Dublin (22E0348), unpublished report by Gahan and Long.